# Water Resources Audit Report: Ketza River Mine

Water Resources Branch

June 2023

The Water Resource Branch strives for water stewardship in the Yukon and is committed to responsible and collaborative management, protection and conservation of the territory's valuable water. As technical scientific experts in water resources, we provide advice for compliance and inspection purposes, and conduct reviews of projects undergoing water licensing and environmental assessment processes.

One of the Branch's responsibilities is to conduct audits of various undertakings that use or deposit waste to water. Audits are undertaken to improve our knowledge and understanding of a project's effects on the receiving water environment, with the intention of identifying emerging issues and sharing enhanced understanding of existing water quality and quantity conditions to support technical advice and input into assessment, licensing, and post-licensing processes. The opinions and recommendations expressed in this report are based on relevant data, reports, field observations, interpretation/analyses of scientific information available to the Branch. Such opinions and recommendations are subject to evolve as further information becomes available. We are also acknowledging that indigenous ways of knowing are not included in this report, nonetheless, they are relevant and they support responsive care of the land and water.

While the Branch provides support to inspectors on enforcement and compliance matters related to water licences, it is not the Branch's role to determine or enforce compliance. As such, the findings of this report should not be considered as a determination of compliance with any existing permit or licence.

# Executive Summary

Water Resources Branch conducted an audit at the Ketza River Mine site, located approximately 80 km southeast of Ross River (by road), between August 30 and September 2, 2021. Information and conclusions contained in this audit are intended to support the Branch in the review process of a future water licensing renewal application for the closure and remediation phase.

The five primary objectives of the site audit were to:

1) Assess the hydrology monitoring network at site as requested by Assessment and Abandoned Mines (AAM),
2) Measure flow along of Cache Creek, Peel Creek, and Misery Creek,
3) Evaluate potential causes of elevated sulphate and arsenic levels observed in groundwater and surface water,
4) Determine if disturbed areas are influencing the water chemistry of Peel Creek, and,
5) Familiarize Branch staff with the site to provide support to AAM and future Water Licence application review

Surface water and groundwater samples were collected around the Ketza River Mine site to evaluate potential source(s) of elevated concentrations of contaminants of concern in site discharge. Sampled parameters included the full suite of parameters analyzed as a part of the mine's monthly sampling program as well as stable water isotopes to improve understanding of surface and groundwater flow paths on site.

Hydrology stations were investigated to determine required infrastructure for implementing a continuous monitoring program that would complement AAM's surface water monitoring. Discharge measurements and estimates were conducted to complement the surface water quality data collection for this audit.

Focused investigations of tributaries flowing into Cache Creek were conducted as a part of this audit. Sampling stations were selected based on desktop investigations and observations during the field investigation with focus on: previous sampling locations,

mine infrastructure/disturbances and key locations in the watershed (confluences & background locations)

Chemistry results were compared to the CCME Water Quality Guidelines (WQG) for the Protection of Freshwater Aquatic Life (CCME-FAL), Yukon Contaminated Site Regulation for Aquatic Life Standards (CSR-AW), British Columbia Ministry of Environment Water Quality Long-term Guideline for Freshwater Aquatic Life (BC MOE), Metal and Diamond Mine Effluent Regulations (MDMER) and the former Water Licence QZ04-063 Effluent Quality Standards (KEQS) (CCME 2021, YCSR 2002, GoC 2002). Isotope data was used to identify water provenances to further contribute to the understanding of the aquatic environment at Ketza Mine.

The key findings of the 2021 audit are the following:

1) Elevated concentrations (concentrations above CCME guidelines) of arsenic and sulfate were observed in headwater regions of five tributary creeks discharging into Cache Creek downstream of the Tailings Storage Facility. One of these tributaries, Peel Creek, may be affected by residual mine structures in the headwaters, but elevated concentrations observed in the other tributaries are likely representative of local background conditions. Concentrations of some contaminants contributed by these tributaries are reduced to below guideline levels through geochemical processes and dilution before Cache Creek discharges into the Ketza River.
2) Peel Creek may be influenced by the presence of Gully Zone Pit in its headwaters. In addition to the elevated concentrations of some contaminants in the site background water, it is likely that seepage contributing contaminants to Peel Creek is influenced by the presence of the QB Zone Pit located further down the creek's reach.
3) Water quality data for the Ketza River Mine site is in the process of being curated to form a complete historical record of all water data since monitoring began. Water Resources Branch analysed data from this preliminary database and other sources focused towards increasing understanding of site contaminant trends and potential for impacts to the receiving environment.

4) Improvements can be made to the current hydrology program to better inform contaminant loading into site waterways. The absence of continuous water level and flow monitoring since 2012 is detrimental to inform remediation planning (water balance modelling and monitoring).

Water Resources Branch recommends the following with respect to the Ketza River Mine site:

1) Collect additional ongoing surface water quality and hydrology measurements in the vicinity of the headwaters of Cache Creek, between KR-20 and KR-01, specially, upstream and downstream of the Unnamed Creek (KR-16 Creek) confluence with Cache Creek.
2) Conduct a review of trends in dissolved constituents in groundwater upon completion of the Ketza geochemical database audit.
3) Incorporate six continuous hydrometric stage monitoring stations at the locations specified in section 4.4. The overarching goal of a continuous hydrometric network is to better quantify flowrates between in-person monitoring events. The dataset would help calibrate eventual water balance and water quality models at a wider scale along Cache Creek down to Ketza River.
4) Increase groundwater sampling frequency from annual to twice annually and monitor groundwater levels more monthly, if possible.

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# List of Acronyms and Abbreviations

| Acronym/ Abbreviation | Definition |
|---|---|
| AAM | Government of Yukon - Assessment and Abandoned Mines |
| AEC | Area of Environmental Contamination |
| Al | Aluminum |
| AMP | Adaptive Management Plan |
| APEC | Area of Potential Environmental Concern |
| ARD/ML | Acid Rock Drainage/Metal Leaching |
| As | Arsenic |
| AW | Aquatic Wildlife |
| BCG-MR | Bromocresol Green/Methyl Red |
| BC-MOE | British Columbia - Ministry of the Environment |
| Ca | Calcium |
| CCME | Canadian Council of Ministers of the Environment |
| Cd | Cadmium |
| COPC | Contaminant of Potential Concern |
| CSR | Yukon Contaminated Sites Regulation |
| Cu | Copper |
| F | Fluorine |
| FAL | Freshwater Aquatic life |
| Fe | Iron |
| FIGQFCS | Federal Interim Groundwater Quality Guidelines for Contaminated Sites |
| GW | Groundwater |
| GY | Government of Yukon |
| IAEA | International Atomic Energy Agency |
| KEQS | Ketza Effluent Quality Standards |
| MDL | Method Detection Limit |
| MDMER | Metals and Diamond Mining Effluent Regulations |
| Mg | Magnesium |
| mL | Millilitre |
| N | Normality |
| NAG | Non Acid-Generating |

| Acronym/ Abbreviation | Definition |
|---|---|
| ORP | Oxidation-Reduction Potential |
| PAG | Potentially Acid-Generating |
| pH | Inverse log of the activity of the hydrogen ion |
| QAQC | Quality Assurance and Quality Control |
| RPD | Relative Percent Difference |
| Se | Selenium |
| $SO_4$ | Sulfate |
| SW | Surface Water |
| TSF | Tailings Storage Facility |
| TSS | Total Suspended Solids |
| UW-EIL | University of Waterloo - Environmental Isotope Laboratory |
| WQG | Water Quality Guideline |
| WRB | Government of Yukon - Water Resources Branch |
| Zn | Zinc |

# 1. Introduction and Background

Ketza River Mine is located in the traditional territory of the Ross River Dena Council, Liard First Nation and Teslin Tlingit Council. The site is accessible via a mine access road that connects to the Robert Campbell Highway southeast of Ross River (Figure 1). The site is situated in the Cache Creek mountain valley and is surrounded on all sides by steep rocky cliffs. Orange coloured rock is prevalent in the area due to the valley's high iron content. The mine site is located just below the tree line with gusty north winds blowing down the valley most days. The areas feels remote, rugged and wild but also is full of life with the high number of grizzly/black bears, moose, caribou and sheep in the region.

During operation, this site extracted and processed gold and silver ore from open pit operations and underground adits. Ketza River Holdings Ltd. held the last water licence (QZ04-063), which expired on December 31, 2009. The site went into care and maintenance in 2012 and was abandoned on April 10, 2015. Government of Yukon, Assessment and Abandoned Mines Branch (AAM) assumed responsibility for the site and continues to manage care and maintenance activities under *Waters Act* Section 37(1). Surface and groundwater quality are monitored on a monthly and annual basis, respectively. AAM is planning and preparing for remediation and site closure.

## 1.1 Purpose and Objectives

The purpose of this audit was to investigate potential source(s) of contaminants of concern, evaluate the existing hydrology monitoring network, and to familiarize Government of Yukon's Water Resources Branch with the site in anticipation of future regulatory processes during the closure phase.

The detailed purposes and objectives of this audit were to:

1) Assess the hydrology monitoring network at site as per request by AAM
    a. Take inventory of existing hydrology stations (active and inactive). Evaluate the potential expansion of current monitoring scope to include discharge measurements from KR-12 (Ketza River), -13 (Cache Creek), -

22 (Misery Creek), and at the outlet of the water treatment station (KR-09A);

   b. Recommend infrastructure to reactivate continuous hydrometric monitoring (water level loggers and derived flow) based on the 2012 hydrological report (6 hydrometric stations); and
   c. Recommend a hydrology program for the site, including potential other locations or making the program more efficient for characterizing the hydrology.

2) Assess the hydrology of Cache and Peel Creeks:
   a. Collect discharge measurements along Cache Creek at all accessible stations to assess contributions of surface water tributaries to inform future hydrometric station locations.
   b. Measure discharge of Peel Creek at KR-15, KR-17, and in between to evaluate the contributions of two seeps observed by AAM in Summer 2021, and downstream of the Peel Creek confluence with Cache Creek (PCC).
3) Explore potential causes of elevated sulphate ($SO_4$) and arsenic (As) concentrations in groundwater and surface water. Collect stable water isotope ($\delta^2H$ and $\delta^{18}O$) samples from each regularly monitored groundwater station and several historic stations during the Aug 2021 field sampling event by AAM and their consultant. Collect water quality and isotope samples at three regularly sampled stations (KR-01, -08 and -15), ten non – routine stations (KR-17, -18, -21, -22, -23, -26, -27, -28, PS1430 and PS1510), during the 2021 audit to investigate and assess potential contaminant sources.
4) Investigate the water chemistry within the Peel Creek catchment to determine if disturbed areas influence water chemistry. Collect water quality and isotope samples on Peel Creek downstream of Gully and QB Pits and the two seeps observed by AAM (PCS2 and PCS3).
5) Familiarize Branch staff with the site to provide support to AAM and future water licence application reviews.

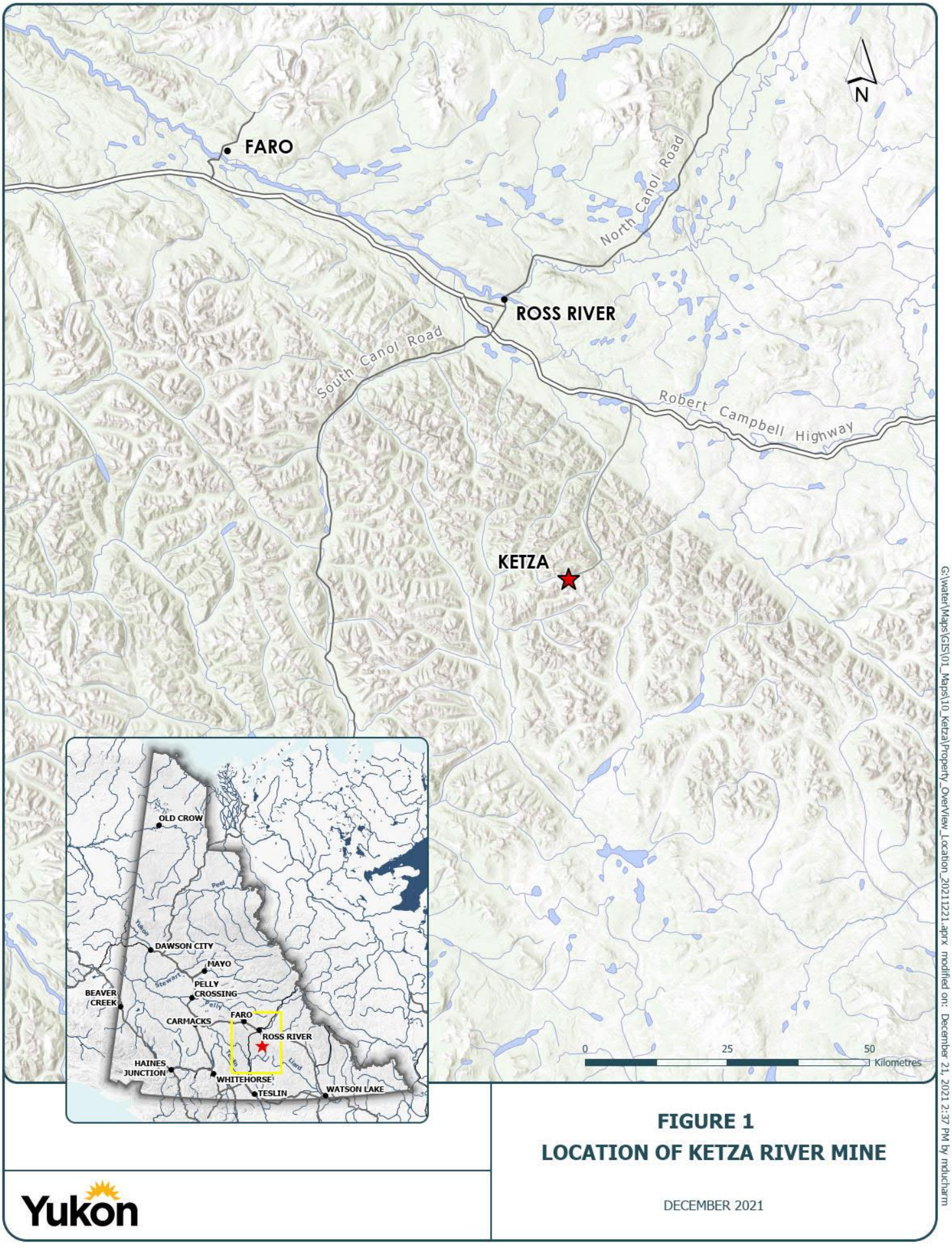



*Figure 1 - Location of the Ketza River Mine*

## 1.2 Site Review

Surface water at the Ketza River Mine consists of a primary flow system with several contributing tributaries (Figure 2). Cache Creek originates at the headwaters of Tarn Lake and flows north-east until it discharges into Ketza River. Oxo, Peel and Misery Creeks are the main tributary creeks with some smaller unnamed creeks joining along the flow path. All of the main tributaries flow into Cache Creek downstream of the Tailings Storage Facility (TSF).

Multiple potential sources of contamination to surface water quality in Cache Creek remain from exploration and operation phases at the mine. Remaining mine infrastructure includes an ore stockpile, underground adits, a tailings storage facility, a processing facility, open pit shells, and waste rock piles (Appendix B) (Tetra Tech EBA Inc. 2016). Four surface water sampling sites are used for background water quality comparison, although their validity as such is uncertain.

The Ketza River Mine has a network of surface water and groundwater monitoring stations that are monitored by consultants contracted by AAM. The frequency of monitoring is inconsistent across the historical record, but as of 2018 all surface water sites are monitored monthly, and all groundwater sites are monitored annually.

During the care and maintenance phase, AAM manages the Ketza River Mine's water quality based on the "Use-Protection Approach" to protect fish and aquatic life (YG, 2021).

# 2. Methods and Materials

This audit consisted of two sampling events:

1. Stable water isotope, surface water quality, and groundwater quality samples were collected by Hemmera Environchem Inc., a consultant of AAM, at all of the routine surface water and groundwater monitoring stations during the August sampling event. Several groundwater monitoring wells not included in the routine were also sampled as part of this sampling event as requested by the Branch.
2. Twenty additional stable water isotope and surface water quality samples, as well as hydrology measurements, were collected by the Branch to characterize site water discharge. These locations included routine and non-routine surface water stations some of which were previously sampled by Hemmera.

## 2.1 Desktop Review

Water Resources Branch carried out a review of site surface water and groundwater quality data to support the conclusions of this audit and inform comparisons with data from Hemmera's most recent monitoring event and the Branch's visit to the site. This review was comprised principally of documents supplied to the Branch by AAM, as enumerated in the 1985-2019 AAM Ketza Report Catalogue.

## 2.2 Surface Water Quality

Hemmera collected stable isotope samples alongside routine surface water quality samples during the monthly sampling session from August 3 to 6, 2021. Air temperatures ranged from 14°C to 17°C. Weather conditions were a mix of clouds and sun with some precipitation on August 5 and 6. There was precipitation within 24hr of sampling on August 3, 2021 (Hemmera, 2021).

Water Resources Branch investigated eight routine sites (KR-01, -08 -15, -17, -21, -26, PS1430 and PS1510), five non – historic stations (KR-18, -22, -23, -27, and -28), two seeps on Peel Creek, and one former station downstream of the Peel-Cache

confluence (PCC) from August 31 to September 2, 2021 (Table 1, Figure 2). Air temperatures ranged from 3.3°C to 17.7°C. Weather conditions were a mix of cloud cover and sun. There was no precipitation at site during this period. Site conditions at each sample location and around the mine property are presented in Appendix A.

Water Resources Branch and Hemmera staff followed Canadian Council of Ministers of the Environment's (CCME) standard sampling methods for the collection of surface water samples (CCME 2011). Stable water isotope samples were collected according to the standard methods of International Atomic Energy Agency (IAEA undated).

Stable water isotopes are a valuable tool used in water provenance determination. Analysis of the proportion of $\delta^{2}H$ and $\delta^{18}O$ in a given sample provides an estimate of the degree of evaporation to which a sample has been subjected to. Generally, surface water samples with a longer residence time tend to be more rich in $\delta^{18}O$, given the lighter $\delta^{16}O$ evaporates more readily. By comparing isotope ratios between water samples along flow paths, a rough estimate of hydraulic connectivity and water residence time can be hypothesized.

Water Resources Branch sample locations were selected based on the desktop review of water quality reports for this site and water quality data provided by AAM. These locations were selected with the goal of meeting the audit objectives. These sampling locations included five tributaries of Cache Creek which were sampled to delineate potential sources of elevated metals.

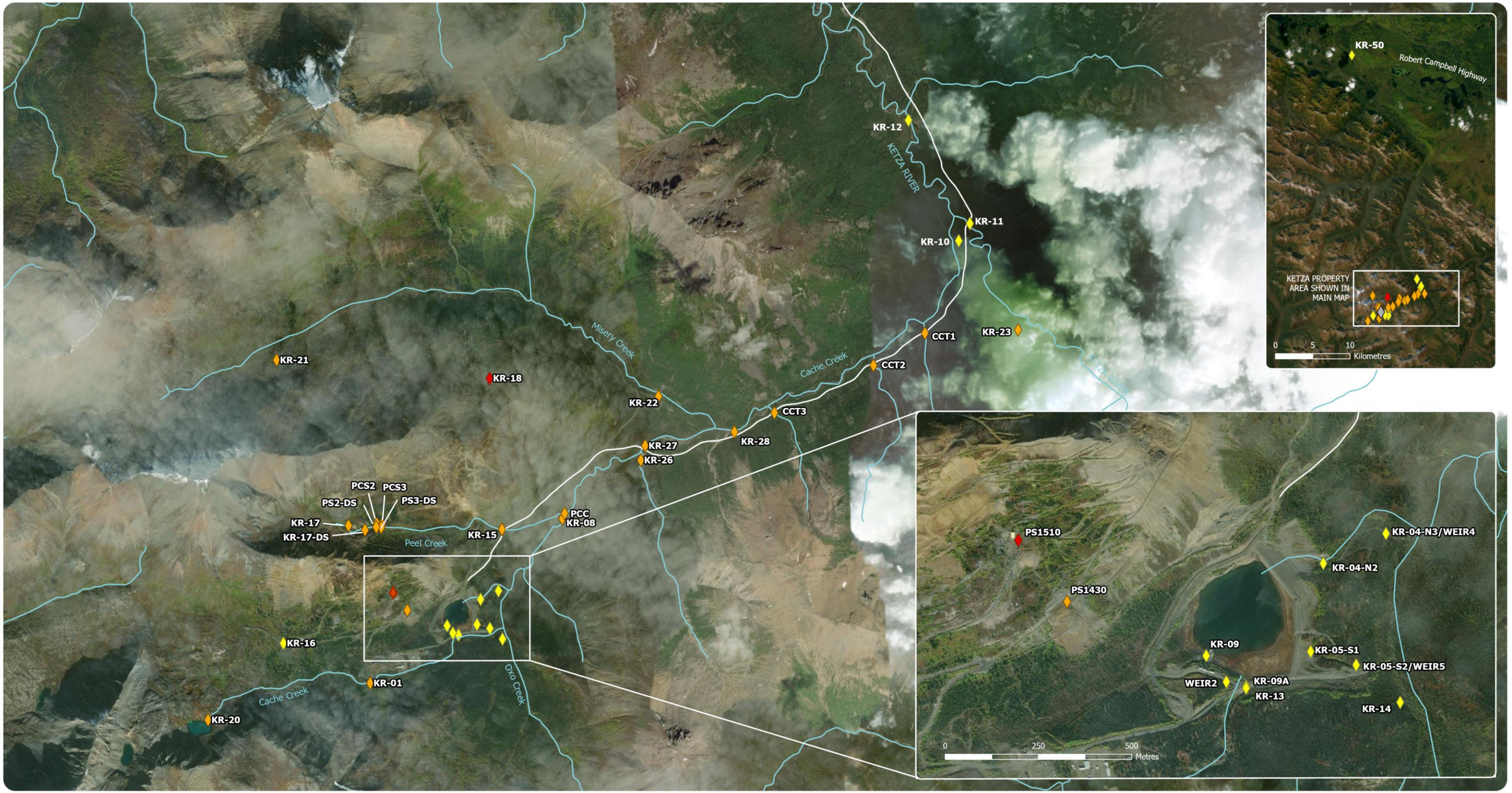
*Table 1 - Surface water quality samples collected during the 2021 site audit*

| Station ID | Description | Coordinates (UTM Zone 8N) | | Water Quality Sample | Isotopes samples |
|---|---|---|---|---|---|
| | | Easting | Northing | | |
| Cache Creek | | | | | |
| KR-20 | upstream of mine site and Cache Creek headwater lake (Tarn Lake) | 643567 | 6824497 | W | W |
| KR-01* | upstream of mill and TSF | 645088 | 6824842 | W/H | W |
| KR-13 | adjacent to mill/tailings | 645863 | 6825271 | - | H |
| KR-08* | downstream of Oxo Creek | 646891 | 6826383 | W | W |
| PCC | downstream of Peel Creek confluence | 646860 | 6826425 | W | W |

| Station ID | Description | Coordinates (UTM Zone 8N) | | Water Quality Sample | Isotopes samples |
|---|---|---|---|---|---|
| | | Easting | Northing | | |
| KR-26 | unnamed creek; discharges into Cache Creek downstream of KR-08 | 647628 | 6826931 | W | W |
| KR-27 | downstream of unnamed Creek confluence | 647669 | 6827067 | W | W |
| KR-28 | downstream of Misery Creek confluence | 648506 | 6827197 | W | W |
| CCT1 | unnamed tributary; upstream of road crossing | 650294 | 6828123 | W | W |
| CCT2 | unnamed tributary; upstream of road crossing | 649821 | 6827834 | W | W |
| CCT3 | unnamed tributary; upstream of road crossing | 648947 | 6827422 | W | W |
| KR-10 | upstream of Ketza River confluence | 650611 | 6828988 | - | H |
| Tailings Storage Facility | | | | | |
| KR-09 | tailings impoundment | 645810 | 6825380 | - | H |
| KR-09A | discharge from Tailings Impoundment | 645917 | 6825298 | - | H |
| KR-05-S1 | south dam seepage; Surface discharge to Cache Creek | 646090 | 6825391 | - | H |
| KR-05-S2 | south dam seepage; Surface discharge to Cache Creek | 646212 | 6825355 | - | H |
| KR-04-N2 | north Dam seepage discharge to Cache Creek | 646124 | 6825627 | - | H |
| KR-04-N3 | north Dam seepage discharge to Cache Creek | 646292 | 6825707 | - | H |
| Oxo Creek | | | | | |
| KR-14* | upstream of Cache Creek Diversion | 646330 | 6825255 | - | H |
| Peel Creek | | | | | |
| KR-17 | downstream of headwater seep | 644885 | 6826319 | W | W |
| KR17-DS | Downstream of seeps from left bank | 645040 | 6826278 | W | W |
| PCS2 | left bank seep (Peel Seep 2) | 644909 | 6826343 | W | W |
| PS2DS | downstream of seep 2 confluence | 645151 | 6826291 | W | W |
| PCS3 | left bank seep (Peel Seep 3) | 644983 | 6826321 | W | W |
| PS3DS | downstream of seep 3 confluence | 645192 | 6826301 | W | W |
| KR-15* | upstream side of main road culvert | 646325 | 6826284 | W/H | W |

| Station ID | Description | Coordinates (UTM Zone 8N) | | Water Quality Sample | Isotopes samples |
|---|---|---|---|---|---|
| | | Easting | Northing | | |
| Misery Creek | | | | | |
| KR-21 | near headwaters of Misery Creek | 644200 | 6827875 | W | W |
| KR-18 | tributary of Misery Creek | 646931 | 6828157 | W[1] | - |
| KR-22 | 500 m upstream of Cache Creek confluence | 647794 | 6827530 | W | W |
| Ketza River | | | | | |
| KR-11* | upstream of Cache Creek confluence | 650716 | 6829150 | - | H |
| KR-12* | downstream of Cache Creek confluence | 650139 | 6830118 | - | H |
| KR-50 | upstream of Campbell Highway culvert | 641418 | 6860090 | - | H |
| Other Stations | | | | | |
| Weir 2 | South of tailings storage facility, within Lower Subsidiary Creek Diversion | 645864 | 6825310 | - | H |
| PS1430 | Mine portal seepage at 1430 masl portal location | 645437 | 6825525 | W | W |
| PS1510 | Mine portal seepage at 1510 masl portal location | 645306 | 6825689 | dry | dry |
| KR-16 | Unnamed tributary of Cache Creek, above mine site | 644274 | 6825216 | - | H |
| KR-23 | Old Iona silver portal run-off, 100m from Ketza River | 651168 | 6828153 | W | W |

*Note: sites listed from upstream to downstream in the respective catchment; * - Water Licence station; TSF – tailings storage facility; masl – meters above sea level; 1 – in-situ field data only; W-sampled by Water Resources, H – Sampled by Hemmera; W/H sampled by Hemmera and Water Resources*




Yukon

0 0.5 1 Kilometres

Background Imagery: SPOT imagery (2014-2016 imagery mosaic). Watercourses and road network from CanVec, Natural Resource Canada at a scale of 1:50 000.

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- Isotope Analysis Only
- Sample and Isotope Analysis
- Sample taken; No Isotope Analysis
- Dry

FIGURE 2

**SURFACE WATER SAMPLE LOCATIONS FOR THE 2021 KETZA AUDIT**

DECEMBER 2022

*Figure 2 - Surface Water Sample Locations for the 2021 Ketza Audit*

Observations recorded in field notes included brief descriptions of site conditions such as air temperature, cloud cover, and weather (Appendix E).

In-situ field measurements were collected at each station using a handheld digital thermometer for air temperature and a YSI Pro DSS multiparameter sonde for field aqueous geochemistry measurements. The thermometer was hung from vegetation in the shade while collecting the water samples at each station. The sonde was inserted into the water at each sample location so that the probes were submerged and left to equilibrate for at least 2 minutes. Parameters measured included water temperature (°C), dissolved oxygen (mg/L), pH (pH units), turbidity (NTU), specific Conductance (µS/cm) and oxidation reduction potential (ORP; mV) (Table 2). The YSI was calibrated by the Branch staff as per manufacturer specifications prior to use. Calibration was verified during and after field sampling.

*Table 2. Water quality parameters included in the 2021 Ketza Audit*

| Parameter | Unit | Method Detection Limit (MDL) |
|---|---|---|
| Field | | |
| pH | pH unit | - |
| Specific Conductivity (SPC) | µS/cm | - |
| Temperature | °C | - |
| Dissolved Oxygen (DO) | mg/L | - |
| Turbidity | NTU | - |
| Oxidation Reduction Potential (ORP) | mV | - |
| Alkalinity (total) | mgCaCO3/L | - |
| Laboratory | | |
| pH | pH unit | - |
| Specific Conductivity (SPC) | µS/cm | 2 |
| Alkalinity (bicarbonate, carbonate, hydroxide, phenolphthalein and total) | $mgCaCO_3/L$ | 1 |
| Total Suspended Solids (TSS) | mg/L | 1 |
| Total Dissolved Solids (TDS) | mg/L | 1 |
| Chloride | mg/L | 0.5 |
| Sulphate (Dissolved) | mg/L | 0.5 |
| Fluoride | mg/L | 0.02 |

| Parameter | Unit | Method Detection Limit (MDL) |
|---|---|---|
| Phosphorus (Total Phosphate and Dissolved) | mg/L | 0.001 |
| Ammonia | mg/L | 0.005 |
| Nitrate, Nitrite | mg/L | 0.002 |
| Total Nitrogen | mg/L | 0.02 |
| Dissolved Organic Carbon (DOC) | mg/L | 0.2 |
| Cyanide (SAD and WAD) | mg/L | 0.005 |
| Metals (Total and Dissolved; including Mercury) | mg/L | Various DLs |
| Chromium (Total, Dissolved, -III and -VI) | mg/L | Various DLs |
| Hardness (Total and Dissolved) | $mgCaCO_3/L$ | $1.9*10^{-6}$ |

*Note: SAD – strong acid dissociable; WAD – weak acid dissociable; DL – detection limit*

Alkalinity was measured in the field for select sample sites using a HACH digital titrator to corroborate laboratory alkalinity measurements. Twenty millilitres of water was field filtered, measured volumetrically with a graduated cylinder, and transferred into a 30 mL Erlenmeyer flask, to which 4 drops of bromocresol green/methyl red indicator was added. Samples were titrated with 0.16 N sulfuric acid until the solution changed colour to bright pink, indicating the pH endpoint of 4.6 had been reached. The number of digital titrator units were recorded, converted to volume using the manufacturer-supplied conversion factor, and used to calculate total alkalinity.

Hemmera and Water Resources Branch collected 17 and 21 stable water isotope samples, respectively. Water Resources Branch submitted all isotope samples to the University of Waterloo-Environmental Isotope Laboratory. In-situ field measurements for pH and specific conductivity were submitted with the unfiltered samples for analysis (Appendix D). Isotope ratios were measured using a Los Gatos Research Liquid Water Isotope Analyser, model T-LWIA-45-EP with a precision ($2\sigma$) of $\delta^2H = \pm 0.8$ ‰ and $\delta^{18}O = \pm 0.2$ ‰.

Analysis of the Branch's samples for a suite of analytical parameters were conducted by Bureau Veritas Laboratories. Analysis of Hemerra samples for a suite of analytical parameters were conducted by CARO Laboratories. These parameters were selected to

support the objectives of the Site audit, allow comparison to the current site specific sampling program, and allow comparison to water quality benchmarks and the standards outlined in the expired water licence QZ04-063 (Table 2, Appendix C). Water Resources Branch and Hemmera analytical results were compared to the CCME Water Quality Guidelines (WQG) for the Protection of Freshwater Aquatic Life (CCME-FAL), Yukon Contaminated Site Regulation for Aquatic Life Standards (CSR-AW), British Columbia Ministry of Environment Water Quality Long-term Guideline for Freshwater Aquatic Life (BC MOE), Metal and Diamond Mine Effluent Regulations (MDMER) and the former Water Licence QZ04-063 Effluent Quality Standards (KEQS) (CCME 2021, YCSR 2002, GoC 2002). Calculated guideline values for certain CCME and CSR thresholds were determined using in-situ parameters and dissolved hardness values. CSR guidelines were determined using a 1:10 dilution ratio to convert to surface water quality values. For the purposes of this audit, these benchmarks were used for comparison only. It is not the purpose of this audit to make conclusions regarding water quality exceedances with respect to standards, guidelines, or regulations.

#### *2.2.1.1 Peel Creek Seep Assessment*

In order to assess the likelihood of waste rock dumps and pit shells in Peel Creek as potential sources of contaminants into Cache Creek, surface water quality samples and isotopes were collected along the entire flow path of Peel Creek (Table 3, Figure 2). Three major seeps were assessed as well as a region of minor seepage showing bright red colouration. These seeps were sampled downstream of their respective daylighting locations where sufficient flow and mixing with the main flow path was observed. Discharge measurements were collected at strategic points along the Peel Creek flow path.

The first major seep (Seep 1) was located at the headwaters of Peel Creek, but was sampled further downstream (KR-17) due to insufficient flow for sample collection at the seep source. This sample provides potential background water quality information regarding Peel Creek before water chemistry changes occur further downstream. The other two major seeps, “Seep 2” (PCS2) and “Seep 3” (PCS3), daylight on the north side of the creek valley and flow into Peel Creek. An additional sample was collected

from a small pool just downstream from the start of the minor red seep region (KR-17DS), where the stream bed was observed with a layer of bright red precipitate (photos 27-31, Appendix A).

A final sample was collected further downstream at station KR-15 to assess the water chemistry of Peel Creek prior to its confluence with Cache Creek.

*Table 3. Surface water quality samples collected along Peel Creek during the 2021 site audit*

| Station ID | Description | Rationale |
|---|---|---|
| KR-17 | downstream of headwater seep | Potential background water quality of creek |
| KR17-DS | downstream of seeps observed along south bank | Observed change in colour of stream substrate downstream of seep entering from south slope |
| Seep 2 | daylighting of seep on north bank (Peel Seep 2) | Water quality representing the groundwater seepage entering from the north slope |
| PS2DS | downstream of seep 2 confluence | Mixing of the creek and seep water to observe potential change in the creek water quality |
| Seep 3 | daylighting of seep on north bank (Peel Seep 3) | Water quality representing the groundwater seepage entering from the north slope |
| PS3DS | downstream of seep 3 confluence | Mixing of the creek and seep water to observe potential change in the creek water quality |
| KR-15 | upstream side of main road culvert | Characterize tributary before discharging into Cache Creek |

#### *2.2.1.2 Misery Creek Seep Assessment*

Misery Creek discharges into Cache Creek between historical stations KR-27 and KR-28. Three surface water stations are established in Misery Creek Valley, two of which were sampled by the Branch during the 2021 audit (Table 4, Figure 2). Misery Creek background water quality was sampled at KR-21, located where an access road crosses Misery Creek in the headwater region. KR-18 is located on a tributary to Misery Creek along the access road, for which only field data was obtained. KR-22 characterizes the water quality of Misery Creek upstream of its discharge into Cache Creek, where red and white precipitates were observed on the substrate. Discharge measurements were collected at strategic locations along the Misery Creek flow path.

*Table 4. Surface water quality samples collected along Misery Creek during the 2021 site audit*

| Station ID | Description | Rationale |
|---|---|---|
| KR-21 | Near headwaters of Misery Creek | Potential background water quality of creek |
| KR-18 | Tributary of Misery Creek | Observe water quality of tributary before mixing with creek |
| KR-22 | 500 m upstream of Cache Creek | Observe water quality of creek before joining with Cache Creek |

## 2.3 Groundwater Quality

Stable water isotope and groundwater quality sample collection at routine groundwater monitoring stations was completed by AAM and Hemmera during the August 2021 sampling event, including seven additional non-routine stations requested by Water Resources Branch. A total of 22 samples were collected (Table 5, Figure 3). In-situ water pH and conductivity were provided for each sample submitted for stable water isotope analysis. All groundwater sampling carried out during this event followed the methodology outlined in Hemmera's Methodology Report (Hemmera, 2020). Some minor deviations occurred, including the exchange of a Grundfos pump for a Hydrolift pump for all samples.

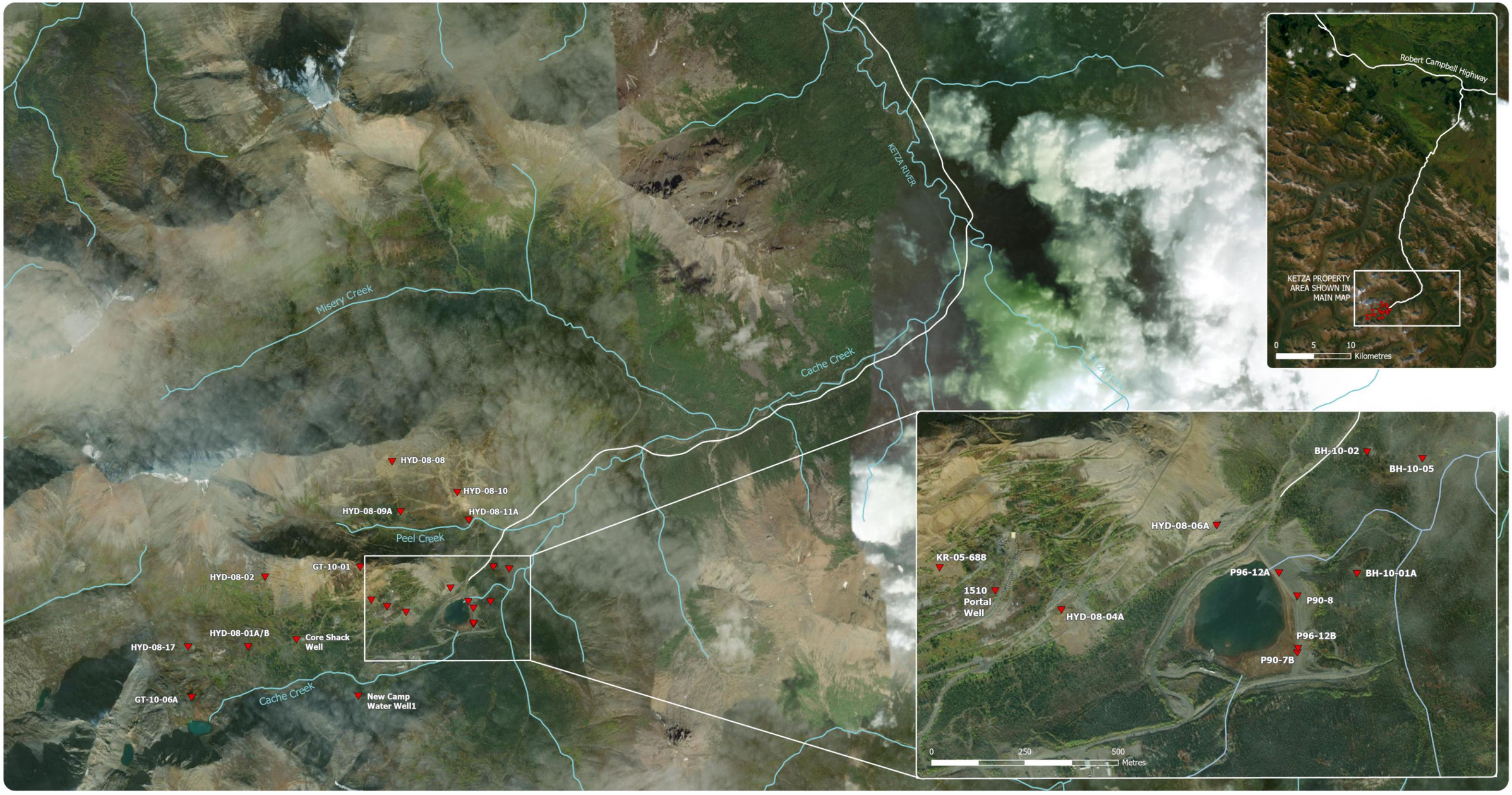
*Table 5. Groundwater quality samples and Isotopes collected by Hemmera during the 2021 site audit*

| Station ID | Coordinates (UTM Zone 8N) | | Sample Date (YYYY-MM-DD) | Location Notes[1] |
|---|---|---|---|---|
| | Easting | Northing | | |
| Cache Creek | | | | |
| GT-10-06A | 643410 | 6824700 | 2021-08-05 | Located in a pit shell upgradient of Tarn Lake |
| HYD-08-17 | 643377 | 6825173 | 2021-08-05 | North of Tarn lake |
| HYD-08-01A | 643940 | 6825175 | 2021-08-05 | Located in pit shell near Cache Creek |
| HYD-08-01B | 643940 | 6825175 | 2021-08-05 | |
| HYD-08-02 | 644099 | 6825829 | 2021-08-04 | Located near top of slope separating Cache Creek from Peel Creek |
| Core Shack Well | 644393 | 6825242 | 2021-08-05 | Well near Core Shack |

| Station ID | Coordinates (UTM Zone 8N) | | Sample Date (YYYY-MM-DD) | Location Notes[1] |
|---|---|---|---|---|
| | Easting | Northing | | |
| KR-05-688 | 645094 | 6825613 | 2021-08-04 | Located on south-facing slope across from camp area |
| PS1430 Portal Well | 645243 | 6825551 | 2021-08-04 | Well discharging mine adit drainage |
| GT-10-01 | 644990 | 6825921 | 2021-08-04 | Located on topographic high between Cache Creek and Peel Creek |
| BH-10-05 | 646387 | 6825905 | 2021-08-03 | Located near confluence of unnamed creek with Cache Creek |
| HYD-08-04A | 645420 | 6825500 | 2021-08-04 | Upgradient of TSF |
| HYD-08-06A | 645836 | 6825726 | 2021-08-05 | Cross gradient to the north of TSF |
| Tailings Storage Facility | | | | |
| P90-7B | 646052 | 6825385 | 2021-08-03 | Piezometer in TSF |
| P96-12A | 646003 | 6825599 | 2021-08-03 | Piezometer in TSF |
| P96-12B | 646054 | 6825397 | 2021-08-03 | Piezometer in TSF |
| P90-8 | 646052 | 6825537 | 2021-08-03 | Piezometer in TSF |
| BH-10-01A | 646212 | 6825597 | 2021-08-03 | Piezometer in TSF |
| BH-10-02 | 646239 | 6825923 | 2021-08-03 | Located near confluence of unnamed creek with Cache Creek |
| New Camp Water Well | 644973 | 6824713 | 2021-08-05 | Camp water supply well |
| Peel Creek | | | | |
| HYD-08-08 | 645289 | 6826911 | 2021-08-03 | Near top of northern slope of Peel Creek catchment |
| HYD-08-09A | 645369 | 6826441 | 2021-08-04 | Located in waste rock dump near Peel Creek |
| HYD-08-10 | 645900 | 6826622 | 2021-08-04 | Located in pit shell upgradient of Peel Creek |
| HYD-08-11A | 646008 | 6826363 | 2021-08-05 | Downgradient of HYD-08-10 |

[1]*Site descriptions are based on visual observation of site APECs and AECs*

*Groundwater monitoring wells were not sampled by WRB during the site visit.*




Yukon

0 0.5 1 Kilometres

Background Imagery: SPOT imagery (2014-2016 imagery mosaic). Watercourses and road network from CanVec, Natural Resource Canada at a scale of 1:50 000.

G:\water\Maps\GIS\01_Maps\10_Ketza\WRB_Audit_2021\02_Audit_Report\Groundwater_20221209.aprx modified on: September 21, 2022 2:40 PM by mducharm

▼ Groundwater Sampling Location

FIGURE 3

**GROUNDWATER SAMPLE LOCATIONS FOR THE 2021 KETZA AUDIT**

DECEMBER 2022

*Figure 3 - Groundwater sampling locations (Hemmera, August 2021)*

## 2.4 Hydrology Measurements

Water Resources Branch collected discharge measurements between Aug 30 and Sept 2, 2021 on at select locations to support the audit objectives (Table 6). Measurements specifically targeted Peel Creek, lower Cache Creek around the Peel Creek confluence, and Misery Creek (Figure 4).

The conditions of flow monitoring locations were also assessed in the context of re-activating a network of continuous hydrometric stations at the site. Locations included in the hydrology assessment are presented in Table 6.

### 2.4.1 Discharge Measurements

Two methods were employed in the collection of stream flow data:

- Velocity-area method (mid-section) in medium size creeks (e.g Cache Creek), and
- Salt dilution method in small creeks (e.g. Peel Creek) that were too narrow, shallow or turbulent to accommodate a flowmeter.
- Estimate of tributary flow by calculating the difference between the discharge results of downstream and upstream measurements.
- Visual estimates made while observing the creek dimensions and water velocity.

#### *2.4.1.1 Velocity-Area mid-section methodology*

Field crew used a Sontek FlowTracker 2 Acoustic Doppler Velocimeter (ADV) to complete discharge measurements in Cache Creek and Misery Creek. Reaches with close to evenly distributed laminar flow uninfluenced by the presence of side channels, debris or excessive turbulence were preferentially selected, as per standard guidance documents (Water Survey of Canada 1999, Resources Information Standards Committee 2018). Stream width and measurement panels were determined by setting up a tagline across the stream perpendicular to main flow. At least 20 panels over the full stream width were used to ensure that no single panel contained more than 10% of total flow. Panel width was adjusted during the measurement to respond to observed

velocities. Where possible, staff gauge readings were recorded at the start and end of measurements to get a sense of flow rate variation. Velocity was measured at 60% of depth from water's surface where total depths were <1m. Where depth was >1m, velocity measurements were collected at 20% and 80% of maximum depth. The instrument measured velocity for 40 seconds per panel to obtain a reliable average.

The ADV automatically calculated discharge using the following standard velocity-area mid-section equation (Xylem 2019) for discharge (Q):

$$Q = \sum \bar{v}_0 \, d_0 \left(\frac{b_1 - b_0}{2}\right) + \bar{v}_1 \, d_1 \left(\frac{b_2 - b_0}{2}\right) + \bar{v}_n d_n \left(\frac{(b_{n+1}) - (b_{n-1})}{2}\right)$$

Where, $\bar{v}$ is the average velocity in the vertical or at the station,

d is the water depth measured at the station,

b is the location of the station

SI units of $m^3/s$, m/s, and m are used for discharge, velocity, and depth/width, respectively.

Measurements are obtained for at least 20 panels across the metering cross-section. Edge calculations are handled differently from stations in open water with reference to the first component of discharge equation. The mean velocity at the edge is scaled from the adjacent station by a user defined correction factor (CF) of 1.

The Sontek FlowTracker 2 calculated overall discharge uncertainty using the inverse variance estimator method developed by the U.S. Geological Survey (Cohn et al. 2013). This method of calculating uncertainty accounts for width, depth and accuracy of FlowTracker2 calibration and the effects of channel variability on depth and velocity across the cross-section (Xylem 2019). Discharge uncertainty calculated by the FlowTracker2 on Cache Creek and Misery Creek ranged from 3.2 % to 6.0 % (Appendix F - forthcoming). The ADV also provided a variety of quality control and assurance assessments in real-time, reducing field measurement error.

#### *2.4.1.2* Salt dilution methodology

Salt dilution gauging method was used along Peel Creek sites where channel conditions were unsuitable for the velocity-area method of discharge measurement. Field crew used selection criteria and calculation methods provided by Gabe Sentlinger (2015). Criteria analyzed when selecting sites for salt dilution discharge gauging included turbulent flows; steep gradient; minimal pools and other backwater areas; no tributary inflows in the gauging reach; ability to perform a clean injection at a point that favours mixing; brine slug fully mixed with the flow at the point where electric conductivity is measured in the channel.

A Fathom Scientific Ltd. QiQuac salt dilution specific conductivity meter was used to collect salt dilution measurements. The QiQuac uses two very high resolution conductivity probes, reducing background noise and allowing the use of smaller quantities of salt and measurement of greater discharges compared to other conductivity meters. Calibration of the conductivity probes was conducted at the measurement locations before each reading. Given the assumption of complete mixing, the location of the probe in the stream is irrelevant. However, the location of each measurement, or each probe in the case of the QiQuac, should be on opposite sides of the stream as well as different distances along the reach to confirm complete mixing. The distance moved, or between probes, will be based on the size of the creek; 5 to 10 % of the overall distance is a good rule of thumb.

Dry salt was mixed in a 20L pail with 5-10L of water from the creek, stirred in a random fashion to keep the mixing turbulent and prevent the salt sludge concentration at the bottom of the pail. The QiQuac was set up to log in 5 second intervals. Mass of salt used at each location on Peel Creek was 100 g of Sifto Pool NaCl.

The audit team reviewed the field discharge results using the post processing spreadsheet template developed by Fathom Scientific. This report presents the post-processed discharge results and both field and QAQC results are available in Appendix F.

### 2.4.2 Hydrometric Station Assessments

The audit team reviewed the EBA (2013) Ketza River Project Hydrological Report for familiarization with the previous hydrometric monitoring program. The 2021 assessment included the six stations of the 2012 monitoring scope (KR-13/14/15/22/10/12) as well as water licence compliance locations KR-01 and KR-08 (Table 6).

Site assessments in 2021 included the following actions for each station assessed to be activated or re-activated in a future hydrometric network (Appendix G):

- In-situ confirmation of locations
- Calculation of watershed areas using ESRI Spatial Analysis hydrology tools with the 30m Digital Elevation Model published by Government of Yukon
- Review of 2012 flow ranges and peak flow timing
- Review of rationale for station location and purpose
- Field visit photos
- Comparison with historical site sketches
- Inspection of channel conditions
- Post-field review of satellite imagery to investigate changes in channel morphology (2005-2021 period when imagery available)
- Inspection of current infrastructure (2012 installation)
- Recommend infrastructure replacements and/or upgrades
- Establish hydrometric monitoring objectives
- Recommend measurement methods for various flow levels (open water high/moderate/low flows, winter/under-ice flows)

The audit team did not review the current Hemmera hydrometric monitoring program as it was ruled out of the scope of this report.

*Table 6. Hydrology assessment location information*

| Station ID | Coordinates (UTM Zone 8N) | | Discharge method | Station Assessment |
|---|---|---|---|---|
| | Easting | Northing | | |
| Cache Creek | | | | |
| KR-01 | 645088 | 6824842 | Visual Estimate | Yes |
| KR-13 | 645863 | 6825271 | Visual Estimate | Yes |
| KR-08 | 646891 | 6826383 | Velocity-Area | Yes |
| PCC | 646860 | 6826425 | Velocity-Area | No |
| KR-10 | 650611 | 6828988 | Visual Estimate | Yes |
| Oxo Creek | | | | |
| KR-14 | 646330 | 6825255 | Visual Estimate | Yes |
| Peel Creek | | | | |
| KR-17 | 644885 | 6826319 | Visual Estimate | No |
| PC-DS1 (or KR17-DS) | 645040 | 6826278 | Salt Dilution | No |
| PC-DS2 | 645151 | 6826291 | Salt Dilution | No |
| PC-DS3 | 644983 | 6826321 | Salt Dilution | No |
| KR-15 | 646325 | 6826284 | Calculated Estimate | Yes |
| Misery Creek | | | | |
| KR-22 | 647794 | 6827530 | Velocity-Area | Yes |
| Ketza River | | | | |
| KR-12 | 650139 | 6830118 | Visual Estimate | Yes |

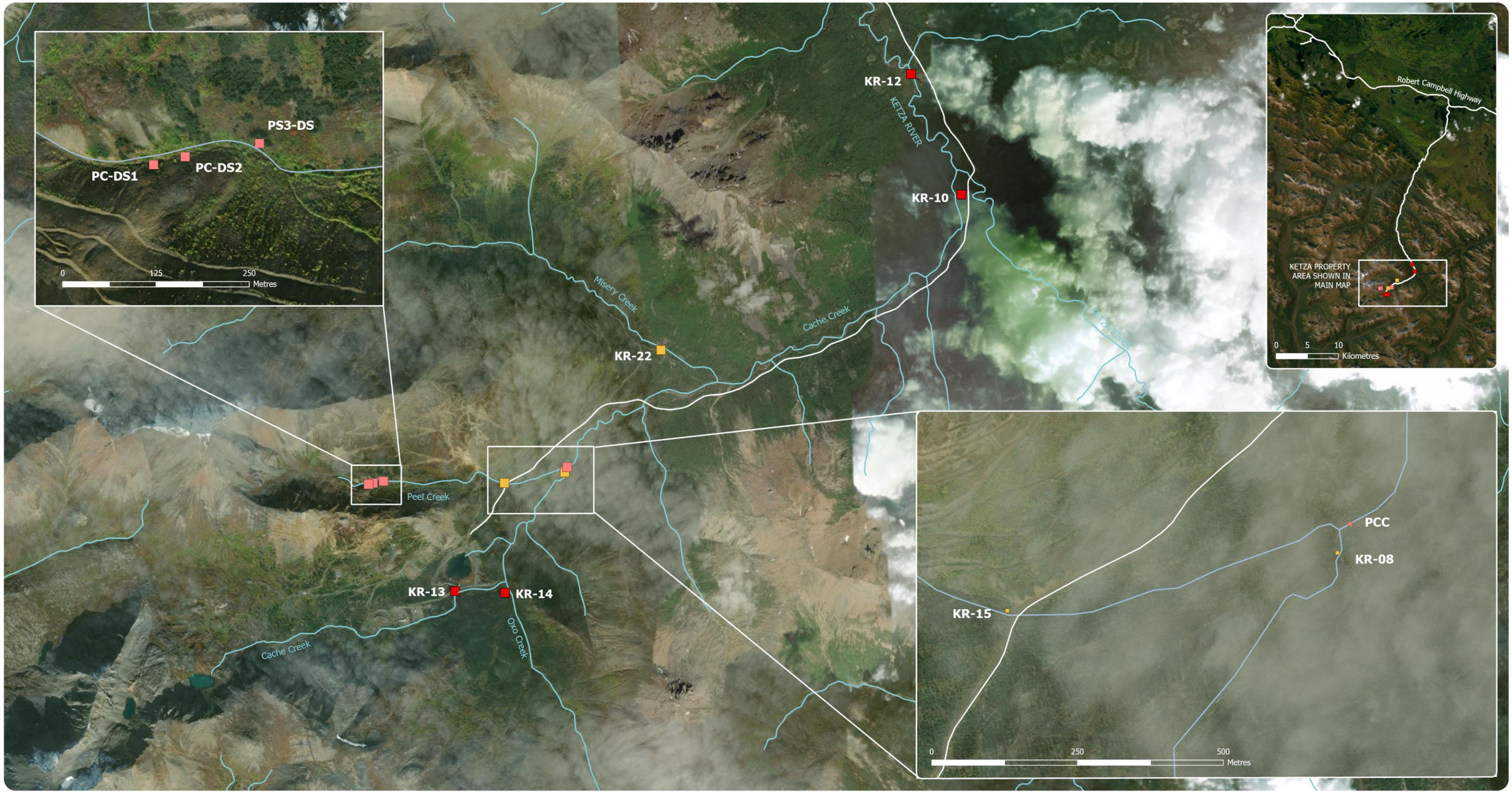



*Figure 4. Hydrology assessment locations for the 2021 audit*

## 2.5 Quality Assurance / Quality Control

### 2.5.1 Surface Water Quality

Calibration of the project YSI Pro DSS Sonde was completed by Water Resources Branch prior to the site visit. Calibration checks were conducted during and after the site visit to monitor instrument calibration drift. No issues were observed regarding measurement drift for any field parameters. Calibration of the YSI was carried out according to the manufacturer's protocols.

The Branch collected samples for quality assurance/quality control (QAQC) as required by CCME sampling requirements for water quality sampling (Table 7).

*Table 7. QAQC samples included in the August 2021 site audit*

| QAQC Sample Type Collected | Procedure | Purpose |
|---|---|---|
| Travel Blank | Lab provides a sample bottle set prefilled with lab grade deionized water. This sample is carried for the duration of the sampling event then returned to the lab. The bottles remain unopened until analysis. | Used to identify if any contamination of the samples was introduced during or as a result of the transportation process. |
| Field Blank | A set of sample bottles is filled with lab grade deionized water in the field by sampling staff following the same standard protocols and procedures of collecting a regular sample. | Used to identify if any contamination could be introduced into the sample from the environment while collecting samples or from sampling staff handling protocols and procedures. |
| Replicate | Two samples are collected consecutively at the same station while adhering to the same standard protocols and procedures. One replicate is collected for every ten samples, rounded up to the nearest ten samples. Analytical results are compared and Relative Percent Difference (RPD) is calculated. | Identify the precision of sampling technique and methods and provide an estimate of sampling error and analytical error. |

Analytical results for the blanks were compared to the method detection limit by calculating the difference between the reported values and the MDL and reported as Difference Magnitude.

$$Difference\ Magnitude = Blank\ concentration - MDL$$

Duplicate water isotope samples were collected and analyzed alongside regular samples at a rate of one duplicate per ten samples.

### 2.5.2 Groundwater Quality

During Hemmera's August 2021 GW sampling program, two duplicate samples, a field blank, and a travel blank were submitted for analysis alongside collected samples. Information was not provided to the Branch regarding their instrument calibration protocols, but it is assumed that the standard calibration frequency of once per field day was followed.

### 2.5.3 Hydrology

No replicate or concurrent hydrometric measurements were collected during the 2021 Water Resources Branch audit. However, each salt dilution gauging measurements are replicates since two conductivity probes are in simultaneous use. Appendix F (forthcoming) displays QAQC indicators such as probe comparisons and uncertainty calculations for each field measurements.

### 2.5.4 Laboratory QAQC

Analytical results from all replicate water quality data obtained by the Branch (both lab and field) were compared by calculating Relative Percent Difference using the equation below:

$$Relative\ Percent\ Difference\ (\%) = \left| \left( \frac{(S_1 - S_2)}{(S_1 + S_2)/_2} \right) \right| * 100$$

Results are considered within acceptable limits when compared values show less than 25% difference (CCME 2011). The difference between replicated parameters was

calculated where RPD > 25%, referred to as Difference Magnitude (Table 7). When considering analyte concentrations in the minor or trace range (<0.001), a small difference between replicates can result in a large RPD value.

An RPD value was not calculated for parameters under the minimum detection limit (MDL).

# 3. Results

## 3.1 Desktop Review

### 3.1.1 Groundwater

The Ketza River Mine has an intermittent surface water and groundwater sampling record spanning back to at least 1990. Varied collection methodologies, periodic renaming of sampling sites, and lack of consistent monitoring constrains analysis of temporal trends in site contaminants. A report by Arktis (2020) reviewed all historic data for surface water sites, but to date no similar review has been carried out for groundwater monitoring stations. As of February 2022, AAM is in the final stages of curating and reviewing a comprehensive water quality database file for the Ketza River Mine. This database, when complete, will facilitate analysis of long-term trends in site-wide surface water and groundwater contamination.

### 3.1.2 Surface Water

Water Resources Branch's review of the period of record from 2015 to 2020 identified 15 chemical and physical parameters that occasionally or frequently exceeded at least one of the applicable site water quality benchmarks (Table 8). Arsenic was the parameter showing the highest frequency of exceedances, at 80.51 % (CCME guideline).

*Table 8. Summary of historical water quality data that exceeded guidelines for regularly sampled stations between 2015 - 2020 (n=24)*

| Parameter | Water Quality Standard/Guideline (mg/L) | | | | | % of samples over standard / guideline | # of exceedance/ # of samples |
|---|---|---|---|---|---|---|---|
| | BC MOE | CCME | CSR | MDMER 1 | KEQS | | |
| Aluminum[2] | N/A | * | N/A | N/A | N/A | 8.97 | 70 / 780 |
| Arsenic | N/A | 0.005 | 0.005 | 0.20 | 0.5 | 80.51 | 628 / 780 |
| Cadmium | N/A | * | * | N/A | N/A | 11.41 | 89 / 780 |
| Cadmium[2] | * | N/A | N/A | N/A | N/A | 0.64 | 5 / 780 |
| Cobalt | 0.004 | N/A | 0.0009 | N/A | N/A | 23.72 | 185 / 780 |
| Copper | N/A | * | * | 0.20 | 0.003 | 10.64 | 83 / 780 |
| Fluoride | * | N/A | * | N/A | N/A | 1.15 | 9 / 780 |
| Iron | N/A | 0.3 | N/A | N/A | N/A | 15.64 | 122 / 780 |
| Lead | N/A | * | * | 0.16 | 0.2 | 0.38 | 3 / 780 |
| Mercury | N/A | 0.000026 | 0.0001 | N/A | N/A | 0.22 | 1 / 457 |
| Selenium | 0.002 | 0.001 | 0.001 | N/A | N/A | 8.59 | 67 / 780 |
| Silver | * | 0.00025 | * | N/A | N/A | 0.26 | 2 / 780 |
| Sulphate | * | N/A | 100 | N/A | N/A | 76.05 | 581 / 764 |
| Total Suspended Solids | N/A | N/A | N/A | 30.00 | 15.0 | 3.72 | 29 / 780 |
| Zinc | * | N/A | * | 0.80 | 0.5 | 7.69 | 60 / 780 |

Note: n – number of stations; BC MOE – British Columbia Ministry of Environment Long-term Water Quality Guideline for Freshwater Aquatic Life; CCME - Canadian Council of Ministers of the Environment Protection of Freshwater Aquatic Life; CSR - Yukon Contaminated Sites Regulations Schedule 3 Protection of Aquatic Life; KEQS – Ketza Effluent Quality Standards; MDMER – Metal and Diamond Mine Regulations; '*'- the standard is calculated (Appendix A); N/A – not applicable; 1- Schedule 4 Table 1 maximum authorized concentrations of prescribed deleterious substances; 2 – dissolved metal.

Assessment based on data provided by YG AAM between 2015-2020. Includes all parameters with exceedances and the percentage of samples that exceeded a guideline or standard. All metal parameters reported are total metals unless otherwise indicated. CSR standard values were divided by 10 to remove the dilution factor for surface water YG 2020). Dissolved hardness, field pH and field temperature were used to calculate CCME guidelines where required, as indicated by *.

A 2020 study of historical surface water quality data from the Ketza River Mine over the entire period of record identified temporal trends of 11 parameters from the expired water licence (QZ04-063), and two additional parameters requested by Government of Yukon, as a part of the development of the site Adaptive Management Plan (AMP) (Arktis, 2020). $NH_3$, As, Cu, CN, Pb, Ni, Se, $SO_4$, TSS, pH and Zn were assessed to detect changes in concentrations throughout the entire sampling record. Concentrations were compared to either the KEQS or CCME long-term water quality guidelines for aquatic life depending on the proximity of the station to the mine site. $SO_4$ was compared to the BC MOE long-term water quality guideline.

A general decrease in concentrations was observed over time for these water quality parameters, except for $SO_4$, along Cache Creek. Arsenic concentrations decreased after the installation of the water treatment plant in 2012, but remain generally above CCME guidelines (Arktis, 2020).

### 3.1.3 Draft Ketza River Mine Adaptive Management Plan

Surface water quality data at the Ketza River Mine was analyzed in 2021 to identify parameters for inclusion in the surface water AMP (Arktis, 2021). The screening process included parameters included all parameters with a CCME DWG or AL standard (Arktis, 2021). Thirteen parameters were assessed for their potential as indicators of changes in environmental conditions, referred to as contaminants of potential concern (COPC). Nine of the 13 parameters considered as COPCs were recommended for developing an adaptive management plan for the mine site (Table 9). Further investigation is recommended for four of the parameters to confirm if they should continue to be identified as COPCs.

*Table 9. Summary of AAM COPC Screening (adapted from Zajdlik and Van Gulck 2021)*

| Chemical | Recommendation |
|---|---|
| Aluminum | Requires additional investigation to confirm need to develop AMP |
| Chromium | |
| Cobalt | |
| Cyanide | |
| Arsenic | AMP Trigger required |
| Copper | |
| Fluoride | |
| Iron | |
| Zinc | |
| Cadmium | AMP trigger not required |
| Manganese | |
| Mercury | |
| Sulphate | |

### 3.1.4 Cache Creek Flow Path

This section presents a review of historic trends in key contaminants along the Cache Creek flow path, from the headwater region to its discharge into the Ketza River.

Historical concentrations of As, Fe and Se have been detected at elevated concentrations along the Cache Creek flow path. Elevated concentrations have been detected at the farthest upstream station, KR-01. Exceedances of As guidelines are consistent along the flow path to the confluence of Cache Creek and Ketza River. Selenium concentrations historically decline along the creek, resulting in fewer exceedances at confluence point KR-10. Aluminum and Cd concentrations increase as the creek progresses. Concentrations of Cu and Fe historically reach their highest values in Cache Creek downstream of the Peel and Misery Creek confluences. TSS consistently exceeds guidelines at all stations downstream of the TSF and shows strong seasonal variation (Higher in summer months and lower in winter months).

Background water quality for Cache Creek at station KR-20 (Tarn Lake) contains high levels of Al, Cd and Zn. These parameters frequently exceed CCME guidelines at this station. Water quality downstream of Tarn Lake and upstream of the TSF shows frequent CCME guideline exceedances for As, Fe and Se (Tetra Tech, 2016, App B).

The exceedances at the stations upstream the TSF (KR-16, -01 and -13) and the headwater station KR-20 suggest that these elements may occur naturally at high concentrations in the headwaters but this can be difficult to fully attribute to background conditions as there are several mining related disturbances in the vicinity (e.g. Tarn Lake Pit). A groundwater discharge area with precipitates can be seen along the northern shore of Tarn Lake, suggesting that Tarn Lake may be groundwater fed, which may be the source of some of these dissolved elements (Figure 5). Again, though, the proximity of the Tarn Lake Pit may be affecting the groundwater concentrations entering Tarn Lake. This makes it difficult to determine what background conditions are in the catchment. Aerial photos showing this precipitate area in 1968 and in 2019 in Figure 5.

There are four stations around the TSF to monitor seepage and assess related contamination that may influence Cache Creek (KR-04-N3, KR-04-N2, KR-05-S1, KR-05-S2). The TSF water prior to treatment has a history of CCME guideline exceedances

*Figure 5 - Aerial photos of Tarn Lake showing region of white and red precipitates (Left – 1968; Right – 2019).*

*1968 – Photography provided by Energy Mines and Resources Aerial Photo Library*

*2019 – Imagery provided by GeoYukon.ca*

for $NH_4$, arsenic, and total CN.

Elemental concentrations in the two tributaries (Oxo and Unnamed) joining from the south side of Cache Creek immediately downstream of the TSF suggest that there are naturally elevated concentrations of some elements in surface water, as these tributaries flow through their respective catchments with very little exposure to anthropogenic disturbances. Samples from station KR-14 on Oxo Creek frequently

exceed CCME guidelines for Cd and Se concentrations, and intermittently exceed CCME guidelines for Al, As, Cu, Fe, and Zn (Arktis, 2021).

The Peel Creek sub catchment contains several disturbed areas associated with historical mining activity including pit shells, waste rock dumps, and access roads. These features present a high potential for water quality impacts, but due to the first observed daylighting of Cache Creek in previously disturbed areas, collecting suitable un-impacted surface water samples in the Peel Creek catchment was not feasible. Historical data indicates over 80% of all Peel Creek samples exceeded the CCME guidelines for As, Al, Cd, Cu, Fe and Zn. Selenium exceeded guidelines at the headwater station (KR-17) in 49% of samples but had fewer exceedances further downstream at KR-15. Inversely, TSS showed more exceedances at the KR-15 station when compared to KR-17 (62% of all samples). Seasonal trends indicate that groundwater is a major source of As to Peel Creek, as As concentrations are low in spring months and increase in summer months.

Water quality in Misery Creek appears to support elevated background levels of some geochemical parameters. Exceedances of CCME guidelines for As and Se are frequently observed along the entire stream. Arsenic concentrations increase as the flow progresses downstream, while Se concentrations decrease. Other parameters showing CCME exceedances at the KR-22 include Al, Cd, Cu and Zn. Surface water input appears to account for exceedances observed downstream as the majority occurred between May to December, surface water flows are the highest. A small tributary of Misery Creek, where station KR-18 is located, is below a natural talus slope and has shown evidence of acid rock drainage since the initiation of sampling in 2005. The pH of this tributary fluctuates between 4.1 and 4.3, well below the CCME guideline. However, this low pH does not appear to influence Misery Creek, as the pH at the downstream station remains higher than at the headwater station. Parameters exceeding CCME guidelines in this tributary include Al, As, Cd, Cu, Ni and Zn. These elevated metal concentrations appear to contribute to the greater concentrations of metals observed downstream in Misery Creek. High variability and poor consistency in the sampling record restricts interpretation of the potential effects of Misery Creek on Cache Creek (Arktis 2020). It should also be noted that there have been fewer samples

collected from the headwaters of Misery and Cache Creeks in the winter months due to avalanche risk in these locations.

Water quality in Ketza River is measurably influenced by Cache Creek (Tetra Tech 2016). Seasonal fluctuations and guideline exceedances in Ketza River resemble what is observed in lower stations on Cache Creek. Previous studies concluded that Peel and Misery Creeks are the main contributors of elevated As, Al, Cd and Cu concentrations in Ketza River downstream of the mine site. Fluctuations in Fe concentrations observed in Ketza River were less influenced by site discharge and were linked to upstream Ketza River concentrations.

### 3.1.5 Summary of Arsenic Trends

Arsenic was identified as the main COPC at the site (Arktis. 2021). Arsenic concentrations in surface water are elevated at most of the monitoring stations. Historical trend analysis shows that Tarn Lake has one of the lowest As concentrations among the stations located along the Cache Creek flow path, although it has had exceedances of the CCME guideline in the past. A significant source of As enters Cache Creek somewhere between the headwater station, Tarn Lake (KR-20) and the next downstream station (KR-01). The tributary to Cache Creek between KR-20 and KR-01 (KR-16) As concentrations are consistently below those of KR-01 and Tarn Lake indicating the source of As is likely a product of groundwater infiltration and not the KR-16 drainage. KR-01 usually has the highest As concentration observed along Cache Creek. Other monitoring stations with elevated As concentrations include the TSF seepage station KR-05S2, as well as stations in Oxo (KR-14) and Peel Creeks (KR-15, KR-17). Once Cache Creek discharges into Ketza River As concentrations (at KR-12) are reduced to the lowest values observed among all monitoring sites although remaining above the CCME guideline (Arktis 2020).

The range of As concentrations in surface water across the site between 2015 and 2020 is presented in Figure 6. Each box plot consists of three sections representing specific ranges within the dataset. The bottom of the box (lower quartile) represents the bottom 25% range of the data. Data within the box represent the middle 50% range, also known as the interquartile range. The top of the box represents the upper

25% range of the data, or the upper quartile. The top and bottom whisker represent the minimum and maximum values excluding outliers. The median is represented by the line inside the box. The “n” values indicate the number of historical data points used to create the box and whisker plots. The intent of this figure is to represent the range of concentrations across the site from 2015-2020.

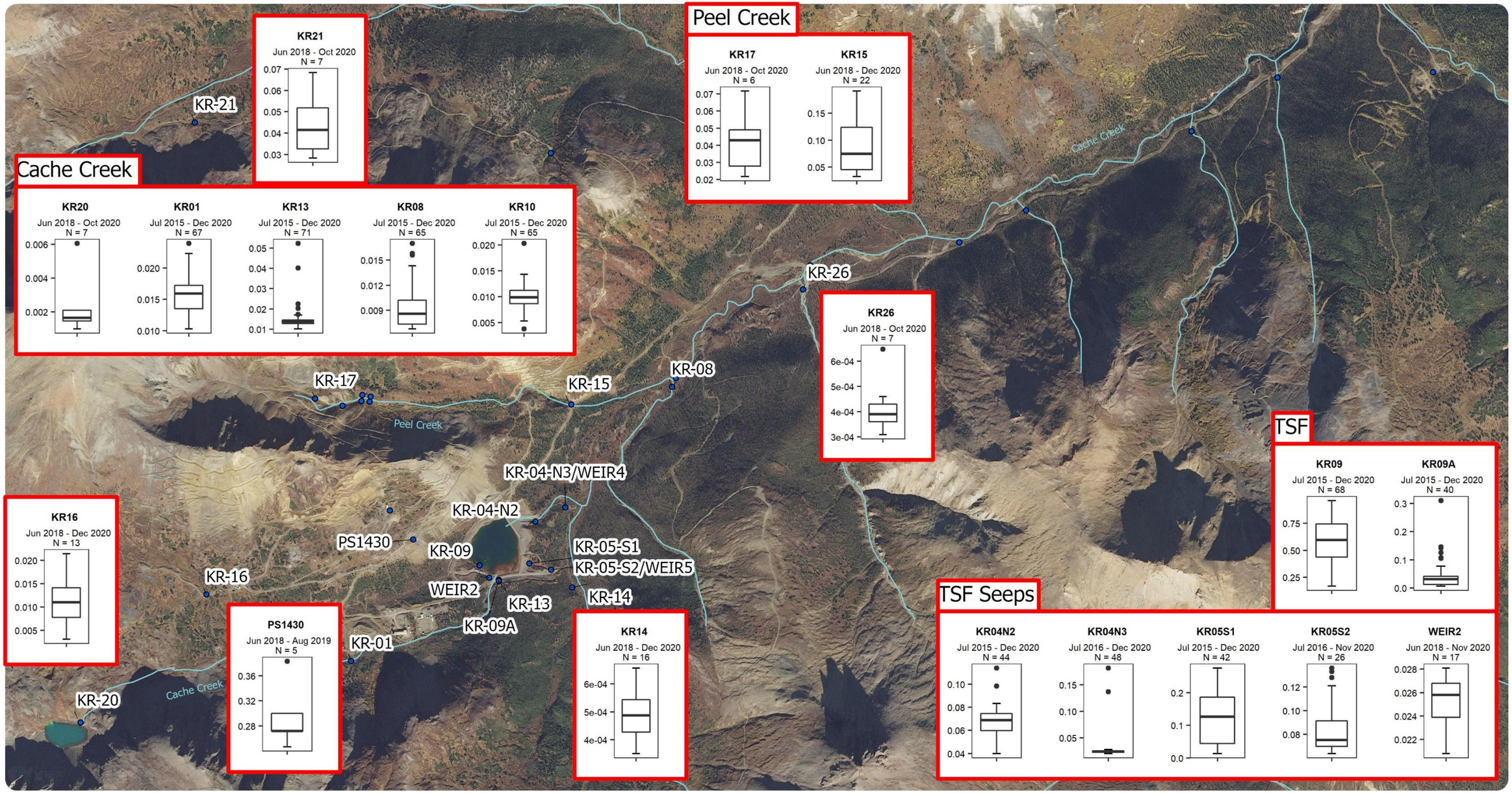



*Figure 6 - Distribution of historical (2015-2020) total arsenic concentrations at the Ketza River Mine site*

### 3.1.6 Summary of sulfate trends

Sulfate was added by AAM to the COPC list as it can be used as an indicator of acid rock drainage / metal leaching (ARD/ML) (Arktis 2020). Water quality evidence of ARD has been observed at KR-18 in the Misery Creek sub catchment since August 2005 (Tetra Tech 2016), and increasing $SO_4$ concentrations at most stations has been observed since approximately 2005 although concentrations generally remain well below the BC MOE WQG used for comparison. One of the exceptions is at the Cache Creek headwater station, KR-20, which shows a decreasing trend since 2005. Sulfate concentrations in Oxo Creek appear to be increasing. Peel Creek was determined not to contribute to increasing $SO_4$ concentrations in Cache Creek. Historical reports have not reported ARD as a potential issue at Ketza River Mine.

### 3.1.7 Groundwater

Groundwater wells are located throughout the site to monitor the impact of APECs on groundwater quality. Locations and boundaries of these site features differ slightly across reports. A comprehensive review of existing hydrogeological conditions at the Ketza River Mine site is represented in Appendix B6 of Tetra Tech's 2016 closure report.

Yukon CSR & FIGQFCS are the only guidelines that have been applied to monitor exceedances in groundwater on site by the Branch. However, the CSR specifically state that exceedances are only triggered when concentrations exceed background levels, which have not been conclusively determined for the site. Other guidelines including CCME, BC MOE and MDMER guidelines have been included in past analyses, but as they apply only to surface water their analysis in prior reports has been for reference purposes only. FIG

#### *3.1.7.1 General site hydrogeology*

Lithologies underlying the site include argillite, limestone, mudstone, and shale. The distribution of these units is presented in Appendix H (Tetra Tech. 2016).

Drilling programs carried out in 2008 and 2010 advanced a series of boreholes across the site, which make up the majority of the groundwater monitoring network currently in place. Boreholes in the HYD-XX-XX series were drilled in 2008 using a combination of diamond drilling and augur drilling methodology, and boreholes in the GT-XX-XX and BHXX-XX series were advanced using Becker hammer drilling methodology in 2010. Since the installation of these monitoring wells, they have been monitored on an annual basis by consultants engaged by AAM.

Based on water level monitoring results, Hemmera calculated groundwater equipotential contours for the August 2021 site visit. The general hydraulic gradient appears to be from the topographic highs at the western edge of the site, decreasing towards the east-southeast. The resolution of the monitoring wells and piezometers was insufficient to draw detailed contours for each watershed, and may not be representative of the actual groundwater elevations across the site. These groundwater elevations are presented in Appendix I (Hemmera, 2021).

#### *3.1.7.2 Groundwater Geochemistry*

The range in pH for site groundwater spans from acidic (2.68) to slightly basic (12.15). Calcium (Ca) and magnesium (Mg) are the dominant cations across the site, and bicarbonate ($HCO_3$) and $SO_4$ represent the dominant anions.

No statistically significant correlation has been proven between areas of high As exceedances and locations downgradient of historical mining activities. However, elevated dissolved metal concentrations in site groundwater indicate that the region may be affected by high local background dissolved metal concentrations in addition to any contributions from mine infrastructure (Tetra Tech, 2016).

No long-term analysis of groundwater geochemical trends has yet been undertaken. Geochemical database auditing and restructuring is currently being undertaken by AAM, with one of the primary goals of the audit being consolidation of all historic groundwater data which would facilitate trend analysis. Frequent CCME and CSR (surface water standards) exceedances of some dissolved metals have been observed in samples collected from groundwater sampling locations, including Al, As, Cd, Cr, Cu,

Fe, Hg, Ni, Ag, and Zn. These exceedances show a high degree of spatial variability across the site. No groundwater stations exist in the Misery Creek sub catchment.

#### *3.1.7.3 Groundwater in the Peel Creek Catchment*

Three groundwater monitoring stations currently exist in the Peel Creek drainage area (HYD-08-08. -09A, and -11A), and one on the topographic high separating Peel and Cache Creeks. (GT-10-01). HYD-08-09 and 08-11 are located directly downgradient of ore handling areas QB Pit. HYD-08-10 is also directly downgradient of an ore handling (Gully Zone Pit) (Tetra Tech, 2016). HYD-08-11 is also downgradient of WB Pit and Gully Zone Pit but this well was found to be destroyed by a landslide during the August 2022 sampling event.

Peel Creek geochemistry is expected to be dominated by groundwater influences, as the principle flow channel is a spring source. Two large seeps between KR-17 and KR-15 further contribute to flow, as well as several smaller seeps in the upper regions.

All groundwater monitoring wells in the Peel Creek drainage show acidic pH values ranging from 2.68 to 6.02. No clear spatial trend was observed in the distribution of the exceptionally low pH values. However, HYD-08-10 is consistently observed to have one of the lowest pH values of any station at the site. All of these wells show exceedances of CCME-FAL, FIGQFCS, CSR-AW, or CSW-DW guidelines for several dissolved metals throughout the sampling record. In particular, HYD-08-09A and -11A have a history of guideline exceedances for As, Cd, and Cu.

To date, it has not been conclusively determined whether the low pH values in these wells and associated high dissolved metal concentrations result from natural groundwater contacts with local reactive minerals or whether mining-related subsurface perturbation has exacerbated these issues.

## 3.2 Site Visit Results

### 3.2.1 Surface Water Quality

#### *3.2.1.1 In-situ Field Measurements*

In-situ field parameters measured by the Branch are presented in Table 10. All measurements are within guideline or licence values except for pH at KR-18 (4.17). Two measurements using different YSI's were recorded, confirming the acidic pH at this site. The pH value at KR-18 is outside the BC MOE long-term water quality guideline for freshwater aquatic life and the effluent quality standard for this mine.

*Table 10. Field parameters measured during the 2021 site audit*

| Station ID | | Air Temp (°C) | Water Temp (°C) | DO (mg/L) | SPC (µs/cm) | pH | ORP (mV) | Turbidity (NTU) |
|---|---|---|---|---|---|---|---|---|
| Water Quality Standard / Guideline (mg/L) | BC MOE | N/A | 18 | ≥8 | N/A | 6.5-9 | N/A | N/A |
| | CCME | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | CSR | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | KEQS | N/A | N/A | N/A | N/A | >6.5 | N/A | N/A |
| Cache Creek | | | | | | | | |
| KR-20 | | 6.5 | 6.2 | 10.53 | 274.4 | 8.0 | 185.1 | 1.31 |
| KR-01* | | 9.3 | 5.4 | 10.69 | 450.3 | 8.29 | 123.1 | 0 |
| KR-08* | | 3.6 | 4.2 | 11.45 | 528 | 8.18 | 71.7 | 0.5 |
| PCC | | 3.3 | 3.7 | 11.59 | 587 | 8.08 | -93.6 | 2.06 |
| KR-26 | | 16.4 | 9.4 | 10.18 | 586 | 8.5 | 179.5 | 1.16 |
| KR-27 | | 14.4 | 7 | 10.72 | 574 | 8.25 | 176.4 | 1.14 |
| KR-28 | | 13.4 | 7.2 | 10.7 | 597 | 8.23 | 197.6 | 1.83 |
| CCT1 | | 8.3 | 2.4 | 12.23 | 623 | 8.29 | 225.7 | 0.44 |
| CCT2 | | 12.2 | 3.5 | 11.78 | 1044 | 8.36 | 195.6 | 1.85 |
| CCT3 | | 12.3 | 4.9 | 11.34 | 1776 | 8.34 | 209.5 | 0.33 |
| Peel Creek | | | | | | | | |
| KR-17 | | 11.8 | 3.2 | 10.83 | 583 | 7.21 | 161.4 | 0 |
| KR17-DS | | 10.1 | 3.6 | 11.28 | 796 | 7.44 | -2 | 0.32 |
| PCS2 | | 13.1 | 1.4 | 10.92 | 505 | 7.4 | 130.9 | 0.15 |

| Station ID | | Air Temp (°C) | Water Temp (°C) | DO (mg/L) | SPC (µs/cm) | pH | ORP (mV) | Turbidity (NTU) |
|---|---|---|---|---|---|---|---|---|
| Water Quality Standard / Guideline (mg/L) | BC MOE | N/A | 18 | ≥8 | N/A | 6.5-9 | N/A | N/A |
| | CCME | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | CSR | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | KEQS | N/A | N/A | N/A | N/A | >6.5 | N/A | N/A |
| PS2DS | | 14.3 | 4.2 | 11.07 | 609 | 7.71 | 99.4 | 1.48 |
| PCS3 | | 17.7 | 1.4 | 11.2 | 500 | 7.35 | 81.6 | 9.62 |
| PS3DS | | 12.5 | 3.7 | 11.28 | 579 | 7.73 | -87 | 2.44 |
| KR-15 | | 12.7 | 3.4 | 11.6 | 715 | 7.71 | -122 | 2.98 |
| Misery Creek | | | | | | | | |
| KR-21 | | 13.7 | 3.9 | 10.77 | 685 | 7.74 | 189.2 | 0.86 |
| KR-18 | | 15.1 | 2.2 | 11.00 | 1340 | 4.17 (BC MOE, KEQS) | 225.3 | 0.40 |
| KR-22 | | 15.9 | 7.9 | 10.45 | 634 | 8.22 | 185.1 | 2.72 |
| Other Stations | | | | | | | | |
| PS1430 | | 16.8 | 1.8 | 11.61 | 1145 | 7.87 | 233.2 | 1.76 |
| KR-23 | | 10.2 | 4.1 | 11.31 | 759 | 7.93 | 235.3 | 0 |

*Note: Temp – temperature; DO – dissolved oxygen; SPC – specific conductivity; ORP – oxidation reduction potential; °C – degrees Celsius; mg/L – milligrams per litre; µS/cm – micro Siemens per centimeter; mV – milli volts; NTU – nephelometric turbidity units; BC MOE – British Columbia Ministry of Environment Long-term Water Quality Guideline for Freshwater Aquatic Life; CCME - Canadian Council of Ministers of the Environment Protection of Freshwater Aquatic Life; CSR - Yukon Contaminated Sites Regulations Schedule 3 Protection of Aquatic Life; KEQS – Ketza Effluent Quality Standards; Highlighted values are in exceedance with the indicated standard/guideline in brackets.*

The range in field-measured alkalinity values across the site is from 90.8 (KR-17DS) to 167.9 (KR-8) mg $CaCO_3$/L (Table 11). The results of these measurements, carried out at select surface water sites as per the methods described in section 2.2, are presented in Table 11. Comparison of these values to lab-analyzed alkalinity is discussed in section 3.2.5.1.1.

*Table 11. Alkalinity concentrations measured in the field during the 2021 site audit*

| Sample ID | Date (YY-MM-DD) | Titration units | Titrant Vol (mL)[1] | Sample Vol (mL) | Bicarbonate (eq/L) | Bicarbonate (mg/L) | Alkalinity (mg/L $CaCO_3$) |
|---|---|---|---|---|---|---|---|
| Cache Creek | | | | | | | |
| KR-8 | 2021-08-31 | 335.5 | 0.4 | 20.0 | 0.003355 | 204.7 | 167.9 |
| PCC | 2021-08-31 | 303.0 | 0.4 | 20.0 | 0.00303 | 184.9 | 151.6 |
| Peel Creek | | | | | | | |
| KR-17 | 2021-08-31 | 246.5 | 0.3 | 20.0 | 0.002465 | 150.4 | 123.3 |
| KR-17DS | 2021-08-31 | 181.5 | 0.2 | 20.0 | 0.001815 | 110.7 | 90.8 |
| PCS2 | 2021-08-31 | 253.5 | 0.3 | 20.0 | 0.002535 | 154.7 | 126.8 |
| PC2-DS | 2021-08-31 | 232.5 | 0.3 | 20.0 | 0.002325 | 141.9 | 116.3 |
| PCS3 | 2021-08-31 | 246.5 | 0.3 | 20.0 | 0.002465 | 150.4 | 123.3 |
| PCS3-DS | 2021-08-31 | 235.0 | 0.3 | 20.0 | 0.00235 | 143.4 | 117.6 |
| KR-15 | 2021-08-31 | 185.5 | 0.2 | 20.0 | 0.001855 | 113.2 | 92.8 |

*Note: YY-MM-DD – year month day; [1] – 0.16 N sulphuric acid; mg/L – milligrams per liter; µS/cm – micro Siemens per centimeter; mV – milli volts; NTU – nephelometric turbidity units; mg $CaCO_3$/L – milligrams calcium carbonate per litre*

### *3.2.1.2 Observed surface water chemistry*

Analytical results for surface water quality and stable water isotopes are presented in Appendix D. Comparison of water quality data to guidelines, standards, and the previous effluent quality standard is for use only in surface water characterization, any exceedances are not indications of non-compliance and should not be used for any purpose beyond the present analysis.

Trends in major ion geochemistry align with expected compositions of groundwater and surface water for mine-influenced sites. Surface water across the site shows a

higher degree of Mg dominance than groundwater samples, which appear to be more Ca-dominated. Surface water samples appear to show a higher degree of $SO_4$ dominance, whereas groundwater samples appear to be more $HCO_3$ dominated. Major ion dominance trends for all samples collected over the course of the Branch's 2021 audit are presented in Figure 7.

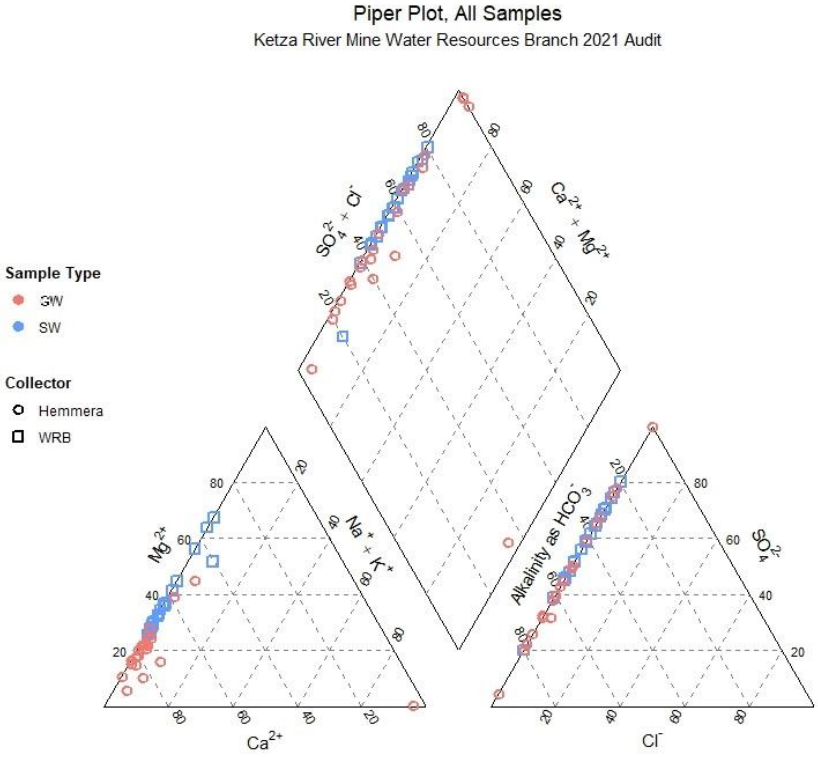



*Figure 7 - Piper plot showing major ion dominance trends*

As anticipated, regulatory guidelines are exceeded numerous times in the sampling results of the present study (BC-MOE = 10 samples, CCME = 38 samples, CSR = 54 samples); however, there are no exceedances of the Ketza EQS. Arsenic and $SO_4$ (dissolved) show the most exceedances among the 13 parameters that had at least one exceedance of any guideline. This study observed exceedances for seven of the nine COPCs established for this site including Al, Co, As, Cu, F, Fe, and Zn. Chromium and cyanide are the two COPCs that do not exceed any guidelines. Exceedances of guidelines and standards are summarized in Table 12.

Arsenic exceeds the CCME guideline and CSR standard for As (0.005 mg/L) 16 times, whereas $SO_4$ exceeds the CSR standard (65 mg/L) 19 times. Among the Cache Creek samples, stations PCC and KR-28 show the highest rates of guideline and standard exceedances with seven parameters each. In Peel Creek, KR-15 exceeds guidelines for six parameters, the most in this tributary. Station KR-22 in Misery Creek shows eight parameter exceedances.

Arsenic concentration surpasses the CCME guideline (0.005 mg/L) somewhere between the Tarn Lake station (KR-20) and the first station downstream on Cache Creek (KR-01), increasing by 0.011 mg/L between these two stations. Four tributaries discharging into Cache Creek along the north bank after the TSF were sampled during the audit and were found not to contribute additional arsenic as flow progresses. The highest concentration of As in Cache Creek (0.0192 mg/L) occurred at a new station downstream of the confluence of Peel and Cache Creek (PCC). Peel Creek shows high As concentrations throughout the entire flow with the highest concentration occurring at KR-15 (0.0444mg/L As(total)). This station is the most downstream station on Peel Creek before discharging into Cache Creek. Misery Creek also shows high As throughout the entire flowpath, with the highest concentration occurring at KR-21 (0.0397mg/L As (total)), which exceeded CCME and CSR guidelines.

The distribution of total As concentrations from samples taken during the 2021 site visit are displayed in Figure 8. The highest concentrations of As amongst the sampled locations occured at PS1430, KR-15, KR-21 and KR-23. The highest concentration of As amongst all of the sampled locations occured at the seep emerging from the mine adit at PS1430 (0.269 mg/L).

An alternative guideline for As (0.025 mg/L) was established for the Giant Mine in the Northwest Territories in 2019 (CIRNAC 2019). This guideline uses the methodology defined most recently by CCME (CCME 2007) which uses the species sensitivity distribution (SSD) approach and was deemed to be a robust guideline in past licencing conversations in Keno, Yukon. This 0.025 mg/L guideline was incorporated into the analysis presented below (section 4.0). Based on this alternative guideline, the water quality in Cache Creek shows acceptable As concentrations throughout its entire flow path. However, Peel Creek exceeds this guideline four times from where the first minor

unnamed red seeps enter along the south bank (KR-17DS) until it discharges into Cache Creek. The two major seeps (PCS2, PCS3) remain slightly below this guideline value and do not provide sufficient flow to dilute concentrations below guideline levels.

Dissolved $SO_4$ concentrations exceed the CSR standard (100 mg/L) at all of the stations except for two. (Table 12, Figure 9). The discharge of Tarn Lake shows the lowest observed sulfate concentration of 65 mg/L. The second lowest reported concentration occurs in the water emerging from the abandoned adit located off site at KR-23 (85 mg/L). An unnamed tributary discharging into Cache Creek along the south bank (CCT3) shows the highest $SO_4$ concentration (830 mg/L) among all site stations. Adit PS1430 shows the second highest concentration of 410 mg/L. Within the Peel and Misery tributaries, KR-17DS and KR-21 show the highest $SO_4$ concentrations at 350 and 250 mg/L, respectively.

