TELKWA COAL
LIMITED

July 20, 2020

Ms. Heather Noble

Project Assessment Director
BC Environmental Assessment Office (EAO)
P.O Box 9426 Stn Prov Govt
Victoria BC V8W 9V1

Send via Email

Tenas Project

Dear Heather,

Telkwa Coal Limited is in receipt of your recent request to post our draft baseline report, Tenas Project: 2017 Baseline Report (ERM 2018) in response to a request from a member of the public.

We wish to emphasize that there was no legislative nor regulatory requirement for us to provide this document to the Environmental Assessment Office in advance of the submission of our Environmental Asssesment application. We provided this draft report to the EAO much earlier than required in the EA process in order for the Working Group to have additional context through this pre-application phase.

We wish to stress that the report is an interim report representing only a partial set of data that will be submitted with the EA application. Additional baseline information and data will be included with the EA submission and readers should keep this in mind when reviewing the material.

Notwithstanding the above, it is appropriate that EAO highlights on the front cover that. “This Baseline Report is a draft report that does not contain all the baseline data that will be submitted with the ultimate EA submission. It should not be regarded as a complete and final report”. To do otherwise, would be misleading.

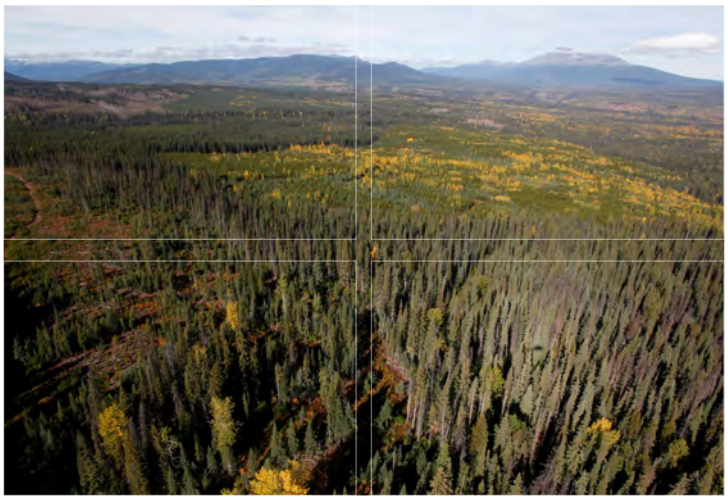
Please contact us if any questions.

Kind regards,

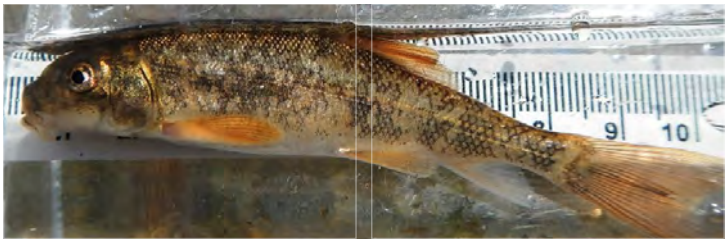
Angela Waterman
Director, Environment and Government Relations
cc.

Telkwa Coal Limited

Mark Gray, Managing Director
Dan Farmer, Chief Operating Officer







Prepared for:

TELKWA COAL
LIMITED

TENAS PROJECT
2017 to 2018 Baseline Report

December 2018

DRAFT

The business of sustainability

ERM

Telkwa Coal Limited, a subsidiary of Allegiance Coal Limited

TENAS PROJECT
2017 to 2018 Baseline Report

December 2018

Project #0403488

DRAFT

EXECUTIVE SUMMARY

A baseline program was established for the proposed Tenas Project in 2017. This report covers the program and information collected from spring 2017 to spring 2018 for the following programs:

- meteorology;
- air quality;
- noise;
- hydrogeology;
- groundwater quality;
- surface water quality;
- sediment quality;
- aquatic resources;
- fish and fish habitat; and
- visual quality.

These programs will provide data required to characterize site-specific existing conditions; contribute to engineering analysis and the mine design; support future development of predictive models, effects assessments, management plans, and closure planning; support permitting; and monitor changes in the local environment.