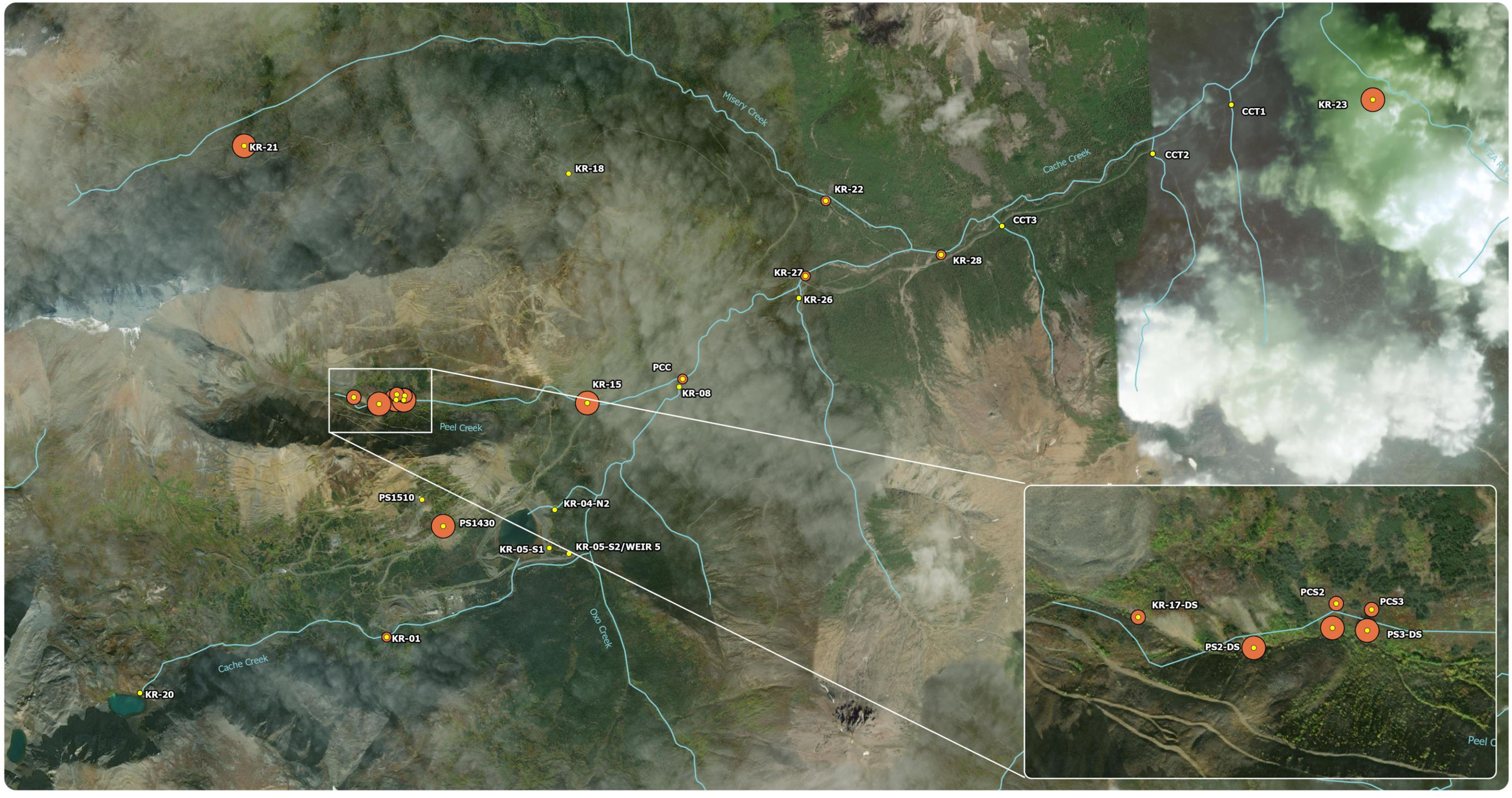



*Figure 8 - Total As concentrations in surface water samples collected by Water ResourcesBranch*

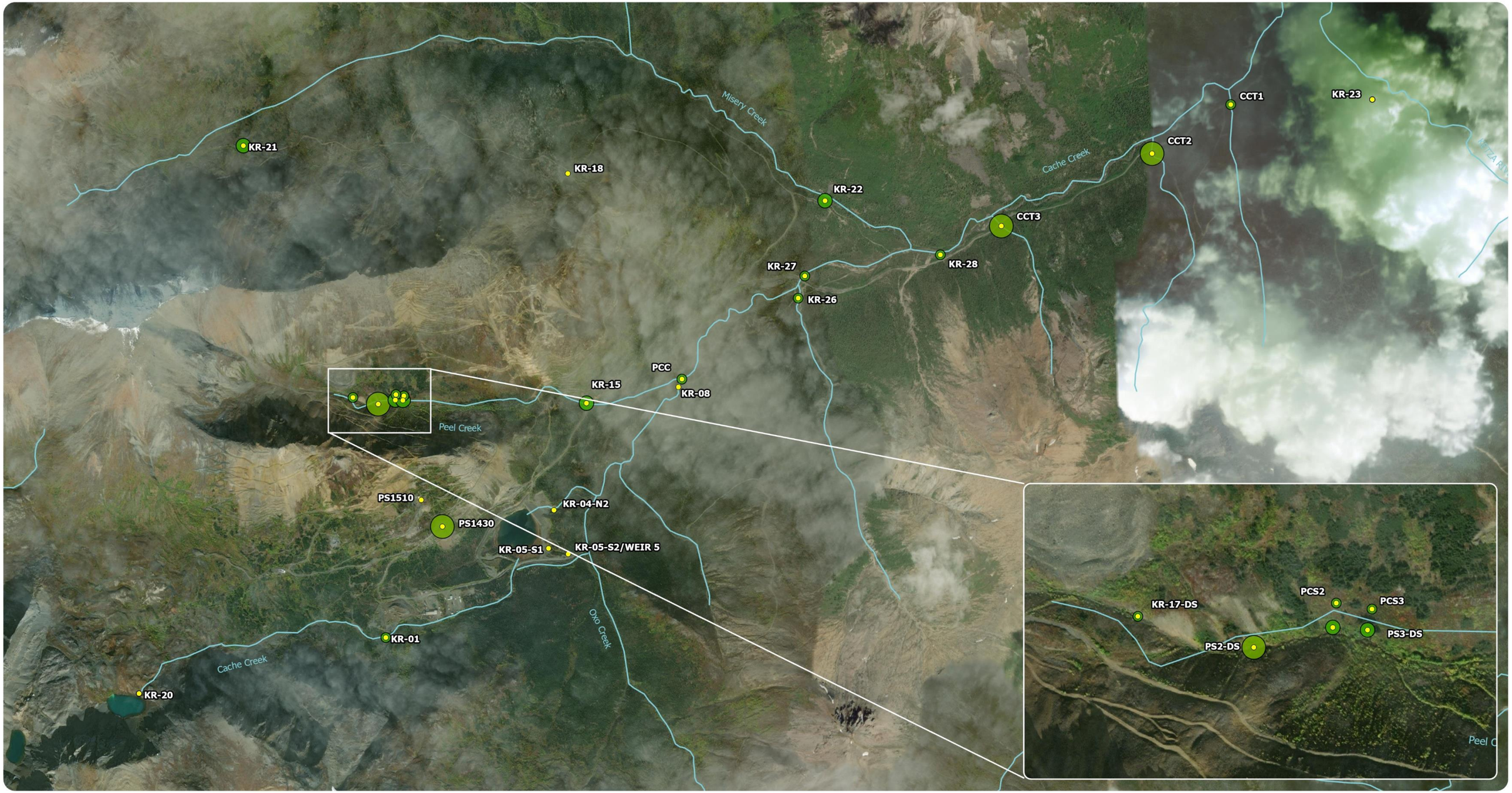



*Figure 9. Dissolved sulfate concentrations in surface water samples collected by WRB*

*Table 12. Comparison of surface water quality taken by Water Resources Branch during the August 2021 site audit that had at least one exceedance against the BC MOE Long-term, CCME, CSR and KEQS standards/guidelines*

| Parameter[1] | Water Quality Standard/Guideline (mg/L) | | | | Station | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | KR-20 | KR-01 | KR-08 | PCC | KR-26 | KR-27 | KR-28 | CCT1 | CCT2 | CCT3 | KR-17 | KR-17DS | PCS2 | PS2-DS | PCS3 | PS3-DS | KR-15 | KR-21 | KR-22 | KR-23 | PS1430 |
| | BC MOE | CCME | CSR | KEQS | Cache Creek | | | | | | | | | | Peel Creek | | | | | | | Misery Creek | | Adits | |
| Aluminum[2] | * | N/A | N/A | N/A | 0.043 | 0.00436 | 0.00304 | 0.0546 (BC MOE) | 0.00174 | 0.0762 (BC MOE) | 0.14 (BC MOE) | 0.00154 | 0.00211 | 0.0031 | 0.001 | 0.00662 | 0.00133 | 0.0277 | 0.00126 | 0.0162 | 0.069 (BC MOE) | 0.00153 | 0.228 (BC MOE) | 0.00152 | 0.00156 |
| Aluminum | N/A | * | N/A | N/A | 0.0636 | 0.0055 | 0.0046 | 0.44 (CCME) | 0.0028 | 0.262 (CCME) | 0.987 (CCME) | 0.0034 | 0.0085 | 0.0043 | 0.0013 | 0.0075 | 0.0012 | 0.0493 | 0.0011 | 0.0273 | 0.422 (CCME) | 0.0041 | 2.69 (CCME) | 0.014 | 0.0032 |
| Antimony | N/A | N/A | 0.02 | N/A | 0.00005 | 0.00039 | 0.00022 | 0.00019 | 0.00028 | 0.00022 | 0.00020 | 0.00092 | 0.00028 | 0.00021 | 0.00010 | 0.00018 | 0.00007 | 0.00013 | 0.00007 | 0.00012 | 0.00016 | 0.00038 | 0.00022 | 0.0411 (CSR) | 0.00024 |
| Arsenic | N/A | 0.005 | 0.005 | 0.5 | 0.00205 | 0.013 (CCME, CSR) | 0.0145 (CCME, CSR) | 0.0192 (CCME, CSR) | 0.00036 | 0.0159 (CCME, CSR) | 0.0134 (CCME, CSR) | 0.00100 | 0.00014 | 0.00029 | 0.0225 (CCME, CSR) | 0.0277 (CCME, CSR) | 0.0209 (CCME, CSR) | 0.0353 (CCME, CSR) | 0.0243 (CCME, CSR) | 0.0284 (CCME, CSR) | 0.0444 (CCME, CSR) | 0.0397 (CCME, CSR) | 0.0134 (CCME, CSR) | 0.0411 (CCME, CSR) | 0.269 (CCME, CSR) |
| Cadmium | N/A | * | * | N/A | 0.00016 (CSR) | $9.1*10^{-6}$ | 0.00004 | 0.00026 | <MDL | 0.00015 | 0.00034 | $5.8*10^{-6}$ | <MDL | <MDL | <MDL | $7.3*10^{-6}$ | <MDL | 0.00001 | <MDL | $6.2*10^{-6}$ | 0.00020 | $6.5*10^{-6}$ | 0.000767 (CSR) | 0.00002 | 0.00015 |
| Cobalt | 0.004 | N/A | 0.0009 | N/A | 0.00146 (CSR) | 0.00002 | 0.00003 | 0.0151 (CSR, BC MOE) | 0.00003 | 0.00789 (CSR, BC MOE) | 0.00994 (CSR, BC MOE) | 0.00002 | 0.00004 | 0.00003 | 0.00002 | 0.00068 | 0.00002 | 0.00144 (CSR) | 0.00002 | 0.00092 (CSR) | 0.0156 (CSR, BC MOE) | 0.00003 | 0.0154 (CSR, BC MOE) | 0.00008 | 0.00025 |
| Copper | N/A | * | * | 0.003 | 0.00040 | 0.00016 | 0.00015 | 0.00131 | 0.00005 | 0.00076 | 0.00651 (CCME) | 0.00008 | 0.00006 | <MDL | 0.00008 | 0.00016 | <MDL | 0.00012 | <MDL | <MDL | 0.00398 | 0.00011 | 0.0185 (CCME, CSR) | 0.00366 | 0.00016 |
| Iron | N/A | 0.3 | N/A | N/A | 0.0821 | 0.0078 | 0.0039 | 1.09 (CCME) | 0.0155 | 0.592 (CCME) | 0.375 (CCME) | 0.0196 | 0.0291 | 0.0027 | <MDL | 0.246 | <MDL | 2.56 (CCME) | <MDL | 1.38 (CCME) | 3.23 (CCME) | 0.0133 | 0.0465 | 0.188 | 0.256 |
| Fluoride | * | N/A | * | N/A | 0.028 | 0.046 | 0.048 | 0.11 | 0.027 | 0.09 | 0.12 | 0.12 | 0.084 | 0.16 | 0.029 | 0.067 | 0.023 | 0.055 | 0.026 | 0.046 | 0.21 | 0.04 | 0.17 | 0.5 (CSR) | 0.81 (CSR)) |
| Lead | * | * | * | 0.2 | 0.00003 | 0.00003 | 0.00001 | 0.00042 | 0.00004 | 0.00023 | 0.00023 | 0.00060 | 0.00014 | 0.00004 | <MDL | $5.8*10^{-6}$ | $6.5*10^{-6}$ | 0.00001 | <MDL | <MDL | $9.2*10^{-6}$ | 0.00002 | 0.00028 | 0.0133 (CCME) | $5.6*10^{-6}$ |
| Selenium | 0.002 | 0.001 | 0.001 | N/A | 0.00007 | 0.00035 | 0.000701 | 0.00064 | 0.00047 | 0.00075 | 0.00074 | 0.00086 | 0.00098 | 0.00102 (CCME, CSR) | 0.00139 (CCME, CSR) | 0.00063 | 0.00117 (CCME, CSR) | 0.00096 | 0.00096 | 0.00104 (CCME, CSR) | 0.00060 | 0.00195 (CCME, CSR) | 0.00095 | 0.00019 | 0.00061 |
| Sulphate[2] | * | N/A | 100 | N/A | 65 | 110 (CSR) | 140 (CSR) | 190 (CSR) | 130 (CSR) | 160 (CSR) | 180 (CSR) | 160 (CSR) | 370 (CSR) | 830 (CSR) | 190 (CSR) | 350 (CSR) | 150 (CSR) | 260 (CSR) | 170 (CSR) | 240 (CSR) | 280 (CSR) | 250 (CSR) | 210 (CSR) | 85 | 410 (CSR) |
| Zinc[2] | N/A | * | N/A | N/A | 0.00704 | 0.00056 | 0.00208 | 0.0366 (CCME) | 0.00016 | 0.0173 (CCME) | 0.0131 | 0.0007 | 0.00115 | 0.0018 | <MDL | 0.00053 | <MDL | 0.00183 | <MDL | 0.00122 | 0.0188 | 0.0012 | 0.0107 | 0.00653 | 0.0472 (CCME) |

Note: 1-All metals reported are as total metals unless labelled otherwise; ;2 – dissolved parameter; mg/L – milligrams per litre; BC MOE – British Columbia Ministry of Environment Long-term Water Quality Guideline for Freshwater Aquatic Life; CCME - Canadian Council of Ministers of the Environment Protection of Freshwater Aquatic Life; CSR - Yukon Contaminated Sites Regulations Schedule 3 Protection of Aquatic Life; KEQS – Ketza Effluent Quality Standards; <MDL – concentration below method detection limit; N/A – not applicable; '*' - calculated standard (Appendix A). Only parameters with exceedances or potential exceedance are shown. Highlighted values are either in exceedance or potential exceedance with the indicated standard/guideline in brackets; CSR standard values were divided by 10 to remove the dilution factor for surface water (YG 2020). Dissolved hardness, field pH and field temperature were used to calculate CCME guidelines where required.

#### *3.2.1.3 Peel and Misery Creek Seeps*

All of the major seeps flowing into Peel Creek in the headwaters consisted of clear water and the substrate was not discoloured from any precipitates in the flow section from seep source to confluence with Peel Creek. Algal growth was observed on the substrate and mosses growing along the flow path (photos 101-111, Appendix A). At the furthest downstream station on Peel Creek before its confluence with Cache Creek (KR-15), sediments and vegetation at this station were completely covered in red precipitate sourcing from the region of red seeps located between KR-17DS and PS2-DS. This is likely due to the groundwater seeps slowly reacting to oxygen upon daylighting from ground and ferric precipitates forming further along the creek.

In the Misery Creek sub catchment, the water appeared clear and the substrate unstained at the furthest upstream sampling site in the catchment (KR-21) (photos 47-50, Appendix A). A large seep area was observed on the uphill side of the access road leading to KR-21, at which the water was a milky white colour changing to a rusty orange (photos 51-56, Appendix A). Substrate in the Misery Creek tributary sampled by KR-18 was stained red, and no noticeable growth of periphyton was observed (photos 36-41, Appendix A). White and brown precipitates were observed to be covering the streambed sediments in Misery Creek after the confluence of the tributary and the main flow path, persisting to the lowest reaches of Misery Creek (photo 132, Appendix A).

### 3.2.2 Groundwater Quality

#### *3.2.2.1 In-situ Field Measurements*

Hemmera collected groundwater and stable isotope samples at each of the routine groundwater monitoring stations during the monthly sampling session from August 3 to 6, 2021. Comparison of field parameter measurements with applicable site guidelines was not a part of the reporting requirements for the site groundwater monitoring. In-situ field parameters measured by Hemmera are provided in Table 13.

*Table 13. Groundwater field parameters measured by Hemmera during the 2021 site audit*

| Station ID | Air Temp (°C) | Water Temp (°C) | DO (mg/L) | SPC (µs/cm) | pH | ORP (mV) | Turbidity (NTU) |
|---|---|---|---|---|---|---|---|
| 1510 Portal Well | | 8 | 8.72 | 885 | 7.59 | 157.5 | 1.72 |
| BH-10-01A | | 5.5 | 6.47 | 1090 | 7.3 | 72.3 | 784 |
| BH-10-02 | | 2.6 | 2.53 | 895 | 7.7 | -101.5 | 97.63 |
| BH-10-05 | | 2.4 | 7.35 | 686 | 7.49 | 46.9 | 618 |
| Core Shack Well | | 8.7 | 9.37 | 436 | 7.72 | 9.37 | 0 |
| GT-10-01 | | 7.1 | 1.95 | 1532 | 7.47 | 124.9 | 17.28 |
| GT-10-06A | | 6.8 | 7.36 | 3089 | 12.19 | -41 | 48.6 |
| HYD-08-01A | | 6 | 3.58 | 1067 | 7.21 | 116 | 24.75 |
| HYD-08-01B | | 7.6 | 0.37 | 1043 | 7.17 | -34.6 | 62 |
| HYD-08-02 | | 6.7 | 6.83 | 523 | 7.03 | 148.1 | 56.65 |
| HYD-08-04A | | 4.1 | 5.35 | 1143 | 7.36 | 283 | 133 |
| HYD-08-06A | | 3.4 | 3.69 | 1961 | 7.36 | -9.6 | 188.7 |
| HYD-08-08 | | 5.5 | 3.32 | 1183 | 6.02 | 143.7 | 0 |
| HYD-08-09A | | 6.9 | 10.59 | 653 | 5.09 | 146.2 | 0 |
| HYD-08-10 | | 8.2 | 5.36 | 1667 | 2.68 | 581.2 | 39.65 |
| HYD-08-11A | | 3.7 | 7.59 | 753 | 3.74 | 474.9 | 114.85 |
| HYD-08-17 | | 3.4 | 1.1 | 1061 | 6.82 | -55.9 | 147.97 |
| KR-05-688 | | 4.6 | 6.21 | 1304 | 7.26 | 152.2 | 0 |
| New Camp Water Well | | 29.5 | 5.71 | 764 | 7.46 | 72.6 | 0 |
| P90-7B | | 9.8 | 5.9 | 337 | 7.64 | 133.8 | 62.36 |
| P90-8 | | 9.6 | 2.48 | 926 | 7.49 | -142.7 | 386 |
| P96-12A | | 3.8 | 3.07 | 916 | 7.48 | 134.3 | 93.13 |
| P96-12B | | 4.4 | 3.69 | 981 | 7.59 | 47.8 | 7.7 |
| Upper Mill Well | | 6.2 | 5.2 | 964 | 7.83 | -78.9 | 0 |

*Note: Temp – temperature; DO – dissolved oxygen; SPC – specific conductance (converted from Hemmera's field notes, which were recorded in conductivity); ORP – oxidation reduction potential; °C – degrees Celsius; mg/L – milligrams per litre; µS/cm – micro Siemens per centimeter; mV – milli volts; NTU – nephelometric turbidity units*

Although guidelines for GW field parameters were not applied by Hemmera, field readings differ greatly from those collected at surface water sites. Most notably, the pH measured at the GT-10-06A is basic (12.19). Inversely, the pH values measured at wells HYD-08-09A, HYD-08-10, and HYD-08-11A are acidic, with values ranging from 2.68 to 5.09. The cause of the high pH values is not known, but the low pH values

associated with the aforementioned wells, accompanied by their generally higher dissolved metal concentrations, are likely indicative of acid rock drainage.

#### *3.2.2.2 Analytical Results*

A summary of the analytical results of the August 2021 GW sampling program carried out by Hemmera area is attached as Appendix J (Hemmera, 2021). Arsenic exceeds one or more applicable guidelines at the majority of the sampled sites, as does $SO_4$. The wells with lower pH values show generally the highest concentrations of dissolved As, followed by the wells with the highest pH. Measured SPC values and dissolved concentrations of other elements generally followed the same trend of lower pH resulting in higher concentrations. Other prominent exceedances of one or multiple applicable guidelines occurring across several wells included the COPCs Al, Cu, Fe, and Zn.

Wells in the Peel Creek catchment (HYD-08-08, -09A, -10, -11A, and GT-10-01) show some of the highest occurrences of guideline exceedances. In particular, the three wells closest to Peel Creek (-09A, -10, -11A) exceed guidelines for Al, As, Cd, F, and Zn.

### 3.2.3 Hydrology

#### *3.2.3.1 Flow Measurements*

Water Resources Branch conducted flow measurements and estimates in the Cache Creek basin from above the Peel Creek confluence to above the Ketza River confluence (Figure 10, Table 14). Weather and flow conditions were likely representative of typical late-summer at the site. Heavy rain occurred in the region during the week prior to the visit and there was moderate rainfall in the evening of 2021-08-30. The following two days were dry, with air temperatures ranging from 3°C to 14°.

Detailed information for every flow measurement collected by Branch staff between August 31 and September 1, 2021 is presented in Appendix F.

##### 3.2.3.1.1 Peel Creek

Water Resources Branch used salt dilution gauging measurements in the upper section of Peel Creek to estimate the contribution of seepages on the northern slope of the creek (Figure 10, Table 14) on 2021-08-31. The uppermost station, KR-17, had low

flow (3L/s) and the flowrate seeping out of an iron-rich-looking talus slope 50 m downstream of KR-17 was approximately 5 L/s. The other two major seeps contribute about 10 L/s each to Peel Creek flow. Salt dilution gauging results at KR-15 were rejected since measurement quality did not meet quality standards; however, discharge was estimated in the lower reach of Peel Creek (44 L/s) by calculating the difference between discharge measurements in Cache Creek above and below Peel confluence (Table 14). At the time of sampling, Peel Creek contributed approximately 9% of Cache Creek flow after its confluence, based on pre- and post-confluence discharge results.

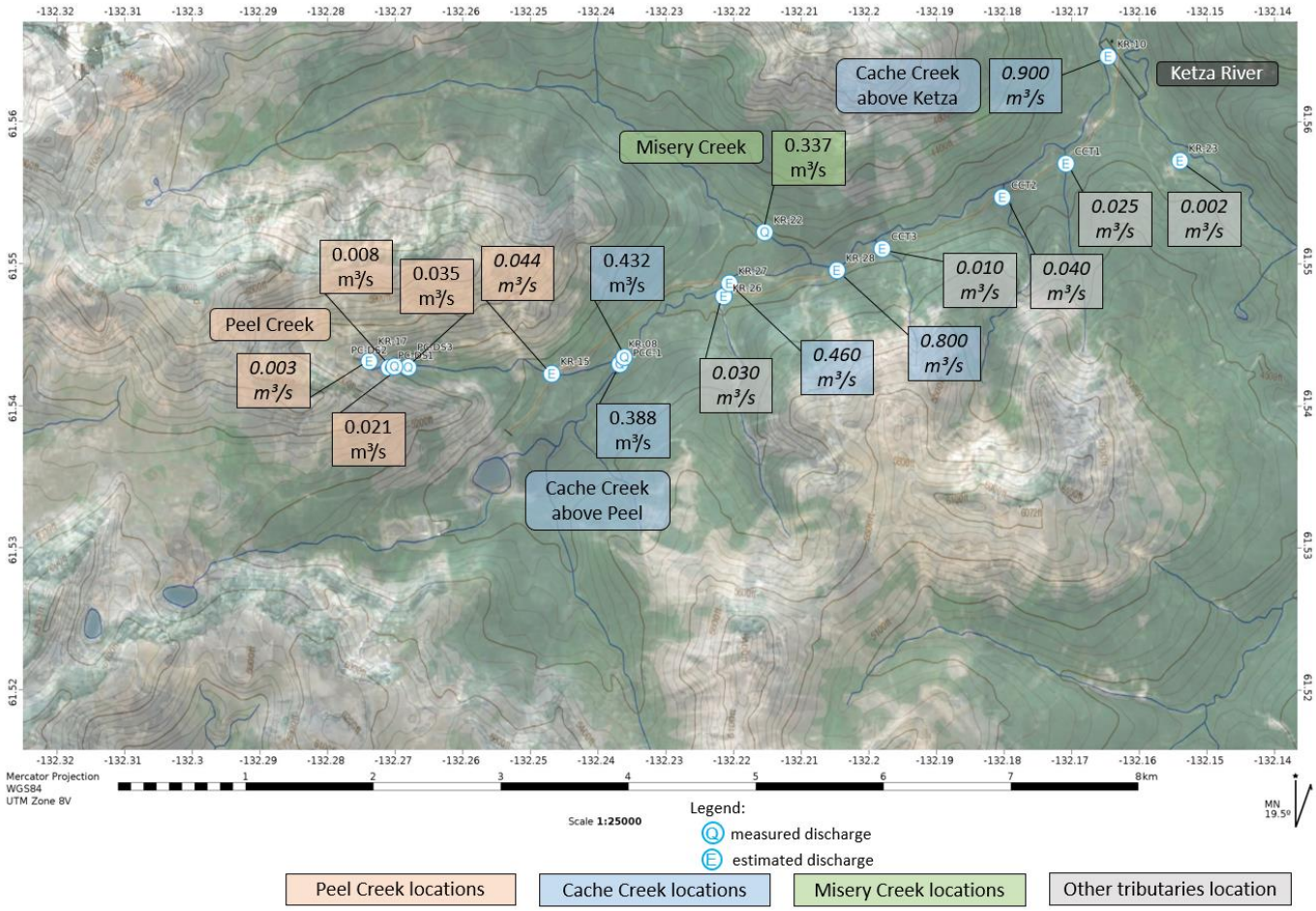



*Figure 10. Map of flow measurements and estimates (italicized) on 2021-08-31 and 2021-09-01*

### 3.2.3.1.2 Misery Creek

Velocity-area cross-section measurements downstream of station KR-22 on 2021-09-01 (Figure 10, Table 14) indicate that Misery Creek (0.337 m³/s) contributed

approximately 42% of Cache Creek flow downstream of their confluence (estimated 0.800 m³/s) at the time of sampling.

#### 3.2.3.1.3 Cache Creek

Two standard measurements were completed in Cache Creek above and below Peel Creek confluence. In combination with other measurements and estimates (Figure 10, Table 14), we aim at representing flow patterns in late-summer conditions between stations KR-08 (approximately 1.5 km downstream of TSF – 0.388 m³/s measured) and KR-10 (approximately 0.2 km U/S of the Cache/Ketza confluence – 0.900 m³/s estimated).

*Table 14. Summary of flow measurements and estimates during August 2021 site visit*

| Sample ID – Description (upstream to downstream order) | Observation date-time | Discharge ($m^3$/sec) | Measurement Method | Contribution to downstream sites (% of Q post-confluence) |
|---|---|---|---|---|
| KR-08 - Cache Creek upstream of Peel | 2022-08-31 10:24 | 0.388 | Velocity-Area | 90% of PCC-1 |
| KR-17 – Peel Creek Upper | 2021-08-31 18:15 | 0.003 | Estimate (visual) | 7% of KR-15 |
| PC-DS1 – Peel Creek upstream of Seep 2 | 2021-08-31 18:15 | 0.008 | Salt Dilution | 18% of KR-15 |
| Seep 2 (Peel Creek Valley) | 2021-08-31 14:40 | 0.010 E | Estimate (visual) | 23% of KR015 |
| PC-DS2 – Peel Creek downstream of Seep 2 | 2021-08-31 14:35 | 0.021 | Salt Dilution | 48% of KR-15 |
| Seep 3 (Peel Creek Valley) | 2021-08-31 14:00 | 0.010 E | Estimate (visual) | 23% of KR-15 |
| PC-DS3 – Peel Creek downstream of Seep 3 | 2021-08-31 13:53 | 0.035 | Salt Dilution | 80% of KR-15 |
| KR-15 - Peel Creek at Road | 2021-08-31 11:55 | 0.044 E | Estimate (difference between PCC-1 and KR-08) | 10% of PCC-1 |
| PCC-1 - Cache Creek downstream of Peel | 2021-08-31 9:23 | 0.432 | Velocity-Area | 94% of KR-27 |
| KR-26 - East Tributary Unnamed | 2021-09-01 13:20 | 0.030 E | Estimate (visual) | 6% of KR-27 |

| Sample ID – Description (upstream to downstream order) | Observation date-time | Discharge ($m^3$/sec) | Measurement Method | Contribution to downstream sites (% of Q post-confluence) |
|---|---|---|---|---|
| KR-27 – Cache Creek at Bridge | 2021-09-01 12:40 | 0.460 E | Estimate (visual with combined upstream meas.) | 58% of KR-28 |
| KR-22 - Misery Creek | 2021-09-01 15:34 | 0.337 | Velocity-Area | 42% of KR-28 |
| KR-28 – Cache Creek downstream of Misery | 2021-09-01 12:10 | 0.800 E | Estimate (visual with combined upstream meas.) | 89% of KR-10 |
| CCT3 - Small tributary east unnamed | 2021-09-01 11:30 | 0.010 E | Estimate (visual) | 1% of KR-10 |
| CCT2 - Small tributary east unnamed | 2021-09-01 10:50 | 0.040 E | Estimate (visual) | 4% of KR-10 |
| CCT1 - Small tributary east unnamed | 2021-09-01 10:50 | 0.025 E | Estimate (visual) | 3% of KR-10 |
| KR-10 – Cache Creek upstream of Ketza River confluence | 2021-09-01 09:45 | 0.900 E | Estimate (visual with combined upstream Q | - |
| KR-23 | 2021-09-01 09:15 | 0.002 E | Estimate (visual) | - |

#### *3.2.3.2 Assessment of Hydrology Monitoring Locations*

A complete summary of the assessment of the hydrometric monitoring network at the Ketza River Mine site is presented in Appendix G.

In our desktop and on-the-ground assessment, we have identified six essential locations (KR-12, -10, -22, -15, -08, -13) for continuous hydrometric monitoring and two locations that would be beneficial (KR-14 and KR-01) to complement the network (Figure 11 and

Table 15). The current equipment at every hydrometric station that was installed on site in 2012 was too deteriorated to be re-used in a future network. New infrastructure, stilling wells, staff gauges and pressure transducers are required.

In addition to the six essential stream locations, discharge logs (recorded by care and maintenance staff) of the water treatment plant by the tailings storage facility (TSF) should also be incorporated in the hydrometric dataset (site KR-09A located immediately downstream of KR-13). The dataset consists of daily entries for the pump flowrate and total treated volume from 2015 to present.

Figure 11 presents locations where continuous monitoring of stage and rating curve development are needed. Three priority ranks, (1) Essential, (2) Beneficial and (3) Not required, have been assigned with best judgment based on flow patterns observed and estimated in order to represent hydrological conditions on site with reasonable accuracy. Following the 2022 field visit, we have also identified substantial changes in channel morphology at Peel Creek station KR-15 and Cache Creek stations KR-10 and KR-12. Table 15 summarizes assessment findings and recommendations for each stations, where Appendix G presents further details on the stations and channel conditions, and recommendations for continuous hydrometric monitoring re-deployment.

Current Ketza River location KR-12 in the middle of a wetland and/or flood plain does not appear adequate for hydrometric monitoring (site labelled “KR-12 old” in Figure 11). Substantial bank erosion immediately downstream of KR-12 would also be detrimental for establishing a stable stage-discharge relationship. Water Resources Branch investigated an alternative location downstream (site labelled “KR-12 new” in Figure 11 at coordinates 1.57907°, -132.17929°) that presents a long, straight reach with no sign of gravel bars, braiding, bank erosion or flood plain. The proposed location “KR-12 new” would include an additional small tributary entering Ketza River below “KR-12 old” on the right downstream edge, as well as the flow through the wetland possibly not captured at the current location.

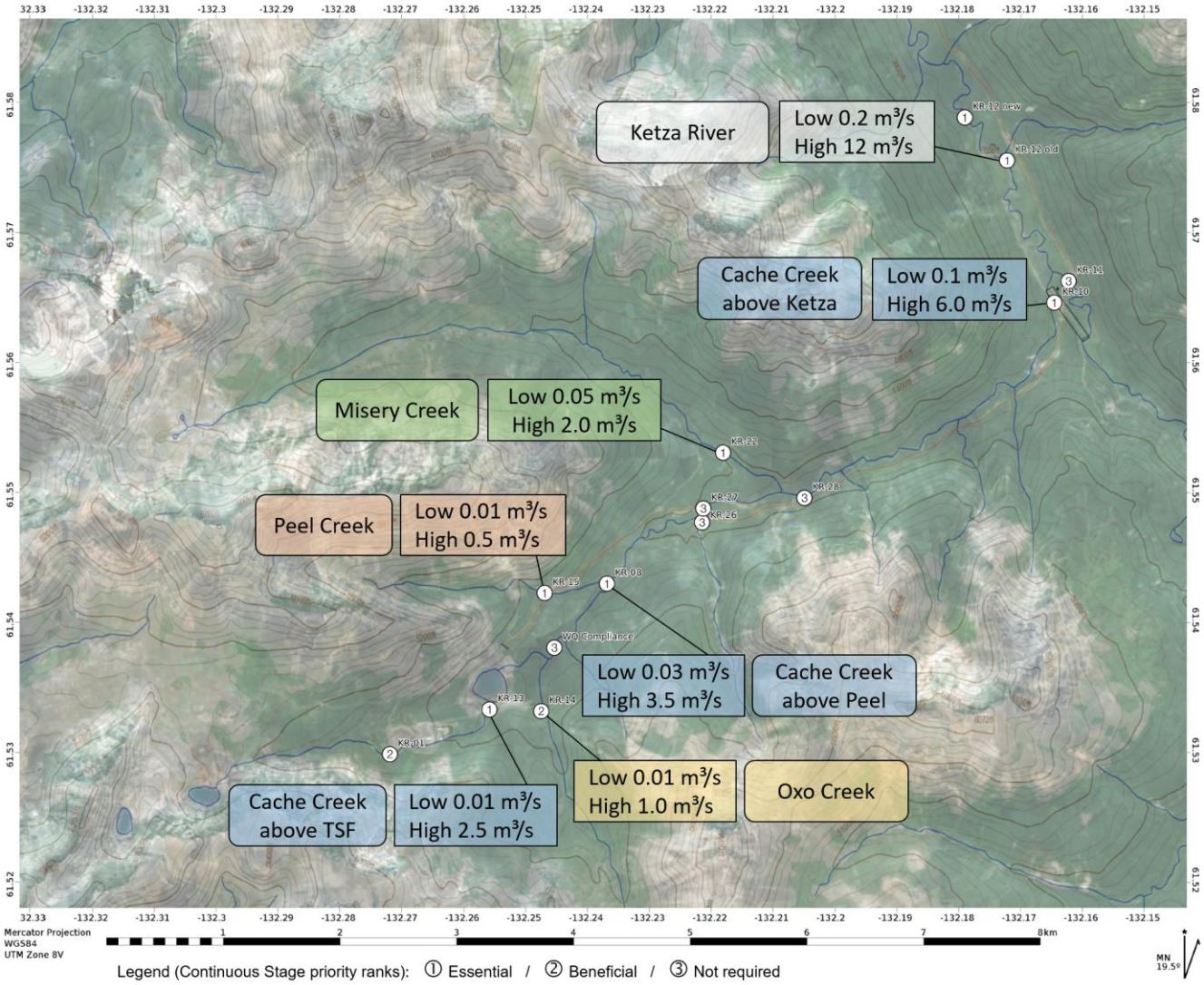



*Figure 11. Flow ranges based on 2012 estimated minimum and peak discharge (EBA 2013) and prioritization of stations locations.*

*Table 15. Current conditions and recommendations for continuous stage and rating curve development (derived continuous discharge in open-water channel conditions) for Ketza River Mine site hydrometric monitoring locations*

| Station name – Location | Continuous Monitoring Priority | Rationale for location, condition and recommendation (continuous hydrometric network) |
|---|---|---|
| KR-12 – Ketza River d/s Cache | 1 – Essential | Quantify Cache Creek contribution to Ketza River.<br>Current location inadequate (wetland floodplain).<br>Relocate hydro station downstream channel is more stable and contained.<br>Develop Rating Curve to derive continuous discharge. |
| KR-11 – Ketza River u/s Cache | 3 – Not required | Could be beneficial for KR-12 & KR-10 QAQC.<br>Discrete flow measurements in conjunction to WQ sampling should suffice. |
| KR-10 – Cache Creek u/s Ketza | 1 – Essential | Monitor total flow leaving the mine property.<br>Relocate hydro station upstream nearby: find better gauging pool for sensor.<br>Develop Rating Curve to derive continuous discharge. |
| KR-28 – Cache Creek d/s Misery | 3 – Not required | Redundant (estimate flow with sum of KR-08,-15,-26,-22). |
| KR-22 – Misery Creek | 1 – Essential | Significant tributary (WQ & Q).<br>Contributes to Arsenic loading of Cache Creek.<br>Current location needs infrastructure improvements.<br>Develop Rating Curve to derive continuous discharge. |
| KR-27 – Cache Creek u/s Misery | 3 – Not required | Redundant (estimate flow with sum of KR-08,-15,-26) |
| KR-26 – Unnamed Tributary from South | 3 – Not required | Not a substantial tributary (minimal impact on Cache WQ & Q). |
| KR-15 – Peel Creek at Road | 1 – Essential | Significant tributary (WQ & Q).<br>Contributes to Arsenic and Sulfates loading of Cache Creek.<br>Current gauging pool subject to aggradation: remove sediment accumulation and tweak hydraulic conditions to mitigate aggradation.<br>Develop Rating Curve to derive continuous discharge. |

| Station name – Location | Continuous Monitoring Priority | Rationale for location, condition and recommendation (continuous hydrometric network) |
|---|---|---|
| KR-08 – Cache Creek upstream of Peel Confluence | 1 – Essential | Pending inspection of new compliance station upstream: KR-08 is likely a more suitable spot for continuous stage monitoring in terms of channel stability.<br>Current location needs new infrastructure.<br>Develop Rating Curve to derive continuous discharge. |
| KR-29 Cache Creek New WQ Compliance Location | 3 – Not required | Proposed new WQ compliance station removing some of the distance between site impacts and the current water quality objective station.<br>The location would have to be downstream of where the south seepage and north seepage enter Cache Creek (e.g. downstream of Oxo Creek), but upstream of the next unnamed creek.<br>Satellite imagery not conclusive for assessing channel conditions relating to continuous stage monitoring.<br>Difference with flow monitored at KR-08 likely not substantial enough to justify dedicated hydrometric station. |
| KR-14 – Oxo Creek | 2 – Beneficial | Substantial tributary in upper basin in flow volume but less in terms of contaminants. Priority rank pending detailed analysis of upper basin.<br>Current location needs infrastructure improvements.<br>Develop Rating Curve to derive continuous discharge. |
| KR-09A – TSF discharge | Special Record (Daily) | Quantify discharge from water treatment station using existing pump flowmeter logs and daily total treated volume. Existing record from 2015 to present and to be continued as is. Flowrate ranging from 0.009 m3/s to 0.015 m3/s when operating in 2020 and 2021. Outlet in Cache Creek located downstream of KR-13 station. |
| KR-13 – Upper Cache before South Diversion and WTF discharge | 1 – Essential | Reach upstream of TSF discharge outlet and diversion channel, but downstream of mine influence (waste rock piles, mill, camp).<br>Location more suitable than KR-01 (1.1 km upstream of KR-13) for continuous hydrometric installation (constricted channel).<br>Current location needs infrastructure improvements. |
| KR-01 | 2 – Beneficial | Reach upstream of waste rock piles, mill and camp.<br>Location assessed against KR-13 (1.1 km downstream of KR-01).<br>Steep gradient and braiding channel not ideal for continuous station. Locations upstream of KR-01 not evaluated. |

*Note: hydrometric network assessment details presented in Appendix G.*

### 3.2.4 Stable Water Isotopes

Water Resources Branch analyzed samples for stable water isotopes $\delta^2H$ and $\delta^{18}O$ to support interpretations of site water movement. Stable water isotope ratios ($\delta^2H$ and $\delta^{18}O$) for the samples collected during the 2021 audit, alongside Whitehorse's Global Network of Isotopes in Precipitation (GNIP) data are presented in Figure 12. The local meteoric water line may not be fully applicable to the Ketza River Mine site due to Whitehorse's distance from the site, but no closer stations exist. The significance of these isotope data relative to the audit objectives is discussed in section 4.

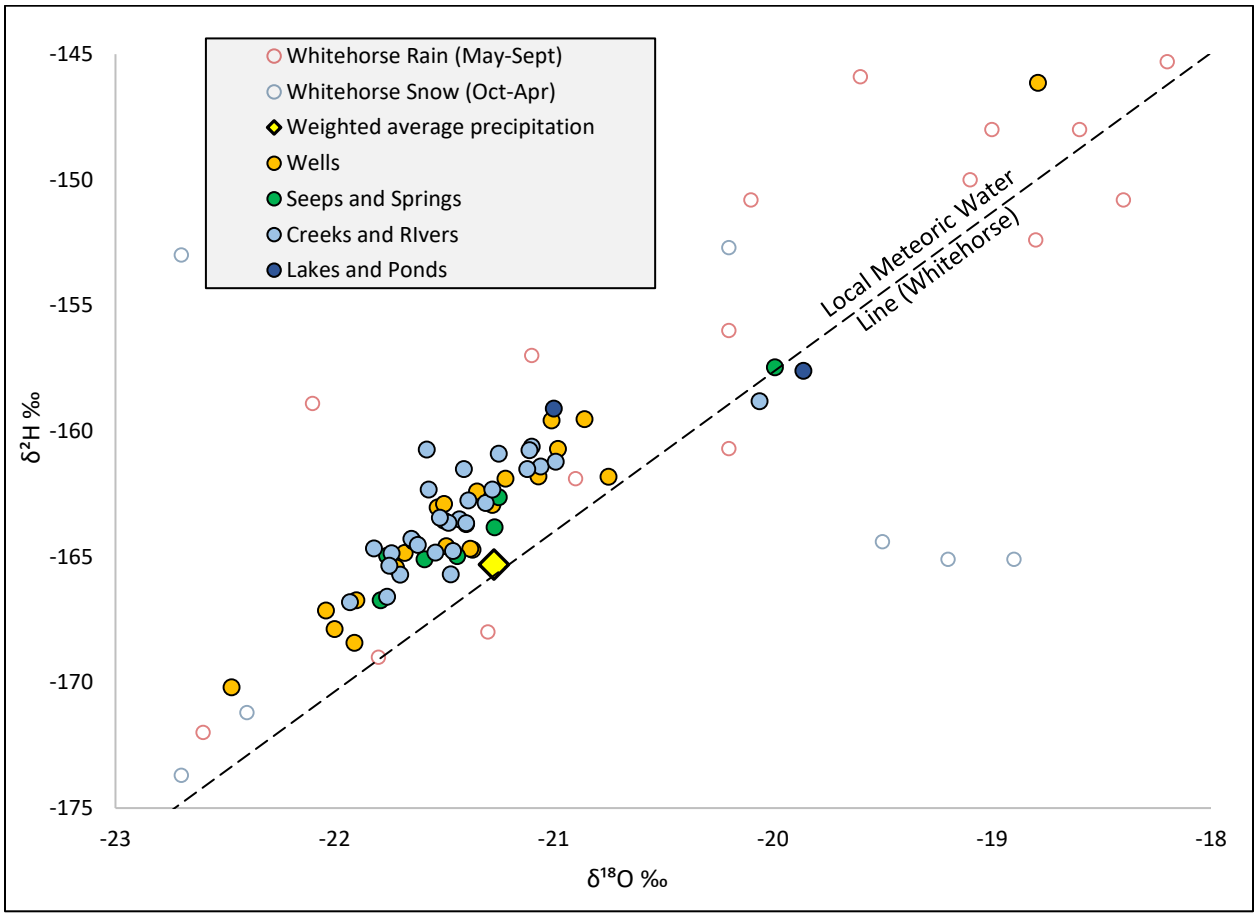



*Figure 12 - $\delta^2H$ and $\delta^{18}O$ ratios for surface water and groundwater samples (solid circles) collected during the Aug. & Sept. 2021 monitoring events and precipitation (hollow circles) from Whitehorse via the Global Network of Isotopes in Precipitation (GNIP; IAEA 2021)*

### 3.2.5 Audit QAQC

Quality assurance/quality control analyses did not identify any significant issues with data collection or analysis for this project.

### *3.2.5.1 Surface Water QAQC*

The project travel blank and field blank showed 5 and 10 parameters above detection limit respectively. However, the concentration of these parameters is small enough to limit concerns regarding sample contamination during transportation or collection.

Duplicate analysis between collected replicate samples suggest good sampling and analytical practices. Average RPD values for the two replicate surface water samples are 8.43% and 8.73% (
Table 16). Individual parameters with RPD values greater than 25% showed sufficiently low magnitudes of difference; therefore, the use of the data is acceptable.

*Table 16. QAQC results from water quality parameters collected during the August 2021 audit*

| QAQC Sample | Parameter[1] | unit | MDL | Difference Magnitude[2,3] | RPD |
|---|---|---|---|---|---|
| Travel Blank | Sulphate[4] | mg/L | <0.50 | 0.7 | N/A |
| | Strontium[4] | mg/L | <0.00005 | 0.000008 | |
| | Strontium | mg/L | <0.00005 | 0.000009 | |
| | Total Suspended Solids | mg/L | <1.0 | 0.6 | |
| | Zinc[4] | mg/L | <0.0001 | 0.00007 | |
| Field Blank | Aluminum[4] | mg/L | <0.0005 | 0.00067 | |
| | Aluminum | mg/L | <0.0005 | 0.00056 | |
| | Alkalinity-B | mgCaCO3/L | <1.0 | 0.5 | |
| | Alkalinity | mgCaCO3/L | <1.0 | 0.2 | |
| | Total Kjeldahl Nitrogen | mg/L | <0.020 | 0.002 | |
| | Nitrogen | mg/L | <0.020 | 0.002 | |
| | Strontium | mg/L | <0.00005 | 0.000007 | |
| | Total Dissolved Solids | mg/L | <1.0 | 1.0 | |
| | Uranium[4] | mg/L | <0.000002 | 0.0000004 | |
| | Zinc[4] | mg/L | <0.0001 | 0.00003 | |

| QAQC Sample | Parameter[1] | unit | MDL | Difference Magnitude[2,3] | RPD |
|---|---|---|---|---|---|
| Replicate 1 | Aluminum[4] | mg/L | <0.0005 | 0.00066 | 49.62 |
| | Aluminum | mg/L | <0.0005 | 0.00068 | 40.96 |
| | Total Kjeldahl Nitrogen | mg/L | <0.020 | 0.033 | 39.05 |
| | Total Dissolved Phosphorus | mg/L | <0.0010 | 0.0005 | 32.26 |
| | Organic Carbon[4] | mg/L | <0.20 | N/A[5] | N/A[5] |
| | Iron | mg/L | <0.001 | | |
| | Lead | mg/L | <0.000005 | | |
| | Total Suspended Solids | mg/L | <1.0 | | |
| | Zinc | mg/L | <0.0001 | | |
| Replicate 2 | Copper[4] | mg/L | <0.00005 | 0.000077 | 41.51 |
| | Iron [4] | mg/L | <0.001 | 0.0012 | 70.59 |
| | Total Kjeldahl Nitrogen | mg/L | <0.020 | 0.045 | 73.17 |
| | Nitrogen | mg/L | <0.020 | 0.044 | 39.64 |
| | Thallium[4] | mg/L | <0.000005 | 0.0000018 | 48.65 |
| | Thallium | mg/L | <0.000005 | 0.0000023 | 50.55 |
| | Tungsten | mg/L | <0.00001 | N/A[5] | N/A[5] |

*Note: 1 – reported as total parameter unless otherwise indicated; 2 –values calculated using analytical method detection limit for blanks; 3 – calculated values reflect comparison between paired replicate samples; 4 - dissolved parameter; 5 – one of the reported concentrations is below detection; N/A – not applicable*

Stable water isotope replicate samples also showed acceptable RPD values. Average RPD values for $\delta^{18}O$ and $\delta^{2}H$ were 0.19% and 0.45% respectively (Table 17).

*Table 17. QAQC results from stable water isotope samples collected during the August 2021 site visit*

| Sub-watershed | QAQC Sample | RPD | |
|---|---|---|---|
| | | $\delta^{18}O$ | $\delta^{2}H$ |
| Analytical Duplicate Samples | | | |
| Cache Creek | KR-20 | 0.10 | 0.16 |
| | 1510 Portal Well | 0.09 | 0.11 |
| | HYD-08-02 | 0.23 | 0.02 |
| | Core Shack Well | 0.09 | 0.10 |
| | KR-13 | 0.14 | 0.06 |
| | KR-09 | 0.65 | 0.43 |
| | P90-7B | 0.51 | 0.01 |
| | P96-12D | 0.14 | 0.04 |
| | KR-04-N2 | 0.09 | 0.08 |
| | BH10-2D | 0.74 | 0.23 |
| | KR-08 | 0.29 | 0.05 |
| | CCT2 | 0.65 | 0.24 |
| Oxo Creek | KR-14 | 0.28 | 0.33 |
| Peel Creek | KR-17 | 0.32 | 0.31 |
| | HYD-08-10 | 0.09 | 0.06 |
| | KR-15 | 0.14 | 0.14 |
| Unnamed Tributary | KR-26 | 0.46 | 0.33 |
| Field Replicate Samples | | | |
| Cache Creek | KR-20 | 0.33 | 0.16 |
| | KR-01 | 1.46 | 0.56 |
| | KR-09 | 0.91 | 0.55 |
| | P96-12B | 0.93 | 0.07 |
| | BH-10-02 | 1.28 | 0.08 |
| | KR-08 | 0.24 | 0.40 |
| Peel Creek | KR-17 | 0.60 | 0.11 |

*Note: QAQC – quality assurance and quality control; RPD – Relative Percent Difference; δ –isotope notation called delta*

#### 3.2.5.1.1 Field vs. lab alkalinity measurements

Field titrations were carried out on select surface water quality samples using the methods outlined in section 2.2 to corroborate laboratory results. Measurements were converted to mg/L $CaCO_3$ to facilitate comparison with lab-reported results. Lab and field values were found to closely align with all the samples within the acceptable 25% range (Table 18).

*Table 18. Comparison of alkalinity samples for in-situ measurements versus lab analysis during the August 2021 site visit*

| Sample ID | Difference Magnitude[1] | RPD |
|---|---|---|
| KR-8 | 17.9 | 11.24% |
| KR-15 | 0.8 | 0.88% |
| KR-17 | 3.3 | 2.74% |
| KR-17-DS | 0.2 | 0.21% |
| PCC | 8.4 | 7.96% |
| PCS2 | 6.8 | 5.54% |
| PCS3 | 3.3 | 2.74% |
| PS2-DS | 6.3 | 5.59% |
| PS3-DS | 2.3 | 2.04% |

*Note: 1 –values calculated as difference between the field and lab alkalinity concentrations; RPD – Relative Percent Difference; δ –isotope notation called delta*

### *3.2.5.2 Groundwater QAQC*

All laboratory QAQC parameters analyzed by Hemmera, calculated from field blanks, travel blanks, and replicate samples collected alongside regular samples, were within the acceptable range according to the August 2021 monitoring report. No systemic issues were identified with the field or travel blanks collected during the course of the sampling program.

# 4. Analysis and Discussion

## 4.1 Chemistry in Cache Creek

Cache Creek is the main water body draining the Ketza River Mine, joining Ketza River approximately 5 km east/southeast of the mine itself.

Upstream station KR-20, at the discharge of Tarn Lake, has a historical record of exceedances for Al, Cd, and Zn. Samples collected by the Branch also showed high Al concentrations at this station.

One waste rock dump (thought to be non acid generating) and one pit shell exist immediately upgradient of the lakeshore region of Tarn Lake with visible red and white precipitates. Figure 14 shows the locations of these residual mine structures (TetraTech, 2016).

Groundwater monitoring well GT-10-06A is screened in these disturbance features. Monitoring well GT-10-06A exceeds CCME guidelines for Al and Zn, among other parameters, whereas HYD-08-17, located approximately 250m north of GT-10-06A shows lesser concentrations. Isotope analysis shows similar stable water isotopic signatures between GT-10-06A, HYD-08-17, and surface water site KR-20, suggesting a potential hydraulic connection between these wells and the lake. The isotopic signature of KR-01 resembles a mixture of KR-20, KR-16, and groundwater influences. KR-13 resembles a mixture of KR-01 with seepage from the 1430 portal (PS1430) and the 1510 Portal Well. The isotope signal of KR-20 indicates that Tarn Lake is not subject to significant evaporation, suggestive of a short residence time (Figure 13). The dashed red circle indicates the discrepancy between the KR-01 samples collected by Water Resources Branch and Hemmera.

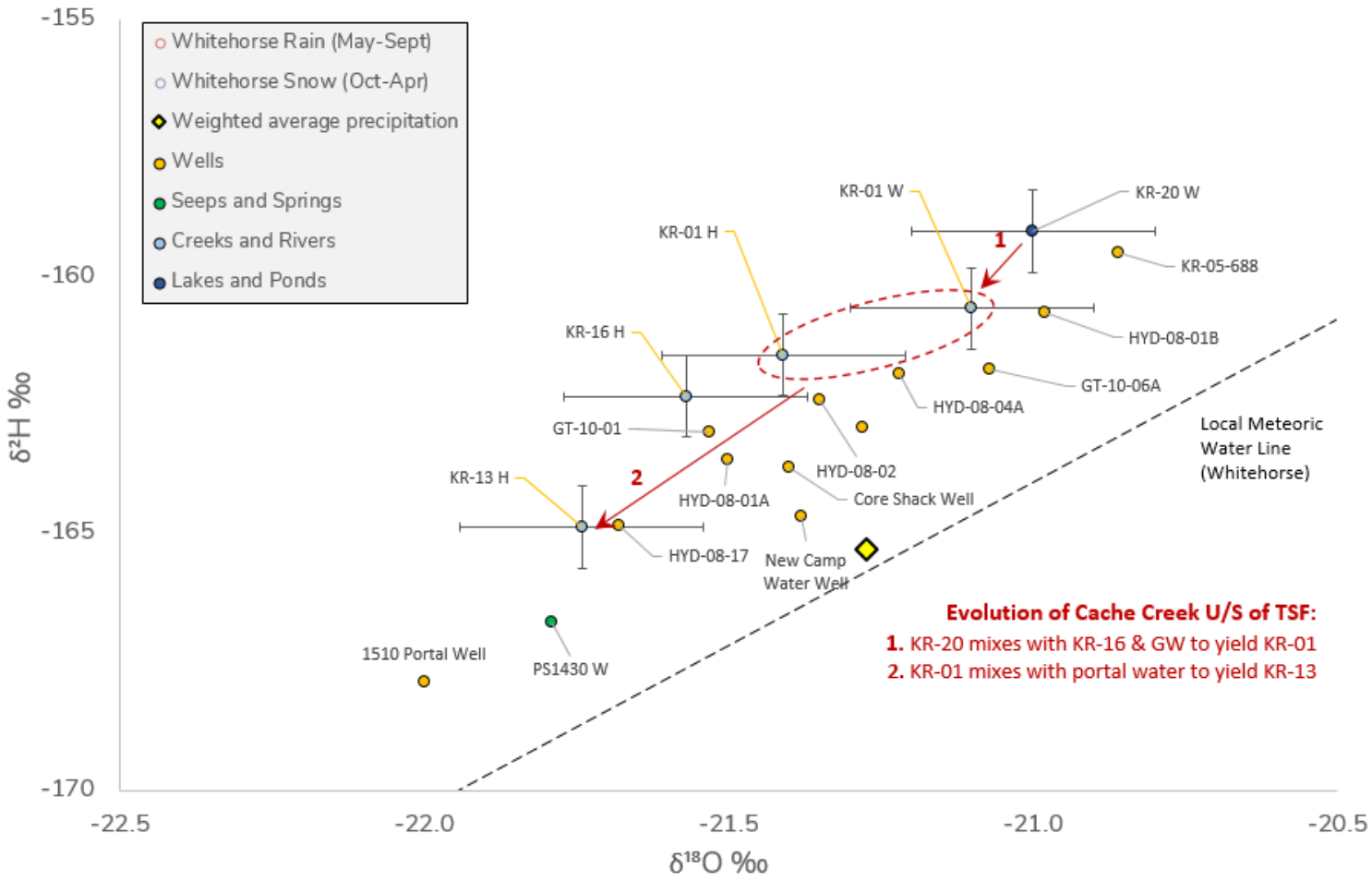



*Figure 13 - $\delta^2H$ and $\delta^{18}O$ ratios for surface water and groundwater samples collected in the Cache Creek catchment (upstream of TSF) during the Aug. & Sept. 2021 monitoring events, presented alongside GNIP data (GNIP; IAEA 2021). H designations represent isotope samples collected by Hemmera, W those collected by Water Resources Branch.*


*Figure 14. Estimated waste rock dumps and pit shells at the Ketza River Mine (TetraTech 2016)*

Based on historical records and Branch sampling results, a source of As enters Cache Creek somewhere between headwater station KR-20 and the next station downstream (KR-01). This source of As has not been conclusively identified, though the only obvious surface water input is the unnamed creek in which KR-16 is located. Figure 14 shows the hypothesized locations of waste rock dumps and pit shells, and identifies a Potentially Acid-Generating (PAG) waste rock dump on the northern slope immediately adjacent to the creek between these stations. Additional water quality samples and hydrology measurements upstream and downstream of KR-16 Creek confluence with Cache Creek could help distinguish this creek's impacts on Cache.

Cache Creek surface water quality in the TSF area has historically been characterized by elevated NH4, arsenic, and CN concentrations. Arsenic appears to be the only contaminant to persist in concentrations exceeding CCME guidelines downstream of the TSF, as per the historical record and Branch surface water quality sampling results. Downstream monitoring station KR-08, the station prior to the Peel - Cache confluence, shows high As and $SO_4$ (though not exceeding WQO's or CCME guidelines) in the historical sampling record and Branch water quality sample results. Oxo Creek and an unnamed tributary entering Cache Creek in the section of stream prior to the Peel/Cache confluence have shown elevated As and $SO_4$ concentrations in the historical sampling record, and are believed to be indicative of high background concentrations due to their lack of contact with any known mine infrastructure. Between stations KR-13 and KR-08, comprising Cache Creek's entire TSF flow section, As increases from 0.013 to 0.0145 mg/L, and $SO_4$ increases from 110 to 140 mg/L. This suggests a moderate source of $SO_4$ and a lesser source of As from the two unnamed tributaries.

Groundwater in the periphery of the TSF, based on limited data available from piezometer and monitoring well samples, does not appear to be impacted by TSF waters. The lack of background wells directly upstream of the TSF limits determination of pre-TSF contaminant levels. Wells HYD-08-04A and HYD-08-06A, cross-gradient from the TSF, show similar arsenic concentrations and higher sulfate concentrations than the piezometers in the TSF. The isotope signatures for the wells in the TSF and those located cross-gradient are relatively similar (ie. highly evaporated, enriched in heavier isotopes), which may indicate some hydrogeological connection. This hydraulic

connection has been observed within the tailings pond as upwellings in several locations as well as water level increases in the pond during winter months

The isotopic signature of KR-08, the station downstream of the TSF but upstream of PCC, appears to be a mix of several sampling sites local to the TSF including KR-13, KR-09A, TSF seepage KR-05-S1, Oxo Creek (KR-14), and local groundwater. The isotope sample collected from P90-8 appears to closely resemble rain water, indicative of poor isolation of the screened piezometer interval from infiltrating rain water.

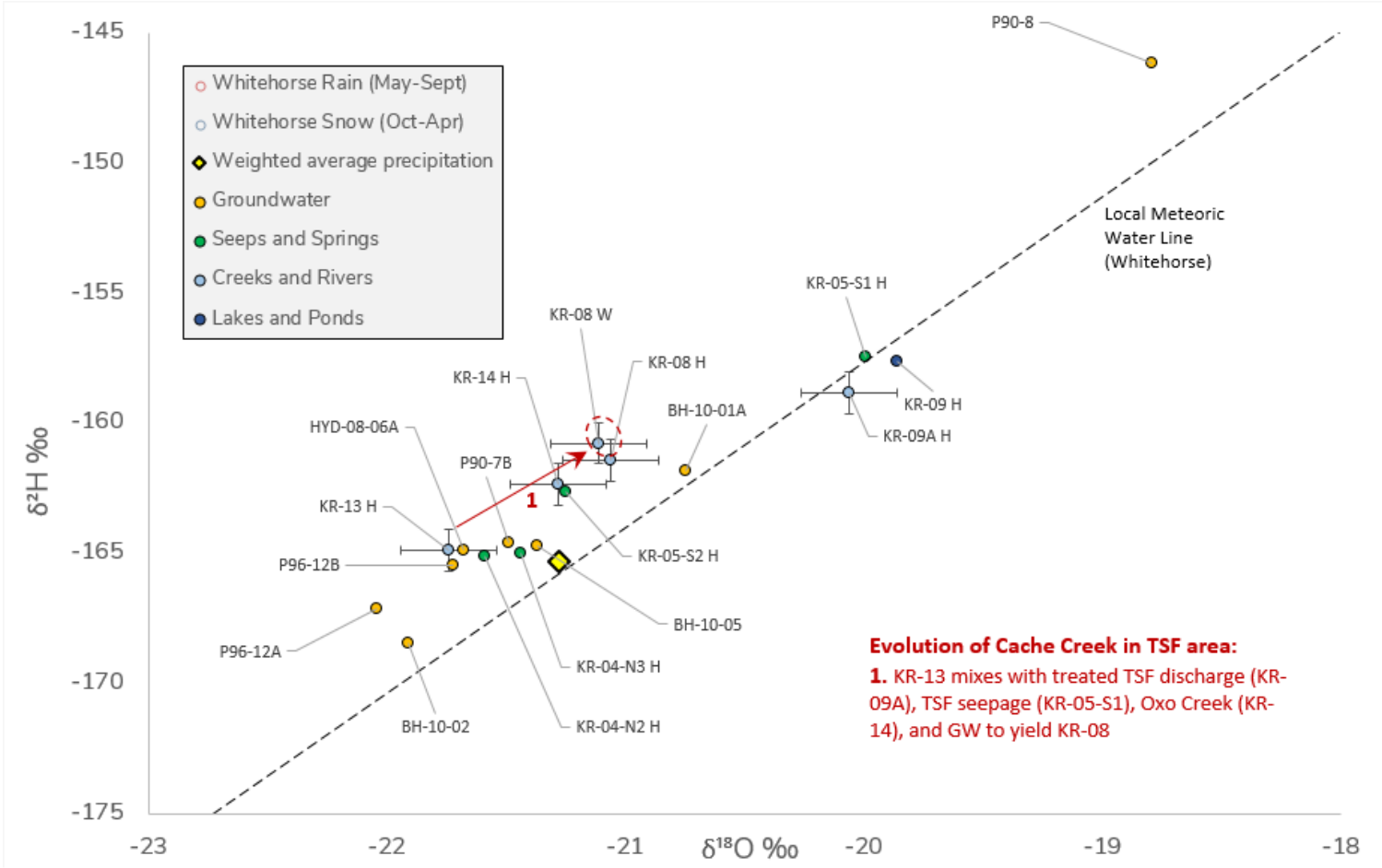



*Figure 15. Figure 1: $\delta^2H$ and $\delta^{18}O$ ratios for surface water and groundwater samples (solid circles) collected in the Cache Creek catchment (TSF area) during the Aug. & Sept. 2021 monitoring events and Whitehorse GNIP data (GNIP; IAEA 2021).*

Although Peel Creek contributes only approximately 9% of the Cache Creek flow following their confluence, Cache Creek's geochemistry is significantly influenced by the influx of Peel Creek at station PCC (located just downstream of the confluence mixing zone of the two watercourses). Peel Creek shows frequent historical guideline

exceedances for As, Al, Cd, Cu, Fe, and Zn, and moderate seasonal fluctuations in these concentrations. Samples collected by Water Resources Branch showed guideline exceedances for Al, As, Co, Fe, SO4, and Zn at Peel Creek Station KR-15 and Cache Creek station PCC. These exceedances indicate Peel Creek exerts a strong influence over contaminant concentrations in Cache Creek, further discussed in section 4.2. After station PCC, the streambed of Cache Creek was covered in an orange precipitate, decreasing in prevalence as flow progressed downstream.

Peel Creek does not appear to strongly impact the isotopic composition of Cache Creek after station PCC based on the close isotopic proximity of stations KR-08 and PCC, stations showing Cache Creek's pre-mixing and post-mixing conditions respectively.

Misery Creek enters Cache Creek between stations KR-27 and KR-28. Misery Creek is characterized by high As and Se along the entire flow path in the historical sampling record. Samples collected by the Branch showed increases in Cu and Al between the two stations, and comparable concentrations of As, Fe, $SO_4$, and Zn, which is consistent with historic data. KR-22, the furthest downstream station on Misery Creek before its confluence with Cache Creek, shows elevated Al, Cd, and Co concentrations in the historical record and in Branch 2021 samples. The concentrations of these parameters are reduced (although remaining above guideline levels) through dilution after confluence with Cache Creek. Misery Creek, and the other tributaries joining Cache Creek between stations KR-28 and KR-10 do not appear to strongly impact the isotopic composition of Cache Creek. Misery Creek exerts an influence on Cache Creek geochemistry, further discussed in section 4.3.

KR-10 is the final monitoring station before Cache Creek enters the receiving environment via Ketza River. This station shows a strong history of exceedances for As and Zn in the sampling record.

The progression in concentrations of various elements along the Cache Creek flow path is presented in Figure 16.

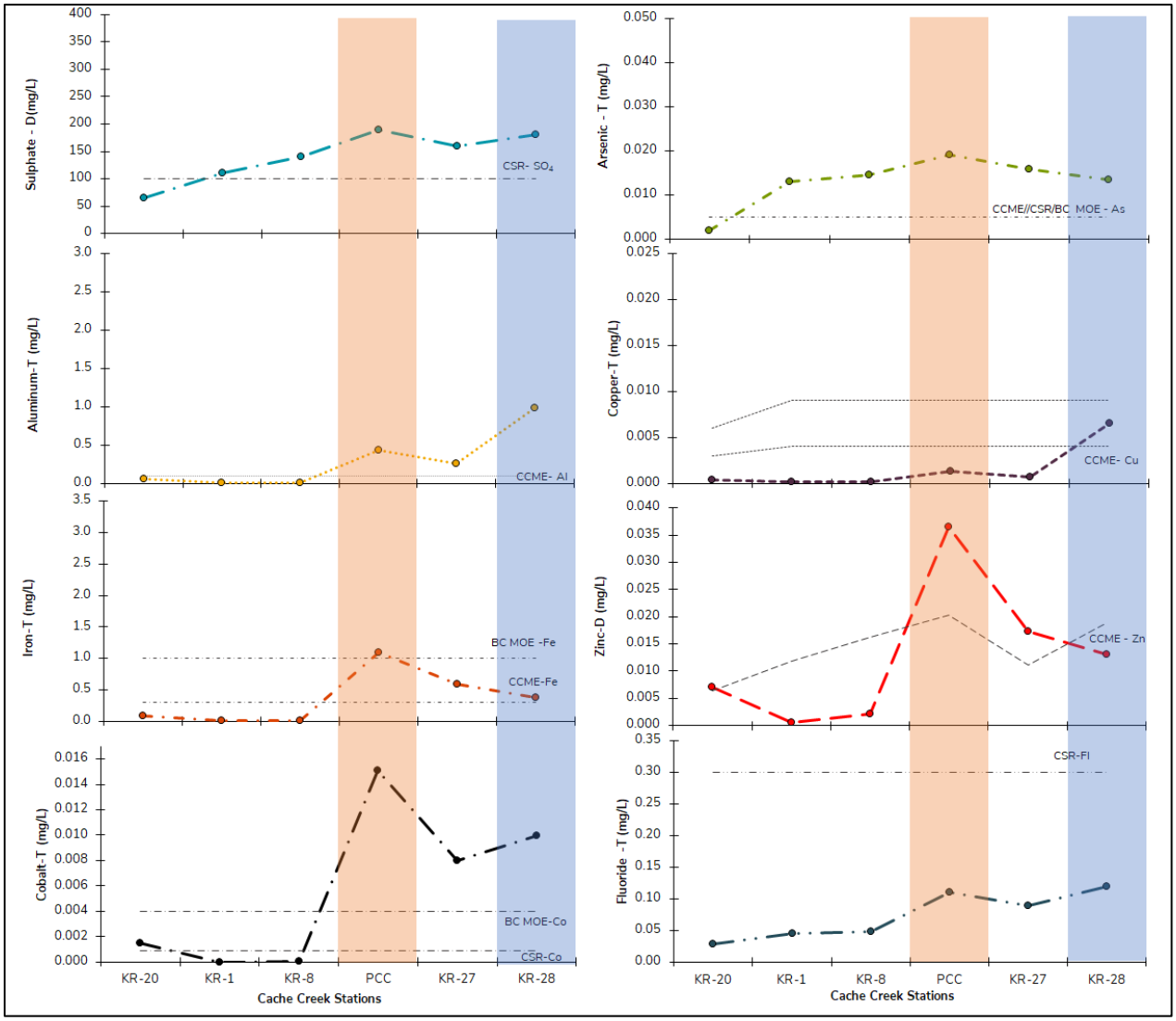



*Figure 16. Analytical results of surface water quality along Cache Creek from August 2021 site audit samples. Sample stations compared in order of flow direction. Orange highlighted area shows influence of Peel Creek. Blue highlighted area shows influence of Misery Creek. Zinc and Copper CCME guidelines are based on hardness values.*

## 4.2 Chemistry in the Peel Creek Sub-catchment

Most historical records pertaining to the Peel Creek sub-catchment identify KR-17 and KR-15 as background water quality sites for the Ketza River Mine due to their lack of contact with the tailings containment facility and distance from most major mine workings in the surrounding area (Tetra Tech, 2016). The validity of these sites as background water quality indicators is uncertain, as certain maps show these two sites in close proximity to PAG waste rock dump, (Gully Zone Waste Rock Dump/Pit and QB

Zone Pit) (Tetra Tech, 2016). KR-17 appears to be located topographically above any expected influence from these pits and dumps suggesting its chemistry may be a product of local area conditions in the mineralized Peel Creek Valley, though conclusions regarding trends are limited by an irregular sampling record, with fewer than 50 observations recorded for these sites from 2005-2009, largely due to winter avalanche risks in the valley

At sampling site KR-17, 100% of samples have exceeded the CCME guidelines for As (T) since sampling began in 2005. Historical concentrations of As were speculated to show a potentially increasing trend, but no level of statistical certainty could be applied (Arktis, 2020). Sulfate (T) concentrations showed a potentially decreasing trend over the same sampling record, approximately asymptotic at 200 mg/L (max 500mg/L, 2008) (Arktis, 2020). During the 2021 Branch audit, As(T) exceeded BC MOE, CCME, and CSR guidelines at KR-17 but As (D) did not exceed any guidelines. Sulfate (D) exceeded the Yukon CSR guideline.

At sampling site KR-15, 100% of samples have exceeded the CCME guidelines for As (T) since sampling began in 2005, with no evident trend (Arktis, 2020). Sulfate did not show any observable trends over the same time period, but has been observed to regularly exceed guidelines. During the 2021 Branch audit, As(T), and $SO_4$ (D) exceeded guidelines at KR-15.

A region showing multiple red-coloured seeps was observed originating on the south side of the stream between KR-17-DS and PCS2-DS. Discharge measurements were collected before and after these seeps joined Peel Creek, and field parameters were measured as close to the daylighting location as possible. KR-17 exact location had little flow, visually estimated at 0.003 $m^3/s$. Immediately below KR-17, a waterfall and coarse rocky streambed caused most of the water to infiltrate in the ground, with only a trickle remaining on the surface. While there was a progressive resurgence up to 0.002 $m^3/s$ directly in the channel in the 100 m distance past the waterfall, most the flow upstream of PCS2 confluence was then coming for the red-coloured seeps, which contribution was estimated at up to 0.006 $m^3/s$ (salt dilution gauging upstream in Peel Creek upstream of PCS2 confluence returned a result of 0.008 $m^3/s$).

A thick (~1 cm) coating of an orange precipitate was observed covering all streambed sediments in Peel Creek after the influx of the red-coloured seeps. These precipitates were observed for the entire length of Peel Creek after the influx of these seeps, and

persisted in diminishing quantities into Cache Creek after the Peel-Cache confluence. The bright red colouration of these seeps is indicative of high concentrations of Fe, among other elements. The elements contained in these red seeps may be products of the dissolution of reactive primary minerals associated with, or representative of, ore minerals. A decrease in As(D) but increase in As(T) concentrations in Peel Creek after these seeps daylight may result from an immobilization of the dissolved As from the seep and headwater as it flows onto the rocks covered by iron precipitate. Removal of dissolved As by coprecipitation or adsorption onto Fe-oxyhydroxide minerals is a well known and documented natural attenuation mechanism and seems likely in Peel Creek (Drahota 2012.). Filtration of water samples through the standard filter size used for water sampling would likely remove the majority of As associated with these Fe mineral assemblages, leaving low concentrations of As(D).

Even though there is a significant decrease of As (D), by an order of magnitude between KR-17 and KR-15 (0.022 to 0.00481 mg/L As(D) respectively), As (T) increases steadily in that section of Peel Creek. It seems that there is a source of both arsenic and iron near KR-17, which is further increased by the influx of the two red seeps.

Dissolved and total Fe concentrations also increase in the vicinity of PCS2-DS and remain consistently elevated though KR-15. Concentrations of dissolved and total As and Fe along the Peel Creek flow path are shown in Figure 17.

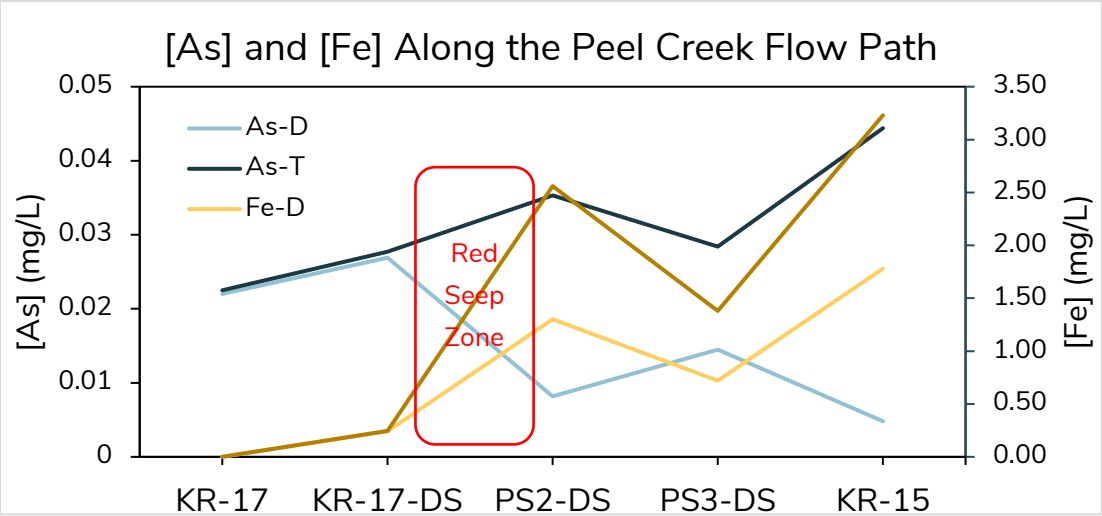


Figure 17 - Evolution in As(T/D) and Fe(T/D) along the Peel Creek flow path

Iron was not included in the trends analysis document produced by Arktis (2020), but if a similar relationship is observed in the sampling record between Fe and As concentrations, it is possible that the relative rates of mobilization of these elements from local reactive primary minerals will remain constant under current conditions. Dissolved and total Fe concentrations observed at KR-15 indicate a functional Fe surplus, suggesting that even if As concentrations were to increase independently of Fe in the upper reaches of Peel Creek, the As attenuation capacity of Fe has not yet been reached. The geochemical favourability of As-Fe coprecipitation or adsorption reactions will likely result in a strong reduction in dissolved As concentration as the flow path progresses if the Fe-rich conditions remain.

The red precipitates formed in Peel Creek can still be seen into Cache Creek after the confluence. It is likely that the Fe-As precipitate will continue to migrate downstream into Cache Creek. Groundwater well HYD-08-09A, located in close proximity to the upper reaches of Peel Creek, showed an isotopic and geochemical signature distinct from those of the SW sites in the area. However, groundwater wells HYD-08-10 and -11A, both upgradient of KR-15, showed similar isotopic signatures to the surface water samples. These similarities and differences may be due to the units in which these wells are screened. HYD-08-09A appears to be screened in an aquifer unit isolated from the waste rock dump, whereas HYD-08-10 and -11A appear to be screened in hydraulically connected units. The isotopic composition of KR-17DS may be the result of a mix of upstream station KR-17 with groundwater seepage (Figure 15).

All Peel Creek surface water sites assessed as part of the 2021 Branch audit (except KR-17) are located down gradient of Gully Zone Pit (Figure 14). Groundwater well HYD-08-09A, located directly down gradient of Gully Zone Pit, shows an isotopic and geochemically distinct signature from any of the SW sites in the area. If the boundaries for this rock dump proposed by Tetra Tech are correct, it is likely that the influx of contaminants into Peel Creek are the result of the QB Zone Pit.

The progression of various elements along the Peel Creek flow path is presented in Figure 18.

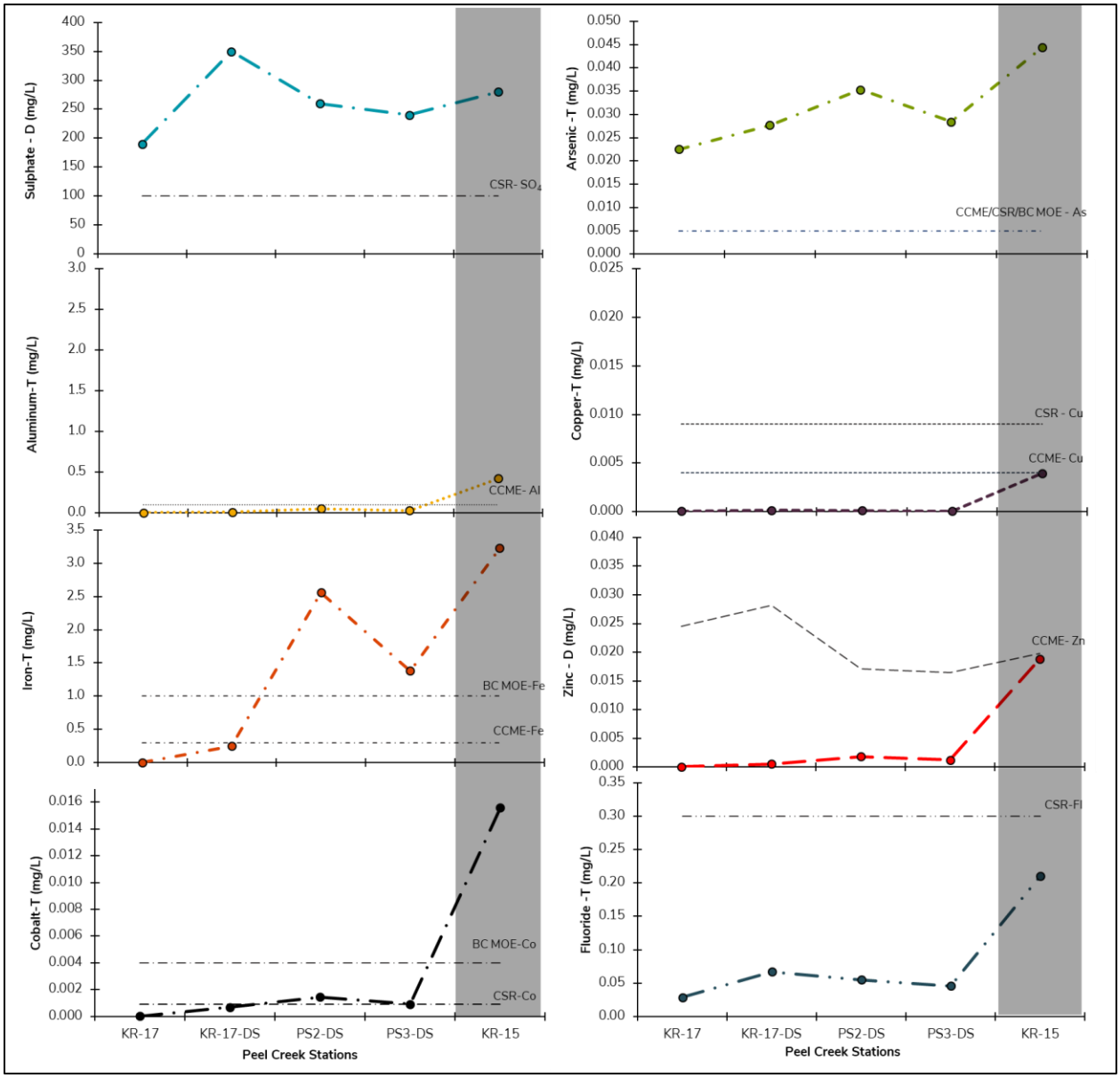



*Figure 18. Analytical results of surface water quality along Peel Creek from August 2021 site audit samples. Sample stations compared in order of flow direction. Highlighted area shows possible influence of QB Zone Pit. Zinc and Copper CCME guidelines are based on hardness values.*

## 4.3 Chemistry in the Misery Creek sub-catchment

There is a relative lack of historical data available on Misery Creek to assess its contribution to contaminants in Cache Creek.

Surface water quality monitoring stations KR-21, KR-18, and KR-22 are the only stations located in the Misery Creek sub-catchment, all three of which were assessed

as a part of this audit. KR-21 is located near the headwaters of the creek and is the only monitoring site out of the three previously mentioned which is currently incorporated in the C&M Monitoring Program. KR-22 is located 500 m upstream of its confluence with Cache Creek, while KR-18 is located in the headwaters of a small tributary that feeds into Misery Creek between the two other stations. A sparse historical sampling record exists for these sites, with less than one third of the number of total samples collected compared to the main sampling stations on Cache Creek (Tetra Tech 2016), largely due to avalanche risk in winter months and KR-18 and KR-22 which are no longer sampled as part of the current monitoring program. KR-18 was not sampled by Water Resources Branch or Hemmera during the 2021 audit but field parameters were collected. At both stations KR-21 and KR-22, guidelines were exceeded for As (BC-MOE, CCME, CSR), $SO_4$ (CSR), and Zn (CCME). Elements including Al, Cd, Co, and Cu did not exceed guidelines at KR-21, but did at KR-22. The isotopic signature between KR-21 and KR-22 appears to become less evaporated, potentially indicative of groundwater influx between the two stations. These trends suggest the tributary sampled at KR-18 is a source of Al, Cd, Co, and Cu to Misery Creek and subsequently Cache Creek as these contaminants were not observed in the upstream station KR-21. The pH at KR-18 was low (4.1-4.3 in the sampling record), which is also where the concentrations of metals were elevated. This low pH does not appear to influence Misery Creek after the convergence of the tributary and the main flow path, although the elevated concentrations of dissolved metals appear to persist into Cache Creek. As alkalinity does not undergo any drastic changes from KR-21 to KR-22, this pH neutralization is likely attributable to dilution. Figure 19 shows the progression in concentrations of various elements along the Misery Creek flow path.

A white precipitate was observed from seep sources near KR-18, persisting through the diffuse tributary flow path through local alpine wetlands into the main Misery Creek channel. Al concentrations at KR-22 were fairly high (2.69 mg Al-T/L and 0.228 mg Al-D/L) and may contribute to the production of the observed white precipitate as the pH increases from acidic to neutral.  If that is the case, it is expected that other metal elements would co-precipitate along with aluminum along the Misery Creek flow path.

No groundwater monitoring stations exist in the Misery Creek sub-catchment.

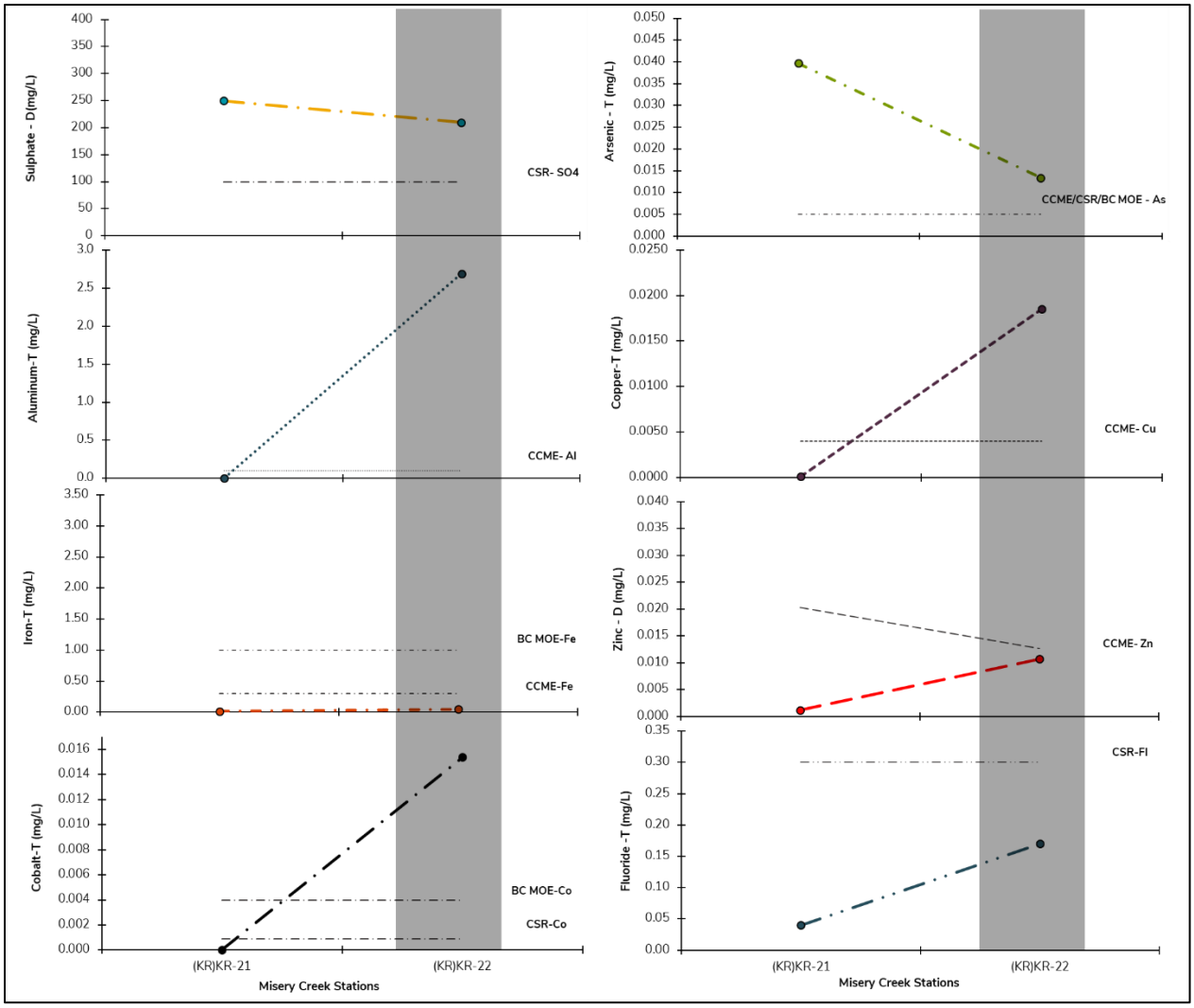



*Figure 19. Analytical results of surface water quality along Misery Creek from August 2021 site audit samples. Sample stations compared in order of flow direction. Highlighted area shows possible influence of KR-18 . Zinc CCME guidelines are based on hardness values.*

## 4.4 Hydrometric monitoring network

The hydrometric stations proposed by Water Resources Branch provide a means of measuring continuous stage (i.e. water level) data in addition to the regular collection of discrete discharge measurements using velocity-area method or salt dilution to inform flow rates at discrete points in time, but stage data informs overall flow over continuous time intervals.

Flow measurements should be conducted monthly alongside surface WQ sample collection at every routine monitoring site as per *The Yukon Guide for Developing Water Quality Objectives and Effluent Quality Standards for Quartz Mining Projects* (Yukon Government 2021B). Collection of high-quality flow measurements is critical for understanding contaminant loading and interpreting variability in water quality results.

The infrastructure described in this audit is designed to capture the full range of stage throughout the open water season on a 15 minute sampling schedule. Building a stage-discharge relationship will require regular field visits to capture accurate discharge measurements and surveying water level to benchmarks in order to correct drift and shifts in the continuous stage record. A minimum of approximately 10 hydrometric field visits at each location and at diverse flow levels (including extremes) would be necessary to establish a robust stage-discharge relationship and develop the corresponding rating curve equation that allows inference of flow between field visits, derived from the 15minute interval water level logs. Calculated continuous discharge records are also used by industry and regulators to understand overall contaminant loads in site catchments. Flow and water level data collection should follow methods and standards described in the Manual of British Columbia Hydrometric Standards, Version 2.0 (R.I.S.C. 2018).

Incorporation of continuous stage monitoring stations should be considered for at least these six essential hydrometric stations:

- KR-12 – Ketza River downstream of Cache Creek
- KR-10 – Cache Creek Lower
- KR-22 – Misery Creek
- KR-15 – Peel Creek at Road
- KR-08 – Cache Creek downstream of TSF and upstream of Peel Creek
- KR-13 – Cache Creek Upper

We also recommend to re-activate station KR-14 – Oxo Creek since its continuous discharge record would be beneficial to explain the increase in flow between KR-13 and KR-08 alongside other Cache Creek contributors such as the water treatment discharge (KR-09A location), diversion channels around the TSF and tailings dam seepage.

Discharge records at location KR-01 upstream of the Mill and Mine Camp are also important and we recommend collecting discrete flow measurements at the same frequency as at KR-13. However the location is not ideal for continuous stage monitoring and we have reasonable confidence in the possibility to establish a strong relationship between flows measured at KR-13 and at KR-01 and therefore produced a derived continuous discharge record at KR-01 with the KR-13 series acting as the proxy.

Discrete discharge measurements will also be important at the proposed WQ compliance station to be located between where the tailings dam seepage enters Cache Creek and station KR-08. There as well, we have reasonable confidence in the possibility to establish a strong relationship between flows measured at KR-08 and at the upstream location, eliminating the need for continuous stage monitoring at the new WQ Compliance station.

Additional continuous stations could be added later however, upon identification of further knowledge gaps; the list above is a conservative recommendation to work within resource allocation constraints.

# 5. Conclusions and Recommendations

Water Resources Branch carried out the 2021 Audit of the Ketza River Mine over the period of August and September 2021. Hemmera Envirochem Inc, a contractor engaged by AAM, sampled all routine surface water and groundwater monitoring sites during their August 2021 sampling event. As per the request of the Branch, stable water isotope samples were also collected from all of these sites by Hemmera to support the site investigation. Water Resources Branch collected water quality and stable water isotope samples as well as hydrology measurements at all routine and several non-routine surface water monitoring sites from August 31 to September 2, 2021, focused towards accomplishing the following objectives:

1) Assess the hydrology monitoring network at site as per request by AAM,
2) Assess the hydrology of Cache and Peel Creeks,

3) Evaluate potential causes of elevated sulphate ($SO_4$) and arsenic (As) levels observed in groundwater and surface water,
4) Determine if disturbed areas are influencing the chemistry of Peel Creek and,
5) Familiarize Branch staff with the site to provide support to AAM and future water licence application review.

A review of available historical site data was undertaken to support audit objectives. Background surface water quality sites include KR-20 (discharge from Tarn lake), KR-17 and KR-15 (Peel Creek stations), and KR-21 (Misery Creek headwaters), although the validity of these sites as unimpacted background surface water quality is uncertain. Sampling station KR-20 has historically elevated concentrations of Al, Cd, and Zn, whereas the stations on Peel Creek have elevated concentrations of As and $SO_4$ throughout the sampling record. The unnamed tributaries joining Cache Creek between KR-28 and KR-10 showed elevated $SO_4$ and dissolved metal concentrations throughout the sampling record. No mine infrastructure has yet been developed in the catchments of these three unnamed tributaries, suggesting that this region is characterized by elevated background concentrations of $SO_4$ and dissolved metals.

The results of the 2021 audit corroborated historical sampling records. Elevated concentrations of metals were observed in most sampling stations spread across the site.

Elevated concentrations of dissolved Al, Cd, and Zn at background station KR-20 are likely attributable to high background concentrations of these elements, or may be influenced by a pit shell located just upgradient of Tarn Lake. Groundwater monitoring wells screened in or below this pit shell showed similar geochemical and isotopic compositions to Tarn Lake, KR-20.

The Peel Creek sub catchment showed elevated concentrations of As and $SO_4$ at both routine stations (KR-17 and KR-15) and all non-routine stations in the main Peel Creek flow path. The three assessed major headwater seeps showed guideline exceedances of As and $SO_4$. These concentrations further increase in the main Peel Creek flow path after a region of minor seepage showing bright red colouration, which contributes elevated concentrations of As, Co, Fe, $SO_4$, and Zn. The presence of the Zone Gully Pit up gradient of these seeps suggests elevated concentrations of these elements may be the result of weathering of reactive primary minerals exposed in the waste rock dump. Trends in dissolved vs. total As, as well as the presence of red-brown precipitates

along the length of the creek, suggest that concentrations of As may be reduced between KR-17 and KR-15 through coprecipitation and adsorption of As onto Fe oxyhydroxide secondary minerals. Concentrations of total As decrease to their lowest levels in the Peel Creek flow path (although remaining above guidelines) at the point at which Peel Creek joins Cache Creek (PCC). The Fe-oxyhydroxide precipitates containing adsorbed As persist well into the Cache Creek flow path. Low As(D) concentrations (below guidelines) but high As(T) concentrations (above guidelines) persist at station KR-28, the furthest downstream site over the course of this audit.

The Misery Creek sub catchment contributes elevated concentrations of Al, As, Co, Cu, Fe, $SO_4$, and Zn to Cache Creek at confluence point KR-28. The majority of these elements source from a tributary creek flowing into Misery sampled by KR-18. These elements are likely representative of elevated background concentrations, as no mine structures are known to exist in the Misery Creek sub catchment.

Implementation of a continuous hydrometric stage monitoring network across the site would pair continuous water level data with data collected during routine monitoring events. High-detail hydrometric data would be provided through implementation of this network and would inform conclusions regarding contaminant loading to Ketza River and the receiving environment. However, creating a continuous flow datasets for these locations will be difficult due to the steepness and unstable channel morphology of the streams on site. Prior to proceeding with this network implementation, it is necessary to clarify the actual need for a continuous hydrometric baseline with partners and regulators of the remediation project.

Water Resources Branch recommends the following based on the results of the 2021 audit:

1) Collect a water sample from the creek in the adjacent watershed to Tarn Lake to see if the As exceeds the guidelines, informing background concentrations in the vicinity of Tarn Lake.
2) Collect additional (quarterly) surface water quality and hydrology measurements (Velocity/Area or salt dilution Methods) upstream and downstream of the KR-16 confluence with Cache Creek to determine this tributaries effects on Cache Creek.
3) Conduct a review of trends in dissolved constituents in groundwater upon completion of the Ketza geochemical database audit.

4) Incorporate six continuous hydrometric stage monitoring stations at locations KR-12, -10, -22, -15, -08 (or -29 if location is suitable) and KR-13.
5) Increase groundwater sampling frequency from annual to twice annually, specifically in the spring and fall.

# 6. Contact Information

For more information about this report contact: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# Appendices

# Appendix A - Photo log

# Appendix A: Photo Log

**Photo 1.** *(KR)KR-01.*
*Upstream view from the left bank at the water sample station on September 2, 2021.*

**Photo 2.** *(KR)KR-01.*
*Downstream view from the left bank at the water sample station on September 2, 2021.*

**Photo 3.** *(KR)KR-01.*
*Substrate at the water sample station on September 2, 2021.*

**Photo 4.** *(KR)KR-01.*
Right bank view from the left bank across from the water sampling station on September 2, 2021.

**Photo 5.** *(KR)KR-01.*
Left bank view from the left bank and looking downstream at the water sampling station on September 2, 2021.

**Photo 6.** *(KR)KR-08.*
Upstream view from the left bank at the water sample station on August 31, 2021.

**Photo 7.** *(KR)KR-08.*
Downstream view from the left bank at the water sample station on August 31, 2021.

**Photo 8.** *(KR)KR-08.*
Substrate at the water sample station on August 31, 2021.

**Photo 9.** *(KR)KR-08.*
Right bank view from left bank from the water sampling station on August 31, 2021.

**Photo 10.** *(KR)KR-08.*
Left bank view from the right bank looking upstream towards the water sampling station on August 31, 2021.

**Photo 11.** *(KR)KR-09.*
View of the Tailings Storage Facility towards the water treatment plant from the access road near (KR)KR-09A on September 2, 2021.

**Photo 12.** *(KR)KR-09A.*
View looking upstream towards the discharge pipe at (KR)KR-09A and at (KR)KR-13 from the right bank looking upstream on September 2, 2021.

**Photo 13.** *(KR)KR-13.*
Upstream view from routine sample station at the discharge of the diversion ditch into Cache Creek on September 2, 2021.

**Photo 14.** *(KR)KR-13.*
Downstream view along Cache Creek from the diversion ditch discharge culvert towards routine sample stations (KR)KR-09A and (KR)KR-13 on September 2, 2021.

**Photo 15.** *(KR)KR-14.*
Upstream view from the left bank at the routine sample station on September 2, 2021.


**Photo 16.** *(KR)KR-14.*
Downstream view from the left bank at the routine water sample station on September 2, 2021.

**Photo 17.** *(KR)KR-15.*
Upstream view from the left bank at the water sample station on September 2, 2021.

**Photo 18.** *(KR)KR-15.*
Downstream view from the left bank at the water sample station on September 2, 2021.

**Photo 19.** *(KR)KR-15.*
Substrate at the water sample station on September 2, 2021.

**Photo 20.** *(KR)KR-15.*
Right bank view from left bank at the water sampling station on September 2, 2021.

**Photo 21.** *(KR)KR-15.*
Left bank view from the left bank looking towards downstream at the water sampling station on September 2, 2021.

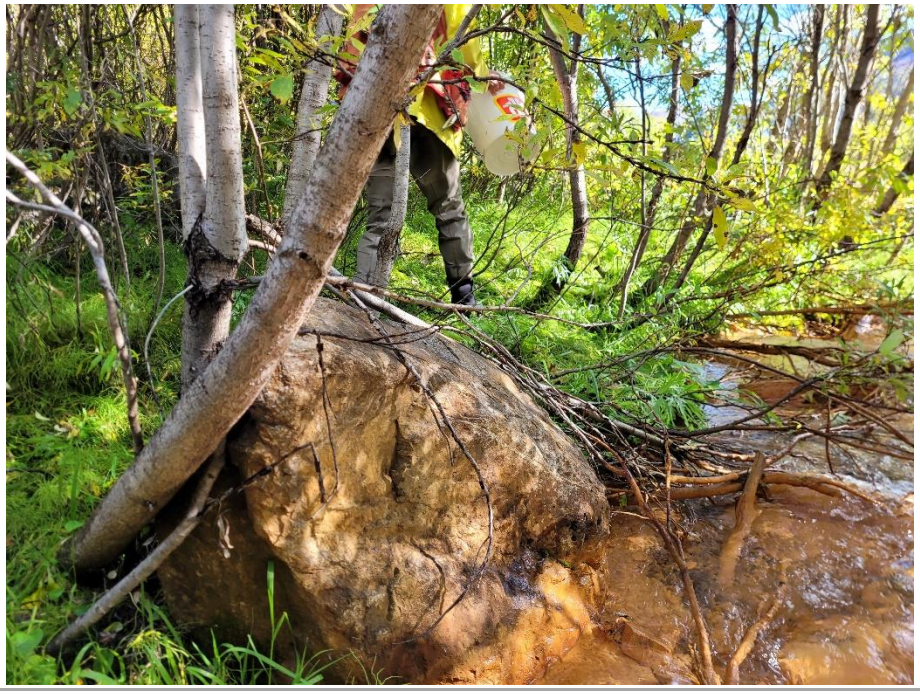


**Photo 22.** *(KR)KR-17.*
Upstream view from the left bank at the water sample station on September 2, 2021.

**Photo 23.** *(KR)KR-17.*
Downstream view from the left bank at the water sample station on August 31, 2021.

**Photo 24.** *(KR)KR-17.*
Substrate at the water sample station on August 31, 2021.

**Photo 25.** *(KR)KR-17.*
Right bank view from left bank at the water sampling station on August 31, 2021.

**Photo 26.** *(KR)KR-17.*
Left bank view from the left bank looking towards downstream at the water sampling station on September 2, 2021.

**Photo 27.** *(KR)KR-17DS.*
Upstream view from the left bank at the water sample station on August 31, 2021.

**Photo 28.** *(KR)KR-17DS.*
Downstream view from the left bank at the water sample station on August 31, 2021.

**Photo 29.** *(KR)KR-17DS.*
Substrate at the water sample station on August 31, 2021.

**Photo 30.** *(KR)KR-17DS.*
Right bank view from left bank at the water sampling station on August 31, 2021.

**Photo 31.** *(KR)KR-17DS.*
Left bank view from the left bank looking downstream at the water sampling station on August 31, 2021.

**Photo 32.** *(KR)KR-17DS.*
Seep daylighting along right bank approximately 5 meters upstream of the water sample station on August 31, 2021.

**Photo 33.** *(KR)KR-17DS.*
Seep daylighting along the right bank approximately 1 meter upstream of the water sample station on August 31, 2021.

**Photo 34.** *(KR)KR-17DS.*
Exposed right bank along Peel Creek adjacent to the water sample station on August 31, 2021.

**Photo 35.** *(KR)KR-17DS.*
Panoramic view of the exposed substrate on the right bank upstream of the water sample station on August 31, 2021.

**Photo 36.** *(KR)KR-18.*
Upstream view from the right bank at the water sample station on September 1, 2021.

**Photo 37.** *(KR)KR-18.*
Downstream view from the right bank at the water sample station on September 1, 2021.

**Photo 38.** *(KR)KR-18.*
Substrate at the water sample station on September 1, 2021.

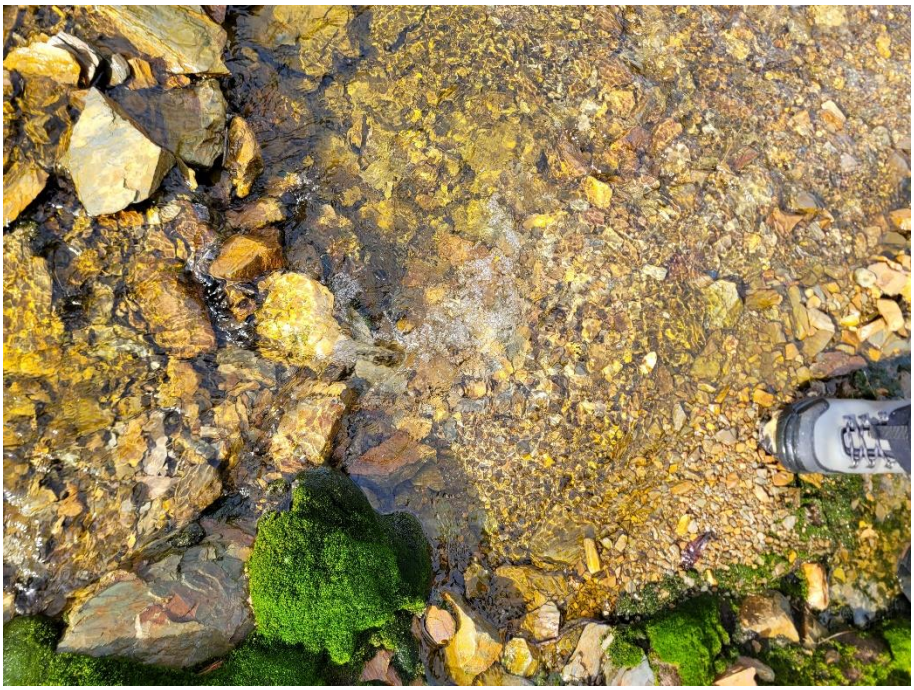


**Photo 39.** *(KR)KR-18.*
Right bank view from left bank at the water sampling station on September 1, 2021.

**Photo 40.** *(KR)KR-18.*
Left bank view from the right bank at the water sampling station on September 1, 2021.

**Photo 41.** *(KR)KR-18.*
Downstream view from the access road downstream of the water sample station looking towards Misery Creek on September 1, 2021.

**Photo 42.** *(KR)KR-20.*
Upstream view from the left bank looking towards the water sample station on September 2, 2021.

**Photo 43.** *(KR)KR-20.*
Downstream view from the left bank at the water sample station on September 2, 2021.

**Photo 44.** *(KR)KR-20.*
Substrate at the water sample station on September 2, 2021.

**Photo 45.** *(KR)KR-20.*
Right bank view from left bank at the water sampling station on September 2, 2021.

**Photo 46.** *(KR)KR-20.*
Left bank view from the left bank looking towards downstream at the water sampling station on September 2, 2021.

**Photo 47.** *(KR)KR-21.*
Upstream and right bank view from the right bank at the water sample station on September 1, 2021.

**Photo 48.** *(KR)KR-21.*
Downstream view from the right bank at the water sample station on September 1, 2021.

**Photo 49.** *(KR)KR-21.*
Substrate at the water sample station on September 1, 2021.

**Photo 50.** *(KR)KR-21.*
Left bank view from the left bank looking towards downstream at the water sampling station on September 1, 2021.

**Photo 51.** *(KR)KR-22.*
Upstream view from the right bank at the water sample station on September 1, 2021.

**Photo 52.** *(KR)KR-22.*
Downstream view from the right bank at the water sample station on September 1, 2021.

**Photo 53.** *(KR)KR-22.*
Substrate at the water sample station on September 1, 2021.

**Photo 54.** *(KR)KR-22.*
Right bank view from the right bank at the water sampling station on September 1, 2021.

**Photo 55.** *(KR)KR-22.*
Left bank view from the right bank looking towards downstream at the water sampling station on September 1, 2021.

**Photo 56.** *(KR)KR-22.*
Substrate upstream along right bank about 5 meters upstream from the right bank looking upstream on September 1, 2021.

**Photo 57.** *(KR)KR-23.*
Upstream view from the right bank at the water sample station on September 1, 2021.

**Photo 58.** *(KR)KR-23.*
Downstream view from the right bank at the water sample station on September 1, 2021.

**Photo 59.** *(KR)KR-23.*
Substrate at the water sample station on September 1, 2021.

**Photo 60.** *(KR)KR-23.*
Right bank view from the right bank looking downstream at the water sampling station on September 1, 2021.

**Photo 61.** *(KR)KR-23.*
Left bank view from the right bank looking towards downstream at the water sampling station on September 1, 2021.

**Photo 62.** *(KR)KR-23.*
Collapsed adit upstream of the water sample station on September 1, 2021.

**Photo 63.** *(KR)KR-23.*
Water emerging from the adit upstream of the water sample station on September 1, 2021.

**Photo 64.** *(KR)KR-23.*
Downstream view of the water emerging from the adit looking towards the water sample station on September 1, 2021.

**Photo 65.** *(KR)KR-23.*
Downstream view of water flowing along the access road downstream of the water sampling station on September 1, 2021.

**Photo 66.** *(KR)KR-23.*
Collapsed culvert downstream of the water sampling station causing diversion of water flow down the access road on September 1, 2021.

**Photo 67.** *(KR)KR-26.*
Upstream view from the right bank at the water sample station on September 1, 2021.

**Photo 68.** *(KR)KR-26.*
Downstream view from the right bank at the water sample station on September 1, 2021.

**Photo 69.** *(KR)KR-26.*
Substrate at the water sample station on September 1, 2021.

**Photo 70.** *(KR)KR-26.*
Right bank view from right bank looking downstream at the water sampling station on September 1, 2021.

**Photo 71.** *(KR)KR-26.*
Left bank view from the right bank at the water sampling station on September 1, 2021.

**Photo 72.** *(KR)KR-27.*
Upstream view from the right bank at the water sample station on September 1, 2021.

**Photo 73.** *(KR)KR-27.*
Downstream view from the right bank at the water sample station on September 1, 2021.

**Photo 74.** *(KR)KR-27.*
Substrate at the water sample station on September 1, 2021.

**Photo 75.** *(KR)KR-27.*
Right bank view from right bank looking upstream towards the water sampling station on September 1, 2021.

**Photo 76.** *(KR)KR-27.*
Left bank view from the right bank looking upstream towards the water sampling station on September 1, 2021.

**Photo 77.** *(KR)KR-28.*
Upstream view from the right bank at the water sample station on September 1, 2021.

**Photo 78.** *(KR)KR-28.*
Downstream view from the right bank at the water sample station on September 1, 2021.

**Photo 79.** *(KR)KR-28.*
Substrate at the water sample station on September 1, 2021.

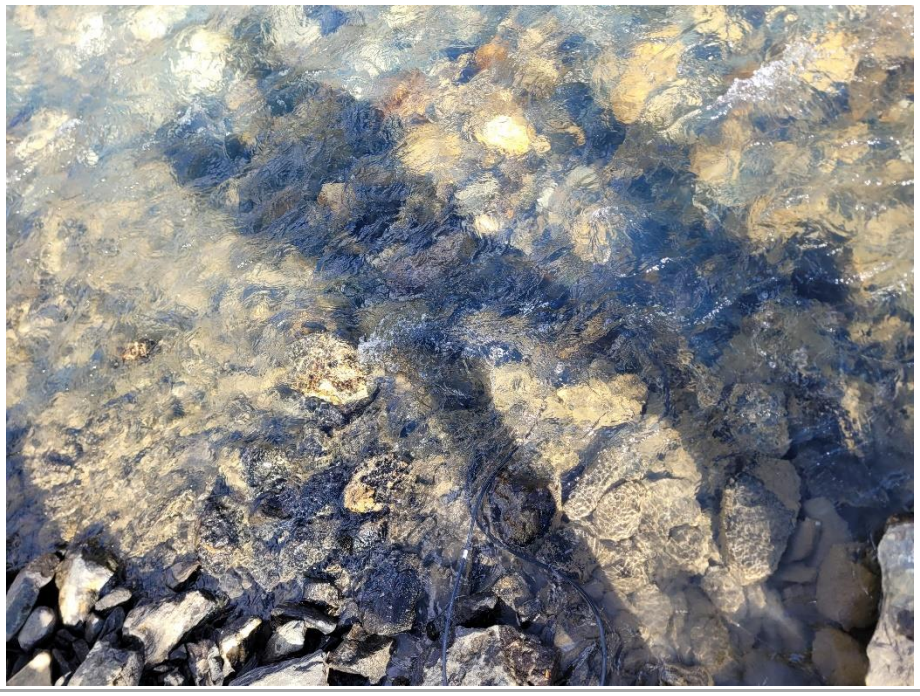


**Photo 80.** *(KR)KR-28.*
Right bank view from right bank looking upstream at the water sampling station on September 1, 2021.

**Photo 81.** *(KR)KR-28.*
Left bank view from the right bank at the water sampling station on September 1, 2021.

**Photo 82.** *PS1430.*
Upstream view looking towards the water sample station where the water emerges from the adit on September 1, 2021.

**Photo 83.** *PS1430.*
Downstream view from the right bank at the water sample station on September 1, 2021.

**Photo 84.** *PS1510.*
Entrance of adit on September 1, 2021.

**Photo 85.** *(KR)KR-28.*
Drainage pipe from adit with no discharge on September 1, 2021.

**Photo 86.** *PCC.*
Upstream view from the leftt bank at the water sample station on August 31, 2021.

**Photo 87.** *PCC.*
Downstream view from the left bank at the water sample station on August 31, 2021.

**Photo 88.** *PCC.*
Substrate at the water sample station on August 31, 2021.

**Photo 89.** *PCC.*
Right bank view from the left bank looking downstream at the water sampling station on August 31, 2021.

**Photo 90.** *PCC.*
Left bank view from the right bank at the water sampling station on August 31, 2021.

**Photo 91.** *PS2DS.*
Upstream view from the left bank at the water sample station on August 31, 2021.

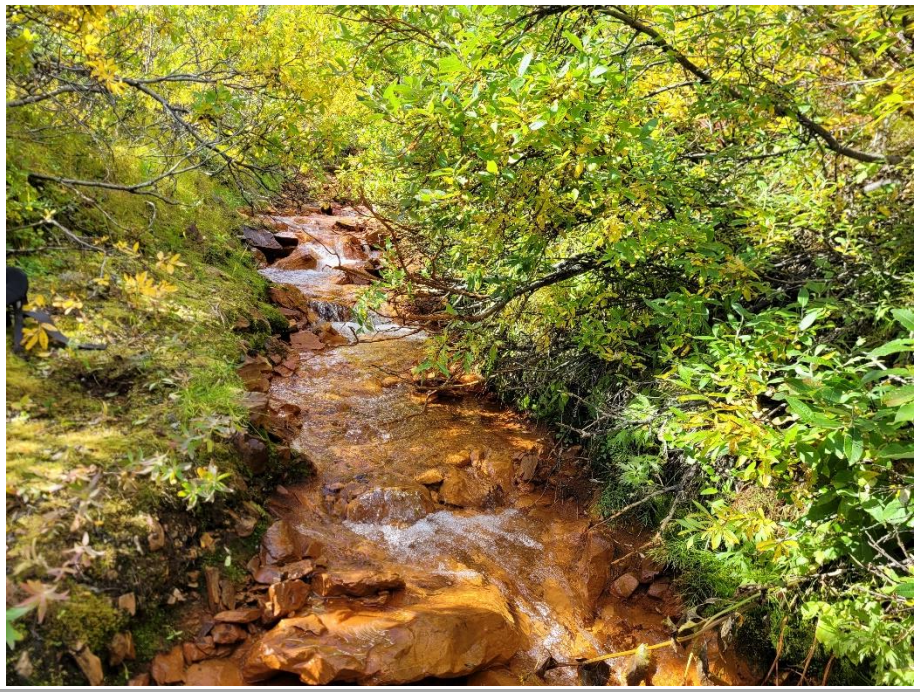


**Photo 92.** *PS2DS.*
Downstream view from the right bank at the water sample station on August 31, 2021.

**Photo 93.** *PS2DS.*
Substrate at the water sample station on August 31, 2021.

**Photo 94.** *PS2DS.*
Right bank view from left bank at the water sampling station on August 31, 2021.

**Photo 95.** *PS2DS.*
Left bank view from the right bank at the water sampling station on August 31, 2021.

**Photo 96.** *PS3DS.*
Upstream view from the right bank at the water sample station on August 31, 2021.

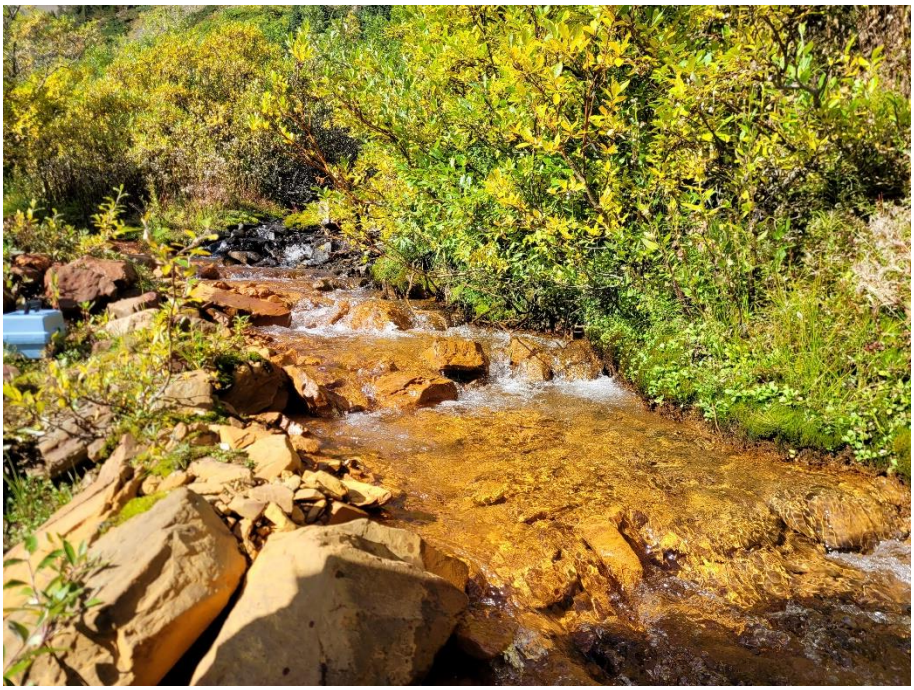


**Photo 97.** *PS3DS.*
Downstream view from the left bank at the water sample station on August 31, 2021.

**Photo 98.** *PS3DS.*
Substrate at the water sample station on August 31, 2021.

**Photo 99.** *PS3DS.*
Right bank view from the left bank at the water sampling station on August 31, 2021.

**Photo 100.** *PS3DS.*
Left bank view from the right bank at the water sampling station on August 31, 2021.

**Photo 101.** Seep 2.
View of seep on left bank and where it merges with Peel Creek from the right bank on August 31, 2021.

**Photo 102.** Seep 2.
View of seep on the left bank and the uphill area on August 31, 2021.

**Photo 103.** Seep 2.
Upstream view where the seep daylights from the left bank at the water sample station on August 31, 2021.

**Photo 104.** Seep 2.
Downstream view from the left bank at the water sample station on August 31, 2021.

**Photo 105.** Seep 2.
Substrate at the water sample station on August 31, 2021.

**Photo 106.** Seep 2.
Right bank view from left bank at the water sampling station on August 31, 2021.

**Photo 107.** Seep 3.
Upstream view where seep daylights from the left bank at the water sample station on August 31, 2021.

**Photo 108.** Seep 3.
Downstream view from the left bank at the water sample station on August 31, 2021.

**Photo 109.** Seep 3.
Substrate at the water sample station on August 31, 2021.

**Photo 110.** Seep 3.
Right bank view from the left bank at the water sampling station on August 31, 2021.

**Photo 111.** *Seep 3.*
Left bank view from the left bank looking downstream at the water sampling station on August 31, 2021.

**Photo 112.** *Cache Creek Tributary 1 (CCT1).*
Upstream view from the left bank at the water sample station on September 1, 2021.

**Photo 113.** *Cache Creek Tributary 1 (CCT1).*
Downstream view from the left bank at the water sample station on September 1, 2021.

**Photo 114.** *Cache Creek Tributary 1 (CCT1).*
Substrate at the water sample station on September 1, 2021.

**Photo 115.** *Cache Creek Tributary 1 (CCT1).*
Right bank view from the left bank looking downstream at the water sampling station on September 1, 2021.

**Photo 116.** *Cache Creek Tributary 1 (CCT1).*
Left bank view from the Left bank at the water sampling station on September 1, 2021.

**Photo 117.** *Cache Creek Tributary 2 (CCT2).*
Upstream view from the left bank approximately 5 meters upstream from the water sample station on September 1, 2021.

**Photo 118.** *Cache Creek Tributary 2 (CCT2).*
Downstream view from the left bank towards the water sample station on September 1, 2021.

**Photo 119.** *Cache Creek Tributary 2 (CCT2).*
Substrate at the water sample station on September 1, 2021.

**Photo 120.** *Cache Creek Tributary 2 (CCT2).*
Right bank view from right bank looking downstream towards the water sampling station on September 1, 2021.

**Photo 121.** *Cache Creek Tributary 2 (CCT2).*
Left bank view from the left bank looking downstream towards the water sampling station on September 1, 2021.

**Photo 122.** *Cache Creek Tributary 3 (CCT3).*
Upstream view from the right bank at the water sample station on September 1, 2021.

**Photo 123.** *Cache Creek Tributary 3 (CCT3).*
Downstream view from the right bank at the water sample station on September 1, 2021.

**Photo 124.** *Cache Creek Tributary 3 (CCT3).*
Substrate at the water sample station on September 1, 2021.

**Photo 125.** *Cache Creek Tributary 3 (CCT3).*
Right bank view from right bank looking downstream at the water sampling station on September 1, 2021.

**Photo 126.** *Cache Creek Tributary 3 (CCT3).*
Left bank view from the right bank at the water sampling station on September 1, 2021.

**Photo 127.** *Tarn Lake.*
Precipitates observed along shoreline on September 2, 2021.

**Photo 128.** *Tarn Lake.*
Precipitates observed along shoreline on September 2, 2021.

**Photo 129.** *Tarn Lake.*
Precipitates observed along shoreline on September 2, 2021.

**Photo 130.** *Tarn Lake.*
Precipitates observed along the shoreline on September 2, 2021.

**Photo 131.** *Tarn Lake.*
View from the access road adjacent to the lake looking towards the tailings storage facility on September 2, 2021.

**Photo 132.** *Seep in the Misery Creek valley.*
View from the access road adjacent to the lake looking towards the tailings storage facility on September 2, 2021.

# Appendix B - Site maps showing disturbance features and AECs/APECs

| Pre-DTA AECs | |
|---|---|
| AEC 1 | Ore Handing Areas |
| AEC 2 | Tailings Storage Facility |
| AEC 3 | 1992 Diesel Fuel Spill Area |
| AEC 4 | Gully and QB Zone Pits and Waste Rock Piles |
| **Pre-DTA or Joint Liability APECs** | |
| APEC 1 | Open Pits and Waste Rock Piles |
| APEC 2 | Underground Workings and Waste Rock Piles |
| APEC 3 | Underground Workshop at Portal 1510 |
| APEC 4 | Ore Stockpile |
| APEC 5 | Former Ore Processing and Tailing Treatment Area and Tailings Distribution Lines |
| APEC 6 | Mill Building Pow erhouse |
| APEC 7 | Mill Building Maintenance Shop |
| APEC 8 | Polishing Pond |
| APEC 9 | Tank Farm, Fueling Area and Product Lines |
| APEC 10 | Main Mill Yard |
| APEC 11 | Mill Dry Area |
| APEC 12 | South Mill Yard |
| APEC 13 | Contractor Yard |
| APEC 14 | Camp Generator Facilities |
| APEC 15 | Former Camp Paint Shop |
| APEC 16 | Former Camp Incinerator |
| APEC 17 | Camp Sew age System |
| APEC 18 | Former Exploration Camp Generator Shed |
| APEC 19 | Former Exploration Camp Grease Ramp |
| APEC 20 | Upper Boneyard |
| APEC 21 | Landfill |
| APEC 22 | Diesel Tank at 1510 Portal |
| APEC 23 | Former Chemical Storage Area near the TSF |
| APEC 24 | Former Waste Oil Storage Area |
| APEC 25 | Exploration Drill Sites (not show n on figure but present thoughout the mine site) |

643000 644000 645000 646000 647000

6827000 6826000 6825000

SHAMROCK ZONE
MANTO ZONE
LAB-HOODOO AREA
PEEL AREA
PENGUIN AREA
See Figure 5 for detail
Knoll Zone Pit
Break Nu Zone Pit
Ridge Zone Pit
1550 Portal
1510 Portal
1430 Pits (E and S)
1430 Portal
Gully Zone Pit
QB Zone Pit
Tarn Zone Pit
Tarn Lake
Limestone Quarry
Exploration Camp
Core Shack Well
Former Waste Oil Storage Site
Former Sewage Lagoon
Existing Septic Field
Camp Complex
Mill Site
Contractor Yard
Lower Mill Well
Upper Mill Well
Ore Stockpile Area
Old & New Camp Water Well
Tailings Storage Facility (TSF)
Peel Creek
Cache Creek
Oxo Creek
1700 1650 1600 1550 1500 1450 1400 1350 1300 1250

APEC 1 APEC 4 AEC 1 AEC 2 AEC 3 APEC 18 APEC 19 APEC 20 APEC 21 APEC 24

HYD-08-07 HYD-08-08 HYD-08-10 HYD-08-09A HYD-08-09B HYD-08-11A HYD-08-11B HYD-08-03 HYD-08-06A HYD-08-06B HYD-08-04A HYD-08-04B HYD-08-12 HYD-08-02 HYD-08-05 HYD-08-18 HYD-08-16A HYD-08-16B HYD-08-19 HYD-08-20 HYD-08-21 HYD-08-22 HYD-08-17 HYD-08-01A HYD-08-01B

GT-10-01 GT-10-04A GT-10-04B GT-10-06A HYD-10-01A

BH-10-14A BH-10-12 BH-10-10 BH-10-08 BH-10-09 BH-10-06 BH-10-02 BH-10-05 BH-10-01A BH-10-01B

KR01 KR02 KR04N3 KR05-688 KR05S2 KR07-1014 KR08 KR09 KR09A KR13 KR14 KR15 KR16 KR17 KR20 KR26 KR27

Weir #1 Weir #2 Weir #3 Wier #4 Wier #5

1510 Portal Well

N S W E

**LEGEND**

- Site Feature
- Pit
- Portal
- Culvert
- Grab Water Sample Location
- Surface Water Monitoring Site
- Water Quality Seepage Site
- Weir
- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour (m asl)
- Area of Environmental Concern (AEC)
- Area of Potential Environmental Concern (APEC)
- Access Road
- Secondary Road
- Diversion
- Watercourse
- Waterbody

**NOTES**
Base data source:
Imagery provided by Google, DigitalGlobe (2005).

**STATUS**
ISSUED FOR USE

# WATER AND GEOCHEMISTRY KETZA RIVER MINE, YT

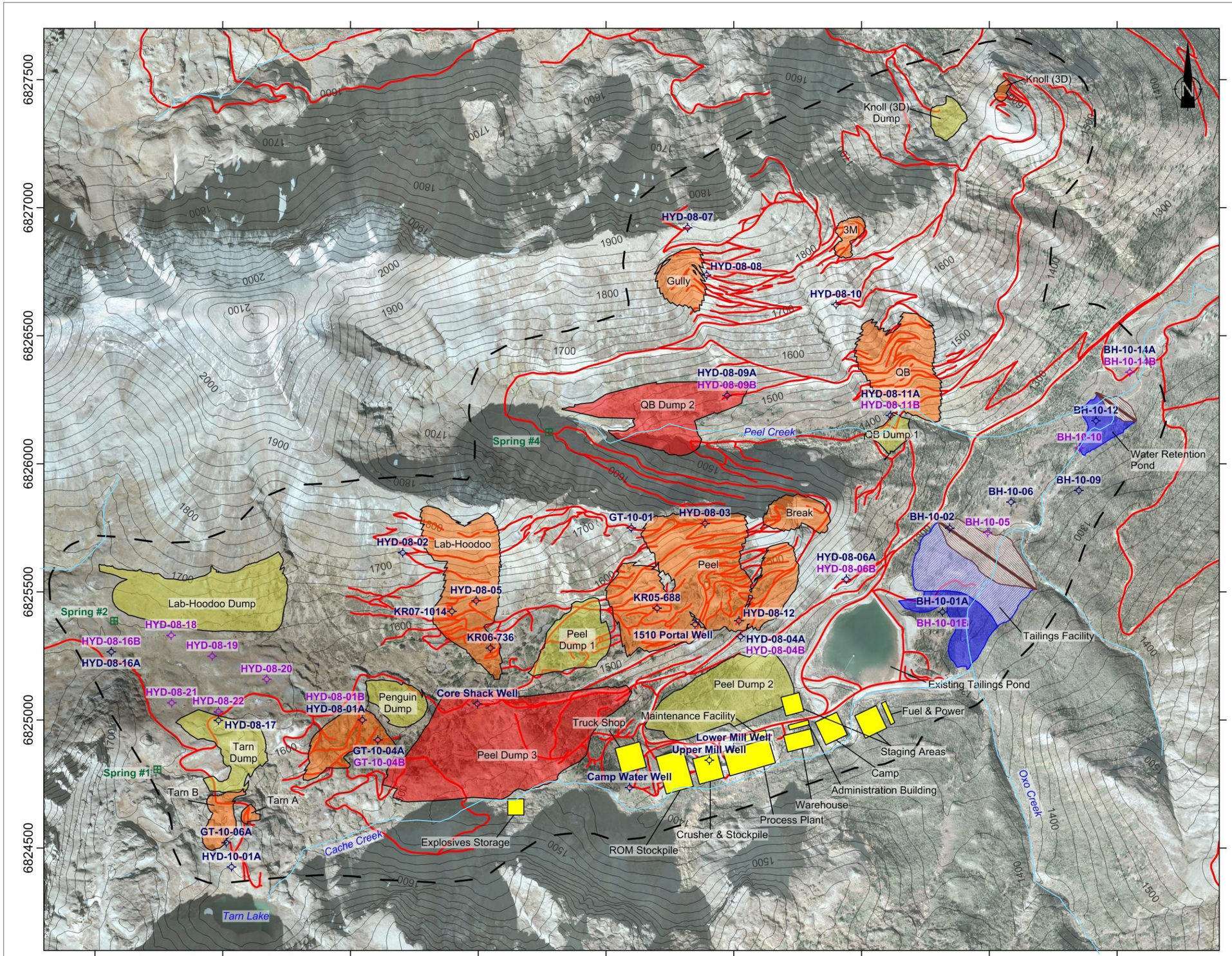
## Water Details and APECs in Study Area

| | | | | |
|---|---|---|---|---|
| PROJECTION: UTM Zone 8 | DATUM: NAD83 | CLIENT: Indigenous and Northern Affairs Canada | | |
| Scale: 1:15,000 (200 100 0 200 Metres) | | | | |
| FILE NO.: MIN03075-01_Figure04_APECs.mxd | | | | |
| PROJECT NO.: ENVMIN03075-01 | DWN: MEZ | CKD: SL | APVD: RM | REV: 0 |
| OFFICE: Tt EBA-VANC | DATE: September 20, 2016 | | | |

TETRA TECH EBA

**Figure 4**

Q:\Vancouver\GIS\ENVIRONMENTAL\MIN\MIN03075-01\Maps\TechMemos\Water\MIN03075-01_Figure04_APECs.mxd modified 20/09/2016 by stephanie.leusink




## LEGEND

- Site Boundary

**Proposed Infrastructure**

- Buildings
- Pit Shells
- Waste Rock Dumps (NAG)
- Waste Rock Dumps (PAG/NAG)
- Tailings Storage Facility / Water Retention Pond
- Existing Road
- Contour (20 m)
- Watercourse
- Waterbody
- Bedrock Monitoring Well
- Overburden Monitoring Well
- Spring

**NOTES**

Base data source: 1:50,000 NTS
Imagery source: Aero Geometrics, Ltd

**STATUS**

ISSUED FOR USE

# KETZA RIVER PROJECT

## Site Plan Showing Monitoring Well Locations

250 125 0 250
Metres

CLIENT: Ketza River Holdings

eba A TETRA TECH COMPANY

| FILE NO. | | | | |
|---|---|---|---|---|
| W23101052_104_MonitoringWells.cdr | | | | |
| **PROJECT NO.** | **DWN** | **CKD** | **APVD** | **REV** |
| W23101052.104 | SK | RMM | | 1 |
| **OFFICE** | **DATE** | | | |
| EBA-WHSE | August 3, 2011 | | | |

**Figure 4.11-1**

Q:\Vancouver\Graphics\ENVIRONMENTAL\W2311\W23101052_Ketza\104\W23101052_104_MonitoringWells.cdr

# Appendix C – Water Licence QZ04-063

YUKON WATER BOARD

Pursuant to the *Waters Act* and *Regulation*, the Yukon Water Board, hereinafter referred to as the Board, hereby grants to

Ketza River Holdings Ltd.
Suite 540 - 688 West Hastings St.
Vancouver, BC V6P 1P1

hereinafter called the Licensee, the right to use water and deposit a waste subject to the restrictions and conditions contained in the *Waters Act* and *Regulation* made hereunder and subject to and in accordance with the conditions specified in this licence.

**Licence Number:** QZ04-063 **Water Management Area:** 02 Yukon

**Licence Type:** A **Nature of Undertaking**: Quartz Mining

**Water Source:** Cache Creek **Tributary of**: Ketza River

**Minimum Latitude:** 61° 25' **Maximum Latitude:** 61° 26'

**Minimum Longitude:** 132° 14' **Maximum Longitude:** 132° 19'

**Purpose:** To store water in, and discharge water from, an existing tailings impoundment.

**Effective Date of Licence**: The date that the signature of the Chairperson of the Yukon Water Board is affixed.

**Expiry Date of Licence:** December 31, 2009

Approved this ___ day

of _____, 2007

_____
Witness

_____
Minister, Executive Council Office

Issued this ___ day

of _____, 2007

YUKON WATER BOARD

_____
Witness

_____
Chairperson

## PART A - GENERAL CONDITIONS

1. Definitions

a) "Act" means the *Waters Act* and any amendments thereto.

b) "Application" collectively means Water Use Application QZ04-063 and any additional submissions and/or revisions submitted to the Board by the Licensee up to the date of the Board's decision to issue this licence.

c) "Board" means the Yukon Water Board.

d) "Inspector" means any person designated as an Inspector under the Act.

e) "Regulation" means the *Waters Regulation.*

f) "Spill Response Plan" means the Emergency Response Plan (ERP), Ketza River Mine Site, that was submitted as a component of the Application and included in Water Use Register QZ04-063 as exhibit 1.5.5, and any subsequent revisions.

g) "Waste" means any substance defined in Section 2 of the *Act.*

h) "Dam Safety Guidelines" means the Dam Safety Guidelines issued by the Canadian Dam Association (1999) or its most recent revision.

Representations, Warranties and Undertakings

2. The Board has relied on the representations, warranties and undertakings provided by the Licensee in the material filed in the Application. Such representations, warranties and undertakings are considered by the Board to be a part of the licence, but shall be subject to, and may be modified by, the conditions of the licence.

3. Where there is a discrepancy between the Application and the conditions of this licence, the conditions of this licence shall prevail. - licensee review meter documentation

Other Uses

4. If, subsequent to the issuing of this licence, the Licensee uses water and/or deposits waste in one or more ways not authorized in this licence, and the combined effect of those uses and/or deposits of wastes, as determined by an Inspector: - wording ?

   a) has no potential for significant adverse environmental effects;
   b) does not interfere with existing rights of other water users or waste depositors; and

c) satisfies the criteria set out in column 2 of Schedule 7 of the *Regulation*,

then no amendment to this licence will be required for that use of water and/or deposit of waste.

Other Laws

5. No condition of this licence limits the application of any other federal, territorial, first nation or municipal legislation.

6. All work authorized by this licence shall occur on property that the Licensee has the right to enter upon and use for that purpose.

Correspondence

7. Where any direction, notice, order, or report under this licence is required to be in writing, it shall be given:

a) To the Licensee, if delivered, faxed or mailed by registered mail to the following address:

Ketza River Holdings Ltd.
Suite 540 - 688 West Hastings St.
Vancouver, BC V6P 1P1

fax: 604 688 9426

and shall be deemed to have been given to the Licensee on the day it was delivered or faxed, or seven days after the day it was mailed, as the case may be.

b) To the Board, if delivered, faxed or sent by registered mail to the following address:

Yukon Water Board
Suite 106, 419 Range Road
Whitehorse, Yukon Y1A 3V1

fax: 867 456 3890

and shall be deemed to have been given to the Board on the day it was delivered or faxed, or seven days after the day it was mailed, as the case may be.

Non-Compliance

8. In the event that the Licensee fails to comply with any condition of this licence, the Board may, subject to the *Act*, cancel the licence.

Deleterious Substances

9. Except as otherwise authorized by this licence, deleterious substances shall be used, transported, stored and disposed of in such a manner that they are not deposited in, or allowed to be deposited in, any waters.

Term of Licence

10. The term of this licence is from the effective date to December 31, 2009.

Reports

11. All monitoring data, reports, plans, studies, study results, designs or manuals required by this licence shall be submitted to the Board in an unbound printed form that is reproducible by standard photocopier and shall be accompanied by 5 copies.

12. All monitoring data, reports, plans, designs or manuals shall also be submitted in digital form, using an IBM compatible format that is readable using commonly available software.

Annual Reports

13. Annual reports shall be submitted to the Board by the Licensee. The first report shall be for the period from the effective date of the licence to December 31, 2008, and the next report will be for the calendar year 2009. Annual reports will be submitted to the Board on or before February 28 of the following year.

14. Annual reports shall include the information required by this licence and by the *Regulation*, including, but not necessarily limited to:

    a) summaries of all data generated as a result of the monitoring requirements of this licence, including analysis and interpretation by a qualified individual or firm and a discussion of any variances from base line conditions or from previous years' data; and

    b) a detailed record of any major maintenance work carried out or planned to be carried out that could have an impact on water.

## Monthly Reports

15. Unless otherwise specified in this licence, the Licensee shall forward to the Board a copy of all data collected as part of the monitoring programs of this licence no more than 30 days after the conclusion of the month in which that data was collected.

Spills and Unauthorized Discharges

16. The Licensee shall keep the Spill Response Plan current. Any revisions to the plan will be submitted to the Board within 10 days of the revision.

17. The Licensee shall immediately contact the 24-hour Yukon Spill Report telephone number (867) 667-7244 and implement the most recent spill contingency plan that has been filed with the Board, should a spill or an unauthorized discharge occur. A detailed written report on any such event, including but not limited to, dates, quantities, parameters, causes and other relevant details and explanations, shall be delivered to the Board not later than 10 days after its occurrence.

Hazardous Materials Storage

18. A complete inventory of chemicals, fuels, oils, lubricants and other hazardous materials relating to the water uses authorized by this licence shall be maintained by the Licensee.

19. Hazardous materials shall be stored or transferred a minimum of 30 metres from any watercourse.

Care and Maintenance

20. Throughout the term of this licence, the Licensee shall maintain all works in good order.

## PART B - SECURITY

21. Within 60 days of the effective date of this licence, the Licensee shall provide security in the amount of three million, eighty seven thousand, six hundred dollars ($3,087,600). The form of security shall be in accordance with the Regulation.

## PART C - OPERATING CONDITIONS

22. The Licensee is hereby authorized to store water within an existing tailings impoundment and to deposit a waste in the form of controlled discharge from the tailings impoundment, as described in the Application, and subject to the conditions of this licence. Where there is a discrepancy between the Application and this licence, the terms of this licence shall prevail.

23. Except as authorized by this licence, no Waste shall enter any watercourse as a result of any operation carried out by the Licensee.

## PART D - EFFLUENT QUALITY STANDARDS

24. At monitoring stations KR-04-N3, KR-05-S2 and KR-9a, no waste discharge shall exceed the following limits:

| Parameter | Maximum Concentration in a Grab Sample |
|---|---|
| Total Arsenic | 0.5 mg/L |
| Total Copper | 0.3 mg/L |
| Total Cyanide | 1.0 mg/L |
| Total Lead | 0.2 mg/L |
| Total Nickel | 0.5 mg/L |
| Total Zinc | 0.5 mg/L |
| Total Ammonia | 1.0 mg/L |
| Total Suspended Solids | 15.0 mg/L |
| pH | >6.5 |

25. Any discharge to a watercourse must meet a bioassay standard of a 96-hour $LC_{50}$ bioassay using Rainbow Trout.

## PART E – MODIFICATION AND CONSTRUCTION

26. Where modifications are required to be made to existing facilities and structures authorized by this licence, and providing that those modifications would not otherwise require a water use licence, then the Licensee shall submit plans, specifications and construction schedules for any such modifications no less than 90 days prior to the start of the construction work.

27. All designs shall be sealed by a Professional Engineer licenced to practice in Yukon.

28. At least 10 days prior to the proposed date of commencement of construction of minor modifications, the Licensee shall submit to the Board a written notification, together with a detailed construction schedule and the name and contact number(s) of the construction superintendent.

29. Where site conditions require minor modifications to the designs submitted to the Board, the Licensee shall notify the Board, in advance, of the details of the modifications or variations from final detailed designs, specifications and quality assurance/quality control procedures previously submitted to the Board. The notice shall include an explanation of the

reasons for the change and an assessment of the potential impact on the performance of the works. The notice shall be sealed by a Professional Engineer licenced to practice in Yukon.

30. As-constructed (record) drawings and construction reports, including quality assurance and quality control documentation, for all structures and facilities shall be submitted to the Board within ninety days of the completion of construction. Each submission shall be sealed by a Professional Engineer licenced to practice in Yukon.

31. No later than September 30, 2008, the Licensee shall complete the construction of a supporting toe berm along the North Dam, as described in the Application.

## PART F - DECOMMISSIONING

Final Closure and Reclamation Plan

32. A Final Closure and Reclamation Plan shall be prepared and submitted to the Board by January 31, 2009. The plan shall define the conditions under which final closure and reclamation will commence. The plan shall be premised on the following objectives:

    a) Maintain the long term physical stability of the North and South Dams;
    b) Maintain the long term physical stability of water diversions; and
    c) Ensure that effluent standards required by this licence are met at all discharges to any receiving waters.

33. Subject to required assessments, authorizations or approvals, the Licensee shall implement the Final Closure and Reclamation Plan.

34. In the event that final closure occurs prior to the submission of the Final Closure and Reclamation Plan, then the Licensee will, at a minimum, and subject to the appropriate authorizations and approvals:

    a) drain the tailings pond;
    b) recontour the tailings to promote surface shedding of precipitation;
    c) construct a dry cover over the tailings;
    d) lower the spillway invert to allow the tailings pond to be free draining; and
    e) upgrade the diversions to accommodate extreme precipitation events.

## PART G - MONITORING AND SURVEILLANCE

35. The Licensee shall comply with the water quality monitoring program contained in Schedule A of this licence.

36. Monitoring and sampling shall be carried out in accordance with the procedures and standards described in:

Murray 667-3407

a) Guidance Document for the Sampling and Analysis of Metal Mining Effluents, April 2001, (Report: EPS 2/MM/5), Minerals and Metals Division, Environment Canada, and

b) Guidance Document for Flow Measurement of Metal Mining Effluents, April 2001, (Report: EPS 2/MM/4), Minerals and Metals Division, Environment Canada, and.

c) Standard Guide for Sampling Ground-Water Monitoring Wells, ASTM D4448-01, ASTM International, PA, USA.

37. Within 60 days of the effective date of this licence, the Licensee shall provide coordinates for any monitoring points listed in Schedule A, Part 1 for which coordinates are not already indicated.

Sediment, Periphyton and Benthic Invertebrate Monitoring

38. Once during the term of the licence, the Licensee shall carry out a sediment, periphyton and benthic invertebrate monitoring program, with sampling and analysis conducted as described below at sampling stations KR-08, KR-10, KR-11, KR-12 and KR-14. The study will be carried out by persons qualified to do so by education and/or experience. The results of the program will be included in the next annual report.

a) Sediment sampling shall be carried out as follows:

i) sediment samples shall be collected in replicates of three from within the active channel, directly into high density plastic sample jars, using an aluminum or Teflon scoop.

ii) Samples shall be dried and screened, using sieves at ASTM mesh numbers 10, 20, 40, 60, 100, 140 and 270 (ASTM-E11-61) and the fraction weights shall be recorded.

iii) A sub-sample composed of material passing through the 100 mesh number sieve shall be analyzed for metals by a 33 element ICP scan. Loss on ignition shall also be determined by heating the sample to 600 degrees C.

b) Benthic invertebrate sampling shall be carried out as follows:

i) Three replicate samples shall be taken by a circular Hess sampler (0.0934 $m^2$) or Waters and Knapp sampler (0.089 $m^2$) equipped with a 250 µm mesh net.

ii) Samples shall be preserved with 10% formalin solution, and identified to the lowest possible taxon (usually genus) and counted.

iii) Stream information collected at the time of the benthos collection shall include velocity, depth, temperature, substrate conditions and riparian conditions.

c) Periphyton sampling shall be carried out as follows:

i) Samples shall be collected from rock by surface scraping (3 or more rocks combined) and the total surface area of rock scraped at that station shall be recorded.

ii) Each sample shall be preserved with Lugols solution.

iii) Each sample shall be enumerated and identified to the lowest taxonomic level.

iv) The results shall include the date of completion, the company performing the identification, enumerations and identifications per station, method used to perform sorting and analysis of data, and resources used for identifications.

Physical Inspections and Monitoring

39. An annual inspection of all earthworks shall be carried out in accordance with the Dam Safety Guidelines by a Professional Engineer licenced to practice in Yukon. A report on the inspection, prepared by the Professional Engineer, shall be submitted as a part of the annual report. The report shall document the inspection locations and methodologies, the results of the inspection, all problems identified, and remedial measures recommended. The status of any remedial measures recommended in the previous year's report shall be appended to the report together with an explanation regarding any recommendation not implemented.

40. Details of any maintenance, inspection and/or surveillance activities undertaken in the previous year in relation to dam safety shall be included in the annual report.

## QZ04-063 SCHEDULE A

SCHEDULE A, PART I
MONITORING STATIONS

Surface Water Monitoring Stations

| Station | Description | Latitude | Longitude |
|---|---|---|---|
| KR-01 | Cache Creek, upstream of mill and tailings pond | 61° 31.7912' | 132° 16.1384' |
| KR-04-N2 | North Dam seepage discharge to Cache Creek | 61° 32.2104' | 132° 14.6078' |
| KR-04-N3 | South Dam seepage discharge to Cache Creek | 61° 32.21' | 132° 15.2' |
| KR-05-S1 | Surface discharge to Cache Creek | 61° 32.0582' | 132° 14.9534' |
| KR-05-S2 | Surface discharge to Cache Creek | 61° 32.052' | 132° 15.157' |
| KR-08 | Cache Creek, downstream of Oxo Creek | 61° 32.5808' | 132° 14.0366' |
| KR-09 | Tailings Impoundment | 61° 32.0204' | 132° 15.1976' |
| KR-09A | Discharge from Tailings Impoundment | | |
| KR-10 | Cache Creek, upstream of Ketza River | 61° 32.8995' | 132° 9.7545' |
| KR-11 | Ketza River, upstream of Cache Creek confluence | 61° 33.9895' | 132° 9.6051' |
| KR-12 | Ketza River, downstream of Cache Creek confluence | 61° 34.5685' | 132° 10.1996' |
| KR-13 | Cache Creek adjacent to mill/tailings | 61° 32.0174' | 132° 15.2018' |
| KR-14 | Oxo Creek above Cache Creek | 61° 32.0102' | 132° 14.7302' |
| KR-15 | Peel Creek above Cache Creek | 61° 32.552' | 132° 14.7062' |
| KR-16 | Unnamed tributary of Cache Creek, above mine site | 61° 32.0192' | 132° 17.0486' |
| KR-50 | Cache Creek at upstream end of Campbell Highway culvert | | |

Groundwater Monitoring Stations

| Station | Description | Latitude | Longitude |
|---|---|---|---|
| P90-7A | South Dam | | |
| P90-7B | South Dam | | |
| P90-7C | South Dam | | |
| P90-8 | Knoll between dams | | |
| P90-9 | Knoll between dams | | |
| P96-11A | North Dam | | |
| P96-11 B | North Dam | | |
| P96-11C | North Dam | | |
| P96-12A | South Dam | | |
| P96-12B | South Dam | | |
| P96-12C | South Dam | | |

SCHEDULE A, PART II
MONITORING SCHEDULE FREQUENCY LEGEND

| Symbol | Frequency |
|---|---|
| W | Weekly |
| WD | Weekly when discharging |
| BW | Bi-weekly |
| M | Monthly |
| BM | Bi-Monthly |

SCHEDULE A, PART III
MONITORING SCHEDULE

| Monitoring Stations | Parameters | | |
|---|---|---|---|
| | Metals and Water Chemistry * | Water Level | Flow |
| KR-01 | M | - | - |
| KR-04-N2 | BW | - | BW |
| KR-04-N3 | BW | - | BW |
| KR-05-S1 | BW | - | BW |
| KR-05-S2 | BW | - | BW |
| KR-08 | M | - | - |
| KR-09 | M | W | - |
| KR-09A | WD | - | WD |
| KR-10 | M | - | - |
| KR-11 | M | - | - |
| KR-12 | M | - | - |
| KR-13 | M | - | - |
| KR-14 | M | - | - |
| KR-15 | M | - | - |
| KR-16 | M | - | - |
| KR-50 | M | - | - |
| P90-7A | M | BM | - |
| P90-7B | M | BM | - |
| P90-7C | M | BM | - |
| P90-8 | M | BM | - |
| P90-9 | M | BM | - |

| Monitoring Stations | Parameters | | |
|---|---|---|---|
| | Metals and Water Chemistry * | Water Level | Flow |
| P96-11A | M | BM | - |
| P96-11B | M | BM | - |
| P96-11C | M | BM | - |
| P96-12A | M | BM | - |
| P96-12B | M | BM | - |
| P96-12C | M | BM | - |

* ICP Total Metals by Low Method Detection Limits, ICP Dissolved Metals by Low Method Detection Limits, Hardness, Total Suspended Solids, Total Dissolved Solids, Total Alkalinity, Total Sulphate, Nitrogen-Nitrate, Nitrogen-Nitrite.

# Appendix D – Water Quality Lab Raw Data

Your Project #: 2021-Ketza
Your C.O.C. #: C#644610-01-01

**Attention: Stephanie Lyons**

Government of Yukon – Dept of ENV
Box 2703
Whitehorse, YT
Canada Y1A2C6

**Report Date: 2021/09/10**
Report #: R3070012
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**BV LABS JOB #: C165062**
**Received: 2021/09/02, 16:11**

Sample Matrix: Water
# Samples Received: 10

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Analytical Method |
|---|---|---|---|---|---|
| Alkalinity @25C (pp, total), CO3,HCO3,OH | 10 | N/A | 2021/09/04 | BBY6SOP-00026 | SM 23 2320 B m |
| Low level chloride/sulphate by AC | 10 | N/A | 2021/09/09 | BBY6SOP-00011 / BBY6SOP-00017 | SM23-4500-Cl/SO4-E m |
| Cyanide SAD (strong acid dissociable) (1) | 10 | N/A | 2021/09/07 | CAL SOP-00270 | SM 23 4500-CN m |
| Cyanide WAD (weak acid dissociable) (1) | 10 | N/A | 2021/09/07 | CAL SOP-00270 | SM 23 4500-CN m |
| Chromium III (Calc'd) (1, 2) | 4 | N/A | 2021/09/07 | | Auto Calc |
| Chromium III (Calc'd) (1, 2) | 6 | N/A | 2021/09/10 | | Auto Calc |
| Dissolved Hexavalent Chromium (1) | 4 | N/A | 2021/09/07 | AB SOP-00063 | SM 23 3500-Cr B m |
| Dissolved Hexavalent Chromium (1) | 6 | N/A | 2021/09/09 | AB SOP-00063 | SM 23 3500-Cr B m |
| Carbon (DOC) (1, 3) | 9 | N/A | 2021/09/09 | AB SOP-00087 | MMCW 119 1996 m |
| Carbon (DOC) (1, 3) | 1 | N/A | 2021/09/10 | AB SOP-00087 | MMCW 119 1996 m |
| Conductivity @25C | 10 | N/A | 2021/09/04 | BBY6SOP-00026 | SM 23 2510 B m |
| Fluoride - Mining Clients | 10 | N/A | 2021/09/10 | BBY6SOP-00048 | SM 23 4500-F C m |
| Hardness Total (calculated as CaCO3) (4) | 10 | N/A | 2021/09/07 | BBY WI-00033 | Auto Calc |
| Hardness (calculated as CaCO3) | 10 | N/A | 2021/09/07 | BBY WI-00033 | Auto Calc |
| Mercury (Dissolved) by CV (2) | 8 | 2021/09/07 | 2021/09/07 | AB SOP-00084 | BCMOE BCLM Oct2013 m |
| Mercury (Dissolved) by CV (2) | 2 | 2021/09/10 | 2021/09/10 | AB SOP-00084 | BCMOE BCLM Oct2013 m |
| Mercury (Total) by CV | 4 | 2021/09/07 | 2021/09/07 | AB SOP-00084 | BCMOE BCLM Oct2013 m |
| Mercury (Total) by CV | 2 | 2021/09/07 | 2021/09/10 | AB SOP-00084 | BCMOE BCLM Oct2013 m |
| Mercury (Total) by CV | 4 | 2021/09/10 | 2021/09/10 | AB SOP-00084 | BCMOE BCLM Oct2013 m |
| Na, K, Ca, Mg, S by CRC ICPMS (diss.) | 10 | N/A | 2021/09/07 | BBY WI-00033 | Auto Calc |
| Elements by ICPMS Low Level (dissolved) (2) | 10 | N/A | 2021/09/04 | BBY7SOP-00002 | EPA 6020b R2 m |
| Elements by ICPMS Digested LL (total) | 1 | 2021/09/03 | 2021/09/04 | BBY7SOP-00003 / BBY7SOP-00002 | EPA 6020b R2 m |
| Na, K, Ca, Mg, S by CRC ICPMS (total) | 10 | N/A | 2021/09/07 | BBY WI-00033 | Auto Calc |
| Elements by ICPMS Low Level (total) | 9 | N/A | 2021/09/03 | BBY7SOP-00002 | EPA 6020b R2 m |
| Nitrogen (Total) | 10 | N/A | 2021/09/09 | BBY6SOP-00016 | SM 23 4500-N C m |
| Ammonia-N Low Level (Preserved) (1) | 10 | N/A | 2021/09/09 | AB SOP-00007 | SM 23 4500 NH3 A G m |
| Nitrate+Nitrite (N) (low level) | 10 | N/A | 2021/09/03 | BBY6SOP-00010 | SM 23 4500-NO3- I m |
| Nitrite (N) (low level) | 10 | N/A | 2021/09/03 | BBY6SOP-00010 | SM 23 4500-NO3- I m |
| Nitrogen - Nitrate (as N) Low Level Calc | 10 | N/A | 2021/09/04 | BBY WI-00033 | Auto Calc |
| Filter and HNO3 Preserve for Metals | 10 | N/A | 2021/09/02 | BBY7 WI-00004 | SM 23 3030B m |

Your Project #: 2021-Ketza
Your C.O.C. #: C#644610-01-01

**Attention: Stephanie Lyons**

Government of Yukon – Dept of ENV
Box 2703
Whitehorse, YT
Canada Y1A2C6

**Report Date: 2021/09/10**
Report #: R3070012
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**BV LABS JOB #: C165062**
**Received: 2021/09/02, 16:11**

Sample Matrix: Water
# Samples Received: 10

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Analytical Method |
|---|---|---|---|---|---|
| pH @25°C (5) | 10 | N/A | 2021/09/04 | BBY6SOP-00026 | SM 23 4500-H+ B m |
| Total Dissolved Solids - Low Level (1) | 10 | 2021/09/05 | 2021/09/05 | AB SOP-00065 | SM 23 2540 C m |
| Total Kjeldahl Nitrogen (Total) | 10 | N/A | 2021/09/09 | BBY WI-00033 | Auto Calc |
| Total Phosphorus Low Level Dissolved (1, 6) | 10 | 2021/09/08 | 2021/09/08 | AB SOP-00024 | SM 23 4500-P A,B,F m |
| Total Phosphorus Low Level Total (1) | 10 | 2021/09/08 | 2021/09/08 | AB SOP-00024 | SM 23 4500-P A,B,F m |
| Total Suspended Solids (NFR) | 10 | 2021/09/07 | 2021/09/08 | BBY6SOP-00034 | SM 23 2540 D 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) This test was performed by Bureau Veritas Calgary Environmental
(2) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(3) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(4) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).
(5) 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

Your Project #: 2021-Ketza
Your C.O.C. #: C#644610-01-01

**Attention: Stephanie Lyons**

Government of Yukon – Dept of ENV
Box 2703
Whitehorse, YT
Canada Y1A2C6

**Report Date: 2021/09/10**
Report #: R3070012
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**BV LABS JOB #: C165062**
**Received: 2021/09/02, 16:11**

reported past the CCME holding time. Bureau Veritas Laboratories endeavours to analyze samples as soon as possible after receipt.
(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

Kandise Wilson
Customer Solutions Representative
13 Sep 2021 18:23:45

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Customer Solutions, Western Canada Customer Experience Team
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==========
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Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

BV Labs Job #: C165062
Report Date: 2021/09/10

Government of Yukon – Dept of ENV
Client Project #: 2021-Ketza
Sampler Initials: SL

## RESULTS OF CHEMICAL ANALYSES OF WATER

| BV Labs ID | | AFC782 | | | AFC782 | | |
|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 09:05 | | | 2021/08/31 09:05 | | |
| COC Number | | C#644610-01-01 | | | C#644610-01-01 | | |
| | UNITS | 2021725-1 | RDL | QC Batch | 2021725-1 Lab-Dup | RDL | QC Batch |
| **Misc. Inorganics** | | | | | | | |
| Fluoride (F) | mg/L | 0.110 | 0.020 | A347643 | 0.110 | 0.020 | A347643 |
| **Calculated Parameters** | | | | | | | |
| Dissolved Chromium III | mg/L | <0.00099 | 0.00099 | A340344 | | | |
| Filter and HNO3 Preservation | N/A | FIELD | | ONSITE | | | |
| Dissolved Hardness (CaCO3) | mg/L | 295 | 0.50 | A340085 | | | |
| Total Hardness (CaCO3) | mg/L | 300 | 0.50 | A339992 | | | |
| Nitrate (N) | mg/L | 0.0572 | 0.0020 | A340789 | | | |
| Total Total Kjeldahl Nitrogen (Calc) | mg/L | 0.109 | 0.020 | A340111 | | | |
| **Misc. Inorganics** | | | | | | | |
| Conductivity | uS/cm | 590 | 2.0 | A342007 | 590 | 2.0 | A342007 |
| Strong Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | 0.00050 | A342803 | | | |
| Weak Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | 0.00050 | A342809 | | | |
| Dissolved Organic Carbon (C) | mg/L | 0.35 | 0.20 | A343810 | | | |
| pH | pH | 7.48 | N/A | A342005 | 7.72 | N/A | A342005 |
| Total Suspended Solids | mg/L | 4.8 | 1.0 | A343312 | | | |
| **Anions** | | | | | | | |
| Alkalinity (PP as CaCO3) | mg/L | <1.0 | 1.0 | A342006 | <1.0 | 1.0 | A342006 |
| Alkalinity (Total as CaCO3) | mg/L | 140 | 1.0 | A342006 | 150 | 1.0 | A342006 |
| Bicarbonate (HCO3) | mg/L | 170 | 1.0 | A342006 | 180 | 1.0 | A342006 |
| Carbonate (CO3) | mg/L | <1.0 | 1.0 | A342006 | <1.0 | 1.0 | A342006 |
| Hydroxide (OH) | mg/L | <1.0 | 1.0 | A342006 | <1.0 | 1.0 | A342006 |
| Dissolved Chloride (Cl) | mg/L | <0.50 | 0.50 | A346519 | <0.50 | 0.50 | A346519 |
| Dissolved Sulphate (SO4) | mg/L | 190 | 0.50 | A346519 | 190 | 0.50 | A346519 |
| **Metals** | | | | | | | |
| Dissolved Hex. Chromium (Cr 6+) | mg/L | <0.00099 | 0.00099 | A343723 | | | |
| **Nutrients** | | | | | | | |
| Dissolved Phosphorus (P) | mg/L | <0.0010 | 0.0010 | A344365 | | | |
| Total Phosphorus (P) | mg/L | <0.0010 | 0.0010 | A344338 | | | |
| Total Ammonia (N) | mg/L | <0.0050 | 0.0050 | A343769 | | | |
| Nitrate plus Nitrite (N) | mg/L | 0.0572 | 0.0020 | A341762 | 0.0607 | 0.0020 | A341762 |
| Nitrite (N) | mg/L | <0.0020 | 0.0020 | A341763 | <0.0020 | 0.0020 | A341763 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable



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BV Labs Job #: C165062
Report Date: 2021/09/10

Government of Yukon – Dept of ENV
Client Project #: 2021-Ketza
Sampler Initials: SL

## RESULTS OF CHEMICAL ANALYSES OF WATER

| **BV Labs ID** | | AFC782 | | | AFC782 | | |
|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2021/08/31 09:05 | | | 2021/08/31 09:05 | | |
| **COC Number** | | C#644610-01-01 | | | C#644610-01-01 | | |
| | **UNITS** | **2021725-1** | **RDL** | **QC Batch** | **2021725-1 Lab-Dup** | **RDL** | **QC Batch** |
| Total Nitrogen (N) | mg/L | 0.166 | 0.020 | A343841 | | | |
| **Physical Properties** | | | | | | | |
| Total Dissolved Solids | mg/L | 393 (1) | 1.0 | A342432 | | | |

RDL = Reportable Detection Limit
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(1) Detection limits raised due to insufficient sample volume.



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Client Project #: 2021-Ketza
Sampler Initials: SL

## RESULTS OF CHEMICAL ANALYSES OF WATER

| BV Labs ID | | AFC783 | | | AFC784 | | AFC785 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 09:50 | | | 2021/08/31 11:30 | | 2021/08/31 13:45 | | |
| COC Number | | C#644610-01-01 | | | C#644610-01-01 | | C#644610-01-01 | | |
| | **UNITS** | **2021725-2** | **RDL** | **QC Batch** | **2021725-03** | **QC Batch** | **2021725-04** | **RDL** | **QC Batch** |
| **Misc. Inorganics** | | | | | | | | | |
| Fluoride (F) | mg/L | 0.048 | 0.020 | A347643 | 0.210 | A347643 | 0.046 | 0.020 | A347643 |
| **Calculated Parameters** | | | | | | | | | |
| Dissolved Chromium III | mg/L | <0.00099 | 0.00099 | A340344 | <0.00099 | A340344 | <0.00099 | 0.00099 | A340344 |
| Filter and HNO3 Preservation | N/A | FIELD | | ONSITE | FIELD | ONSITE | FIELD | | ONSITE |
| Dissolved Hardness (CaCO3) | mg/L | 267 | 0.50 | A340085 | 356 | A340085 | 297 | 0.50 | A340085 |
| Total Hardness (CaCO3) | mg/L | 270 | 0.50 | A339992 | 360 | A339992 | 300 | 0.50 | A339992 |
| Nitrate (N) | mg/L | 0.0447 | 0.0020 | A340789 | 0.124 | A340789 | 0.124 | 0.0020 | A340789 |
| Total Total Kjeldahl Nitrogen (Calc) | mg/L | 0.124 | 0.020 | A340111 | 0.128 | A340111 | 0.161 | 0.020 | A340111 |
| **Misc. Inorganics** | | | | | | | | | |
| Conductivity | uS/cm | 530 | 2.0 | A341967 | 710 | A341967 | 570 | 2.0 | A342007 |
| Strong Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | 0.00050 | A342803 | <0.00050 | A342803 | <0.00050 | 0.00050 | A342803 |
| Weak Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | 0.00050 | A342809 | <0.00050 | A342809 | <0.00050 | 0.00050 | A342809 |
| Dissolved Organic Carbon (C) | mg/L | 0.31 | 0.20 | A343810 | <0.20 | A343810 | <0.20 | 0.20 | A343810 |
| pH | pH | 7.84 | N/A | A341963 | 7.28 | A341963 | 7.43 | N/A | A342005 |
| Total Suspended Solids | mg/L | 2.4 | 1.0 | A343244 | 11 | A343244 | 3.6 | 1.0 | A343312 |
| **Anions** | | | | | | | | | |
| Alkalinity (PP as CaCO3) | mg/L | <1.0 | 1.0 | A341966 | <1.0 | A341966 | <1.0 | 1.0 | A342006 |
| Alkalinity (Total as CaCO3) | mg/L | 150 | 1.0 | A341966 | 92 | A341966 | 120 | 1.0 | A342006 |
| Bicarbonate (HCO3) | mg/L | 190 | 1.0 | A341966 | 110 | A341966 | 140 | 1.0 | A342006 |
| Carbonate (CO3) | mg/L | <1.0 | 1.0 | A341966 | <1.0 | A341966 | <1.0 | 1.0 | A342006 |
| Hydroxide (OH) | mg/L | <1.0 | 1.0 | A341966 | <1.0 | A341966 | <1.0 | 1.0 | A342006 |
| Dissolved Chloride (Cl) | mg/L | 0.56 | 0.50 | A346519 | <0.50 | A346519 | <0.50 | 0.50 | A346519 |
| Dissolved Sulphate (SO4) | mg/L | 140 | 0.50 | A346519 | 280 | A346519 | 240 | 5.0 | A346519 |
| **Metals** | | | | | | | | | |
| Dissolved Hex. Chromium (Cr 6+) | mg/L | <0.00099 | 0.00099 | A343019 | <0.00099 | A343723 | <0.00099 | 0.00099 | A343723 |
| **Nutrients** | | | | | | | | | |
| Dissolved Phosphorus (P) | mg/L | <0.0010 | 0.0010 | A344365 | <0.0010 | A344365 | 0.0013 | 0.0010 | A344365 |
| Total Phosphorus (P) | mg/L | 0.0011 | 0.0010 | A344325 | 0.0046 | A344325 | 0.0017 | 0.0010 | A344338 |
| Total Ammonia (N) | mg/L | <0.0050 | 0.0050 | A343769 | 0.0053 | A343769 | 0.20 | 0.0050 | A343769 |
| Nitrate plus Nitrite (N) | mg/L | 0.0447 | 0.0020 | A341762 | 0.124 | A341762 | 0.124 | 0.0020 | A341762 |
| Nitrite (N) | mg/L | <0.0020 | 0.0020 | A341763 | <0.0020 | A341763 | <0.0020 | 0.0020 | A341763 |

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## RESULTS OF CHEMICAL ANALYSES OF WATER

| **BV Labs ID** | | AFC783 | | | AFC784 | | AFC785 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2021/08/31 09:50 | | | 2021/08/31 11:30 | | 2021/08/31 13:45 | | |
| **COC Number** | | C#644610-01-01 | | | C#644610-01-01 | | C#644610-01-01 | | |
| | **UNITS** | **2021725-2** | **RDL** | **QC Batch** | **2021725-03** | **QC Batch** | **2021725-04** | **RDL** | **QC Batch** |
| Total Nitrogen (N) | mg/L | 0.168 | 0.020 | A343841 | 0.252 | A343841 | 0.285 | 0.020 | A343841 |
| **Physical Properties** | | | | | | | | | |
| Total Dissolved Solids | mg/L | 347 (1) | 1.0 | A342432 | 511 | A342432 | 394 | 1.0 | A342432 |

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Report Date: 2021/09/10

Government of Yukon – Dept of ENV
Client Project #: 2021-Ketza
Sampler Initials: SL

## RESULTS OF CHEMICAL ANALYSES OF WATER

| BV Labs ID | | AFC785 | | | AFC786 | | |
|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 13:45 | | | 2021/08/31 14:15 | | |
| COC Number | | C#644610-01-01 | | | C#644610-01-01 | | |
| | UNITS | 2021725-04 Lab-Dup | RDL | QC Batch | 2021725-05 | RDL | QC Batch |
| **Misc. Inorganics** | | | | | | | |
| Fluoride (F) | mg/L | | | | 0.055 | 0.020 | A347643 |
| **Calculated Parameters** | | | | | | | |
| Dissolved Chromium III | mg/L | | | | <0.00099 | 0.00099 | A340344 |
| Filter and HNO3 Preservation | N/A | | | | FIELD | | ONSITE |
| Dissolved Hardness (CaCO3) | mg/L | | | | 305 | 0.50 | A340085 |
| Total Hardness (CaCO3) | mg/L | | | | 310 | 0.50 | A339992 |
| Nitrate (N) | mg/L | | | | 0.0940 | 0.0020 | A340789 |
| Total Total Kjeldahl Nitrogen (Calc) | mg/L | | | | 0.183 | 0.020 | A340111 |
| **Misc. Inorganics** | | | | | | | |
| Conductivity | uS/cm | | | | 610 | 2.0 | A342007 |
| Strong Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | 0.00050 | A342803 | <0.00050 | 0.00050 | A342803 |
| Weak Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | 0.00050 | A342809 | <0.00050 | 0.00050 | A342809 |
| Dissolved Organic Carbon (C) | mg/L | | | | <0.20 | 0.20 | A343810 |
| pH | pH | | | | 7.47 | N/A | A342005 |
| Total Suspended Solids | mg/L | | | | 11 | 1.0 | A343244 |
| **Anions** | | | | | | | |
| Alkalinity (PP as CaCO3) | mg/L | | | | <1.0 | 1.0 | A342006 |
| Alkalinity (Total as CaCO3) | mg/L | | | | 110 | 1.0 | A342006 |
| Bicarbonate (HCO3) | mg/L | | | | 140 | 1.0 | A342006 |
| Carbonate (CO3) | mg/L | | | | <1.0 | 1.0 | A342006 |
| Hydroxide (OH) | mg/L | | | | <1.0 | 1.0 | A342006 |
| Dissolved Chloride (Cl) | mg/L | | | | <0.50 | 0.50 | A346519 |
| Dissolved Sulphate (SO4) | mg/L | | | | 260 | 5.0 | A346519 |
| **Metals** | | | | | | | |
| Dissolved Hex. Chromium (Cr 6+) | mg/L | | | | <0.00099 | 0.00099 | A343019 |
| **Nutrients** | | | | | | | |
| Dissolved Phosphorus (P) | mg/L | | | | <0.0010 | 0.0010 | A344365 |
| Total Phosphorus (P) | mg/L | | | | 0.0047 | 0.0010 | A344325 |
| Total Ammonia (N) | mg/L | | | | 0.0051 | 0.0050 | A343769 |
| Nitrate plus Nitrite (N) | mg/L | | | | 0.0940 | 0.0020 | A341762 |
| Nitrite (N) | mg/L | | | | <0.0020 | 0.0020 | A341763 |

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## RESULTS OF CHEMICAL ANALYSES OF WATER

| **BV Labs ID** | | AFC785 | | | AFC786 | | |
|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2021/08/31 13:45 | | | 2021/08/31 14:15 | | |
| **COC Number** | | C#644610-01-01 | | | C#644610-01-01 | | |
| | **UNITS** | **2021725-04 Lab-Dup** | **RDL** | **QC Batch** | **2021725-05** | **RDL** | **QC Batch** |
| Total Nitrogen (N) | mg/L | | | | 0.277 | 0.020 | A343841 |
| **Physical Properties** | | | | | | | |
| Total Dissolved Solids | mg/L | | | | 423 (1) | 1.0 | A342432 |

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## RESULTS OF CHEMICAL ANALYSES OF WATER

| BV Labs ID | | AFC787 | | | AFC787 | | |
|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 14:30 | | | 2021/08/31 14:30 | | |
| COC Number | | C#644610-01-01 | | | C#644610-01-01 | | |
| | UNITS | 2021725-06 | RDL | QC Batch | 2021725-06 Lab-Dup | RDL | QC Batch |
| **Misc. Inorganics** | | | | | | | |
| Fluoride (F) | mg/L | 0.026 | 0.020 | A347643 | | | |
| **Calculated Parameters** | | | | | | | |
| Dissolved Chromium III | mg/L | <0.00099 | 0.00099 | A340344 | | | |
| Filter and HNO3 Preservation | N/A | FIELD | | ONSITE | | | |
| Dissolved Hardness (CaCO3) | mg/L | 257 | 0.50 | A340085 | | | |
| Total Hardness (CaCO3) | mg/L | 250 | 0.50 | A339992 | | | |
| Nitrate (N) | mg/L | 0.205 | 0.0020 | A340789 | | | |
| Total Total Kjeldahl Nitrogen (Calc) | mg/L | 0.074 | 0.020 | A340111 | | | |
| **Misc. Inorganics** | | | | | | | |
| Conductivity | uS/cm | 520 | 2.0 | A342007 | | | |
| Strong Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | 0.00050 | A342803 | | | |
| Weak Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | 0.00050 | A342809 | | | |
| Dissolved Organic Carbon (C) | mg/L | <0.20 | 0.20 | A343810 | | | |
| pH | pH | 7.52 | N/A | A342005 | | | |
| Total Suspended Solids | mg/L | <1.0 | 1.0 | A343244 | | | |
| **Anions** | | | | | | | |
| Alkalinity (PP as CaCO3) | mg/L | <1.0 | 1.0 | A342006 | | | |
| Alkalinity (Total as CaCO3) | mg/L | 120 | 1.0 | A342006 | | | |
| Bicarbonate (HCO3) | mg/L | 150 | 1.0 | A342006 | | | |
| Carbonate (CO3) | mg/L | <1.0 | 1.0 | A342006 | | | |
| Hydroxide (OH) | mg/L | <1.0 | 1.0 | A342006 | | | |
| Dissolved Chloride (Cl) | mg/L | <0.50 | 0.50 | A346519 | | | |
| Dissolved Sulphate (SO4) | mg/L | 170 | 0.50 | A346519 | | | |
| **Metals** | | | | | | | |
| Dissolved Hex. Chromium (Cr 6+) | mg/L | <0.00099 | 0.00099 | A343723 | | | |
| **Nutrients** | | | | | | | |
| Dissolved Phosphorus (P) | mg/L | 0.0024 | 0.0010 | A344365 | | | |
| Total Phosphorus (P) | mg/L | 0.0036 | 0.0010 | A344325 | | | |
| Total Ammonia (N) | mg/L | <0.0050 | 0.0050 | A343769 | | | |
| Nitrate plus Nitrite (N) | mg/L | 0.205 | 0.0020 | A341762 | | | |
| Nitrite (N) | mg/L | <0.0020 | 0.0020 | A341763 | | | |

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## RESULTS OF CHEMICAL ANALYSES OF WATER

| **BV Labs ID** | | AFC787 | | | AFC787 | | |
|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2021/08/31 14:30 | | | 2021/08/31 14:30 | | |
| **COC Number** | | C#644610-01-01 | | | C#644610-01-01 | | |
| | **UNITS** | **2021725-06** | **RDL** | **QC Batch** | **2021725-06 Lab-Dup** | **RDL** | **QC Batch** |
| Total Nitrogen (N) | mg/L | 0.279 | 0.020 | A343841 | 0.277 | 0.020 | A343841 |
| **Physical Properties** | | | | | | | |
| Total Dissolved Solids | mg/L | 316 | 1.0 | A342432 | | | |

RDL = Reportable Detection Limit
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## RESULTS OF CHEMICAL ANALYSES OF WATER

| BV Labs ID | | AFC788 | | AFC789 | | AFC790 | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 15:30 | | 2021/08/31 16:45 | | 2021/08/31 | | |
| COC Number | | C#644610-01-01 | | C#644610-01-01 | | C#644610-01-01 | | |
| | **UNITS** | **2021725-07** | **QC Batch** | **2021725-08** | **QC Batch** | **2021725-09** | **RDL** | **QC Batch** |
| **Misc. Inorganics** | | | | | | | | |
| Fluoride (F) | mg/L | 0.023 | A347643 | 0.029 | A347643 | 0.028 | 0.020 | A347643 |
| **Calculated Parameters** | | | | | | | | |
| Dissolved Chromium III | mg/L | <0.00099 | A340344 | <0.00099 | A340344 | <0.00099 | 0.00099 | A340344 |
| Filter and HNO3 Preservation | N/A | FIELD | ONSITE | FIELD | ONSITE | FIELD | | ONSITE |
| Dissolved Hardness (CaCO3) | mg/L | 247 | A340085 | 290 | A340085 | 281 | 0.50 | A340085 |
| Total Hardness (CaCO3) | mg/L | 250 | A339992 | 280 | A339992 | 280 | 0.50 | A339992 |
| Nitrate (N) | mg/L | 0.152 | A340789 | 0.0503 | A340789 | 0.0497 | 0.0020 | A340789 |
| Total Total Kjeldahl Nitrogen (Calc) | mg/L | 0.088 | A340111 | 0.101 | A340111 | 0.068 | 0.020 | A340111 |
| **Misc. Inorganics** | | | | | | | | |
| Conductivity | uS/cm | 510 | A342007 | 580 | A342007 | 580 | 2.0 | A342007 |
| Strong Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | A342803 | <0.00050 | A342803 | <0.00050 | 0.00050 | A342803 |
| Weak Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | A342809 | <0.00050 | A342809 | <0.00050 | 0.00050 | A342809 |
| Dissolved Organic Carbon (C) | mg/L | <0.20 | A343810 | <0.20 | A343810 | 0.33 | 0.20 | A343810 |
| pH | pH | 7.63 | A342005 | 7.57 | A342005 | 7.59 | N/A | A342005 |
| Total Suspended Solids | mg/L | <1.0 | A343312 | 2.4 | A343244 | <1.0 | 1.0 | A343312 |
| **Anions** | | | | | | | | |
| Alkalinity (PP as CaCO3) | mg/L | <1.0 | A342006 | <1.0 | A342006 | <1.0 | 1.0 | A342006 |
| Alkalinity (Total as CaCO3) | mg/L | 120 | A342006 | 120 | A342006 | 130 | 1.0 | A342006 |
| Bicarbonate (HCO3) | mg/L | 150 | A342006 | 150 | A342006 | 150 | 1.0 | A342006 |
| Carbonate (CO3) | mg/L | <1.0 | A342006 | <1.0 | A342006 | <1.0 | 1.0 | A342006 |
| Hydroxide (OH) | mg/L | <1.0 | A342006 | <1.0 | A342006 | <1.0 | 1.0 | A342006 |
| Dissolved Chloride (Cl) | mg/L | <0.50 | A346519 | <0.50 | A346519 | <0.50 | 0.50 | A346519 |
| Dissolved Sulphate (SO4) | mg/L | 150 | A346519 | 190 | A346519 | 200 | 0.50 | A346519 |
| **Metals** | | | | | | | | |
| Dissolved Hex. Chromium (Cr 6+) | mg/L | <0.00099 | A343019 | <0.00099 | A343019 | <0.00099 | 0.00099 | A343723 |
| **Nutrients** | | | | | | | | |
| Dissolved Phosphorus (P) | mg/L | 0.0027 | A344365 | 0.0018 | A344365 | 0.0013 | 0.0010 | A344365 |
| Total Phosphorus (P) | mg/L | 0.0023 | A344325 | 0.0029 | A344338 | 0.0030 | 0.0010 | A344325 |
| Total Ammonia (N) | mg/L | <0.0050 | A343769 | <0.0050 | A343769 | <0.0050 | 0.0050 | A343769 |
| Nitrate plus Nitrite (N) | mg/L | 0.152 | A341762 | 0.0503 | A341762 | 0.0497 | 0.0020 | A341762 |
| Nitrite (N) | mg/L | <0.0020 | A341763 | <0.0020 | A341763 | <0.0020 | 0.0020 | A341763 |

RDL = Reportable Detection Limit
N/A = Not Applicable



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## RESULTS OF CHEMICAL ANALYSES OF WATER

| BV Labs ID | | AFC788 | | AFC789 | | AFC790 | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 15:30 | | 2021/08/31 16:45 | | 2021/08/31 | | |
| COC Number | | C#644610-01-01 | | C#644610-01-01 | | C#644610-01-01 | | |
| | **UNITS** | **2021725-07** | **QC Batch** | **2021725-08** | **QC Batch** | **2021725-09** | **RDL** | **QC Batch** |
| Total Nitrogen (N) | mg/L | 0.240 | A343841 | 0.151 | A343841 | 0.118 | 0.020 | A343841 |
| **Physical Properties** | | | | | | | | |
| Total Dissolved Solids | mg/L | 340 | A342432 | 387 (1) | A342432 | 397 | 1.0 | A342432 |

RDL = Reportable Detection Limit
(1) Detection limits raised due to insufficient sample volume.