Meteorology

A meteorological monitoring program was initiated with the installation of one meteorological station to monitor on-site representative meteorological conditions in the proposed mine area. The Tenas Deposit station was installed on September 29, 2017 and continuously measures air temperature, relative humidity, precipitation, snow depth, wind speed and direction, solar radiation, and barometric pressure.

Existing data used to supplement the baseline summary include data from regional Environment and Climate Change Canada and British Columbia Ministry of Environment and Climate Change meteorological and climate datasets.

The Tenas Deposit station temperature and precipitation data were gap-filled to have a continuous data record from January 2017 to March 2018. During this period, air temperatures ranged from -26 to 25°C. The annual 2017 precipitation was 739 mm with 32% as snowfall and 68% as rainfall. A very large precipitation event occurred on October 24, 2017, with 73 mm of precipitation measured at the Tenas station and similar amounts measured at the Smithers airport stations. This was the largest amount of daily precipitation on record at the Smithers airport with data spanning back to 1942.

From October 2017 to March 2018, wind speeds at the Tenas Deposit were generally low and predominately came from the southwest, solar radiation ranged from 0 to 653 W/m^2, and station-level barometric pressure ranged from 87 to 92 kPa. The snowpack began accumulating in mid October and peaked at 144 cm in March 2018. The snowpack depth in the valley bottoms was unusually deep, and was the deepest on record at the Smithers airport station (103 cm in February). The snowpack's snow-water-equivalent measured at Hudson Bay Mtn. peaked at 530 mm in March 2018.

Air Quality

A baseline air quality monitoring program was initiated with the installation of four dust and metal deposition (dustfall) stations to monitor on-site representative dustfall conditions in different areas of the Project. Stations were installed in September 2017 at the proposed mine site (DF-TenasDep), along the proposed haul route near rural farm land (DF-Kerr), along the proposed haul route within Telkwa (DF-Telkwa), and at the proposed rail load out (DF-Rail).

Existing data used to inform the baseline include available 2014 to 2017 NO_2, O_3, PM_{10} and $PM_{2.5}$ data from regional British Columbia Ministry of Environment and Climate Change (BC ENV) air quality monitoring stations, and other historical projects in the region (Davidson and Dome) with data from 1996 to 2010.

The September 2017 to February 2018 dustfall results were all below the historical BC air quality objective's (AQO) upper range value (2.9 mg/dm^2/day). Dustfall was generally lower in the winter than the fall due to snow cover on the ground. Dustfall was highest at DF-Kerr, likely due to the adjacent public unpaved road.

NO_2 measurements in Smithers (2016 to 2017) were all below the applicable BC Air Quality Objectives (AQO). O_3 measurements in Smithers (2015 to 2017) had two 1-hour exceedances of the BC AQO in 2017. PM_{10} measurements in Smithers and Houston (2014 to 2017) had between one and six exceedances of the 24-hour BC AQO at each station in each year. $PM_{2.5}$ measurements in Smithers, Houston and Telkwa (2014 to 2017) had between three and 28 exceedances of the 24-hour BC AQO at each station in each year. All stations exceeded the annual $PM_{2.5}$ BC AQO each year except for the Smithers station in 2016. The Bulkley Valley is known to have periods of poor air quality, primarily due to smoke and road dust particulate matter emission sources.

Noise

A baseline ambient noise monitoring program was initiated in October 2017 to monitor on-site noise in different areas of the Project. Stations were established near the proposed open pit (S-TenasDep), near the proposed plant and water treatment area (S-Plant), and in the proposed rail load out loop (S-Rail). Each station measured approximately 24-hours of seasonal noise during one day in October, December, and March except for S-Rail that was first established in December.

24 hour noise levels at S-TenasDep and S-Plant were similar and ranged seasonally on average from 20 - 36 dBA. These stations were away from most sources of anthropogenic noise except for aircraft and train horns. Twenty-four hour noise levels for the S-Rail station ranged from 39 to 42 dBA. This station was 340 m away from existing train tracks and 900 m away from Highway 16. Aircraft were the loudest common noises sources recorded at S-TenasDep and S-Plant, and aircraft and passing trains were the loudest recorded at S-Rail.