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## RESULTS OF CHEMICAL ANALYSES OF WATER

| BV Labs ID | | AFC790 | | | AFC791 | | |
|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 | | | 2021/08/31 18:00 | | |
| COC Number | | C#644610-01-01 | | | C#644610-01-01 | | |
| | UNITS | 2021725-09 Lab-Dup | RDL | QC Batch | 2021725-10 | RDL | QC Batch |
| **Misc. Inorganics** | | | | | | | |
| Fluoride (F) | mg/L | | | | 0.067 | 0.020 | A347643 |
| **Calculated Parameters** | | | | | | | |
| Dissolved Chromium III | mg/L | | | | <0.00099 | 0.00099 | A340344 |
| Filter and HNO3 Preservation | N/A | | | | FIELD | | ONSITE |
| Dissolved Hardness (CaCO3) | mg/L | | | | 408 | 0.50 | A340085 |
| Total Hardness (CaCO3) | mg/L | | | | 400 | 0.50 | A339992 |
| Nitrate (N) | mg/L | | | | 0.0588 | 0.0020 | A340789 |
| Total Total Kjeldahl Nitrogen (Calc) | mg/L | | | | 0.091 | 0.020 | A340111 |
| **Misc. Inorganics** | | | | | | | |
| Conductivity | uS/cm | | | | 800 | 2.0 | A342007 |
| Strong Acid Dissoc. Cyanide (CN) | mg/L | | | | <0.00050 | 0.00050 | A342803 |
| Weak Acid Dissoc. Cyanide (CN) | mg/L | | | | <0.00050 | 0.00050 | A342809 |
| Dissolved Organic Carbon (C) | mg/L | 0.26 | 0.20 | A343810 | <0.20 | 0.20 | A343810 |
| pH | pH | | | | 7.30 | N/A | A342005 |
| Total Suspended Solids | mg/L | <1.0 | 1.0 | A343312 | 2.0 | 1.0 | A343312 |
| **Anions** | | | | | | | |
| Alkalinity (PP as CaCO3) | mg/L | | | | <1.0 | 1.0 | A342006 |
| Alkalinity (Total as CaCO3) | mg/L | | | | 91 | 1.0 | A342006 |
| Bicarbonate (HCO3) | mg/L | | | | 110 | 1.0 | A342006 |
| Carbonate (CO3) | mg/L | | | | <1.0 | 1.0 | A342006 |
| Hydroxide (OH) | mg/L | | | | <1.0 | 1.0 | A342006 |
| Dissolved Chloride (Cl) | mg/L | | | | <0.50 | 0.50 | A346519 |
| Dissolved Sulphate (SO4) | mg/L | | | | 350 | 5.0 | A346519 |
| **Metals** | | | | | | | |
| Dissolved Hex. Chromium (Cr 6+) | mg/L | | | | <0.00099 | 0.00099 | A343723 |
| **Nutrients** | | | | | | | |
| Dissolved Phosphorus (P) | mg/L | | | | 0.0017 | 0.0010 | A344365 |
| Total Phosphorus (P) | mg/L | | | | 0.0021 | 0.0010 | A344338 |
| Total Ammonia (N) | mg/L | | | | <0.0050 | 0.0050 | A343769 |
| Nitrate plus Nitrite (N) | mg/L | | | | 0.0588 | 0.0020 | A341762 |
| Nitrite (N) | mg/L | | | | <0.0020 | 0.0020 | A341763 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable



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## RESULTS OF CHEMICAL ANALYSES OF WATER

| BV Labs ID | | AFC790 | | | AFC791 | | |
|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 | | | 2021/08/31 18:00 | | |
| COC Number | | C#644610-01-01 | | | C#644610-01-01 | | |
| | UNITS | 2021725-09 Lab-Dup | RDL | QC Batch | 2021725-10 | RDL | QC Batch |
| Total Nitrogen (N) | mg/L | | | | 0.150 | 0.020 | A343841 |
| **Physical Properties** | | | | | | | |
| Total Dissolved Solids | mg/L | | | | 593 | 1.0 | A342432 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

| BV Labs ID | | AFC791 | | |
|---|---|---|---|---|
| Sampling Date | | 2021/08/31 18:00 | | |
| COC Number | | C#644610-01-01 | | |
| | UNITS | 2021725-10 Lab-Dup | RDL | QC Batch |
| **Metals** | | | | |
| Dissolved Hex. Chromium (Cr 6+) | mg/L | <0.00099 | 0.00099 | A343723 |

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate



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## MERCURY BY COLD VAPOR (WATER)

| BV Labs ID | | AFC782 | | | AFC782 | | | AFC783 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 09:05 | | | 2021/08/31 09:05 | | | 2021/08/31 09:50 | | |
| COC Number | | C#644610-01-01 | | | C#644610-01-01 | | | C#644610-01-01 | | |
| | UNITS | 2021725-1 | RDL | QC Batch | 2021725-1 Lab-Dup | RDL | QC Batch | 2021725-2 | RDL | QC Batch |
| **Elements** | | | | | | | | | | |
| Dissolved Mercury (Hg) | ug/L | <0.0019 | 0.0019 | A343127 | | | | <0.0019 | 0.0019 | A343127 |
| Total Mercury (Hg) | ug/L | <0.0019 | 0.0019 | A343419 | <0.0019 | 0.0019 | A343419 | <0.0019 | 0.0019 | A343419 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

| BV Labs ID | | AFC784 | AFC785 | | AFC786 | | |
|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 11:30 | 2021/08/31 13:45 | | 2021/08/31 14:15 | | |
| COC Number | | C#644610-01-01 | C#644610-01-01 | | C#644610-01-01 | | |
| | UNITS | 2021725-03 | 2021725-04 | QC Batch | 2021725-05 | RDL | QC Batch |
| **Elements** | | | | | | | |
| Dissolved Mercury (Hg) | ug/L | <0.0019 | <0.0019 | A343127 | <0.0019 | 0.0019 | A343127 |
| Total Mercury (Hg) | ug/L | <0.0019 | <0.0019 | A343419 | <0.0019 | 0.0019 | A346928 |

RDL = Reportable Detection Limit

| BV Labs ID | | AFC786 | | | AFC787 | AFC788 | AFC789 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 14:15 | | | 2021/08/31 14:30 | 2021/08/31 15:30 | 2021/08/31 16:45 | | |
| COC Number | | C#644610-01-01 | | | C#644610-01-01 | C#644610-01-01 | C#644610-01-01 | | |
| | UNITS | 2021725-05 Lab-Dup | RDL | QC Batch | 2021725-06 | 2021725-07 | 2021725-08 | RDL | QC Batch |
| **Elements** | | | | | | | | | |
| Dissolved Mercury (Hg) | ug/L | | | | <0.0019 | <0.0019 | <0.0019 | 0.0019 | A343127 |
| Total Mercury (Hg) | ug/L | <0.0019 | 0.0019 | A346928 | <0.0019 | <0.0019 | <0.0019 | 0.0019 | A346928 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

| BV Labs ID | | AFC790 | | | AFC790 | | | AFC791 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 | | | 2021/08/31 | | | 2021/08/31 18:00 | | |
| COC Number | | C#644610-01-01 | | | C#644610-01-01 | | | C#644610-01-01 | | |
| | UNITS | 2021725-09 | RDL | QC Batch | 2021725-09 Lab-Dup | RDL | QC Batch | 2021725-10 | RDL | QC Batch |
| **Elements** | | | | | | | | | | |
| Dissolved Mercury (Hg) | ug/L | <0.0019 | 0.0019 | A346922 | <0.0019 | 0.0019 | A346922 | <0.0019 | 0.0019 | A346922 |
| Total Mercury (Hg) | ug/L | <0.0019 | 0.0019 | A346928 | | | | <0.0019 | 0.0019 | A346928 |

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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFC782 | | | AFC782 | | | AFC783 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 09:05 | | | 2021/08/31 09:05 | | | 2021/08/31 09:50 | | |
| COC Number | | C#644610-01-01 | | | C#644610-01-01 | | | C#644610-01-01 | | |
| | UNITS | 2021725-1 | RDL | QC Batch | 2021725-1 Lab-Dup | RDL | QC Batch | 2021725-2 | RDL | QC Batch |
| **Dissolved Metals by ICPMS** | | | | | | | | | | |
| Dissolved Aluminum (Al) | ug/L | 54.6 | 0.50 | A341524 | | | | 3.04 | 0.50 | A341524 |
| Dissolved Antimony (Sb) | ug/L | 0.187 | 0.020 | A341524 | | | | 0.214 | 0.020 | A341524 |
| Dissolved Arsenic (As) | ug/L | 7.77 | 0.020 | A341524 | | | | 14.1 | 0.020 | A341524 |
| Dissolved Barium (Ba) | ug/L | 10.7 | 0.020 | A341524 | | | | 11.0 | 0.020 | A341524 |
| Dissolved Beryllium (Be) | ug/L | <0.010 | 0.010 | A341524 | | | | <0.010 | 0.010 | A341524 |
| Dissolved Bismuth (Bi) | ug/L | <0.0050 | 0.0050 | A341524 | | | | <0.0050 | 0.0050 | A341524 |
| Dissolved Boron (B) | ug/L | <10 | 10 | A341524 | | | | <10 | 10 | A341524 |
| Dissolved Cadmium (Cd) | ug/L | 0.197 | 0.0050 | A341524 | | | | 0.0327 | 0.0050 | A341524 |
| Dissolved Chromium (Cr) | ug/L | <0.10 | 0.10 | A341524 | | | | <0.10 | 0.10 | A341524 |
| Dissolved Cobalt (Co) | ug/L | 14.5 | 0.0050 | A341524 | | | | 0.0306 | 0.0050 | A341524 |
| Dissolved Copper (Cu) | ug/L | 0.303 | 0.050 | A341524 | | | | 0.118 | 0.050 | A341524 |
| Dissolved Iron (Fe) | ug/L | 155 | 1.0 | A341524 | | | | <1.0 | 1.0 | A341524 |
| Dissolved Lead (Pb) | ug/L | 0.0201 | 0.0050 | A341524 | | | | <0.0050 | 0.0050 | A341524 |
| Dissolved Lithium (Li) | ug/L | 2.10 | 0.50 | A341524 | | | | 1.20 | 0.50 | A341524 |
| Dissolved Manganese (Mn) | ug/L | 125 | 0.050 | A341524 | | | | 0.242 | 0.050 | A341524 |
| Dissolved Molybdenum (Mo) | ug/L | 0.202 | 0.050 | A341524 | | | | 0.224 | 0.050 | A341524 |
| Dissolved Nickel (Ni) | ug/L | 8.94 | 0.020 | A341524 | | | | 0.611 | 0.020 | A341524 |
| Dissolved Selenium (Se) | ug/L | 0.666 | 0.040 | A341524 | | | | 0.709 | 0.040 | A341524 |
| Dissolved Silicon (Si) | ug/L | 2610 | 50 | A341524 | | | | 2080 | 50 | A341524 |
| Dissolved Silver (Ag) | ug/L | <0.0050 | 0.0050 | A341524 | | | | <0.0050 | 0.0050 | A341524 |
| Dissolved Strontium (Sr) | ug/L | 203 | 0.050 | A341524 | | | | 185 | 0.050 | A341524 |
| Dissolved Tellurium (Te) | ug/L | <0.020 | 0.020 | A341524 | | | | <0.020 | 0.020 | A341524 |
| Dissolved Thallium (Tl) | ug/L | <0.0020 | 0.0020 | A341524 | | | | <0.0020 | 0.0020 | A341524 |
| Dissolved Thorium (Th) | ug/L | <0.0050 | 0.0050 | A341524 | | | | <0.0050 | 0.0050 | A341524 |
| Dissolved Tin (Sn) | ug/L | <0.20 | 0.20 | A341524 | | | | <0.20 | 0.20 | A341524 |
| Dissolved Titanium (Ti) | ug/L | <0.50 | 0.50 | A341524 | | | | <0.50 | 0.50 | A341524 |
| Dissolved Tungsten (W) | ug/L | 0.039 | 0.010 | A341524 | | | | 0.055 | 0.010 | A341524 |
| Dissolved Uranium (U) | ug/L | 1.76 | 0.0020 | A341524 | | | | 1.99 | 0.0020 | A341524 |
| Dissolved Vanadium (V) | ug/L | <0.20 | 0.20 | A341524 | | | | <0.20 | 0.20 | A341524 |
| Dissolved Zinc (Zn) | ug/L | 36.6 | 0.10 | A341524 | | | | 2.08 | 0.10 | A341524 |
| Dissolved Zirconium (Zr) | ug/L | <0.10 | 0.10 | A341524 | | | | <0.10 | 0.10 | A341524 |

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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFC782 | | | AFC782 | | | AFC783 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 09:05 | | | 2021/08/31 09:05 | | | 2021/08/31 09:50 | | |
| COC Number | | C#644610-01-01 | | | C#644610-01-01 | | | C#644610-01-01 | | |
| | UNITS | 2021725-1 | RDL | QC Batch | 2021725-1 Lab-Dup | RDL | QC Batch | 2021725-2 | RDL | QC Batch |
| Dissolved Calcium (Ca) | mg/L | 79.9 | 0.050 | A340086 | | | | 71.6 | 0.050 | A340086 |
| Dissolved Magnesium (Mg) | mg/L | 23.2 | 0.050 | A340086 | | | | 21.5 | 0.050 | A340086 |
| Dissolved Potassium (K) | mg/L | 0.280 | 0.050 | A340086 | | | | 0.222 | 0.050 | A340086 |
| Dissolved Sodium (Na) | mg/L | 0.830 | 0.050 | A340086 | | | | 0.673 | 0.050 | A340086 |
| Dissolved Sulphur (S) | mg/L | 53.0 | 3.0 | A340086 | | | | 38.7 | 3.0 | A340086 |
| **Total Metals by ICPMS** | | | | | | | | | | |
| Total Aluminum (Al) | ug/L | 440 | 0.50 | A341316 | 439 | 0.50 | A341316 | 4.60 | 0.50 | A341316 |
| Total Antimony (Sb) | ug/L | 0.196 | 0.020 | A341316 | 0.199 | 0.020 | A341316 | 0.216 | 0.020 | A341316 |
| Total Arsenic (As) | ug/L | 19.2 | 0.020 | A341316 | 19.5 | 0.020 | A341316 | 14.5 | 0.020 | A341316 |
| Total Barium (Ba) | ug/L | 11.5 | 0.020 | A341316 | 11.3 | 0.020 | A341316 | 11.3 | 0.020 | A341316 |
| Total Beryllium (Be) | ug/L | 0.027 | 0.010 | A341316 | 0.032 | 0.010 | A341316 | <0.010 | 0.010 | A341316 |
| Total Bismuth (Bi) | ug/L | <0.0050 | 0.0050 | A341316 | <0.0050 | 0.0050 | A341316 | <0.0050 | 0.0050 | A341316 |
| Total Boron (B) | ug/L | <10 | 10 | A341316 | <10 | 10 | A341316 | <10 | 10 | A341316 |
| Total Cadmium (Cd) | ug/L | 0.263 | 0.0050 | A341316 | 0.271 | 0.0050 | A341316 | 0.0361 | 0.0050 | A341316 |
| Total Chromium (Cr) | ug/L | <0.10 | 0.10 | A341316 | <0.10 | 0.10 | A341316 | <0.10 | 0.10 | A341316 |
| Total Cobalt (Co) | ug/L | 15.1 | 0.0050 | A341316 | 15.3 | 0.0050 | A341316 | 0.0317 | 0.0050 | A341316 |
| Total Copper (Cu) | ug/L | 1.31 | 0.050 | A341316 | 1.33 | 0.050 | A341316 | 0.152 | 0.050 | A341316 |
| Total Iron (Fe) | ug/L | 1090 | 1.0 | A341316 | 1060 | 1.0 | A341316 | 3.9 | 1.0 | A341316 |
| Total Lead (Pb) | ug/L | 0.423 | 0.0050 | A341316 | 0.422 | 0.0050 | A341316 | 0.0147 | 0.0050 | A341316 |
| Total Lithium (Li) | ug/L | 2.04 | 0.50 | A341316 | 2.02 | 0.50 | A341316 | 1.20 | 0.50 | A341316 |
| Total Manganese (Mn) | ug/L | 128 | 0.050 | A341316 | 128 | 0.050 | A341316 | 0.573 | 0.050 | A341316 |
| Total Molybdenum (Mo) | ug/L | 0.211 | 0.050 | A341316 | 0.211 | 0.050 | A341316 | 0.251 | 0.050 | A341316 |
| Total Nickel (Ni) | ug/L | 9.27 | 0.020 | A341316 | 9.49 | 0.020 | A341316 | 0.603 | 0.020 | A341316 |
| Total Selenium (Se) | ug/L | 0.636 | 0.040 | A341316 | 0.682 | 0.040 | A341316 | 0.701 | 0.040 | A341316 |
| Total Silicon (Si) | ug/L | 2780 | 50 | A341316 | 2760 | 50 | A341316 | 2090 | 50 | A341316 |
| Total Silver (Ag) | ug/L | <0.0050 | 0.0050 | A341316 | <0.0050 | 0.0050 | A341316 | <0.0050 | 0.0050 | A341316 |
| Total Strontium (Sr) | ug/L | 206 | 0.050 | A341316 | 211 | 0.050 | A341316 | 192 | 0.050 | A341316 |
| Total Tellurium (Te) | ug/L | <0.020 | 0.020 | A341316 | <0.020 | 0.020 | A341316 | <0.020 | 0.020 | A341316 |
| Total Thallium (Tl) | ug/L | 0.0024 | 0.0020 | A341316 | 0.0027 | 0.0020 | A341316 | <0.0020 | 0.0020 | A341316 |
| Total Thorium (Th) | ug/L | 0.0126 | 0.0050 | A341316 | 0.0146 | 0.0050 | A341316 | <0.0050 | 0.0050 | A341316 |
| Total Tin (Sn) | ug/L | <0.20 | 0.20 | A341316 | <0.20 | 0.20 | A341316 | <0.20 | 0.20 | A341316 |
| Total Titanium (Ti) | ug/L | <0.50 | 0.50 | A341316 | <0.50 | 0.50 | A341316 | <0.50 | 0.50 | A341316 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFC782 | | | AFC782 | | | AFC783 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 09:05 | | | 2021/08/31 09:05 | | | 2021/08/31 09:50 | | |
| COC Number | | C#644610-01-01 | | | C#644610-01-01 | | | C#644610-01-01 | | |
| | UNITS | 2021725-1 | RDL | QC Batch | 2021725-1 Lab-Dup | RDL | QC Batch | 2021725-2 | RDL | QC Batch |
| Total Tungsten (W) | ug/L | 0.041 | 0.010 | A341316 | 0.043 | 0.010 | A341316 | 0.054 | 0.010 | A341316 |
| Total Uranium (U) | ug/L | 1.84 | 0.0020 | A341316 | 1.86 | 0.0020 | A341316 | 2.02 | 0.0020 | A341316 |
| Total Vanadium (V) | ug/L | <0.20 | 0.20 | A341316 | <0.20 | 0.20 | A341316 | <0.20 | 0.20 | A341316 |
| Total Zinc (Zn) | ug/L | 69.0 | 0.10 | A341316 | 69.8 | 0.10 | A341316 | 1.88 | 0.10 | A341316 |
| Total Zirconium (Zr) | ug/L | <0.10 | 0.10 | A341316 | <0.10 | 0.10 | A341316 | <0.10 | 0.10 | A341316 |
| Total Calcium (Ca) | mg/L | 80.7 | 0.050 | A340088 | | | | 71.9 | 0.050 | A340088 |
| Total Magnesium (Mg) | mg/L | 23.0 | 0.050 | A340088 | | | | 22.0 | 0.050 | A340088 |
| Total Potassium (K) | mg/L | 0.291 | 0.050 | A340088 | | | | 0.231 | 0.050 | A340088 |
| Total Sodium (Na) | mg/L | 0.834 | 0.050 | A340088 | | | | 0.679 | 0.050 | A340088 |
| Total Sulphur (S) | mg/L | 52.2 | 3.0 | A340088 | | | | 40.2 | 3.0 | A340088 |

RDL = Reportable Detection Limit
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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFC784 | | | AFC785 | | | AFC786 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 11:30 | | | 2021/08/31 13:45 | | | 2021/08/31 14:15 | | |
| COC Number | | C#644610-01-01 | | | C#644610-01-01 | | | C#644610-01-01 | | |
| | UNITS | 2021725-03 | RDL | QC Batch | 2021725-04 | RDL | QC Batch | 2021725-05 | RDL | QC Batch |
| **Dissolved Metals by ICPMS** | | | | | | | | | | |
| Dissolved Aluminum (Al) | ug/L | 69.0 | 0.50 | A341524 | 16.2 | 0.50 | A341524 | 27.7 | 0.50 | A341524 |
| Dissolved Antimony (Sb) | ug/L | 0.170 | 0.020 | A341524 | 0.106 | 0.020 | A341524 | 0.128 | 0.020 | A341524 |
| Dissolved Arsenic (As) | ug/L | 4.81 | 0.020 | A341524 | 14.5 | 0.020 | A341524 | 8.17 | 0.020 | A341524 |
| Dissolved Barium (Ba) | ug/L | 11.2 | 0.020 | A341524 | 10.9 | 0.020 | A341524 | 10.2 | 0.020 | A341524 |
| Dissolved Beryllium (Be) | ug/L | <0.010 | 0.010 | A341524 | <0.010 | 0.010 | A341524 | <0.010 | 0.010 | A341524 |
| Dissolved Bismuth (Bi) | ug/L | <0.0050 | 0.0050 | A341524 | <0.0050 | 0.0050 | A341524 | <0.0050 | 0.0050 | A341524 |
| Dissolved Boron (B) | ug/L | <10 | 10 | A341524 | <10 | 10 | A341524 | <10 | 10 | A341524 |
| Dissolved Cadmium (Cd) | ug/L | 0.166 | 0.0050 | A341524 | 0.0056 | 0.0050 | A341524 | 0.0072 | 0.0050 | A341524 |
| Dissolved Chromium (Cr) | ug/L | <0.10 | 0.10 | A341524 | <0.10 | 0.10 | A341524 | <0.10 | 0.10 | A341524 |
| Dissolved Cobalt (Co) | ug/L | 15.1 | 0.0050 | A341524 | 0.850 | 0.0050 | A341524 | 1.36 | 0.0050 | A341524 |
| Dissolved Copper (Cu) | ug/L | 0.722 | 0.050 | A341524 | <0.050 | 0.050 | A341524 | 0.065 | 0.050 | A341524 |
| Dissolved Iron (Fe) | ug/L | 1780 | 1.0 | A341524 | 719 | 1.0 | A341524 | 1300 | 1.0 | A341524 |
| Dissolved Lead (Pb) | ug/L | <0.0050 | 0.0050 | A341524 | <0.0050 | 0.0050 | A341524 | <0.0050 | 0.0050 | A341524 |
| Dissolved Lithium (Li) | ug/L | 2.56 | 0.50 | A341524 | 1.25 | 0.50 | A341524 | 1.43 | 0.50 | A341524 |
| Dissolved Manganese (Mn) | ug/L | 81.3 | 0.050 | A341524 | 34.9 | 0.050 | A341524 | 54.2 | 0.050 | A341524 |
| Dissolved Molybdenum (Mo) | ug/L | 0.101 | 0.050 | A341524 | 0.138 | 0.050 | A341524 | 0.147 | 0.050 | A341524 |
| Dissolved Nickel (Ni) | ug/L | 9.80 | 0.020 | A341524 | 1.52 | 0.020 | A341524 | 2.14 | 0.020 | A341524 |
| Dissolved Selenium (Se) | ug/L | 0.604 | 0.040 | A341524 | 0.995 | 0.040 | A341524 | 0.952 | 0.040 | A341524 |
| Dissolved Silicon (Si) | ug/L | 3780 | 50 | A341524 | 2370 | 50 | A341524 | 2260 | 50 | A341524 |
| Dissolved Silver (Ag) | ug/L | <0.0050 | 0.0050 | A341524 | <0.0050 | 0.0050 | A341524 | <0.0050 | 0.0050 | A341524 |
| Dissolved Strontium (Sr) | ug/L | 253 | 0.050 | A341524 | 223 | 0.050 | A341524 | 225 | 0.050 | A341524 |
| Dissolved Tellurium (Te) | ug/L | <0.020 | 0.020 | A341524 | <0.020 | 0.020 | A341524 | <0.020 | 0.020 | A341524 |
| Dissolved Thallium (Tl) | ug/L | <0.0020 | 0.0020 | A341524 | <0.0020 | 0.0020 | A341524 | <0.0020 | 0.0020 | A341524 |
| Dissolved Thorium (Th) | ug/L | <0.0050 | 0.0050 | A341524 | <0.0050 | 0.0050 | A341524 | <0.0050 | 0.0050 | A341524 |
| Dissolved Tin (Sn) | ug/L | <0.20 | 0.20 | A341524 | <0.20 | 0.20 | A341524 | <0.20 | 0.20 | A341524 |
| Dissolved Titanium (Ti) | ug/L | <0.50 | 0.50 | A341524 | <0.50 | 0.50 | A341524 | <0.50 | 0.50 | A341524 |
| Dissolved Tungsten (W) | ug/L | <0.010 | 0.010 | A341524 | <0.010 | 0.010 | A341524 | <0.010 | 0.010 | A341524 |
| Dissolved Uranium (U) | ug/L | 1.21 | 0.0020 | A341524 | 1.94 | 0.0020 | A341524 | 1.79 | 0.0020 | A341524 |
| Dissolved Vanadium (V) | ug/L | <0.20 | 0.20 | A341524 | <0.20 | 0.20 | A341524 | <0.20 | 0.20 | A341524 |
| Dissolved Zinc (Zn) | ug/L | 18.8 | 0.10 | A341524 | 1.22 | 0.10 | A341524 | 1.83 | 0.10 | A341524 |
| Dissolved Zirconium (Zr) | ug/L | <0.10 | 0.10 | A341524 | <0.10 | 0.10 | A341524 | <0.10 | 0.10 | A341524 |
| Dissolved Calcium (Ca) | mg/L | 103 | 0.050 | A340086 | 85.0 | 0.050 | A340086 | 86.0 | 0.050 | A340086 |

RDL = Reportable Detection Limit



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFC784 | | | AFC785 | | | AFC786 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 11:30 | | | 2021/08/31 13:45 | | | 2021/08/31 14:15 | | |
| COC Number | | C#644610-01-01 | | | C#644610-01-01 | | | C#644610-01-01 | | |
| | UNITS | 2021725-03 | RDL | QC Batch | 2021725-04 | RDL | QC Batch | 2021725-05 | RDL | QC Batch |
| Dissolved Magnesium (Mg) | mg/L | 23.9 | 0.050 | A340086 | 20.6 | 0.050 | A340086 | 21.8 | 0.050 | A340086 |
| Dissolved Potassium (K) | mg/L | 0.481 | 0.050 | A340086 | 0.275 | 0.050 | A340086 | 0.290 | 0.050 | A340086 |
| Dissolved Sodium (Na) | mg/L | 1.45 | 0.050 | A340086 | 0.855 | 0.050 | A340086 | 0.779 | 0.050 | A340086 |
| Dissolved Sulphur (S) | mg/L | 89.1 | 3.0 | A340086 | 62.0 | 3.0 | A340086 | 67.8 | 3.0 | A340086 |
| **Total Metals by ICPMS** | | | | | | | | | | |
| Total Aluminum (Al) | ug/L | 422 | 0.50 | A341316 | 27.3 | 3.0 | A341287 | 49.3 | 0.50 | A341316 |
| Total Antimony (Sb) | ug/L | 0.156 | 0.020 | A341316 | 0.119 | 0.020 | A341287 | 0.131 | 0.020 | A341316 |
| Total Arsenic (As) | ug/L | 44.4 | 0.020 | A341316 | 28.4 | 0.020 | A341287 | 35.3 | 0.020 | A341316 |
| Total Barium (Ba) | ug/L | 11.6 | 0.020 | A341316 | 11.3 | 0.050 | A341287 | 10.9 | 0.020 | A341316 |
| Total Beryllium (Be) | ug/L | 0.024 | 0.010 | A341316 | <0.010 | 0.010 | A341287 | <0.010 | 0.010 | A341316 |
| Total Bismuth (Bi) | ug/L | <0.0050 | 0.0050 | A341316 | <0.010 | 0.010 | A341287 | <0.0050 | 0.0050 | A341316 |
| Total Boron (B) | ug/L | <10 | 10 | A341316 | <10 | 10 | A341287 | <10 | 10 | A341316 |
| Total Cadmium (Cd) | ug/L | 0.203 | 0.0050 | A341316 | 0.0062 | 0.0050 | A341287 | 0.0118 | 0.0050 | A341316 |
| Total Chromium (Cr) | ug/L | <0.10 | 0.10 | A341316 | <0.10 | 0.10 | A341287 | <0.10 | 0.10 | A341316 |
| Total Cobalt (Co) | ug/L | 15.6 | 0.0050 | A341316 | 0.918 | 0.010 | A341287 | 1.44 | 0.0050 | A341316 |
| Total Copper (Cu) | ug/L | 3.98 | 0.050 | A341316 | <0.10 | 0.10 | A341287 | 0.120 | 0.050 | A341316 |
| Total Iron (Fe) | ug/L | 3230 | 1.0 | A341316 | 1380 | 5.0 | A341287 | 2560 | 1.0 | A341316 |
| Total Lead (Pb) | ug/L | 0.0092 | 0.0050 | A341316 | <0.020 | 0.020 | A341287 | 0.0130 | 0.0050 | A341316 |
| Total Lithium (Li) | ug/L | 2.55 | 0.50 | A341316 | 1.24 | 0.50 | A341287 | 1.36 | 0.50 | A341316 |
| Total Manganese (Mn) | ug/L | 84.6 | 0.050 | A341316 | 36.0 | 0.10 | A341287 | 56.6 | 0.050 | A341316 |
| Total Molybdenum (Mo) | ug/L | 0.091 | 0.050 | A341316 | 0.150 | 0.050 | A341287 | 0.147 | 0.050 | A341316 |
| Total Nickel (Ni) | ug/L | 9.88 | 0.020 | A341316 | 1.58 | 0.10 | A341287 | 2.36 | 0.020 | A341316 |
| Total Phosphorus (P) | ug/L | | | | 6.2 | 5.0 | A341287 | | | |
| Total Selenium (Se) | ug/L | 0.602 | 0.040 | A341316 | 1.04 | 0.040 | A341287 | 0.961 | 0.040 | A341316 |
| Total Silicon (Si) | ug/L | 3930 | 50 | A341316 | 2450 | 50 | A341287 | 2270 | 50 | A341316 |
| Total Silver (Ag) | ug/L | <0.0050 | 0.0050 | A341316 | <0.010 | 0.010 | A341287 | <0.0050 | 0.0050 | A341316 |
| Total Strontium (Sr) | ug/L | 255 | 0.050 | A341316 | 233 | 0.050 | A341287 | 225 | 0.050 | A341316 |
| Total Tellurium (Te) | ug/L | <0.020 | 0.020 | A341316 | | | | <0.020 | 0.020 | A341316 |
| Total Thallium (Tl) | ug/L | 0.0021 | 0.0020 | A341316 | <0.0020 | 0.0020 | A341287 | <0.0020 | 0.0020 | A341316 |
| Total Thorium (Th) | ug/L | <0.0050 | 0.0050 | A341316 | | | | <0.0050 | 0.0050 | A341316 |
| Total Tin (Sn) | ug/L | <0.20 | 0.20 | A341316 | <0.20 | 0.20 | A341287 | <0.20 | 0.20 | A341316 |
| Total Titanium (Ti) | ug/L | <0.50 | 0.50 | A341316 | <2.0 | 2.0 | A341287 | <0.50 | 0.50 | A341316 |
| Total Tungsten (W) | ug/L | <0.010 | 0.010 | A341316 | | | | <0.010 | 0.010 | A341316 |

RDL = Reportable Detection Limit



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFC784 | | | AFC785 | | | AFC786 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 11:30 | | | 2021/08/31 13:45 | | | 2021/08/31 14:15 | | |
| COC Number | | C#644610-01-01 | | | C#644610-01-01 | | | C#644610-01-01 | | |
| | UNITS | 2021725-03 | RDL | QC Batch | 2021725-04 | RDL | QC Batch | 2021725-05 | RDL | QC Batch |
| Total Uranium (U) | ug/L | 1.22 | 0.0020 | A341316 | 1.98 | 0.0050 | A341287 | 1.80 | 0.0020 | A341316 |
| Total Vanadium (V) | ug/L | <0.20 | 0.20 | A341316 | <0.20 | 0.20 | A341287 | <0.20 | 0.20 | A341316 |
| Total Zinc (Zn) | ug/L | 30.0 | 0.10 | A341316 | 2.4 | 1.0 | A341287 | 3.36 | 0.10 | A341316 |
| Total Zirconium (Zr) | ug/L | <0.10 | 0.10 | A341316 | <0.10 | 0.10 | A341287 | <0.10 | 0.10 | A341316 |
| Total Calcium (Ca) | mg/L | 105 | 0.050 | A340088 | 86.3 | 0.25 | A340088 | 86.5 | 0.050 | A340088 |
| Total Magnesium (Mg) | mg/L | 24.4 | 0.050 | A340088 | 20.5 | 0.25 | A340088 | 21.8 | 0.050 | A340088 |
| Total Potassium (K) | mg/L | 0.482 | 0.050 | A340088 | 0.27 | 0.25 | A340088 | 0.290 | 0.050 | A340088 |
| Total Sodium (Na) | mg/L | 1.46 | 0.050 | A340088 | 0.84 | 0.25 | A340088 | 0.773 | 0.050 | A340088 |
| Total Sulphur (S) | mg/L | 90.9 | 3.0 | A340088 | 61.3 | 3.0 | A340088 | 66.3 | 3.0 | A340088 |

RDL = Reportable Detection Limit



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFC787 | AFC788 | AFC789 | AFC790 | AFC791 | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 14:30 | 2021/08/31 15:30 | 2021/08/31 16:45 | 2021/08/31 | 2021/08/31 18:00 | | |
| COC Number | | C#644610-01-01 | C#644610-01-01 | C#644610-01-01 | C#644610-01-01 | C#644610-01-01 | | |
| | UNITS | 2021725-06 | 2021725-07 | 2021725-08 | 2021725-09 | 2021725-10 | RDL | QC Batch |
| **Dissolved Metals by ICPMS** | | | | | | | | |
| Dissolved Aluminum (Al) | ug/L | 1.26 | 1.33 | 1.00 | 1.66 | 6.62 | 0.50 | A341524 |
| Dissolved Antimony (Sb) | ug/L | 0.070 | 0.068 | 0.100 | 0.107 | 0.189 | 0.020 | A341524 |
| Dissolved Arsenic (As) | ug/L | 23.5 | 20.7 | 22.0 | 21.4 | 26.9 | 0.020 | A341524 |
| Dissolved Barium (Ba) | ug/L | 10.7 | 11.1 | 9.26 | 8.96 | 10.0 | 0.020 | A341524 |
| Dissolved Beryllium (Be) | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | A341524 |
| Dissolved Bismuth (Bi) | ug/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | A341524 |
| Dissolved Boron (B) | ug/L | <10 | <10 | <10 | <10 | <10 | 10 | A341524 |
| Dissolved Cadmium (Cd) | ug/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0064 | 0.0050 | A341524 |
| Dissolved Chromium (Cr) | ug/L | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 0.10 | A341524 |
| Dissolved Cobalt (Co) | ug/L | 0.0213 | 0.0195 | 0.0219 | 0.0197 | 0.686 | 0.0050 | A341524 |
| Dissolved Copper (Cu) | ug/L | <0.050 | <0.050 | 0.075 | 0.086 | 0.192 | 0.050 | A341524 |
| Dissolved Iron (Fe) | ug/L | <1.0 | <1.0 | <1.0 | <1.0 | 242 | 1.0 | A341524 |
| Dissolved Lead (Pb) | ug/L | <0.0050 | 0.0120 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | A341524 |
| Dissolved Lithium (Li) | ug/L | 0.86 | 0.58 | 0.66 | 0.64 | 2.44 | 0.50 | A341524 |
| Dissolved Manganese (Mn) | ug/L | <0.050 | <0.050 | <0.050 | <0.050 | 48.8 | 0.050 | A341524 |
| Dissolved Molybdenum (Mo) | ug/L | 0.138 | 0.156 | 0.229 | 0.223 | 0.102 | 0.050 | A341524 |
| Dissolved Nickel (Ni) | ug/L | 0.129 | 0.098 | 0.389 | 0.341 | 2.96 | 0.020 | A341524 |
| Dissolved Selenium (Se) | ug/L | 0.957 | 1.21 | 1.40 | 1.30 | 0.680 | 0.040 | A341524 |
| Dissolved Silicon (Si) | ug/L | 2420 | 2070 | 2050 | 2010 | 2650 | 50 | A341524 |
| Dissolved Silver (Ag) | ug/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | A341524 |
| Dissolved Strontium (Sr) | ug/L | 213 | 199 | 194 | 188 | 264 | 0.050 | A341524 |
| Dissolved Tellurium (Te) | ug/L | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | A341524 |
| Dissolved Thallium (Tl) | ug/L | <0.0020 | <0.0020 | <0.0020 | <0.0020 | 0.0026 | 0.0020 | A341524 |
| Dissolved Thorium (Th) | ug/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | A341524 |
| Dissolved Tin (Sn) | ug/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.20 | A341524 |
| Dissolved Titanium (Ti) | ug/L | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | 0.50 | A341524 |
| Dissolved Tungsten (W) | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | A341524 |
| Dissolved Uranium (U) | ug/L | 2.04 | 2.10 | 2.14 | 2.07 | 1.10 | 0.0020 | A341524 |
| Dissolved Vanadium (V) | ug/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.20 | A341524 |
| Dissolved Zinc (Zn) | ug/L | <0.10 | <0.10 | <0.10 | <0.10 | 0.53 | 0.10 | A341524 |
| Dissolved Zirconium (Zr) | ug/L | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 0.10 | A341524 |
| Dissolved Calcium (Ca) | mg/L | 76.1 | 71.4 | 83.0 | 81.1 | 115 | 0.050 | A340086 |

RDL = Reportable Detection Limit



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFC787 | AFC788 | AFC789 | AFC790 | AFC791 | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 14:30 | 2021/08/31 15:30 | 2021/08/31 16:45 | 2021/08/31 | 2021/08/31 18:00 | | |
| COC Number | | C#644610-01-01 | C#644610-01-01 | C#644610-01-01 | C#644610-01-01 | C#644610-01-01 | | |
| | **UNITS** | **2021725-06** | **2021725-07** | **2021725-08** | **2021725-09** | **2021725-10** | **RDL** | **QC Batch** |
| Dissolved Magnesium (Mg) | mg/L | 16.3 | 16.7 | 20.0 | 19.1 | 29.2 | 0.050 | A340086 |
| Dissolved Potassium (K) | mg/L | 0.230 | 0.206 | 0.190 | 0.187 | 0.477 | 0.050 | A340086 |
| Dissolved Sodium (Na) | mg/L | 0.935 | 0.588 | 0.596 | 0.575 | 0.939 | 0.050 | A340086 |
| Dissolved Sulphur (S) | mg/L | 47.0 | 42.3 | 57.2 | 53.6 | 105 | 3.0 | A340086 |
| **Total Metals by ICPMS** | | | | | | | | |
| Total Aluminum (Al) | ug/L | 1.11 | 1.22 | 1.32 | 2.00 | 7.54 | 0.50 | A341316 |
| Total Antimony (Sb) | ug/L | 0.072 | 0.071 | 0.101 | 0.098 | 0.184 | 0.020 | A341316 |
| Total Arsenic (As) | ug/L | 24.3 | 20.9 | 22.5 | 21.1 | 27.7 | 0.020 | A341316 |
| Total Barium (Ba) | ug/L | 10.9 | 11.2 | 9.17 | 8.68 | 10.0 | 0.020 | A341316 |
| Total Beryllium (Be) | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | A341316 |
| Total Bismuth (Bi) | ug/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | A341316 |
| Total Boron (B) | ug/L | <10 | <10 | <10 | <10 | <10 | 10 | A341316 |
| Total Cadmium (Cd) | ug/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0073 | 0.0050 | A341316 |
| Total Chromium (Cr) | ug/L | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 0.10 | A341316 |
| Total Cobalt (Co) | ug/L | 0.0180 | 0.0220 | 0.0228 | 0.0219 | 0.683 | 0.0050 | A341316 |
| Total Copper (Cu) | ug/L | <0.050 | <0.050 | 0.078 | 0.095 | 0.163 | 0.050 | A341316 |
| Total Iron (Fe) | ug/L | <1.0 | <1.0 | <1.0 | 1.2 | 246 | 1.0 | A341316 |
| Total Lead (Pb) | ug/L | <0.0050 | 0.0065 | <0.0050 | 0.0076 | 0.0058 | 0.0050 | A341316 |
| Total Lithium (Li) | ug/L | 0.78 | 0.50 | 0.63 | 0.59 | 2.23 | 0.50 | A341316 |
| Total Manganese (Mn) | ug/L | 0.113 | 0.097 | 0.143 | 0.161 | 48.1 | 0.050 | A341316 |
| Total Molybdenum (Mo) | ug/L | 0.141 | 0.149 | 0.228 | 0.226 | 0.122 | 0.050 | A341316 |
| Total Nickel (Ni) | ug/L | 0.136 | 0.069 | 0.389 | 0.370 | 2.84 | 0.020 | A341316 |
| Total Selenium (Se) | ug/L | 0.963 | 1.17 | 1.39 | 1.27 | 0.630 | 0.040 | A341316 |
| Total Silicon (Si) | ug/L | 2400 | 2040 | 1980 | 1940 | 2600 | 50 | A341316 |
| Total Silver (Ag) | ug/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | A341316 |
| Total Strontium (Sr) | ug/L | 213 | 198 | 191 | 184 | 252 | 0.050 | A341316 |
| Total Tellurium (Te) | ug/L | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | A341316 |
| Total Thallium (Tl) | ug/L | <0.0020 | <0.0020 | <0.0020 | <0.0020 | <0.0020 | 0.0020 | A341316 |
| Total Thorium (Th) | ug/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | A341316 |
| Total Tin (Sn) | ug/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.20 | A341316 |
| Total Titanium (Ti) | ug/L | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | 0.50 | A341316 |
| Total Tungsten (W) | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | A341316 |

RDL = Reportable Detection Limit
N/A = Not Applicable



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFC787 | AFC788 | AFC789 | AFC790 | AFC791 | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/08/31 14:30 | 2021/08/31 15:30 | 2021/08/31 16:45 | 2021/08/31 | 2021/08/31 18:00 | | |
| COC Number | | C#644610-01-01 | C#644610-01-01 | C#644610-01-01 | C#644610-01-01 | C#644610-01-01 | | |
| | **UNITS** | **2021725-06** | **2021725-07** | **2021725-08** | **2021725-09** | **2021725-10** | **RDL** | **QC Batch** |
| Total Uranium (U) | ug/L | 2.02 | 2.11 | 2.11 | 2.04 | 1.07 | 0.0020 | A341316 |
| Total Vanadium (V) | ug/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.20 | A341316 |
| Total Zinc (Zn) | ug/L | 1.03 | 1.08 | 0.80 | 1.08 | 1.17 | 0.10 | A341316 |
| Total Zirconium (Zr) | ug/L | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 0.10 | A341316 |
| Total Calcium (Ca) | mg/L | 74.2 | 71.3 | 80.8 | 80.2 | 112 | 0.050 | A340088 |
| Total Magnesium (Mg) | mg/L | 16.1 | 16.4 | 19.8 | 19.2 | 28.4 | 0.050 | A340088 |
| Total Potassium (K) | mg/L | 0.223 | 0.201 | 0.192 | 0.187 | 0.457 | 0.050 | A340088 |
| Total Sodium (Na) | mg/L | 0.916 | 0.589 | 0.617 | 0.579 | 0.905 | 0.050 | A340088 |
| Total Sulphur (S) | mg/L | 46.9 | 42.6 | 57.4 | 53.4 | 105 | 3.0 | A340088 |

RDL = Reportable Detection Limit



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFC791 | | |
|---|---|---|---|---|
| Sampling Date | | 2021/08/31 18:00 | | |
| COC Number | | C#644610-01-01 | | |
| | UNITS | 2021725-10 Lab-Dup | RDL | QC Batch |
| **Dissolved Metals by ICPMS** | | | | |
| Dissolved Aluminum (Al) | ug/L | 6.18 | 0.50 | A341524 |
| Dissolved Antimony (Sb) | ug/L | 0.184 | 0.020 | A341524 |
| Dissolved Arsenic (As) | ug/L | 26.8 | 0.020 | A341524 |
| Dissolved Barium (Ba) | ug/L | 9.99 | 0.020 | A341524 |
| Dissolved Beryllium (Be) | ug/L | <0.010 | 0.010 | A341524 |
| Dissolved Bismuth (Bi) | ug/L | <0.0050 | 0.0050 | A341524 |
| Dissolved Boron (B) | ug/L | <10 | 10 | A341524 |
| Dissolved Cadmium (Cd) | ug/L | 0.0068 | 0.0050 | A341524 |
| Dissolved Chromium (Cr) | ug/L | <0.10 | 0.10 | A341524 |
| Dissolved Cobalt (Co) | ug/L | 0.693 | 0.0050 | A341524 |
| Dissolved Copper (Cu) | ug/L | 0.185 | 0.050 | A341524 |
| Dissolved Iron (Fe) | ug/L | 239 | 1.0 | A341524 |
| Dissolved Lead (Pb) | ug/L | <0.0050 | 0.0050 | A341524 |
| Dissolved Lithium (Li) | ug/L | 2.32 | 0.50 | A341524 |
| Dissolved Manganese (Mn) | ug/L | 48.8 | 0.050 | A341524 |
| Dissolved Molybdenum (Mo) | ug/L | 0.124 | 0.050 | A341524 |
| Dissolved Nickel (Ni) | ug/L | 2.97 | 0.020 | A341524 |
| Dissolved Selenium (Se) | ug/L | 0.679 | 0.040 | A341524 |
| Dissolved Silicon (Si) | ug/L | 2630 | 50 | A341524 |
| Dissolved Silver (Ag) | ug/L | <0.0050 | 0.0050 | A341524 |
| Dissolved Strontium (Sr) | ug/L | 255 | 0.050 | A341524 |
| Dissolved Tellurium (Te) | ug/L | <0.020 | 0.020 | A341524 |
| Dissolved Thallium (Tl) | ug/L | 0.0023 | 0.0020 | A341524 |
| Dissolved Thorium (Th) | ug/L | <0.0050 | 0.0050 | A341524 |
| Dissolved Tin (Sn) | ug/L | <0.20 | 0.20 | A341524 |
| Dissolved Titanium (Ti) | ug/L | <0.50 | 0.50 | A341524 |
| Dissolved Tungsten (W) | ug/L | <0.010 | 0.010 | A341524 |
| Dissolved Uranium (U) | ug/L | 1.09 | 0.0020 | A341524 |
| Dissolved Vanadium (V) | ug/L | <0.20 | 0.20 | A341524 |
| Dissolved Zinc (Zn) | ug/L | 0.52 | 0.10 | A341524 |
| Dissolved Zirconium (Zr) | ug/L | <0.10 | 0.10 | A341524 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate



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## GENERAL COMMENTS

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

| | |
|---|---|
| Package 1 | 6.0°C |
| Package 2 | 5.7°C |

**Results relate only to the items tested.**



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## QUALITY ASSURANCE REPORT

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| A341287 | SOM | Matrix Spike | Total Aluminum (Al) | 2021/09/04 | | NC | % | 80 - 120 |
| | | | Total Antimony (Sb) | 2021/09/04 | | 99 | % | 80 - 120 |
| | | | Total Arsenic (As) | 2021/09/04 | | 106 | % | 80 - 120 |
| | | | Total Barium (Ba) | 2021/09/04 | | NC | % | 80 - 120 |
| | | | Total Beryllium (Be) | 2021/09/04 | | 101 | % | 80 - 120 |
| | | | Total Bismuth (Bi) | 2021/09/04 | | 97 | % | 80 - 120 |
| | | | Total Boron (B) | 2021/09/04 | | NC | % | 80 - 120 |
| | | | Total Cadmium (Cd) | 2021/09/04 | | 99 | % | 80 - 120 |
| | | | Total Chromium (Cr) | 2021/09/04 | | 105 | % | 80 - 120 |
| | | | Total Cobalt (Co) | 2021/09/04 | | 98 | % | 80 - 120 |
| | | | Total Copper (Cu) | 2021/09/04 | | 95 | % | 80 - 120 |
| | | | Total Iron (Fe) | 2021/09/04 | | NC | % | 80 - 120 |
| | | | Total Lead (Pb) | 2021/09/04 | | 101 | % | 80 - 120 |
| | | | Total Lithium (Li) | 2021/09/04 | | NC | % | 80 - 120 |
| | | | Total Manganese (Mn) | 2021/09/04 | | NC | % | 80 - 120 |
| | | | Total Molybdenum (Mo) | 2021/09/04 | | NC | % | 80 - 120 |
| | | | Total Nickel (Ni) | 2021/09/04 | | 96 | % | 80 - 120 |
| | | | Total Phosphorus (P) | 2021/09/04 | | 102 | % | 80 - 120 |
| | | | Total Selenium (Se) | 2021/09/04 | | 97 | % | 80 - 120 |
| | | | Total Silicon (Si) | 2021/09/04 | | NC | % | 80 - 120 |
| | | | Total Silver (Ag) | 2021/09/04 | | 97 | % | 80 - 120 |
| | | | Total Strontium (Sr) | 2021/09/04 | | NC | % | 80 - 120 |
| | | | Total Thallium (Tl) | 2021/09/04 | | 103 | % | 80 - 120 |
| | | | Total Tin (Sn) | 2021/09/04 | | 98 | % | 80 - 120 |
| | | | Total Titanium (Ti) | 2021/09/04 | | NC | % | 80 - 120 |
| | | | Total Uranium (U) | 2021/09/04 | | 109 | % | 80 - 120 |
| | | | Total Vanadium (V) | 2021/09/04 | | 109 | % | 80 - 120 |
| | | | Total Zinc (Zn) | 2021/09/04 | | 100 | % | 80 - 120 |
| | | | Total Zirconium (Zr) | 2021/09/04 | | NC | % | 80 - 120 |
| A341287 | SOM | Spiked Blank | Total Aluminum (Al) | 2021/09/04 | | 97 | % | 80 - 120 |
| | | | Total Antimony (Sb) | 2021/09/04 | | 100 | % | 80 - 120 |
| | | | Total Arsenic (As) | 2021/09/04 | | 99 | % | 80 - 120 |
| | | | Total Barium (Ba) | 2021/09/04 | | 97 | % | 80 - 120 |
| | | | Total Beryllium (Be) | 2021/09/04 | | 103 | % | 80 - 120 |
| | | | Total Bismuth (Bi) | 2021/09/04 | | 99 | % | 80 - 120 |
| | | | Total Boron (B) | 2021/09/04 | | 105 | % | 80 - 120 |
| | | | Total Cadmium (Cd) | 2021/09/04 | | 99 | % | 80 - 120 |
| | | | Total Chromium (Cr) | 2021/09/04 | | 98 | % | 80 - 120 |
| | | | Total Cobalt (Co) | 2021/09/04 | | 97 | % | 80 - 120 |
| | | | Total Copper (Cu) | 2021/09/04 | | 97 | % | 80 - 120 |
| | | | Total Iron (Fe) | 2021/09/04 | | 102 | % | 80 - 120 |
| | | | Total Lead (Pb) | 2021/09/04 | | 101 | % | 80 - 120 |
| | | | Total Lithium (Li) | 2021/09/04 | | 97 | % | 80 - 120 |
| | | | Total Manganese (Mn) | 2021/09/04 | | 98 | % | 80 - 120 |
| | | | Total Molybdenum (Mo) | 2021/09/04 | | 100 | % | 80 - 120 |
| | | | Total Nickel (Ni) | 2021/09/04 | | 98 | % | 80 - 120 |
| | | | Total Phosphorus (P) | 2021/09/04 | | 97 | % | 80 - 120 |
| | | | Total Selenium (Se) | 2021/09/04 | | 100 | % | 80 - 120 |
| | | | Total Silicon (Si) | 2021/09/04 | | 106 | % | 80 - 120 |
| | | | Total Silver (Ag) | 2021/09/04 | | 98 | % | 80 - 120 |
| | | | Total Strontium (Sr) | 2021/09/04 | | 97 | % | 80 - 120 |
| | | | Total Thallium (Tl) | 2021/09/04 | | 94 | % | 80 - 120 |
| | | | Total Tin (Sn) | 2021/09/04 | | 99 | % | 80 - 120 |
| | | | Total Titanium (Ti) | 2021/09/04 | | 100 | % | 80 - 120 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Total Uranium (U) | 2021/09/04 | | 106 | % | 80 - 120 |
| | | | Total Vanadium (V) | 2021/09/04 | | 98 | % | 80 - 120 |
| | | | Total Zinc (Zn) | 2021/09/04 | | 100 | % | 80 - 120 |
| | | | Total Zirconium (Zr) | 2021/09/04 | | 97 | % | 80 - 120 |
| A341287 | SOM | Method Blank | Total Aluminum (Al) | 2021/09/04 | <3.0 | | ug/L | |
| | | | Total Antimony (Sb) | 2021/09/04 | <0.020 | | ug/L | |
| | | | Total Arsenic (As) | 2021/09/04 | <0.020 | | ug/L | |
| | | | Total Barium (Ba) | 2021/09/04 | <0.050 | | ug/L | |
| | | | Total Beryllium (Be) | 2021/09/04 | <0.010 | | ug/L | |
| | | | Total Bismuth (Bi) | 2021/09/04 | <0.010 | | ug/L | |
| | | | Total Boron (B) | 2021/09/04 | <10 | | ug/L | |
| | | | Total Cadmium (Cd) | 2021/09/04 | <0.0050 | | ug/L | |
| | | | Total Chromium (Cr) | 2021/09/04 | <0.10 | | ug/L | |
| | | | Total Cobalt (Co) | 2021/09/04 | <0.010 | | ug/L | |
| | | | Total Copper (Cu) | 2021/09/04 | <0.10 | | ug/L | |
| | | | Total Iron (Fe) | 2021/09/04 | <5.0 | | ug/L | |
| | | | Total Lead (Pb) | 2021/09/04 | <0.020 | | ug/L | |
| | | | Total Lithium (Li) | 2021/09/04 | <0.50 | | ug/L | |
| | | | Total Manganese (Mn) | 2021/09/04 | <0.10 | | ug/L | |
| | | | Total Molybdenum (Mo) | 2021/09/04 | <0.050 | | ug/L | |
| | | | Total Nickel (Ni) | 2021/09/04 | <0.10 | | ug/L | |
| | | | Total Phosphorus (P) | 2021/09/04 | <5.0 | | ug/L | |
| | | | Total Selenium (Se) | 2021/09/04 | <0.040 | | ug/L | |
| | | | Total Silicon (Si) | 2021/09/04 | <50 | | ug/L | |
| | | | Total Silver (Ag) | 2021/09/04 | <0.010 | | ug/L | |
| | | | Total Strontium (Sr) | 2021/09/04 | <0.050 | | ug/L | |
| | | | Total Thallium (Tl) | 2021/09/04 | <0.0020 | | ug/L | |
| | | | Total Tin (Sn) | 2021/09/04 | <0.20 | | ug/L | |
| | | | Total Titanium (Ti) | 2021/09/04 | <2.0 | | ug/L | |
| | | | Total Uranium (U) | 2021/09/04 | <0.0050 | | ug/L | |
| | | | Total Vanadium (V) | 2021/09/04 | <0.20 | | ug/L | |
| | | | Total Zinc (Zn) | 2021/09/04 | <1.0 | | ug/L | |
| | | | Total Zirconium (Zr) | 2021/09/04 | <0.10 | | ug/L | |
| A341287 | SOM | RPD | Total Aluminum (Al) | 2021/09/04 | 4.9 | | % | 20 |
| | | | Total Antimony (Sb) | 2021/09/04 | 6.4 | | % | 20 |
| | | | Total Arsenic (As) | 2021/09/04 | 3.1 | | % | 20 |
| | | | Total Barium (Ba) | 2021/09/04 | 2.4 | | % | 20 |
| | | | Total Beryllium (Be) | 2021/09/04 | NC | | % | 20 |
| | | | Total Bismuth (Bi) | 2021/09/04 | NC | | % | 20 |
| | | | Total Boron (B) | 2021/09/04 | 2.5 | | % | 20 |
| | | | Total Cadmium (Cd) | 2021/09/04 | NC | | % | 20 |
| | | | Total Chromium (Cr) | 2021/09/04 | 9.2 | | % | 20 |
| | | | Total Cobalt (Co) | 2021/09/04 | 1.2 | | % | 20 |
| | | | Total Copper (Cu) | 2021/09/04 | 3.2 | | % | 20 |
| | | | Total Iron (Fe) | 2021/09/04 | 0.42 | | % | 20 |
| | | | Total Lead (Pb) | 2021/09/04 | 0.085 | | % | 20 |
| | | | Total Lithium (Li) | 2021/09/04 | 0.45 | | % | 20 |
| | | | Total Manganese (Mn) | 2021/09/04 | 0.93 | | % | 20 |
| | | | Total Molybdenum (Mo) | 2021/09/04 | 0.17 | | % | 20 |
| | | | Total Nickel (Ni) | 2021/09/04 | 1.5 | | % | 20 |
| | | | Total Phosphorus (P) | 2021/09/04 | 9.8 | | % | 20 |
| | | | Total Selenium (Se) | 2021/09/04 | 2.3 | | % | 20 |
| | | | Total Silicon (Si) | 2021/09/04 | 2.5 | | % | 20 |
| | | | Total Silver (Ag) | 2021/09/04 | NC | | % | 20 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Total Strontium (Sr) | 2021/09/04 | 1.3 | | % | 20 |
| | | | Total Thallium (Tl) | 2021/09/04 | NC | | % | 20 |
| | | | Total Tin (Sn) | 2021/09/04 | NC | | % | 20 |
| | | | Total Titanium (Ti) | 2021/09/04 | 17 | | % | 20 |
| | | | Total Uranium (U) | 2021/09/04 | 2.1 | | % | 20 |
| | | | Total Vanadium (V) | 2021/09/04 | 1.8 | | % | 20 |
| | | | Total Zinc (Zn) | 2021/09/04 | 2.1 | | % | 20 |
| | | | Total Zirconium (Zr) | 2021/09/04 | 13 | | % | 20 |
| A341316 | JLP | Matrix Spike [AFC782-10] | Total Aluminum (Al) | 2021/09/07 | | 112 | % | 80 - 120 |
| | | | Total Antimony (Sb) | 2021/09/07 | | 101 | % | 80 - 120 |
| | | | Total Arsenic (As) | 2021/09/07 | | 104 | % | 80 - 120 |
| | | | Total Barium (Ba) | 2021/09/07 | | 101 | % | 80 - 120 |
| | | | Total Beryllium (Be) | 2021/09/07 | | 98 | % | 80 - 120 |
| | | | Total Bismuth (Bi) | 2021/09/07 | | 99 | % | 80 - 120 |
| | | | Total Boron (B) | 2021/09/07 | | 102 | % | 80 - 120 |
| | | | Total Cadmium (Cd) | 2021/09/07 | | 100 | % | 80 - 120 |
| | | | Total Chromium (Cr) | 2021/09/07 | | 100 | % | 80 - 120 |
| | | | Total Cobalt (Co) | 2021/09/07 | | 98 | % | 80 - 120 |
| | | | Total Copper (Cu) | 2021/09/07 | | 93 | % | 80 - 120 |
| | | | Total Iron (Fe) | 2021/09/07 | | NC | % | 80 - 120 |
| | | | Total Lead (Pb) | 2021/09/07 | | 101 | % | 80 - 120 |
| | | | Total Lithium (Li) | 2021/09/07 | | 98 | % | 80 - 120 |
| | | | Total Manganese (Mn) | 2021/09/07 | | NC | % | 80 - 120 |
| | | | Total Molybdenum (Mo) | 2021/09/07 | | 107 | % | 80 - 120 |
| | | | Total Nickel (Ni) | 2021/09/07 | | 96 | % | 80 - 120 |
| | | | Total Selenium (Se) | 2021/09/07 | | 106 | % | 80 - 120 |
| | | | Total Silicon (Si) | 2021/09/07 | | 113 | % | 80 - 120 |
| | | | Total Silver (Ag) | 2021/09/07 | | 99 | % | 80 - 120 |
| | | | Total Strontium (Sr) | 2021/09/07 | | NC | % | 80 - 120 |
| | | | Total Tellurium (Te) | 2021/09/07 | | 95 | % | 80 - 120 |
| | | | Total Thallium (Tl) | 2021/09/07 | | 100 | % | 80 - 120 |
| | | | Total Thorium (Th) | 2021/09/07 | | 107 | % | 80 - 120 |
| | | | Total Tin (Sn) | 2021/09/07 | | 102 | % | 80 - 120 |
| | | | Total Titanium (Ti) | 2021/09/07 | | 103 | % | 80 - 120 |
| | | | Total Tungsten (W) | 2021/09/07 | | 105 | % | 80 - 120 |
| | | | Total Uranium (U) | 2021/09/07 | | 107 | % | 80 - 120 |
| | | | Total Vanadium (V) | 2021/09/07 | | 103 | % | 80 - 120 |
| | | | Total Zinc (Zn) | 2021/09/07 | | NC | % | 80 - 120 |
| | | | Total Zirconium (Zr) | 2021/09/07 | | 108 | % | 80 - 120 |
| A341316 | JLP | Spiked Blank | Total Aluminum (Al) | 2021/09/03 | | 95 | % | 80 - 120 |
| | | | Total Antimony (Sb) | 2021/09/03 | | 97 | % | 80 - 120 |
| | | | Total Arsenic (As) | 2021/09/03 | | 98 | % | 80 - 120 |
| | | | Total Barium (Ba) | 2021/09/03 | | 96 | % | 80 - 120 |
| | | | Total Beryllium (Be) | 2021/09/03 | | 98 | % | 80 - 120 |
| | | | Total Bismuth (Bi) | 2021/09/03 | | 98 | % | 80 - 120 |
| | | | Total Boron (B) | 2021/09/03 | | 100 | % | 80 - 120 |
| | | | Total Cadmium (Cd) | 2021/09/03 | | 98 | % | 80 - 120 |
| | | | Total Chromium (Cr) | 2021/09/03 | | 96 | % | 80 - 120 |
| | | | Total Cobalt (Co) | 2021/09/03 | | 96 | % | 80 - 120 |
| | | | Total Copper (Cu) | 2021/09/03 | | 96 | % | 80 - 120 |
| | | | Total Iron (Fe) | 2021/09/03 | | 101 | % | 80 - 120 |
| | | | Total Lead (Pb) | 2021/09/03 | | 100 | % | 80 - 120 |
| | | | Total Lithium (Li) | 2021/09/03 | | 91 | % | 80 - 120 |
| | | | Total Manganese (Mn) | 2021/09/03 | | 97 | % | 80 - 120 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Total Molybdenum (Mo) | 2021/09/03 | | 99 | % | 80 - 120 |
| | | | Total Nickel (Ni) | 2021/09/03 | | 97 | % | 80 - 120 |
| | | | Total Selenium (Se) | 2021/09/03 | | 102 | % | 80 - 120 |
| | | | Total Silicon (Si) | 2021/09/03 | | 101 | % | 80 - 120 |
| | | | Total Silver (Ag) | 2021/09/03 | | 97 | % | 80 - 120 |
| | | | Total Strontium (Sr) | 2021/09/03 | | 95 | % | 80 - 120 |
| | | | Total Tellurium (Te) | 2021/09/03 | | 101 | % | 80 - 120 |
| | | | Total Thallium (Tl) | 2021/09/03 | | 91 | % | 80 - 120 |
| | | | Total Thorium (Th) | 2021/09/03 | | 96 | % | 80 - 120 |
| | | | Total Tin (Sn) | 2021/09/03 | | 98 | % | 80 - 120 |
| | | | Total Titanium (Ti) | 2021/09/03 | | 98 | % | 80 - 120 |
| | | | Total Tungsten (W) | 2021/09/03 | | 97 | % | 80 - 120 |
| | | | Total Uranium (U) | 2021/09/03 | | 102 | % | 80 - 120 |
| | | | Total Vanadium (V) | 2021/09/03 | | 97 | % | 80 - 120 |
| | | | Total Zinc (Zn) | 2021/09/03 | | 102 | % | 80 - 120 |
| | | | Total Zirconium (Zr) | 2021/09/03 | | 100 | % | 80 - 120 |
| A341316 | JLP | Method Blank | Total Aluminum (Al) | 2021/09/03 | <0.50 | | ug/L | |
| | | | Total Antimony (Sb) | 2021/09/03 | <0.020 | | ug/L | |
| | | | Total Arsenic (As) | 2021/09/03 | <0.020 | | ug/L | |
| | | | Total Barium (Ba) | 2021/09/03 | <0.020 | | ug/L | |
| | | | Total Beryllium (Be) | 2021/09/03 | <0.010 | | ug/L | |
| | | | Total Bismuth (Bi) | 2021/09/03 | <0.0050 | | ug/L | |
| | | | Total Boron (B) | 2021/09/03 | <10 | | ug/L | |
| | | | Total Cadmium (Cd) | 2021/09/03 | <0.0050 | | ug/L | |
| | | | Total Chromium (Cr) | 2021/09/03 | <0.10 | | ug/L | |
| | | | Total Cobalt (Co) | 2021/09/03 | <0.0050 | | ug/L | |
| | | | Total Copper (Cu) | 2021/09/03 | <0.050 | | ug/L | |
| | | | Total Iron (Fe) | 2021/09/03 | <1.0 | | ug/L | |
| | | | Total Lead (Pb) | 2021/09/03 | <0.0050 | | ug/L | |
| | | | Total Lithium (Li) | 2021/09/03 | <0.50 | | ug/L | |
| | | | Total Manganese (Mn) | 2021/09/03 | <0.050 | | ug/L | |
| | | | Total Molybdenum (Mo) | 2021/09/03 | <0.050 | | ug/L | |
| | | | Total Nickel (Ni) | 2021/09/03 | <0.020 | | ug/L | |
| | | | Total Selenium (Se) | 2021/09/03 | <0.040 | | ug/L | |
| | | | Total Silicon (Si) | 2021/09/03 | <50 | | ug/L | |
| | | | Total Silver (Ag) | 2021/09/03 | <0.0050 | | ug/L | |
| | | | Total Strontium (Sr) | 2021/09/03 | <0.050 | | ug/L | |
| | | | Total Tellurium (Te) | 2021/09/03 | <0.020 | | ug/L | |
| | | | Total Thallium (Tl) | 2021/09/03 | 0.0025, RDL=0.0020 (1) | | ug/L | |
| | | | Total Thorium (Th) | 2021/09/03 | <0.0050 | | ug/L | |
| | | | Total Tin (Sn) | 2021/09/03 | <0.20 | | ug/L | |
| | | | Total Titanium (Ti) | 2021/09/03 | <0.50 | | ug/L | |
| | | | Total Tungsten (W) | 2021/09/03 | <0.010 | | ug/L | |
| | | | Total Uranium (U) | 2021/09/03 | <0.0020 | | ug/L | |
| | | | Total Vanadium (V) | 2021/09/03 | <0.20 | | ug/L | |
| | | | Total Zinc (Zn) | 2021/09/03 | <0.10 | | ug/L | |
| | | | Total Zirconium (Zr) | 2021/09/03 | <0.10 | | ug/L | |
| A341316 | JLP | RPD [AFC782-10] | Total Aluminum (Al) | 2021/09/03 | 0.11 | | % | 20 |
| | | | Total Antimony (Sb) | 2021/09/03 | 1.2 | | % | 20 |
| | | | Total Arsenic (As) | 2021/09/03 | 1.2 | | % | 20 |
| | | | Total Barium (Ba) | 2021/09/03 | 2.1 | | % | 20 |
| | | | Total Beryllium (Be) | 2021/09/03 | 17 | | % | 20 |
| | | | Total Bismuth (Bi) | 2021/09/03 | NC | | % | 20 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Total Boron (B) | 2021/09/03 | NC | | % | 20 |
| | | | Total Cadmium (Cd) | 2021/09/03 | 3.2 | | % | 20 |
| | | | Total Chromium (Cr) | 2021/09/03 | NC | | % | 20 |
| | | | Total Cobalt (Co) | 2021/09/03 | 1.8 | | % | 20 |
| | | | Total Copper (Cu) | 2021/09/03 | 1.8 | | % | 20 |
| | | | Total Iron (Fe) | 2021/09/03 | 2.1 | | % | 20 |
| | | | Total Lead (Pb) | 2021/09/03 | 0.19 | | % | 20 |
| | | | Total Lithium (Li) | 2021/09/03 | 0.75 | | % | 20 |
| | | | Total Manganese (Mn) | 2021/09/03 | 0.12 | | % | 20 |
| | | | Total Molybdenum (Mo) | 2021/09/03 | 0.28 | | % | 20 |
| | | | Total Nickel (Ni) | 2021/09/03 | 2.4 | | % | 20 |
| | | | Total Selenium (Se) | 2021/09/03 | 7.0 | | % | 20 |
| | | | Total Silicon (Si) | 2021/09/03 | 0.77 | | % | 20 |
| | | | Total Silver (Ag) | 2021/09/03 | NC | | % | 20 |
| | | | Total Strontium (Sr) | 2021/09/03 | 2.3 | | % | 20 |
| | | | Total Tellurium (Te) | 2021/09/03 | NC | | % | 20 |
| | | | Total Thallium (Tl) | 2021/09/03 | 12 | | % | 20 |
| | | | Total Thorium (Th) | 2021/09/03 | 15 | | % | 20 |
| | | | Total Tin (Sn) | 2021/09/03 | NC | | % | 20 |
| | | | Total Titanium (Ti) | 2021/09/03 | NC | | % | 20 |
| | | | Total Tungsten (W) | 2021/09/03 | 3.8 | | % | 20 |
| | | | Total Uranium (U) | 2021/09/03 | 1.0 | | % | 20 |
| | | | Total Vanadium (V) | 2021/09/03 | NC | | % | 20 |
| | | | Total Zinc (Zn) | 2021/09/03 | 1.2 | | % | 20 |
| | | | Total Zirconium (Zr) | 2021/09/03 | NC | | % | 20 |
| A341524 | JLP | Matrix Spike [AFC791-08] | Dissolved Aluminum (Al) | 2021/09/04 | | 91 | % | 80 - 120 |
| | | | Dissolved Antimony (Sb) | 2021/09/04 | | 94 | % | 80 - 120 |
| | | | Dissolved Arsenic (As) | 2021/09/04 | | 95 | % | 80 - 120 |
| | | | Dissolved Barium (Ba) | 2021/09/04 | | 92 | % | 80 - 120 |
| | | | Dissolved Beryllium (Be) | 2021/09/04 | | 90 | % | 80 - 120 |
| | | | Dissolved Bismuth (Bi) | 2021/09/04 | | 92 | % | 80 - 120 |
| | | | Dissolved Boron (B) | 2021/09/04 | | 91 | % | 80 - 120 |
| | | | Dissolved Cadmium (Cd) | 2021/09/04 | | 93 | % | 80 - 120 |
| | | | Dissolved Chromium (Cr) | 2021/09/04 | | 93 | % | 80 - 120 |
| | | | Dissolved Cobalt (Co) | 2021/09/04 | | 90 | % | 80 - 120 |
| | | | Dissolved Copper (Cu) | 2021/09/04 | | 89 | % | 80 - 120 |
| | | | Dissolved Iron (Fe) | 2021/09/04 | | 96 | % | 80 - 120 |
| | | | Dissolved Lead (Pb) | 2021/09/04 | | 95 | % | 80 - 120 |
| | | | Dissolved Lithium (Li) | 2021/09/04 | | 86 | % | 80 - 120 |
| | | | Dissolved Manganese (Mn) | 2021/09/04 | | 90 | % | 80 - 120 |
| | | | Dissolved Molybdenum (Mo) | 2021/09/04 | | 101 | % | 80 - 120 |
| | | | Dissolved Nickel (Ni) | 2021/09/04 | | 89 | % | 80 - 120 |
| | | | Dissolved Selenium (Se) | 2021/09/04 | | 98 | % | 80 - 120 |
| | | | Dissolved Silicon (Si) | 2021/09/04 | | 97 | % | 80 - 120 |
| | | | Dissolved Silver (Ag) | 2021/09/04 | | 91 | % | 80 - 120 |
| | | | Dissolved Strontium (Sr) | 2021/09/04 | | NC | % | 80 - 120 |
| | | | Dissolved Tellurium (Te) | 2021/09/04 | | 95 | % | 80 - 120 |
| | | | Dissolved Thallium (Tl) | 2021/09/04 | | 89 | % | 80 - 120 |
| | | | Dissolved Thorium (Th) | 2021/09/04 | | 95 | % | 80 - 120 |
| | | | Dissolved Tin (Sn) | 2021/09/04 | | 94 | % | 80 - 120 |
| | | | Dissolved Titanium (Ti) | 2021/09/04 | | 96 | % | 80 - 120 |
| | | | Dissolved Tungsten (W) | 2021/09/04 | | 94 | % | 80 - 120 |
| | | | Dissolved Uranium (U) | 2021/09/04 | | 101 | % | 80 - 120 |
| | | | Dissolved Vanadium (V) | 2021/09/04 | | 96 | % | 80 - 120 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Zinc (Zn) | 2021/09/04 | | 93 | % | 80 - 120 |
| | | | Dissolved Zirconium (Zr) | 2021/09/04 | | 100 | % | 80 - 120 |
| A341524 | JLP | Spiked Blank | Dissolved Aluminum (Al) | 2021/09/03 | | 96 | % | 80 - 120 |
| | | | Dissolved Antimony (Sb) | 2021/09/03 | | 98 | % | 80 - 120 |
| | | | Dissolved Arsenic (As) | 2021/09/03 | | 98 | % | 80 - 120 |
| | | | Dissolved Barium (Ba) | 2021/09/03 | | 95 | % | 80 - 120 |
| | | | Dissolved Beryllium (Be) | 2021/09/03 | | 97 | % | 80 - 120 |
| | | | Dissolved Bismuth (Bi) | 2021/09/03 | | 98 | % | 80 - 120 |
| | | | Dissolved Boron (B) | 2021/09/03 | | 98 | % | 80 - 120 |
| | | | Dissolved Cadmium (Cd) | 2021/09/03 | | 98 | % | 80 - 120 |
| | | | Dissolved Chromium (Cr) | 2021/09/03 | | 98 | % | 80 - 120 |
| | | | Dissolved Cobalt (Co) | 2021/09/03 | | 96 | % | 80 - 120 |
| | | | Dissolved Copper (Cu) | 2021/09/03 | | 96 | % | 80 - 120 |
| | | | Dissolved Iron (Fe) | 2021/09/03 | | 100 | % | 80 - 120 |
| | | | Dissolved Lead (Pb) | 2021/09/03 | | 100 | % | 80 - 120 |
| | | | Dissolved Lithium (Li) | 2021/09/03 | | 91 | % | 80 - 120 |
| | | | Dissolved Manganese (Mn) | 2021/09/03 | | 97 | % | 80 - 120 |
| | | | Dissolved Molybdenum (Mo) | 2021/09/03 | | 98 | % | 80 - 120 |
| | | | Dissolved Nickel (Ni) | 2021/09/03 | | 97 | % | 80 - 120 |
| | | | Dissolved Selenium (Se) | 2021/09/03 | | 99 | % | 80 - 120 |
| | | | Dissolved Silicon (Si) | 2021/09/03 | | 102 | % | 80 - 120 |
| | | | Dissolved Silver (Ag) | 2021/09/03 | | 96 | % | 80 - 120 |
| | | | Dissolved Strontium (Sr) | 2021/09/03 | | 97 | % | 80 - 120 |
| | | | Dissolved Tellurium (Te) | 2021/09/03 | | 102 | % | 80 - 120 |
| | | | Dissolved Thallium (Tl) | 2021/09/03 | | 91 | % | 80 - 120 |
| | | | Dissolved Thorium (Th) | 2021/09/03 | | 97 | % | 80 - 120 |
| | | | Dissolved Tin (Sn) | 2021/09/03 | | 98 | % | 80 - 120 |
| | | | Dissolved Titanium (Ti) | 2021/09/03 | | 99 | % | 80 - 120 |
| | | | Dissolved Tungsten (W) | 2021/09/03 | | 98 | % | 80 - 120 |
| | | | Dissolved Uranium (U) | 2021/09/03 | | 103 | % | 80 - 120 |
| | | | Dissolved Vanadium (V) | 2021/09/03 | | 97 | % | 80 - 120 |
| | | | Dissolved Zinc (Zn) | 2021/09/03 | | 103 | % | 80 - 120 |
| | | | Dissolved Zirconium (Zr) | 2021/09/03 | | 99 | % | 80 - 120 |
| A341524 | JLP | Method Blank | Dissolved Aluminum (Al) | 2021/09/04 | <0.50 | | ug/L | |
| | | | Dissolved Antimony (Sb) | 2021/09/04 | <0.020 | | ug/L | |
| | | | Dissolved Arsenic (As) | 2021/09/04 | <0.020 | | ug/L | |
| | | | Dissolved Barium (Ba) | 2021/09/04 | <0.020 | | ug/L | |
| | | | Dissolved Beryllium (Be) | 2021/09/04 | <0.010 | | ug/L | |
| | | | Dissolved Bismuth (Bi) | 2021/09/04 | <0.0050 | | ug/L | |
| | | | Dissolved Boron (B) | 2021/09/04 | <10 | | ug/L | |
| | | | Dissolved Cadmium (Cd) | 2021/09/04 | <0.0050 | | ug/L | |
| | | | Dissolved Chromium (Cr) | 2021/09/04 | <0.10 | | ug/L | |
| | | | Dissolved Cobalt (Co) | 2021/09/04 | <0.0050 | | ug/L | |
| | | | Dissolved Copper (Cu) | 2021/09/04 | <0.050 | | ug/L | |
| | | | Dissolved Iron (Fe) | 2021/09/04 | <1.0 | | ug/L | |
| | | | Dissolved Lead (Pb) | 2021/09/04 | <0.0050 | | ug/L | |
| | | | Dissolved Lithium (Li) | 2021/09/04 | <0.50 | | ug/L | |
| | | | Dissolved Manganese (Mn) | 2021/09/04 | <0.050 | | ug/L | |
| | | | Dissolved Molybdenum (Mo) | 2021/09/04 | <0.050 | | ug/L | |
| | | | Dissolved Nickel (Ni) | 2021/09/04 | <0.020 | | ug/L | |
| | | | Dissolved Selenium (Se) | 2021/09/04 | <0.040 | | ug/L | |
| | | | Dissolved Silicon (Si) | 2021/09/04 | <50 | | ug/L | |
| | | | Dissolved Silver (Ag) | 2021/09/04 | <0.0050 | | ug/L | |
| | | | Dissolved Strontium (Sr) | 2021/09/04 | <0.050 | | ug/L | |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Tellurium (Te) | 2021/09/04 | <0.020 | | ug/L | |
| | | | Dissolved Thallium (Tl) | 2021/09/04 | <0.0020 | | ug/L | |
| | | | Dissolved Thorium (Th) | 2021/09/04 | <0.0050 | | ug/L | |
| | | | Dissolved Tin (Sn) | 2021/09/04 | <0.20 | | ug/L | |
| | | | Dissolved Titanium (Ti) | 2021/09/04 | <0.50 | | ug/L | |
| | | | Dissolved Tungsten (W) | 2021/09/04 | <0.010 | | ug/L | |
| | | | Dissolved Uranium (U) | 2021/09/04 | <0.0020 | | ug/L | |
| | | | Dissolved Vanadium (V) | 2021/09/04 | <0.20 | | ug/L | |
| | | | Dissolved Zinc (Zn) | 2021/09/04 | <0.10 | | ug/L | |
| | | | Dissolved Zirconium (Zr) | 2021/09/04 | <0.10 | | ug/L | |
| A341524 | JLP | RPD [AFC791-08] | Dissolved Aluminum (Al) | 2021/09/04 | 6.9 | | % | 20 |
| | | | Dissolved Antimony (Sb) | 2021/09/04 | 3.0 | | % | 20 |
| | | | Dissolved Arsenic (As) | 2021/09/04 | 0.60 | | % | 20 |
| | | | Dissolved Barium (Ba) | 2021/09/04 | 0.51 | | % | 20 |
| | | | Dissolved Beryllium (Be) | 2021/09/04 | NC | | % | 20 |
| | | | Dissolved Bismuth (Bi) | 2021/09/04 | NC | | % | 20 |
| | | | Dissolved Boron (B) | 2021/09/04 | NC | | % | 20 |
| | | | Dissolved Cadmium (Cd) | 2021/09/04 | 6.1 | | % | 20 |
| | | | Dissolved Chromium (Cr) | 2021/09/04 | NC | | % | 20 |
| | | | Dissolved Cobalt (Co) | 2021/09/04 | 1.1 | | % | 20 |
| | | | Dissolved Copper (Cu) | 2021/09/04 | 3.9 | | % | 20 |
| | | | Dissolved Iron (Fe) | 2021/09/04 | 1.2 | | % | 20 |
| | | | Dissolved Lead (Pb) | 2021/09/04 | NC | | % | 20 |
| | | | Dissolved Lithium (Li) | 2021/09/04 | 4.9 | | % | 20 |
| | | | Dissolved Manganese (Mn) | 2021/09/04 | 0.0057 | | % | 20 |
| | | | Dissolved Molybdenum (Mo) | 2021/09/04 | 19 | | % | 20 |
| | | | Dissolved Nickel (Ni) | 2021/09/04 | 0.49 | | % | 20 |
| | | | Dissolved Selenium (Se) | 2021/09/04 | 0.10 | | % | 20 |
| | | | Dissolved Silicon (Si) | 2021/09/04 | 0.71 | | % | 20 |
| | | | Dissolved Silver (Ag) | 2021/09/04 | NC | | % | 20 |
| | | | Dissolved Strontium (Sr) | 2021/09/04 | 3.6 | | % | 20 |
| | | | Dissolved Tellurium (Te) | 2021/09/04 | NC | | % | 20 |
| | | | Dissolved Thallium (Tl) | 2021/09/04 | 12 | | % | 20 |
| | | | Dissolved Thorium (Th) | 2021/09/04 | NC | | % | 20 |
| | | | Dissolved Tin (Sn) | 2021/09/04 | NC | | % | 20 |
| | | | Dissolved Titanium (Ti) | 2021/09/04 | NC | | % | 20 |
| | | | Dissolved Tungsten (W) | 2021/09/04 | NC | | % | 20 |
| | | | Dissolved Uranium (U) | 2021/09/04 | 1.2 | | % | 20 |
| | | | Dissolved Vanadium (V) | 2021/09/04 | NC | | % | 20 |
| | | | Dissolved Zinc (Zn) | 2021/09/04 | 1.3 | | % | 20 |
| | | | Dissolved Zirconium (Zr) | 2021/09/04 | NC | | % | 20 |
| A341762 | TSO | Matrix Spike [AFC782-02] | Nitrate plus Nitrite (N) | 2021/09/03 | | 101 | % | 80 - 120 |
| A341762 | TSO | Spiked Blank | Nitrate plus Nitrite (N) | 2021/09/03 | | 104 | % | 80 - 120 |
| A341762 | TSO | Method Blank | Nitrate plus Nitrite (N) | 2021/09/03 | <0.0020 | | mg/L | |
| A341762 | TSO | RPD [AFC782-02] | Nitrate plus Nitrite (N) | 2021/09/03 | 5.9 | | % | 25 |
| A341763 | TSO | Matrix Spike [AFC782-02] | Nitrite (N) | 2021/09/03 | | 100 | % | 80 - 120 |
| A341763 | TSO | Spiked Blank | Nitrite (N) | 2021/09/03 | | 101 | % | 80 - 120 |
| A341763 | TSO | Method Blank | Nitrite (N) | 2021/09/03 | <0.0020 | | mg/L | |
| A341763 | TSO | RPD [AFC782-02] | Nitrite (N) | 2021/09/03 | NC | | % | 25 |
| A341963 | BO3 | Spiked Blank | pH | 2021/09/04 | | 101 | % | 97 - 103 |
| A341963 | BO3 | RPD | pH | 2021/09/04 | 0.14 | | % | N/A |
| | | | pH | 2021/09/04 | 0.69 | | % | N/A |
| A341966 | BO3 | Spiked Blank | Alkalinity (Total as CaCO3) | 2021/09/04 | | 95 | % | 80 - 120 |
| A341966 | BO3 | Method Blank | Alkalinity (PP as CaCO3) | 2021/09/04 | <1.0 | | mg/L | |



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## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Alkalinity (Total as CaCO3) | 2021/09/04 | <1.0 | | mg/L | |
| | | | Bicarbonate (HCO3) | 2021/09/04 | <1.0 | | mg/L | |
| | | | Carbonate (CO3) | 2021/09/04 | <1.0 | | mg/L | |
| | | | Hydroxide (OH) | 2021/09/04 | <1.0 | | mg/L | |
| A341967 | BO3 | Spiked Blank | Conductivity | 2021/09/04 | | 98 | % | 80 - 120 |
| A341967 | BO3 | Method Blank | Conductivity | 2021/09/04 | <2.0 | | uS/cm | |
| A342005 | BO3 | Spiked Blank | pH | 2021/09/04 | | 101 | % | 97 - 103 |
| A342005 | BO3 | RPD [AFC782-02] | pH | 2021/09/04 | 3.2 | | % | N/A |
| A342005 | BO3 | RPD | pH | 2021/09/04 | 12 | | % | N/A |
| A342006 | BO3 | Spiked Blank | Alkalinity (Total as CaCO3) | 2021/09/04 | | 97 | % | 80 - 120 |
| A342006 | BO3 | Method Blank | Alkalinity (PP as CaCO3) | 2021/09/04 | <1.0 | | mg/L | |
| | | | Alkalinity (Total as CaCO3) | 2021/09/04 | <1.0 | | mg/L | |
| | | | Bicarbonate (HCO3) | 2021/09/04 | <1.0 | | mg/L | |
| | | | Carbonate (CO3) | 2021/09/04 | <1.0 | | mg/L | |
| | | | Hydroxide (OH) | 2021/09/04 | <1.0 | | mg/L | |
| A342006 | BO3 | RPD [AFC782-02] | Alkalinity (PP as CaCO3) | 2021/09/04 | NC | | % | 20 |
| | | | Alkalinity (Total as CaCO3) | 2021/09/04 | 2.7 | | % | 20 |
| | | | Bicarbonate (HCO3) | 2021/09/04 | 2.7 | | % | 20 |
| | | | Carbonate (CO3) | 2021/09/04 | NC | | % | 20 |
| | | | Hydroxide (OH) | 2021/09/04 | NC | | % | 20 |
| A342007 | BO3 | Spiked Blank | Conductivity | 2021/09/04 | | 100 | % | 80 - 120 |
| A342007 | BO3 | Method Blank | Conductivity | 2021/09/04 | <2.0 | | uS/cm | |
| A342007 | BO3 | RPD [AFC782-02] | Conductivity | 2021/09/04 | 0.68 | | % | 10 |
| A342432 | HE1 | Matrix Spike | Total Dissolved Solids | 2021/09/05 | | 95 | % | 80 - 120 |
| A342432 | HE1 | Spiked Blank | Total Dissolved Solids | 2021/09/05 | | 96 | % | 80 - 120 |
| A342432 | HE1 | Method Blank | Total Dissolved Solids | 2021/09/05 | <1.0 | | mg/L | |
| A342432 | HE1 | RPD | Total Dissolved Solids | 2021/09/05 | 10 | | % | 20 |
| A342803 | TMU | Matrix Spike [AFC785-06] | Strong Acid Dissoc. Cyanide (CN) | 2021/09/07 | | 105 | % | 80 - 120 |
| A342803 | TMU | Spiked Blank | Strong Acid Dissoc. Cyanide (CN) | 2021/09/07 | | 102 | % | 80 - 120 |
| A342803 | TMU | Method Blank | Strong Acid Dissoc. Cyanide (CN) | 2021/09/07 | <0.00050 | | mg/L | |
| A342803 | TMU | RPD [AFC785-06] | Strong Acid Dissoc. Cyanide (CN) | 2021/09/07 | NC | | % | 20 |
| A342809 | TMU | Matrix Spike [AFC785-06] | Weak Acid Dissoc. Cyanide (CN) | 2021/09/07 | | 104 | % | 80 - 120 |
| A342809 | TMU | Spiked Blank | Weak Acid Dissoc. Cyanide (CN) | 2021/09/07 | | 103 | % | 80 - 120 |
| A342809 | TMU | Method Blank | Weak Acid Dissoc. Cyanide (CN) | 2021/09/07 | <0.00050 | | mg/L | |
| A342809 | TMU | RPD [AFC785-06] | Weak Acid Dissoc. Cyanide (CN) | 2021/09/07 | NC | | % | 20 |
| A343019 | KWE | Matrix Spike | Dissolved Hex. Chromium (Cr 6+) | 2021/09/07 | | 86 | % | 80 - 120 |
| A343019 | KWE | Spiked Blank | Dissolved Hex. Chromium (Cr 6+) | 2021/09/07 | | 110 | % | 80 - 120 |
| A343019 | KWE | Method Blank | Dissolved Hex. Chromium (Cr 6+) | 2021/09/07 | <0.00099 | | mg/L | |
| A343019 | KWE | RPD | Dissolved Hex. Chromium (Cr 6+) | 2021/09/07 | NC | | % | 20 |
| A343127 | CJY | Matrix Spike | Dissolved Mercury (Hg) | 2021/09/07 | | 93 | % | 80 - 120 |
| A343127 | CJY | Spiked Blank | Dissolved Mercury (Hg) | 2021/09/07 | | 83 | % | 80 - 120 |
| A343127 | CJY | Method Blank | Dissolved Mercury (Hg) | 2021/09/07 | <0.0019 | | ug/L | |
| A343127 | CJY | RPD | Dissolved Mercury (Hg) | 2021/09/07 | NC | | % | 20 |
| A343244 | BTM | Matrix Spike [AFC787-01] | Total Suspended Solids | 2021/09/08 | | 107 | % | 80 - 120 |
| A343244 | BTM | Spiked Blank | Total Suspended Solids | 2021/09/08 | | 100 | % | 80 - 120 |
| A343244 | BTM | Method Blank | Total Suspended Solids | 2021/09/08 | <1.0 | | mg/L | |
| A343244 | BTM | RPD | Total Suspended Solids | 2021/09/08 | 13 | | % | 20 |
| A343312 | BTM | Matrix Spike [AFC791-01] | Total Suspended Solids | 2021/09/08 | | 107 | % | 80 - 120 |
| A343312 | BTM | Spiked Blank | Total Suspended Solids | 2021/09/08 | | 102 | % | 80 - 120 |
| A343312 | BTM | Method Blank | Total Suspended Solids | 2021/09/08 | <1.0 | | mg/L | |
| A343312 | BTM | RPD [AFC790-01] | Total Suspended Solids | 2021/09/08 | NC | | % | 20 |
| A343419 | CJY | Matrix Spike | Total Mercury (Hg) | 2021/09/07 | | 86 | % | 80 - 120 |
| A343419 | CJY | Spiked Blank | Total Mercury (Hg) | 2021/09/07 | | 83 | % | 80 - 120 |
| A343419 | CJY | Method Blank | Total Mercury (Hg) | 2021/09/07 | <0.0019 | | ug/L | |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| A343419 | CJY | RPD [AFC782-11] | Total Mercury (Hg) | 2021/09/07 | NC | | % | 20 |
| A343723 | KWE | Matrix Spike [AFC791-07] | Dissolved Hex. Chromium (Cr 6+) | 2021/09/09 | | 93 | % | 80 - 120 |
| A343723 | KWE | Spiked Blank | Dissolved Hex. Chromium (Cr 6+) | 2021/09/09 | | 105 | % | 80 - 120 |
| A343723 | KWE | Method Blank | Dissolved Hex. Chromium (Cr 6+) | 2021/09/09 | <0.00099 | | mg/L | |
| A343723 | KWE | RPD [AFC791-07] | Dissolved Hex. Chromium (Cr 6+) | 2021/09/09 | NC | | % | 20 |
| A343769 | SKM | Matrix Spike | Total Ammonia (N) | 2021/09/09 | | 102 | % | 80 - 120 |
| A343769 | SKM | Spiked Blank | Total Ammonia (N) | 2021/09/09 | | 100 | % | 80 - 120 |
| A343769 | SKM | Method Blank | Total Ammonia (N) | 2021/09/09 | <0.0050 | | mg/L | |
| A343769 | SKM | RPD | Total Ammonia (N) | 2021/09/09 | 4.6 | | % | 20 |
| A343810 | MDO | Matrix Spike [AFC790-03] | Dissolved Organic Carbon (C) | 2021/09/10 | | 104 | % | 80 - 120 |
| A343810 | MDO | Spiked Blank | Dissolved Organic Carbon (C) | 2021/09/09 | | 114 | % | 80 - 120 |
| A343810 | MDO | Method Blank | Dissolved Organic Carbon (C) | 2021/09/09 | <0.20 | | mg/L | |
| A343810 | MDO | RPD [AFC790-03] | Dissolved Organic Carbon (C) | 2021/09/10 | NC | | % | 20 |
| A343841 | TSO | Matrix Spike [AFC787-04] | Total Nitrogen (N) | 2021/09/09 | | 101 | % | 80 - 120 |
| A343841 | TSO | Spiked Blank | Total Nitrogen (N) | 2021/09/09 | | 100 | % | 80 - 120 |
| A343841 | TSO | Method Blank | Total Nitrogen (N) | 2021/09/09 | <0.020 | | mg/L | |
| A343841 | TSO | RPD [AFC787-04] | Total Nitrogen (N) | 2021/09/09 | 0.54 | | % | 20 |
| A344325 | FM0 | Matrix Spike | Total Phosphorus (P) | 2021/09/08 | | 96 | % | 80 - 120 |
| A344325 | FM0 | QC Standard | Total Phosphorus (P) | 2021/09/08 | | 98 | % | 80 - 120 |
| A344325 | FM0 | Spiked Blank | Total Phosphorus (P) | 2021/09/08 | | 110 | % | 80 - 120 |
| A344325 | FM0 | Method Blank | Total Phosphorus (P) | 2021/09/08 | <0.0010 | | mg/L | |
| A344325 | FM0 | RPD | Total Phosphorus (P) | 2021/09/08 | NC | | % | 20 |
| A344338 | FM0 | Matrix Spike | Total Phosphorus (P) | 2021/09/08 | | 98 | % | 80 - 120 |
| A344338 | FM0 | QC Standard | Total Phosphorus (P) | 2021/09/08 | | 91 | % | 80 - 120 |
| A344338 | FM0 | Spiked Blank | Total Phosphorus (P) | 2021/09/08 | | 93 | % | 80 - 120 |
| A344338 | FM0 | Method Blank | Total Phosphorus (P) | 2021/09/08 | <0.0010 | | mg/L | |
| A344338 | FM0 | RPD | Total Phosphorus (P) | 2021/09/08 | NC | | % | 20 |
| A344365 | FM0 | Matrix Spike | Dissolved Phosphorus (P) | 2021/09/08 | | 94 | % | 80 - 120 |
| A344365 | FM0 | QC Standard | Dissolved Phosphorus (P) | 2021/09/08 | | 88 | % | 80 - 120 |
| A344365 | FM0 | Spiked Blank | Dissolved Phosphorus (P) | 2021/09/08 | | 103 | % | 80 - 120 |
| A344365 | FM0 | Method Blank | Dissolved Phosphorus (P) | 2021/09/08 | <0.0010 | | mg/L | |
| A344365 | FM0 | RPD | Dissolved Phosphorus (P) | 2021/09/08 | NC | | % | 20 |
| A346519 | MO5 | Matrix Spike [AFC782-02] | Dissolved Chloride (Cl) | 2021/09/09 | | 102 | % | 80 - 120 |
| | | | Dissolved Sulphate (SO4) | 2021/09/09 | | NC | % | 80 - 120 |
| A346519 | MO5 | Spiked Blank | Dissolved Chloride (Cl) | 2021/09/09 | | 103 | % | 80 - 120 |
| | | | Dissolved Sulphate (SO4) | 2021/09/09 | | 108 | % | 80 - 120 |
| A346519 | MO5 | Method Blank | Dissolved Chloride (Cl) | 2021/09/09 | <0.50 | | mg/L | |
| | | | Dissolved Sulphate (SO4) | 2021/09/09 | <0.50 | | mg/L | |
| A346519 | MO5 | RPD [AFC782-02] | Dissolved Chloride (Cl) | 2021/09/09 | NC | | % | 20 |
| | | | Dissolved Sulphate (SO4) | 2021/09/09 | 1.8 | | % | 20 |
| A346922 | CJY | Matrix Spike [AFC791-09] | Dissolved Mercury (Hg) | 2021/09/10 | | 88 | % | 80 - 120 |
| A346922 | CJY | Spiked Blank | Dissolved Mercury (Hg) | 2021/09/10 | | 83 | % | 80 - 120 |
| A346922 | CJY | Method Blank | Dissolved Mercury (Hg) | 2021/09/10 | <0.0019 | | ug/L | |
| A346922 | CJY | RPD [AFC790-09] | Dissolved Mercury (Hg) | 2021/09/10 | NC | | % | 20 |
| A346928 | CJY | Matrix Spike [AFC787-11] | Total Mercury (Hg) | 2021/09/10 | | 99 | % | 80 - 120 |
| A346928 | CJY | Spiked Blank | Total Mercury (Hg) | 2021/09/10 | | 96 | % | 80 - 120 |
| A346928 | CJY | Method Blank | Total Mercury (Hg) | 2021/09/10 | <0.0019 | | ug/L | |
| A346928 | CJY | RPD [AFC786-11] | Total Mercury (Hg) | 2021/09/10 | NC | | % | 20 |
| A347643 | MO5 | Matrix Spike [AFC782-02] | Fluoride (F) | 2021/09/10 | | 100 | % | 80 - 120 |
| A347643 | MO5 | Spiked Blank | Fluoride (F) | 2021/09/10 | | 100 | % | 80 - 120 |
| A347643 | MO5 | Method Blank | Fluoride (F) | 2021/09/10 | <0.020 | | mg/L | |



Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| A347643 | MO5 | RPD [AFC782-02] | Fluoride (F) | 2021/09/10 | 0 | | % | 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) Method blank exceeds acceptance limits for Tl- 2X RDL acceptable for low level metals determination.



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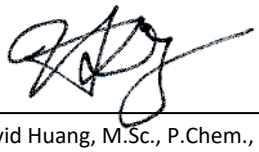
## VALIDATION SIGNATURE PAGE

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

BV Labs 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 Signature Page.



Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

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

C165062_COC

e Only

| INVOICE TO: | | Report Information | | Project Information | | |
|---|---|---|---|---|---|---|
| Company Name | #4977 Government of Yukon – Dept of ENV | Company Name | #44311 Government of Yukon – Dept of ENV | Quotation # | C10319 | Bottle Order #: 644610 |
| Contact Name | Stephanie Lyons | Contact Name | Stephanie Lyons | P.O. # | | |
| Address | Water Resources Branch (V-310) Box 2703 | Address | Box 2703 | Project # | 2021-Ketza | |
| | Whitehorse YT Y1A 2C6 | | Whitehorse YT Y1A2C6 | Project Name | | Chain Of Custody Record: C#644610-01-01 |
| Phone | (867) 689-8767 Fax: | Phone | (867) 689-8767 Fax: | Site # | | Project Manager: Customer Solutions |
| Email | Stephanie.lyons@yukon.ca | Email | stephanie.lyons@yukon.ca | Sampled By | S.Lyons | |

Regulatory Criteria

Special Instructions

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

Samples must be kept cool ( < 10°C ) from time of sampling until delivery to BV Labs

Turnaround Time (TAT) Required

Please provide advance notice for rush projects

Regular (Standard) TAT (will be applied if Rush TAT is not specified) X

Standard TAT = 5-7 Working days for most tests.

Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)

Date Required: Time Required:

Rush Confirmation Number: (call lab for #)

| | Sample Barcode Label | Sample (Location) Identification | Date Sampled | Time Sampled | Matrix | Regulated Drinking Water ? (Y/N) | Metals Field Filtered ? (Y/N) | Alk, EC, F, pH & LL-Cl, SO4, NO2, NO3 (Group 01) | TSS & LL-TDS (Group 02) | LL DOC & Dissolved Total Phosphorus (Group 03) | Total N, TKN & LL Total Phosphorus (Group 04) | Ammonia-N Low Level (Preserved) | Cyanide SAD & WAD (Group 07) | Dissolved CR3 & CR6 (Group 08) | Ketza LL Dissolved Metals (Group 05) | Ketza LL Total Metals (Group 06) | # of Bottles | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 2021T25 - 1 | 21/Aug/31 | 0905 | W | N | Y | X | X | X | X | X | X | X | X | X | 13 | |
| 2 | | 2021T25 - 02 | | 0950 | | | | | | | | | | | | | | |
| 3 | | 2021T25 - 03 | | 1130 | | | | | | | | | | | | | | |
| 4 | | 2021T25 - 04 | | 1345 | | | | | | | | | | | | | | |
| 5 | | 2021T25 - 05 | | 1415 | | | | | | | | | | | | | | |
| 6 | | 2021T25 - 06 | | 1430 | | | | | | | | | | | | | | |
| 7 | | 2021T25 - 07 | | 15:30 | | | | | | | | | | | | | | |
| 8 | | 2021T25 - 08 | | 16:45 | | | | | | | | | | | | | | |
| 9 | | 2021T25 - 09 | | — | | | | | | | | | | | | | | |
| 10 | | 2021T25 - 10 | | 18:00 | | | | | | | | | | | | | | |

| * RELINQUISHED BY: (Signature/Print) | Date: (YY/MM/DD) | Time | RECEIVED BY: (Signature/Print) | Date: (YY/MM/DD) | Time | # jars used and not submitted | Lab Use Only: Time Sensitive | Temperature (°C) on Receipt | Custody Seal Intact on Cooler? |
|---|---|---|---|---|---|---|---|---|---|
| Stephanie Lyons/Stephanie Lyons | 21/08/01 | 1700 | RICHARD STUIVENBERG | 21/08/02 | 16:22 | | | 4/7/7 | X Yes No |

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' 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.BVLABS.COM/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.