Hydrogeology

The 2017 to 2108 hydrogeology baseline program was initiated in July 2017. Manual groundwater level measurements were recorded from 13 of the existing monitoring wells in July 2017, September 2017, January 2018 and March/April 2018 and from nine newly installed monitoring wells in March/April 2018. Manual groundwater level measurements were also recorded at three of the 13 existing monitoring wells in August 2017. The new wells have only been monitored once since their installation and therefore cannot be discussed in relation to seasonal fluctuations until more data is acquired. Continuous groundwater level measurements were recorded every 12 hours in five of the existing wells (three bedrock, two overburden) from September 2017 to March 2018.

Generally, the existing bedrock wells showed the lowest water levels in July to September 2017 and the highest water levels in January to April 2018; overburden wells were often dry, which correlates with historical data. The timing for highest levels in those not dry varied. Higher fluctuations occurred in overburden wells, with the highest manual fluctuation measurement of 2.30 m, and the highest continuous fluctuation measurement at 1.26 m.

Bedrock wells showed a north-northeast flow under a horizontal hydraulic gradient of approximately 0.09. A low vertical hydraulic gradient between two of the coal of seams suggests these two seams may be hydraulically connected. Shallow overburden wells showed a northern groundwater flow (similar to the topography) and a horizontal gradient of 0.04. Though more data is required to calculate the vertical hydraulic gradient between the upper and lower water-bearing overburden deposits, new and historical data infers a strong downward hydraulic gradient between these deposits.

Groundwater Quality

The 2017 to 2018 groundwater quality baseline program was initiated in August 2017 with the sampling of a subset of historical monitoring wells in and around the Tenas Pit. Two quarterly sampling events were conducted, with sample collection from nine wells in the August/ September 2017, and five wells in January 2018. The historical groundwater quality data from 1995 to 1997 and 2016 is also discussed in comparison to the current data.

The pH of the samples ranged between 6.5 and 9.0. Turbidity was below the provincial water quality guideline in all instances except one sampling location in January 2018. In general turbidity values were lower in bedrock wells than in overburden wells. Seasonally, conductivity values were generally within 8% of each other. Bedrock wells can generally be considered “soft”, while overburden wells can generally be considered “hard”.

Fluoride was the only anion or nutrient with elevated values, while others such as chloride, nitrate, nitrite, and sulfate were often below detection limits. Ammonia was detected in the majority of the wells with substantially lower concentrations in the overburden wells in comparison to the bedrock wells.

Of the total and dissolved metals, total arsenic, total copper, total iron, total barium, and total chromium were elevated during the January 2018 sampling event from one well. This result appears to be due to the high turbidity at this time, as the dissolved metals values for the same metals at this same well are generally below detection limits. Iron, however, was elevated for both total and dissolved values in September 2017, and met provincial guidelines in January 2018.

Higher values of total organic carbon in January 2018 appear to be again related to high turbidity values.

Hydrology

A baseline hydrometric baseline program was initiated in May 2017 to collect Project specific data. A network of three automated hydrometric monitoring stations was established and operated in and around the Project area as a part of the 2017 to 2018 baseline monitoring program. Stations were established on Tenas and Goathorn creeks downstream of the proposed pit, and one station on the Telkwa River upstream of the confluence with Goathorn Creek.

During the 2017 to 2018 monitoring period (May 2017 through March 2018), 11 site visits were completed and a total of 34 discharge measurements conducted across the hydrometric network. Discharge measurements, along with concurrent stage measurements were used to develop preliminary rating curves for the three monitoring stations. Rating curves were used along with the continuous stage data collected at the stations to generate annual hydrographs and compute various hydrologic indices. Site specific existing data were not available to supplement data collected during the baseline program.

Similar seasonal stream flow patterns were observed across the monitored streams and rivers in the Project area. The timing of runoff was typical of the regional stream flow regime, with the majority of runoff resulting from snowmelt during the spring and early summer. Slight differences were observed in seasonal runoff distribution between the monitoring locations, with a marginal increase in the proportion of runoff occurring in late summer in the larger watersheds and those with higher glacier coverage. Annual peak flows resulted from a high intensity rain event that occurred in late October. Peak flows that resulted from this event were of short duration but very high, ranging approximately 45% to 80% higher than the observed freshet driven peak flows. Summer low flows were observed in August in Tenas Creek, and in September at Goathorn Creek and the Telkwa River. Annual low flows occurred in late March throughout the Project area.