8/5/14

White: BV Labs Yellow: Client

Your Project #: 2021-Ketza
Your C.O.C. #: 644610-04-01, 644610-05-01

**Attention: Stephanie Lyons**

Government of Yukon – Dept of ENV
Box 2703
Whitehorse, YT
Canada Y1A2C6

**Report Date: 2021/09/23**
Report #: R3075583
Version: 2 - Final

# CERTIFICATE OF ANALYSIS

**BV LABS JOB #: C165509**
**Received: 2021/09/03, 15:17**

Sample Matrix: Water
# Samples Received: 15

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Analytical Method |
|---|---|---|---|---|---|
| Alkalinity @25C (pp, total), CO3,HCO3,OH | 9 | N/A | 2021/09/07 | BBY6SOP-00026 | SM 23 2320 B m |
| Alkalinity @25C (pp, total), CO3,HCO3,OH | 6 | N/A | 2021/09/08 | BBY6SOP-00026 | SM 23 2320 B m |
| Low level chloride/sulphate by AC | 14 | N/A | 2021/09/10 | BBY6SOP-00011 / BBY6SOP-00017 | SM23-4500-Cl/SO4-E m |
| Low level chloride/sulphate by AC | 1 | N/A | 2021/09/14 | BBY6SOP-00011 / BBY6SOP-00017 | SM23-4500-Cl/SO4-E m |
| Cyanide SAD (strong acid dissociable) (1) | 15 | N/A | 2021/09/10 | CAL SOP-00270 | SM 23 4500-CN m |
| Cyanide WAD (weak acid dissociable) (1) | 15 | N/A | 2021/09/10 | CAL SOP-00270 | SM 23 4500-CN m |
| Chromium III (Calc'd) (1, 2) | 14 | N/A | 2021/09/13 | | Auto Calc |
| Chromium III (Calc'd) (1, 2) | 1 | N/A | 2021/09/14 | | Auto Calc |
| Dissolved Hexavalent Chromium (1) | 15 | N/A | 2021/09/09 | AB SOP-00063 | SM 23 3500-Cr B m |
| Carbon (DOC) (1, 3) | 11 | N/A | 2021/09/10 | AB SOP-00087 | MMCW 119 1996 m |
| Carbon (DOC) (1, 3) | 3 | N/A | 2021/09/11 | AB SOP-00087 | MMCW 119 1996 m |
| Carbon (DOC) (1, 3) | 1 | N/A | 2021/09/13 | AB SOP-00087 | MMCW 119 1996 m |
| Conductivity @25C | 9 | N/A | 2021/09/07 | BBY6SOP-00026 | SM 23 2510 B m |
| Conductivity @25C | 6 | N/A | 2021/09/08 | BBY6SOP-00026 | SM 23 2510 B m |
| Fluoride - Mining Clients | 2 | N/A | 2021/09/10 | BBY6SOP-00048 | SM 23 4500-F C m |
| Fluoride - Mining Clients | 13 | N/A | 2021/09/11 | BBY6SOP-00048 | SM 23 4500-F C m |
| Hardness Total (calculated as CaCO3) (4) | 14 | N/A | 2021/09/09 | BBY WI-00033 | Auto Calc |
| Hardness Total (calculated as CaCO3) (4) | 1 | N/A | 2021/09/13 | BBY WI-00033 | Auto Calc |
| Hardness (calculated as CaCO3) | 14 | N/A | 2021/09/13 | BBY WI-00033 | Auto Calc |
| Hardness (calculated as CaCO3) | 1 | N/A | 2021/09/14 | BBY WI-00033 | Auto Calc |
| Mercury (Dissolved) by CV (2) | 1 | 2021/09/07 | 2021/09/07 | AB SOP-00084 | BCMOE BCLM Oct2013 m |
| Mercury (Dissolved) by CV (2) | 14 | 2021/09/10 | 2021/09/10 | AB SOP-00084 | BCMOE BCLM Oct2013 m |
| Mercury (Total) by CV | 1 | 2021/09/07 | 2021/09/10 | AB SOP-00084 | BCMOE BCLM Oct2013 m |
| Mercury (Total) by CV | 14 | 2021/09/10 | 2021/09/10 | AB SOP-00084 | BCMOE BCLM Oct2013 m |
| Na, K, Ca, Mg, S by CRC ICPMS (diss.) | 14 | N/A | 2021/09/13 | BBY WI-00033 | Auto Calc |
| Na, K, Ca, Mg, S by CRC ICPMS (diss.) | 1 | N/A | 2021/09/14 | BBY WI-00033 | Auto Calc |
| Elements by ICPMS Low Level (dissolved) (2) | 14 | N/A | 2021/09/11 | BBY7SOP-00002 | EPA 6020b R2 m |
| Elements by ICPMS Low Level (dissolved) (2) | 1 | N/A | 2021/09/14 | BBY7SOP-00002 | EPA 6020b R2 m |
| Elements by ICPMS Digested LL (total) | 1 | 2021/09/08 | 2021/09/09 | BBY7SOP-00003 / BBY7SOP-00002 | EPA 6020b R2 m |

Your Project #: 2021-Ketza
Your C.O.C. #: 644610-04-01, 644610-05-01

**Attention: Stephanie Lyons**

Government of Yukon – Dept of ENV
Box 2703
Whitehorse, YT
Canada Y1A2C6

**Report Date: 2021/09/23**
Report #: R3075583
Version: 2 - Final

# CERTIFICATE OF ANALYSIS

**BV LABS JOB #: C165509**
**Received: 2021/09/03, 15:17**

Sample Matrix: Water
# Samples Received: 15

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Analytical Method |
|---|---|---|---|---|---|
| Na, K, Ca, Mg, S by CRC ICPMS (total) | 14 | N/A | 2021/09/09 | BBY WI-00033 | Auto Calc |
| Na, K, Ca, Mg, S by CRC ICPMS (total) | 1 | N/A | 2021/09/13 | BBY WI-00033 | Auto Calc |
| Elements by ICPMS Low Level (total) | 13 | N/A | 2021/09/08 | BBY7SOP-00002 | EPA 6020b R2 m |
| Elements by ICPMS Low Level (total) | 1 | N/A | 2021/09/11 | BBY7SOP-00002 | EPA 6020b R2 m |
| Nitrogen (Total) | 15 | N/A | 2021/09/09 | BBY6SOP-00016 | SM 23 4500-N C m |
| Ammonia-N Low Level (Preserved) (1) | 15 | N/A | 2021/09/11 | AB SOP-00007 | SM 23 4500 NH3 A G m |
| Nitrate+Nitrite (N) (low level) | 15 | N/A | 2021/09/04 | BBY6SOP-00010 | SM 23 4500-NO3- I m |
| Nitrite (N) (low level) | 15 | N/A | 2021/09/04 | BBY6SOP-00010 | SM 23 4500-NO3- I m |
| Nitrogen - Nitrate (as N) Low Level Calc | 15 | N/A | 2021/09/04 | BBY WI-00033 | Auto Calc |
| Filter and HNO3 Preserve for Metals | 14 | N/A | 2021/09/03 | BBY7 WI-00004 | SM 23 3030B m |
| Filter and HNO3 Preserve for Metals | 1 | N/A | 2021/09/13 | BBY7 WI-00004 | SM 23 3030B m |
| pH @25°C (5) | 9 | N/A | 2021/09/07 | BBY6SOP-00026 | SM 23 4500-H+ B m |
| pH @25°C (5) | 6 | N/A | 2021/09/08 | BBY6SOP-00026 | SM 23 4500-H+ B m |
| Total Dissolved Solids - Low Level (1) | 10 | 2021/09/08 | 2021/09/08 | AB SOP-00065 | SM 23 2540 C m |
| Total Dissolved Solids - Low Level (1) | 3 | 2021/09/09 | 2021/09/09 | AB SOP-00065 | SM 23 2540 C m |
| Total Dissolved Solids - Low Level (1) | 1 | 2021/09/18 | 2021/09/18 | AB SOP-00065 | SM 23 2540 C m |
| Total Dissolved Solids - Low Level (1) | 1 | 2021/09/18 | 2021/09/22 | AB SOP-00065 | SM 23 2540 C m |
| Total Kjeldahl Nitrogen (Total) | 15 | N/A | 2021/09/09 | BBY WI-00033 | Auto Calc |
| Total Phosphorus Low Level Dissolved (1, 6) | 11 | 2021/09/10 | 2021/09/11 | AB SOP-00024 | SM 23 4500-P A,B,F m |
| Total Phosphorus Low Level Dissolved (1, 6) | 4 | 2021/09/10 | 2021/09/12 | AB SOP-00024 | SM 23 4500-P A,B,F m |
| Total Phosphorus Low Level Total (1) | 10 | 2021/09/10 | 2021/09/11 | AB SOP-00024 | SM 23 4500-P A,B,F m |
| Total Phosphorus Low Level Total (1) | 5 | 2021/09/10 | 2021/09/12 | AB SOP-00024 | SM 23 4500-P A,B,F m |
| Total Suspended Solids (NFR) | 11 | 2021/09/08 | 2021/09/09 | BBY6SOP-00034 | SM 23 2540 D m |
| Total Suspended Solids (NFR) | 4 | 2021/09/09 | 2021/09/10 | BBY6SOP-00034 | SM 23 2540 D 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

Your Project #: 2021-Ketza
Your C.O.C. #: 644610-04-01, 644610-05-01

**Attention: Stephanie Lyons**

Government of Yukon – Dept of ENV
Box 2703
Whitehorse, YT
Canada Y1A2C6

**Report Date: 2021/09/23**
Report #: R3075583
Version: 2 - Final

# CERTIFICATE OF ANALYSIS

**BV LABS JOB #: C165509**
**Received: 2021/09/03, 15:17**

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) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
(2) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(3) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(4) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).
(5) 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 Laboratories endeavours to analyze samples as soon as possible after receipt.
(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

Kandise Wilson
Customer Solutions Representative
23 Sep 2021 18:20:11

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Customer Solutions, Western Canada Customer Experience Team
Email: customersolutionswest@bureauveritas.com
Phone# (604) 734 7276

==========

BV Labs 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 Signature Page.

## RESULTS OF CHEMICAL ANALYSES OF WATER

| BV Labs ID | | AFF263 | | AFF264 | | | AFF264 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 09:15 | | 2021/09/01 | | | 2021/09/01 | | |
| COC Number | | 644610-04-01 | | 644610-04-01 | | | 644610-04-01 | | |
| | UNITS | 2021T25-11 | QC Batch | 2021T25-12 | RDL | QC Batch | 2021T25-12 Lab-Dup | RDL | QC Batch |
| **Misc. Inorganics** | | | | | | | | | |
| Fluoride (F) | mg/L | 0.500 | A348726 | 0.120 | 0.020 | A347643 | | | |
| **Calculated Parameters** | | | | | | | | | |
| Dissolved Chromium III | mg/L | <0.00099 | A341719 | <0.00099 | 0.00099 | A341719 | | | |
| Filter and HNO3 Preservation | N/A | FIELD | ONSITE | FIELD | | ONSITE | | | |
| Dissolved Hardness (CaCO3) | mg/L | 404 | A341393 | 352 | 0.50 | A341393 | | | |
| Total Hardness (CaCO3) | mg/L | 380 | A341392 | 330 | 0.50 | A341392 | | | |
| Nitrate (N) | mg/L | 0.451 | A341410 | 0.0768 | 0.0020 | A341410 | | | |
| Total Total Kjeldahl Nitrogen (Calc) | mg/L | 0.067 | A341594 | 0.058 | 0.020 | A341594 | | | |
| **Misc. Inorganics** | | | | | | | | | |
| Conductivity | uS/cm | 750 | A345394 | 630 | 2.0 | A345385 | 630 | 2.0 | A345385 |
| Strong Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | A346114 | <0.00050 | 0.00050 | A346114 | | | |
| Weak Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | A346121 | <0.00050 | 0.00050 | A346121 | | | |
| Dissolved Organic Carbon (C) | mg/L | 0.35 | A347315 | 0.39 | 0.20 | A347315 | | | |
| pH | pH | 8.36 | A345387 | 8.20 | N/A | A345379 | 8.26 | N/A | A345379 |
| Total Suspended Solids | mg/L | 3.6 | A344551 | <1.0 | 1.0 | A344551 | | | |
| **Anions** | | | | | | | | | |
| Alkalinity (PP as CaCO3) | mg/L | 4.1 | A345389 | <1.0 | 1.0 | A345383 | <1.0 | 1.0 | A345383 |
| Alkalinity (Total as CaCO3) | mg/L | 360 | A345389 | 190 | 1.0 | A345383 | 190 | 1.0 | A345383 |
| Bicarbonate (HCO3) | mg/L | 430 | A345389 | 240 | 1.0 | A345383 | 240 | 1.0 | A345383 |
| Carbonate (CO3) | mg/L | 4.9 | A345389 | <1.0 | 1.0 | A345383 | <1.0 | 1.0 | A345383 |
| Hydroxide (OH) | mg/L | <1.0 | A345389 | <1.0 | 1.0 | A345383 | <1.0 | 1.0 | A345383 |
| Dissolved Chloride (Cl) | mg/L | <0.50 | A348087 | <0.50 | 0.50 | A348087 | | | |
| Dissolved Sulphate (SO4) | mg/L | 85 | A348087 | 160 | 0.50 | A348087 | | | |
| **Metals** | | | | | | | | | |
| Dissolved Hex. Chromium (Cr 6+) | mg/L | <0.00099 | A343723 | <0.00099 | 0.00099 | A343723 | | | |
| **Nutrients** | | | | | | | | | |
| Dissolved Phosphorus (P) | mg/L | <0.0010 | A347209 | <0.0010 | 0.0010 | A347209 | | | |
| Total Phosphorus (P) | mg/L | 0.0034 | A347213 | <0.0010 | 0.0010 | A347455 | | | |
| Total Ammonia (N) | mg/L | <0.0050 | A348557 | <0.0050 | 0.0050 | A348557 | | | |
| Nitrate plus Nitrite (N) | mg/L | 0.451 | A342326 | 0.0768 | 0.0020 | A342326 | 0.0776 | 0.0020 | A342326 |
| Nitrite (N) | mg/L | <0.0020 | A342330 | <0.0020 | 0.0020 | A342330 | <0.0020 | 0.0020 | A342330 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable



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## RESULTS OF CHEMICAL ANALYSES OF WATER

| **BV Labs ID** | | AFF263 | | AFF264 | | | AFF264 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2021/09/01 09:15 | | 2021/09/01 | | | 2021/09/01 | | |
| **COC Number** | | 644610-04-01 | | 644610-04-01 | | | 644610-04-01 | | |
| | **UNITS** | **2021T25-11** | **QC Batch** | **2021T25-12** | **RDL** | **QC Batch** | **2021T25-12 Lab-Dup** | **RDL** | **QC Batch** |
| Total Nitrogen (N) | mg/L | 0.518 | A345060 | 0.134 | 0.020 | A345060 | | | |
| **Physical Properties** | | | | | | | | | |
| Total Dissolved Solids | mg/L | 411 (1) | A345116 | 416 (1) | 1.1 | A345116 | | | |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
(1) Detection limits raised due to insufficient sample volume.



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## RESULTS OF CHEMICAL ANALYSES OF WATER

| BV Labs ID | | AFF265 | | AFF266 | | | AFF267 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 10:45 | | 2021/09/01 11:15 | | | 2021/09/01 12:00 | | |
| COC Number | | 644610-04-01 | | 644610-04-01 | | | 644610-04-01 | | |
| | **UNITS** | **2021T25-13** | **QC Batch** | **2021T25-14** | **RDL** | **QC Batch** | **2021T25-15** | **RDL** | **QC Batch** |
| **Misc. Inorganics** | | | | | | | | | |
| Fluoride (F) | mg/L | 0.084 | A347643 | 0.160 | 0.020 | A348726 | 0.120 | 0.020 | A348726 |
| **Calculated Parameters** | | | | | | | | | |
| Dissolved Chromium III | mg/L | <0.00099 | A341719 | <0.00099 | 0.00099 | A341719 | <0.00099 | 0.00099 | A341719 |
| Filter and HNO3 Preservation | N/A | FIELD | ONSITE | FIELD | | ONSITE | FIELD | | ONSITE |
| Dissolved Hardness (CaCO3) | mg/L | 611 | A341393 | 1120 | 0.50 | A341393 | 325 | 0.50 | A341393 |
| Total Hardness (CaCO3) | mg/L | 580 | A341392 | 1100 | 0.50 | A341392 | 310 | 0.50 | A341392 |
| Nitrate (N) | mg/L | 0.0588 | A341410 | 0.0028 | 0.0020 | A341410 | 0.0491 | 0.0020 | A341410 |
| Total Total Kjeldahl Nitrogen (Calc) | mg/L | 0.055 | A341594 | 0.045 | 0.020 | A341594 | 0.096 | 0.020 | A341594 |
| **Misc. Inorganics** | | | | | | | | | |
| Conductivity | uS/cm | 1100 | A345385 | 1800 | 2.0 | A345385 | 610 | 2.0 | A345385 |
| Strong Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | A346114 | <0.00050 | 0.00050 | A346114 | <0.00050 | 0.00050 | A346114 |
| Weak Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | A346121 | <0.00050 | 0.00050 | A346121 | <0.00050 | 0.00050 | A346121 |
| Dissolved Organic Carbon (C) | mg/L | 0.20 | A347315 | <0.20 | 0.20 | A347315 | 0.32 | 0.20 | A347315 |
| pH | pH | 8.30 | A345379 | 8.18 | N/A | A345379 | 8.13 | N/A | A345379 |
| Total Suspended Solids | mg/L | 2.0 | A344664 | <1.0 | 1.0 | A344685 | 4.8 | 1.0 | A344551 |
| **Anions** | | | | | | | | | |
| Alkalinity (PP as CaCO3) | mg/L | <1.0 | A345383 | <1.0 | 1.0 | A345383 | <1.0 | 1.0 | A345383 |
| Alkalinity (Total as CaCO3) | mg/L | 210 | A345383 | 300 | 1.0 | A345383 | 140 | 1.0 | A345383 |
| Bicarbonate (HCO3) | mg/L | 260 | A345383 | 360 | 1.0 | A345383 | 180 | 1.0 | A345383 |
| Carbonate (CO3) | mg/L | <1.0 | A345383 | <1.0 | 1.0 | A345383 | <1.0 | 1.0 | A345383 |
| Hydroxide (OH) | mg/L | <1.0 | A345383 | <1.0 | 1.0 | A345383 | <1.0 | 1.0 | A345383 |
| Dissolved Chloride (Cl) | mg/L | <0.50 | A348087 | 0.56 | 0.50 | A348087 | <0.50 | 0.50 | A348087 |
| Dissolved Sulphate (SO4) | mg/L | 370 | A348087 | 830 | 5.0 | A348087 | 180 | 0.50 | A348087 |
| **Metals** | | | | | | | | | |
| Dissolved Hex. Chromium (Cr 6+) | mg/L | <0.00099 | A343723 | <0.00099 | 0.00099 | A343723 | <0.00099 | 0.00099 | A345891 |
| **Nutrients** | | | | | | | | | |
| Dissolved Phosphorus (P) | mg/L | <0.0010 | A347209 | <0.0010 | 0.0010 | A347209 | <0.0010 | 0.0010 | A347209 |
| Total Phosphorus (P) | mg/L | <0.0010 | A347455 | <0.0010 | 0.0010 | A347455 | <0.0010 | 0.0010 | A347213 |
| Total Ammonia (N) | mg/L | <0.0050 | A348557 | <0.0050 | 0.0050 | A348557 | <0.0050 | 0.0050 | A348557 |
| Nitrate plus Nitrite (N) | mg/L | 0.0588 | A342326 | 0.0028 | 0.0020 | A342326 | 0.0491 | 0.0020 | A342326 |
| Nitrite (N) | mg/L | <0.0020 | A342330 | <0.0020 | 0.0020 | A342330 | <0.0020 | 0.0020 | A342330 |
| Total Nitrogen (N) | mg/L | 0.114 | A345060 | 0.048 | 0.020 | A345060 | 0.145 | 0.020 | A343841 |

RDL = Reportable Detection Limit
N/A = Not Applicable



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## RESULTS OF CHEMICAL ANALYSES OF WATER

| **BV Labs ID** | | AFF265 | | AFF266 | | | AFF267 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2021/09/01 10:45 | | 2021/09/01 11:15 | | | 2021/09/01 12:00 | | |
| **COC Number** | | 644610-04-01 | | 644610-04-01 | | | 644610-04-01 | | |
| | **UNITS** | **2021T25-13** | **QC Batch** | **2021T25-14** | **RDL** | **QC Batch** | **2021T25-15** | **RDL** | **QC Batch** |
| **Physical Properties** | | | | | | | | | |
| Total Dissolved Solids | mg/L | 795 (1) | A345116 | 1520 (1) | 1.1 | A345116 | 411 (1) | 1.2 | A345116 |

RDL = Reportable Detection Limit
(1) Detection limits raised due to insufficient sample volume.



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## RESULTS OF CHEMICAL ANALYSES OF WATER

| BV Labs ID | | AFF267 | | | AFF268 | | | AFF268 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 12:00 | | | 2021/09/01 11:45 | | | 2021/09/01 11:45 | | |
| COC Number | | 644610-04-01 | | | 644610-04-01 | | | 644610-04-01 | | |
| | UNITS | 2021T25-15 Lab-Dup | RDL | QC Batch | 2021T25-16 | RDL | QC Batch | 2021T25-16 Lab-Dup | RDL | QC Batch |
| **Misc. Inorganics** | | | | | | | | | | |
| Fluoride (F) | mg/L | | | | <0.020 | 0.020 | A348726 | | | |
| **Calculated Parameters** | | | | | | | | | | |
| Dissolved Chromium III | mg/L | | | | <0.00099 | 0.00099 | A341719 | | | |
| Filter and HNO3 Preservation | N/A | | | | FIELD | | ONSITE | | | |
| Dissolved Hardness (CaCO3) | mg/L | | | | <0.50 | 0.50 | A341393 | | | |
| Total Hardness (CaCO3) | mg/L | | | | <0.50 | 0.50 | A341392 | | | |
| Nitrate (N) | mg/L | | | | <0.0020 | 0.0020 | A341410 | | | |
| Total Total Kjeldahl Nitrogen (Calc) | mg/L | | | | 0.022 | 0.020 | A341594 | | | |
| **Misc. Inorganics** | | | | | | | | | | |
| Conductivity | uS/cm | | | | <2.0 | 2.0 | A345394 | | | |
| Strong Acid Dissoc. Cyanide (CN) | mg/L | | | | <0.00050 | 0.00050 | A346114 | | | |
| Weak Acid Dissoc. Cyanide (CN) | mg/L | | | | <0.00050 | 0.00050 | A346121 | | | |
| Dissolved Organic Carbon (C) | mg/L | | | | <0.20 | 0.20 | A347315 | <0.20 | 0.20 | A347315 |
| pH | pH | | | | 6.34 | N/A | A345387 | | | |
| Total Suspended Solids | mg/L | | | | <1.0 | 1.0 | A344685 | | | |
| **Anions** | | | | | | | | | | |
| Alkalinity (PP as CaCO3) | mg/L | | | | <1.0 | 1.0 | A345389 | | | |
| Alkalinity (Total as CaCO3) | mg/L | | | | 1.2 | 1.0 | A345389 | | | |
| Bicarbonate (HCO3) | mg/L | | | | 1.5 | 1.0 | A345389 | | | |
| Carbonate (CO3) | mg/L | | | | <1.0 | 1.0 | A345389 | | | |
| Hydroxide (OH) | mg/L | | | | <1.0 | 1.0 | A345389 | | | |
| Dissolved Chloride (Cl) | mg/L | | | | <0.50 | 0.50 | A351779 | <0.50 | 0.50 | A351779 |
| Dissolved Sulphate (SO4) | mg/L | | | | <0.50 | 0.50 | A351779 | <0.50 | 0.50 | A351779 |
| **Metals** | | | | | | | | | | |
| Dissolved Hex. Chromium (Cr 6+) | mg/L | | | | <0.00099 | 0.00099 | A343723 | | | |
| **Nutrients** | | | | | | | | | | |
| Dissolved Phosphorus (P) | mg/L | | | | <0.0010 | 0.0010 | A347209 | | | |
| Total Phosphorus (P) | mg/L | <0.0010 | 0.0010 | A347213 | <0.0010 | 0.0010 | A347213 | | | |
| Total Ammonia (N) | mg/L | | | | <0.0050 | 0.0050 | A348557 | | | |
| Nitrate plus Nitrite (N) | mg/L | | | | <0.0020 | 0.0020 | A342326 | | | |
| Nitrite (N) | mg/L | | | | <0.0020 | 0.0020 | A342330 | | | |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable



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## RESULTS OF CHEMICAL ANALYSES OF WATER

| BV Labs ID | | AFF267 | | | AFF268 | | | AFF268 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 12:00 | | | 2021/09/01 11:45 | | | 2021/09/01 11:45 | | |
| COC Number | | 644610-04-01 | | | 644610-04-01 | | | 644610-04-01 | | |
| | UNITS | 2021T25-15 Lab-Dup | RDL | QC Batch | 2021T25-16 | RDL | QC Batch | 2021T25-16 Lab-Dup | RDL | QC Batch |
| Total Nitrogen (N) | mg/L | | | | 0.022 | 0.020 | A345060 | | | |
| **Physical Properties** | | | | | | | | | | |
| Total Dissolved Solids | mg/L | | | | 2.0 (1) | 1.0 | A357208 | | | |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
(1) Sample was originally processed within hold time. Data quality required investigation. Re-analysis was completed past recommended hold time.



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## RESULTS OF CHEMICAL ANALYSES OF WATER

| BV Labs ID | | AFF269 | | AFF270 | | | AFF271 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 12:30 | | 2021/09/01 13:15 | | | 2021/09/01 14:15 | | |
| COC Number | | 644610-04-01 | | 644610-04-01 | | | 644610-04-01 | | |
| | **UNITS** | **2021T25-17** | **QC Batch** | **2021T25-18** | **RDL** | **QC Batch** | **2021T25-19** | **RDL** | **QC Batch** |
| **Misc. Inorganics** | | | | | | | | | |
| Fluoride (F) | mg/L | 0.090 | A348726 | 0.027 | 0.020 | A348726 | 0.170 | 0.020 | A348726 |
| **Calculated Parameters** | | | | | | | | | |
| Dissolved Chromium III | mg/L | <0.00099 | A341719 | <0.00099 | 0.00099 | A341719 | <0.00099 | 0.00099 | A341719 |
| Filter and HNO3 Preservation | N/A | FIELD | ONSITE | FIELD | | ONSITE | FIELD | | ONSITE |
| Dissolved Hardness (CaCO3) | mg/L | 307 | A341393 | 336 | 0.50 | A341393 | 343 | 0.50 | A341393 |
| Total Hardness (CaCO3) | mg/L | 300 | A341392 | 320 | 0.50 | A341392 | 330 | 0.50 | A341392 |
| Nitrate (N) | mg/L | 0.0592 | A341410 | 0.0352 | 0.0020 | A341410 | 0.0218 | 0.0020 | A341410 |
| Total Total Kjeldahl Nitrogen (Calc) | mg/L | 0.055 | A341594 | 0.037 | 0.020 | A341594 | 0.048 | 0.020 | A341594 |
| **Misc. Inorganics** | | | | | | | | | |
| Conductivity | uS/cm | 590 | A345394 | 600 | 2.0 | A345394 | 650 | 2.0 | A345394 |
| Strong Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | A346114 | <0.00050 | 0.00050 | A346114 | <0.00050 | 0.00050 | A346114 |
| Weak Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | A346121 | <0.00050 | 0.00050 | A346121 | <0.00050 | 0.00050 | A346121 |
| Dissolved Organic Carbon (C) | mg/L | <0.20 | A348719 | 0.38 | 0.20 | A347315 | <0.20 | 0.20 | A348719 |
| pH | pH | 8.15 | A345387 | 8.34 | N/A | A345387 | 8.00 | N/A | A345387 |
| Total Suspended Solids | mg/L | 2.8 | A344551 | 1.2 | 1.0 | A344551 | 12 | 1.0 | A344551 |
| **Anions** | | | | | | | | | |
| Alkalinity (PP as CaCO3) | mg/L | <1.0 | A345389 | 2.0 | 1.0 | A345389 | <1.0 | 1.0 | A345389 |
| Alkalinity (Total as CaCO3) | mg/L | 150 | A345389 | 220 | 1.0 | A345389 | 110 | 1.0 | A345389 |
| Bicarbonate (HCO3) | mg/L | 190 | A345389 | 260 | 1.0 | A345389 | 140 | 1.0 | A345389 |
| Carbonate (CO3) | mg/L | <1.0 | A345389 | 2.4 | 1.0 | A345389 | <1.0 | 1.0 | A345389 |
| Hydroxide (OH) | mg/L | <1.0 | A345389 | <1.0 | 1.0 | A345389 | <1.0 | 1.0 | A345389 |
| Dissolved Chloride (Cl) | mg/L | <0.50 | A348087 | <0.50 | 0.50 | A348087 | <0.50 | 0.50 | A348087 |
| Dissolved Sulphate (SO4) | mg/L | 160 | A348087 | 130 | 0.50 | A348087 | 210 | 5.0 | A348087 |
| **Metals** | | | | | | | | | |
| Dissolved Hex. Chromium (Cr 6+) | mg/L | <0.00099 | A345891 | <0.00099 | 0.00099 | A345891 | <0.00099 | 0.00099 | A345891 |
| **Nutrients** | | | | | | | | | |
| Dissolved Phosphorus (P) | mg/L | <0.0010 | A347443 | <0.0010 | 0.0010 | A347209 | <0.0010 | 0.0010 | A347443 |
| Total Phosphorus (P) | mg/L | <0.0010 | A347450 | <0.0010 | 0.0010 | A347213 | 0.0017 | 0.0010 | A347213 |
| Total Ammonia (N) | mg/L | <0.0050 | A348557 | <0.0050 | 0.0050 | A348557 | <0.0050 | 0.0050 | A348557 |
| Nitrate plus Nitrite (N) | mg/L | 0.0592 | A342326 | 0.0352 | 0.0020 | A342326 | 0.0218 | 0.0020 | A342326 |
| Nitrite (N) | mg/L | <0.0020 | A342330 | <0.0020 | 0.0020 | A342330 | <0.0020 | 0.0020 | A342330 |
| Total Nitrogen (N) | mg/L | 0.114 | A345060 | 0.073 | 0.020 | A345060 | 0.069 | 0.020 | A345060 |

RDL = Reportable Detection Limit
N/A = Not Applicable



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## RESULTS OF CHEMICAL ANALYSES OF WATER

| **BV Labs ID** | | AFF269 | | AFF270 | | | AFF271 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2021/09/01 12:30 | | 2021/09/01 13:15 | | | 2021/09/01 14:15 | | |
| **COC Number** | | 644610-04-01 | | 644610-04-01 | | | 644610-04-01 | | |
| | **UNITS** | **2021T25-17** | **QC Batch** | **2021T25-18** | **RDL** | **QC Batch** | **2021T25-19** | **RDL** | **QC Batch** |
| **Physical Properties** | | | | | | | | | |
| Total Dissolved Solids | mg/L | 385 (1) | A345116 | 354 (1) | 1.1 | A345116 | 453 (1) | 1.1 | A345116 |

RDL = Reportable Detection Limit
(1) Detection limits raised due to insufficient sample volume.



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## RESULTS OF CHEMICAL ANALYSES OF WATER

| BV Labs ID | | AFF272 | | | AFF272 | | | AFF273 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 15:30 | | | 2021/09/01 15:30 | | | 2021/09/01 15:30 | | |
| COC Number | | 644610-04-01 | | | 644610-04-01 | | | 644610-05-01 | | |
| | UNITS | 2021T25-20 | RDL | QC Batch | 2021T25-20 Lab-Dup | RDL | QC Batch | 2021T25-21 | RDL | QC Batch |
| **Misc. Inorganics** | | | | | | | | | | |
| Fluoride (F) | mg/L | 0.040 | 0.020 | A348726 | 0.038 | 0.020 | A348726 | 0.810 | 0.020 | A348726 |
| **Calculated Parameters** | | | | | | | | | | |
| Dissolved Chromium III | mg/L | <0.00099 | 0.00099 | A341719 | | | | <0.00099 | 0.00099 | A341719 |
| Filter and HNO3 Preservation | N/A | FIELD | | ONSITE | | | | FIELD | | ONSITE |
| Dissolved Hardness (CaCO3) | mg/L | 373 | 0.50 | A341393 | | | | 644 | 0.50 | A341393 |
| Total Hardness (CaCO3) | mg/L | 350 | 0.50 | A341392 | | | | 630 | 0.50 | A341392 |
| Nitrate (N) | mg/L | 0.0626 | 0.0020 | A341410 | | | | 0.438 | 0.0020 | A341410 |
| Total Total Kjeldahl Nitrogen (Calc) | mg/L | 0.048 | 0.020 | A341594 | | | | 0.032 | 0.020 | A341594 |
| **Misc. Inorganics** | | | | | | | | | | |
| Conductivity | uS/cm | 690 | 2.0 | A345409 | | | | 1100 | 2.0 | A345385 |
| Strong Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | 0.00050 | A346114 | <0.00050 | 0.00050 | A346114 | <0.00050 | 0.00050 | A346114 |
| Weak Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | 0.00050 | A346121 | <0.00050 | 0.00050 | A346121 | <0.00050 | 0.00050 | A346121 |
| Dissolved Organic Carbon (C) | mg/L | <0.20 | 0.20 | A348719 | | | | 0.42 | 0.20 | A347315 |
| pH | pH | 7.92 | N/A | A345396 | | | | 8.12 | N/A | A345379 |
| Total Suspended Solids | mg/L | <1.0 | 1.0 | A344551 | | | | <1.0 | 1.0 | A344546 |
| **Anions** | | | | | | | | | | |
| Alkalinity (PP as CaCO3) | mg/L | <1.0 | 1.0 | A345397 | | | | <1.0 | 1.0 | A345383 |
| Alkalinity (Total as CaCO3) | mg/L | 110 | 1.0 | A345397 | | | | 200 | 1.0 | A345383 |
| Bicarbonate (HCO3) | mg/L | 130 | 1.0 | A345397 | | | | 250 | 1.0 | A345383 |
| Carbonate (CO3) | mg/L | <1.0 | 1.0 | A345397 | | | | <1.0 | 1.0 | A345383 |
| Hydroxide (OH) | mg/L | <1.0 | 1.0 | A345397 | | | | <1.0 | 1.0 | A345383 |
| Dissolved Chloride (Cl) | mg/L | <0.50 | 0.50 | A348160 | | | | 0.51 | 0.50 | A348087 |
| Dissolved Sulphate (SO4) | mg/L | 250 | 5.0 | A348160 | | | | 410 | 5.0 | A348087 |
| **Metals** | | | | | | | | | | |
| Dissolved Hex. Chromium (Cr 6+) | mg/L | <0.00099 | 0.00099 | A345891 | <0.00099 | 0.00099 | A345891 | <0.00099 | 0.00099 | A345891 |
| **Nutrients** | | | | | | | | | | |
| Dissolved Phosphorus (P) | mg/L | 0.0022 | 0.0010 | A347443 | | | | 0.0077 | 0.0010 | A347209 |
| Total Phosphorus (P) | mg/L | 0.0029 | 0.0010 | A347455 | | | | 0.014 | 0.0010 | A347213 |
| Total Ammonia (N) | mg/L | <0.0050 | 0.0050 | A348552 | | | | <0.0050 | 0.0050 | A348557 |
| Nitrate plus Nitrite (N) | mg/L | 0.0626 | 0.0020 | A342326 | | | | 0.438 | 0.0020 | A342326 |
| Nitrite (N) | mg/L | <0.0020 | 0.0020 | A342330 | | | | <0.0020 | 0.0020 | A342330 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable



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## RESULTS OF CHEMICAL ANALYSES OF WATER

| **BV Labs ID** | | AFF272 | | | AFF272 | | | AFF273 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2021/09/01 15:30 | | | 2021/09/01 15:30 | | | 2021/09/01 15:30 | | |
| **COC Number** | | 644610-04-01 | | | 644610-04-01 | | | 644610-05-01 | | |
| | **UNITS** | **2021T25-20** | **RDL** | **QC Batch** | **2021T25-20 Lab-Dup** | **RDL** | **QC Batch** | **2021T25-21** | **RDL** | **QC Batch** |
| Total Nitrogen (N) | mg/L | 0.111 | 0.020 | A345060 | | | | 0.470 | 0.020 | A345060 |
| **Physical Properties** | | | | | | | | | | |
| Total Dissolved Solids | mg/L | 497 (1) | 1.1 | A345116 | | | | 888 (1) | 1.1 | A345116 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
(1) Detection limits raised due to insufficient sample volume.



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## RESULTS OF CHEMICAL ANALYSES OF WATER

| BV Labs ID | | AFF274 | AFF275 | | | AFF275 | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/02 10:15 | 2021/09/02 11:00 | | | 2021/09/02 11:00 | | |
| COC Number | | 644610-05-01 | 644610-05-01 | | | 644610-05-01 | | |
| | UNITS | 2021T25-22 | 2021T25-23 | RDL | QC Batch | 2021T25-23 Lab-Dup | RDL | QC Batch |
| **Misc. Inorganics** | | | | | | | | |
| Fluoride (F) | mg/L | 0.046 | 0.028 | 0.020 | A348726 | | | |
| **Calculated Parameters** | | | | | | | | |
| Dissolved Chromium III | mg/L | <0.00099 | <0.00099 | 0.00099 | A341719 | | | |
| Filter and HNO3 Preservation | N/A | FIELD | FIELD | | ONSITE | | | |
| Dissolved Hardness (CaCO3) | mg/L | 243 | 136 | 0.50 | A341393 | | | |
| Total Hardness (CaCO3) | mg/L | 220 | 130 | 0.50 | A341392 | | | |
| Nitrate (N) | mg/L | 0.0263 | 0.0500 | 0.0020 | A341410 | | | |
| Total Total Kjeldahl Nitrogen (Calc) | mg/L | 0.039 | 0.039 | 0.020 | A341594 | | | |
| **Misc. Inorganics** | | | | | | | | |
| Conductivity | uS/cm | 460 | 280 | 2.0 | A345385 | | | |
| Strong Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | <0.00050 | 0.00050 | A346114 | | | |
| Weak Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | <0.00050 | 0.00050 | A346121 | | | |
| Dissolved Organic Carbon (C) | mg/L | 0.22 | <0.20 | 0.20 | A347315 | | | |
| pH | pH | 8.12 | 7.73 | N/A | A345379 | | | |
| Total Suspended Solids | mg/L | 1.6 | 2.4 | 1.0 | A346053 | | | |
| **Anions** | | | | | | | | |
| Alkalinity (PP as CaCO3) | mg/L | <1.0 | <1.0 | 1.0 | A345383 | | | |
| Alkalinity (Total as CaCO3) | mg/L | 140 | 72 | 1.0 | A345383 | | | |
| Bicarbonate (HCO3) | mg/L | 170 | 88 | 1.0 | A345383 | | | |
| Carbonate (CO3) | mg/L | <1.0 | <1.0 | 1.0 | A345383 | | | |
| Hydroxide (OH) | mg/L | <1.0 | <1.0 | 1.0 | A345383 | | | |
| Dissolved Chloride (Cl) | mg/L | <0.50 | <0.50 | 0.50 | A348087 | | | |
| Dissolved Sulphate (SO4) | mg/L | 110 | 65 | 0.50 | A348087 | | | |
| **Metals** | | | | | | | | |
| Dissolved Hex. Chromium (Cr 6+) | mg/L | <0.00099 | <0.00099 | 0.00099 | A343723 | | | |
| **Nutrients** | | | | | | | | |
| Dissolved Phosphorus (P) | mg/L | <0.0010 | <0.0010 | 0.0010 | A347209 | <0.0010 | 0.0010 | A347209 |
| Total Phosphorus (P) | mg/L | <0.0010 | <0.0010 | 0.0010 | A347213 | | | |
| Total Ammonia (N) | mg/L | <0.0050 | <0.0050 | 0.0050 | A348557 | <0.0050 | 0.0050 | A348557 |
| Nitrate plus Nitrite (N) | mg/L | 0.0263 | 0.0500 | 0.0020 | A342326 | | | |
| Nitrite (N) | mg/L | <0.0020 | <0.0020 | 0.0020 | A342330 | | | |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable



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## RESULTS OF CHEMICAL ANALYSES OF WATER

| **BV Labs ID** | | AFF274 | AFF275 | | | AFF275 | | |
|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2021/09/02 10:15 | 2021/09/02 11:00 | | | 2021/09/02 11:00 | | |
| **COC Number** | | 644610-05-01 | 644610-05-01 | | | 644610-05-01 | | |
| | **UNITS** | **2021T25-22** | **2021T25-23** | **RDL** | **QC Batch** | **2021T25-23 Lab-Dup** | **RDL** | **QC Batch** |
| Total Nitrogen (N) | mg/L | 0.066 | 0.089 | 0.020 | A345060 | | | |
| **Physical Properties** | | | | | | | | |
| Total Dissolved Solids | mg/L | 263 | 178 | 1.0 | A346241 | | | |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate



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## RESULTS OF CHEMICAL ANALYSES OF WATER

| BV Labs ID | | AFF276 | | AFF277 | | | AFF277 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/02 11:15 | | 2021/09/02 12:00 | | | 2021/09/02 12:00 | | |
| COC Number | | 644610-05-01 | | 644610-05-01 | | | 644610-05-01 | | |
| | UNITS | 2021T25-24 | QC Batch | 2021T25-25 | RDL | QC Batch | 2021T25-25 Lab-Dup | RDL | QC Batch |
| **Misc. Inorganics** | | | | | | | | | |
| Fluoride (F) | mg/L | 0.026 | A348726 | <0.020 | 0.020 | A348726 | | | |
| **Calculated Parameters** | | | | | | | | | |
| Dissolved Chromium III | mg/L | <0.00099 | A341719 | <0.00099 | 0.00099 | A341719 | | | |
| Filter and HNO3 Preservation | N/A | LAB | A349745 | FIELD | | ONSITE | | | |
| Dissolved Hardness (CaCO3) | mg/L | 131 | A341393 | <0.50 | 0.50 | A341393 | | | |
| Total Hardness (CaCO3) | mg/L | 140 | A341392 | <0.50 | 0.50 | A341392 | | | |
| Nitrate (N) | mg/L | 0.0495 | A341410 | <0.0020 | 0.0020 | A341410 | | | |
| Total Total Kjeldahl Nitrogen (Calc) | mg/L | 0.084 | A341594 | <0.020 | 0.020 | A341594 | | | |
| **Misc. Inorganics** | | | | | | | | | |
| Conductivity | uS/cm | 280 | A345385 | <2.0 | 2.0 | A345385 | | | |
| Strong Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | A346114 | <0.00050 | 0.00050 | A346114 | | | |
| Weak Acid Dissoc. Cyanide (CN) | mg/L | <0.00050 | A346121 | <0.00050 | 0.00050 | A346121 | | | |
| Dissolved Organic Carbon (C) | mg/L | <0.20 | A347315 | <0.20 | 0.20 | A348719 | <0.20 | 0.20 | A348719 |
| pH | pH | 7.70 | A345379 | 5.66 | N/A | A345379 | | | |
| Total Suspended Solids | mg/L | 2.8 | A346053 | 1.6 | 1.0 | A346053 | | | |
| **Anions** | | | | | | | | | |
| Alkalinity (PP as CaCO3) | mg/L | <1.0 | A345383 | <1.0 | 1.0 | A345383 | | | |
| Alkalinity (Total as CaCO3) | mg/L | 70 | A345383 | <1.0 | 1.0 | A345383 | | | |
| Bicarbonate (HCO3) | mg/L | 86 | A345383 | <1.0 | 1.0 | A345383 | | | |
| Carbonate (CO3) | mg/L | <1.0 | A345383 | <1.0 | 1.0 | A345383 | | | |
| Hydroxide (OH) | mg/L | <1.0 | A345383 | <1.0 | 1.0 | A345383 | | | |
| Dissolved Chloride (Cl) | mg/L | <0.50 | A348087 | <0.50 | 0.50 | A348087 | | | |
| Dissolved Sulphate (SO4) | mg/L | 72 | A348087 | 1.2 | 0.50 | A348087 | | | |
| **Metals** | | | | | | | | | |
| Dissolved Hex. Chromium (Cr 6+) | mg/L | <0.00099 | A343723 | <0.00099 | 0.00099 | A345891 | | | |
| **Nutrients** | | | | | | | | | |
| Dissolved Phosphorus (P) | mg/L | <0.0010 | A347209 | <0.0010 | 0.0010 | A347443 | | | |
| Total Phosphorus (P) | mg/L | <0.0010 | A347213 | <0.0010 | 0.0010 | A347213 | | | |
| Total Ammonia (N) | mg/L | <0.0050 | A348552 | <0.0050 | 0.0050 | A348557 | | | |
| Nitrate plus Nitrite (N) | mg/L | 0.0495 | A342326 | <0.0020 | 0.0020 | A342326 | | | |
| Nitrite (N) | mg/L | <0.0020 | A342330 | <0.0020 | 0.0020 | A342330 | | | |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable



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## RESULTS OF CHEMICAL ANALYSES OF WATER

| **BV Labs ID** | | AFF276 | | AFF277 | | | AFF277 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sampling Date** | | 2021/09/02 11:15 | | 2021/09/02 12:00 | | | 2021/09/02 12:00 | | |
| **COC Number** | | 644610-05-01 | | 644610-05-01 | | | 644610-05-01 | | |
| | **UNITS** | **2021T25-24** | **QC Batch** | **2021T25-25** | **RDL** | **QC Batch** | **2021T25-25 Lab-Dup** | **RDL** | **QC Batch** |
| Total Nitrogen (N) | mg/L | 0.133 | A343841 | <0.020 | 0.020 | A345060 | | | |
| **Physical Properties** | | | | | | | | | |
| Total Dissolved Solids | mg/L | 172 | A346241 | <1.0 (1) | 1.0 | A362419 | | | |

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate

(1) Sample was originally processed within hold time. Data quality required investigation. Re-analysis was completed past recommended hold time.



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## MERCURY BY COLD VAPOR (WATER)

| BV Labs ID | | AFF263 | AFF264 | AFF265 | AFF266 | AFF267 | AFF268 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 09:15 | 2021/09/01 | 2021/09/01 10:45 | 2021/09/01 11:15 | 2021/09/01 12:00 | 2021/09/01 11:45 | | |
| COC Number | | 644610-04-01 | 644610-04-01 | 644610-04-01 | 644610-04-01 | 644610-04-01 | 644610-04-01 | | |
| | UNITS | 2021T25-11 | 2021T25-12 | 2021T25-13 | 2021T25-14 | 2021T25-15 | 2021T25-16 | RDL | QC Batch |
| **Elements** | | | | | | | | | |
| Dissolved Mercury (Hg) | ug/L | <0.0019 | <0.0019 | <0.0019 | <0.0019 | <0.0019 | <0.0019 | 0.0019 | A347548 |
| Total Mercury (Hg) | ug/L | <0.0019 | <0.0019 | <0.0019 | <0.0019 | <0.0019 | <0.0019 | 0.0019 | A347313 |

RDL = Reportable Detection Limit

| BV Labs ID | | AFF269 | AFF270 | AFF271 | AFF272 | | AFF273 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 12:30 | 2021/09/01 13:15 | 2021/09/01 14:15 | 2021/09/01 15:30 | | 2021/09/01 15:30 | | |
| COC Number | | 644610-04-01 | 644610-04-01 | 644610-04-01 | 644610-04-01 | | 644610-05-01 | | |
| | UNITS | 2021T25-17 | 2021T25-18 | 2021T25-19 | 2021T25-20 | QC Batch | 2021T25-21 | RDL | QC Batch |
| **Elements** | | | | | | | | | |
| Dissolved Mercury (Hg) | ug/L | <0.0019 | <0.0019 | <0.0019 | <0.0019 | A347548 | <0.0019 | 0.0019 | A347548 |
| Total Mercury (Hg) | ug/L | <0.0019 | <0.0019 | <0.0019 | <0.0019 | A347313 | <0.0019 | 0.0019 | A347795 |

RDL = Reportable Detection Limit

| BV Labs ID | | AFF273 | | | AFF274 | | AFF275 | AFF276 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 15:30 | | | 2021/09/02 10:15 | | 2021/09/02 11:00 | 2021/09/02 11:15 | | |
| COC Number | | 644610-05-01 | | | 644610-05-01 | | 644610-05-01 | 644610-05-01 | | |
| | UNITS | 2021T25-21 Lab-Dup | RDL | QC Batch | 2021T25-22 | QC Batch | 2021T25-23 | 2021T25-24 | RDL | QC Batch |
| **Elements** | | | | | | | | | | |
| Dissolved Mercury (Hg) | ug/L | | | | <0.0019 | A343127 | <0.0019 | <0.0019 | 0.0019 | A347548 |
| Total Mercury (Hg) | ug/L | <0.0019 | 0.0019 | A347795 | <0.0019 | A347795 | <0.0019 | <0.0019 | 0.0019 | A347795 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

| BV Labs ID | | AFF277 | | |
|---|---|---|---|---|
| Sampling Date | | 2021/09/02 12:00 | | |
| COC Number | | 644610-05-01 | | |
| | UNITS | 2021T25-25 | RDL | QC Batch |
| **Elements** | | | | |
| Dissolved Mercury (Hg) | ug/L | <0.0019 | 0.0019 | A347548 |
| Total Mercury (Hg) | ug/L | <0.0019 | 0.0019 | A347795 |

RDL = Reportable Detection Limit



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFF263 | | | AFF263 | | | AFF264 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 09:15 | | | 2021/09/01 09:15 | | | 2021/09/01 | | |
| COC Number | | 644610-04-01 | | | 644610-04-01 | | | 644610-04-01 | | |
| | UNITS | 2021T25-11 | RDL | QC Batch | 2021T25-11 Lab-Dup | RDL | QC Batch | 2021T25-12 | RDL | QC Batch |
| **Dissolved Metals by ICPMS** | | | | | | | | | | |
| Dissolved Aluminum (Al) | ug/L | 1.52 | 0.50 | A346416 | 1.43 | 0.50 | A346416 | 1.54 | 0.50 | A346416 |
| Dissolved Antimony (Sb) | ug/L | 39.9 | 0.020 | A346416 | 40.1 | 0.020 | A346416 | 0.941 | 0.020 | A346416 |
| Dissolved Arsenic (As) | ug/L | 24.3 | 0.020 | A346416 | 24.3 | 0.020 | A346416 | 0.913 | 0.020 | A346416 |
| Dissolved Barium (Ba) | ug/L | 29.8 | 0.020 | A346416 | 29.6 | 0.020 | A346416 | 39.1 | 0.020 | A346416 |
| Dissolved Beryllium (Be) | ug/L | <0.010 | 0.010 | A346416 | <0.010 | 0.010 | A346416 | <0.010 | 0.010 | A346416 |
| Dissolved Bismuth (Bi) | ug/L | <0.0050 | 0.0050 | A346416 | <0.0050 | 0.0050 | A346416 | <0.0050 | 0.0050 | A346416 |
| Dissolved Boron (B) | ug/L | 50 | 10 | A346416 | 49 | 10 | A346416 | <10 | 10 | A346416 |
| Dissolved Cadmium (Cd) | ug/L | 0.0180 | 0.0050 | A346416 | 0.0168 | 0.0050 | A346416 | 0.0069 | 0.0050 | A346416 |
| Dissolved Chromium (Cr) | ug/L | <0.10 | 0.10 | A346416 | <0.10 | 0.10 | A346416 | <0.10 | 0.10 | A346416 |
| Dissolved Cobalt (Co) | ug/L | 0.119 | 0.0050 | A346416 | 0.114 | 0.0050 | A346416 | 0.0284 | 0.0050 | A346416 |
| Dissolved Copper (Cu) | ug/L | 1.10 | 0.050 | A346416 | 1.12 | 0.050 | A346416 | 0.101 | 0.050 | A346416 |
| Dissolved Iron (Fe) | ug/L | 2.3 | 1.0 | A346416 | 2.2 | 1.0 | A346416 | 4.5 | 1.0 | A346416 |
| Dissolved Lead (Pb) | ug/L | 0.289 | 0.0050 | A346416 | 0.275 | 0.0050 | A346416 | 0.0513 | 0.0050 | A346416 |
| Dissolved Lithium (Li) | ug/L | 21.4 | 0.50 | A346416 | 21.5 | 0.50 | A346416 | 2.09 | 0.50 | A346416 |
| Dissolved Manganese (Mn) | ug/L | 1.92 | 0.050 | A346416 | 1.88 | 0.050 | A346416 | 3.13 | 0.050 | A346416 |
| Dissolved Molybdenum (Mo) | ug/L | 0.514 | 0.050 | A346416 | 0.487 | 0.050 | A346416 | 0.225 | 0.050 | A346416 |
| Dissolved Nickel (Ni) | ug/L | 0.819 | 0.020 | A346416 | 0.785 | 0.020 | A346416 | 0.168 | 0.020 | A346416 |
| Dissolved Selenium (Se) | ug/L | 0.182 | 0.040 | A346416 | 0.159 | 0.040 | A346416 | 0.734 | 0.040 | A346416 |
| Dissolved Silicon (Si) | ug/L | 2660 | 50 | A346416 | 2660 | 50 | A346416 | 2020 | 50 | A346416 |
| Dissolved Silver (Ag) | ug/L | <0.0050 | 0.0050 | A346416 | <0.0050 | 0.0050 | A346416 | <0.0050 | 0.0050 | A346416 |
| Dissolved Strontium (Sr) | ug/L | 1130 | 0.050 | A346416 | 1110 | 0.050 | A346416 | 299 | 0.050 | A346416 |
| Dissolved Tellurium (Te) | ug/L | <0.020 | 0.020 | A346416 | <0.020 | 0.020 | A346416 | <0.020 | 0.020 | A346416 |
| Dissolved Thallium (Tl) | ug/L | 0.0026 | 0.0020 | A346416 | 0.0025 | 0.0020 | A346416 | <0.0020 | 0.0020 | A346416 |
| Dissolved Thorium (Th) | ug/L | <0.0050 | 0.0050 | A346416 | <0.0050 | 0.0050 | A346416 | <0.0050 | 0.0050 | A346416 |
| Dissolved Tin (Sn) | ug/L | <0.20 | 0.20 | A346416 | <0.20 | 0.20 | A346416 | <0.20 | 0.20 | A346416 |
| Dissolved Titanium (Ti) | ug/L | <0.50 | 0.50 | A346416 | <0.50 | 0.50 | A346416 | <0.50 | 0.50 | A346416 |
| Dissolved Tungsten (W) | ug/L | 0.170 | 0.010 | A346416 | 0.172 | 0.010 | A346416 | <0.010 | 0.010 | A346416 |
| Dissolved Uranium (U) | ug/L | 1.15 | 0.0020 | A346416 | 1.16 | 0.0020 | A346416 | 3.02 | 0.0020 | A346416 |
| Dissolved Vanadium (V) | ug/L | <0.20 | 0.20 | A346416 | <0.20 | 0.20 | A346416 | <0.20 | 0.20 | A346416 |
| Dissolved Zinc (Zn) | ug/L | 6.53 | 0.10 | A346416 | 6.43 | 0.10 | A346416 | 0.70 | 0.10 | A346416 |
| Dissolved Zirconium (Zr) | ug/L | <0.10 | 0.10 | A346416 | <0.10 | 0.10 | A346416 | <0.10 | 0.10 | A346416 |
| Dissolved Calcium (Ca) | mg/L | 70.9 | 0.050 | A342028 | | | | 77.8 | 0.050 | A342028 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFF263 | | | AFF263 | | | AFF264 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 09:15 | | | 2021/09/01 09:15 | | | 2021/09/01 | | |
| COC Number | | 644610-04-01 | | | 644610-04-01 | | | 644610-04-01 | | |
| | UNITS | 2021T25-11 | RDL | QC Batch | 2021T25-11 Lab-Dup | RDL | QC Batch | 2021T25-12 | RDL | QC Batch |
| Dissolved Magnesium (Mg) | mg/L | 55.2 | 0.050 | A342028 | | | | 38.3 | 0.050 | A342028 |
| Dissolved Potassium (K) | mg/L | 3.50 | 0.050 | A342028 | | | | 0.220 | 0.050 | A342028 |
| Dissolved Sodium (Na) | mg/L | 14.2 | 0.050 | A342028 | | | | 0.406 | 0.050 | A342028 |
| Dissolved Sulphur (S) | mg/L | 23.1 | 3.0 | A342028 | | | | 46.8 | 3.0 | A342028 |
| **Total Metals by ICPMS** | | | | | | | | | | |
| Total Aluminum (Al) | ug/L | 14.0 | 3.0 | A343719 | | | | 3.37 | 0.50 | A343687 |
| Total Antimony (Sb) | ug/L | 41.1 | 0.020 | A343719 | | | | 0.923 | 0.020 | A343687 |
| Total Arsenic (As) | ug/L | 41.1 | 0.020 | A343719 | | | | 0.998 | 0.020 | A343687 |
| Total Barium (Ba) | ug/L | 29.6 | 0.050 | A343719 | | | | 38.8 | 0.020 | A343687 |
| Total Beryllium (Be) | ug/L | <0.010 | 0.010 | A343719 | | | | <0.010 | 0.010 | A343687 |
| Total Bismuth (Bi) | ug/L | 0.028 | 0.010 | A343719 | | | | <0.0050 | 0.0050 | A343687 |
| Total Boron (B) | ug/L | 49 | 10 | A343719 | | | | <10 | 10 | A343687 |
| Total Cadmium (Cd) | ug/L | 0.0245 | 0.0050 | A343719 | | | | 0.0058 | 0.0050 | A343687 |
| Total Chromium (Cr) | ug/L | <0.10 | 0.10 | A343719 | | | | <0.10 | 0.10 | A343687 |
| Total Cobalt (Co) | ug/L | 0.078 | 0.010 | A343719 | | | | 0.0219 | 0.0050 | A343687 |
| Total Copper (Cu) | ug/L | 3.66 | 0.10 | A343719 | | | | 0.079 | 0.050 | A343687 |
| Total Iron (Fe) | ug/L | 188 | 5.0 | A343719 | | | | 19.6 | 1.0 | A343687 |
| Total Lead (Pb) | ug/L | 13.3 | 0.020 | A343719 | | | | 0.605 | 0.0050 | A343687 |
| Total Lithium (Li) | ug/L | 21.4 | 0.50 | A343719 | | | | 2.07 | 0.50 | A343687 |
| Total Manganese (Mn) | ug/L | 11.1 | 0.10 | A343719 | | | | 3.70 | 0.050 | A343687 |
| Total Molybdenum (Mo) | ug/L | 0.233 | 0.050 | A343719 | | | | 0.248 | 0.050 | A343687 |
| Total Nickel (Ni) | ug/L | 0.94 | 0.10 | A343719 | | | | 0.190 | 0.020 | A343687 |
| Total Selenium (Se) | ug/L | 0.192 | 0.040 | A343719 | | | | 0.864 | 0.040 | A343687 |
| Total Silicon (Si) | ug/L | 2750 | 50 | A343719 | | | | 2140 | 50 | A343687 |
| Total Silver (Ag) | ug/L | 0.061 | 0.010 | A343719 | | | | <0.0050 | 0.0050 | A343687 |
| Total Strontium (Sr) | ug/L | 1130 | 0.050 | A343719 | | | | 303 | 0.050 | A343687 |
| Total Tellurium (Te) | ug/L | <0.020 | 0.020 | A343719 | | | | <0.020 | 0.020 | A343687 |
| Total Thallium (Tl) | ug/L | 0.0037 | 0.0020 | A343719 | | | | <0.0020 | 0.0020 | A343687 |
| Total Thorium (Th) | ug/L | <0.020 | 0.020 | A343719 | | | | <0.0050 | 0.0050 | A343687 |
| Total Tin (Sn) | ug/L | <0.20 | 0.20 | A343719 | | | | <0.20 | 0.20 | A343687 |
| Total Titanium (Ti) | ug/L | <2.0 | 2.0 | A343719 | | | | <0.50 | 0.50 | A343687 |
| Total Tungsten (W) | ug/L | 0.132 | 0.010 | A343719 | | | | <0.010 | 0.010 | A343687 |
| Total Uranium (U) | ug/L | 1.09 | 0.0050 | A343719 | | | | 2.85 | 0.0020 | A343687 |

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Lab-Dup = Laboratory Initiated Duplicate



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFF263 | | | AFF263 | | | AFF264 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 09:15 | | | 2021/09/01 09:15 | | | 2021/09/01 | | |
| COC Number | | 644610-04-01 | | | 644610-04-01 | | | 644610-04-01 | | |
| | UNITS | 2021T25-11 | RDL | QC Batch | 2021T25-11 Lab-Dup | RDL | QC Batch | 2021T25-12 | RDL | QC Batch |
| Total Vanadium (V) | ug/L | <0.20 | 0.20 | A343719 | | | | <0.20 | 0.20 | A343687 |
| Total Zinc (Zn) | ug/L | 8.3 | 1.0 | A343719 | | | | 0.73 | 0.10 | A343687 |
| Total Zirconium (Zr) | ug/L | <0.10 | 0.10 | A343719 | | | | <0.10 | 0.10 | A343687 |
| Total Calcium (Ca) | mg/L | 68.1 | 0.25 | A341601 | | | | 73.7 | 0.050 | A341601 |
| Total Magnesium (Mg) | mg/L | 51.1 | 0.25 | A341601 | | | | 35.8 | 0.050 | A341601 |
| Total Potassium (K) | mg/L | 3.28 | 0.25 | A341601 | | | | 0.214 | 0.050 | A341601 |
| Total Sodium (Na) | mg/L | 13.3 | 0.25 | A341601 | | | | 0.433 | 0.050 | A341601 |
| Total Sulphur (S) | mg/L | 23.6 | 3.0 | A341601 | | | | 50.3 | 3.0 | A341601 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFF264 | | | AFF265 | | AFF266 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 | | | 2021/09/01 10:45 | | 2021/09/01 11:15 | | |
| COC Number | | 644610-04-01 | | | 644610-04-01 | | 644610-04-01 | | |
| | UNITS | 2021T25-12 Lab-Dup | RDL | QC Batch | 2021T25-13 | RDL | 2021T25-14 | RDL | QC Batch |
| **Dissolved Metals by ICPMS** | | | | | | | | | |
| Dissolved Aluminum (Al) | ug/L | | | | 2.11 | 0.50 | 3.1 | 1.0 | A346416 |
| Dissolved Antimony (Sb) | ug/L | | | | 0.297 | 0.020 | 0.231 | 0.040 | A346416 |
| Dissolved Arsenic (As) | ug/L | | | | 0.110 | 0.020 | 0.239 | 0.040 | A346416 |
| Dissolved Barium (Ba) | ug/L | | | | 32.3 | 0.020 | 13.9 | 0.040 | A346416 |
| Dissolved Beryllium (Be) | ug/L | | | | <0.010 | 0.010 | <0.020 | 0.020 | A346416 |
| Dissolved Bismuth (Bi) | ug/L | | | | <0.0050 | 0.0050 | <0.010 | 0.010 | A346416 |
| Dissolved Boron (B) | ug/L | | | | <10 | 10 | <20 | 20 | A346416 |
| Dissolved Cadmium (Cd) | ug/L | | | | <0.0050 | 0.0050 | <0.010 | 0.010 | A346416 |
| Dissolved Chromium (Cr) | ug/L | | | | <0.10 | 0.10 | <0.20 | 0.20 | A346416 |
| Dissolved Cobalt (Co) | ug/L | | | | 0.0349 | 0.0050 | 0.036 | 0.010 | A346416 |
| Dissolved Copper (Cu) | ug/L | | | | 0.057 | 0.050 | <0.10 | 0.10 | A346416 |
| Dissolved Iron (Fe) | ug/L | | | | <1.0 | 1.0 | <2.0 | 2.0 | A346416 |
| Dissolved Lead (Pb) | ug/L | | | | 0.0134 | 0.0050 | <0.010 | 0.010 | A346416 |
| Dissolved Lithium (Li) | ug/L | | | | 4.03 | 0.50 | 6.6 | 1.0 | A346416 |
| Dissolved Manganese (Mn) | ug/L | | | | 0.365 | 0.050 | <0.10 | 0.10 | A346416 |
| Dissolved Molybdenum (Mo) | ug/L | | | | 0.270 | 0.050 | 0.80 | 0.10 | A346416 |
| Dissolved Nickel (Ni) | ug/L | | | | 0.271 | 0.020 | 2.07 | 0.040 | A346416 |
| Dissolved Selenium (Se) | ug/L | | | | 0.879 | 0.040 | 1.06 | 0.080 | A346416 |
| Dissolved Silicon (Si) | ug/L | | | | 2440 | 50 | 2300 | 100 | A346416 |
| Dissolved Silver (Ag) | ug/L | | | | <0.0050 | 0.0050 | <0.010 | 0.010 | A346416 |
| Dissolved Strontium (Sr) | ug/L | | | | 545 | 0.050 | 733 | 0.10 | A346416 |
| Dissolved Tellurium (Te) | ug/L | | | | <0.020 | 0.020 | <0.040 | 0.040 | A346416 |
| Dissolved Thallium (Tl) | ug/L | | | | <0.0020 | 0.0020 | <0.0040 | 0.0040 | A346416 |
| Dissolved Thorium (Th) | ug/L | | | | <0.0050 | 0.0050 | <0.010 | 0.010 | A346416 |
| Dissolved Tin (Sn) | ug/L | | | | <0.20 | 0.20 | <0.40 | 0.40 | A346416 |
| Dissolved Titanium (Ti) | ug/L | | | | <0.50 | 0.50 | <1.0 | 1.0 | A346416 |
| Dissolved Tungsten (W) | ug/L | | | | <0.010 | 0.010 | 0.073 | 0.020 | A346416 |
| Dissolved Uranium (U) | ug/L | | | | 8.07 | 0.0020 | 25.1 | 0.0040 | A346416 |
| Dissolved Vanadium (V) | ug/L | | | | <0.20 | 0.20 | <0.40 | 0.40 | A346416 |
| Dissolved Zinc (Zn) | ug/L | | | | 1.15 | 0.10 | 1.80 | 0.20 | A346416 |
| Dissolved Zirconium (Zr) | ug/L | | | | <0.10 | 0.10 | <0.20 | 0.20 | A346416 |
| Dissolved Calcium (Ca) | mg/L | | | | 107 | 0.050 | 162 | 0.10 | A342028 |

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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFF264 | | | AFF265 | | AFF266 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 | | | 2021/09/01 10:45 | | 2021/09/01 11:15 | | |
| COC Number | | 644610-04-01 | | | 644610-04-01 | | 644610-04-01 | | |
| | UNITS | 2021T25-12 Lab-Dup | RDL | QC Batch | 2021T25-13 | RDL | 2021T25-14 | RDL | QC Batch |
| Dissolved Magnesium (Mg) | mg/L | | | | 83.6 | 0.050 | 175 | 0.10 | A342028 |
| Dissolved Potassium (K) | mg/L | | | | 0.507 | 0.050 | 0.55 | 0.10 | A342028 |
| Dissolved Sodium (Na) | mg/L | | | | 0.515 | 0.050 | 0.43 | 0.10 | A342028 |
| Dissolved Sulphur (S) | mg/L | | | | 125 | 3.0 | 284 | 6.0 | A342028 |
| **Total Metals by ICPMS** | | | | | | | | | |
| Total Aluminum (Al) | ug/L | 3.36 | 0.50 | A343687 | 8.54 | 0.50 | 4.3 | 1.0 | A343687 |
| Total Antimony (Sb) | ug/L | 0.902 | 0.020 | A343687 | 0.284 | 0.020 | 0.208 | 0.040 | A343687 |
| Total Arsenic (As) | ug/L | 1.01 | 0.020 | A343687 | 0.135 | 0.020 | 0.293 | 0.040 | A343687 |
| Total Barium (Ba) | ug/L | 37.8 | 0.020 | A343687 | 31.2 | 0.020 | 13.9 | 0.040 | A343687 |
| Total Beryllium (Be) | ug/L | <0.010 | 0.010 | A343687 | <0.010 | 0.010 | <0.020 | 0.020 | A343687 |
| Total Bismuth (Bi) | ug/L | <0.0050 | 0.0050 | A343687 | <0.0050 | 0.0050 | <0.010 | 0.010 | A343687 |
| Total Boron (B) | ug/L | <10 | 10 | A343687 | <10 | 10 | <20 | 20 | A343687 |
| Total Cadmium (Cd) | ug/L | 0.0058 | 0.0050 | A343687 | <0.0050 | 0.0050 | <0.010 | 0.010 | A343687 |
| Total Chromium (Cr) | ug/L | <0.10 | 0.10 | A343687 | 0.12 | 0.10 | <0.20 | 0.20 | A343687 |
| Total Cobalt (Co) | ug/L | 0.0259 | 0.0050 | A343687 | 0.0422 | 0.0050 | 0.032 | 0.010 | A343687 |
| Total Copper (Cu) | ug/L | 0.079 | 0.050 | A343687 | 0.064 | 0.050 | <0.10 | 0.10 | A343687 |
| Total Iron (Fe) | ug/L | 19.7 | 1.0 | A343687 | 29.1 | 1.0 | 2.7 | 2.0 | A343687 |
| Total Lead (Pb) | ug/L | 0.603 | 0.0050 | A343687 | 0.145 | 0.0050 | 0.036 | 0.010 | A343687 |
| Total Lithium (Li) | ug/L | 2.06 | 0.50 | A343687 | 3.84 | 0.50 | 6.4 | 1.0 | A343687 |
| Total Manganese (Mn) | ug/L | 3.55 | 0.050 | A343687 | 1.30 | 0.050 | 0.56 | 0.10 | A343687 |
| Total Molybdenum (Mo) | ug/L | 0.247 | 0.050 | A343687 | 0.250 | 0.050 | 0.85 | 0.10 | A343687 |
| Total Nickel (Ni) | ug/L | 0.164 | 0.020 | A343687 | 0.263 | 0.020 | 1.73 | 0.040 | A343687 |
| Total Selenium (Se) | ug/L | 0.830 | 0.040 | A343687 | 0.980 | 0.040 | 1.02 | 0.080 | A343687 |
| Total Silicon (Si) | ug/L | 2200 | 50 | A343687 | 2410 | 50 | 2190 | 100 | A343687 |
| Total Silver (Ag) | ug/L | <0.0050 | 0.0050 | A343687 | <0.0050 | 0.0050 | <0.010 | 0.010 | A343687 |
| Total Strontium (Sr) | ug/L | 299 | 0.050 | A343687 | 516 | 0.050 | 724 | 0.10 | A343687 |
| Total Tellurium (Te) | ug/L | <0.020 | 0.020 | A343687 | <0.020 | 0.020 | <0.040 | 0.040 | A343687 |
| Total Thallium (Tl) | ug/L | <0.0020 | 0.0020 | A343687 | <0.0020 | 0.0020 | <0.0040 | 0.0040 | A343687 |
| Total Thorium (Th) | ug/L | <0.0050 | 0.0050 | A343687 | 0.0059 | 0.0050 | <0.010 | 0.010 | A343687 |
| Total Tin (Sn) | ug/L | <0.20 | 0.20 | A343687 | <0.20 | 0.20 | <0.40 | 0.40 | A343687 |
| Total Titanium (Ti) | ug/L | <0.50 | 0.50 | A343687 | <0.50 | 0.50 | <1.0 | 1.0 | A343687 |
| Total Tungsten (W) | ug/L | <0.010 | 0.010 | A343687 | <0.010 | 0.010 | 0.187 | 0.020 | A343687 |
| Total Uranium (U) | ug/L | 2.83 | 0.0020 | A343687 | 7.59 | 0.0020 | 24.0 | 0.0040 | A343687 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFF264 | | | AFF265 | | AFF266 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 | | | 2021/09/01 10:45 | | 2021/09/01 11:15 | | |
| COC Number | | 644610-04-01 | | | 644610-04-01 | | 644610-04-01 | | |
| | UNITS | 2021T25-12 Lab-Dup | RDL | QC Batch | 2021T25-13 | RDL | 2021T25-14 | RDL | QC Batch |
| Total Vanadium (V) | ug/L | <0.20 | 0.20 | A343687 | <0.20 | 0.20 | <0.40 | 0.40 | A343687 |
| Total Zinc (Zn) | ug/L | 0.76 | 0.10 | A343687 | 1.14 | 0.10 | 1.93 | 0.20 | A343687 |
| Total Zirconium (Zr) | ug/L | <0.10 | 0.10 | A343687 | <0.10 | 0.10 | <0.20 | 0.20 | A343687 |
| Total Calcium (Ca) | mg/L | | | | 103 | 0.050 | 159 | 0.10 | A341601 |
| Total Magnesium (Mg) | mg/L | | | | 78.4 | 0.050 | 169 | 0.10 | A341601 |
| Total Potassium (K) | mg/L | | | | 0.464 | 0.050 | 0.54 | 0.10 | A341601 |
| Total Sodium (Na) | mg/L | | | | 0.510 | 0.050 | 0.43 | 0.10 | A341601 |
| Total Sulphur (S) | mg/L | | | | 122 | 3.0 | 268 | 6.0 | A341601 |

RDL = Reportable Detection Limit
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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFF267 | AFF268 | AFF269 | AFF270 | | AFF271 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 12:00 | 2021/09/01 11:45 | 2021/09/01 12:30 | 2021/09/01 13:15 | | 2021/09/01 14:15 | | |
| COC Number | | 644610-04-01 | 644610-04-01 | 644610-04-01 | 644610-04-01 | | 644610-04-01 | | |
| | **UNITS** | **2021T25-15** | **2021T25-16** | **2021T25-17** | **2021T25-18** | **QC Batch** | **2021T25-19** | **RDL** | **QC Batch** |
| **Dissolved Metals by ICPMS** | | | | | | | | | |
| Dissolved Aluminum (Al) | ug/L | 140 | 1.17 | 76.2 | 1.74 | A346416 | 228 | 0.50 | A346095 |
| Dissolved Antimony (Sb) | ug/L | 0.222 | <0.020 | 0.223 | 0.297 | A346416 | 0.218 | 0.020 | A346095 |
| Dissolved Arsenic (As) | ug/L | 4.83 | <0.020 | 6.50 | 0.345 | A346416 | 2.80 | 0.020 | A346095 |
| Dissolved Barium (Ba) | ug/L | 17.7 | <0.020 | 13.6 | 21.2 | A346416 | 24.8 | 0.020 | A346095 |
| Dissolved Beryllium (Be) | ug/L | <0.010 | <0.010 | <0.010 | <0.010 | A346416 | <0.010 | 0.010 | A346095 |
| Dissolved Bismuth (Bi) | ug/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | A346416 | <0.0050 | 0.0050 | A346095 |
| Dissolved Boron (B) | ug/L | <10 | <10 | <10 | <10 | A346416 | <10 | 10 | A346095 |
| Dissolved Cadmium (Cd) | ug/L | 0.244 | <0.0050 | 0.119 | <0.0050 | A346416 | 0.494 | 0.0050 | A346095 |
| Dissolved Chromium (Cr) | ug/L | <0.10 | <0.10 | <0.10 | <0.10 | A346416 | <0.10 | 0.10 | A346095 |
| Dissolved Cobalt (Co) | ug/L | 9.48 | <0.0050 | 8.10 | 0.0150 | A346416 | 14.1 | 0.0050 | A346095 |
| Dissolved Copper (Cu) | ug/L | 0.996 | <0.050 | 0.222 | <0.050 | A346416 | 1.62 | 0.050 | A346095 |
| Dissolved Iron (Fe) | ug/L | 6.3 | <1.0 | 18.5 | <1.0 | A346416 | <1.0 | 1.0 | A346095 |
| Dissolved Lead (Pb) | ug/L | 0.0097 | <0.0050 | 0.0106 | <0.0050 | A346416 | 0.0135 | 0.0050 | A346095 |
| Dissolved Lithium (Li) | ug/L | 2.77 | <0.50 | 2.29 | 3.63 | A346416 | 4.27 | 0.50 | A346095 |
| Dissolved Manganese (Mn) | ug/L | 268 | <0.050 | 72.8 | <0.050 | A346416 | 683 | 0.050 | A346095 |
| Dissolved Molybdenum (Mo) | ug/L | 0.221 | <0.050 | 0.230 | 0.279 | A346416 | 0.214 | 0.050 | A346095 |
| Dissolved Nickel (Ni) | ug/L | 14.2 | <0.020 | 5.54 | 0.049 | A346416 | 32.1 | 0.020 | A346095 |
| Dissolved Selenium (Se) | ug/L | 0.739 | <0.040 | 0.682 | 0.431 | A346416 | 0.853 | 0.040 | A346095 |
| Dissolved Silicon (Si) | ug/L | 2970 | <50 | 2750 | 2330 | A346416 | 3200 | 50 | A346095 |
| Dissolved Silver (Ag) | ug/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | A346416 | <0.0050 | 0.0050 | A346095 |
| Dissolved Strontium (Sr) | ug/L | 245 | <0.050 | 228 | 315 | A346416 | 269 | 0.050 | A346095 |
| Dissolved Tellurium (Te) | ug/L | <0.020 | <0.020 | <0.020 | <0.020 | A346416 | <0.020 | 0.020 | A346095 |
| Dissolved Thallium (Tl) | ug/L | <0.0020 | <0.0020 | <0.0020 | <0.0020 | A346416 | <0.0020 | 0.0020 | A346095 |
| Dissolved Thorium (Th) | ug/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | A346416 | <0.0050 | 0.0050 | A346095 |
| Dissolved Tin (Sn) | ug/L | <0.20 | <0.20 | <0.20 | <0.20 | A346416 | <0.20 | 0.20 | A346095 |
| Dissolved Titanium (Ti) | ug/L | <0.50 | <0.50 | <0.50 | <0.50 | A346416 | <0.50 | 0.50 | A346095 |
| Dissolved Tungsten (W) | ug/L | 0.053 | <0.010 | 0.091 | <0.010 | A346416 | <0.010 | 0.010 | A346095 |
| Dissolved Uranium (U) | ug/L | 1.65 | 0.0024 | 1.95 | 1.84 | A346416 | 1.15 | 0.0020 | A346095 |
| Dissolved Vanadium (V) | ug/L | <0.20 | <0.20 | <0.20 | <0.20 | A346416 | <0.20 | 0.20 | A346095 |
| Dissolved Zinc (Zn) | ug/L | 13.1 | 0.13 | 17.3 | 0.16 | A346416 | 10.7 | 0.10 | A346095 |
| Dissolved Zirconium (Zr) | ug/L | <0.10 | <0.10 | <0.10 | <0.10 | A346416 | <0.10 | 0.10 | A346095 |
| Dissolved Calcium (Ca) | mg/L | 81.9 | <0.050 | 78.6 | 43.4 | A342028 | 80.0 | 0.050 | A342028 |
| Dissolved Magnesium (Mg) | mg/L | 29.2 | <0.050 | 27.0 | 55.3 | A342028 | 34.6 | 0.050 | A342028 |

RDL = Reportable Detection Limit

## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFF267 | AFF268 | AFF269 | AFF270 | | AFF271 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 12:00 | 2021/09/01 11:45 | 2021/09/01 12:30 | 2021/09/01 13:15 | | 2021/09/01 14:15 | | |
| COC Number | | 644610-04-01 | 644610-04-01 | 644610-04-01 | 644610-04-01 | | 644610-04-01 | | |
| | UNITS | 2021T25-15 | 2021T25-16 | 2021T25-17 | 2021T25-18 | QC Batch | 2021T25-19 | RDL | QC Batch |
| Dissolved Potassium (K) | mg/L | 0.355 | <0.050 | 0.362 | 0.557 | A342028 | 0.378 | 0.050 | A342028 |
| Dissolved Sodium (Na) | mg/L | 0.874 | <0.050 | 0.962 | 0.620 | A342028 | 0.805 | 0.050 | A342028 |
| Dissolved Sulphur (S) | mg/L | 58.7 | <3.0 | 52.0 | 38.3 | A342028 | 74.9 | 3.0 | A342028 |
| **Total Metals by ICPMS** | | | | | | | | | |
| Total Aluminum (Al) | ug/L | 987 | 1.06 | 262 | 2.76 | A343687 | 2690 | 0.50 | A343687 |
| Total Antimony (Sb) | ug/L | 0.205 | <0.020 | 0.221 | 0.287 | A343687 | 0.216 | 0.020 | A343687 |
| Total Arsenic (As) | ug/L | 13.4 | <0.020 | 15.9 | 0.361 | A343687 | 13.4 | 0.020 | A343687 |
| Total Barium (Ba) | ug/L | 17.8 | <0.020 | 13.8 | 20.6 | A343687 | 25.3 | 0.020 | A343687 |
| Total Beryllium (Be) | ug/L | 0.080 | <0.010 | 0.016 | <0.010 | A343687 | 0.206 | 0.010 | A343687 |
| Total Bismuth (Bi) | ug/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | A343687 | <0.0050 | 0.0050 | A343687 |
| Total Boron (B) | ug/L | <10 | <10 | <10 | <10 | A343687 | <10 | 10 | A343687 |
| Total Cadmium (Cd) | ug/L | 0.344 | <0.0050 | 0.154 | <0.0050 | A343687 | 0.767 | 0.0050 | A343687 |
| Total Chromium (Cr) | ug/L | <0.10 | <0.10 | <0.10 | <0.10 | A343687 | <0.10 | 0.10 | A343687 |
| Total Cobalt (Co) | ug/L | 9.94 | <0.0050 | 7.98 | 0.0255 | A343687 | 15.4 | 0.0050 | A343687 |
| Total Copper (Cu) | ug/L | 6.51 | <0.050 | 0.757 | 0.052 | A343687 | 18.5 | 0.050 | A343687 |
| Total Iron (Fe) | ug/L | 375 | <1.0 | 592 | 15.5 | A343687 | 46.5 | 1.0 | A343687 |
| Total Lead (Pb) | ug/L | 0.229 | <0.0050 | 0.226 | 0.0392 | A343687 | 0.275 | 0.0050 | A343687 |
| Total Lithium (Li) | ug/L | 2.81 | <0.50 | 2.33 | 3.57 | A343687 | 4.06 | 0.50 | A343687 |
| Total Manganese (Mn) | ug/L | 266 | <0.050 | 69.1 | 0.741 | A343687 | 660 | 0.050 | A343687 |
| Total Molybdenum (Mo) | ug/L | 0.203 | <0.050 | 0.231 | 0.297 | A343687 | 0.195 | 0.050 | A343687 |
| Total Nickel (Ni) | ug/L | 14.6 | <0.020 | 5.55 | 0.071 | A343687 | 33.9 | 0.020 | A343687 |
| Total Selenium (Se) | ug/L | 0.744 | <0.040 | 0.747 | 0.473 | A343687 | 0.953 | 0.040 | A343687 |
| Total Silicon (Si) | ug/L | 2960 | <50 | 2830 | 2410 | A343687 | 3560 | 50 | A343687 |
| Total Silver (Ag) | ug/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | A343687 | <0.0050 | 0.0050 | A343687 |
| Total Strontium (Sr) | ug/L | 242 | 0.057 | 236 | 316 | A343687 | 269 | 0.050 | A343687 |
| Total Tellurium (Te) | ug/L | <0.020 | <0.020 | <0.020 | <0.020 | A343687 | <0.020 | 0.020 | A343687 |
| Total Thallium (Tl) | ug/L | <0.0020 | <0.0020 | <0.0020 | <0.0020 | A343687 | <0.0020 | 0.0020 | A343687 |
| Total Thorium (Th) | ug/L | 0.0084 | <0.0050 | 0.0052 | <0.0050 | A343687 | 0.0104 | 0.0050 | A343687 |
| Total Tin (Sn) | ug/L | <0.20 | <0.20 | <0.20 | <0.20 | A343687 | <0.20 | 0.20 | A343687 |
| Total Titanium (Ti) | ug/L | <0.50 | <0.50 | <0.50 | <0.50 | A343687 | <0.50 | 0.50 | A343687 |
| Total Tungsten (W) | ug/L | 0.051 | <0.010 | 0.089 | <0.010 | A343687 | <0.010 | 0.010 | A343687 |
| Total Uranium (U) | ug/L | 1.77 | <0.0020 | 1.92 | 1.76 | A343687 | 1.56 | 0.0020 | A343687 |
| Total Vanadium (V) | ug/L | <0.20 | <0.20 | <0.20 | <0.20 | A343687 | <0.20 | 0.20 | A343687 |
| Total Zinc (Zn) | ug/L | 52.2 | <0.10 | 39.4 | 0.20 | A343687 | 91.4 | 0.10 | A343687 |

RDL = Reportable Detection Limit



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFF267 | AFF268 | AFF269 | AFF270 | | AFF271 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 12:00 | 2021/09/01 11:45 | 2021/09/01 12:30 | 2021/09/01 13:15 | | 2021/09/01 14:15 | | |
| COC Number | | 644610-04-01 | 644610-04-01 | 644610-04-01 | 644610-04-01 | | 644610-04-01 | | |
| | **UNITS** | **2021T25-15** | **2021T25-16** | **2021T25-17** | **2021T25-18** | **QC Batch** | **2021T25-19** | **RDL** | **QC Batch** |
| Total Zirconium (Zr) | ug/L | <0.10 | <0.10 | <0.10 | <0.10 | A343687 | <0.10 | 0.10 | A343687 |
| Total Calcium (Ca) | mg/L | 78.6 | <0.050 | 78.4 | 42.7 | A341601 | 78.2 | 0.050 | A341601 |
| Total Magnesium (Mg) | mg/L | 28.0 | <0.050 | 25.9 | 52.4 | A341601 | 33.4 | 0.050 | A341601 |
| Total Potassium (K) | mg/L | 0.347 | <0.050 | 0.342 | 0.532 | A341601 | 0.371 | 0.050 | A341601 |
| Total Sodium (Na) | mg/L | 0.863 | <0.050 | 2.44 | 0.638 | A341601 | 0.774 | 0.050 | A341601 |
| Total Sulphur (S) | mg/L | 57.2 | <3.0 | 51.7 | 40.4 | A341601 | 75.6 | 3.0 | A341601 |
| RDL = Reportable Detection Limit | | | | | | | | | |



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFF271 | | | AFF272 | AFF273 | AFF274 | AFF275 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 14:15 | | | 2021/09/01 15:30 | 2021/09/01 15:30 | 2021/09/02 10:15 | 2021/09/02 11:00 | | |
| COC Number | | 644610-04-01 | | | 644610-04-01 | 644610-05-01 | 644610-05-01 | 644610-05-01 | | |
| | UNITS | 2021T25-19 Lab-Dup | RDL | QC Batch | 2021T25-20 | 2021T25-21 | 2021T25-22 | 2021T25-23 | RDL | QC Batch |
| **Dissolved Metals by ICPMS** | | | | | | | | | | |
| Dissolved Aluminum (Al) | ug/L | 233 | 0.50 | A346095 | 1.53 | 1.56 | 4.36 | 43.0 | 0.50 | A346095 |
| Dissolved Antimony (Sb) | ug/L | 0.214 | 0.020 | A346095 | 0.369 | 0.235 | 0.386 | 0.061 | 0.020 | A346095 |
| Dissolved Arsenic (As) | ug/L | 2.85 | 0.020 | A346095 | 37.6 | 202 | 12.3 | 0.992 | 0.020 | A346095 |
| Dissolved Barium (Ba) | ug/L | 25.0 | 0.020 | A346095 | 16.3 | 4.17 | 7.85 | 2.44 | 0.020 | A346095 |
| Dissolved Beryllium (Be) | ug/L | <0.010 | 0.010 | A346095 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | A346095 |
| Dissolved Bismuth (Bi) | ug/L | <0.0050 | 0.0050 | A346095 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | A346095 |
| Dissolved Boron (B) | ug/L | <10 | 10 | A346095 | <10 | <10 | <10 | <10 | 10 | A346095 |
| Dissolved Cadmium (Cd) | ug/L | 0.496 | 0.0050 | A346095 | 0.0085 | 0.143 | 0.0091 | 0.170 | 0.0050 | A346095 |
| Dissolved Chromium (Cr) | ug/L | <0.10 | 0.10 | A346095 | <0.10 | <0.10 | <0.10 | <0.10 | 0.10 | A346095 |
| Dissolved Cobalt (Co) | ug/L | 14.5 | 0.0050 | A346095 | 0.0258 | 0.236 | 0.0217 | 1.59 | 0.0050 | A346095 |
| Dissolved Copper (Cu) | ug/L | 1.65 | 0.050 | A346095 | 0.058 | 0.079 | 0.105 | 0.224 | 0.050 | A346095 |
| Dissolved Iron (Fe) | ug/L | <1.0 | 1.0 | A346095 | <1.0 | 4.8 | <1.0 | 2.3 | 1.0 | A346095 |
| Dissolved Lead (Pb) | ug/L | 0.0133 | 0.0050 | A346095 | <0.0050 | <0.0050 | 0.0061 | <0.0050 | 0.0050 | A346095 |
| Dissolved Lithium (Li) | ug/L | 4.15 | 0.50 | A346095 | 0.77 | 3.69 | 0.99 | 1.09 | 0.50 | A346095 |
| Dissolved Manganese (Mn) | ug/L | 683 | 0.050 | A346095 | 0.133 | 20.3 | 0.083 | 32.7 | 0.050 | A346095 |
| Dissolved Molybdenum (Mo) | ug/L | 0.235 | 0.050 | A346095 | 0.251 | 0.692 | 0.210 | 0.169 | 0.050 | A346095 |
| Dissolved Nickel (Ni) | ug/L | 32.7 | 0.020 | A346095 | 0.910 | 2.23 | 0.474 | 9.23 | 0.020 | A346095 |
| Dissolved Selenium (Se) | ug/L | 0.867 | 0.040 | A346095 | 1.80 | 0.638 | 0.339 | 0.058 | 0.040 | A346095 |
| Dissolved Silicon (Si) | ug/L | 3150 | 50 | A346095 | 1880 | 5570 | 1760 | 940 | 50 | A346095 |
| Dissolved Silver (Ag) | ug/L | <0.0050 | 0.0050 | A346095 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | A346095 |
| Dissolved Strontium (Sr) | ug/L | 263 | 0.050 | A346095 | 263 | 775 | 186 | 108 | 0.050 | A346095 |
| Dissolved Tellurium (Te) | ug/L | <0.020 | 0.020 | A346095 | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | A346095 |
| Dissolved Thallium (Tl) | ug/L | <0.0020 | 0.0020 | A346095 | <0.0020 | 0.0092 | <0.0020 | 0.0046 | 0.0020 | A346095 |
| Dissolved Thorium (Th) | ug/L | <0.0050 | 0.0050 | A346095 | <0.0050 | 0.0059 | <0.0050 | <0.0050 | 0.0050 | A346095 |
| Dissolved Tin (Sn) | ug/L | <0.20 | 0.20 | A346095 | <0.20 | <0.20 | <0.20 | <0.20 | 0.20 | A346095 |
| Dissolved Titanium (Ti) | ug/L | <0.50 | 0.50 | A346095 | <0.50 | <0.50 | <0.50 | <0.50 | 0.50 | A346095 |
| Dissolved Tungsten (W) | ug/L | <0.010 | 0.010 | A346095 | <0.010 | 0.012 | <0.010 | <0.010 | 0.010 | A346095 |
| Dissolved Uranium (U) | ug/L | 1.13 | 0.0020 | A346095 | 2.24 | 4.26 | 1.81 | 1.16 | 0.0020 | A346095 |
| Dissolved Vanadium (V) | ug/L | <0.20 | 0.20 | A346095 | <0.20 | <0.20 | <0.20 | <0.20 | 0.20 | A346095 |
| Dissolved Zinc (Zn) | ug/L | 11.0 | 0.10 | A346095 | 1.20 | 47.2 | 0.56 | 7.04 | 0.10 | A346095 |
| Dissolved Zirconium (Zr) | ug/L | <0.10 | 0.10 | A346095 | <0.10 | <0.10 | <0.10 | <0.10 | 0.10 | A346095 |
| Dissolved Calcium (Ca) | mg/L | | | | 94.4 | 188 | 67.8 | 35.8 | 0.050 | A342028 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFF271 | | | AFF272 | AFF273 | AFF274 | AFF275 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 14:15 | | | 2021/09/01 15:30 | 2021/09/01 15:30 | 2021/09/02 10:15 | 2021/09/02 11:00 | | |
| COC Number | | 644610-04-01 | | | 644610-04-01 | 644610-05-01 | 644610-05-01 | 644610-05-01 | | |
| | **UNITS** | **2021T25-19 Lab-Dup** | **RDL** | **QC Batch** | **2021T25-20** | **2021T25-21** | **2021T25-22** | **2021T25-23** | **RDL** | **QC Batch** |
| Dissolved Magnesium (Mg) | mg/L | | | | 33.2 | 42.4 | 17.8 | 11.5 | 0.050 | A342028 |
| Dissolved Potassium (K) | mg/L | | | | 0.288 | 0.990 | 0.151 | 0.120 | 0.050 | A342028 |
| Dissolved Sodium (Na) | mg/L | | | | 0.539 | 3.52 | 0.305 | 0.164 | 0.050 | A342028 |
| Dissolved Sulphur (S) | mg/L | | | | 83.4 | 144 | 32.2 | 20.9 | 3.0 | A342028 |
| **Total Metals by ICPMS** | | | | | | | | | | |
| Total Aluminum (Al) | ug/L | | | | 4.09 | 3.22 | 5.54 | 63.6 | 0.50 | A343687 |
| Total Antimony (Sb) | ug/L | | | | 0.377 | 0.241 | 0.399 | 0.051 | 0.020 | A343687 |
| Total Arsenic (As) | ug/L | | | | 39.7 | 269 | 13.0 | 2.05 | 0.020 | A343687 |
| Total Barium (Ba) | ug/L | | | | 15.8 | 4.11 | 7.47 | 2.44 | 0.020 | A343687 |
| Total Beryllium (Be) | ug/L | | | | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | A343687 |
| Total Bismuth (Bi) | ug/L | | | | <0.0050 | 0.0059 | <0.0050 | <0.0050 | 0.0050 | A343687 |
| Total Boron (B) | ug/L | | | | <10 | <10 | <10 | <10 | 10 | A343687 |
| Total Cadmium (Cd) | ug/L | | | | 0.0065 | 0.154 | 0.0091 | 0.165 | 0.0050 | A343687 |
| Total Chromium (Cr) | ug/L | | | | <0.10 | <0.10 | <0.10 | <0.10 | 0.10 | A343687 |
| Total Cobalt (Co) | ug/L | | | | 0.0309 | 0.250 | 0.0213 | 1.46 | 0.0050 | A343687 |
| Total Copper (Cu) | ug/L | | | | 0.107 | 0.158 | 0.165 | 0.405 | 0.050 | A343687 |
| Total Iron (Fe) | ug/L | | | | 13.3 | 256 | 7.8 | 82.1 | 1.0 | A343687 |
| Total Lead (Pb) | ug/L | | | | 0.0198 | 0.0056 | 0.0348 | 0.0297 | 0.0050 | A343687 |
| Total Lithium (Li) | ug/L | | | | 0.75 | 3.48 | 0.92 | 1.08 | 0.50 | A343687 |
| Total Manganese (Mn) | ug/L | | | | 0.565 | 20.5 | 0.650 | 30.2 | 0.050 | A343687 |
| Total Molybdenum (Mo) | ug/L | | | | 0.211 | 0.685 | 0.243 | 0.156 | 0.050 | A343687 |
| Total Nickel (Ni) | ug/L | | | | 0.843 | 2.13 | 0.415 | 8.64 | 0.020 | A343687 |
| Total Selenium (Se) | ug/L | | | | 1.95 | 0.611 | 0.352 | 0.074 | 0.040 | A343687 |
| Total Silicon (Si) | ug/L | | | | 1980 | 5290 | 1700 | 924 | 50 | A343687 |
| Total Silver (Ag) | ug/L | | | | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0050 | A343687 |
| Total Strontium (Sr) | ug/L | | | | 253 | 754 | 175 | 108 | 0.050 | A343687 |
| Total Tellurium (Te) | ug/L | | | | <0.020 | <0.020 | <0.020 | <0.020 | 0.020 | A343687 |
| Total Thallium (Tl) | ug/L | | | | <0.0020 | 0.0092 | <0.0020 | 0.0034 | 0.0020 | A343687 |
| Total Thorium (Th) | ug/L | | | | <0.0050 | <0.0050 | <0.0050 | 0.0060 | 0.0050 | A343687 |
| Total Tin (Sn) | ug/L | | | | <0.20 | <0.20 | <0.20 | <0.20 | 0.20 | A343687 |
| Total Titanium (Ti) | ug/L | | | | <0.50 | <0.50 | <0.50 | <0.50 | 0.50 | A343687 |
| Total Tungsten (W) | ug/L | | | | <0.010 | 0.010 | <0.010 | <0.010 | 0.010 | A343687 |
| Total Uranium (U) | ug/L | | | | 2.09 | 4.03 | 1.69 | 1.13 | 0.0020 | A343687 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFF271 | | | AFF272 | AFF273 | AFF274 | AFF275 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/01 14:15 | | | 2021/09/01 15:30 | 2021/09/01 15:30 | 2021/09/02 10:15 | 2021/09/02 11:00 | | |
| COC Number | | 644610-04-01 | | | 644610-04-01 | 644610-05-01 | 644610-05-01 | 644610-05-01 | | |
| | **UNITS** | **2021T25-19 Lab-Dup** | **RDL** | **QC Batch** | **2021T25-20** | **2021T25-21** | **2021T25-22** | **2021T25-23** | **RDL** | **QC Batch** |
| Total Vanadium (V) | ug/L | | | | <0.20 | <0.20 | <0.20 | <0.20 | 0.20 | A343687 |
| Total Zinc (Zn) | ug/L | | | | 1.17 | 50.7 | 1.47 | 9.47 | 0.10 | A343687 |
| Total Zirconium (Zr) | ug/L | | | | <0.10 | <0.10 | <0.10 | <0.10 | 0.10 | A343687 |
| Total Calcium (Ca) | mg/L | | | | 90.9 | 183 | 62.8 | 34.8 | 0.050 | A341601 |
| Total Magnesium (Mg) | mg/L | | | | 29.8 | 40.7 | 16.5 | 10.5 | 0.050 | A341601 |
| Total Potassium (K) | mg/L | | | | 0.258 | 0.943 | 0.135 | 0.112 | 0.050 | A341601 |
| Total Sodium (Na) | mg/L | | | | 0.511 | 3.29 | 0.275 | 0.145 | 0.050 | A341601 |
| Total Sulphur (S) | mg/L | | | | 82.3 | 147 | 31.7 | 21.4 | 3.0 | A341601 |