Surface Water Quality

A surface water quality baseline monitoring program was initiated in the spring of 2017. Creeks and rivers near proposed Project infrastructure were sampled monthly from May 2017 to April 2018. Sampling included 13 sites, and was supplemented by publically-available water quality data from an additional six sites.

Project area streams displayed strong seasonal patterns, with elevated nutrient and metal concentrations during freshet (May) and fall rains (September). Peak concentrations typically occurred during freshet in all creeks, except the Telkwa River where concentrations were higher in the fall and associated with elevated suspended solids. In contrast, alkalinity, pH, conductivity, and hardness had elevated concentrations in the winter during low flow, and had lower concentrations in the summer following freshet. Project area streams had neutral to slightly basic pH, low sensitivities to acid-inputs, with hard water in the smaller creeks and soft water in the larger rivers. Total suspended solids and turbidity were generally low in Project area streams, except the Telkwa River in the fall. Sulphate was the dominant anion, and generally had elevated concentrations during low flow. Fluoride concentrations were highest in the fall and winter. Polycyclic aromatic hydrocarbon and benzene, toluene, ethylbenzene, and xylene concentrations were all below detection limits. The majority of samples were below detection limits for phenols.

Aluminum, chromium, copper, and iron appear to be elevated in the Project area, as every creek both upstream and downstream of the Project were above federal and provincial guidelines. Elevated metal concentrations above guidelines typically occurred during freshet (May/June), except in the Telkwa River where they were more common in September and associated with high total suspended solids (TSS). The Telkwa River had concentrations above guidelines for eight metals, the most of any Project area stream.

Sediment Quality

A Sediment quality baseline program was initiated in 2017. Six sites in the Project area were sampled in September 2017, and the data were supplemented by publically-available data from two sites on Tenas Creek collected in 1986.

Project area streams were principally sand, with a low amount of fines. Sediment total organic carbon concentrations were low in Project area streams. Goathorn Creek at WQS05 had the highest sediment concentrations of arsenic, cadmium, copper, mercury, and zinc. Tenas Creek samples had the highest arsenic, chromium, iron, manganese, and nickel concentrations. Selenium concentrations were low in Project area streams, with a maximum of 0.3 mg/kg at the downstream Tenas Creek site in 1986.

Sediment arsenic, iron, manganese, and nickel appear to be elevated in the Project area as all sites, including upstream of the Project, were above provincial sediment quality guidelines. Sediment copper concentrations in Project area streams were also commonly above guidelines. Goathorn Creek sediment concentrations were above guidelines for seven metals, and typically had the highest concentrations of all sampled sites.

Aquatic Resources

An aquatic resources baseline program was initiated in 2017. Six sites in the Project area were sampled in September 2017, and supplemented by publically-available data from six additional sites.

Periphyton biomass and density was generally higher in the Telkwa and Bulkley rivers compared to the smaller streams, and communities were dominated by diatoms. In contrast, Tenas and Goathorn creeks periphyton communities were principally blue-green algae, and Tenas Creek had the lowest genus richness and diversity.

Benthic invertebrate communities were dominated by the pollution-tolerant Ephemeroptera and Plecoptera, and abundances were highest in Tenas Creek at WQS02. Lower Tenas Creek, upper Goathorn Creek, and the Telkwa River also had an abundance of Diptera, particularly Chironomidae. The Telkwa and Bulkey rivers generally had higher family richness; however, family diversity was comparable across sites.

Fish and Fish Habitat

A fish and fish habitat baseline program was initiated in October 2017. Seven locations along Tenas Creek, Goathorn Creek, Telkwa River, and Bulkley River were sampled, with three locations as reference sites, and four as receiving environment sites.

Fish habitat in the Project area was generally higher quality in the lower reaches of the streams; however, fish are present throughout the Project area. Tenas Creek and Goathorn Creek are typified by low to moderate gradient, gravel and cobble substrates, and occasional pools. The Bulkley River and Telkwa River are large streams with diverse fish communities, and moderately complex habitat.

There were some differences in fish size between the four watersheds, but indicators of fish health such as weight, length, and liver size were similar. Tissue metal concentrations were similar among watersheds. Selenium and mercury concentrations did not exceed federal and provincial guidelines.