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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFF276 | | | AFF276 | | | AFF277 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/02 11:15 | | | 2021/09/02 11:15 | | | 2021/09/02 12:00 | | |
| COC Number | | 644610-05-01 | | | 644610-05-01 | | | 644610-05-01 | | |
| | UNITS | 2021T25-24 | RDL | QC Batch | 2021T25-24 Lab-Dup | RDL | QC Batch | 2021T25-25 | RDL | QC Batch |
| **Dissolved Metals by ICPMS** | | | | | | | | | | |
| Dissolved Aluminum (Al) | ug/L | 48.0 | 0.50 | A351252 | | | | <0.50 | 0.50 | A346095 |
| Dissolved Antimony (Sb) | ug/L | 0.049 | 0.020 | A351252 | | | | <0.020 | 0.020 | A346095 |
| Dissolved Arsenic (As) | ug/L | 1.27 | 0.020 | A351252 | | | | <0.020 | 0.020 | A346095 |
| Dissolved Barium (Ba) | ug/L | 2.58 | 0.020 | A351252 | | | | <0.020 | 0.020 | A346095 |
| Dissolved Beryllium (Be) | ug/L | <0.010 | 0.010 | A351252 | | | | <0.010 | 0.010 | A346095 |
| Dissolved Bismuth (Bi) | ug/L | <0.0050 | 0.0050 | A351252 | | | | <0.0050 | 0.0050 | A346095 |
| Dissolved Boron (B) | ug/L | <10 | 10 | A351252 | | | | <10 | 10 | A346095 |
| Dissolved Cadmium (Cd) | ug/L | 0.159 | 0.0050 | A351252 | | | | <0.0050 | 0.0050 | A346095 |
| Dissolved Chromium (Cr) | ug/L | <0.10 | 0.10 | A351252 | | | | <0.10 | 0.10 | A346095 |
| Dissolved Cobalt (Co) | ug/L | 1.56 | 0.0050 | A351252 | | | | <0.0050 | 0.0050 | A346095 |
| Dissolved Copper (Cu) | ug/L | 0.147 | 0.050 | A351252 | | | | <0.050 | 0.050 | A346095 |
| Dissolved Iron (Fe) | ug/L | 1.1 | 1.0 | A351252 | | | | <1.0 | 1.0 | A346095 |
| Dissolved Lead (Pb) | ug/L | <0.0050 | 0.0050 | A351252 | | | | <0.0050 | 0.0050 | A346095 |
| Dissolved Lithium (Li) | ug/L | 1.02 | 0.50 | A351252 | | | | <0.50 | 0.50 | A346095 |
| Dissolved Manganese (Mn) | ug/L | 31.0 | 0.050 | A351252 | | | | <0.050 | 0.050 | A346095 |
| Dissolved Molybdenum (Mo) | ug/L | 0.173 | 0.050 | A351252 | | | | <0.050 | 0.050 | A346095 |
| Dissolved Nickel (Ni) | ug/L | 9.01 | 0.020 | A351252 | | | | <0.020 | 0.020 | A346095 |
| Dissolved Selenium (Se) | ug/L | 0.060 | 0.040 | A351252 | | | | <0.040 | 0.040 | A346095 |
| Dissolved Silicon (Si) | ug/L | 894 | 50 | A351252 | | | | <50 | 50 | A346095 |
| Dissolved Silver (Ag) | ug/L | <0.0050 | 0.0050 | A351252 | | | | <0.0050 | 0.0050 | A346095 |
| Dissolved Strontium (Sr) | ug/L | 112 | 0.050 | A351252 | | | | 0.058 | 0.050 | A346095 |
| Dissolved Tellurium (Te) | ug/L | <0.020 | 0.020 | A351252 | | | | <0.020 | 0.020 | A346095 |
| Dissolved Thallium (Tl) | ug/L | 0.0028 | 0.0020 | A351252 | | | | <0.0020 | 0.0020 | A346095 |
| Dissolved Thorium (Th) | ug/L | <0.0050 | 0.0050 | A351252 | | | | <0.0050 | 0.0050 | A346095 |
| Dissolved Tin (Sn) | ug/L | <0.20 | 0.20 | A351252 | | | | <0.20 | 0.20 | A346095 |
| Dissolved Titanium (Ti) | ug/L | <0.50 | 0.50 | A351252 | | | | <0.50 | 0.50 | A346095 |
| Dissolved Tungsten (W) | ug/L | <0.010 | 0.010 | A351252 | | | | <0.010 | 0.010 | A346095 |
| Dissolved Uranium (U) | ug/L | 1.12 | 0.0020 | A351252 | | | | <0.0020 | 0.0020 | A346095 |
| Dissolved Vanadium (V) | ug/L | <0.20 | 0.20 | A351252 | | | | <0.20 | 0.20 | A346095 |
| Dissolved Zinc (Zn) | ug/L | 5.76 | 0.10 | A351252 | | | | 0.17 | 0.10 | A346095 |
| Dissolved Zirconium (Zr) | ug/L | <0.10 | 0.10 | A351252 | | | | <0.10 | 0.10 | A346095 |
| Dissolved Calcium (Ca) | mg/L | 34.3 | 0.050 | A342028 | | | | <0.050 | 0.050 | A342028 |

RDL = Reportable Detection Limit
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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFF276 | | | AFF276 | | | AFF277 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/02 11:15 | | | 2021/09/02 11:15 | | | 2021/09/02 12:00 | | |
| COC Number | | 644610-05-01 | | | 644610-05-01 | | | 644610-05-01 | | |
| | UNITS | 2021T25-24 | RDL | QC Batch | 2021T25-24 Lab-Dup | RDL | QC Batch | 2021T25-25 | RDL | QC Batch |
| Dissolved Magnesium (Mg) | mg/L | 11.0 | 0.050 | A342028 | | | | <0.050 | 0.050 | A342028 |
| Dissolved Potassium (K) | mg/L | 0.111 | 0.050 | A342028 | | | | <0.050 | 0.050 | A342028 |
| Dissolved Sodium (Na) | mg/L | 0.154 | 0.050 | A342028 | | | | <0.050 | 0.050 | A342028 |
| Dissolved Sulphur (S) | mg/L | 21.4 | 3.0 | A342028 | | | | <3.0 | 3.0 | A342028 |
| **Total Metals by ICPMS** | | | | | | | | | | |
| Total Aluminum (Al) | ug/L | 70.7 | 0.50 | A347639 | 68.0 | 0.50 | A347639 | <0.50 | 0.50 | A343687 |
| Total Antimony (Sb) | ug/L | 0.056 | 0.020 | A347639 | 0.050 | 0.020 | A347639 | <0.020 | 0.020 | A343687 |
| Total Arsenic (As) | ug/L | 1.84 | 0.020 | A347639 | 1.79 | 0.020 | A347639 | <0.020 | 0.020 | A343687 |
| Total Barium (Ba) | ug/L | 2.75 | 0.020 | A347639 | 2.75 | 0.020 | A347639 | <0.020 | 0.020 | A343687 |
| Total Beryllium (Be) | ug/L | <0.010 | 0.010 | A347639 | <0.010 | 0.010 | A347639 | <0.010 | 0.010 | A343687 |
| Total Bismuth (Bi) | ug/L | <0.0050 | 0.0050 | A347639 | <0.0050 | 0.0050 | A347639 | <0.0050 | 0.0050 | A343687 |
| Total Boron (B) | ug/L | <10 | 10 | A347639 | <10 | 10 | A347639 | <10 | 10 | A343687 |
| Total Cadmium (Cd) | ug/L | 0.183 | 0.0050 | A347639 | 0.175 | 0.0050 | A347639 | <0.0050 | 0.0050 | A343687 |
| Total Chromium (Cr) | ug/L | <0.10 | 0.10 | A347639 | <0.10 | 0.10 | A347639 | <0.10 | 0.10 | A343687 |
| Total Cobalt (Co) | ug/L | 1.78 | 0.0050 | A347639 | 1.75 | 0.0050 | A347639 | <0.0050 | 0.0050 | A343687 |
| Total Copper (Cu) | ug/L | 0.372 | 0.050 | A347639 | 0.390 | 0.050 | A347639 | <0.050 | 0.050 | A343687 |
| Total Iron (Fe) | ug/L | 80.4 | 1.0 | A347639 | 81.2 | 1.0 | A347639 | <1.0 | 1.0 | A343687 |
| Total Lead (Pb) | ug/L | 0.0277 | 0.0050 | A347639 | 0.0270 | 0.0050 | A347639 | <0.0050 | 0.0050 | A343687 |
| Total Lithium (Li) | ug/L | 1.14 | 0.50 | A347639 | 1.11 | 0.50 | A347639 | <0.50 | 0.50 | A343687 |
| Total Manganese (Mn) | ug/L | 36.5 | 0.050 | A347639 | 36.2 | 0.050 | A347639 | <0.050 | 0.050 | A343687 |
| Total Molybdenum (Mo) | ug/L | 0.175 | 0.050 | A347639 | 0.156 | 0.050 | A347639 | <0.050 | 0.050 | A343687 |
| Total Nickel (Ni) | ug/L | 9.67 | 0.020 | A347639 | 9.39 | 0.020 | A347639 | <0.020 | 0.020 | A343687 |
| Total Selenium (Se) | ug/L | 0.072 | 0.040 | A347639 | 0.063 | 0.040 | A347639 | <0.040 | 0.040 | A343687 |
| Total Silicon (Si) | ug/L | 1020 | 50 | A347639 | 1020 | 50 | A347639 | <50 | 50 | A343687 |
| Total Silver (Ag) | ug/L | <0.0050 | 0.0050 | A347639 | <0.0050 | 0.0050 | A347639 | <0.0050 | 0.0050 | A343687 |
| Total Strontium (Sr) | ug/L | 117 | 0.050 | A347639 | 115 | 0.050 | A347639 | 0.059 | 0.050 | A343687 |
| Total Tellurium (Te) | ug/L | <0.020 | 0.020 | A347639 | <0.020 | 0.020 | A347639 | <0.020 | 0.020 | A343687 |
| Total Thallium (Tl) | ug/L | 0.0057 | 0.0020 | A347639 | 0.0054 | 0.0020 | A347639 | <0.0020 | 0.0020 | A343687 |
| Total Thorium (Th) | ug/L | 0.0071 | 0.0050 | A347639 | 0.0074 | 0.0050 | A347639 | <0.0050 | 0.0050 | A343687 |
| Total Tin (Sn) | ug/L | <0.20 | 0.20 | A347639 | <0.20 | 0.20 | A347639 | <0.20 | 0.20 | A343687 |
| Total Titanium (Ti) | ug/L | <0.50 | 0.50 | A347639 | <0.50 | 0.50 | A347639 | <0.50 | 0.50 | A343687 |
| Total Tungsten (W) | ug/L | 0.029 | 0.010 | A347639 | 0.032 | 0.010 | A347639 | <0.010 | 0.010 | A343687 |
| Total Uranium (U) | ug/L | 1.22 | 0.0020 | A347639 | 1.21 | 0.0020 | A347639 | <0.0020 | 0.0020 | A343687 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate



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## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| BV Labs ID | | AFF276 | | | AFF276 | | | AFF277 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021/09/02 11:15 | | | 2021/09/02 11:15 | | | 2021/09/02 12:00 | | |
| COC Number | | 644610-05-01 | | | 644610-05-01 | | | 644610-05-01 | | |
| | UNITS | 2021T25-24 | RDL | QC Batch | 2021T25-24 Lab-Dup | RDL | QC Batch | 2021T25-25 | RDL | QC Batch |
| Total Vanadium (V) | ug/L | <0.20 | 0.20 | A347639 | <0.20 | 0.20 | A347639 | <0.20 | 0.20 | A343687 |
| Total Zinc (Zn) | ug/L | 9.63 | 0.10 | A347639 | 9.31 | 0.10 | A347639 | 0.81 | 0.10 | A349611 |
| Total Zirconium (Zr) | ug/L | <0.10 | 0.10 | A347639 | <0.10 | 0.10 | A347639 | <0.10 | 0.10 | A343687 |
| Total Calcium (Ca) | mg/L | 36.7 | 0.050 | A341601 | | | | <0.050 | 0.050 | A341601 |
| Total Magnesium (Mg) | mg/L | 11.4 | 0.050 | A341601 | | | | <0.050 | 0.050 | A341601 |
| Total Potassium (K) | mg/L | 0.125 | 0.050 | A341601 | | | | <0.050 | 0.050 | A341601 |
| Total Sodium (Na) | mg/L | 0.154 | 0.050 | A341601 | | | | <0.050 | 0.050 | A341601 |
| Total Sulphur (S) | mg/L | 21.9 | 3.0 | A341601 | | | | <3.0 | 3.0 | A341601 |

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate



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## GENERAL COMMENTS

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

| | |
|---|---|
| Package 1 | 6.0°C |
| Package 2 | 4.0°C |
| Package 3 | 7.0°C |

Sample AFF268 [2021T25-16] : Sample was analyzed past method specified hold time for Total Dissolved Solids - Low Level. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample AFF276 [2021T25-24] : The sample for dissolved metals was filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling.

Sample AFF277 [2021T25-25] : Sample was analyzed past method specified hold time for Total Dissolved Solids - Low Level. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample AFF277, Elements by ICPMS Low Level (total): Test repeated.

**Results relate only to the items tested.**



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## QUALITY ASSURANCE REPORT

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| A342326 | TSO | Matrix Spike [AFF264-02] | Nitrate plus Nitrite (N) | 2021/09/04 | | 102 | % | 80 - 120 |
| A342326 | TSO | Spiked Blank | Nitrate plus Nitrite (N) | 2021/09/04 | | 105 | % | 80 - 120 |
| A342326 | TSO | Method Blank | Nitrate plus Nitrite (N) | 2021/09/04 | <0.0020 | | mg/L | |
| A342326 | TSO | RPD [AFF264-02] | Nitrate plus Nitrite (N) | 2021/09/04 | 1.0 | | % | 25 |
| A342330 | TSO | Matrix Spike [AFF264-02] | Nitrite (N) | 2021/09/04 | | 100 | % | 80 - 120 |
| A342330 | TSO | Spiked Blank | Nitrite (N) | 2021/09/04 | | 102 | % | 80 - 120 |
| A342330 | TSO | Method Blank | Nitrite (N) | 2021/09/04 | <0.0020 | | mg/L | |
| A342330 | TSO | RPD [AFF264-02] | Nitrite (N) | 2021/09/04 | NC | | % | 25 |
| A343127 | CJY | Matrix Spike | Dissolved Mercury (Hg) | 2021/09/07 | | 93 | % | 80 - 120 |
| A343127 | CJY | Spiked Blank | Dissolved Mercury (Hg) | 2021/09/07 | | 83 | % | 80 - 120 |
| A343127 | CJY | Method Blank | Dissolved Mercury (Hg) | 2021/09/07 | <0.0019 | | ug/L | |
| A343127 | CJY | RPD | Dissolved Mercury (Hg) | 2021/09/07 | NC | | % | 20 |
| A343687 | AA1 | Matrix Spike [AFF264-03] | Total Aluminum (Al) | 2021/09/08 | | 100 | % | 80 - 120 |
| | | | Total Antimony (Sb) | 2021/09/08 | | 105 | % | 80 - 120 |
| | | | Total Arsenic (As) | 2021/09/08 | | 109 | % | 80 - 120 |
| | | | Total Barium (Ba) | 2021/09/08 | | 99 | % | 80 - 120 |
| | | | Total Beryllium (Be) | 2021/09/08 | | 100 | % | 80 - 120 |
| | | | Total Bismuth (Bi) | 2021/09/08 | | 92 | % | 80 - 120 |
| | | | Total Boron (B) | 2021/09/08 | | 94 | % | 80 - 120 |
| | | | Total Cadmium (Cd) | 2021/09/08 | | 103 | % | 80 - 120 |
| | | | Total Chromium (Cr) | 2021/09/08 | | 97 | % | 80 - 120 |
| | | | Total Cobalt (Co) | 2021/09/08 | | 93 | % | 80 - 120 |
| | | | Total Copper (Cu) | 2021/09/08 | | 90 | % | 80 - 120 |
| | | | Total Iron (Fe) | 2021/09/08 | | 101 | % | 80 - 120 |
| | | | Total Lead (Pb) | 2021/09/08 | | 103 | % | 80 - 120 |
| | | | Total Lithium (Li) | 2021/09/08 | | 97 | % | 80 - 120 |
| | | | Total Manganese (Mn) | 2021/09/08 | | 96 | % | 80 - 120 |
| | | | Total Molybdenum (Mo) | 2021/09/08 | | 108 | % | 80 - 120 |
| | | | Total Nickel (Ni) | 2021/09/08 | | 92 | % | 80 - 120 |
| | | | Total Selenium (Se) | 2021/09/08 | | 112 | % | 80 - 120 |
| | | | Total Silicon (Si) | 2021/09/08 | | 106 | % | 80 - 120 |
| | | | Total Silver (Ag) | 2021/09/08 | | 96 | % | 80 - 120 |
| | | | Total Strontium (Sr) | 2021/09/08 | | NC | % | 80 - 120 |
| | | | Total Tellurium (Te) | 2021/09/08 | | 104 | % | 80 - 120 |
| | | | Total Thallium (Tl) | 2021/09/08 | | 103 | % | 80 - 120 |
| | | | Total Thorium (Th) | 2021/09/08 | | 103 | % | 80 - 120 |
| | | | Total Tin (Sn) | 2021/09/08 | | 104 | % | 80 - 120 |
| | | | Total Titanium (Ti) | 2021/09/08 | | 101 | % | 80 - 120 |
| | | | Total Tungsten (W) | 2021/09/08 | | 102 | % | 80 - 120 |
| | | | Total Uranium (U) | 2021/09/08 | | 105 | % | 80 - 120 |
| | | | Total Vanadium (V) | 2021/09/08 | | 100 | % | 80 - 120 |
| | | | Total Zinc (Zn) | 2021/09/08 | | 99 | % | 80 - 120 |
| | | | Total Zirconium (Zr) | 2021/09/08 | | 109 | % | 80 - 120 |
| A343687 | AA1 | Spiked Blank | Total Aluminum (Al) | 2021/09/08 | | 99 | % | 80 - 120 |
| | | | Total Antimony (Sb) | 2021/09/08 | | 100 | % | 80 - 120 |
| | | | Total Arsenic (As) | 2021/09/08 | | 100 | % | 80 - 120 |
| | | | Total Barium (Ba) | 2021/09/08 | | 98 | % | 80 - 120 |
| | | | Total Beryllium (Be) | 2021/09/08 | | 99 | % | 80 - 120 |
| | | | Total Bismuth (Bi) | 2021/09/08 | | 97 | % | 80 - 120 |
| | | | Total Boron (B) | 2021/09/08 | | 99 | % | 80 - 120 |
| | | | Total Cadmium (Cd) | 2021/09/08 | | 99 | % | 80 - 120 |
| | | | Total Chromium (Cr) | 2021/09/08 | | 97 | % | 80 - 120 |
| | | | Total Cobalt (Co) | 2021/09/08 | | 96 | % | 80 - 120 |
| | | | Total Copper (Cu) | 2021/09/08 | | 96 | % | 80 - 120 |
| | | | Total Iron (Fe) | 2021/09/08 | | 101 | % | 80 - 120 |



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## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Total Lead (Pb) | 2021/09/08 | | 99 | % | 80 - 120 |
| | | | Total Lithium (Li) | 2021/09/08 | | 96 | % | 80 - 120 |
| | | | Total Manganese (Mn) | 2021/09/08 | | 98 | % | 80 - 120 |
| | | | Total Molybdenum (Mo) | 2021/09/08 | | 102 | % | 80 - 120 |
| | | | Total Nickel (Ni) | 2021/09/08 | | 98 | % | 80 - 120 |
| | | | Total Selenium (Se) | 2021/09/08 | | 99 | % | 80 - 120 |
| | | | Total Silicon (Si) | 2021/09/08 | | 102 | % | 80 - 120 |
| | | | Total Silver (Ag) | 2021/09/08 | | 98 | % | 80 - 120 |
| | | | Total Strontium (Sr) | 2021/09/08 | | 100 | % | 80 - 120 |
| | | | Total Tellurium (Te) | 2021/09/08 | | 98 | % | 80 - 120 |
| | | | Total Thallium (Tl) | 2021/09/08 | | 96 | % | 80 - 120 |
| | | | Total Thorium (Th) | 2021/09/08 | | 96 | % | 80 - 120 |
| | | | Total Tin (Sn) | 2021/09/08 | | 99 | % | 80 - 120 |
| | | | Total Titanium (Ti) | 2021/09/08 | | 100 | % | 80 - 120 |
| | | | Total Tungsten (W) | 2021/09/08 | | 99 | % | 80 - 120 |
| | | | Total Uranium (U) | 2021/09/08 | | 101 | % | 80 - 120 |
| | | | Total Vanadium (V) | 2021/09/08 | | 99 | % | 80 - 120 |
| | | | Total Zinc (Zn) | 2021/09/08 | | 99 | % | 80 - 120 |
| | | | Total Zirconium (Zr) | 2021/09/08 | | 100 | % | 80 - 120 |
| A343687 | AA1 | Method Blank | Total Aluminum (Al) | 2021/09/08 | <0.50 | | ug/L | |
| | | | Total Antimony (Sb) | 2021/09/08 | <0.020 | | ug/L | |
| | | | Total Arsenic (As) | 2021/09/08 | <0.020 | | ug/L | |
| | | | Total Barium (Ba) | 2021/09/08 | <0.020 | | ug/L | |
| | | | Total Beryllium (Be) | 2021/09/08 | <0.010 | | ug/L | |
| | | | Total Bismuth (Bi) | 2021/09/08 | <0.0050 | | ug/L | |
| | | | Total Boron (B) | 2021/09/08 | <10 | | ug/L | |
| | | | Total Cadmium (Cd) | 2021/09/08 | <0.0050 | | ug/L | |
| | | | Total Chromium (Cr) | 2021/09/08 | <0.10 | | ug/L | |
| | | | Total Cobalt (Co) | 2021/09/08 | <0.0050 | | ug/L | |
| | | | Total Copper (Cu) | 2021/09/08 | <0.050 | | ug/L | |
| | | | Total Iron (Fe) | 2021/09/08 | <1.0 | | ug/L | |
| | | | Total Lead (Pb) | 2021/09/08 | <0.0050 | | ug/L | |
| | | | Total Lithium (Li) | 2021/09/08 | <0.50 | | ug/L | |
| | | | Total Manganese (Mn) | 2021/09/08 | <0.050 | | ug/L | |
| | | | Total Molybdenum (Mo) | 2021/09/08 | <0.050 | | ug/L | |
| | | | Total Nickel (Ni) | 2021/09/08 | <0.020 | | ug/L | |
| | | | Total Selenium (Se) | 2021/09/08 | <0.040 | | ug/L | |
| | | | Total Silicon (Si) | 2021/09/08 | <50 | | ug/L | |
| | | | Total Silver (Ag) | 2021/09/08 | <0.0050 | | ug/L | |
| | | | Total Strontium (Sr) | 2021/09/08 | <0.050 | | ug/L | |
| | | | Total Tellurium (Te) | 2021/09/08 | <0.020 | | ug/L | |
| | | | Total Thallium (Tl) | 2021/09/08 | <0.0020 | | ug/L | |
| | | | Total Thorium (Th) | 2021/09/08 | <0.0050 | | ug/L | |
| | | | Total Tin (Sn) | 2021/09/08 | <0.20 | | ug/L | |
| | | | Total Titanium (Ti) | 2021/09/08 | <0.50 | | ug/L | |
| | | | Total Tungsten (W) | 2021/09/08 | <0.010 | | ug/L | |
| | | | Total Uranium (U) | 2021/09/08 | <0.0020 | | ug/L | |
| | | | Total Vanadium (V) | 2021/09/08 | <0.20 | | ug/L | |
| | | | Total Zinc (Zn) | 2021/09/08 | <0.10 | | ug/L | |
| | | | Total Zirconium (Zr) | 2021/09/08 | <0.10 | | ug/L | |
| A343687 | AA1 | RPD [AFF264-03] | Total Aluminum (Al) | 2021/09/08 | 0.27 | | % | 20 |
| | | | Total Antimony (Sb) | 2021/09/08 | 2.3 | | % | 20 |
| | | | Total Arsenic (As) | 2021/09/08 | 0.72 | | % | 20 |
| | | | Total Barium (Ba) | 2021/09/08 | 2.6 | | % | 20 |
| | | | Total Beryllium (Be) | 2021/09/08 | NC | | % | 20 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Total Bismuth (Bi) | 2021/09/08 | NC | | % | 20 |
| | | | Total Boron (B) | 2021/09/08 | NC | | % | 20 |
| | | | Total Cadmium (Cd) | 2021/09/08 | 0.69 | | % | 20 |
| | | | Total Chromium (Cr) | 2021/09/08 | NC | | % | 20 |
| | | | Total Cobalt (Co) | 2021/09/08 | 17 | | % | 20 |
| | | | Total Copper (Cu) | 2021/09/08 | 0.83 | | % | 20 |
| | | | Total Iron (Fe) | 2021/09/08 | 0.46 | | % | 20 |
| | | | Total Lead (Pb) | 2021/09/08 | 0.35 | | % | 20 |
| | | | Total Lithium (Li) | 2021/09/08 | 0.25 | | % | 20 |
| | | | Total Manganese (Mn) | 2021/09/08 | 4.1 | | % | 20 |
| | | | Total Molybdenum (Mo) | 2021/09/08 | 0.38 | | % | 20 |
| | | | Total Nickel (Ni) | 2021/09/08 | 14 | | % | 20 |
| | | | Total Selenium (Se) | 2021/09/08 | 4.0 | | % | 20 |
| | | | Total Silicon (Si) | 2021/09/08 | 2.5 | | % | 20 |
| | | | Total Silver (Ag) | 2021/09/08 | NC | | % | 20 |
| | | | Total Strontium (Sr) | 2021/09/08 | 1.4 | | % | 20 |
| | | | Total Tellurium (Te) | 2021/09/08 | NC | | % | 20 |
| | | | Total Thallium (Tl) | 2021/09/08 | NC | | % | 20 |
| | | | Total Thorium (Th) | 2021/09/08 | NC | | % | 20 |
| | | | Total Tin (Sn) | 2021/09/08 | NC | | % | 20 |
| | | | Total Titanium (Ti) | 2021/09/08 | NC | | % | 20 |
| | | | Total Tungsten (W) | 2021/09/08 | NC | | % | 20 |
| | | | Total Uranium (U) | 2021/09/08 | 0.67 | | % | 20 |
| | | | Total Vanadium (V) | 2021/09/08 | NC | | % | 20 |
| | | | Total Zinc (Zn) | 2021/09/08 | 4.6 | | % | 20 |
| | | | Total Zirconium (Zr) | 2021/09/08 | NC | | % | 20 |
| A343687 | AA1 | RPD | Total Aluminum (Al) | 2021/09/09 | 1.5 | | % | 20 |
| | | | Total Antimony (Sb) | 2021/09/09 | NC | | % | 20 |
| | | | Total Arsenic (As) | 2021/09/09 | NC | | % | 20 |
| | | | Total Barium (Ba) | 2021/09/09 | NC | | % | 20 |
| | | | Total Beryllium (Be) | 2021/09/09 | NC | | % | 20 |
| | | | Total Bismuth (Bi) | 2021/09/09 | NC | | % | 20 |
| | | | Total Boron (B) | 2021/09/09 | NC | | % | 20 |
| | | | Total Cadmium (Cd) | 2021/09/09 | NC | | % | 20 |
| | | | Total Chromium (Cr) | 2021/09/09 | NC | | % | 20 |
| | | | Total Cobalt (Co) | 2021/09/09 | NC | | % | 20 |
| | | | Total Copper (Cu) | 2021/09/09 | NC | | % | 20 |
| | | | Total Iron (Fe) | 2021/09/09 | NC | | % | 20 |
| | | | Total Lead (Pb) | 2021/09/09 | NC | | % | 20 |
| | | | Total Lithium (Li) | 2021/09/09 | NC | | % | 20 |
| | | | Total Manganese (Mn) | 2021/09/09 | NC | | % | 20 |
| | | | Total Molybdenum (Mo) | 2021/09/09 | 7.5 | | % | 20 |
| | | | Total Nickel (Ni) | 2021/09/09 | NC | | % | 20 |
| | | | Total Selenium (Se) | 2021/09/09 | NC | | % | 20 |
| | | | Total Silicon (Si) | 2021/09/09 | NC | | % | 20 |
| | | | Total Silver (Ag) | 2021/09/09 | NC | | % | 20 |
| | | | Total Strontium (Sr) | 2021/09/09 | NC | | % | 20 |
| | | | Total Thallium (Tl) | 2021/09/09 | NC | | % | 20 |
| | | | Total Tin (Sn) | 2021/09/09 | NC | | % | 20 |
| | | | Total Titanium (Ti) | 2021/09/09 | NC | | % | 20 |
| | | | Total Uranium (U) | 2021/09/09 | NC | | % | 20 |
| | | | Total Vanadium (V) | 2021/09/09 | NC | | % | 20 |
| | | | Total Zinc (Zn) | 2021/09/09 | 14 | | % | 20 |
| | | | Total Zirconium (Zr) | 2021/09/09 | 6.7 | | % | 20 |
| A343719 | AA1 | Matrix Spike | Total Aluminum (Al) | 2021/09/09 | | 101 | % | 80 - 120 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Total Antimony (Sb) | 2021/09/09 | | 104 | % | 80 - 120 |
| | | | Total Arsenic (As) | 2021/09/09 | | 107 | % | 80 - 120 |
| | | | Total Barium (Ba) | 2021/09/09 | | NC | % | 80 - 120 |
| | | | Total Beryllium (Be) | 2021/09/09 | | 96 | % | 80 - 120 |
| | | | Total Bismuth (Bi) | 2021/09/09 | | 95 | % | 80 - 120 |
| | | | Total Boron (B) | 2021/09/09 | | NC | % | 80 - 120 |
| | | | Total Cadmium (Cd) | 2021/09/09 | | 96 | % | 80 - 120 |
| | | | Total Chromium (Cr) | 2021/09/09 | | 96 | % | 80 - 120 |
| | | | Total Cobalt (Co) | 2021/09/09 | | 94 | % | 80 - 120 |
| | | | Total Copper (Cu) | 2021/09/09 | | 91 | % | 80 - 120 |
| | | | Total Iron (Fe) | 2021/09/09 | | NC | % | 80 - 120 |
| | | | Total Lead (Pb) | 2021/09/09 | | 96 | % | 80 - 120 |
| | | | Total Lithium (Li) | 2021/09/09 | | NC | % | 80 - 120 |
| | | | Total Manganese (Mn) | 2021/09/09 | | NC | % | 80 - 120 |
| | | | Total Molybdenum (Mo) | 2021/09/09 | | NC | % | 80 - 120 |
| | | | Total Nickel (Ni) | 2021/09/09 | | 92 | % | 80 - 120 |
| | | | Total Selenium (Se) | 2021/09/09 | | 107 | % | 80 - 120 |
| | | | Total Silicon (Si) | 2021/09/09 | | 107 | % | 80 - 120 |
| | | | Total Silver (Ag) | 2021/09/09 | | 94 | % | 80 - 120 |
| | | | Total Strontium (Sr) | 2021/09/09 | | NC | % | 80 - 120 |
| | | | Total Tellurium (Te) | 2021/09/09 | | 108 | % | 80 - 120 |
| | | | Total Thallium (Tl) | 2021/09/09 | | 98 | % | 80 - 120 |
| | | | Total Thorium (Th) | 2021/09/09 | | 99 | % | 80 - 120 |
| | | | Total Tin (Sn) | 2021/09/09 | | 99 | % | 80 - 120 |
| | | | Total Titanium (Ti) | 2021/09/09 | | 102 | % | 80 - 120 |
| | | | Total Tungsten (W) | 2021/09/09 | | 107 | % | 80 - 120 |
| | | | Total Uranium (U) | 2021/09/09 | | 104 | % | 80 - 120 |
| | | | Total Vanadium (V) | 2021/09/09 | | 102 | % | 80 - 120 |
| | | | Total Zinc (Zn) | 2021/09/09 | | 96 | % | 80 - 120 |
| | | | Total Zirconium (Zr) | 2021/09/09 | | 107 | % | 80 - 120 |
| A343719 | AA1 | Spiked Blank | Total Aluminum (Al) | 2021/09/09 | | 99 | % | 80 - 120 |
| | | | Total Antimony (Sb) | 2021/09/09 | | 102 | % | 80 - 120 |
| | | | Total Arsenic (As) | 2021/09/09 | | 102 | % | 80 - 120 |
| | | | Total Barium (Ba) | 2021/09/09 | | 100 | % | 80 - 120 |
| | | | Total Beryllium (Be) | 2021/09/09 | | 101 | % | 80 - 120 |
| | | | Total Bismuth (Bi) | 2021/09/09 | | 100 | % | 80 - 120 |
| | | | Total Boron (B) | 2021/09/09 | | 98 | % | 80 - 120 |
| | | | Total Cadmium (Cd) | 2021/09/09 | | 100 | % | 80 - 120 |
| | | | Total Chromium (Cr) | 2021/09/09 | | 98 | % | 80 - 120 |
| | | | Total Cobalt (Co) | 2021/09/09 | | 95 | % | 80 - 120 |
| | | | Total Copper (Cu) | 2021/09/09 | | 96 | % | 80 - 120 |
| | | | Total Iron (Fe) | 2021/09/09 | | 102 | % | 80 - 120 |
| | | | Total Lead (Pb) | 2021/09/09 | | 101 | % | 80 - 120 |
| | | | Total Lithium (Li) | 2021/09/09 | | 97 | % | 80 - 120 |
| | | | Total Manganese (Mn) | 2021/09/09 | | 97 | % | 80 - 120 |
| | | | Total Molybdenum (Mo) | 2021/09/09 | | 103 | % | 80 - 120 |
| | | | Total Nickel (Ni) | 2021/09/09 | | 97 | % | 80 - 120 |
| | | | Total Selenium (Se) | 2021/09/09 | | 100 | % | 80 - 120 |
| | | | Total Silicon (Si) | 2021/09/09 | | 105 | % | 80 - 120 |
| | | | Total Silver (Ag) | 2021/09/09 | | 98 | % | 80 - 120 |
| | | | Total Strontium (Sr) | 2021/09/09 | | 101 | % | 80 - 120 |
| | | | Total Tellurium (Te) | 2021/09/09 | | 103 | % | 80 - 120 |
| | | | Total Thallium (Tl) | 2021/09/09 | | 100 | % | 80 - 120 |
| | | | Total Thorium (Th) | 2021/09/09 | | 99 | % | 80 - 120 |
| | | | Total Tin (Sn) | 2021/09/09 | | 100 | % | 80 - 120 |



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## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Total Titanium (Ti) | 2021/09/09 | | 100 | % | 80 - 120 |
| | | | Total Tungsten (W) | 2021/09/09 | | 102 | % | 80 - 120 |
| | | | Total Uranium (U) | 2021/09/09 | | 103 | % | 80 - 120 |
| | | | Total Vanadium (V) | 2021/09/09 | | 99 | % | 80 - 120 |
| | | | Total Zinc (Zn) | 2021/09/09 | | 100 | % | 80 - 120 |
| | | | Total Zirconium (Zr) | 2021/09/09 | | 103 | % | 80 - 120 |
| A343719 | AA1 | Method Blank | Total Aluminum (Al) | 2021/09/09 | <3.0 | | ug/L | |
| | | | Total Antimony (Sb) | 2021/09/09 | <0.020 | | ug/L | |
| | | | Total Arsenic (As) | 2021/09/09 | <0.020 | | ug/L | |
| | | | Total Barium (Ba) | 2021/09/09 | <0.050 | | ug/L | |
| | | | Total Beryllium (Be) | 2021/09/09 | <0.010 | | ug/L | |
| | | | Total Bismuth (Bi) | 2021/09/09 | <0.010 | | ug/L | |
| | | | Total Boron (B) | 2021/09/09 | <10 | | ug/L | |
| | | | Total Cadmium (Cd) | 2021/09/09 | <0.0050 | | ug/L | |
| | | | Total Chromium (Cr) | 2021/09/09 | <0.10 | | ug/L | |
| | | | Total Cobalt (Co) | 2021/09/09 | <0.010 | | ug/L | |
| | | | Total Copper (Cu) | 2021/09/09 | <0.10 | | ug/L | |
| | | | Total Iron (Fe) | 2021/09/09 | <5.0 | | ug/L | |
| | | | Total Lead (Pb) | 2021/09/09 | <0.020 | | ug/L | |
| | | | Total Lithium (Li) | 2021/09/09 | <0.50 | | ug/L | |
| | | | Total Manganese (Mn) | 2021/09/09 | <0.10 | | ug/L | |
| | | | Total Molybdenum (Mo) | 2021/09/09 | <0.050 | | ug/L | |
| | | | Total Nickel (Ni) | 2021/09/09 | <0.10 | | ug/L | |
| | | | Total Selenium (Se) | 2021/09/09 | <0.040 | | ug/L | |
| | | | Total Silicon (Si) | 2021/09/09 | <50 | | ug/L | |
| | | | Total Silver (Ag) | 2021/09/09 | <0.010 | | ug/L | |
| | | | Total Strontium (Sr) | 2021/09/09 | <0.050 | | ug/L | |
| | | | Total Tellurium (Te) | 2021/09/09 | <0.020 | | ug/L | |
| | | | Total Thallium (Tl) | 2021/09/09 | <0.0020 | | ug/L | |
| | | | Total Thorium (Th) | 2021/09/09 | <0.020 | | ug/L | |
| | | | Total Tin (Sn) | 2021/09/09 | <0.20 | | ug/L | |
| | | | Total Titanium (Ti) | 2021/09/09 | <2.0 | | ug/L | |
| | | | Total Tungsten (W) | 2021/09/09 | <0.010 | | ug/L | |
| | | | Total Uranium (U) | 2021/09/09 | <0.0050 | | ug/L | |
| | | | Total Vanadium (V) | 2021/09/09 | <0.20 | | ug/L | |
| | | | Total Zinc (Zn) | 2021/09/09 | <1.0 | | ug/L | |
| | | | Total Zirconium (Zr) | 2021/09/09 | <0.10 | | ug/L | |
| A343719 | AA1 | RPD | Total Aluminum (Al) | 2021/09/09 | NC | | % | 20 |
| | | | Total Antimony (Sb) | 2021/09/09 | NC | | % | 20 |
| | | | Total Arsenic (As) | 2021/09/09 | 0.52 | | % | 20 |
| | | | Total Barium (Ba) | 2021/09/09 | 0.92 | | % | 20 |
| | | | Total Beryllium (Be) | 2021/09/09 | NC | | % | 20 |
| | | | Total Bismuth (Bi) | 2021/09/09 | NC | | % | 20 |
| | | | Total Boron (B) | 2021/09/09 | 0.18 | | % | 20 |
| | | | Total Cadmium (Cd) | 2021/09/09 | NC | | % | 20 |
| | | | Total Chromium (Cr) | 2021/09/09 | NC | | % | 20 |
| | | | Total Cobalt (Co) | 2021/09/09 | 5.7 | | % | 20 |
| | | | Total Copper (Cu) | 2021/09/09 | 4.5 | | % | 20 |
| | | | Total Iron (Fe) | 2021/09/09 | 1.3 | | % | 20 |
| | | | Total Lead (Pb) | 2021/09/09 | 5.7 | | % | 20 |
| | | | Total Lithium (Li) | 2021/09/09 | 1.9 | | % | 20 |
| | | | Total Manganese (Mn) | 2021/09/09 | 3.2 | | % | 20 |
| | | | Total Molybdenum (Mo) | 2021/09/09 | 0.67 | | % | 20 |
| | | | Total Nickel (Ni) | 2021/09/09 | 4.7 | | % | 20 |
| | | | Total Selenium (Se) | 2021/09/09 | 9.1 | | % | 20 |



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## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Total Silicon (Si) | 2021/09/09 | 2.4 | | % | 20 |
| | | | Total Silver (Ag) | 2021/09/09 | NC | | % | 20 |
| | | | Total Strontium (Sr) | 2021/09/09 | 1.7 | | % | 20 |
| | | | Total Thallium (Tl) | 2021/09/09 | NC | | % | 20 |
| | | | Total Tin (Sn) | 2021/09/09 | NC | | % | 20 |
| | | | Total Titanium (Ti) | 2021/09/09 | NC | | % | 20 |
| | | | Total Uranium (U) | 2021/09/09 | 2.3 | | % | 20 |
| | | | Total Vanadium (V) | 2021/09/09 | NC | | % | 20 |
| | | | Total Zinc (Zn) | 2021/09/09 | 1.0 | | % | 20 |
| | | | Total Zirconium (Zr) | 2021/09/09 | 14 | | % | 20 |
| A343723 | KWE | Matrix Spike | Dissolved Hex. Chromium (Cr 6+) | 2021/09/09 | | 93 | % | 80 - 120 |
| A343723 | KWE | Spiked Blank | Dissolved Hex. Chromium (Cr 6+) | 2021/09/09 | | 105 | % | 80 - 120 |
| A343723 | KWE | Method Blank | Dissolved Hex. Chromium (Cr 6+) | 2021/09/09 | <0.00099 | | mg/L | |
| A343723 | KWE | RPD | Dissolved Hex. Chromium (Cr 6+) | 2021/09/09 | NC | | % | 20 |
| A343841 | TSO | Matrix Spike | Total Nitrogen (N) | 2021/09/09 | | 101 | % | 80 - 120 |
| A343841 | TSO | Spiked Blank | Total Nitrogen (N) | 2021/09/09 | | 100 | % | 80 - 120 |
| A343841 | TSO | Method Blank | Total Nitrogen (N) | 2021/09/09 | <0.020 | | mg/L | |
| A343841 | TSO | RPD | Total Nitrogen (N) | 2021/09/09 | 0.54 | | % | 20 |
| A344546 | BTM | Matrix Spike | Total Suspended Solids | 2021/09/09 | | 103 | % | 80 - 120 |
| A344546 | BTM | Spiked Blank | Total Suspended Solids | 2021/09/09 | | 102 | % | 80 - 120 |
| A344546 | BTM | Method Blank | Total Suspended Solids | 2021/09/09 | <1.0 | | mg/L | |
| A344546 | BTM | RPD | Total Suspended Solids | 2021/09/09 | NC | | % | 20 |
| A344551 | BTM | Matrix Spike | Total Suspended Solids | 2021/09/09 | | 103 | % | 80 - 120 |
| A344551 | BTM | Spiked Blank | Total Suspended Solids | 2021/09/09 | | 101 | % | 80 - 120 |
| A344551 | BTM | Method Blank | Total Suspended Solids | 2021/09/09 | <1.0 | | mg/L | |
| A344551 | BTM | RPD | Total Suspended Solids | 2021/09/09 | NC | | % | 20 |
| A344664 | BTM | Matrix Spike | Total Suspended Solids | 2021/09/09 | | 102 | % | 80 - 120 |
| A344664 | BTM | Spiked Blank | Total Suspended Solids | 2021/09/09 | | 102 | % | 80 - 120 |
| A344664 | BTM | Method Blank | Total Suspended Solids | 2021/09/09 | <1.0 | | mg/L | |
| A344664 | BTM | RPD | Total Suspended Solids | 2021/09/09 | NC | | % | 20 |
| A344685 | BTM | Matrix Spike [AFF268-01] | Total Suspended Solids | 2021/09/09 | | 104 | % | 80 - 120 |
| A344685 | BTM | Spiked Blank | Total Suspended Solids | 2021/09/09 | | 102 | % | 80 - 120 |
| A344685 | BTM | Method Blank | Total Suspended Solids | 2021/09/09 | <1.0 | | mg/L | |
| A344685 | BTM | RPD | Total Suspended Solids | 2021/09/09 | NC | | % | 20 |
| A345060 | TSO | Matrix Spike | Total Nitrogen (N) | 2021/09/09 | | 103 | % | 80 - 120 |
| A345060 | TSO | Spiked Blank | Total Nitrogen (N) | 2021/09/09 | | 108 | % | 80 - 120 |
| A345060 | TSO | Method Blank | Total Nitrogen (N) | 2021/09/09 | <0.020 | | mg/L | |
| A345060 | TSO | RPD | Total Nitrogen (N) | 2021/09/09 | 1.2 | | % | 20 |
| A345116 | AP1 | Spiked Blank | Total Dissolved Solids | 2021/09/08 | | 104 | % | 80 - 120 |
| A345116 | AP1 | Method Blank | Total Dissolved Solids | 2021/09/08 | <1.0 | | mg/L | |
| A345379 | BB3 | Spiked Blank | pH | 2021/09/07 | | 101 | % | 97 - 103 |
| A345379 | BB3 | RPD | pH | 2021/09/07 | 0.13 | | % | N/A |
| A345379 | BB3 | RPD [AFF264-02] | pH | 2021/09/07 | 0.73 | | % | N/A |
| A345383 | BB3 | Matrix Spike [AFF264-02] | Alkalinity (Total as CaCO3) | 2021/09/07 | | NC | % | 80 - 120 |
| A345383 | BB3 | Spiked Blank | Alkalinity (Total as CaCO3) | 2021/09/07 | | 96 | % | 80 - 120 |
| A345383 | BB3 | Method Blank | Alkalinity (PP as CaCO3) | 2021/09/07 | <1.0 | | mg/L | |
| | | | Alkalinity (Total as CaCO3) | 2021/09/07 | <1.0 | | mg/L | |
| | | | Bicarbonate (HCO3) | 2021/09/07 | <1.0 | | mg/L | |
| | | | Carbonate (CO3) | 2021/09/07 | <1.0 | | mg/L | |
| | | | Hydroxide (OH) | 2021/09/07 | <1.0 | | mg/L | |
| A345383 | BB3 | RPD [AFF264-02] | Alkalinity (PP as CaCO3) | 2021/09/07 | NC | | % | 20 |
| | | | Alkalinity (Total as CaCO3) | 2021/09/07 | 0.0052 | | % | 20 |
| | | | Bicarbonate (HCO3) | 2021/09/07 | 0.0052 | | % | 20 |
| | | | Carbonate (CO3) | 2021/09/07 | NC | | % | 20 |
| | | | Hydroxide (OH) | 2021/09/07 | NC | | % | 20 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| A345385 | BB3 | Spiked Blank | Conductivity | 2021/09/07 | | 100 | % | 80 - 120 |
| A345385 | BB3 | Method Blank | Conductivity | 2021/09/07 | <2.0 | | uS/cm | |
| A345385 | BB3 | RPD | Conductivity | 2021/09/07 | 0.097 | | % | 10 |
| A345385 | BB3 | RPD [AFF264-02] | Conductivity | 2021/09/07 | 0.16 | | % | 10 |
| A345387 | BB3 | Spiked Blank | pH | 2021/09/07 | | 101 | % | 97 - 103 |
| A345387 | BB3 | RPD | pH | 2021/09/08 | 0.13 | | % | N/A |
| | | | pH | 2021/09/08 | 0 | | % | N/A |
| A345389 | BB3 | Matrix Spike | Alkalinity (Total as CaCO3) | 2021/09/08 | | NC | % | 80 - 120 |
| A345389 | BB3 | Spiked Blank | Alkalinity (Total as CaCO3) | 2021/09/07 | | 84 | % | 80 - 120 |
| A345389 | BB3 | Method Blank | Alkalinity (PP as CaCO3) | 2021/09/07 | <1.0 | | mg/L | |
| | | | Alkalinity (Total as CaCO3) | 2021/09/07 | <1.0 | | mg/L | |
| | | | Bicarbonate (HCO3) | 2021/09/07 | <1.0 | | mg/L | |
| | | | Carbonate (CO3) | 2021/09/07 | <1.0 | | mg/L | |
| | | | Hydroxide (OH) | 2021/09/07 | <1.0 | | mg/L | |
| A345389 | BB3 | RPD | Alkalinity (PP as CaCO3) | 2021/09/08 | NC | | % | 20 |
| | | | Alkalinity (Total as CaCO3) | 2021/09/08 | 1.2 | | % | 20 |
| | | | Bicarbonate (HCO3) | 2021/09/08 | 1.2 | | % | 20 |
| | | | Carbonate (CO3) | 2021/09/08 | NC | | % | 20 |
| | | | Hydroxide (OH) | 2021/09/08 | NC | | % | 20 |
| A345394 | BB3 | Spiked Blank | Conductivity | 2021/09/07 | | 98 | % | 80 - 120 |
| A345394 | BB3 | Method Blank | Conductivity | 2021/09/07 | <2.0 | | uS/cm | |
| A345396 | BB3 | Spiked Blank | pH | 2021/09/07 | | 98 | % | 97 - 103 |
| A345397 | BB3 | Matrix Spike [AFF272-02] | Alkalinity (Total as CaCO3) | 2021/09/08 | | NC | % | 80 - 120 |
| A345397 | BB3 | Spiked Blank | Alkalinity (Total as CaCO3) | 2021/09/08 | | 92 | % | 80 - 120 |
| A345397 | BB3 | Method Blank | Alkalinity (PP as CaCO3) | 2021/09/08 | <1.0 | | mg/L | |
| | | | Alkalinity (Total as CaCO3) | 2021/09/08 | <1.0 | | mg/L | |
| | | | Bicarbonate (HCO3) | 2021/09/08 | <1.0 | | mg/L | |
| | | | Carbonate (CO3) | 2021/09/08 | <1.0 | | mg/L | |
| | | | Hydroxide (OH) | 2021/09/08 | <1.0 | | mg/L | |
| A345409 | BB3 | Spiked Blank | Conductivity | 2021/09/08 | | 99 | % | 80 - 120 |
| A345409 | BB3 | Method Blank | Conductivity | 2021/09/08 | <2.0 | | uS/cm | |
| A345891 | KWE | Matrix Spike [AFF272-11] | Dissolved Hex. Chromium (Cr 6+) | 2021/09/09 | | 94 | % | 80 - 120 |
| A345891 | KWE | Spiked Blank | Dissolved Hex. Chromium (Cr 6+) | 2021/09/09 | | 107 | % | 80 - 120 |
| A345891 | KWE | Method Blank | Dissolved Hex. Chromium (Cr 6+) | 2021/09/09 | <0.00099 | | mg/L | |
| A345891 | KWE | RPD [AFF272-11] | Dissolved Hex. Chromium (Cr 6+) | 2021/09/09 | NC | | % | 20 |
| A346053 | BTM | Matrix Spike | Total Suspended Solids | 2021/09/10 | | 105 | % | 80 - 120 |
| A346053 | BTM | Spiked Blank | Total Suspended Solids | 2021/09/10 | | 101 | % | 80 - 120 |
| A346053 | BTM | Method Blank | Total Suspended Solids | 2021/09/10 | <1.0 | | mg/L | |
| A346053 | BTM | RPD | Total Suspended Solids | 2021/09/10 | 18 | | % | 20 |
| A346095 | AA1 | Matrix Spike [AFF271-05] | Dissolved Aluminum (Al) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Dissolved Antimony (Sb) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Arsenic (As) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Dissolved Barium (Ba) | 2021/09/11 | | 97 | % | 80 - 120 |
| | | | Dissolved Beryllium (Be) | 2021/09/11 | | 98 | % | 80 - 120 |
| | | | Dissolved Bismuth (Bi) | 2021/09/11 | | 98 | % | 80 - 120 |
| | | | Dissolved Boron (B) | 2021/09/11 | | 99 | % | 80 - 120 |
| | | | Dissolved Cadmium (Cd) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Dissolved Chromium (Cr) | 2021/09/11 | | 98 | % | 80 - 120 |
| | | | Dissolved Cobalt (Co) | 2021/09/11 | | 93 | % | 80 - 120 |
| | | | Dissolved Copper (Cu) | 2021/09/11 | | 92 | % | 80 - 120 |
| | | | Dissolved Iron (Fe) | 2021/09/11 | | 103 | % | 80 - 120 |
| | | | Dissolved Lead (Pb) | 2021/09/11 | | 98 | % | 80 - 120 |
| | | | Dissolved Lithium (Li) | 2021/09/11 | | 95 | % | 80 - 120 |
| | | | Dissolved Manganese (Mn) | 2021/09/11 | | NC | % | 80 - 120 |
| | | | Dissolved Molybdenum (Mo) | 2021/09/11 | | 106 | % | 80 - 120 |



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| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Nickel (Ni) | 2021/09/11 | | 92 | % | 80 - 120 |
| | | | Dissolved Selenium (Se) | 2021/09/11 | | 104 | % | 80 - 120 |
| | | | Dissolved Silicon (Si) | 2021/09/11 | | 106 | % | 80 - 120 |
| | | | Dissolved Silver (Ag) | 2021/09/11 | | 96 | % | 80 - 120 |
| | | | Dissolved Strontium (Sr) | 2021/09/11 | | NC | % | 80 - 120 |
| | | | Dissolved Tellurium (Te) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Dissolved Thallium (Tl) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Dissolved Thorium (Th) | 2021/09/11 | | 105 | % | 80 - 120 |
| | | | Dissolved Tin (Sn) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Titanium (Ti) | 2021/09/11 | | 103 | % | 80 - 120 |
| | | | Dissolved Tungsten (W) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Dissolved Uranium (U) | 2021/09/11 | | 107 | % | 80 - 120 |
| | | | Dissolved Vanadium (V) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Zinc (Zn) | 2021/09/11 | | 99 | % | 80 - 120 |
| | | | Dissolved Zirconium (Zr) | 2021/09/11 | | 108 | % | 80 - 120 |
| A346095 | AA1 | Spiked Blank | Dissolved Aluminum (Al) | 2021/09/11 | | 103 | % | 80 - 120 |
| | | | Dissolved Antimony (Sb) | 2021/09/11 | | 103 | % | 80 - 120 |
| | | | Dissolved Arsenic (As) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Dissolved Barium (Ba) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Dissolved Beryllium (Be) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Dissolved Bismuth (Bi) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Boron (B) | 2021/09/11 | | 99 | % | 80 - 120 |
| | | | Dissolved Cadmium (Cd) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Chromium (Cr) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Dissolved Cobalt (Co) | 2021/09/11 | | 99 | % | 80 - 120 |
| | | | Dissolved Copper (Cu) | 2021/09/11 | | 99 | % | 80 - 120 |
| | | | Dissolved Iron (Fe) | 2021/09/11 | | 104 | % | 80 - 120 |
| | | | Dissolved Lead (Pb) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Dissolved Lithium (Li) | 2021/09/11 | | 97 | % | 80 - 120 |
| | | | Dissolved Manganese (Mn) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Dissolved Molybdenum (Mo) | 2021/09/11 | | 104 | % | 80 - 120 |
| | | | Dissolved Nickel (Ni) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Dissolved Selenium (Se) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Silicon (Si) | 2021/09/11 | | 107 | % | 80 - 120 |
| | | | Dissolved Silver (Ag) | 2021/09/11 | | 99 | % | 80 - 120 |
| | | | Dissolved Strontium (Sr) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Tellurium (Te) | 2021/09/11 | | 103 | % | 80 - 120 |
| | | | Dissolved Thallium (Tl) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Dissolved Thorium (Th) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Tin (Sn) | 2021/09/11 | | 103 | % | 80 - 120 |
| | | | Dissolved Titanium (Ti) | 2021/09/11 | | 105 | % | 80 - 120 |
| | | | Dissolved Tungsten (W) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Uranium (U) | 2021/09/11 | | 106 | % | 80 - 120 |
| | | | Dissolved Vanadium (V) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Zinc (Zn) | 2021/09/11 | | 104 | % | 80 - 120 |
| | | | Dissolved Zirconium (Zr) | 2021/09/11 | | 103 | % | 80 - 120 |
| A346095 | AA1 | Method Blank | Dissolved Aluminum (Al) | 2021/09/11 | <0.50 | | ug/L | |
| | | | Dissolved Antimony (Sb) | 2021/09/11 | <0.020 | | ug/L | |
| | | | Dissolved Arsenic (As) | 2021/09/11 | <0.020 | | ug/L | |
| | | | Dissolved Barium (Ba) | 2021/09/11 | <0.020 | | ug/L | |
| | | | Dissolved Beryllium (Be) | 2021/09/11 | <0.010 | | ug/L | |
| | | | Dissolved Bismuth (Bi) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Dissolved Boron (B) | 2021/09/11 | <10 | | ug/L | |
| | | | Dissolved Cadmium (Cd) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Dissolved Chromium (Cr) | 2021/09/11 | <0.10 | | ug/L | |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Cobalt (Co) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Dissolved Copper (Cu) | 2021/09/11 | <0.050 | | ug/L | |
| | | | Dissolved Iron (Fe) | 2021/09/11 | <1.0 | | ug/L | |
| | | | Dissolved Lead (Pb) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Dissolved Lithium (Li) | 2021/09/11 | <0.50 | | ug/L | |
| | | | Dissolved Manganese (Mn) | 2021/09/11 | <0.050 | | ug/L | |
| | | | Dissolved Molybdenum (Mo) | 2021/09/11 | <0.050 | | ug/L | |
| | | | Dissolved Nickel (Ni) | 2021/09/11 | <0.020 | | ug/L | |
| | | | Dissolved Selenium (Se) | 2021/09/11 | <0.040 | | ug/L | |
| | | | Dissolved Silicon (Si) | 2021/09/11 | <50 | | ug/L | |
| | | | Dissolved Silver (Ag) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Dissolved Strontium (Sr) | 2021/09/11 | 0.056, RDL=0.050 (1) | | ug/L | |
| | | | Dissolved Tellurium (Te) | 2021/09/11 | <0.020 | | ug/L | |
| | | | Dissolved Thallium (Tl) | 2021/09/11 | <0.0020 | | ug/L | |
| | | | Dissolved Thorium (Th) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Dissolved Tin (Sn) | 2021/09/11 | <0.20 | | ug/L | |
| | | | Dissolved Titanium (Ti) | 2021/09/11 | <0.50 | | ug/L | |
| | | | Dissolved Tungsten (W) | 2021/09/11 | <0.010 | | ug/L | |
| | | | Dissolved Uranium (U) | 2021/09/11 | <0.0020 | | ug/L | |
| | | | Dissolved Vanadium (V) | 2021/09/11 | <0.20 | | ug/L | |
| | | | Dissolved Zinc (Zn) | 2021/09/11 | <0.10 | | ug/L | |
| | | | Dissolved Zirconium (Zr) | 2021/09/11 | <0.10 | | ug/L | |
| A346095 | AA1 | RPD [AFF271-05] | Dissolved Aluminum (Al) | 2021/09/11 | 2.0 | | % | 20 |
| | | | Dissolved Antimony (Sb) | 2021/09/11 | 1.9 | | % | 20 |
| | | | Dissolved Arsenic (As) | 2021/09/11 | 1.9 | | % | 20 |
| | | | Dissolved Barium (Ba) | 2021/09/11 | 1.0 | | % | 20 |
| | | | Dissolved Beryllium (Be) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Bismuth (Bi) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Boron (B) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Cadmium (Cd) | 2021/09/11 | 0.29 | | % | 20 |
| | | | Dissolved Chromium (Cr) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Cobalt (Co) | 2021/09/11 | 2.2 | | % | 20 |
| | | | Dissolved Copper (Cu) | 2021/09/11 | 2.1 | | % | 20 |
| | | | Dissolved Iron (Fe) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Lead (Pb) | 2021/09/11 | 1.9 | | % | 20 |
| | | | Dissolved Lithium (Li) | 2021/09/11 | 2.9 | | % | 20 |
| | | | Dissolved Manganese (Mn) | 2021/09/11 | 0.040 | | % | 20 |
| | | | Dissolved Molybdenum (Mo) | 2021/09/11 | 9.3 | | % | 20 |
| | | | Dissolved Nickel (Ni) | 2021/09/11 | 2.0 | | % | 20 |
| | | | Dissolved Selenium (Se) | 2021/09/11 | 1.6 | | % | 20 |
| | | | Dissolved Silicon (Si) | 2021/09/11 | 1.6 | | % | 20 |
| | | | Dissolved Silver (Ag) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Strontium (Sr) | 2021/09/11 | 2.2 | | % | 20 |
| | | | Dissolved Tellurium (Te) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Thallium (Tl) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Thorium (Th) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Tin (Sn) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Titanium (Ti) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Tungsten (W) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Uranium (U) | 2021/09/11 | 1.3 | | % | 20 |
| | | | Dissolved Vanadium (V) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Zinc (Zn) | 2021/09/11 | 2.1 | | % | 20 |
| | | | Dissolved Zirconium (Zr) | 2021/09/11 | NC | | % | 20 |
| A346114 | TMU | Matrix Spike [AFF272-10] | Strong Acid Dissoc. Cyanide (CN) | 2021/09/10 | | 104 | % | 80 - 120 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| A346114 | TMU | Spiked Blank | Strong Acid Dissoc. Cyanide (CN) | 2021/09/10 | | 101 | % | 80 - 120 |
| A346114 | TMU | Method Blank | Strong Acid Dissoc. Cyanide (CN) | 2021/09/10 | <0.00050 | | mg/L | |
| A346114 | TMU | RPD [AFF272-10] | Strong Acid Dissoc. Cyanide (CN) | 2021/09/10 | NC | | % | 20 |
| A346121 | TMU | Matrix Spike [AFF272-10] | Weak Acid Dissoc. Cyanide (CN) | 2021/09/10 | | 102 | % | 80 - 120 |
| A346121 | TMU | Spiked Blank | Weak Acid Dissoc. Cyanide (CN) | 2021/09/10 | | 104 | % | 80 - 120 |
| A346121 | TMU | Method Blank | Weak Acid Dissoc. Cyanide (CN) | 2021/09/10 | <0.00050 | | mg/L | |
| A346121 | TMU | RPD [AFF272-10] | Weak Acid Dissoc. Cyanide (CN) | 2021/09/10 | NC | | % | 20 |
| A346241 | KGA | Matrix Spike | Total Dissolved Solids | 2021/09/13 | | 109 | % | 80 - 120 |
| A346241 | KGA | Spiked Blank | Total Dissolved Solids | 2021/09/09 | | 100 | % | 80 - 120 |
| A346241 | KGA | Method Blank | Total Dissolved Solids | 2021/09/09 | <1.0 | | mg/L | |
| A346241 | KGA | RPD | Total Dissolved Solids | 2021/09/13 | 2.0 | | % | 20 |
| A346416 | AA1 | Matrix Spike [AFF263-05] | Dissolved Aluminum (Al) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Dissolved Antimony (Sb) | 2021/09/11 | | NC | % | 80 - 120 |
| | | | Dissolved Arsenic (As) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Barium (Ba) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Dissolved Beryllium (Be) | 2021/09/11 | | 98 | % | 80 - 120 |
| | | | Dissolved Bismuth (Bi) | 2021/09/11 | | 97 | % | 80 - 120 |
| | | | Dissolved Boron (B) | 2021/09/11 | | 98 | % | 80 - 120 |
| | | | Dissolved Cadmium (Cd) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Dissolved Chromium (Cr) | 2021/09/11 | | 97 | % | 80 - 120 |
| | | | Dissolved Cobalt (Co) | 2021/09/11 | | 92 | % | 80 - 120 |
| | | | Dissolved Copper (Cu) | 2021/09/11 | | 91 | % | 80 - 120 |
| | | | Dissolved Iron (Fe) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Lead (Pb) | 2021/09/11 | | 98 | % | 80 - 120 |
| | | | Dissolved Lithium (Li) | 2021/09/11 | | 93 | % | 80 - 120 |
| | | | Dissolved Manganese (Mn) | 2021/09/11 | | 96 | % | 80 - 120 |
| | | | Dissolved Molybdenum (Mo) | 2021/09/11 | | 108 | % | 80 - 120 |
| | | | Dissolved Nickel (Ni) | 2021/09/11 | | 92 | % | 80 - 120 |
| | | | Dissolved Selenium (Se) | 2021/09/11 | | 103 | % | 80 - 120 |
| | | | Dissolved Silicon (Si) | 2021/09/11 | | 95 | % | 80 - 120 |
| | | | Dissolved Silver (Ag) | 2021/09/11 | | 97 | % | 80 - 120 |
| | | | Dissolved Strontium (Sr) | 2021/09/11 | | NC | % | 80 - 120 |
| | | | Dissolved Tellurium (Te) | 2021/09/11 | | 99 | % | 80 - 120 |
| | | | Dissolved Thallium (Tl) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Dissolved Thorium (Th) | 2021/09/11 | | 105 | % | 80 - 120 |
| | | | Dissolved Tin (Sn) | 2021/09/11 | | 104 | % | 80 - 120 |
| | | | Dissolved Titanium (Ti) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Tungsten (W) | 2021/09/11 | | 108 | % | 80 - 120 |
| | | | Dissolved Uranium (U) | 2021/09/11 | | 109 | % | 80 - 120 |
| | | | Dissolved Vanadium (V) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Dissolved Zinc (Zn) | 2021/09/11 | | 96 | % | 80 - 120 |
| | | | Dissolved Zirconium (Zr) | 2021/09/11 | | 107 | % | 80 - 120 |
| A346416 | AA1 | Spiked Blank | Dissolved Aluminum (Al) | 2021/09/11 | | 104 | % | 80 - 120 |
| | | | Dissolved Antimony (Sb) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Arsenic (As) | 2021/09/11 | | 99 | % | 80 - 120 |
| | | | Dissolved Barium (Ba) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Dissolved Beryllium (Be) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Dissolved Bismuth (Bi) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Boron (B) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Dissolved Cadmium (Cd) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Dissolved Chromium (Cr) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Cobalt (Co) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Dissolved Copper (Cu) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Dissolved Iron (Fe) | 2021/09/11 | | 105 | % | 80 - 120 |
| | | | Dissolved Lead (Pb) | 2021/09/11 | | 99 | % | 80 - 120 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Lithium (Li) | 2021/09/11 | | 98 | % | 80 - 120 |
| | | | Dissolved Manganese (Mn) | 2021/09/11 | | 103 | % | 80 - 120 |
| | | | Dissolved Molybdenum (Mo) | 2021/09/11 | | 103 | % | 80 - 120 |
| | | | Dissolved Nickel (Ni) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Dissolved Selenium (Se) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Dissolved Silicon (Si) | 2021/09/11 | | 111 | % | 80 - 120 |
| | | | Dissolved Silver (Ag) | 2021/09/11 | | 98 | % | 80 - 120 |
| | | | Dissolved Strontium (Sr) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Tellurium (Te) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Thallium (Tl) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Dissolved Thorium (Th) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Dissolved Tin (Sn) | 2021/09/11 | | 104 | % | 80 - 120 |
| | | | Dissolved Titanium (Ti) | 2021/09/11 | | 107 | % | 80 - 120 |
| | | | Dissolved Tungsten (W) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Dissolved Uranium (U) | 2021/09/11 | | 106 | % | 80 - 120 |
| | | | Dissolved Vanadium (V) | 2021/09/11 | | 103 | % | 80 - 120 |
| | | | Dissolved Zinc (Zn) | 2021/09/11 | | 105 | % | 80 - 120 |
| | | | Dissolved Zirconium (Zr) | 2021/09/11 | | 105 | % | 80 - 120 |
| A346416 | AA1 | Method Blank | Dissolved Aluminum (Al) | 2021/09/11 | <0.50 | | ug/L | |
| | | | Dissolved Antimony (Sb) | 2021/09/11 | <0.020 | | ug/L | |
| | | | Dissolved Arsenic (As) | 2021/09/11 | <0.020 | | ug/L | |
| | | | Dissolved Barium (Ba) | 2021/09/11 | <0.020 | | ug/L | |
| | | | Dissolved Beryllium (Be) | 2021/09/11 | <0.010 | | ug/L | |
| | | | Dissolved Bismuth (Bi) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Dissolved Boron (B) | 2021/09/11 | <10 | | ug/L | |
| | | | Dissolved Cadmium (Cd) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Dissolved Chromium (Cr) | 2021/09/11 | <0.10 | | ug/L | |
| | | | Dissolved Cobalt (Co) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Dissolved Copper (Cu) | 2021/09/11 | <0.050 | | ug/L | |
| | | | Dissolved Iron (Fe) | 2021/09/11 | <1.0 | | ug/L | |
| | | | Dissolved Lead (Pb) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Dissolved Lithium (Li) | 2021/09/11 | <0.50 | | ug/L | |
| | | | Dissolved Manganese (Mn) | 2021/09/11 | <0.050 | | ug/L | |
| | | | Dissolved Molybdenum (Mo) | 2021/09/11 | <0.050 | | ug/L | |
| | | | Dissolved Nickel (Ni) | 2021/09/11 | <0.020 | | ug/L | |
| | | | Dissolved Selenium (Se) | 2021/09/11 | <0.040 | | ug/L | |
| | | | Dissolved Silicon (Si) | 2021/09/11 | <50 | | ug/L | |
| | | | Dissolved Silver (Ag) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Dissolved Strontium (Sr) | 2021/09/11 | <0.050 | | ug/L | |
| | | | Dissolved Tellurium (Te) | 2021/09/11 | <0.020 | | ug/L | |
| | | | Dissolved Thallium (Tl) | 2021/09/11 | <0.0020 | | ug/L | |
| | | | Dissolved Thorium (Th) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Dissolved Tin (Sn) | 2021/09/11 | <0.20 | | ug/L | |
| | | | Dissolved Titanium (Ti) | 2021/09/11 | <0.50 | | ug/L | |
| | | | Dissolved Tungsten (W) | 2021/09/11 | <0.010 | | ug/L | |
| | | | Dissolved Uranium (U) | 2021/09/11 | 0.0021, RDL=0.0020 (2) | | ug/L | |
| | | | Dissolved Vanadium (V) | 2021/09/11 | <0.20 | | ug/L | |
| | | | Dissolved Zinc (Zn) | 2021/09/11 | 0.14, RDL=0.10 (3) | | ug/L | |
| | | | Dissolved Zirconium (Zr) | 2021/09/11 | <0.10 | | ug/L | |
| A346416 | AA1 | RPD [AFF263-05] | Dissolved Aluminum (Al) | 2021/09/11 | 6.3 | | % | 20 |
| | | | Dissolved Antimony (Sb) | 2021/09/11 | 0.41 | | % | 20 |
| | | | Dissolved Arsenic (As) | 2021/09/11 | 0.027 | | % | 20 |
| | | | Dissolved Barium (Ba) | 2021/09/11 | 0.81 | | % | 20 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Beryllium (Be) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Bismuth (Bi) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Boron (B) | 2021/09/11 | 0.29 | | % | 20 |
| | | | Dissolved Cadmium (Cd) | 2021/09/11 | 6.5 | | % | 20 |
| | | | Dissolved Chromium (Cr) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Cobalt (Co) | 2021/09/11 | 4.7 | | % | 20 |
| | | | Dissolved Copper (Cu) | 2021/09/11 | 1.8 | | % | 20 |
| | | | Dissolved Iron (Fe) | 2021/09/11 | 4.5 | | % | 20 |
| | | | Dissolved Lead (Pb) | 2021/09/11 | 5.0 | | % | 20 |
| | | | Dissolved Lithium (Li) | 2021/09/11 | 0.43 | | % | 20 |
| | | | Dissolved Manganese (Mn) | 2021/09/11 | 2.5 | | % | 20 |
| | | | Dissolved Molybdenum (Mo) | 2021/09/11 | 5.4 | | % | 20 |
| | | | Dissolved Nickel (Ni) | 2021/09/11 | 4.3 | | % | 20 |
| | | | Dissolved Selenium (Se) | 2021/09/11 | 13 | | % | 20 |
| | | | Dissolved Silicon (Si) | 2021/09/11 | 0.13 | | % | 20 |
| | | | Dissolved Silver (Ag) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Strontium (Sr) | 2021/09/11 | 1.7 | | % | 20 |
| | | | Dissolved Tellurium (Te) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Thallium (Tl) | 2021/09/11 | 1.2 | | % | 20 |
| | | | Dissolved Thorium (Th) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Tin (Sn) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Titanium (Ti) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Tungsten (W) | 2021/09/11 | 1.2 | | % | 20 |
| | | | Dissolved Uranium (U) | 2021/09/11 | 0.15 | | % | 20 |
| | | | Dissolved Vanadium (V) | 2021/09/11 | NC | | % | 20 |
| | | | Dissolved Zinc (Zn) | 2021/09/11 | 1.5 | | % | 20 |
| | | | Dissolved Zirconium (Zr) | 2021/09/11 | NC | | % | 20 |
| A347209 | FM0 | Matrix Spike [AFF275-08] | Dissolved Phosphorus (P) | 2021/09/11 | | 107 | % | 80 - 120 |
| A347209 | FM0 | QC Standard | Dissolved Phosphorus (P) | 2021/09/11 | | 90 | % | 80 - 120 |
| A347209 | FM0 | Spiked Blank | Dissolved Phosphorus (P) | 2021/09/11 | | 113 | % | 80 - 120 |
| A347209 | FM0 | Method Blank | Dissolved Phosphorus (P) | 2021/09/11 | <0.0010 | | mg/L | |
| A347209 | FM0 | RPD [AFF275-08] | Dissolved Phosphorus (P) | 2021/09/11 | NC | | % | 20 |
| A347213 | FM0 | Matrix Spike [AFF267-07] | Total Phosphorus (P) | 2021/09/11 | | 100 | % | 80 - 120 |
| A347213 | FM0 | QC Standard | Total Phosphorus (P) | 2021/09/11 | | 90 | % | 80 - 120 |
| A347213 | FM0 | Spiked Blank | Total Phosphorus (P) | 2021/09/11 | | 115 | % | 80 - 120 |
| A347213 | FM0 | Method Blank | Total Phosphorus (P) | 2021/09/11 | <0.0010 | | mg/L | |
| A347213 | FM0 | RPD [AFF267-07] | Total Phosphorus (P) | 2021/09/11 | NC | | % | 20 |
| A347313 | CJY | Matrix Spike | Total Mercury (Hg) | 2021/09/10 | | 87 | % | 80 - 120 |
| A347313 | CJY | Spiked Blank | Total Mercury (Hg) | 2021/09/10 | | 96 | % | 80 - 120 |
| A347313 | CJY | Method Blank | Total Mercury (Hg) | 2021/09/10 | <0.0019 | | ug/L | |
| A347313 | CJY | RPD | Total Mercury (Hg) | 2021/09/10 | 3.2 | | % | 20 |
| A347315 | ZWU | Matrix Spike [AFF268-08] | Dissolved Organic Carbon (C) | 2021/09/10 | | 111 | % | 80 - 120 |
| A347315 | ZWU | Spiked Blank | Dissolved Organic Carbon (C) | 2021/09/10 | | 111 | % | 80 - 120 |
| A347315 | ZWU | Method Blank | Dissolved Organic Carbon (C) | 2021/09/10 | <0.20 | | mg/L | |
| A347315 | ZWU | RPD [AFF268-08] | Dissolved Organic Carbon (C) | 2021/09/10 | NC | | % | 20 |
| A347443 | STI | Matrix Spike | Dissolved Phosphorus (P) | 2021/09/12 | | 76 (4) | % | 80 - 120 |
| A347443 | STI | QC Standard | Dissolved Phosphorus (P) | 2021/09/12 | | 87 | % | 80 - 120 |
| A347443 | STI | Spiked Blank | Dissolved Phosphorus (P) | 2021/09/12 | | 111 | % | 80 - 120 |
| A347443 | STI | Method Blank | Dissolved Phosphorus (P) | 2021/09/12 | <0.0010 | | mg/L | |
| A347443 | STI | RPD | Dissolved Phosphorus (P) | 2021/09/12 | 1.5 | | % | 20 |
| A347450 | STI | Matrix Spike | Total Phosphorus (P) | 2021/09/12 | | 92 | % | 80 - 120 |
| A347450 | STI | QC Standard | Total Phosphorus (P) | 2021/09/12 | | 90 | % | 80 - 120 |
| A347450 | STI | Spiked Blank | Total Phosphorus (P) | 2021/09/12 | | 98 | % | 80 - 120 |
| A347450 | STI | Method Blank | Total Phosphorus (P) | 2021/09/12 | <0.0010 | | mg/L | |
| A347450 | STI | RPD | Total Phosphorus (P) | 2021/09/12 | NC | | % | 20 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| A347455 | STI | Matrix Spike | Total Phosphorus (P) | 2021/09/12 | | 69 (4) | % | 80 - 120 |
| A347455 | STI | QC Standard | Total Phosphorus (P) | 2021/09/12 | | 87 | % | 80 - 120 |
| A347455 | STI | Spiked Blank | Total Phosphorus (P) | 2021/09/12 | | 97 | % | 80 - 120 |
| A347455 | STI | Method Blank | Total Phosphorus (P) | 2021/09/12 | <0.0010 | | mg/L | |
| A347455 | STI | RPD | Total Phosphorus (P) | 2021/09/12 | NC | | % | 20 |
| A347548 | CJY | Matrix Spike | Dissolved Mercury (Hg) | 2021/09/10 | | 98 | % | 80 - 120 |
| A347548 | CJY | Spiked Blank | Dissolved Mercury (Hg) | 2021/09/10 | | 98 | % | 80 - 120 |
| A347548 | CJY | Method Blank | Dissolved Mercury (Hg) | 2021/09/10 | <0.0019 | | ug/L | |
| A347548 | CJY | RPD | Dissolved Mercury (Hg) | 2021/09/10 | NC | | % | 20 |
| A347639 | AA1 | Matrix Spike [AFF276-04] | Total Aluminum (Al) | 2021/09/11 | | 93 | % | 80 - 120 |
| | | | Total Antimony (Sb) | 2021/09/11 | | 98 | % | 80 - 120 |
| | | | Total Arsenic (As) | 2021/09/11 | | 95 | % | 80 - 120 |
| | | | Total Barium (Ba) | 2021/09/11 | | 97 | % | 80 - 120 |
| | | | Total Beryllium (Be) | 2021/09/11 | | 91 | % | 80 - 120 |
| | | | Total Bismuth (Bi) | 2021/09/11 | | 96 | % | 80 - 120 |
| | | | Total Boron (B) | 2021/09/11 | | 89 | % | 80 - 120 |
| | | | Total Cadmium (Cd) | 2021/09/11 | | 96 | % | 80 - 120 |
| | | | Total Chromium (Cr) | 2021/09/11 | | 91 | % | 80 - 120 |
| | | | Total Cobalt (Co) | 2021/09/11 | | 88 | % | 80 - 120 |
| | | | Total Copper (Cu) | 2021/09/11 | | 87 | % | 80 - 120 |
| | | | Total Iron (Fe) | 2021/09/11 | | 98 | % | 80 - 120 |
| | | | Total Lead (Pb) | 2021/09/11 | | 98 | % | 80 - 120 |
| | | | Total Lithium (Li) | 2021/09/11 | | 90 | % | 80 - 120 |
| | | | Total Manganese (Mn) | 2021/09/11 | | 88 | % | 80 - 120 |
| | | | Total Molybdenum (Mo) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Total Nickel (Ni) | 2021/09/11 | | 89 | % | 80 - 120 |
| | | | Total Selenium (Se) | 2021/09/11 | | 94 | % | 80 - 120 |
| | | | Total Silicon (Si) | 2021/09/11 | | 104 | % | 80 - 120 |
| | | | Total Silver (Ag) | 2021/09/11 | | 89 | % | 80 - 120 |
| | | | Total Strontium (Sr) | 2021/09/11 | | NC | % | 80 - 120 |
| | | | Total Tellurium (Te) | 2021/09/11 | | 97 | % | 80 - 120 |
| | | | Total Thallium (Tl) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Total Thorium (Th) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Total Tin (Sn) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Total Titanium (Ti) | 2021/09/11 | | 97 | % | 80 - 120 |
| | | | Total Tungsten (W) | 2021/09/11 | | 95 | % | 80 - 120 |
| | | | Total Uranium (U) | 2021/09/11 | | 106 | % | 80 - 120 |
| | | | Total Vanadium (V) | 2021/09/11 | | 95 | % | 80 - 120 |
| | | | Total Zinc (Zn) | 2021/09/11 | | 93 | % | 80 - 120 |
| | | | Total Zirconium (Zr) | 2021/09/11 | | 102 | % | 80 - 120 |
| A347639 | AA1 | Spiked Blank | Total Aluminum (Al) | 2021/09/11 | | 104 | % | 80 - 120 |
| | | | Total Antimony (Sb) | 2021/09/11 | | 105 | % | 80 - 120 |
| | | | Total Arsenic (As) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Total Barium (Ba) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Total Beryllium (Be) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Total Bismuth (Bi) | 2021/09/11 | | 103 | % | 80 - 120 |
| | | | Total Boron (B) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Total Cadmium (Cd) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Total Chromium (Cr) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Total Cobalt (Co) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Total Copper (Cu) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Total Iron (Fe) | 2021/09/11 | | 106 | % | 80 - 120 |
| | | | Total Lead (Pb) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Total Lithium (Li) | 2021/09/11 | | 98 | % | 80 - 120 |
| | | | Total Manganese (Mn) | 2021/09/11 | | 103 | % | 80 - 120 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Total Molybdenum (Mo) | 2021/09/11 | | 104 | % | 80 - 120 |
| | | | Total Nickel (Ni) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Total Selenium (Se) | 2021/09/11 | | 101 | % | 80 - 120 |
| | | | Total Silicon (Si) | 2021/09/11 | | 109 | % | 80 - 120 |
| | | | Total Silver (Ag) | 2021/09/11 | | 99 | % | 80 - 120 |
| | | | Total Strontium (Sr) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Total Tellurium (Te) | 2021/09/11 | | 105 | % | 80 - 120 |
| | | | Total Thallium (Tl) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Total Thorium (Th) | 2021/09/11 | | 103 | % | 80 - 120 |
| | | | Total Tin (Sn) | 2021/09/11 | | 104 | % | 80 - 120 |
| | | | Total Titanium (Ti) | 2021/09/11 | | 106 | % | 80 - 120 |
| | | | Total Tungsten (W) | 2021/09/11 | | 100 | % | 80 - 120 |
| | | | Total Uranium (U) | 2021/09/11 | | 107 | % | 80 - 120 |
| | | | Total Vanadium (V) | 2021/09/11 | | 102 | % | 80 - 120 |
| | | | Total Zinc (Zn) | 2021/09/11 | | 103 | % | 80 - 120 |
| | | | Total Zirconium (Zr) | 2021/09/11 | | 102 | % | 80 - 120 |
| A347639 | AA1 | Method Blank | Total Aluminum (Al) | 2021/09/11 | <0.50 | | ug/L | |
| | | | Total Antimony (Sb) | 2021/09/11 | <0.020 | | ug/L | |
| | | | Total Arsenic (As) | 2021/09/11 | <0.020 | | ug/L | |
| | | | Total Barium (Ba) | 2021/09/11 | <0.020 | | ug/L | |
| | | | Total Beryllium (Be) | 2021/09/11 | <0.010 | | ug/L | |
| | | | Total Bismuth (Bi) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Total Boron (B) | 2021/09/11 | <10 | | ug/L | |
| | | | Total Cadmium (Cd) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Total Chromium (Cr) | 2021/09/11 | <0.10 | | ug/L | |
| | | | Total Cobalt (Co) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Total Copper (Cu) | 2021/09/11 | <0.050 | | ug/L | |
| | | | Total Iron (Fe) | 2021/09/11 | <1.0 | | ug/L | |
| | | | Total Lead (Pb) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Total Lithium (Li) | 2021/09/11 | <0.50 | | ug/L | |
| | | | Total Manganese (Mn) | 2021/09/11 | <0.050 | | ug/L | |
| | | | Total Molybdenum (Mo) | 2021/09/11 | <0.050 | | ug/L | |
| | | | Total Nickel (Ni) | 2021/09/11 | <0.020 | | ug/L | |
| | | | Total Selenium (Se) | 2021/09/11 | <0.040 | | ug/L | |
| | | | Total Silicon (Si) | 2021/09/11 | <50 | | ug/L | |
| | | | Total Silver (Ag) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Total Strontium (Sr) | 2021/09/11 | <0.050 | | ug/L | |
| | | | Total Tellurium (Te) | 2021/09/11 | <0.020 | | ug/L | |
| | | | Total Thallium (Tl) | 2021/09/11 | <0.0020 | | ug/L | |
| | | | Total Thorium (Th) | 2021/09/11 | <0.0050 | | ug/L | |
| | | | Total Tin (Sn) | 2021/09/11 | <0.20 | | ug/L | |
| | | | Total Titanium (Ti) | 2021/09/11 | <0.50 | | ug/L | |
| | | | Total Tungsten (W) | 2021/09/11 | <0.010 | | ug/L | |
| | | | Total Uranium (U) | 2021/09/11 | 0.0027, RDL=0.0020 (2) | | ug/L | |
| | | | Total Vanadium (V) | 2021/09/11 | <0.20 | | ug/L | |
| | | | Total Zinc (Zn) | 2021/09/11 | <0.10 | | ug/L | |
| | | | Total Zirconium (Zr) | 2021/09/11 | <0.10 | | ug/L | |
| A347639 | AA1 | RPD [AFF276-04] | Total Aluminum (Al) | 2021/09/11 | 3.8 | | % | 20 |
| | | | Total Antimony (Sb) | 2021/09/11 | 11 | | % | 20 |
| | | | Total Arsenic (As) | 2021/09/11 | 2.4 | | % | 20 |
| | | | Total Barium (Ba) | 2021/09/11 | 0.13 | | % | 20 |
| | | | Total Beryllium (Be) | 2021/09/11 | NC | | % | 20 |
| | | | Total Bismuth (Bi) | 2021/09/11 | NC | | % | 20 |
| | | | Total Boron (B) | 2021/09/11 | NC | | % | 20 |

## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Total Cadmium (Cd) | 2021/09/11 | 4.5 | | % | 20 |
| | | | Total Chromium (Cr) | 2021/09/11 | NC | | % | 20 |
| | | | Total Cobalt (Co) | 2021/09/11 | 1.6 | | % | 20 |
| | | | Total Copper (Cu) | 2021/09/11 | 4.7 | | % | 20 |
| | | | Total Iron (Fe) | 2021/09/11 | 1.0 | | % | 20 |
| | | | Total Lead (Pb) | 2021/09/11 | 2.6 | | % | 20 |
| | | | Total Lithium (Li) | 2021/09/11 | 2.3 | | % | 20 |
| | | | Total Manganese (Mn) | 2021/09/11 | 1.1 | | % | 20 |
| | | | Total Molybdenum (Mo) | 2021/09/11 | 11 | | % | 20 |
| | | | Total Nickel (Ni) | 2021/09/11 | 2.9 | | % | 20 |
| | | | Total Selenium (Se) | 2021/09/11 | 13 | | % | 20 |
| | | | Total Silicon (Si) | 2021/09/11 | 0.60 | | % | 20 |
| | | | Total Silver (Ag) | 2021/09/11 | NC | | % | 20 |
| | | | Total Strontium (Sr) | 2021/09/11 | 1.4 | | % | 20 |
| | | | Total Tellurium (Te) | 2021/09/11 | NC | | % | 20 |
| | | | Total Thallium (Tl) | 2021/09/11 | 4.7 | | % | 20 |
| | | | Total Thorium (Th) | 2021/09/11 | 4.0 | | % | 20 |
| | | | Total Tin (Sn) | 2021/09/11 | NC | | % | 20 |
| | | | Total Titanium (Ti) | 2021/09/11 | NC | | % | 20 |
| | | | Total Tungsten (W) | 2021/09/11 | 11 | | % | 20 |
| | | | Total Uranium (U) | 2021/09/11 | 0.35 | | % | 20 |
| | | | Total Vanadium (V) | 2021/09/11 | NC | | % | 20 |
| | | | Total Zinc (Zn) | 2021/09/11 | 3.4 | | % | 20 |
| | | | Total Zirconium (Zr) | 2021/09/11 | NC | | % | 20 |
| A347643 | MO5 | Matrix Spike | Fluoride (F) | 2021/09/10 | | 100 | % | 80 - 120 |
| A347643 | MO5 | Spiked Blank | Fluoride (F) | 2021/09/10 | | 100 | % | 80 - 120 |
| A347643 | MO5 | Method Blank | Fluoride (F) | 2021/09/10 | <0.020 | | mg/L | |
| A347643 | MO5 | RPD | Fluoride (F) | 2021/09/10 | 0 | | % | 20 |
| A347795 | CJY | Matrix Spike [AFF274-04] | Total Mercury (Hg) | 2021/09/10 | | 104 | % | 80 - 120 |
| A347795 | CJY | Spiked Blank | Total Mercury (Hg) | 2021/09/10 | | 106 | % | 80 - 120 |
| A347795 | CJY | Method Blank | Total Mercury (Hg) | 2021/09/10 | <0.0019 | | ug/L | |
| A347795 | CJY | RPD [AFF273-04] | Total Mercury (Hg) | 2021/09/10 | NC | | % | 20 |
| A348087 | MO5 | Matrix Spike | Dissolved Chloride (Cl) | 2021/09/10 | | 100 | % | 80 - 120 |
| | | | Dissolved Sulphate (SO4) | 2021/09/10 | | NC | % | 80 - 120 |
| A348087 | MO5 | Spiked Blank | Dissolved Chloride (Cl) | 2021/09/10 | | 103 | % | 80 - 120 |
| | | | Dissolved Sulphate (SO4) | 2021/09/10 | | 99 | % | 80 - 120 |
| A348087 | MO5 | Method Blank | Dissolved Chloride (Cl) | 2021/09/10 | <0.50 | | mg/L | |
| | | | Dissolved Sulphate (SO4) | 2021/09/10 | <0.50 | | mg/L | |
| A348087 | MO5 | RPD | Dissolved Chloride (Cl) | 2021/09/10 | NC | | % | 20 |
| | | | Dissolved Sulphate (SO4) | 2021/09/10 | 2.5 | | % | 20 |
| A348160 | MO5 | Matrix Spike | Dissolved Chloride (Cl) | 2021/09/10 | | 84 | % | 80 - 120 |
| | | | Dissolved Sulphate (SO4) | 2021/09/10 | | NC | % | 80 - 120 |
| A348160 | MO5 | Spiked Blank | Dissolved Chloride (Cl) | 2021/09/10 | | 103 | % | 80 - 120 |
| | | | Dissolved Sulphate (SO4) | 2021/09/10 | | 101 | % | 80 - 120 |
| A348160 | MO5 | Method Blank | Dissolved Chloride (Cl) | 2021/09/10 | <0.50 | | mg/L | |
| | | | Dissolved Sulphate (SO4) | 2021/09/10 | 0.98, RDL=0.50 | | mg/L | |
| A348160 | MO5 | RPD | Dissolved Chloride (Cl) | 2021/09/10 | 5.1 | | % | 20 |
| | | | Dissolved Sulphate (SO4) | 2021/09/10 | 1.6 | | % | 20 |
| A348552 | JFH | Matrix Spike | Total Ammonia (N) | 2021/09/11 | | 96 | % | 80 - 120 |
| A348552 | JFH | Spiked Blank | Total Ammonia (N) | 2021/09/11 | | 96 | % | 80 - 120 |
| A348552 | JFH | Method Blank | Total Ammonia (N) | 2021/09/11 | <0.0050 | | mg/L | |
| A348552 | JFH | RPD | Total Ammonia (N) | 2021/09/11 | 1.3 | | % | 20 |
| A348557 | JFH | Matrix Spike [AFF275-09] | Total Ammonia (N) | 2021/09/11 | | 101 | % | 80 - 120 |
| A348557 | JFH | Spiked Blank | Total Ammonia (N) | 2021/09/11 | | 97 | % | 80 - 120 |



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## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| A348557 | JFH | Method Blank | Total Ammonia (N) | 2021/09/11 | <0.0050 | | mg/L | |
| A348557 | JFH | RPD [AFF275-09] | Total Ammonia (N) | 2021/09/11 | NC | | % | 20 |
| A348719 | ZWU | Matrix Spike [AFF277-08] | Dissolved Organic Carbon (C) | 2021/09/13 | | 112 | % | 80 - 120 |
| A348719 | ZWU | Spiked Blank | Dissolved Organic Carbon (C) | 2021/09/11 | | 115 | % | 80 - 120 |
| A348719 | ZWU | Method Blank | Dissolved Organic Carbon (C) | 2021/09/11 | <0.20 | | mg/L | |
| A348719 | ZWU | RPD [AFF277-08] | Dissolved Organic Carbon (C) | 2021/09/13 | NC | | % | 20 |
| A348726 | TL9 | Matrix Spike [AFF272-02] | Fluoride (F) | 2021/09/11 | | 104 | % | 80 - 120 |
| A348726 | TL9 | Spiked Blank | Fluoride (F) | 2021/09/11 | | 106 | % | 80 - 120 |
| A348726 | TL9 | Method Blank | Fluoride (F) | 2021/09/11 | <0.020 | | mg/L | |
| A348726 | TL9 | RPD [AFF272-02] | Fluoride (F) | 2021/09/11 | 5.1 | | % | 20 |
| A349611 | AA1 | Matrix Spike | Total Zinc (Zn) | 2021/09/14 | | 102 | % | 80 - 120 |
| A349611 | AA1 | Spiked Blank | Total Zinc (Zn) | 2021/09/14 | | 102 | % | 80 - 120 |
| A349611 | AA1 | Method Blank | Total Zinc (Zn) | 2021/09/14 | <0.10 | | ug/L | |
| A349611 | AA1 | RPD | Total Zinc (Zn) | 2021/09/14 | 1.9 | | % | 20 |
| A351252 | AA1 | Matrix Spike | Dissolved Aluminum (Al) | 2021/09/14 | | 57 (4) | % | 80 - 120 |
| | | | Dissolved Antimony (Sb) | 2021/09/14 | | 105 | % | 80 - 120 |
| | | | Dissolved Arsenic (As) | 2021/09/14 | | 101 | % | 80 - 120 |
| | | | Dissolved Barium (Ba) | 2021/09/14 | | 97 | % | 80 - 120 |
| | | | Dissolved Beryllium (Be) | 2021/09/14 | | 92 | % | 80 - 120 |
| | | | Dissolved Bismuth (Bi) | 2021/09/14 | | 93 | % | 80 - 120 |
| | | | Dissolved Boron (B) | 2021/09/14 | | 91 | % | 80 - 120 |
| | | | Dissolved Cadmium (Cd) | 2021/09/14 | | 103 | % | 80 - 120 |
| | | | Dissolved Chromium (Cr) | 2021/09/14 | | 91 | % | 80 - 120 |
| | | | Dissolved Cobalt (Co) | 2021/09/14 | | 95 | % | 80 - 120 |
| | | | Dissolved Copper (Cu) | 2021/09/14 | | 87 | % | 80 - 120 |
| | | | Dissolved Iron (Fe) | 2021/09/14 | | 45 (4) | % | 80 - 120 |
| | | | Dissolved Lead (Pb) | 2021/09/14 | | 96 | % | 80 - 120 |
| | | | Dissolved Lithium (Li) | 2021/09/14 | | 83 | % | 80 - 120 |
| | | | Dissolved Manganese (Mn) | 2021/09/14 | | NC | % | 80 - 120 |
| | | | Dissolved Molybdenum (Mo) | 2021/09/14 | | 107 | % | 80 - 120 |
| | | | Dissolved Nickel (Ni) | 2021/09/14 | | 94 | % | 80 - 120 |
| | | | Dissolved Selenium (Se) | 2021/09/14 | | 101 | % | 80 - 120 |
| | | | Dissolved Silicon (Si) | 2021/09/14 | | NC | % | 80 - 120 |
| | | | Dissolved Silver (Ag) | 2021/09/14 | | 100 | % | 80 - 120 |
| | | | Dissolved Strontium (Sr) | 2021/09/14 | | NC | % | 80 - 120 |
| | | | Dissolved Tellurium (Te) | 2021/09/14 | | 103 | % | 80 - 120 |
| | | | Dissolved Thallium (Tl) | 2021/09/14 | | 95 | % | 80 - 120 |
| | | | Dissolved Thorium (Th) | 2021/09/14 | | 99 | % | 80 - 120 |
| | | | Dissolved Tin (Sn) | 2021/09/14 | | 101 | % | 80 - 120 |
| | | | Dissolved Titanium (Ti) | 2021/09/14 | | 87 | % | 80 - 120 |
| | | | Dissolved Tungsten (W) | 2021/09/14 | | 99 | % | 80 - 120 |
| | | | Dissolved Uranium (U) | 2021/09/14 | | 99 | % | 80 - 120 |
| | | | Dissolved Vanadium (V) | 2021/09/14 | | 92 | % | 80 - 120 |
| | | | Dissolved Zinc (Zn) | 2021/09/14 | | 101 | % | 80 - 120 |
| | | | Dissolved Zirconium (Zr) | 2021/09/14 | | 107 | % | 80 - 120 |
| A351252 | AA1 | Spiked Blank | Dissolved Aluminum (Al) | 2021/09/14 | | 98 | % | 80 - 120 |
| | | | Dissolved Antimony (Sb) | 2021/09/14 | | 104 | % | 80 - 120 |
| | | | Dissolved Arsenic (As) | 2021/09/14 | | 101 | % | 80 - 120 |
| | | | Dissolved Barium (Ba) | 2021/09/14 | | 102 | % | 80 - 120 |
| | | | Dissolved Beryllium (Be) | 2021/09/14 | | 102 | % | 80 - 120 |
| | | | Dissolved Bismuth (Bi) | 2021/09/14 | | 99 | % | 80 - 120 |
| | | | Dissolved Boron (B) | 2021/09/14 | | 101 | % | 80 - 120 |
| | | | Dissolved Cadmium (Cd) | 2021/09/14 | | 102 | % | 80 - 120 |
| | | | Dissolved Chromium (Cr) | 2021/09/14 | | 93 | % | 80 - 120 |
| | | | Dissolved Cobalt (Co) | 2021/09/14 | | 96 | % | 80 - 120 |



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## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Copper (Cu) | 2021/09/14 | | 92 | % | 80 - 120 |
| | | | Dissolved Iron (Fe) | 2021/09/14 | | 103 | % | 80 - 120 |
| | | | Dissolved Lead (Pb) | 2021/09/14 | | 99 | % | 80 - 120 |
| | | | Dissolved Lithium (Li) | 2021/09/14 | | 99 | % | 80 - 120 |
| | | | Dissolved Manganese (Mn) | 2021/09/14 | | 93 | % | 80 - 120 |
| | | | Dissolved Molybdenum (Mo) | 2021/09/14 | | 103 | % | 80 - 120 |
| | | | Dissolved Nickel (Ni) | 2021/09/14 | | 98 | % | 80 - 120 |
| | | | Dissolved Selenium (Se) | 2021/09/14 | | 99 | % | 80 - 120 |
| | | | Dissolved Silicon (Si) | 2021/09/14 | | 103 | % | 80 - 120 |
| | | | Dissolved Silver (Ag) | 2021/09/14 | | 100 | % | 80 - 120 |
| | | | Dissolved Strontium (Sr) | 2021/09/14 | | 96 | % | 80 - 120 |
| | | | Dissolved Tellurium (Te) | 2021/09/14 | | 104 | % | 80 - 120 |
| | | | Dissolved Thallium (Tl) | 2021/09/14 | | 99 | % | 80 - 120 |
| | | | Dissolved Thorium (Th) | 2021/09/14 | | 101 | % | 80 - 120 |
| | | | Dissolved Tin (Sn) | 2021/09/14 | | 103 | % | 80 - 120 |
| | | | Dissolved Titanium (Ti) | 2021/09/14 | | 103 | % | 80 - 120 |
| | | | Dissolved Tungsten (W) | 2021/09/14 | | 98 | % | 80 - 120 |
| | | | Dissolved Uranium (U) | 2021/09/14 | | 100 | % | 80 - 120 |
| | | | Dissolved Vanadium (V) | 2021/09/14 | | 92 | % | 80 - 120 |
| | | | Dissolved Zinc (Zn) | 2021/09/14 | | 101 | % | 80 - 120 |
| | | | Dissolved Zirconium (Zr) | 2021/09/14 | | 103 | % | 80 - 120 |
| A351252 | AA1 | Method Blank | Dissolved Aluminum (Al) | 2021/09/14 | <0.50 | | ug/L | |
| | | | Dissolved Antimony (Sb) | 2021/09/14 | <0.020 | | ug/L | |
| | | | Dissolved Arsenic (As) | 2021/09/14 | <0.020 | | ug/L | |
| | | | Dissolved Barium (Ba) | 2021/09/14 | <0.020 | | ug/L | |
| | | | Dissolved Beryllium (Be) | 2021/09/14 | <0.010 | | ug/L | |
| | | | Dissolved Bismuth (Bi) | 2021/09/14 | <0.0050 | | ug/L | |
| | | | Dissolved Boron (B) | 2021/09/14 | <10 | | ug/L | |
| | | | Dissolved Cadmium (Cd) | 2021/09/14 | <0.0050 | | ug/L | |
| | | | Dissolved Chromium (Cr) | 2021/09/14 | <0.10 | | ug/L | |
| | | | Dissolved Cobalt (Co) | 2021/09/14 | <0.0050 | | ug/L | |
| | | | Dissolved Copper (Cu) | 2021/09/14 | <0.050 | | ug/L | |
| | | | Dissolved Iron (Fe) | 2021/09/14 | <1.0 | | ug/L | |
| | | | Dissolved Lead (Pb) | 2021/09/14 | <0.0050 | | ug/L | |
| | | | Dissolved Lithium (Li) | 2021/09/14 | <0.50 | | ug/L | |
| | | | Dissolved Manganese (Mn) | 2021/09/14 | <0.050 | | ug/L | |
| | | | Dissolved Molybdenum (Mo) | 2021/09/14 | <0.050 | | ug/L | |
| | | | Dissolved Nickel (Ni) | 2021/09/14 | <0.020 | | ug/L | |
| | | | Dissolved Selenium (Se) | 2021/09/14 | <0.040 | | ug/L | |
| | | | Dissolved Silicon (Si) | 2021/09/14 | <50 | | ug/L | |
| | | | Dissolved Silver (Ag) | 2021/09/14 | <0.0050 | | ug/L | |
| | | | Dissolved Strontium (Sr) | 2021/09/14 | <0.050 | | ug/L | |
| | | | Dissolved Tellurium (Te) | 2021/09/14 | <0.020 | | ug/L | |
| | | | Dissolved Thallium (Tl) | 2021/09/14 | <0.0020 | | ug/L | |
| | | | Dissolved Thorium (Th) | 2021/09/14 | <0.0050 | | ug/L | |
| | | | Dissolved Tin (Sn) | 2021/09/14 | <0.20 | | ug/L | |
| | | | Dissolved Titanium (Ti) | 2021/09/14 | <0.50 | | ug/L | |
| | | | Dissolved Tungsten (W) | 2021/09/14 | <0.010 | | ug/L | |
| | | | Dissolved Uranium (U) | 2021/09/14 | <0.0020 | | ug/L | |
| | | | Dissolved Vanadium (V) | 2021/09/14 | <0.20 | | ug/L | |
| | | | Dissolved Zinc (Zn) | 2021/09/14 | <0.10 | | ug/L | |
| | | | Dissolved Zirconium (Zr) | 2021/09/14 | <0.10 | | ug/L | |
| A351252 | AA1 | RPD | Dissolved Antimony (Sb) | 2021/09/14 | 3.6 | | % | 20 |
| | | | Dissolved Arsenic (As) | 2021/09/14 | 3.0 | | % | 20 |
| | | | Dissolved Barium (Ba) | 2021/09/14 | 1.4 | | % | 20 |



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## QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Beryllium (Be) | 2021/09/14 | NC | | % | 20 |
| | | | Dissolved Bismuth (Bi) | 2021/09/14 | NC | | % | 20 |
| | | | Dissolved Boron (B) | 2021/09/14 | 0.17 | | % | 20 |
| | | | Dissolved Cadmium (Cd) | 2021/09/14 | 4.6 | | % | 20 |
| | | | Dissolved Chromium (Cr) | 2021/09/14 | 1.5 | | % | 20 |
| | | | Dissolved Lithium (Li) | 2021/09/14 | 1.1 | | % | 20 |
| | | | Dissolved Molybdenum (Mo) | 2021/09/14 | 0.21 | | % | 20 |
| | | | Dissolved Nickel (Ni) | 2021/09/14 | 1.2 | | % | 20 |
| | | | Dissolved Selenium (Se) | 2021/09/14 | 10 | | % | 20 |
| | | | Dissolved Silicon (Si) | 2021/09/14 | 1.9 | | % | 20 |
| | | | Dissolved Silver (Ag) | 2021/09/14 | NC | | % | 20 |
| | | | Dissolved Strontium (Sr) | 2021/09/14 | 0.34 | | % | 20 |
| | | | Dissolved Thallium (Tl) | 2021/09/14 | NC | | % | 20 |
| | | | Dissolved Tin (Sn) | 2021/09/14 | NC | | % | 20 |
| | | | Dissolved Uranium (U) | 2021/09/14 | 1.3 | | % | 20 |
| | | | Dissolved Vanadium (V) | 2021/09/14 | 2.4 | | % | 20 |
| | | | Dissolved Zinc (Zn) | 2021/09/14 | 4.1 | | % | 20 |
| | | | Dissolved Zirconium (Zr) | 2021/09/14 | NC | | % | 20 |
| A351779 | MO5 | Matrix Spike [AFF268-02] | Dissolved Chloride (Cl) | 2021/09/14 | | 100 | % | 80 - 120 |
| | | | Dissolved Sulphate (SO4) | 2021/09/14 | | 102 | % | 80 - 120 |
| A351779 | MO5 | Spiked Blank | Dissolved Chloride (Cl) | 2021/09/14 | | 103 | % | 80 - 120 |
| | | | Dissolved Sulphate (SO4) | 2021/09/14 | | 99 | % | 80 - 120 |
| A351779 | MO5 | Method Blank | Dissolved Chloride (Cl) | 2021/09/14 | <0.50 | | mg/L | |
| | | | Dissolved Sulphate (SO4) | 2021/09/14 | <0.50 | | mg/L | |
| A351779 | MO5 | RPD [AFF268-02] | Dissolved Chloride (Cl) | 2021/09/14 | NC | | % | 20 |
| | | | Dissolved Sulphate (SO4) | 2021/09/14 | NC | | % | 20 |
| A357208 | AP1 | Matrix Spike | Total Dissolved Solids | 2021/09/18 | | 82 | % | 80 - 120 |
| A357208 | AP1 | Spiked Blank | Total Dissolved Solids | 2021/09/18 | | 96 | % | 80 - 120 |
| A357208 | AP1 | Method Blank | Total Dissolved Solids | 2021/09/18 | <1.0 | | mg/L | |
| A357208 | AP1 | RPD | Total Dissolved Solids | 2021/09/18 | 0.29 | | % | 20 |
| A362419 | HE1 | Spiked Blank | Total Dissolved Solids | 2021/09/22 | | 92 | % | 80 - 120 |
| A362419 | HE1 | Method Blank | Total Dissolved Solids | 2021/09/22 | <1.0 | | mg/L | |

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) Method blank exceeds acceptance limits for Srl- 2X RDL acceptable for low level metals determination.

(2) Method blank exceeds acceptance limits for U- 2X RDL acceptable for low level metals determination.

(3) Method blank exceeds acceptance limits for Zn- 2X RDL acceptable for low level metals determination.

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



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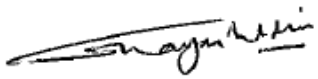
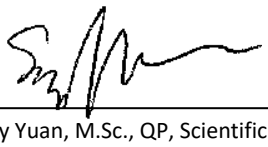
## VALIDATION SIGNATURE PAGE

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



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



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

BV Labs 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 Signature Page.



Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

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

C165509_COC

| INVOICE TO: | | Report Information | | Project Information | | |
|---|---|---|---|---|---|---|
| Company Name | #4977 Government of Yukon – Dept of ENV | Company Name | #44311 Government of Yukon – Dept of ENV | Quotation # | C10319 | Bottle Order #: 644610 |
| Contact Name | Stephanie Lyons | Contact Name | Stephanie Lyons | P.O. # | | |
| Address | Water Resources Branch (V-310) Box 2703<br>Whitehorse YT Y1A 2C6 | Address | Box 2703<br>Whitehorse YT Y1A2C6 | Project # | 2021-Ketza | Chain Of Custody Record: C#644610-04-01 |
| Phone | (867) 689-8767 Fax: | Phone | (867) 689-8767 Fax: | Project Name | | Project Manager: Customer Solutions |
| Email | Stephanie.lyons@yukon.ca | Email | stephanie.lyons@yukon.ca | Site # | | |
| | | | | Sampled By | | |

Regulatory Criteria

Special Instructions

**Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form**

**Samples must be kept cool ( < 10°C ) from time of sampling until delivery to BV Labs**

Turnaround Time (TAT) Required

Please provide advance notice for rush projects

**Regular (Standard) TAT** (X)
*(will be applied if Rush TAT is not specified)*
*Standard TAT = 5-7 Working days for most tests.*
*Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.*

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

| | Sample Barcode Label | Sample (Location) Identification | Date Sampled | Time Sampled | Matrix | Regulated Drinking Water ? (Y/N) | Metals Field Filtered ? (Y/N) | Alk, EC, F, pH & LL-Cl, SO4, NO2, NO3 (Group 01) | TSS & LL-TDS (Group 02) | LL DOC & Dissolved Total Phosphorus (Group 03) | Total N, TKN & LL Total Phosphorus (Group 04) | Ammonia-N Low Level (Preserved) | Cyanide SAD & WAD (Group 07) | Dissolved CR3 & CR6 (Group 08) | Ketza LL Dissolved Metals (Group 05) | Ketza LL Total Metals (Group 06) | | # of Bottles | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 2021T25 - 11 | 01Sept'21 | 09:15 | SW | N | Y | X | X | X | X | X | X | X | X | X | | 13 | |
| 2 | | 2021T25 - 12 | | | | | | | | | | | | | | | | | |
| 3 | | 2021T25 - 13 | | 10:45 | | | | | | | | | | | | | | | |
| 4 | | 2021T25 - 14 | | 11:15 | | | | | | | | | | | | | | | |
| 5 | | 2021T25 - 15 | | 12:00 | | | | | | | | | | | | | | | |
| 6 | | 2021T25 - 16 | | 11:45 | | | | | | | | | | | | | | | |
| 7 | | 2021T25 - 17 | | 12:30 | | | | | | | | | | | | | | | |
| 8 | | 2021T25 - 18 | | 13:15 | | | | | | | | | | | | | | | |
| 9 | | 2021T25 - 19 | | 14:15 | | | | | | | | | | | | | | | |
| 10 | | 2021T25 - 20 | | 15:30 | | | | | | | | | | | | | | | |

| * RELINQUISHED BY: (Signature/Print) | Date: (YY/MM/DD) | Time | RECEIVED BY: (Signature/Print) | Date: (YY/MM/DD) | Time | # jars used and not submitted | Lab Use Only: Time Sensitive | Temperature (°C) on Receipt | Custody Seal Intact on Cooler? |
|---|---|---|---|---|---|---|---|---|---|
| Stephanie Lyons | 21/09/02 | 1700 | | 21/09/03 | 15:17 | | ☐ | 6.6, 6.4, 4.1, 4.1, 2.7, 2.7 | ☒ Yes ☐ No |

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' 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.BVLABS.COM/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.

White: BV Labs Yellow: Client

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

C165509_COC

| INVOICE TO: | | Report Information | | Project Information | |
|---|---|---|---|---|---|
| Company Name | #4977 Government of Yukon – Dept of ENV | Company Name | #44311 Government of Yukon – Dept of ENV | Quotation # | C10319 |
| Contact Name | Stephanie Lyons | Contact Name | Stephanie Lyons | P.O. # | |
| Address | Water Resources Branch (V-310) Box 2703<br>Whitehorse YT Y1A 2C6 | Address | Box 2703<br>Whitehorse YT Y1A2C6 | Project # | 2021-Ketza |
| Phone | (867) 689-8767 Fax: | Phone | (867) 689-8767 Fax: | Project Name | |
| Email | Stephanie.lyons@yukon.ca | Email | stephanie.lyons@yukon.ca | Site # | |
| | | | | Sampled By | |

Bottle Order #: 644610

Chain Of Custody Record: C#644610-05-01

Project Manager: Customer Solutions

Regulatory Criteria

Special Instructions

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

Samples must be kept cool ( < 10°C ) from time of sampling until delivery to BV Labs

Turnaround Time (TAT) Required

Please provide advance notice for rush projects

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

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

| | Sample Barcode Label | Sample (Location) Identification | Date Sampled | Time Sampled | Matrix | Regulated Drinking Water ? (Y/N) | Metals Field Filtered ? (Y/N) | Alk, EC, F, pH & LL-Cl, SO4, NO2, NO3 (Group 01) | TSS & LL-TDS (Group 02) | LL DOC & Dissolved Total Phosphorus (Group 03) | Total N, TKN & LL Total Phosphorus (Group 04) | Ammonia-N Low Level (Preserved) | Cyanide SAD & WAD (Group 07) | Dissolved CR3 & CR6 (Group 08) | Ketza LL Dissolved Metals (Group 05) | Ketza LL Total Metals (Group 06) | # of Bottles | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 2021T25-21 | 01Sept'21 | 15 30 | SW | N | Y | X | X | X | X | X | X | X | X | X | 13 | |
| 2 | | 2021T25-22 | 02Sept'21 | 1015 (1045) | | | | | | | | | | | | | | |
| 3 | | 2021T25-23 | | 1100 | | | | | | | | | | | | | | |
| 4 | | 2021T25-24 | | 1115 | | | | | | | | | | | | | 4 | -ran out of bottles; unfiltered unpreserved sample - please split into different parameters |
| 5 | | 2021T25-25 | | 1200 | | | | | | | | | | | | | 13 | -trip blank |
| 6 | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | |

| * RELINQUISHED BY: (Signature/Print) | Date: (YY/MM/DD) | Time | RECEIVED BY: (Signature/Print) | Date: (YY/MM/DD) | Time | # jars used and not submitted | Lab Use Only: Time Sensitive | Temperature (°C) on Receipt | Custody Seal Intact on Cooler? |
|---|---|---|---|---|---|---|---|---|---|
| Stephanie Lyons | 21/09/02 | 1700 | | 21/09/03 | 13:17 | | | 6,6,6,4,4,4 7.7.7 | Yes / No |

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' 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.BVLABS.COM/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.

White: BV Labs Yellow: Client

Bureau Veritas Canada (2019) Inc.

Client: Lyons/Yukon Water Resources Branch

Project: 2021 Ketza Mine Audit
(Contract # C00061500)

ISO# 2021422
Location: 5-A
67 for 18O, 2H

Environmental Isotope Lab
2021-09-23


| # | Sample | Date | Lab# | $\delta^{18}O$ | Result | Repeat | $\delta^{2}H$ | Result | Repeat | | pH | EC | AZD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | $H_2O$ | VSMOW | ± 0.2‰ | $H_2O$ | VSMOW | ± 0.8‰ | | | uS/cm | |
| 1 | 2021T24-01 | 2021-08-04 | 461319 | X | -22.00 | -22.02 | X | -167.88 | -168.06 | 1x30mL | 7.59 | 597.0 | |
| 2 | 2021T24-02 | 2021-08-03 | 461320 | X | -20.75 | | X | -161.82 | | 1x30mL | 7.30 | 686.0 | |
| 3 | 2021T24-03 | 2021-08-03 | 461321 | X | -21.91 | | X | -168.43 | | 1x30mL | 7.70 | 493.0 | |
| 4 | 2021T24-04 | 2021-08-03 | 461322 | X | -21.37 | | X | -164.72 | | 1x30mL | 7.49 | 444.0 | |
| 5 | 2021T24-05 | 2021-08-05 | 461323 | X | -21.40 | -21.42 | X | -163.71 | -163.54 | 1x30mL | 7.72 | 300.0 | |
| 6 | 2021T24-06 | 2021-08-04 | 461324 | X | -21.53 | | X | -163.04 | | 1x30mL | 7.47 | 826.0 | |
| 7 | 2021T24-07 | 2021-08-05 | 461325 | X | -21.07 | | X | -161.81 | | 1x30mL | 12.19 | 1,999.0 | |
| 8 | 2021T24-08 | 2021-08-05 | 461326 | X | -21.50 | | X | -163.56 | | 1x30mL | 7.21 | 610.0 | |
| 9 | 2021T24-09 | 2021-08-05 | 461327 | X | -20.98 | | X | -160.71 | | 1x30mL | 7.17 | 529.0 | |
| 10 | 2021T24-10 | 2021-08-04 | 461328 | X | -21.35 | -21.30 | X | -162.40 | -162.43 | 1x30mL | 7.03 | 333.0 | |
| 11 | 2021T24-11 | 2021-08-04 | 461329 | X | -21.22 | | X | -161.90 | | 1x30mL | 7.36 | 694.0 | |
| 12 | 2021T24-12 | 2021-08-05 | 461330 | X | -21.68 | | X | -164.85 | | 1x30mL | 7.36 | 1,125.0 | |
| 13 | 2021T24-13 | 2021-08-03 | 461331 | X | -21.01 | | X | -159.58 | | 1x30mL | 6.02 | 670.0 | |
| 14 | 2021T24-14 | 2021-08-04 | 461332 | X | -22.47 | | X | -170.20 | | 1x30mL | 5.09 | 465.0 | |
| 15 | 2021T24-15 | 2021-08-04 | 461333 | X | -21.50 | -21.48 | X | -162.90 | -162.80 | 1x30mL | 2.68 | 1,012.0 | |
| 16 | 2021T24-16 | 2021-08-05 | 461334 | X | -21.90 | | X | -166.74 | | 1x30mL | 3.74 | 491.0 | |
| 17 | 2021T24-17 | 2021-08-05 | 461335 | X | -20.86 | | X | -159.53 | | 1x30mL | 6.82 | 554.0 | |
| 18 | 2021T24-18 | 2021-08-04 | 461336 | X | -21.38 | | X | -164.68 | | 1x30mL | 7.26 | 814.0 | |
| 19 | 2021T24-19 | 2021-08-05 | 461337 | X | -21.28 | | X | -162.94 | | 1x30mL | 7.46 | 469.1 | |
| 20 | 2021T24-20 | 2021-08-03 | 461338 | X | -21.49 | -21.60 | X | -164.58 | -164.55 | 1x30mL | 7.64 | 208.0 | |
| 21 | 2021T24-21 | 2021-08-03 | 461339 | X | -18.79 | | X | -146.14 | | 1x30mL | 7.49 | 509.0 | |
| 22 | 2021T24-22 | 2021-08-03 | 461340 | X | -22.04 | | X | -167.14 | | 1x30mL | 7.48 | 514.0 | |
| 23 | 2021T24-23 | 2021-08-03 | 461341 | X | -21.72 | | X | -165.44 | | 1x30mL | 7.59 | 563.0 | |
| 24 | 2021T24-24 | - | | | | | | | | | | | |
| 25 | 2021T24-25 | 2021-08-06 | 461342 | X | -21.41 | | X | -161.52 | | 1x30mL | 8.29 | 304.6 | |
| 26 | 2021T24-26 | 2021-08-05 | 461343 | X | -21.59 | -21.57 | X | -165.11 | -165.24 | 1x30mL | 7.69 | 709.0 | |
| 27 | 2021T24-27 | 2021-08-05 | 461344 | X | -21.44 | | X | -164.98 | | 1x30mL | 8.01 | 650.0 | |
| 28 | 2021T24-28 | 2021-08-05 | 461345 | X | -19.99 | | X | -157.47 | | 1x30mL | 7.96 | 424.2 | |
| 29 | 2021T24-29 | 2021-08-05 | 461346 | X | -21.25 | | X | -162.64 | | 1x30mL | 7.90 | 438.7 | |
| 30 | 2021T24-30 | 2021-08-06 | 461347 | X | -21.06 | -21.00 | X | -161.41 | -161.33 | 1x30mL | 8.37 | 436.0 | |
| 31 | 2021T24-31 | 2021-08-06 | 461348 | X | -19.86 | -19.99 | X | -157.61 | -158.29 | 1x30mL | 8.23 | 643.0 | |
| 32 | 2021T24-32 | 2021-08-06 | 461349 | X | -20.06 | | X | -158.82 | | 1x30mL | 7.84 | 639.0 | |
| 33 | 2021T24-33 | 2021-08-06 | 461350 | X | -21.39 | | X | -162.76 | | 1x30mL | 8.40 | 517.0 | |
| 34 | 2021T24-34 | 2021-08-06 | 461351 | X | -21.12 | | X | -161.51 | | 1x30mL | 8.38 | 451.7 | |
| 35 | 2021T24-35 | 2021-08-06 | 461352 | X | -21.31 | | X | -162.86 | | 1x30mL | 8.30 | 489.1 | |
| 36 | 2021T24-36 | 2021-08-05 | 461353 | X | -21.74 | -21.71 | X | -164.87 | -164.97 | 1x30mL | 8.40 | 418.4 | |
| 37 | 2021T24-37 | 2021-08-06 | 461354 | X | -21.28 | -21.22 | X | -162.33 | -161.79 | 1x30mL | 8.40 | 536.0 | |
| 38 | 2021T24-38 | 2021-08-05 | 461355 | X | -21.93 | | X | -166.81 | | 1x30mL | 7.70 | 660.0 | |
| 39 | 2021T24-39 | 2021-08-05 | 461356 | X | -21.57 | | X | -162.33 | | 1x30mL | 8.36 | 497.0 | |
| 40 | 2021T24-40 | 2021-08-06 | 461357 | X | -21.76 | | X | -166.60 | | 1x30mL | 8.38 | 759.0 | |
| 41 | 2021T24-41 | 2021-08-06 | 461358 | X | -20.99 | | X | -161.22 | | 1x30mL | 8.27 | 413.3 | |
| 42 | 2021T24-42 | 2021-08-03 | 461359 | X | -21.52 | -21.55 | X | -165.56 | -165.49 | 1x30mL | 7.59 | 563.0 | |
| 43 | 2021T24-43 | 2021-08-03 | 461360 | X | -21.63 | -21.79 | X | -168.30 | -168.68 | 1x30mL | 7.70 | 493.0 | |
| 44 | 2021T24-44 | 2021-08-06 | 461361 | X | -19.68 | | X | -156.74 | | 1x30mL | 8.23 | 643.0 | |
| 45 | 2021T24-45 | 2021-08-31 | 461362 | X | -21.25 | | X | -160.90 | | 1x30mL | 8.08 | 587.0 | |
| 46 | 2021T24-46 | 2021-08-31 | 461363 | X | -21.11 | | X | -160.76 | | 1x30mL | 8.18 | 528.0 | |
| 47 | 2021T24-47 | 2021-08-31 | 461364 | X | -21.46 | -21.49 | X | -164.77 | -165.00 | 1x30mL | 7.71 | 715.0 | |
| 48 | 2021T24-48 | 2021-08-31 | 461365 | X | -21.62 | | X | -164.53 | | 1x30mL | 7.73 | 579.0 | |
| 49 | 2021T24-49 | 2021-08-31 | 461366 | X | -21.65 | | X | -164.29 | | 1x30mL | 7.71 | 609.0 | |
| 50 | 2021T24-50 | 2021-08-31 | 461367 | X | -21.64 | | X | -164.39 | | 1x30mL | 7.35 | 500.0 | |
| 51 | 2021T24-51 | 2021-08-31 | 461368 | X | -21.76 | | X | -164.97 | | 1x30mL | 7.40 | 505.0 | |
| 52 | 2021T24-52 | 2021-08-31 | 461369 | X | -21.75 | -21.82 | X | -165.36 | -165.87 | 1x30mL | 7.53 | 569.0 | |
| 53 | 2021T24-53 | 2021-08-31 | 461370 | X | -21.88 | | X | -165.55 | | 1x30mL | 7.53 | 569.0 | |
| 54 | 2021T24-54 | 2021-08-31 | 461371 | X | -21.48 | | X | -163.65 | | 1x30mL | 7.44 | 796.0 | |

ENVIRONMENTAL ISOTOPE LABORATORY

| # | Sample | Date | Lab# | $\delta^{18}O$ | Result | Repeat | $\delta^{2}H$ | Result | Repeat | | pH | EC | AZD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | $H_2O$ | VSMOW | ± 0.2‰ | $H_2O$ | VSMOW | ± 0.8‰ | | | uS/cm | |
| 55 | 2021T24-55 | 2021-09-01 | 461372 | X | -21.27 | | X | -163.83 | | 1x30mL | 7.93 | 759.0 | |
| 56 | 2021T24-56 | 2021-09-01 | 461373 | X | -21.43 | | X | -163.52 | | 1x30mL | 8.29 | 623.0 | |
| 57 | 2021T24-57 | 2021-09-01 | 461374 | X | -21.47 | -21.33 | X | -165.70 | -165.31 | 1x30mL | 8.36 | 1,044.0 | |
| 58 | 2021T24-58 | 2021-09-01 | 461375 | X | -21.70 | | X | -165.72 | | 1x30mL | 8.34 | 1,767.0 | |
| 59 | 2021T24-59 | 2021-09-01 | 461376 | X | -21.52 | | X | -163.45 | | 1x30mL | 8.23 | 597.0 | |
| 60 | 2021T24-60 | 2021-09-01 | 461377 | X | -13.53 | -13.49 | X | -95.90 | -95.34 | 1x30mL | 5.86 | 2.6 | |
| 61 | 2021T24-61 | 2021-09-01 | 461378 | X | -21.40 | | X | -163.67 | | 1x30mL | 8.25 | 574.0 | |
| 62 | 2021T24-62 | 2021-09-01 | 461379 | X | -21.54 | -21.64 | X | -164.84 | -164.29 | 1x30mL | 8.50 | 586.0 | |
| 63 | 2021T24-63 | 2021-09-01 | 461380 | X | -21.82 | | X | -164.67 | | 1x30mL | 8.22 | 634.0 | |
| 64 | 2021T24-64 | 2021-09-01 | 461381 | X | -21.58 | | X | -160.74 | | 1x30mL | 7.74 | 685.0 | |
| 65 | 2021T24-65 | 2021-09-01 | 461382 | X | -21.79 | | X | -166.74 | | 1x30mL | 7.87 | 1,145.0 | |
| 66 | 2021T24-66 | 2021-09-02 | 461383 | X | -21.10 | | X | -160.62 | | 1x30mL | 8.29 | 450.3 | |
| 67 | 2021T24-67 | 2021-09-02 | 461384 | X | -21.00 | -21.02 | X | -159.11 | -159.37 | 1x30mL | 8.00 | 274.4 | |
| 68 | 2021T24-68 | 2021-09-02 | 461385 | X | -20.93 | | X | -159.37 | | 1x30mL | 8.00 | 274.4 | |

**NOTES**
No sample #24

ENVIRONMENTAL ISOTOPE LABORATORY

# Appendix E – 2021 Audit Field Notes – Hemmera and Water Resources Branch

Station ID: PCC-1
Sample ID: 2021T25-1
Sample Class: SW

Date: 31 ~~Sept~~ Aug 21
Weather: rained yesterday sunny; no breeze; 3.3°C
Coordinates: N61.54337 W132.23592
Site Description: D/S Peel & Coche Confluence

Field Crew (circle sampler): (SL) CF
Field Meter Used: YSI Y23461626/
YSI Y22S5689

| | |
|---|---|
| Time: | 0905 |
| Air Temp (°C): | 3.3 |
| H2O Temp (°C): | 3.7/3.6 |
| DO (mg/L): | 11.59/11.85 |
| DO (%): | -/89.5 |
| Cond (µs/cm): | ~~57~~/552.2 |
| SPC (µs/cm): | 587/597 |
| pH: | 8.08/7.35 |
| ORP (mV): | -/93.6 |
| Turbidity (NTU): | 2.06/1.22 |

QA/QC Sample IDs

| | | |
|---|---|---|
| Duplicate: | | Time: |
| Trip Blank: | | Time: |
| Field Blank: | | Time: |

Picture #s: Field Notes/US/DS/Sub/RB/LB
Comments: Brown precipitate, Fe?

Titration $V_1 = 20$ $M_1 = 305$ 0.1600 $H_2SO_4$
$V_2 = 20$ $M_2 = 301$ light pink endpoint

No.395

Station ID: KR-08-1
Sample ID: 2021T25-02
Sample Class: SW

Date: 31 Aug 2021
Weather: Sunny; no cloud, no breeze; 3.6°C
Coordinates: N 61.54294° W132.23627°
Site Description: Cache Ck. US Peel Creek

Field Crew (circle sampler): (SL) / CF
Field Meter Used: YSI Y23461626 / Y22S6689

| | |
|---|---|
| Time: | 09:50 |
| Air Temp (°C): | 3.6 |
| H2O Temp (°C): | 4.2 / 4.1 |
| DO (mg/L): | 11.45 / 11.72 |
| DO (%): | - / 89.9 |
| Cond (µs/cm): | - / 322.8 |
| SPC (µs/cm): | 528 / 537 |
| pH: | 8.18 / 7.72 |
| ORP (mV): | - / 71.7 |
| Turbidity (NTU): | 0.50 / -0.65 |

QA/QC Sample IDs

| | | | |
|---|---|---|---|
| Duplicate: | | Time: | |
| Trip Blank: | | Time: | |
| Field Blank: | | Time: | |

Picture #s: US / DS / sub / RB / LB
Comments: 1 black bear with 2 cubs

Titration $V_1 T_1$ = 20 $M_1$ = 338
$V_2 T_2$ = 20 $M_2$ = 333

Station ID: KR-15-1
Sample ID: 2021T25-03
Sample Class: SW

Date: 31 Aug 2021 Weather: sunny, 5% clouds; light breeze
Coordinates: U/S culvert on Peel creek, next to tractors camp road
Site Description: N61.54229 W132.24698

Time: 11:30
Air Temp (°C): 12.7
H2O Temp (°C): 3.4/3.3
DO (mg/L): 11.60/11.93
DO (%): -/89.4
Cond (µs/cm): -/424.7
SPC (µs/cm): 715/726
pH: 7.71/7.13
ORP (mV): -122.0
Turbidity (NTU): 2.98/2.34

Field Crew (circle sampler): (SL)/CF
Field Meter Used: Y234626/Y225689

QA/QC Sample IDs
Duplicate: Time:
Trip Blank: Time:
Field Blank: Time:

Picture #s: U/S / DS / sub / RB / LB
Comments: iron oxide precipitate on substrate and vegetation in stream bed.

Titration: $V_1 = 20$ $U_1 = 188$
$V_2 = 20$ $U_2 =$

Station ID: PS3-DS
Sample ID: 2021T25-04
Sample Class: SW

Date: 31 Aug 2021 Weather: sonny ~5% cloud v. light breeze.
Coordinates: N 61.54270° W 132.26811°
Site Description: Peel Cr D/S Seep 3

Field Crew (circle sampler): (SL) / CF
Field Meter Used: Y2346026 / Y2256889

| | |
|---|---|
| Time: | 1345 |
| Air Temp (°C): | 12.5 |
| H2O Temp (°C): | 3.7 / 3.5 |
| DO (mg/L): | 11.28 / 11.64 |
| DO (%): | — / 87.7 |
| Cond (µs/cm): | — / 345.8 |
| SPC (µs/cm): | 579 / 588 |
| pH: | 7.73 / 7.28 |
| ORP (mV): | — / 87.0 |
| Turbidity (NTU): | 2.44 / 0.90 |

QA/QC Sample IDs

Duplicate: _____ Time: _____
Trip Blank: _____ Time: _____
Field Blank: _____ Time: _____

Picture #s: US / DS / sub / RB / LB
Comments: iron oxide precip covering stream substrate 100%

$V_1$=20 $U_1$=236 0.6N $H_2SO_4$
$V_a$=20 $U_2$=234 Grad. Cyl. measurement
LP endpoint

Station ID: PS2 DS
Sample ID: 2021T25-05
Sample Class: SW

Date: 31 Aug 2021
Weather: sunny; 5% cloud; v light breeze
Coordinates: 61.54280 132.26900
Site Description: Peek Ck D/S seep 2

Time: 1415
Air Temp (°C): 14.3
H2O Temp (°C): 4.2/4.2
DO (mg/L): -/87.1
DO (%): 11.07 /11.35
Cond (µs/cm): - / 372.7
SPC (µs/cm): 609 /619
pH: 7.71/ 7.19
ORP (mV): -/ 99.4
Turbidity (NTU): 1.48 /0.94

Field Crew (circle sampler): (SL)/CF
Field Meter Used: Y234626 / Y225689

QA/QC Sample IDs
Duplicate: Time:
Trip Blank: Time:
Field Blank: Time:

Picture #s: US/DS/sub/RB/LB
Comments: 100% iron oxide precip on stream substrate

V1:20 U1:230 0.6N $H_2SO_4$
V2:20 U2:235 LP endpoint

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PCS3

Station ID: (Seep 3)

Sample ID: 2021T25-06

Sample Class: SW

Date: 31 Aug 2021

Weather: sunny, 10% cloud, light breeze

Coordinates: N61.54287° W132.26822°

Site Description: seep daylighting

Field Crew (circle sampler): (SL) / CF / AB

Field Meter Used:

| | |
|---|---|
| Time: | 14:30 / |
| Air Temp (°C): | 17.7 / |
| H2O Temp (°C): | 1.4 / 1.3 |
| DO (mg/L): | 11.20 / 12.01 |
| DO (%): | — / 85.3 |
| Cond (µs/cm): | — / 279.6 |
| SPC (µs/cm): | 500 / 513 |
| pH: | 7.35 / 7.09 |
| ORP (mV): | — / 81.6 |
| Turbidity (NTU): | 9.62 / 10.45 |

QA/QC Sample IDs

Duplicate: Time:

Trip Blank: Time:

Field Blank: Time:

Picture #s: US / DS / substrate

Comments: 3 seeps (main w 2 side) no iron precip on substrate

V1: 20 U1: 251 0.16N $H_2SO_4$

V2: 20 U2: 242 LP endpoint

PCS2

Station ID: (Seep 2)

Sample ID: 2021T25-07

Sample Class: SW

Date: 31 Aug 2021 Weather: v. light breeze sunny; 15% cloud cover

Coordinates: 61.54285, 132.26822 ? same coordinates as PCS3?

Site Description: seep 2 daylighting.

Field Crew (circle sampler): (SL) CF, AB

Field Meter Used:

| | | |
|---|---|---|
| Time: | 15:30 | |
| Air Temp (°C): | 13.1 | |
| H2O Temp (°C): | 1.4 | 1.3 |
| DO (mg/L): | 10.82 | 11.74 |
| DO (%): | | 83.4 |
| Cond (µs/cm): | | 280.5 |
| SPC (µs/cm): | 505 | 513 |
| pH: | 7.40 | 7.58 |
| ORP (mV): | | 130.9 |
| Turbidity (NTU): | 0.15 | -139 |

QA/QC Sample IDs

Duplicate: Time:

Trip Blank: Time:

Field Blank: Time:

Picture #s: US/DS/SUB/RB/LB

Comments:

$V_1$: 20 $U_1$: 256 0.16N $H_2SO_4$

$V_2$: 20 $U_2$: 251 LP endpoint

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seep daylights @N61.54328° W132.27467

Station ID: KR17
Sample ID: 2021T25-08 / 09 (DUP)
Sample Class: SW

Date: Aug 31/2021
Coordinates: N 61.54322 W 132.27417
Site Description: KR17, daylighting 50m upstream of location

Weather: sun, few clouds, 15C, ~~light breeze~~

Field Crew (circle sampler): (SW) CF / AB
Field Meter Used: YSI PRO Y22S689 Y234626

| | | |
|---|---|---|
| Time: | 16:45 | |
| Air Temp (°C): | 11.8 | |
| H2O Temp (°C): | 4.8 | 3.2 |
| DO (mg/L): | 10.05 | 10.83 |
| DO (%): | 80.6 | |
| Cond (µs/cm): | 336.1 | |
| SPC (µs/cm): | 569 | 583 |
| pH: | 7.53 | 7.21 |
| ORP (mV): | 161.4 | |
| Turbidity (NTU): | -0.13 | -1.45 |

V1: 20 U1: 248
V2: 20 U2: 245

QA/QC Sample IDs

Duplicate: 2021T25-09 Time: 17:15
Trip Blank: Time:
Field Blank: Time:

Picture #s: US/DS/sub/RB/LB
Comments: no staining on rocks/substrate.
-seep daylights ~50m US

KR17 DS

Station ID: ~~Seep 1~~

Sample ID: 2021T26-10

Sample Class: SW

→ N 61° 32.563' W132° 16.266'

Date: 31 Aug 2021 Weather: sunny, 25% cloud, light breeze

Coordinates: ~~N61. 54328° W132. 87467°~~

Site Description: D/S of seep daylight from ~~Left~~ Right Bank; ~2m D/S + ~10m D/S noticable on stream substrate iron precip.

Field Crew (circle sampler): (SL) / CF / AB

Field Meter Used:

| | |
|---|---|
| Time: | 1800 |
| Air Temp (°C): | 10.1 |
| H2O Temp (°C): | 3.6 / 3.5 |
| DO (mg/L): | 11.28 / 11.57 |
| DO (%): | – / 87.4 |
| Cond (µs/cm): | – / 485.2 |
| SPC (µs/cm): | 796 / 807 |
| pH: | 7.44 / 7.00 |
| ORP (mV): | – / -2.0 |
| Turbidity (NTU): | 0.32 / -0.83 |

QA/QC Sample IDs

Duplicate: Time:

Trip Blank: Time:

Field Blank: Time:

Picture #s: US / DS / sub / RB / LB / seep 2m U/S

Comments: GW seep daylighting from Right bank - ~~disturbed~~ soil exposed

0.16N $H_2SO_4$ LP endpoint

$V_1$: 20 $V_2$: 20

$V_1$: 182 $V_2$: 181

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Rite in the Rain

No.395

Station ID: KR-23
Sample ID: 2021T25-11
Sample Class: SW

Date: 01 Sept 2021 Weather: sunny, <5% cloud, v light breeze
Coordinates: N 61. 55725° W132. 15392°
Site Description: discharge DS of old adit

Field Crew (circle sampler): (SD) (CF) / SL
Field Meter Used: Y234626/Y225689

| | |
|---|---|
| Time: | 0915 |
| Air Temp (°C): | 10.2 |
| H2O Temp (°C): | 4.1 / 4.0 |
| DO (mg/L): | 11.3 / 11.65 |
| DO (%): | - / 89.1 |
| Cond (µs/cm): | - / 461.8 |
| SPC (µs/cm): | 759 / 771 |
| pH: | 7.93 / 6.73 |
| ORP (mV): | - / 225.3 |
| Turbidity (NTU): | 0.00 / -0.82 |

QA/QC Sample IDs

Duplicate: _____ Time: _____
Trip Blank: _____ Time: _____
Field Blank: _____ Time: _____

Picture #s: US / DS / SUB / RB / LB / adit discharge
Comments: DS ditch along road / old culvert non-functioning on access road

Station ID: CCT1
Sample ID: 2021T25-12
Sample Class: SW

Date: 01 Sept 2021 Weather: sunny <5% cloud, light breeze
Coordinates: N61.55725° W132.17088°
Site Description: Tributary to Cache Creek, US of road crossing.

Time: 1005
Air Temp (°C): 8.3
H2O Temp (°C): 2.4 / 2.3
DO (mg/L): 12.23 / 12.54
DO (%): - / 91.6
Cond (µs/cm): - / 358.7
SPC (µs/cm): 623 / 633
pH: 8.29 / 7.45
ORP (mV): - / 225.7
Turbidity (NTU): 0.44 / -0.31

Field Crew (circle sampler): SL / (CF)
Field Meter Used: Y2346260 / Y2275689

QA/QC Sample IDs
Duplicate: Time:
Trip Blank: Time:
Field Blank: Time:

Picture #s: US / DS / Sub / RB / LB
Comments: no abnormal colour on substrate; brownish green periphyton mossy growing on rocks; lg ~ 5m cobble substrate.

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Station ID: CCT2
Sample ID: 2021T25-13
Sample Class: SW

Time: 10:45
Air Temp (°C): 12.2
H2O Temp (°C): 3.5/3.4
DO (mg/L): 11.78/12.12
DO (%): = /91.3
Cond (µs/cm): ~ /624
SPC (µs/cm): 1044/1062
pH: 8.36/7.53
ORP (mV): — /195.6
Turbidity (NTU): 1.85/0.99

Date: 1-Sept-2021 Weather: sunny 25% clouds, little breeze
Coordinates: N 61.55496 W 132.17478
Site Description: Tributary to Cache Ck, US of road culvert
Field Crew (circle sampler): CF, (SL)
Field Meter Used: Y234626 / Y225689

QA/QC Sample IDs
Duplicate: Time:
Trip Blank: Time:
Field Blank: Time:

Picture #s: US, DS, Sub, RB LB
Comments: brownish green sediment, no odour, 5m-lg cobbles

Station ID: CCT3
Sample ID: 2021T25-14
Sample Class: SW

Date: 1-Sept.-2021 Weather: Sunny, <5% clouds
Coordinates: N61.55149 W132.19676
Site Description: Tributary to cache ck, US of road culvert
Field Crew (circle sampler): CF, (SL)
Field Meter Used: YA34626 / YA25689

| | |
|---|---|
| Time: | 11:15 |
| Air Temp (°C): | 4.9/4.8 |
| H2O Temp (°C): | 12.3 |
| DO (mg/L): | 11.34/11.59 |
| DO (%): | —/90.8 |
| Cond (µs/cm): | ~~767~~/1700 |
| SPC (µs/cm): | 1767/1794 |
| pH: | 8.34/7.54 |
| ORP (mV): | —/209.5 |
| Turbidity (NTU): | 0.33/0.38 |

QA/QC Sample IDs

Duplicate: Time:
Trip Blank: Time:
Field Blank: Time:

Picture #s: US, DS, Sub, RB, LB
Comments: brownish green sediment, no odour, sm-med cobbles

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Station ID: KR-28
Sample ID: 2021T25-15
Sample Class: SW

Date: 1-SEP-2021 Weather: Sunny, 20% clouds
Coordinates: N61.54962 W152.20453
Site Description: Cache Creek

Field Crew (circle sampler): CF, (SL)
Field Meter Used: Y234626/Y225689

Time: 12:00
Air Temp (°C): 13.4
H2O Temp (°C): 7.2/7.1
DO (mg/L): 10.70/10.89
DO (%): -/90.1
Cond (µs/cm): -/399.0
SPC (µs/cm): 517/606
pH: 8.23/7.51
ORP (mV): -/197.6
Turbidity (NTU): 1.83/0.07

QA/QC Sample IDs

Duplicate: _____ Time: _____
Trip Blank: _____ Time: _____
Field Blank: 2021T25-16 Time: 11:45

Picture #s: US, DS, Sub, RB, LB
Comments: large - med cobbles

Station ID: KR-27
Sample ID: 2021T2S-17
Sample Class: SW

Date: 1-SEPT-2021 Weather: Clear 5% clouds
Coordinates: N 61.54959 W 152.22078
Site Description: Cache Ck DS of bridge

Time: 12:30
Air Temp (°C): 14.4
H2O Temp (°C): 7.0/6.9
DO (mg/L): 10.72/10.94
DO (%): — /90.1
Cond (µs/cm): — /382.2
SPC (µs/cm): 574/583
pH: 8.25/7.54
ORP (mV): — /176.4
Turbidity (NTU): 1.41/-0.14

Field Crew (circle sampler): CF, (SL)
Field Meter Used: Y234626/Y225689

QA/QC Sample IDs

Duplicate: Time:
Trip Blank: Time:
Field Blank: Time:

Picture #s: US, DS, Sub, RB, LB
Comments: large-med cobbles, some brown and red staining

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Station ID: KR-26
Sample ID: 2021T25-18
Sample Class: SW

Date: 1-SEPT-2021 Weather: sunny, 10% clouds
Coordinates: 61.54755 W132.22208
Site Description: trib. cache creek, US of fjord
Field Crew (circle sampler): CF (SL) AM
Field Meter Used: Y234626/Y22256B9

| | |
|---|---|
| Time: | 13:15 |
| Air Temp (°C): | 16.4 |
| H2O Temp (°C): | 9.4/9.3 |
| DO (mg/L): | 10.18/10.33 |
| DO (%): | —/90.2 |
| Cond (µs/cm): | —/417.4 |
| SPC (µs/cm): | 586/596 |
| pH: | 8.50/7.91 |
| ORP (mV): | —/179.5 |
| Turbidity (NTU): | 1.16/-0.17 |

QA/QC Sample IDs

Duplicate: _____ Time: _____
Trip Blank: _____ Time: _____
Field Blank: _____ Time: _____

Picture #s: US, DS, Sub RB LB
Comments: clear, no odour, med. cobbles

Station ID: KR-22
Sample ID: 2021T25-19
Sample Class: SW

Time: 14:15
Air Temp (°C): 15.9
H2O Temp (°C): 7.9 / 7.8
DO (mg/L): 10.45 / 10.70
DO (%): – / 90.1
Cond (µs/cm): – / 432.7
SPC (µs/cm): 634 / 645
pH: 8.22 / 7.64
ORP (mV): – / 185.1
Turbidity (NTU): 2.72 / 0.93

Date: 1-Sept-2021 Weather: Clear
Coordinates: N61.55254 W132.21600
Site Description: Misery Creek, 200m US of confluence
Field Crew (circle sampler): CF, SL
Field Meter Used: Y23460 / Y22568 9

QA/QC Sample IDs
Duplicate: Time:
Trip Blank: Time:
Field Blank: Time:

Picture #s: US, DS, Sub, RB, LB
Comments: White precipitate, slightly milky water

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Station ID: KR-21
Sample ID: 2021T25-20
Sample Class: SW

Time: 15:30
Air Temp (°C): 13.7
H2O Temp (°C): 3.9/3.7
DO (mg/L): 10.77/11.40
DO (%): —/86.5
Cond (µs/cm): —/412.4
SPC (µs/cm): 685/696
pH: 7.74/7.28
ORP (mV): —/189.2
Turbidity (NTU): 0.86/-0.14

Date: 1-Sept-2021 Weather: light clouds
Coordinates: N 61.55731 W 132.28545
Site Description: Misery creek US of fjord
Field Crew (circle sampler): CF (SL)
Field Meter Used: Y23626/Y22256B9

QA/QC Sample IDs
Duplicate: Time:
Trip Blank: Time:
Field Blank: Time:

Picture #s: VS, DS, Sub, RB, LB
Comments: clear, no odour. Some big rocks on road, not accessible by truck

Station ID: MCS1

Sample ID: — n/s

Sample Class: SW

Date: 01 Sept 2021 Weather: v light breeze sunny; overcast; 90% clouds

Coordinates: N61.557389° W132.285872°

Site Description: seep; milky white precip ~300m up access road from KR-21

Time: 16:05

Air Temp (°C):

H2O Temp (°C):

DO (mg/L):

DO (%):

Cond (µs/cm):

SPC (µs/cm):

pH:

ORP (mV):

Turbidity (NTU):

Field Crew (circle sampler):

Field Meter Used:

QA/QC Sample IDs

Duplicate: Time:

Trip Blank: Time:

Field Blank: Time:

Picture #s: pano of area

Comments: looks undisturbed on Uphill side of access road

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Station ID: KR-18
Sample ID: —
Sample Class: —

Time: 16:20
Air Temp (°C): 15.1
H2O Temp (°C): 2.2/2.2
DO (mg/L): 11.00/11.50
DO (%): — / 83.9
Cond (µs/cm): — / 757
SPC (µs/cm): 1340/1346
pH: 4.17/3.74
ORP (mV): — / 205.8
Turbidity (NTU): 0.40/-1.18

Date: 1-Sept-2021 Weather: 75% clouds
Coordinates: 61.55502 132.24800
Site Description: Cache Creek trib US of road culvert
Field Crew (circle sampler):
Field Meter Used: Y23462G / Y0025629

QA/QC Sample IDs
Duplicate: Time:
Trip Blank: Time:
Field Blank: Time:

Picture #s: US, DS, Sub, RB, LB, DDS
Comments: some brown staining

lower portal (Site ID confirmed by site manager)

Portal Pipe outflow

Station ID: ~~PS 1510 SC~~ 1430 | Date: 1-SEPT-2021 | Weather: Sunny, Cirro stratus

Sample ID: not sampled | Coordinates:

Sample Class: SW | Site Description: Pipe coming from mine portal

Field Crew (circle sampler): CF AB (SL)

Field Meter Used: Y25626/Y225629

| | |
|---|---|
| Time: | 17:15 |
| Air Temp (°C): | 16.8 |
| H2O Temp (°C): | 2.9 / 2.5 |
| DO (mg/L): | 11.35 / 12.01 |
| DO (%): | – / 98.6 |
| Cond (µs/cm): | – / 1664 |
| SPC (µs/cm): | 1165 / 1160 |
| pH: | 7.68 / 5.84 |
| ORP (mV): | – / 286.3 |
| Turbidity (NTU): | 2.11 / 1.48 |

QA/QC Sample IDs

Duplicate: Time:

Trip Blank: Time:

Field Blank: Time:

Picture #s: pipe

Comments:

before pipe PS 1430 lower portal

Station ID: ~~PS1510~~ PS1430 Date: 1-SEP-2021 Weather: Sunny, Some Clouds

Sample ID: 2021T25-21 Coordinates: 61.53587 132.26451

Sample Class: SW Site Description: water flowing out of portal

Field Crew (circle sampler): CF (SL) TB

Field Meter Used: Y23462G/Y22256Q9

| | |
|---|---|
| Time: | 15:30 |
| Air Temp (°C): | 16.8 |
| H2O Temp (°C): | 1.8 / 1.7 |
| DO (mg/L): | 11.61 / 12.07 |
| DO (%): | — / 86.9 |
| Cond (µs/cm): | — / 646 |
| SPC (µs/cm): | 1145 / 1163 |
| pH: | 7.87 / 6.56 |
| ORP (mV): | — / 233.2 |
| Turbidity (NTU): | 1.76 / 0.23 |

QA/QC Sample IDs

Duplicate: _____ Time: _____

Trip Blank: _____ Time: _____

Field Blank: _____ Time: _____

Picture #s: portal outflow

Comments: _____

upper ported — confirmed site ID with site manager AAM may have switched ID's - ERA 2016 shows site ID's opposite

Station ID: PS1430 (1510) *a

Sample ID:

Sample Class: N/S

Date: 01 Sept '21

Weather: sunny ~40% clouds (wispy

Coordinates: N 61.53734° W132.26717°

Site Description: upper portal → dry no water flowing near portal or at end of discharge pipe.

Field Crew (circle sampler):

Field Meter Used:

Time:

Air Temp (°C):

H2O Temp (°C):

DO (mg/L):

DO (%):

Cond (µs/cm):

SPC (µs/cm):

pH:

ORP (mV):

Turbidity (NTU):

QA/QC Sample IDs

Duplicate: Time:

Trip Blank: Time:

Field Blank: Time:

Picture #s: portal entrance; end of pipe.

Comments:

Station ID: KR-01
Sample ID: 2021TAS-22
Sample Class: SW

Time: 10:15
Air Temp (°C): 9.3
H2O Temp (°C): 5.4 / 5.3
DO (mg/L): 10.69 / 11.08
DO (%): — / 87.4
Cond (µs/cm): — / 284.3
SPC (µs/cm): 450.3 / 456.5
pH: 8.29 / 7.27
ORP (mV): — / 127.1
Turbidity (NTU): -0.08 / -1.30

Date: 2-SEPT-2021 Weather: Overcast
Coordinates: 61.52978 132.27124
Site Description: Upper Cache Ck, US of diversion
Field Crew (circle sampler): CF, (SL)
Field Meter Used: Y23462G / Y22205629

QA/QC Sample IDs
Duplicate: Time:
Trip Blank: Time:
Field Blank: Time:

Picture #s: US DS Sub RB LB
Comments: Clear, no odor, sm-lg cobbles

Station ID: KR-20

Sample ID: 2021T25-23

Sample Class: SW

Date: 2-SEPT-2021 Weather: Overcast, windy

Coordinates: 61.52730 132.29988

Site Description: Torn Lake outflow

Field Crew (circle sampler): CF, (SL)

Field Meter Used: Y23626/Y22256

| | |
|---|---|
| Time: | 11:00 |
| Air Temp (°C): | 6.5 |
| H2O Temp (°C): | 6.2/6.1 |
| DO (mg/L): | 10.53/10.78 |
| DO (%): | —/86.8 |
| Cond (µs/cm): | —/177.1 |
| SPC (µs/cm): | 274.4/278.2 |
| pH: | 8.00/7.09 |
| ORP (mV): | —/185.1 |
| Turbidity (NTU): | 1.31/-0.24 |

QA/QC Sample IDs

Duplicate: 2021T25-24 Time: 11:15

Trip Blank: ~~\~~ Time: ~~\~~

Field Blank: ~~\~~ Time: ~~\~~

Picture #s: US, DS, sub, RB, LB

Comments: clear, brown organics on sub, no odour

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Tacoma, WA, USA • RiteintheRain.com

Station ID: Tarn Lake
Sample ID: —
Sample Class: —

Time: 11:15
Air Temp (°C): 6.5
H2O Temp (°C): 6.2 / 6.1
DO (mg/L): 10.35 / 10.64
DO (%): — / 85.8
Cond (µs/cm): — / 180.2
SPC (µs/cm): 276.8 / 282.5
pH: 8.02 / 7.15
ORP (mV): — / 172.8
Turbidity (NTU): 1.78 / 0.64

Date: 2-SEPT-2021 Weather: Cloudy
Coordinates: 61.52752 132.30333
Site Description: Tarn Lake - white precip area

Field Crew (circle sampler): CF, SL
Field Meter Used:

QA/QC Sample IDs
Duplicate: Time:
Trip Blank: Time:
Field Blank: Time:

Picture #s: precip area
Comments:

Station ID: Torn Lake

Sample ID: —

Sample Class: —

Date: 2-SEP-2021 Weather: Cloudy

Coordinates: 61.52728 132.30353

Site Description: Torn Lake, brown precip area

Field Crew (circle sampler): CR, SL

Field Meter Used:

| | |
|---|---|
| Time: | 11:15 |
| Air Temp (°C): | 6.5 |
| H2O Temp (°C): | 6.0/5.6 |
| DO (mg/L): | 10.41/10.99 |
| DO (%): | ~~84.4~~/84.4 |
| Cond (µs/cm): | —/179.9 |
| SPC (µs/cm): | 295.4/398.2 (294.6 ✓ 283.5) |
| pH: | 7.42/6.25 |
| ORP (mV): | —/199.5 |
| Turbidity (NTU): | 4.44/3.88 |

QA/QC Sample IDs

Duplicate: Time:

Trip Blank: Time:

Field Blank: Time:

Picture #s: precip area

Comments:

JL DARLING LLC
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Station ID: Trip Blank
Sample ID: 2021T25-25
Sample Class: —

Date: 02 SEPT 2021 Weather: —
Coordinates: —
Site Description: —

Time: 1200
Air Temp (°C):
H2O Temp (°C):
DO (mg/L):
DO (%):
Cond (µs/cm):
SPC (µs/cm):
pH:
ORP (mV):
Turbidity (NTU):

Field Crew (circle sampler):
Field Meter Used:

QA/QC Sample IDs

Duplicate: — Time: —
Trip Blank: same Time: same
Field Blank: — Time: —

Picture #s:
Comments:

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | HYD-801 A | Project Number | 104822 |
| Date | Aug 5 | Client | YG EMR |
| Sampler | JI/AT | Project Name | Ketza |
| Weather | 17°, overcast | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 9.860 | Well casing height (magl) | 0.20 |
| Depth to Bottom (m) | 54.61 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | |
| Purge Method | Hydrosleeve | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 0935 | 2L | | 6.0 | 3.58 | 610 | 7.21 | 116.0 | 24.75 NTU |
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| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 0940 | Hydrosleeve | (Yes) No | Yes ~~Name:~~ |

General Notes, Calculations:

Well broken off. Casing laying on ground and plastic puc is detached leaving an open hole/open flush mount. puc. No cover. organics in well.
full puc casing re-attached after sample

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# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | MW10-01 / MW10-02 | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Weather | 17°, Sunn | | |
| Datalogger Details (download info, etc.) | N/A MW10-02 had logger. Not downloaded. | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | MW10-01 : 0 / MW10-02 : 3.393 | Well casing height (magl) | |
| Depth to Bottom (m) | MW10-01 11.651 MW10-02 : 8.0 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | |
| Purge Method | | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
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| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1700 | | Yes No | Yes Name: |

General Notes, Calculations:

Not in Scope. No Samples.

MW10-01 is artesian

MW10-02 Solinist barologger at well. Not downloaded.

Located below tailing pond road.

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# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | PA0-01A /B | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | JI /AS | Project Name | Ketza |
| Weather | 12°C, Sunny | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | A: 6.765 B: 15.845 | Well casing height (magl) | Flush |
| Depth to Bottom (m) | A: 9.996 B: 28.239 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | |
| Purge Method | | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
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| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 16:45 | | Yes No | Yes Name: |

General Notes, Calculations:

Not in Scope. Located on tailing pond embankment road.

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | PQ0-9 | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | AT / JI | Project Name | Ketza |
| Weather | 17 / Sunny | | |
| Datalogger Details (download info, etc.) | NA | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | — | Well casing height (magl) | — |
| Depth to Bottom (m) | — | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | — |
| Purge Method | — | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
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| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| — | — | Yes No | Yes Name: |

General Notes, Calculations:

Broken ~0.40m down.

Not in Scope.

Located on tailing pond Road

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | P89-1 | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | JF / AT | Project Name | Ketza |
| Weather | 17 & Sunny | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | Dry | Well casing height (magl) | 0 / Flush |
| Depth to Bottom (m) | 1.876. | Tubing Depth (m) | |
| Well Diameter | 1" | Estimated Water Volume (L) | |
| Purge Method | N/A | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
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| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1641 | | Yes No | Yes Name: |

General Notes, Calculations:

Well not in Scope

Well dry

Located on tailing pond Road

Hemmera
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# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | PGA-3 | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Weather | 17°, Sunny Rain last 24h | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | DRY | Well casing height (magl) | 0 |
| Depth to Bottom (m) | 3.495 | Tubing Depth (m) | |
| Well Diameter | 1" | Estimated Water Volume (L) | DRY |
| Purge Method | | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
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| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1457 | | Yes No | Yes Name: |

General Notes, Calculations:

No Sample. Dry. Well broken off at ground level. Cap placed loosely on top of well.

Not in Scope - located on Tailing Pond Road

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | Pole-12C | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | II/AT | Project Name | Ketza |
| Weather | 17c, Sunny | Rain last 24h | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | DRY | Well casing height (magl) | 1.641 |
| Depth to Bottom (m) | 9.158 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | DRY |
| Purge Method | | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
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| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1543 | | Yes No | Yes Name: |

General Notes, Calculations:

Dry well

PVC pipe sticking above metal casing

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | PG6 - 11A | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | AT / JF | Project Name | Ketza |
| Weather | 14°c, Overcast. Rain last 24h | | |
| Datalogger Details (download info, etc.) | No logger | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | Dry | Well casing height (magl) | 0.953 m |
| Depth to Bottom (m) | 3.114 | Tubing Depth (m) | — |
| Well Diameter | 2" | Estimated Water Volume (L) | Dry |
| Purge Method | N/A | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
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| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 0837 | N/A | Yes ~~No~~ | Yes ~~Name:~~ |

General Notes, Calculations:

No Sample. Well dry.

Well in good condition. No maintence needed.

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# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | PGC-11B | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | AT / JI | Project Name | Ketza |
| Weather | 14°C, overcast. Rain last 24 hour | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | Dry | Well casing height (magl) | 1.313 |
| Depth to Bottom (m) | 4.227 | Tubing Depth (m) | — |
| Well Diameter | 2" | Estimated Water Volume (L) | Dry |
| Purge Method | — | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
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| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 0843 | — | Yes No | Yes Name: |

General Notes, Calculations:

Well PVC casing sticking up above metal casing.

Well dry. No sample.

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | PG6 - 11C | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | JI / A. | Project Name | Ketza |
| Weather | 14°C, overcast | | |
| Datalogger Details (download info, etc.) | No logger | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 17.889 | Well casing height (magl) | 1.311 m |
| Depth to Bottom (m) | 17.900 | Tubing Depth (m) | — |
| Well Diameter | 2" | Estimated Water Volume (L) | 0.001 m |
| Purge Method | N/A | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
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| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 0849 | | Yes No | Yes Name: |

General Notes, Calculations:

Well pvc sticks up above well metal casing
Insufficient Volume. No Sample of parameters.

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | PQ0.7A | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | JI/AT | Project Name | Ketza |
| Weather | 14°, Sunny Rain last 24h | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | DRY | Well casing height (magl) | 0.064 |
| Depth to Bottom (m) | 8.219 | Tubing Depth (m) | — |
| Well Diameter | 2" | Estimated Water Volume (L) | DRY |
| Purge Method | N/A | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
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| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 0905 | — | Yes No | Yes Name: |

General Notes, Calculations:

Well is dry. PVC casing has no metal casing. No sample

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | 090-7C | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Weather | 14°c, Sunny Rain last 24h | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 9.279 | Well casing height (magl) | 0.046 m |
| Depth to Bottom (m) | 9.284 | Tubing Depth (m) | — |
| Well Diameter | 2" | Estimated Water Volume (L) | 0.005 m |
| Purge Method | — | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
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| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 0934 | — | Yes No | Yes Name: |

General Notes, Calculations:

Insufficient water for parameters or sample.

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# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | HYD-08-04A | Project Number | 104822 |
| Date | Aug 4 /21 | Client | YG EMR |
| Sampler | JI / AS | Project Name | Ketza |
| Weather | 15°C, Overcast | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 23.915 | Well casing height (magl) | 1.32 |
| Depth to Bottom (m) | 101.662 | Tubing Depth (m) | — |
| Well Diameter | 2" | Estimated Water Volume (L) | 195.494 |
| Purge Method | Hydro lift | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 12:56 | 10 | | 3.9 | 5.96 | 694 | 7.11 | 347.2 | 71.5 |
| 12:58 | 20 | | 3.9 | 5.65 | 694 | 7.25 | 323.5 | 76.0 |
| 1:01 | 30 | | 3.9 | 5.96 | 693 | 7.28 | 307 | 120 |
| 1:03 | 40 | | 4.0 | 5.44 | 694 | 7.32 | 293 | 130 |
| 1:06 | 50 | | 4.1 | 5.35 | 694 | 7.36 | 283 | 133 |
| | | | | | | | | |
| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 13:15 | Hydrolift | Yes (No) | Yes Name: |

General Notes, Calculations:

Purged until parameters stabelized.

Well is in good condition.

Unidentified Well immediately beside HYD-08-04A → DTW: 5.365m
dry well
driller's sludge in the well

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | Core shack well | Project Number | 104822 |
| Date | 5-Aug-21 | Client | YG EMR |
| Sampler | AT, JI | Project Name | Ketza |
| Weather | 16°C, overcast | | |
| Datalogger Details (download info. etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 16.640 | Well casing height (magl) | 0 |
| Depth to Bottom (m) | 34.870 | Tubing Depth (m) | |
| Well Diameter | 4" | Estimated Water Volume (L) | |
| Purge Method | bailer | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 0846 | | | 8.7 | 9.37 | 300 | 7.72 | 100.2 | 0 |
| | | | | | | | | |
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| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 0845 | Bailer | (Yes) No | Yes ~~Name:~~ |

General Notes, Calculations:

Well in coreshack hut. has pump (non-operational) in it.

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | HYD-08-06A | Project Number | 104822 |
| Date | ~~Jun~~ Aug 5/21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Weather | 19°C, overcast | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 6.542 | Well casing height (magl) | 0.94 |
| Depth to Bottom (m) | 20.27 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | 27.456 |
| Purge Method | Waterra / Airlift | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 1500 | 27L | | 3.4 | 2.95 | 1256 | 7.18 | 19.5 | 349.53 |
| 1563 | 54L | | 3.4 | 3.38 | 1179 | 7.30 | 2.6 | 231.0 |
| 1506 | 82L | | 3.4 | 3.69 | 1125 | 7.36 | -9.6 | 188.7 |
| | | | | | | | | |
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| | | | | | | | | |
| | | | | | | | | |

NTU

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1510 | Waterra | (Yes) No | ~~Yes~~ Name: |

General Notes, Calculations:

6.542
20.27
13.728 x 2 = 27.456 x 3 = 82.368

Well in good condition.

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | P90-7B | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | JI /A. | Project Name | Ketza |
| Weather | 14°C, Sunny Rain last 24h | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 6.268 | Well casing height (magl) | 0. |
| Depth to Bottom (m) | 17.003 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | 21.47 |
| Purge Method | Waterra & Hydrolift | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 0946 | 15L | 13.004 | 15.5 | 8.13 | 214 | 7.92 | 31.5 | 56.97 NTU |
| 1440 | 24L | | 9.8 | 5.90 | 208 | 7.81 | 133.8 | 62.36 |
| | | | | | | | | |
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| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1440 | Waterra | Yes No | Yes Name: |

General Notes, Calculations:

PVC is flush with concrete

6.268
17.003
10.735 x2 21.470 x3 64.41 L needed to purge

Purged dry after 22L. direct sample after 22L

- Debris came out of well during purging

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | HYD-08-02 | Project Number | 104822 |
| Date | Aug 4/21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Weather | 16°C, overcast | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 137.899 | Well casing height (magl) | |
| Depth to Bottom (m) | 164.35 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | |
| Purge Method | HydroSleeve | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 1745 | 2L | | 6.7 | 6.83 | 333 | 7.03 | 148.1 | 56.65 |
| | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 17:50 | HydroSleeve | (Yes) No | Yes ← Name: |

General Notes, Calculations:

PVC Sticking above Metal casing.
Well in good shape.

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | GT-10-01 | Project Number | 104822 |
| Date | Aug 4/21 | Client | YG EMR |
| Sampler | JE / AC | Project Name | Ketza |
| Weather | 15°C, overcast | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | ~~151.729~~ 151.727 | Well casing height (magl) | 1.200 |
| Depth to Bottom (m) | 194.9 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | |
| Purge Method | Hydrosleeve | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 16:00 | 2 | | 7.1 | 1.95 | 826 | 7.47 | 124.9 | 17.28 |
| | | | | | | | | |
| | | | | | | | | |
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| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 15:30 | Hydrosleeve | (Yes) No | Yes Name: |

General Notes, Calculations:

Well casing loose in ground.
Upheaving / push up of concrete.

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | HYD-08-10 | Project Number | 104822 |
| Date | Aug 4/21 | Client | YG EMR |
| Sampler | JT / AT | Project Name | Ketza |
| Weather | Hot, overcast | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 65.287 | Well casing height (magl) | |
| Depth to Bottom (m) | 111.975 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | |
| Purge Method | Hydrosleeve | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 1100 | 2L | | 8.2 | 5.36 | 1012 | 7.68 | 581.2 | 39.65 NTU |
| | | | | | | | | |
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| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1100 | Hydrosleeve | (Yes) No | Yes ~~No~~ Name: |

General Notes, Calculations:

Well did not have J-plug on it. exposed to elements. Organic matter on rim of PVC.

PVC pipe Sticks up over metal casing.
Metal casing is loose in ground → wobbly.
J-plug installed.

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# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | HYD-08-098 | Project Number | 104822 |
| Date | Aug 4/21 | Client | YG EMR |
| Sampler | JI/AT | Project Name | Ketza |
| Weather | 14°, overcast | | |
| Datalogger Details (download info, etc.) | | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | | Well casing height (magl) | 1.150 |
| Depth to Bottom (m) | 3.356 | Tubing Depth (m) | |
| Well Diameter | 1" | Estimated Water Volume (L) | |
| Purge Method | | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
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| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 0910 | | Yes No | Yes Name: |

General Notes, Calculations:

Well blocked 3.356m down.

No water.

Well casing loose in ground.

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | HYD-08-09A | Project Number | 104822 |
| Date | Aug 4/21 | Client | YG EMR |
| Sampler | JI /A | Project Name | Ketza |
| Weather | | | |
| Datalogger Details (download info, etc.) | | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 13.960 | Well casing height (magl) | 1.020 |
| Depth to Bottom (m) | 61.000 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | |
| Purge Method | HydroSleeve | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 9:26 | 2 | | 6.9 | 10.59 | 465 | 5.09 | 146.2 | O |
| | | | | | | | | |
| | | | | | | | | |
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| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | | QAQC Sample Collected |
|---|---|---|---|---|
| 9:45 | HydroSleeve | (Yes) | No | Yes ~~Name:~~ |

General Notes, Calculations:

Well lost in ground.

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | KR-05-688 | Project Number | 104822 |
| Date | Aug 4/21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Weather | 16°, overcast | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 47.472 | Well casing height (magl) | |
| Depth to Bottom (m) | 72.42 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | 49.896 |
| Purge Method | Hydrolift | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 1630 | 10L | | 5.3 | 6.23 | 828 | 7.28 | 153.0 | 0 |
| 1637 | 20L | | 4.6 | 6.20 | 814 | 7.27 | 152.8 | 0 |
| 1640 | 25 | | 4.6 | 6.21 | 814 | 7.26 | 152.2 | 0 |
| | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |

NTU

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1640 | Hydrolift | (Yes) No | (Yes) Name: F.B. |

General Notes, Calculations:

47.472
- 72.420
24.948 x2 : 49.896

Well in good condition

Purged 30L & Sampled. Parameters stable

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# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | 1510 Portal well | Project Number | 104822 |
| Date | Aug 4/21 | Client | YG EMR |
| Sampler | TI / AT | Project Name | Ketza |
| Weather | Sun, overcast | | |
| Datalogger Details (download info, etc.) | N/a | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 62.870 | Well casing height (magl) | 0 |
| Depth to Bottom (m) | 916.344 | Tubing Depth (m) | |
| Well Diameter | 4" | Estimated Water Volume (L) | |
| Purge Method | Hydrosleeve | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 14:08 | 2 | | 8.0 | 8.72 | 597 | 7.59 | 157.5 | 1.72 |
| | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 17:10 | Hydrosleeve | (Yes) No | Yes Name: |

General Notes, Calculations:

Well 4" in diameter. did not have cap on it and we had no 4" caps. left open. Inside abandoned structure.

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | Upper Mill well | Project Number | 104822 |
| Date | Aug 5/21 | Client | YG EMR |
| Sampler | AT / JI | Project Name | Ketza |
| Weather | 16°C, overcast | | |
| Datalogger Details (download info, etc.) | NA | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | — | Well casing height (magl) | 0 |
| Depth to Bottom (m) | — | Tubing Depth (m) | |
| Well Diameter | 4 | Estimated Water Volume (L) | |
| Purge Method | Pump | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 1855 | 300 | — | 6.2 | 5.20 | 582 | 7.83 | -78.9 | 0 NTU |
| | | | | | | | | |
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| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1900 | pump | Yes (No) | Yes Name: |

General Notes, Calculations:

Taken from hose @ pump check.
Pump for 21min before Sample.

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | HYD-08-17 | Project Number | 104822 |
| Date | Aug 5/21 | Client | YG EMR |
| Sampler | JL/BT | Project Name | Ketza |
| Weather | 16c, overcast | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 3.125 | Well casing height (magl) | 0.99 |
| Depth to Bottom (m) | 41.400 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | 76 |
| Purge Method | ~~Low Flow~~ Hydrolift | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 1100 | 80 | | 3.4 | 1.10 | 554 | 6.82 | -55.9 | 147.97 NTU |
| | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1100 | ~~LOWFlow~~ | (Yes) No | Yes ~~Name:~~ |

General Notes, Calculations:

Hydrolift

Purged ~80L & well read dry.
Sampled after recharged

228 to purge

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# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | New Camp Well | Project Number | 104822 |
| Date | Aug 5/21 | Client | YG EMR |
| Sampler | J Amos / DL | Project Name | Ketza |
| Weather | 14°C = overcast | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | — | Well casing height (magl) | |
| Depth to Bottom (m) | — | Tubing Depth (m) | |
| Well Diameter | 4" | Estimated Water Volume (L) | |
| Purge Method | Pump | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| | 60 | — | 29.5 | 5.71 | 469.1 | 7.46 | 72.6 | O |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |
| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 2020 | Pump | (Yes) No | Yes Name: — |

General Notes, Calculations:

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# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | PG6-12B | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Weather | Hot, Sunny | Rain last 24h | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 8.600 | Well casing height (magl) | 1.300m |
| Depth to Bottom (m) | 9.072 | Tubing Depth (m) | — |
| Well Diameter | 2" | Estimated Water Volume (L) | 0.944 |
| Purge Method | Bailer | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 1512 | 1L | | 6.6 | 2.95 | 559 | 7.54 | 92.3 | 1.87 NTU |
| 1515 | 2L | | 4.8 | 3.90 | 566 | 7.58 | 67.7 | 4.29 |
| 1518 | 3L | | 4.4 | 3.69 | 563 | 7.59 | 47.8 | 7.70 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1520 | Bailer | (Yes) No | (Yes) Name: PG6-12D |

General Notes, Calculations:

Duplicate taken.

8.600
9.072
0.472 x2 = 0.944 x3 = 2.832L to Purge

PVC pipe sticking above Metal casing

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | GT-10-06A | Project Number | 104822 |
| Date | Aug 5/21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Weather | 15°c, overcast | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 39.650 | Well casing height (magl) | 1.08 |
| Depth to Bottom (m) | 63.54 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | |
| Purge Method | Bailer | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 11:44 | | | 6.8 | 7.36 | 1999 | 12.19 | -41.0 | 48.6 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 11:50 | Bailer | (Yes) No | Yes ~~Name:~~ |

General Notes, Calculations:

Only 1/4 of large general bottle filled before well went dry with 0 recharge.

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | HYD-08-08 | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | JI/AT | Project Name | Ketza |
| Weather | Hi, Overcast | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 81.318 | Well casing height (magl) | 1.910 |
| Depth to Bottom (m) | 104.375 | Tubing Depth (m) | — |
| Well Diameter | 4" | Estimated Water Volume (L) | |
| Purge Method | HydroSleve | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 12:36 | 3L | — | 5.5 | 3.32 | 670 | 6.02 | 143.7 | ~~-295~~ 0 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1325 | HydroSleve | (Yes) No | Yes No Name: |

General Notes, Calculations:

Debris in water. "Rusty" in color.

No odor.

Well is pushed up. Loose in ground. cracked near base. Refer to photos.

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | PG6-12A | Project Number | 104822 |
| Date | Aug 5/21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Weather | 15°c, Sunny Rain last 24h | | |
| Datalogger Details (download info, etc.) | NA | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 8.866 | Well casing height (magl) | 1.220 |
| Depth to Bottom (m) | 15.597 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | 13.462 |
| Purge Method | Bailer | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 1012 | 13L | / | 4.4 | 3.05 | 519 | 7.46 | 100.6 | ~~12.95~~ 10.78 |
| 10:20 | 26L | / | 3.9 | 2.55 | 516 | 7.39 | 119.1 | 35.61 |
| 10:33 | 39L | | 3.8 | 3.07 | 514 | 7.48 | 134.3 | 93.13 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1050 | Bailer | (Yes) No | Yes Name: |

General Notes, Calculations:

8.866
15.597
6.731 x2 13.462 x3 40.386L Needs purged

PVC sticks above metal casing.

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# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | BH-10-DIB | Project Number | 104822 |
| Date | AUG 3/21 | Client | YG EMR |
| Sampler | AF / JI | Project Name | Ketza |
| Weather | 17C, Sunny | | |
| Datalogger Details (download info, etc.) | NA | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | DRY | Well casing height (magl) | 0.96 |
| Depth to Bottom (m) | 3.39 | Tubing Depth (m) | |
| Well Diameter | 1" | Estimated Water Volume (L) | |
| Purge Method | | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1710 | | Yes No | Yes ~~No~~ Name: |

General Notes, Calculations:

Well dry. No Sample.

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# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | BH-00-01A | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | JI/AT | Project Name | Ketza |
| Weather | 17°, Sunny | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 10.985 | Well casing height (magl) | 0.94 |
| Depth to Bottom (m) | 11.592 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | 1.214 |
| Purge Method | Bailer | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 1713 | 1.2 | | 6.1 | 7.45 | 714 | 7.43 | 64.2 | 710 NTU |
| 1715 | 2.4 | | 4.3 | 7.60 | 703 | 7.35 | 68.9 | 891 |
| 1717 | 3.6 | | 5.5 | 6.47 | 686 | 7.30 | 72.3 | 784 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1720 | Bailer | (Yes) No | Yes Name: |

General Notes, Calculations:

$$\begin{array}{r} 10.985 \\ 11.592 \\ \hline 0.607 \end{array} \times 2 : 1.214 \times 3 \quad 3.642 \text{ to purge}$$

PVC piping sticks above Metal casing.

Well Stindy.

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | BH-10-05 | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | JE/AF | Project Name | Ketza |
| Weather | 17°, Sunny | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 4.465 | Well casing height (magl) | 0.753 |
| Depth to Bottom (m) | 9.482 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | 10.034 |
| Purge Method | Hydrolift | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 1905 | 10 | | 3.1 | 5.40 | 476 | 7.60 | 30.3 | 457.0 |
| 1909 | 20 | | 2.5 | 7.40 | 451 | 7.58 | 41.0 | 484.0 |
| 1906 | 30 | | 2.4 | 7.35 | 444 | 7.49 | 46.9 | 698.0 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 19:15 | Hydrolift. | (Yes) No | ~~Yes~~ Name: |

General Notes, Calculations:

4.465
9.482
5.017 x2 = 10.034 x3 = 30.102

Well in good condition

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | BH10-02 | Project Number | 104822 |
| Date | Aug 3/20 | Client | YG EMR |
| Sampler | AT/JT | Project Name | Ketza |
| Weather | 17c, Sunny | | |
| Datalogger Details (download info, etc.) | Not downloaded | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 5.395 | Well casing height (magl) | 0.885 |
| Depth to Bottom (m) | 14.952 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | 19.114 |
| Purge Method | ~~Bailer~~ Hydro lift | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| | 19 | | 3.8 | 3.65 | 489 | 7.81 | -108 | 35.67 NTU |
| | 38 | | 2.8 | 2.96 | 492 | 7.71 | -104.9 | 67.71 |
| | 57 | | 2.6 | 2.53 | 493 | 7.70 | -101.5 | 93.67 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 18:15 | Hydrolift | (Yes) No | (Yes) Name: BH-10-02D |

General Notes, Calculations:

5.395
14.952
9.557 x2 19.114 x 57.342 to purge

# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | PQ0-8 | Project Number | 104822 |
| Date | Aug 3/21 | Client | YG EMR |
| Sampler | JI / A. | Project Name | Ketza |
| Weather | 17c, Sunny. | Rain Last 24h | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 8.185 | Well casing height (magl) | 0 |
| Depth to Bottom (m) | 8.618 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | 0.866L |
| Purge Method | Bailer | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 1606 | 0.5L | | 9.2 | 2.47 | 505 | 7.47 | -139.1 | 360 NTU |
| 1607 | 1L | | 9.6 | 2.40 | 500 | 7.47 | -140.6 | 380 |
| 1609 | 2L | | 9.6 | 2.48 | 509 | 7.49 | -142.7 | 386 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1610 | | Yes No | Yes. Name: |

General Notes, Calculations:

8.185
8.618
0.433 x2 = 0.866 x 3 = 2.598L Purge

Strong odor → "Death Smell". Well is broken to be a flush mount ~~at~~ broken at grand level and was not covered sufficiently. Well is in a depression. Road runoff going directly into well.

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# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | HYD-801B | Project Number | 104822 |
| Date | Aug 5 /21 | Client | YG EMR |
| Sampler | JI/AT | Project Name | Ketza |
| Weather | Hot, overcast | | |
| Datalogger Details (download info, etc.) | N/A | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 2.281 | Well casing height (magl) | 1.40 |
| Depth to Bottom (m) | 6.46 | Tubing Depth (m) | |
| Well Diameter | 1" | Estimated Water Volume (L) | |
| Purge Method | Low Flow | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, ~~odour~~, etc. |
|---|---|---|---|---|---|---|---|---|
| 0950 | 500ml | 3.235 | 6.3 | 1.19 | 523 | 7.20 | -21.5 | 68.28 |
| 0953 | | 3.256 | 7.2 | 0.55 | 525 | 7.17 | -30.8 | 68.40 |
| 0956 | 1400ml | 3.255 | 7.6 | 0.37 | 529 | 7.17 | -34.6 | 62.00 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

NTU

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1000 | Low Flow | (Yes) No | Yes Name: |

General Notes, Calculations:

No cap installed on well. Metal casing fell over. PVC standing alone

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# GROUNDWATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Well Name | HyD - 08-11A | Project Number | 104822 |
| Date | Aug 5/21 | Client | YG EMR |
| Sampler | II/AT | Project Name | Ketza |
| Weather | 16° overcast | | |
| Datalogger Details (download info, etc.) | | | |

**Monitoring Well Details**

| | | | |
|---|---|---|---|
| Depth to Water (m) | 12.645 | Well casing height (magl) | |
| Depth to Bottom (m) | 32.130 | Tubing Depth (m) | |
| Well Diameter | 2" | Estimated Water Volume (L) | 38.97 |
| Purge Method | Waterra Hydrolift | | |

**Field Readings**

| Time | Purge Volume | Water Level (m) | Temp (°C) | DO (mg/L) | Conductivity (µs/cm) | pH | Redox (mV) | Appearance, odour, etc. |
|---|---|---|---|---|---|---|---|---|
| 1415 | 38L | | 3.7 | 7.30 | 419 | 3.81 | 457.6 | 25.05 NTU |
| 1423 | 76L | | 3.6 | 7.63 | 414 | 3.75 | 469.3 | 83.20 |
| 1435 | 116L | | 3.7 | 7.59 | 491 | 3.74 | 474.9 | 114.85 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Sample Time (24 hr) | Sample Method | Field Filtered & Preserved | QAQC Sample Collected |
|---|---|---|---|
| 1440 | Waterra | (Yes) No | Yes ~~No~~ ~~Name:~~ |

General Notes, Calculations:

12.645
- 32.130
19.485 x2 38.97 x3 116.91

Well in good condition

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# SURFACE WATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Site Name | Ketza KR16 | Project Number | 104822-01 |
| Date | Aug 5/21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 16°, overcast | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| Water Depth (m) | 0.25 |
| Temperature (°C) | 11.0 |
| DO (mg/L) | 9.57 |
| Conductivity (µs/cm) | 497 |
| pH | 8.36 |
| Redox (mV) | 103.1 |
| Turbidity (NTU) | 0 |
| Appearance / Odour | clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 0915 | (Yes) No | Yes Name: | See coc |

General Notes:

Stream clear.

| | | | |
|---|---|---|---|
| Site Name | Ketza KR15 | Project Number | 104822-01 |
| Date | Aug 5/21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 17°, overcast | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| Water Depth (m) | 0.10 |
| Temperature (°C) | 5.1 |
| DO (mg/L) | 10.06 |
| Conductivity (µs/cm) | 660 |
| pH | 7.70 |
| Redox (mV) | - |
| Turbidity (NTU) | 0 |
| Appearance / Odour | Orange creek bottom coverage |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1550 | (Yes) No | Yes Name: | See Coc |

General Notes:

Salt Flow

k cal.
B: 660
201: 864
402: 1080
603: 1295
804: —

Salt 1

TS: 16:04
TE: 16:07
B: 661
Δ: ~732
Q: 101

Salt 2

TS: 16:09
TE: 16:11
B: 661
Δ: 785
Q: 102

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# SURFACE WATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Site Name | KR-10 | Project Number | 104822-01 |
| Date | Aug 6/21 | Client | YG EMR |
| Sampler | JI/AR | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | Rain | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| **Water Depth (m)** | 0.25 |
| **Temperature (°C)** | 12.0 |
| **DO (mg/L)** | 9.24 |
| **Conductivity (µs/cm)** | 517 |
| **pH** | 8.40 |
| **Redox (mV)** | 82.1 |
| **Turbidity (NTU)** | 32 |
| **Appearance / Odour** | Slightly cloudy |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1610 | (Yes) No | Yes Name: | See COC |

General Notes:

| | | | |
|---|---|---|---|
| Site Name | | Project Number | 104822-01 |
| Date | | Client | YG EMR |
| Sampler | | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| **Water Depth (m)** | |
| **Temperature (°C)** | |
| **DO (mg/L)** | |
| **Conductivity (µs/cm)** | |
| **pH** | |
| **Redox (mV)** | |
| **Turbidity (NTU)** | |
| **Appearance / Odour** | |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| | Yes No | Yes Name: | |

General Notes:

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# SURFACE WATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Site Name | KR-12 | Project Number | 104822-01 |
| Date | 6-Aug-21 | Client | YG EMR |
| Sampler | AT/JI | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 17°C, mostly cloudy | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| **Water Depth (m)** | SG 0.278 |
| **Temperature (°C)** | 12.3 |
| **DO (mg/L)** | 9.01 |
| **Conductivity (µs/cm)** | 489.1 |
| **pH** | 8.30 |
| **Redox (mV)** | 87.1 |
| **Turbidity (NTU)** | 14.96 |
| **Appearance / Odour** | turbid |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 16:45 | Yes No | Yes Name: | See CoC |

General Notes:

| | | | |
|---|---|---|---|
| Site Name | KR-50 | Project Number | 104822-01 |
| Date | Aug 6/21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 17°C, Sunny | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| **Water Depth (m)** | 0.25 |
| **Temperature (°C)** | 11.1 |
| **DO (mg/L)** | 9.13 |
| **Conductivity (µs/cm)** | 759 |
| **pH** | 8.38 |
| **Redox (mV)** | 94.6 |
| **Turbidity (NTU)** | 0 |
| **Appearance / Odour** | clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1755 | (Yes) No | Yes Name: | See CoC |

General Notes:

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# SURFACE WATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Site Name | KRO1 | Project Number | 104822-01 |
| Date | AUG 6/21 | Client | YG EMR |
| Sampler | AT/JI | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 17° overcast | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| Water Depth (m) | 0.25 |
| Temperature (°C) | 11.5 |
| DO (mg/L) | 9.05 |
| Conductivity (µs/cm) | 304.6 |
| pH | 8.29 |
| Redox (mV) | 25.1 |
| Turbidity (NTU) | 0 |
| Appearance / Odour | clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1400 | (Yes) No | Yes Name: TB | See CoC |

General Notes:

Salt kcl
B 307.6
1 522
2 736
3 956

Salt 1
TS 1409
TE 1414
B 304.7
Δ 1075
Q 1506

Salt 2
TS 14:14
TE 14:19
B 304.8
Δ 767
Q 1606

| | | | |
|---|---|---|---|
| Site Name | KR-11 | Project Number | 104822-01 |
| Date | 6-Aug-11 | Client | YG EMR |
| Sampler | AT/JI | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 17°C, mostly cloudy | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| Water Depth (m) | 0.25 |
| Temperature (°C) | 11.8 |
| DO (mg/L) | 9.23 |
| Conductivity (µs/cm) | 451.7 |
| pH | 8.38 |
| Redox (mV) | 83.9 |
| Turbidity (NTU) | 0 |
| Appearance / Odour | clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 16:30 | (Yes) No | Yes Name: | See CoC |

General Notes:

# SURFACE WATER SAMPLE COLLECTION SHEET

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| | | | |
|---|---|---|---|
| Site Name | NWID-1 | Project Number | 104822-01 |
| Date | 6-Aug-21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 14°C, overcast | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| Water Depth (m) | 0.1 |
| Temperature (°C) | 10.1 |
| DO (mg/L) | 9.39 |
| Conductivity (µs/cm) | 843 |
| pH | 7.96 |
| Redox (mV) | 74.4 |
| Turbidity (NTU) | 0.4 |
| Appearance / Odour | Clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1300 | ~~Yes~~ No | ~~Yes~~ Name: | Flow Only |

General Notes:

Salt

1<cal
B 859
1 1081
2 1295
3 1192

Salt 1
TS 1259
TE 1305
B 844
Δ 1326
Q 52

Salt 2
TS 1305
TE 1308
B 851
Δ 1383
Q 53

| | | | |
|---|---|---|---|
| Site Name | KP14 | Project Number | 104822-01 |
| Date | 6-AUG/21 | Client | YG EMR |
| Sampler | TI / AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 17°C, Sunny → Rain last 24h | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| Water Depth (m) | SG: 0.215 |
| Temperature (°C) | ~~15.~~ 9.8 |
| DO (mg/L) | 9.55 |
| Conductivity (µs/cm) | 536 |
| pH | 8.40 |
| Redox (mV) | 76.5 |
| Turbidity (NTU) | ~~0~~ |
| Appearance / Odour | clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1325 | (Yes) No | ~~Yes~~ Name: | See COC |

General Notes:

Salt.
kcal
B 543
1 748
2 973
3 1194

Salt 1
TS 13:29
TE 13:36
B 536
Δ 1059
Q 1506

Salt 2
TS 13:36
TE 13:41
B 538
Δ 1078
Q 1566

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# SURFACE WATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Site Name | NWID-3 | Project Number | 104822-01 |
| Date | AUG 6/21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 14°, Overcast | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| Water Depth (m) | 0.1 |
| Temperature (°C) | 11.9 |
| DO (mg/L) | 9.20 |
| Conductivity (µs/cm) | 767 |
| pH | 8.20 |
| Redox (mV) | 71.5 |
| Turbidity (NTU) | 0 |
| Appearance / Odour | clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1222 | Yes No | Yes Name: | Flow Only |

General Notes:

Salt Flow
lc cal
B 763
1 994
2 1209
3 1462

Salt 1
TS 1226
TE 1230
B 767
Δ 1364
Q 51g

Salt 2
TS 1230
TE 1233
B 774
Δ 1381
Q 51g

| | | | |
|---|---|---|---|
| Site Name | NWID-2 | Project Number | 104822-01 |
| Date | AUG 6 /21 | Client | YG EMR |
| Sampler | JI. /AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 14, Sunny | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| Water Depth (m) | 0.1 |
| Temperature (°C) | 11.8 |
| DO (mg/L) | 9.47 |
| Conductivity (µs/cm) | 583 |
| pH | 8.17 |
| Redox (mV) | 74.9 |
| Turbidity (NTU) | 0 |
| Appearance / Odour | clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1240 | Yes No | Yes Name: | Flow Only |

General Notes:

Salt
k cal
B 779
1 1020
2 1230
3 1433

Salt 1
TS 1241
TE 1245
B 581
Δ 758
Q 50

Salt 2
TS 1245
TE 1249
B 581
Δ 785
Q 51

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# SURFACE WATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Site Name | LSCD-1 | Project Number | 104822-01 |
| Date | AUG 6/21 | Client | YG EMR |
| Sampler | TL/AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 14°C, overcast | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| **Water Depth (m)** | 0.1 |
| **Temperature (°C)** | 10.6 |
| **DO (mg/L)** | 9.28 |
| **Conductivity (µs/cm)** | 431.0 |
| **pH** | 8.19 |
| **Redox (mV)** | 74.3 |
| **Turbidity (NTU)** | 0 |
| **Appearance / Odour** | clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1152 | Yes ~~No~~ | Yes ~~Name:~~ | Flow Only |

General Notes:

Flow - Salt

| KCal | Salt 1 | Salt 2 |
|---|---|---|
| ~~B~~ | TS 1153 | TS 1156 |
| B 434.6 | TE 1156 | TE 1159 |
| 1 659 | B 431 | B 432 |
| 2 890 | Δ 586 | Δ 581 |
| 3 1087 | Q 52 | Q 52 |

| | | | |
|---|---|---|---|
| Site Name | YKSCD | Project Number | 104822-01 |
| Date | Aug 6/21 | Client | YG EMR |
| Sampler | TL/AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 14°C, Overcast | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| **Water Depth (m)** | 0.1 |
| **Temperature (°C)** | 15.9 |
| **DO (mg/L)** | 9.11 |
| **Conductivity (µs/cm)** | 425.8 |
| **pH** | 8.30 |
| **Redox (mV)** | 69.9 |
| **Turbidity (NTU)** | 0 |
| **Appearance / Odour** | Clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1209 | ~~Yes~~ No | ~~Yes~~ Name: | Flow Only |

General Notes:

Flow. Salt.

| KCal. | Salt 1 | Salt 2 |
|---|---|---|
| B 430 | TS 1208 | TS 12:13 |
| 1 638 | TE 12:12 | TE 12:16 |
| 2 856 | B 426.4 | B 605 |
| 3 1061 | Δ 599 | B 427.4 |
| | Q 50 | Q 52 |

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# SURFACE WATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Site Name | LSCD-3 | Project Number | 104822-01 |
| Date | AUG-6/21 | Client | YG EMR |
| Sampler | JI/AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 14°C, Rain | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| **Water Depth (m)** | 0.10 |
| **Temperature (°C)** | 10.5 |
| **DO (mg/L)** | 9.42 |
| **Conductivity (µs/cm)** | 425.9 |
| **pH** | 8.22 |
| **Redox (mV)** | 72.3 |
| **Turbidity (NTU)** | 0 |
| **Appearance / Odour** | Clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1115 | ~~Yes~~ No | Yes Name: | Flow |

General Notes:

Flow Only. Salt.

| K-Cal | Salt 1 | Salt 2 |
|---|---|---|
| B 429.0 | TS 1122 | TS 1125 |
| 1 660 | TE 1125 | TE 1130 |
| 2 893 | B 425 | B 426.8 |
| 3 1120 | Δ 555 | Δ 545 |
| | Q 51g | Q 51g |

| | | | |
|---|---|---|---|
| Site Name | LSCD-2 | Project Number | 104822-01 |
| Date | AUG 6/21 | Client | YG EMR |
| Sampler | JI/AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 14°C, Rain | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| **Water Depth (m)** | 0.10 |
| **Temperature (°C)** | 10.6 |
| **DO (mg/L)** | 9.34 |
| **Conductivity (µs/cm)** | 426.1 |
| **pH** | 8.21 |
| **Redox (mV)** | 71.9 |
| **Turbidity (NTU)** | 5.87 |
| **Appearance / Odour** | Clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1138 | Yes ~~No~~ | Yes Name: | Flow Only |

General Notes:

Flow only. Salt.

| K-Cal | Salt 1 | Salt 2 |
|---|---|---|
| B 427.2 | TS 1138 | TS 1141 |
| 1 650 | TE 1141 | TE 1144 |
| 2 868 | B 426.1 | B 427.1 |
| 3 1074 | Δ 633 | Δ 624 |
| | Q 50 | Q 51 |

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# SURFACE WATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Site Name | KR-09A | Project Number | 104822-01 |
| Date | AUG 6/21 | Client | YG EMR |
| Sampler | TP/AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 14°C, Rain | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| **Water Depth (m)** | — |
| **Temperature (°C)** | 16.1 |
| **DO (mg/L)** | 8.31 |
| **Conductivity (µs/cm)** | 639 |
| **pH** | 7.84 |
| **Redox (mV)** | 82.9 |
| **Turbidity (NTU)** | 0 |
| **Appearance / Odour** | clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1045 | Yes (No) | Yes (No) Name: | See COC |

General Notes:

Sample taken from discharge pipe.

| | | | |
|---|---|---|---|
| Site Name | KR-09 | Project Number | 104822-01 |
| Date | AUG 6/21 | Client | YG EMR |
| Sampler | TP/AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 14°C, Rain | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| **Water Depth (m)** | 1.759 |
| **Temperature (°C)** | 16.16 |
| **DO (mg/L)** | 8.53 |
| **Conductivity (µs/cm)** | 643 |
| **pH** | 8.23 |
| **Redox (mV)** | 90.7 |
| **Turbidity (NTU)** | 0 |
| **Appearance / Odour** | Clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1100 | Yes (No) | Yes (No) Name: KR-09D | See COC |

General Notes:

Duplicate taken → KR-09D

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# SURFACE WATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Site Name | KR-08 | Project Number | 104822-01 |
| Date | AUG 6/21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 14° Rain | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| Water Depth (m) | SG: 0.190 |
| Temperature (°C) | 9.4 |
| DO (mg/L) | 9.65 |
| Conductivity (µs/cm) | 436.0 |
| pH | 8.37 |
| Redox (mV) | 71.9 |
| Turbidity (NTU) | 59.00 |
| Appearance / Odour | Turbid / cloudy |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 0945 | Yes No | Yes Name: | See COC |

General Notes:

Heavy Rain event overnight making Stream turbid.