Visual Quality

In 2017, the Visual Quality study developed a viewshed for the Project using a digital elevation model based on a subset of The Canadian Digital Surface Model (CDSM). Fifteen sites found in *The Bulkley Land and Resource Management Plan* (LRMP) and associated *Bulkley Landscape Unit Plans* were visited and subsequently scoped out of further study, as they did not have any view of the Project area.

Based on important corridors identified in these plans, an additional 18 sites were established. Of these 18 sites, four sites were found in subsequent field visits to have vegetative screening that completely obscured any view of the project site. The remaining 14 sites were photographed.

A separate viewshed was developed for the rail loadout area, though no photographs were taken. Due to uncertainty surrounding component heights, additional viewsheds were developed to investigate the visual consequences of project component heights from ground level to 120 metres above the current land surfaces. This was found to have little consequence and no change in visibility from the LRMP viewpoints.

ACKNOWLEDGEMENTS

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Chapter 2 Meteorology	ERM	Daniel Casanova, B.Sc., EP Trevor Newton, M.Sc.
Chapter 3 Air Quality	ERM	Golnar Zandpour, MET Trevor Newton, M.Sc Daniel Casanova, B.Sc., EP
Chapter 4 Noise	ERM	Nathan Lynch, M.DS., MAAS Daniel Casanova, B.Sc., EP Jeremy Jackson, M.E.T., R.P.Bio.
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Chapter 6 Groundwater Water Quality	Cassiar Geoscience Consulting Ltd.	Cody Cameron, P.Geo.
Chapter 7 Hydrology	ERM	Coby Hall, B.Sc.
Chapter 8 Surface Water Quality	ERM	Elizabeth Boyle, M.Sc., R.P.Bio.
Chapter 9 Sediment Quality	ERM	Elizabeth Boyle, M.Sc., R.P.Bio.
Chapter 10 Aquatic Resources	ERM	Elizabeth Boyle, M.Sc., R.P.Bio.
Chapter 11 Fish and Fish Habitat	ERM	Kirsten Seymour, M.Sc., R.P.Bio.
Chapter 12 Visual Quality	ERM	Michael Stead, B.Sc.

TENAS PROJECT
2017 to 2018 Baseline Report

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PLATES

LIST OF APPENDICES

GLOSSARY AND ABBREVIATIONS

Terminology used in this document is defined where it is first used. The following list will assist readers who may choose to review only portions of the document.

µg/m³	Micrograms per cubic metre
µS/cm	Microsiemens/centimetre
7-day low flows	The minimum average 7-day flow that occurs over a specified period, such as a month, season, or year.
AIR	Application Information Requirements
ALS	ALS Laboratory Group
Ambient noise	The all-encompassing noise associated within a given environment. It is the composite of sounds from many sources, both near and far. This is described using the LA_{eq} descriptor.
AMS	Airshed Management Society
Annual runoff	A measure of the hydrologic response of a watershed. It is often presented as a depth of water, in mm, over an entire watershed allowing direct comparison with precipitation totals.
ANOVA	Analysis of Variance
ANSI	American National Standards Institute
AR	Adit road
ARD	Acid rock drainage
ASTM	American Society for Testing and Materials
Background noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is described using the LA_{90} descriptor.
Baseflow	The groundwater component of flow discharge that is attributed to soil moisture and groundwater drainage into a channel.
BC	British Columbia
BC AQO	British Columbia Air Quality Objectives
BC EAO	British Columbia Environmental Assessment Office

BC EMS	British Columbia Environmental Management System
BC ENV	British Columbia Ministry of Environment and Climate Change Strategy
BC MECC	British Columbia Ministry of Environment and Climate Change
BC MEM	British Columbia Ministry of Energy and Mines
BC MEMPR	British Columbia Ministry of Energy, Mines and Petroleum Resources
BC MOE	British Columbia Ministry of Environment
BC MOT	British Columbia Ministry of Transportation
BC WQG - FAL	Water quality guidelines - freshwater aquatic life
Bench mark	A point of reference against which data may be compared or assessed.
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
BVLD	Bulkley Valley Lakes District
CAAQS	Canadian Ambient Air Quality Standards
CABIN	Canadian Aquatic Biomonitoring Network
CALA	Canadian Association for Laboratory Accreditation
Ca-Mg-HCO_3	Calcium-magnesium-bicarbonate
CCME	Canadian Council of Ministers of the Environment
CH	Chad's House
chl *a*	Chlorophyll *a*
CI	Confidence interval
cm	Centimetre
CN	Canadian National Railway Avenue
COC	Chain of custody
CPUE	Catch per unit effort
CRA	Commercial, recreational, or Aboriginal
CRM	Comparison with reference material