Salt Flow

kcal.
B 437.2
1 657
2 879
3 1096

Salt 1
TS: 9:58
TE: 10:02
B 438.8
Δ 941
Q 3016g

Salt 2
TS: 10:06
TE: 10:10
B: 440.2
Δ: 1000
Q 3015

| | | | |
|---|---|---|---|
| Site Name | Weir 2 | Project Number | 104822-01 |
| Date | AUG 6/21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 14° Rain | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| Water Depth (m) | 0.25 |
| Temperature (°C) | 9.7 |
| DO (mg/L) | 9.49 |
| Conductivity (µs/cm) | 443.3 |
| pH | 8.27 |
| Redox (mV) | 83.0 |
| Turbidity (NTU) | |
| Appearance / Odour | clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1030 | Yes No | Yes Name: | See COC |

General Notes:

No volumetric flow. Water pouring over top of weir.

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# SURFACE WATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Site Name | KZ-04-W3 | Project Number | 104822-01 |
| Date | 5-Aug-21 | Client | YG EMR |
| Sampler | AT/JI | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 14°C, overcast | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| Water Depth (m) | 0.10 |
| Temperature (°C) | 8.2 |
| DO (mg/L) | 9.67 |
| Conductivity (µs/cm) | 650 |
| pH | 8.01 |
| Redox (mV) | 74.3 |
| Turbidity (NTU) | 0 |
| Appearance / Odour | clear, w/ brown algae on bottom |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 16:00 | Yes No | Yes Name: | See CoC |

General Notes:

LC50 bioassy collected
Volumetric Flow
4.28
4.50
4.13
4.19
4.03

| | | | |
|---|---|---|---|
| Site Name | Weir 3 | Project Number | 104822-01 |
| Date | AUG 5/21 | Client | YG EMR |
| Sampler | JI/AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 14°C, Overcast | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| Water Depth (m) | 0.10 |
| Temperature (°C) | 14.1 |
| DO (mg/L) | 8.14 |
| Conductivity (µs/cm) | 788 |
| pH | 8.27 |
| Redox (mV) | 56.1 |
| Turbidity (NTU) | 0 |
| Appearance / Odour | clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1810 | Yes No | Yes Name: | |

General Notes:

Volumetric Flow
5.30
5.70
5.66
5.32
5.50

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# SURFACE WATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Site Name | KR-05-52 | Project Number | 104822-01 |
| Date | Aug 5/21 | Client | YG EMR |
| Sampler | JI / AT | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 16°C, Rain | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| **Water Depth (m)** | 0.15 |
| **Temperature (°C)** | 14.1 |
| **DO (mg/L)** | 9.28 |
| **Conductivity (µs/cm)** | 438.7 |
| **pH** | 7.90 |
| **Redox (mV)** | 66.4 |
| **Turbidity (NTU)** | 0 |
| **Appearance / Odour** | Clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1705 | (Yes) No | Yes Name: | See CoC |

General Notes:

LC-50 collected

Weir in good Condition.

16.30 @ 15L → Volumetric flow
16.34
16.34
16.22
16.25

| | | | |
|---|---|---|---|
| Site Name | KR-04-N2 | Project Number | 104822-01 |
| Date | AUG 5/21 | Client | YG EMR |
| Sampler | AT / JI | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 15°C, Rain | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| **Water Depth (m)** | SG: 0.629 |
| **Temperature (°C)** | 11.8 |
| **DO (mg/L)** | 9.11 |
| **Conductivity (µs/cm)** | 709 |
| **pH** | 7.69 |
| **Redox (mV)** | 89.9 |
| **Turbidity (NTU)** | 0 |
| **Appearance / Odour** | Clear |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1740 | (Yes) No | (Yes) Name: FB | See CoC |

General Notes:

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# SURFACE WATER SAMPLE COLLECTION SHEET

| | | | |
|---|---|---|---|
| Site Name | KR13 Ketza ~~KR15~~ | Project Number | 104822-01 |
| Date | Aug 5/21 | Client | YG EMR |
| Sampler | AT / JI | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 14c, Rain | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| Water Depth (m) | 0.10 |
| Temperature (°C) | 11.2 |
| DO (mg/L) | 9.28 |
| Conductivity (µs/cm) | 418.4 |
| pH | 8.40 |
| Redox (mV) | 28.6 |
| Turbidity (NTU) | 0 |
| Appearance / Odour | |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 1625 | (Yes) No | Yes Name: | See COC |

General Notes:

| | | | |
|---|---|---|---|
| Site Name | KR-05-S Ketza | Project Number | 104822-01 |
| Date | Aug 5 21 | Client | YG EMR |
| Sampler | AT / JI | Project Name | Ketza |
| Geographic Coordinates | | | |
| Weather | 14°C, rain | | |

| Field Parameters (note units if different than those stated) | |
|---|---|
| Water Depth (m) | SG. 0.531 |
| Temperature (°C) | 17.4 |
| DO (mg/L) | 7.94 |
| Conductivity (µs/cm) | 424.2 |
| pH | 7.96 |
| Redox (mV) | 55.2 |
| Turbidity (NTU) | 0 |
| Appearance / Odour | clear, algae on rocks |

| Sample Time (24 hr) | Field Preserved & Filtered if Required | QAQC Sample Collected | Analysis |
|---|---|---|---|
| 16:50 | (Yes) No | Yes Name: | See COC |

General Notes:

Compared to last August, water levels have dropped

# Appendix F - Flow Measurements Datasheets

## KR-15 Peel Creek at Road

| Station ID & Name: | KR-15 | Peel Creek at Road | |
|---|---|---|---|
| GPS (WGS 84 Lat Long D.D) | 61.5422 | -132.2475 | 1301 m a.s.l. |

Gauging comments

Date: 2021-08-31

Best flow estimate available for KR-15 is using the difference in discharge from velocity-area cross-sections (FlowTracker 2 instrument) above and below Peel Creek - Cache Creek confluence, i.e. PCC-1 flow (downstream) minus KR-08 flow (upstream):

0.044 $m^3/s$ around 10:00 on 2021-08-31.

Visual flow estimate during KR-15 site visit: 40 L/s at 12:00.

Salt dilution gauging conducted on 2021-08-31 around 11:55 but result was rejected.
Discharge result was suspect due to inadequate mixing range. Selected measurement reach was too short and tracer plume passed too fast, likely leading to a discharge overestimate by the QiQuac instrument (conductivity probes).

KR-15 Gauging pool looking across from left downstream bank, upstream of road crossing

## PC-DS3 Peel Creek d/s of Seep 3

| Station ID & Name: | PC-DS3 | Peel Creek d/s of Seep 3 | |
|---|---|---|---|
| GPS (WGS 84 Lat Long D.D) | 61.5427 | -132.2681 | 1499 m a.s.l. |

| Salt Dilution - Slug Injection Method – Two Hi-Res Conductivity Probes | | | Weather |
|---|---|---|---|
| Parameter | Value | Unit | Dry - Clear |
| Date | 2021-08-31 | YYYY-MM-DD | Instrument - S/N |
| Start Trace Time | 13:50:26 | HH:MM | QiQuac |
| End Trace Time | 13:55:47 | HH:MM | QM5.24 |
| Mass of salt (dry) | 0.100 | kg | Firmware Version |
| Mixing reach length | 50 | m | QQF0.3.5 |
| Mixing potential | good | Y/N | NaCl Brand |
| Field Calibration? [NaCl] 5.0 g/l | Y | [NaCl](g/l) | Sifto (Pool) |
| | Ch0 | Probe | Ch1 |
| Probe S/N | TM7.206 | | TM7.144 |
| Field Q | 0.035 | $m^3$/sec | 0.036 |
| Field Grade | A | QUnc. & %DQ | A |
| Discharge (post-processed) | 0.035 | $m^3$/sec | 0.036 |
| Background EC.T (avg, n=20) | 559.37 | µS/cm | 572.08 |
| Peak EC.T | 654.77 | µS/cm | 665.15 |
| Peak above BG EC.T in % | + 17 % | | + 16 % |
| Salt pulse duration | 00:05:21 | HH:MM:SS | 00:05:10 |
| QUnc. (95% conf. intrvl.) | 5.4 | % | 5.4 |
| CF.T (field cal.) | 0.514 | (mg/L)/(µS/cm) | 0.492 |

PC-DS3 Conductivity probe locations looking downstream

## PC-DS2 Peel Creek d/s of Seep 2

| Station ID & Name: | PC-DS2 | Peel Creek d/s of Seep 2 | |
|---|---|---|---|
| GPS (WGS 84 Lat Long D.D) | 61.5428 | -132.2701 | 1519 m a.s.l. |
| Salt Dilution - Slug Injection Method – Two Hi-Res Conductivity Probes | | | Weather |
| Parameter | Value | Unit | Dry - Clear |
| Date | 2021-08-31 | YYYY-MM-DD | Instrument - S/N |
| Start Trace Time | 14:31:07 | HH:MM | QiQuac |
| End Trace Time | 14:37:42 | HH:MM | QM5.24 |
| Mass of salt (dry) | 0.100 | kg | Firmware Version |
| Mixing reach length | 70 | m | QQF0.3.5 |
| Mixing potential | good | Y/N | NaCl Brand |
| Field Calibration? [NaCl] 5.0 g/l | Y | [NaCl](g/l) | Sifto (Pool) |
| | Ch0 | Probe | Ch1 |
| Probe S/N | TM7.206 | | TM7.144 |
| Field Q | 0.021 | $m^3$/sec | 0.021 |
| Field Grade | A | QUnc. & %DQ | A |
| Discharge (post-processed) | 0.021 | $m^3$/sec | 0.021 |
| Background EC.T (avg, n=20) | 593.12 | µS/cm | 607.30 |
| Peak EC.T | 688.78 | µS/cm | 707.36 |
| Peak above BG EC.T in % | + 16 % | | + 16 % |
| Salt pulse duration | 00:06:55 | HH:MM:SS | 00:06:35 |
| QUnc. (95% conf. intrvl.) | 5.3 | % | 5.6 |
| CF.T (field cal.) | 0.497 | (mg/L)/(µS/cm) | 0.478 |

PC-DS2 Conductivity probe locations looking upstream

## PC-DS1 Peel Creek d/s of Seep 1

| Station ID & Name: | PC-DS1 | Peel Creek d/s of Seep 1 | |
|---|---|---|---|
| GPS (WGS 84 Lat Long D.D) | 61.5427 | -132.2681 | 1525 m a.s.l. |

| Salt Dilution - Slug Injection Method – Two Hi-Res Conductivity Probes | | | Weather |
|---|---|---|---|
| Parameter | Value | Unit | Dry - Clear |
| Date | 2021-08-31 | YYYY-MM-DD | Instrument - S/N |
| Start Trace Time | 18:11:20 | HH:MM | QiQuac |
| End Trace Time | 18:19:55 | HH:MM | QM5.24 |
| Mass of salt (dry) | 0.100 | kg | Firmware Version |
| Mixing reach length | 45 | m | QQF0.3.5 |
| Mixing potential | fair | Y/N | NaCl Brand |
| Field Calibration? [NaCl] 5.0 g/l | Y | [NaCl](g/l) | Sifto (Pool) |
| | Ch0 | Probe | Ch1 |
| Probe S/N | TM7.206 | | TM7.144 |
| Field Q | 0.008 | $m^3$/sec | 0.007 |
| Field Grade | C | QUnc. & %DQ | C |
| Discharge (post-processed) | 0.008 | $m^3$/sec | 0.007 |
| Background EC.T (avg, n=20) | 746.51 | µS/cm | 767.75 |
| Peak EC.T | 989.23 | µS/cm | 1069.45 |
| Peak above BG EC.T in % | + 33 % | | + 39 % |
| Salt pulse duration | 00:08:35 | HH:MM:SS | 00:08:00 |
| QUnc. (95% conf. intrvl.) | 6.6 | % | 6.3 |
| CF.T (field cal.) | 0.488 | (mg/L)/(µS/cm) | 0.473 |

**Gauging conditions comments:**

Subpar channel conditions, steep gradient of steps/pools, coarse streambed, flow in substrate.

PC-DS1 Conductivity probe locations looking downstream

## KR-08 Cache Creek (upstream of Peel confluence)

| Station ID & Name: | KR-08 | Cache Creek u/s Peel | |
|---|---|---|---|
| GPS (WGS 84 Lat Long D.D) | 61.543 | -132.236 | 1242 m a.s.l. |
| Wading –Velocity-Area Method – Acoustic Doppler Velocimetry (ADV) | | | |
| Parameter | Value | Unit | Instrument |
| Date | 2021-08-31 | YYYY-MM-DD | Sontek FlowTracker2 |
| Start Time | 10:00 | HH:MM | Handheld/Probe Serial # |
| End Time | 10:49 | HH:MM | FT2H2048013 |
| Stations | 25 | # | FT2P2050002 |
| Discharge | 0.388 | $m^3$/sec | Operator |
| Section Width | 2.95 | m | AM & SL |
| Section Area | 0.644 | $m^2$ | Q location relative to SG |
| Mean Velocity | 0.602 | m/sec | Downstream |
| Highest Panel % of Q | 7.3 | % | Q Dist. to SG (m) |
| Uncertainty (IVE) | 3.2 | % | 2 |
| Staff Gauge (SG) Reading / Time | 0.130 | m / HH:MM | 10:34 |
| Stage-Discharge Control | Type | Effectiveness | Control distance to SG (m) |
| Natural | Section | Partial | 4 |
| Condition: | Clear | Time cleaned: | Not cleaned |

KR-08 Velocity-area cross-section – looking downstream

## PCC-1 Cache Creek downstream of Peel Creek confluence

| Station ID & Name: | PCC-1 | Cache Creek d/s Peel | |
|---|---|---|---|
| GPS (WGS 84 Lat Long D.D) | 61.556 | -132.236 | 1241 m a.s.l. |
| Wading –Velocity-Area Method – Acoustic Doppler Velocimetry (ADV) | | | |
| Parameter | Value | Unit | Instrument |
| Date | 2021-08-31 | YYYY-MM-DD | Sontek FlowTracker2 |
| Start Time | 09:06 | HH:MM | Handheld/Probe Serial # |
| End Time | 09:40 | HH:MM | FT2H2048013 |
| Stations | 22 | # | FT2P2050002 |
| Discharge | 0.432 | $m^3$/sec | Operator |
| Section Width | 3.05 | m | AM |
| Section Area | 0.750 | $m^2$ | Q location relative to SG |
| Mean Velocity | 0.576 | m/sec | N/A |
| Highest Panel % of Q | 8.6 | % | Q distance to SG (m) |
| Uncertainty (IVE) | 6.0 | % | N/A |
| Staff Gauge (SG) Reading / Time | N/A | m / HH:MM | N/A |
| Stage-Discharge Control | Type | Effectiveness | Control distance to SG (m) |
| Natural | Section | Partial | N/A |
| Condition: | Clear | Time cleaned: | Not cleaned |

PCC-1 Velocity-area cross-section – looking upstream

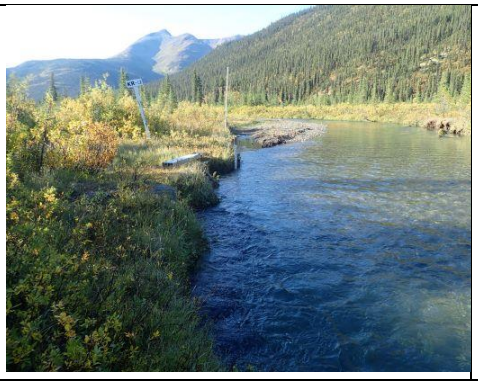
## KR-22 Misery Creek

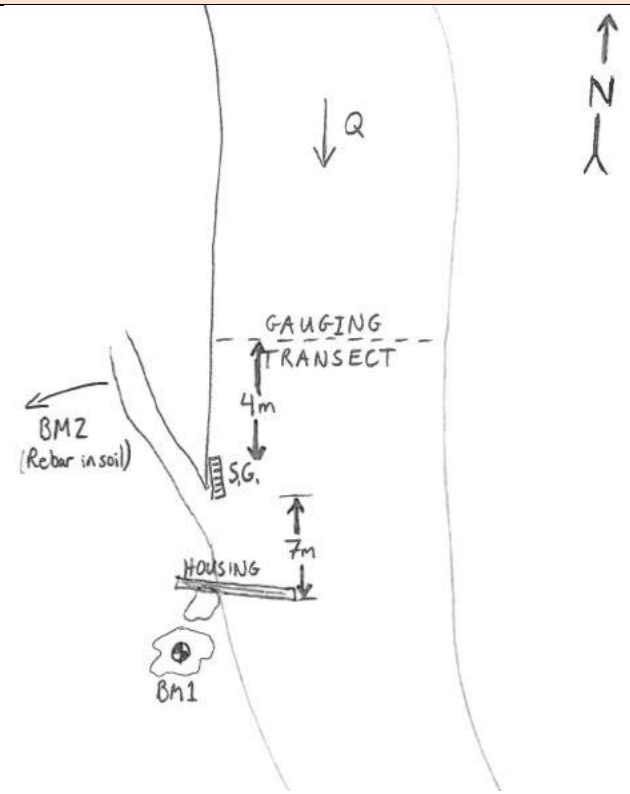
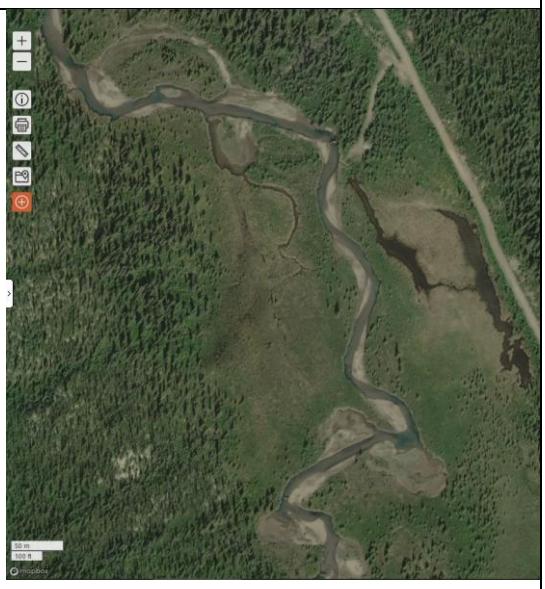
| Station ID & Name: | KR-22 | Misery Creek | |
|---|---|---|---|
| GPS (WGS 84 Lat Long D.D) | 61.545 | -132.220 | 1221 m a.s.l. |
| Wading –Velocity-Area Method – Acoustic Doppler Velocimetry (ADV) | | | |
| Parameter | Value | Unit | Instrument |
| Date | 2021-09-01 | YYYY-MM-DD | Sontek FlowTracker2 |
| Start Time | 15:18 | HH:MM | Handheld/Probe Serial # |
| End Time | 15:50 | HH:MM | FT2H2048013 |
| Stations | 24 | # | FT2P2050002 |
| Discharge | 0.337 | $m^3$/sec | Operator |
| Section Width | 3.40 | m | AM |
| Section Area | 0.725 | $m^2$ | Q location relative to SG |
| Mean Velocity | 0.466 | m/sec | Downstream |
| Highest Panel % of Q | 8.5 | % | Q distance to SG (m) |
| Uncertainty (IVE) | 5.9 | % | 300 |
| Staff Gauge (SG) Reading / Time | 0.285 | m / HH:MM | 15:00 |
| Stage-Discharge Control | Type | Effectiveness | Distance to SG (m) |
| Natural | Section | Partial | 2 |
| Condition: | Clear | Time cleaned: | Not cleaned |

KR-22 Velocity-area cross-section – looking upstream

# Appendix G - Hydrometric Network Assessment

## KR-12 Ketza River

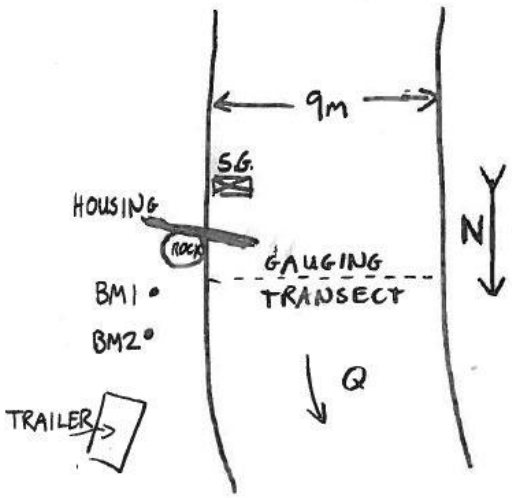
| Station name | KR-12 Ketza River downstream of Cache Creek confluence | |
|---|---|---|
| Location | 61.575544°, -132.172186° (WGS84), 1,086 m asl<br>The hydrometric station is located on the right bank of the Ketza River about 80 metres west of the Ketza camp access road at a point along the road 1.2 kilometers north of the Ketza creek bridge. | |
| Watershed Area | Catchment is 95.2 km² and KR-12 is the most downstream station in existing monitoring network. Maximum elevation in watershed is 2,168 m asl. | |
| Flow Range | Low:<br>2011-2012 Winter average: 0.155 m³/s | Annual maximum:<br>2012-06-22 Freshet peak: 12.120 m³/s |
| Rationale | EBA chose this location close to the Project boundary to monitor flows leaving the property.<br>Ketza River is the receiving water for Cache Creek.<br>Primary purpose is to estimate % of discharge from Cache Creek that contributes to Ketza River flow. | |
| Photos |  |  |
| | KR-12 looking upstream | KR-12 looking downstream |

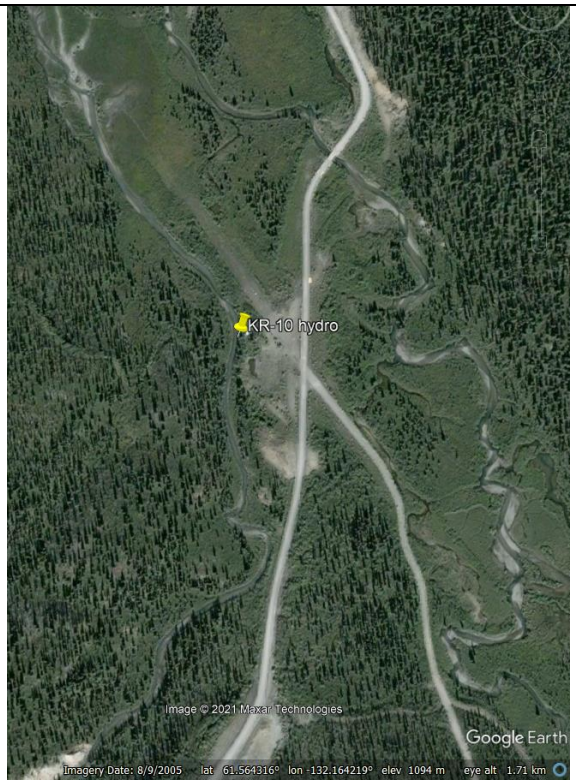
| Station name | KR-12 Ketza River downstream of Cache Creek confluence |
|---|---|
| Sketch |  <br>2012 Sketch of the layout of KR12 – Ketza R.<br>Source: EBA. 2013. Ketza River Project 2012 Hydrological Report. |
| Channel conditions | Right bank eroding and collapsed at stilling well location.<br>Channel somewhat unstable downstream of S.G. but fair at the S.G. location.<br>Section control: crest of riffle downstream of left bend.<br>Station located at mouth of small stream draining adjacent wetland. Gravel bar upstream of station presents potential for braiding at certain stages.<br>The satellite imagery reveals KR-12 is currently located in the middle of a wetland and/or flood plain. |
| Satellite imagery |  <br>Imagery date: 2005-08-09<br>  <br>KR-12 current location in wetland (2019-06) |

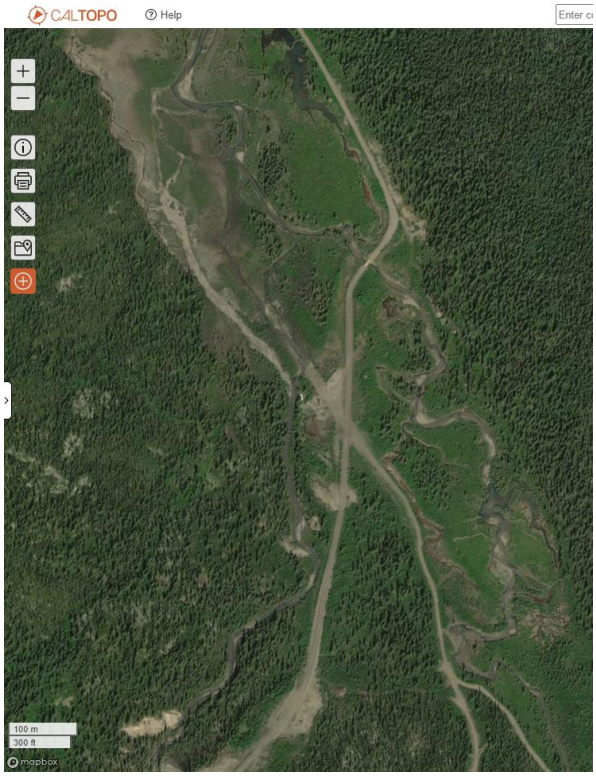
<table>
<tr><td>Station name</td><td>KR-12 Ketza River downstream of Cache Creek confluence</td></tr>
<tr><td></td><td>https://caltopo.com/map.html#ll=61.57694,-132.17319&z=16&b=imagery</td></tr>
<tr><td>Current infra-structure</td><td>EBA (2013): “A 2.5 m long, 5 cm diameter Schedule 40 galvanized steel pipe was attached to a large boulder located near the right bank of the creek by means of two heavy duty mounting tabs secured to the boulder with 3/8 inch by 6 inch long rock anchors. The pressure/temperature instrumentation located within the pipe housing is in about 1.0metre of water depth near the edge of the right bank of the river.<br>The staff gauge was vertically mounted to a 2” x 4” by 8’ long pressure treated wooden stake driven into the river bed to depth of 0.7 metres. The gauge is further secured by attaching the back of the stake to a 3 cm diameter rebar 2meters long, driven one meter into the river bed.”<br><br>
<table>
<tr><th colspan="2">Hydrometric Station Key Elevations</th></tr>
<tr><td>6/14/2012 2:30 PM</td><td>Date and time of the elevation survey</td></tr>
<tr><td>1086.000 metres MSL</td><td>Assumed elevation of the primary benchmark BM1 (from Google Earth)</td></tr>
<tr><td>1086.631 metres MSL</td><td>Elevation of the secondary benchmark (BM2)</td></tr>
<tr><td>1084.821 metres MSL</td><td>Elevation of the pressure / temperature sensor located within the housing</td></tr>
<tr><td>1084.920 metres MSL</td><td>Elevation of the zero reading on the staff gauge</td></tr>
<tr><td>1085.538 metres MSL</td><td>Water surface elevation near the housing at the time of the survey</td></tr>
<tr><td>0.120 metres</td><td>Correction to staff gauge reading to obtain pressure transducer water level</td></tr>
</table>
Surveyed elevations in 2012 at KR-12 (EBA 2013)<br><br>2021 observations: staff gauge is slightly loose, tilted and damaged.<br>Stilling well location now inadequate. Boulder supporting sensor housing has collapsed into river.<br>Benchmark boulder shattered and will collapse in river with further bank erosion.<br>BM1 unreliable. BM2 not found.</td></tr>
<tr><td>Recommended infrastructure</td><td>The existing KR-12 location in the middle of a wetland and/or flood plain is not adequate for hydrometric monitoring.<br>WRB suggests to relocate the station downstream (61.57907°, -132.17929°) as it presents a long, straight reach with no sign of gravel bars, braiding or flood plain. The presence of trees at shoreline suggest elevated banks and confinement (potential for cableway). There also appears to be a rocky outcropping on LDB shoreline that might be suitable for a bedrock bolt or staff plate benchmark.<br>Thalweg is on the left downstream bank<br><br>Installation as per R.I.S.C. 2018 guidelines:<br>Staff Gauge with adequate support structure<br>3 elevation benchmarks (rock bolt in boulder or ground rod driven to refusal)<br>Stilling well or mid-stream anchor deployment (pending site inspection)<br>Pressure transducer (continuous water level logger).<br>Cable way hardware (for tethered ADCP boat measurements in high flows)</td></tr>
<tr><td>Monitoring objectives</td><td>Sufficiently frequent station visits to capture:</td></tr>
</table>

| Station name | KR-12 Ketza River downstream of Cache Creek confluence |
|---|---|
| | Pre-spring freshet (late April – early May) to ensure loggers are synchronized and in working order<br>Spring freshet (late May – early June snowmelt peak)<br>Late melt (late June, early July)<br>Significant rain event(s)<br>Summer low flow<br>Pre-freeze-up (September) to winterize loggers (protect from freezing damage)<br>Early winter (November)<br>Late winter/winter low flow (March)<br>Survey stage (water surface elevation) on each visit.<br>Develop rating curve and derive continuous discharge from corrected stage time-series. |
| Measurement methods | High flow: cross section standard measurement with ADCP (i.e. cableway and boat deployment)<br>Moderate – low flow: cross section standard measurement with ADV or equivalent (i.e. wading)<br>Winter flow: salt dilution gauging following R.I.S.C. 2018 best practices.<br><br>Alternative if high flow measurements are unsafe: collect discharge measurement from bridge at KR-11 (upstream of Cache Creek confluence) and estimate discharge by adding Q from KR-10 and KR-11. |
| Priority rank | 1 – Essential |

## KR-10 Cache Creek (upstream of Ketza River confluence)

<table>
<tr><td>Station name</td><td colspan="2">KR-10 Cache Creek (upstream of Ketza River confluence)</td></tr>
<tr><td>Location</td><td colspan="2">61.564608°, -132.164550°<br>The hydrometric station is located on the right bank of Cache Creek about 70 metres east of the Ketza camp access road at a point along the road 200 metres south of the Ketza River bridge. The site is located about 20metres south east of an old camper/trailer located near the abandoned airstrip.</td></tr>
<tr><td>Watershed Area</td><td colspan="2">42.85 km²</td></tr>
<tr><td>Flow Range</td><td>Low:<br>2011-2012 Winter average: 0.060 m³/s</td><td>Annual maximum:<br>2012-06-24 Freshet peak: 5.363 m³/s</td></tr>
<tr><td>Rationale</td><td colspan="2">EBA chose this location as the most downstream option along Cache Creek to quantify flows leaving the property before the stream reaches a floodplain and its confluence with the upper branch of Ketza River.<br>Primary purpose is to estimate % of discharge from Cache Creek that contributes to Ketza River flow.</td></tr>
<tr><td>Photos</td><td>  <br>KR-10 looking upstream</td><td>  <br>KR-10 looking at well on RDB</td></tr>
<tr><td>Sketch</td><td colspan="2"> 
<br>2012 Sketch of the layout of KR10 – Cache Cr<br>Source: EBA. 2013. Ketza River Project 2012 Hydrological Report.</td></tr>
<tr><td>Channel conditions</td><td colspan="2">The 2012 location is not suitable anymore due to substantial sedimentation on the right downstream bank. Main flow is in the middle and/or in left half of the channel in the upstream vicinity. Immediate</td></tr>
</table>

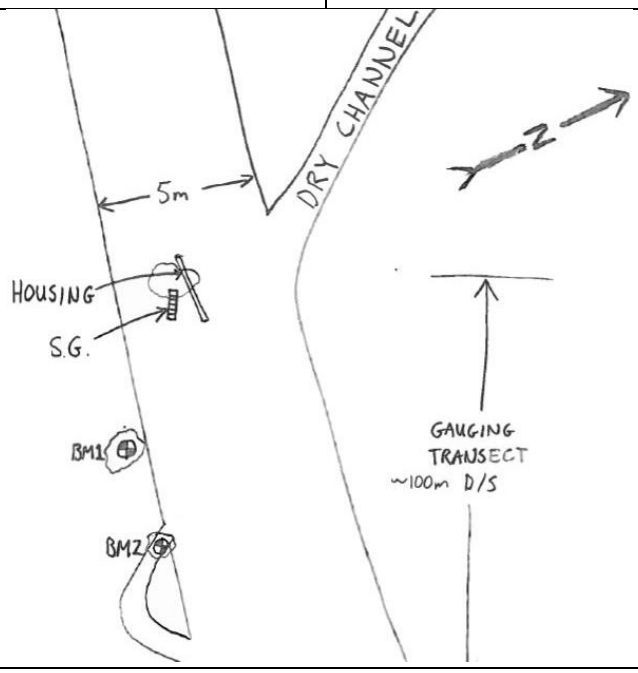
<table>
<tr><td></td><td>downstream options are limited since the channel is less constricted before the creek spills out of its old bed and braids trough the former airstrip prior to confluence with Ketza River.</td></tr>
<tr><td>Satellite imagery</td><td> 

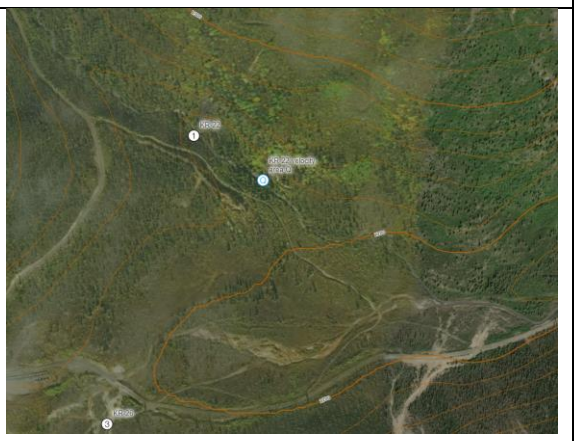
Imagery date: 2005-08-09


Imagery date: 2019-06
<br>https://caltopo.com/map.html#ll=61.56447,-132.16224&z=17&b=imagery</td></tr>
<tr><td>Current infra-structure</td><td>EBA (2013): “A 2.5 m long, 5 cm diameter Schedule 40 galvanized steel pipe was attached to a large boulder located near the right bank of the creek by means of two heavy duty mounting brackets secured to the boulder with 3/8 inch by 6 inch long rock anchors. The pressure/temperature instrumentation located within the pipe housing is in about 0.4 metres water depth at the time of installation.<br>The staff gauge was mounted to a pressure treated 2” x 4” by 8’ wooden stake driven into the river bed to a depth of 0.8metres. The staff gauge is further secured by attaching the back of the wooden stake to a 3 cm diameter rebar 2 meters long that was driven one meter into the river bed.”
<table>
<tr><th colspan="2">Hydrometric Station Key Elevations</th></tr>
<tr><td>6/16/2012 9:07 AM</td><td>Date and time of the elevation survey</td></tr>
<tr><td>1094.000 metres MSL</td><td>Assumed elevation of the primary benchmark BM1 (from Google Earth)</td></tr>
<tr><td>1093.926 metres MSL</td><td>Elevation of the secondary benchmark (BM2)</td></tr>
<tr><td>1093.117 metres MSL</td><td>Elevation of the pressure / temperature sensor located within the housing</td></tr>
<tr><td>1093.099 metres MSL</td><td>Elevation of the zero reading on the staff gauge</td></tr>
<tr><td>1093.559 metres MSL</td><td>Water surface elevation near the housing at the time of the survey</td></tr>
<tr><td>-0.079 metres</td><td>Correction to staff gauge reading to obtain pressure transducer water level</td></tr>
</table>
Surveyed elevations in 2012 at KR-10 (EBA 2013)<br>2021 observations: Stilling well location now inadequate due to sediment accumulation and not proper gauging pool in surrounding area. Galvanized pipe present, partially buried in sediments. Pipe cap was seized due to corroded threads. Benchmarks rods appeared to have been subject to vertical movements.</td></tr>
<tr><td>Recom-mended</td><td>WRB suggests to relocate the station upstream within the same reach. The current reach still presents a long, straight reach with good channel constriction. Potential small gauging pools exist on the left</td></tr>
</table>

| | |
|---|---|
| infra-structure | downstream bank for installing a stilling well. Alternative option is to deploy the logger mid-channel without a stilling well.<br><br>Installation as per R.I.S.C. 2018 guidelines:<br>Staff Gauge with adequate support structure<br>3 elevation benchmarks (rock bolt in boulder or ground rod driven to refusal)<br>Stilling well or mid-stream anchor deployment (pending site inspection)<br>Pressure transducer (continuous water level logger).<br>Cable way hardware (for tethered ADCP boat measurements in high flows) |
| Monitoring objectives | Sufficiently frequent station visits to capture:<br>Pre-spring freshet (late April – early May) to ensure loggers are synchronized and in working order<br>Spring freshet (late May – early June snowmelt peak)<br>Late melt (late June, early July)<br>Significant rain event(s)<br>Summer low flow<br>Pre-freeze-up (September) to winterize loggers (protect from freezing damage)<br>Early winter (November)<br>Late winter/winter low flow (March)<br>Survey stage (water surface elevation) on each visit.<br>Develop rating curve and derive continuous discharge from corrected stage time-series. |
| Measure-ment methods | Open water (high to moderate): Area-velocity discharge measurement with ADV or equivalent (i.e. wading).<br>Low flow and winter: salt dilution gauging following R.I.S.C. 2018 best practices.<br>Stage survey with differential leveling<br>Follow R.I.S.C. 2018 guidelines. |
| Priority rank | 1 – Essential |

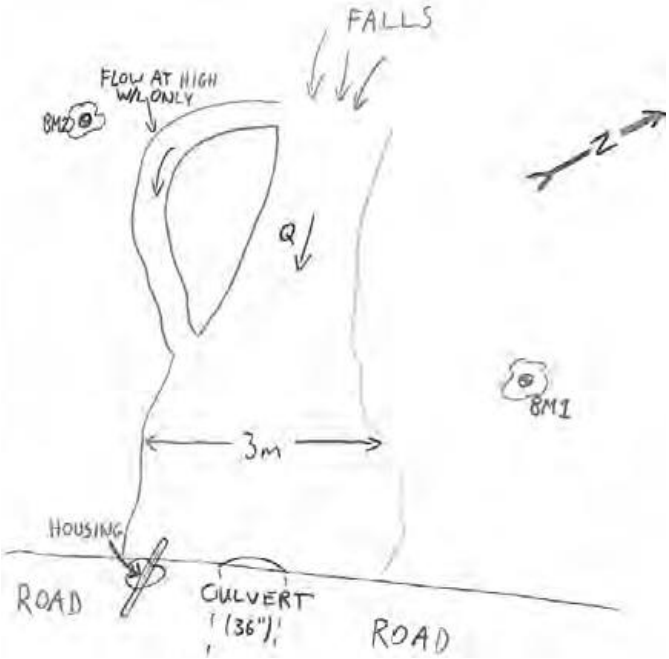
# KR-22 Misery Creek

| Station name | KR-22 Misery Creek | |
|---|---|---|
| Location | 61.552903°, -132.218339° (WGS84), 1,221 m asl<br>Velocity –Area cross section reach located 160 m downstream of gauging pool.<br><br>The hydrometric station is located near the right bank of Misery Creek about 40 metres upstream of the existing water quality station and 700metres upstream of the confluence with Cache Creek. The site is accessed by traveling east from camp down the camp access. Turn north on the dirt road 2 km past K15-Peel Creek station. Then turn right (south east) at the first intersection. Travel down this road parallel to Misery creek for about 200 m and then left to the site when you are at the same elevation as the creek. | |
| Watershed Area | KR22-Misery Creek basin has maximum extents of 5.8 km by 3.4 km and a catchment area of 13.97 km². The maximum basin elevation is 2,168m asl. | |
| Flow Range | Low:<br>2012 October min. measured: 0.088 m³/s | Annual maximum:<br>2012-06-16 Freshet peak: 1.427 m³/s |
| Rationale | Significant tributary: in % of Cache Creek flow, in contaminant loading (arsenic, sulfate) | |
| Photos |  |  |
| | KR-22 Staff Gauge & Sensor Casing - looking upstream | KR-22 Velocity-Area cross section reach (flow meas.) - looking upstream... |
| Sketch |  | |

<table>
<tr><td>Station name</td><td>KR-22 Misery Creek</td></tr>
<tr><td></td><td>2012 Sketch of the layout of KR22 – Misery Cr<br>Source: EBA. 2013. Ketza River Project 2012 Hydrological Report.</td></tr>
<tr><td>Channel conditions</td><td>Turbulent flow with boils in the pool where the stilling well was installed. Gauging transect far below the sensor pool where the reach is more straight and flow is more laminar (but without a suitable gauging pool).</td></tr>
<tr><td>Satellite imagery</td><td>  <br>Imagery date: 2005-08-09<br>  <br>Imagery date: 2019-06<br>https://caltopo.com/map.html#ll=61.55305,-132.21812&z=17&b=imagery&a=c%2Cmba</td></tr>
<tr><td>Current infra-structure</td><td>EBA (2012): “A 2.5 m long, 5 cm diameter Schedule 40 galvanized steel pipe was attached to a large boulder located near the right bank of the creek by means of two heavy duty mounting tabs secured to the boulder with 3/8 inch by 6 inch long rock anchors. The pressure/temperature instrumentation located within the pipe housing is in about 0.25 metres water depth.<br>The staff gauge was vertically mounted to a pressure treated 2” x 4” by 4’ pressure treated wooden stake and attached to a large boulder near the right bank.<br>Two benchmarks were installed by placing 3/8 inch by 6 inch long rock anchors on the tops of two large rocks located on the right shore within 5 metres of the hydrometric station housing.”<br><br>
<table>
<tr><th colspan="2">Hydrometric Station Key Elevations</th></tr>
<tr><td>June 15, 2012</td><td>Date and time of the elevation survey</td></tr>
<tr><td>1220.000 metres MSL</td><td>Assumed elevation of the primary benchmark BM1 (from Google Earth)</td></tr>
<tr><td>1220.079 metres MSL</td><td>Elevation of the secondary benchmark (BM2)</td></tr>
<tr><td></td><td>Elevation of the pressure / temperature sensor located within the housing</td></tr>
<tr><td>1219.518 metres MSL</td><td>Elevation of the zero reading on the staff gauge</td></tr>
<tr><td>1219.901 metres MSL</td><td>Water surface elevation near the housing at the time of the survey</td></tr>
<tr><td>0.014 metres</td><td>Correction to staff gauge reading to obtain pressure transducer water level</td></tr>
</table>
Surveyed elevations in 2012 at KR-22 (EBA 2013)<br><br>2021 observations: the well cap threads are corroded and seized, does not open and the old OTT logger could not be retrieved from the casing. Turbulent flow with water boils right by the stilling well likely causes unreliable readings.</td></tr>
<tr><td>Recom-mended infra-structure</td><td>WRB suggests to keep this location and upgrade the infrastructure, especially to prevent the boils to affect logger record and staff gauge readings.<br><br>Installation as per R.I.S.C. 2018 guidelines:<br>Staff Gauge with adequate support structure<br>3 elevation benchmarks (rock bolt in boulder or ground rod driven to refusal)</td></tr>
</table>

| Station name | KR-22 Misery Creek |
|---|---|
| | Stilling well<br>Pressure transducer (continuous water level logger). |
| Monitoring objectives | Sufficiently frequent station visits to capture:<br>Pre-spring freshet (late April – early May) to ensure loggers are synchronized and in working order<br>Spring freshet (late May – early June snowmelt peak)<br>Late melt (late June, early July)<br>Significant rain event(s)<br>Summer low flow<br>Pre-freeze-up (September) to winterize loggers (protect from freezing damage)<br>Early winter (November)<br>Late winter/winter low flow (March)<br>Survey stage (water surface elevation) on each visit.<br>Develop rating curve and derive continuous discharge from corrected stage time-series. |
| Measurement methods | Open water (high to moderate): velocity-area method with ADV or equivalent (i.e. wading).<br>Low flow and winter: salt dilution gauging following R.I.S.C. 2018 best practices.<br>Stage survey with differential leveling<br>Follow R.I.S.C. 2018 guidelines. |
| Priority rank | 1 – Essential |

## KR-15 Peel Creek at Road

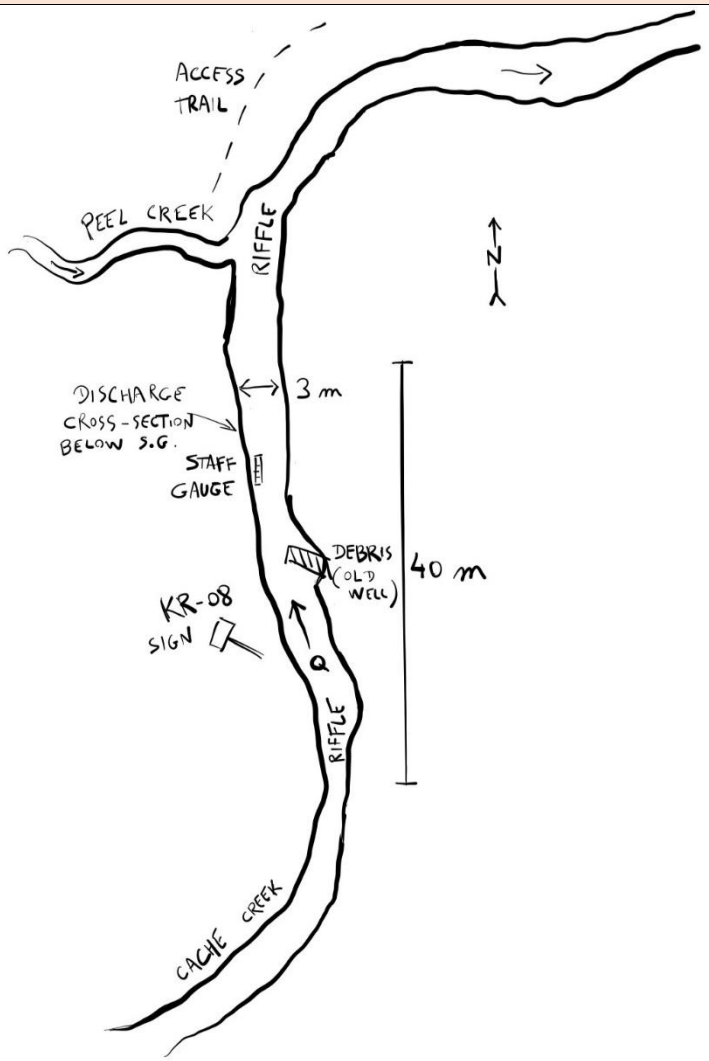
| Station name | KR-15 Peel Creek at Road | |
|---|---|---|
| Location | 61.542206°, -132.247500° (WGS84), 1314 m asl<br>Located on Peel Creek on the right bank of the creek just upstream of where the flow enters a culvert which passes under the Ketza camp access road. | |
| Watershed Area | KR-15 basin has maximum extents of 2.8 km by 1.1 km, a catchment area of 2.52 km², and the maximum basin elevation is 2,134 m asl | |
| Flow Range | Low:<br>2011-2012 Winter base flow in the order of 0.010 m³/s | Annual maximum:<br>2012-06-24 Freshet peak: 0.466 m³/s |
| Rationale | Significant tributary: in % of Cache Creek flow, in contaminant loading (arsenic, sulfate) | |
| Photos |  |  |
| | KR-15 looking at right bank | KR-15 looking upstream from culvert inlet |
| Sketch |  <br>2012 Sketch of the layout of KR-15 – Peel Creek<br>Source: EBA. 2013. Ketza River Project 2012 Hydrological Report. | |
| Channel conditions | The terminus of the housing was in a gauging pool of water about 30 cm deep in 2012. Fine sediments have filled in that pool has since installation.<br><br>2012 conditions with effective gauging pool: | |

| Station name | KR-15 Peel Creek at Road |
|---|---|
| |  |
| Satellite imagery |  <br>Imagery date: 2019-06 |
| | https://caltopo.com/map.html#ll=61.54284,-132.24933&z=16&b=imagery |
| Current infrastructure | EBA (2013) installation notes: "A 2.5 m long, 5 cm diameter Schedule 40 galvanized steel pipe was attached to a large boulder located near the right bank of the creek by means of two heavy duty mounting tabs secured to the boulder with 3/8 inch by 6 inch long rock anchors. The pressure/temperature instrumentation located within the pipe housing is in about 0.25 metres water depth near the edge of the creek.<br>The staff gauge was vertically mounted to a pressure treated 2" x 4" by 8' pressure treated wooden stake driven into the river bed to a depth of 0.8metres. The gauge is further secured by attaching the back of the wooden stake to a 3 cm diameter rebar 2meters long that was driven one meter into the river bed.<br>Two benchmarks were installed consisting of rock anchor bolts installed on boulders at two locations within a 5metre radius of the hydrometric station housing." |

| Station name | KR-15 Peel Creek at Road |
|---|---|
| | <table><tr><th colspan="2">Hydrometric Station Key Elevations</th></tr><tr><td>June 15, 2012 at 16:45</td><td>Date and time of the elevation survey</td></tr><tr><td>1314.000 metres MSL</td><td>Assumed elevation of the primary benchmark BM1 (from Google Earth)</td></tr><tr><td>1314.356 metres MSL</td><td>Elevation of the secondary benchmark (BM2)</td></tr><tr><td></td><td>Elevation of the pressure / temperature sensor located within the housing</td></tr><tr><td>1312.162 metres MSL</td><td>Elevation of the zero reading on the staff gauge</td></tr><tr><td>1312.548 metres MSL</td><td>Water surface elevation near the housing at the time of the survey</td></tr><tr><td>-0.143 metres</td><td>Correction to staff gauge reading to obtain pressure transducer water level</td></tr></table><br>Surveyed elevations in 2012 at KR-15 (EBA 2013)<br><br>2021 observations: staff gauge severely bent and buried in sediments. Aggradation in gauging pool (filled with fine rusty sediment); sensor and bottom of casing buried. 2012 installation unusable. Rock-bolted benchmarks stability not assessed. |
| Recommended infrastructure | WRB suggests to keep this location and upgrade the infrastructure.<br>Clear a 50 m trail upstream of station to facilitate access to a far enough injection site for salt dilution gauging.<br><br>Installation as per R.I.S.C. 2018 guidelines:<br>Staff Gauge with adequate support structure<br>3 elevation benchmarks (rock bolt in boulder or ground rod driven to refusal)<br>Stilling well<br>Pressure transducer (continuous water level logger). |
| Monitoring objectives | Sufficiently frequent station visits to capture:<br>Pre-spring freshet (late April – early May) to ensure loggers are synchronized and in working order<br>Spring freshet (late May – early June snowmelt peak)<br>Late melt (late June, early July)<br>Significant rain event(s)<br>Summer low flow<br>Pre-freeze-up (September) to winterize loggers (protect from freezing damage)<br>Early winter (November)<br>Late winter/winter low flow (March)<br>Survey stage (water surface elevation) on each visit.<br>Develop rating curve and derive continuous discharge from corrected stage time-series. |
| Measurement methods | High flow: velocity-area method with ADV or equivalent (i.e. wading).<br>Moderate – low flow: salt dilution gauging following R.I.S.C. 2018 best practices. |
| Priority rank | 1 – Essential |

## KR-08 Cache Creek (upstream of Peel confluence)

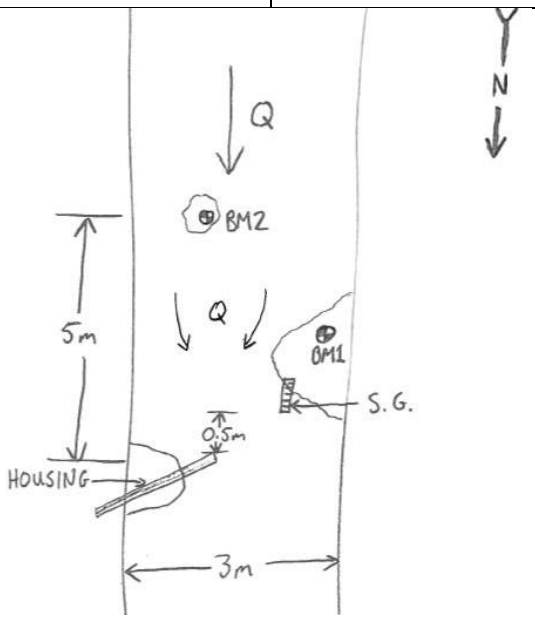
| Station name | KR-08 Cache Creek (upstream of Peel confluence) | |
|---|---|---|
| Location | 61.542943°, -132.236814°, 1242 m asl | |
| Watershed Area | KR-08 basin has maximum extents of 5.3 km by 3.5 km, a catchment area of 14 km², and the maximum basin elevation is 2,075 m asl. | |
| Flow Range | Low:<br>Winter base flow in the order of 0.030 m³/s | Annual maximum:<br>2012-06-24 Freshet peak: 3.5 m³/s (estimate) |
| Stage Range | N/A | N/A |
| Rationale | Cache Creek flow downstream of tailings pond influence (tailings and water treatment discharge and tailings dam seepages). | |
| Photos |  |  |
| | KR-08 looking upstream | KR-13 looking downstream |

| Station name | KR-08 Cache Creek (upstream of Peel confluence) |
|---|---|
| Sketch |  <br>2021 Sketch of the layout of KR-08 – Cache Creek |
| Channel conditions | The culvert debris from the old hydrometric infrastructure shaped the flow distribution, constricted to left bank, which is convenient for station installation. No effective control in place, sparse boulders influence the water level in the reach but there is no well defined gauging pool present. |

| Station name | KR-08 Cache Creek (upstream of Peel confluence) |
|---|---|
| Satellite imagery |  <br>Imagery date: 2005-08-09 |
| | https://caltopo.com/map.html#ll=61.54372,-132.23447&z=15&b=imagery |
| Current infrastructure | Debris of old infrastructure (prior to 2005). Staff gauge remains in stream but is not reliable (tilted and wobbly). No apparent benchmarks. |
| Recommended infrastructure | WRB suggests to keep this location and upgrade the infrastructure.<br>We looked at an alternate location upstream of the Mill and Camp by KR-01 but could not find a suitable reach and gauging pool due to channel braiding and low banks.<br><br>Installation as per R.I.S.C. 2018 guidelines:<br>Staff Gauge with adequate support structure<br>3 elevation benchmarks (ground rod driven to refusal)<br>Stilling well and pressure transducer (continuous water level logger). |
| Monitoring objectives | Sufficiently frequent station visits to capture:<br>Pre-spring freshet (late April – early May) to ensure loggers are synchronized and in working order<br>Spring freshet (late May – early June snowmelt peak)<br>Late melt (late June, early July)<br>Significant rain event(s)<br>Summer low flow<br>Pre-freeze-up (September) to winterize loggers (protect from freezing damage)<br>Early winter (November)<br>Late winter/winter low flow (March)<br>Survey stage (water surface elevation) on each visit.<br>Develop rating curve and derive continuous discharge from corrected stage time-series. |

| Station name | KR-08 Cache Creek (upstream of Peel confluence) |
|---|---|
| Measurement methods | High flow: velocity-area method with ADV or equivalent (i.e. wading).<br>Moderate – low flow: salt dilution gauging following R.I.S.C. 2018 best practices. |
| Priority rank | 1 – Essential |

# KR-14 Oxo Creek

| Station name | KR-14 Oxo Creek Upper | |
|---|---|---|
| Location | 61.533064°, -132.247683°, 1316 m asl<br>Station is located on the right bank of Oxo Creek about 130 metres south (upstream) of the confluence of Oxo and Cache Creek. The station is about 820 metres east of the Ketza camp. To access the site, one must follow a path from the tailings pond access road up Oxo Creek valley. | |
| Watershed Area | KR14-Oxo Creek basin has maximum extents of 2.4 km by 2.7 km and a catchment area of 4.29 km². The maximum basin elevation is 1,954m asl. | |
| Flow Range | Low:<br>2011-2012 Winter base flow in the order of 0.010 m³/s | Annual maximum:<br>2012-06-24 Freshet peak: 0.937 m³/s |
| Stage Range | 2012 open-water min: 0.150 m | 2012 open-water max: 0.508 m |
| Rationale | Oxo is one of the three major tributaries of Cache Creek (along with Peel and Misery) with their confluence just downstream of mine water discharge points (water treatment outlet and tailings dam seepages)<br>Oxo Creek flow record is useful in order to estimate the mine discharge (east of tailings pond) occurring between KR-13 and KR-08 Cache Creek stations. | |
| Photos |  |  |
| | KR-14 looking upstream | KR-14 looking downstream |
| Sketch |  | |

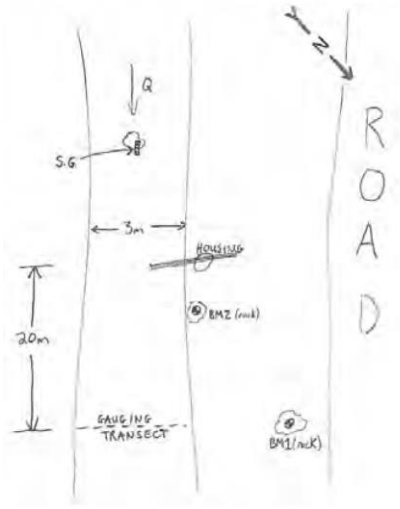
2012 Sketch of the layout of KR-14 - Oxo Creek

<table>
<tr><td>Station name</td><td>KR-14 Oxo Creek Upper</td></tr>
<tr><td></td><td>Source: EBA. 2013. Ketza River Project 2012 Hydrological Report.</td></tr>
<tr><td>Channel conditions</td><td>Turbulent flow in steep gradient of step-pools with cobble and boulder streambed.</td></tr>
<tr><td>Satellite imagery</td><td> 

Imagery date: 2005-08-09<br>https://caltopo.com/map.html#ll=61.52989,-132.23814&z=15&b=imagery</td></tr>
<tr><td>Current infrastructure</td><td>EBA (2013): “A 2.5 m long, 5 cm diameter Schedule 40 galvanized steel pipe was attached to a large boulder located near the right bank of the creek by means of two heavy duty mounting tabs secured to a boulder with 3/8 inch by 6 inch long rock anchors. The pressure/temperature instrumentation located within the pipe housing is in about 0.4metres water depth near the center of the creek.<br>The staff gauge was vertically mounted to a pressure treated 2” x 4” by 8’ pressure treated wooden stake which was attached to a large boulder by means of rock anchor bolts. The staff gauge is located near the left bank of the creek near the pressure transducer housing.<br>Two benchmarks were installed consisting of rock anchor bolts installed on boulders at two locations within a 5metre radius of the hydrometric station housing.”<br><br>
<table>
<tr><th colspan="2">Hydrometric Station Key Elevations</th></tr>
<tr><td>June 13, 2012 at 17:17</td><td>Date and time of the elevation survey</td></tr>
<tr><td>1316.000 metres MSL</td><td>Assumed elevation of the primary benchmark BM1 (from Google Earth)</td></tr>
<tr><td>1316.175 metres MSL</td><td>Elevation of the secondary benchmark (BM2)</td></tr>
<tr><td></td><td>Elevation of the pressure / temperature sensor located within the housing</td></tr>
<tr><td>1315.055 metres MSL</td><td>Elevation of the zero reading on the staff gauge</td></tr>
<tr><td>1315.350 metres MSL</td><td>Water surface elevation near the housing at the time of the survey</td></tr>
<tr><td>0.066 metres</td><td>Correction to staff gauge reading to obtain pressure transducer water level</td></tr>
</table>
Surveyed elevations in 2012 at KR-14 (EBA 2013)<br><br>2021 observations: staff gauge tilted, unusable since its placement is not vertical. Both sensor casing and staff gauge in a mediocre location, too close to turbulences. However, this gauging pool remains the best candidate in the reach before the gradient gets steeper and less accessible closer to confluence or upstream of current location.</td></tr>
</table>

| Station name | KR-14 Oxo Creek Upper |
|---|---|
| | |
| Recommended infrastructure | WRB suggests to keep this location and upgrade the infrastructure.<br><br>Installation as per R.I.S.C. 2018 guidelines:<br>Staff Gauge with adequate support structure<br>3 elevation benchmarks (rock bolt in boulder or ground rod driven to refusal)<br>Stilling well and pressure transducer (continuous water level logger). |
| Monitoring objectives | Sufficiently frequent station visits to capture:<br>Pre-spring freshet (late April – early May) to ensure loggers are synchronized and in working order<br>Spring freshet (late May – early June snowmelt peak)<br>Late melt (late June, early July)<br>Significant rain event(s)<br>Summer low flow<br>Pre-freeze-up (September) to winterize loggers (protect from freezing damage)<br>Early winter (November)<br>Late winter/winter low flow (March)<br>Survey stage (water surface elevation) on each visit.<br>Develop rating curve and derive continuous discharge from corrected stage time-series. |
| Measurement methods | High flow: velocity-area method with ADV or equivalent (i.e. wading).<br>Moderate – low flow: salt dilution gauging following R.I.S.C. 2018 best practices. |
| Priority rank | 2 – Beneficial |

## KR-13 Cache Creek Upper

| Station name | KR-13 Cache Creek Upstream of TSF | |
|---|---|---|
| Location | 61.533381°, -132.256428°, 1331 m asl<br>Located on Cache Creek in the approximate vicinity of the existing camp, across the road from the existing tailings pond. The housing is located on the left bank of the creek about 50 metres upstream of the tailings pond discharge location into Cache Creek. | |
| Watershed Area | KR13 basin has maximum extents of 4.2 km by 2.6 km and a catchment area of 5.27 km². Maximum basin elevation is 2,075m asl. | |
| Flow Range | Low:<br>2011-2012 Winter base flow in the order of 0.011 m³/s | Annual maximum:<br>2012-06-24 Freshet peak: 2.491 m³/s |
| Stage Range | 2012 open-water min: 0.119 m | 2012 open-water max: 0.388 m |
| Rationale | Cache Creek flow upstream of mine influence (tailings and water treatment discharge). However, flows maybe affected by mill and camp runoff but we expect these impacts to be typically below 0.003 m³/s | |
| Photos |  <br>KR-13 looking upstream at sensor |  <br>KR-13 looking upstream at staff gauge |
| Sketch |  <br>2012 Sketch of the layout of KR-13 – Cache Creek Upper<br>Source: EBA. 2013. Ketza River Project 2012 Hydrological Report. | |

| Station name | KR-13 Cache Creek Upstream of TSF |
|---|---|
| Channel conditions | Turbulent flow in steep gradient of step-pools with cobble and boulder streambed. Channel constriction with high banks is convenient to capture the whole range of water levels in the logger record. |
| Satellite imagery |  <br>Imagery date: 2019-06<br>https://caltopo.com/map.html#ll=61.53294,-132.25569&z=17&b=imagery |
| Current infrastructure | EBA (2013): "A 2.5 m long, 5 cm diameter Schedule 40 galvanized steel pipe was attached to a large boulder located on the left bank of the creek by means of heavy duty mounting tabs secured to the boulder with 3/8 inch by 6 inch long rock anchors. The pressure/temperature instrumentation located within the pipe housing which terminates near center of the creek in 0.27metres of water depth at the time of the installation.<br>A one metre long staff gauge was mounted to a 2" x 4" by 4' long pressure treated wood support which in turn was attached vertically to a large boulder near the right bank of the river 25metres upstream of the station housing.<br>The two benchmarks consist of anchor bolts installed on the top of large boulders near the station. BM1 is located 3 metres downstream of the housing near the creek left bank. BM2 is located about 20metres downstream and 3meters inland from the left bank." |
| Recommended infrastructure | WRB suggests to keep this location and upgrade the infrastructure. |

| Hydrometric Station Key Elevations | |
|---|---|
| 6/13/2012, 10:16 AM | Date and time of the elevation survey |
| 1331.000 metres MSL | Assumed elevation of the primary benchmark BM1 (from Google Earth) |
| 1330.584 metres MSL | Elevation of the secondary benchmark (BM2) |
| | Elevation of the pressure / temperature sensor located within the housing |
| 1330.258 metres MSL | Elevation of the zero reading on the staff gauge |
| 1330.601 metres MSL | Water surface elevation near the housing at the time of the survey |
| -0.035 metres | Correction to staff gauge reading to obtain pressure transducer water level |

Surveyed elevations in 2012 at KR-13 (EBA 2013)

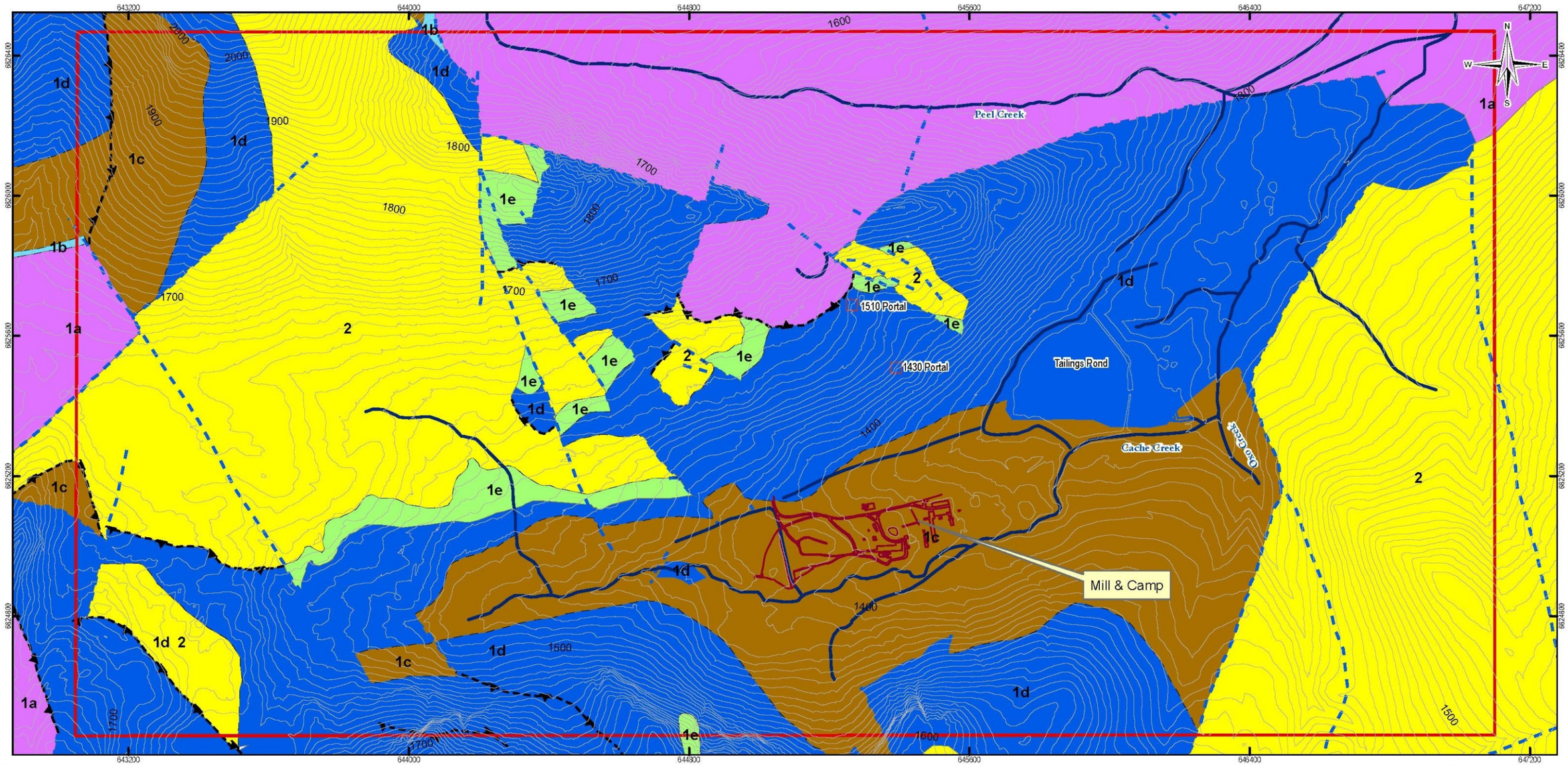
| Station name | KR-13 Cache Creek Upstream of TSF |
|---|---|
| | We looked at an alternate location upstream of the Mill and Camp by KR-01 but could not find a suitable reach and gauging pool due to channel braiding and low banks.<br><br>Installation as per R.I.S.C. 2018 guidelines:<br>Staff Gauge with adequate support structure<br>3 elevation benchmarks (rock bolt in boulder or ground rod driven to refusal)<br>Stilling well and pressure transducer (continuous water level logger). |
| Monitoring objectives | Sufficiently frequent station visits to capture:<br>Pre-spring freshet (late April – early May) to ensure loggers are synchronized and in working order<br>Spring freshet (late May – early June snowmelt peak)<br>Late melt (late June, early July)<br>Significant rain event(s)<br>Summer low flow<br>Pre-freeze-up (September) to winterize loggers (protect from freezing damage)<br>Early winter (November)<br>Late winter/winter low flow (March)<br>Survey stage (water surface elevation) on each visit.<br>Develop rating curve and derive continuous discharge from corrected stage time-series. |
| Measurement methods | High flow: velocity-area method with ADV or equivalent (i.e. wading).<br>Moderate – low flow: salt dilution gauging following R.I.S.C. 2018 best practices. |
| Priority rank | 1 – Essential |

## KR-01 Cache Creek Upstream of Mill and TSF

| Station name | KR-01 Cache Creek Upstream of Mill and TSF | |
|---|---|---|
| Location | 61.528983, -132.27183°, 1414 m asl<br>Located on Cache Creek in the reach upstream of existing mill and camp, just upstream of waste rock / tailings piles. There is no hydrometric infrastructure at the current KR-01 water quality sampling location but there are remnants of an older pre-2005 stilling well 50 m downstream of KR-01. | |
| Watershed Area | KR01 basin has maximum extents of 3.3 km by 2.6 km and a catchment area of 4.45 km².<br>Maximum basin elevation is 2,075m asl. | |
| Flow Range | Low:<br>Winter base flow in the order of 0.010 m³/s | Annual maximum:<br>2012 Freshet peak in the order 2.4 m³/s |
| Stage Range | N/A | N/A |
| Rationale | Cache Creek flow upstream of mine influence including the mill and its waste rock piles runoff. | |
| Photos |  <br>KR-01 looking upstream at sampling location |  <br>Downstream of KR-01 looking at old stilling well (braided channel) |
| Channel conditions | Turbulent flow in steep gradient of step-pools with cobble and boulder streambed. The channel lacks high banks and braids through vegetation downstream of KR-01 sampling location. Channel configuration is complicated for establishing a robust water level record and conducting precise flow measurements. | |

| Station name | KR-01 Cache Creek Upstream of Mill and TSF |
|---|---|
| Satellite imagery |  <br>Imagery date: 2019-06<br>https://caltopo.com/map.html#ll=61.52996,-132.27089&z=18&b=imagery |
| Current infrastructure | Old pre-2005 infrastructure is decrepit and channel conditions are not adequate there for meeting continuous monitoring requirements. |
| Recommended infrastructure | WRB suggests to limit monitoring at KR-01 to discrete discharge measurements. These flow measurements must be conducted immediately after KR-13 flow measurements in order to potentially establish a reliable relationship between flow at KR-13 and KR-01. The continuous record at KR-13 could then be used to derive continuous flow at KR-01. |
| Monitoring objectives | Sufficiently frequent station visits to capture:<br>Pre-spring freshet (late April – early May) r<br>Spring freshet (late May – early June snowmelt peak)<br>Late melt (late June, early July)<br>Significant rain event(s)<br>Summer low flow<br>Pre-freeze-up (September)<br>Early winter (November)<br>Late winter/winter low flow (March)<br>Measure flow at KR-01 immediately after KR-13.<br>Estimate continuous discharge from the rating model at KR-13. |
| Measurement methods | High flow: velocity-area method with ADV or equivalent (i.e. wading).<br>Moderate – low flow: salt dilution gauging following R.I.S.C. 2018 best practices. |
| Priority rank | 2 – Beneficial |

# Appendix H – Surficial Geology of the Ketza River Mine site




## LEGEND

- 10 m Contours
- Creeks
- Drainage
- Study Area
- Portals

**FaultType**

- Contact
- Fault
- Thrust Fault

- 1a argillite
- 1b limestone
- 1c calcareous argillite
- 1d Lower Cambrian limestone complex host unit includes FSLT, MSLT, BSLT, BXLT and WBN
- 1e mudstone
- 2 shale

**NOTES**

Geology map from EBA (2008) Bedrock geology, surficial geology and terrain, terrain hazards - 2007 environmental baseline studies. Prepared for Ketza River Holdings. February 2008.

**STATUS**
ISSUED FOR USE

**CLIENT**
Ketza River Holdings

# DETAILED HYDROGEOLOGICAL ASSESSMENT KETZA RIVER MINE, YT

## Geology Map

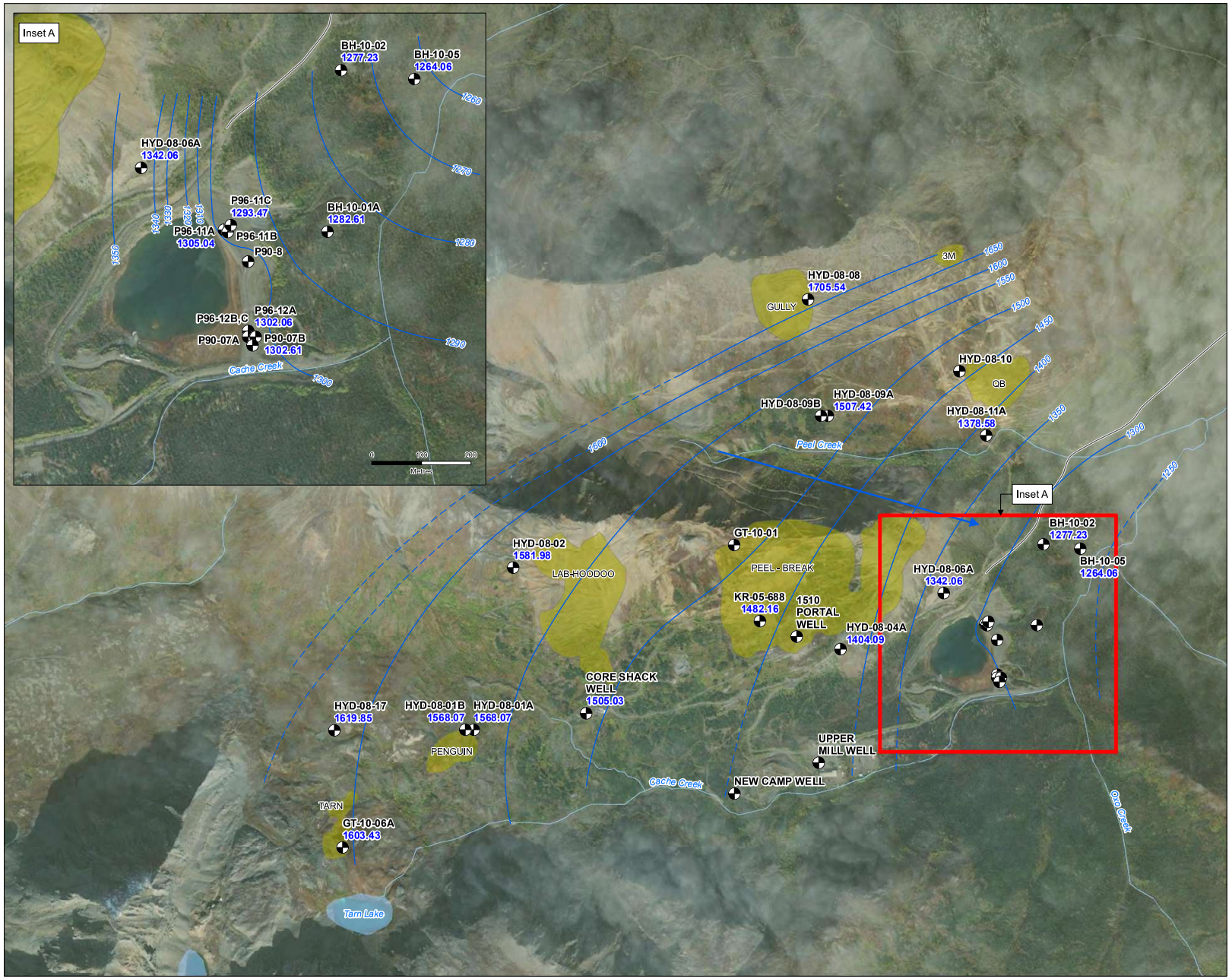
| PROJECT NO. | DWN | CKD | APVD | REV |
|---|---|---|---|---|
| W23101050.103 | SK | RMM | | 0 |

| OFFICE | DATE |
|---|---|
| EBA-WHSE | August 5, 2011 |

A TETRA TECH COMPANY

Figure 3

# Appendix I – Groundwater Contours (Hemmera, August 2021)




Surface and Groundwater Monitoring
Ketza River, YT

## Groundwater Contours

### Legend

- Groundwater Well Location
- Groundwater Elevation Contour
- Inferred Groundwater Elevation Contour
- 1503 Measured Groundwater Elevation (masl)
- Inferred Groundwater Flow Direction
- Mineralized Zone
- Highway
- Road
- Watercourse
- Waterbody

### 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.
3. Location of monitoring wells P90-07A, P90-07B, P90-07C, P90-8, P96-11A, P96-11C have not been surveyed and are approximate.

### Sources

- Contains information licensed under the Open Government Licence: Yukon
- Aerial Image: ESRI World Imagery

N

1:15,000

0 200 400 600 800 1,000
Metres

NAD 1983 UTM Zone 8N

Page Size: 11" x 17"

| 104822-01 | Production Date: Sep 7, 2021 | Figure 4.1 |
|---|---|---|

Hemmera
An Ausenco Company

Government of Yukon,
Department of Energy,
Mines and Resources

# Appendix J – Groundwater Monitoring Exceedance Summary (Hemmera, August 2021)

### Table 4.4 Groundwater Exceedance Summary

| Sample Location | Parameters Exceeding and Dissolved Concentration | | | |
|---|---|---|---|---|
| | CCME-FAL | FIGQFCS | CSR AW | CSR DW |
| 1510 Portal Well | Arsenic 13.8 µg/L | Sulphate 199 mg/L<br>Arsenic 13.8 µg/L<br>Total Cyanide 4.9 µg/L | n/a | n/a |
| BH-10-01A | n/a | Total Cyanide, 4.0 µg/L | n/a | n/a |
| BH-10-02 | Fluoride 0.5 mg/L<br>Arsenic 38.9 µg/L | Fluoride 0.5 mg/L<br>Sulphate 103 mg/L<br>Arsenic 38.9 µg/L | n/a | Arsenic 38.9 µg/L<br>Total Cyanide 7.7 µg/L |
| BH-10-05 | n/a | n/a | n/a | Manganese 69.3 µ/L |
| Core Shack Well | Fluoride 0.13 mg/L<br>Arsenic 34 µg/L<br>Selenium 1.46 µg/L | Fluoride 0.13 mg/L<br>Arsenic 34 µg/L<br>Selenium 1.46 µg/L | n/a | Fluoride 0.13 mg/L<br>Arsenic 34 µg/L |
| GT-10-01 | Fluoride 0.27 mg/L<br>Zinc 11.8 µg/L | Fluoride 0.27 mg/L<br>Sulphate 256 mg/L<br>Zinc 11.8 µg/L | n/a | n/a |
| GT-10-06A | Fluoride 0.55 mg/L<br>Aluminum 560 µg/L<br>Arsenic 1710 µg/L<br>Cadmium 0.312 µg/L<br>Chromium, Hexavalent 11.5 µg/L<br>Copper 69.2 µg/L<br>Total Cyanide 7.9 µg/L | Fluoride 0.55 mg/L<br>Sulphate 169 mg/L<br>Aluminum 560 µg/L<br>Arsenic 1710 µg/L<br>Cadmium 0.312 µg/L<br>Chromium 15.7 µg/L<br>Copper 69.2 µg/L<br>Total Cyanide 7.9 µg/L<br>Nickel 369 µg/L | Arsenic 1710 µg/L<br>Cadmium 0.312 µg/L<br>Chromium, Hexavalent 11.5 µg/L<br>Copper 69.2 µg/L<br>Nickel 369 µg/L<br>Sodium 244 µg/L | Aluminum 560 µg/L Antimony 9.98 µg/L<br>Arsenic 1710 µg/L |
| HYD-08-1A | Fluoride 0.19 mg/L<br>Uranium 33.3 µg/L | Fluoride 0.19 mg/L<br>Sulphate 101 mg/L<br>Uranium 33.3 µg/L | n/a | n/a |
| HYD-08-01B | Arsenic 19.2 µg/L<br>Iron 0.306 mg/L | Arsenic 19.2 µg/L<br>Iron 0.306 mg/L | n/a | Iron 0.306 mg/L<br>Manganese 69.4 µg/L |

| Sample Location | Parameters Exceeding and Dissolved Concentration | | | |
|---|---|---|---|---|
| | CCME-FAL | FIGQFCS | CSR AW | CSR DW |
| HYD-08-02 | Arsenic 12.2 µg/L<br>Copper 5.58 µg/L<br>Zinc 63.4 µg/L | Arsenic 12.2 µg/L<br>Barium 647 µg/L<br>Copper 5.58 µg/L<br>Zinc 63.4 µg/L | n/a | Manganese 59.7 µg/L |
| HYD-08-04A | Fluoride 0.49 mg/L<br>Arsenic 8.67 µg/L<br>Zinc 14.5 µg/L | Fluoride 0.49 mg/L<br>Sulphate 218 mg/L<br>Arsenic 8.67 µg/L<br>Zinc 14.5 µg/L | n/a | n/a |
| HYD-08-06A | Fluoride 0.13 mg/L<br>Arsenic 11.5 µg/L<br>Iron 0.666 mg/L | Fluoride 0.13 mg/L<br>Sulphate 497 mg/L<br>Arsenic 11.5 µg/L<br>Iron 0.666 mg/L | n/a | Iron 0.666 mg/L |
| HYD-08-08 | Fluoride 0.18 mg/L<br>Zinc 11.7 µg/L | Fluoride 0.18 mg/L<br>Sulphate 300 mg/L<br>Zinc 11.7 µg/L | n/a | Manganese 262 µg/L |
| HYD-08-09A | Fluoride 0.21 mg/L<br>Aluminum 2880 µg/L<br>Cadmium 0.304 µg/L<br>Total Cyanide 141 µg/L<br>Zinc 129 µg/L | Fluoride 0.21 mg/L<br>Sulphate 223 mg/L<br>Aluminum 2880 µg/L<br>Cadmium 0.304 µg/L<br>Total Cyanide 141 µg/L<br>Zinc 129 µg/L | Cobalt 21 µg/L<br>Total Cyanide 141 µg/L | Aluminum 2880 µg/L<br>Manganese 322 µg/L |
| HYD-08-10 | Fluoride 0.78 mg/L<br>Aluminum 18700 µg/L<br>Arsenic 825 µg/L<br>Calcium 1.25 µg/L<br>Chromium, trivalent 13.2 µg/L<br>Cobalt 313 µg/L<br>Iron 62.5 mg/L<br>Nickle 85.7 µg/L<br>Zinc 221 µg/L | Fluoride 0.78 mg/L<br>Sulphate 760 mg/L<br>Aluminum 18700 µg/L<br>Arsenic 825 µg/L<br>Calcium 1.25 µg/L<br>Chromium 13.2 µg/L<br>Cobalt 313 µg/L<br>Iron 62.5 mg/L<br>Nickle 85.7 µg/L<br>Zinc 221 µg/L | Arsenic 825 µg/L<br>Calcium 1.25 µg/L<br>Zinc 221 µg/L | Sulphate 760 mg/L<br>Aluminum 18700 µg/L<br>Arsenic 825 µg/L<br>Iron 62.5 mg/L<br>Manganese 332 µg/L |

| Sample Location | Parameters Exceeding and Dissolved Concentration | | | |
|---|---|---|---|---|
| | CCME-FAL | FIGQFCS | CSR AW | CSR DW |
| HYD-08-11A | Fluoride 1.56 mg/L<br>Aluminum 24800 µg/L<br>Arsenic 58.6 µg/L<br>Cadmium 6.66 µg/L<br>Cobalt 610 µg/L<br>Copper 529 µg/L<br>Nickel 266 µg/L<br>Zinc 1220 µg/L | Fluoride 1.56 mg/L<br>Sulphate 566 mg/L<br>Aluminum 24800 µg/L<br>Arsenic 58.6 µg/L<br>Cadmium 6.66 µg/L<br>Copper 529 µg/L<br>Manganese 1750 µg/L<br>Nickel 266 µg/L<br>Zinc 1220 µg/L | Arsenic 58.6 µg/L<br>Cadmium 6.66 µg/L<br>Cobalt 610 µg/L<br>Copper 529 µg/L | Fluoride 1.56 mg/L<br>Sulphate 566 mg/L<br>Aluminum 24800 µg/L<br>Arsenic 58.6 µg/L<br>Cadmium 6.66 µg/L<br>Manganese 1750 µg/L |
| HYD-08-17 | Cyanide 9.2 µg/L<br>Iron 2.36 mg/L<br>Uranium 17 µg/L | Sulphate 254 mg/L<br>Cyanide 9.2 µg/L<br>Iron 2.36 mg/L<br>Uranium 17 µg/L | n/a | Iron 2.36 mg/L<br>Manganese 60.5 µg/L |
| KR-05-688 | n/a | Sulphate 166 mg/L | n/a | n/a |
| New Camp Water Well | Arsenic 9.27 µg/L | Arsenic 9.27 µg/L | n/a | n/a |
| P90-7B | Arsenic 20.6 µg/L<br>Total Cyanide 8.5 µg/L | Arsenic 20.6 µg/L<br>Total Cyanide 8.5 µg/L | n/a | n/a |
| P90-8 | Arsenic 506 µg/L<br>Total Cyanide 10.2 µg/L<br>Iron 1.09 mg/L | Sulphate 189 mg/L<br>Arsenic 506 µg/L<br>Total Cyanide 10.2 µg/L<br>Iron 1.09 mg/L | Arsenic 506 µg/L | Arsenic 506 µg/L<br>Iron 1.09 mg/L |
| P96-12A | Arsenic 9.1 µg/L<br>Total Cyanide 15.5 µg/L | Arsenic 9.1 µg/L<br>Total Cyanide 15.5 µg/L | n/a | Manganese 840 µg/L |
| P96-12B | Arsenic 427 µg/L | Sulphate 125 mg/L<br>Arsenic 427 µg/L<br>Manganese 1720 µg/L | Arsenic 427 µg/L | Arsenic 427 µg/L<br>Manganese 1720 µg/L |
| Upper Mill Well | Fluoride 0.57 mg/L<br>Arsenic 667 µg/L<br>Iron 0.915 mg/L<br>Zinc 27.2 µg/L | Fluoride 0.57 mg/L<br>Sulphate 118 mg/L<br>Arsenic 667 µg/L<br>Total Cyanide 3.7 µg/L<br>Iron 0.915 mg/L<br>Zinc 27.2 µg/L | Arsenic 667 µg/L | Arsenic 667 µg/L<br>Iron 0.915 mg/L |