dB	Decibel. The unit used to describe sound levels and noise exposure. It is equivalent to 10 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure. Differences in noise levels of around 10 dB are generally perceived to be a doubling (or halving) of the perceived loudness of the noise. An increase of 10 dB is perceived as twice as loud, an increase of 20 dB is four times as loud, an increase of 30 dB is eight times as loud, etc.
dBA	The unit used to measure 'A-weighted' sound pressure levels. A-weighting is an adjustment made to sound-level measurement to approximate the response of the human ear.
dBC	The unit used to measure 'C-weighted' sound pressure levels. C-weighting is an adjustment made to sound-level measurements which takes into account low-frequency components of noise within the audibility range of humans.
DELT	Deformities, erosions, lesions, and tumours
DF	Dustfall
DFO	Fisheries and Oceans Canada
DR	Davidson Road
dwt	dry weight
EC	Environment Canada
ECCC	Environment and Climate Change Canada
EMA	*Environmental Management Act*
EPA	Environmental Protection Agency
ERM	ERM Consultants Canada Ltd.
Eutrophic	Trophic level (total phosphorus 0.035 to 0.1 mg/L)
F	F-value
Field blank	Samples of distilled water that are opened in the field and are analyzed using the same methods as a regular sample; used to identify sources of contamination.
Field duplicate	Two samples that are collected at the same time/location and analyzed separately with blind labels; used to identify variation from the environment, sampling or analytical methods.
FL	Fork length

g	gram(s)
Gauge datum	An offset applied to gauges. It is set to an elevation relative to the common datum, the point of 0.0 m stage-height for a gauge.
GC	Glacier Gulch site
GEO	Geotechnical well installed by SRK
GHG	Greenhouse gas
GLM	Generalized linear model
Gradient	An increase or decrease in the magnitude of a parameter (i.e., the degree of steepness along a streambed).
Groundwater	Water stored in soil or rock
ha	Hectare
HCO_3	Bicarbonate
HDPE	High density polyethylene
HG-AFS	Hydride generation-atomic fluorescence spectrometry
Holding time	Maximum amount of time that a sample may be held without significant degradation of the parameter
HSI	Hepatosomatic index
Hydrographs	A graphic presentation of the variation of a hydrologic parameter with elapsed time
Hz	Hertz
ICP-MS	Inductively coupled plasma mass spectrometry
ID	Identification
IEC	International Electrotechnical Commission
IPI	Inflatable Packers International
ISO	International Organization for Standardization
ISQG	Interim Sediment Quality Guideline
Joint AIR for MA/EMA AIR Permits	Joint Application Information Requirements for *Mines Act* and *Environmental Management Act* Permits
K	Hydraulic conductivity

kg	kilogram(s)
KL	Kathlyn Lake Elementary School
km	Kilometre
km/h	Kilometres per hour
kPa	Kilopascal
L_{10}	The noise level exceeded for 10% of the time and is approximately the average of the maximum noise levels.
L_{90}	The noise level exceeded for 90% of the time and is approximately the average of the minimum noise levels. The L90 level is often referred to as the "background" noise level and is commonly used as a basis for determining noise criteria for assessment purposes.
LA_{10}	L10 with A-weighting
LA_{90}	L90 with A-weighting
LA_{eq}	Leq with A-weighting
LA_{max}	Lmax with A-weighting
LA_{min}	Lmin with A-weighting
LDPE	Low density polyethylene
L_{eq}	The equivalent or average noise level during a measurement period. For example, the one hour Leq noise descriptor simply refers to the Leq noise level calculated over a one hour period. Any of the noise descriptors may be defined in this way, with an accompanying time period (e.g., one hour L10) as required.
L_{max}	The absolute maximum noise level in a noise sample.
L_{min}	The absolute minimum noise level in a noise sample.
LSA	Local Study Area
LWD	Large woody debris
M	Million or mega
m	Metres
m btoc	Metres below top of casing
m/s	Metres per second

MA	*Mines Act*
MA/EMA Permit	*Mines Act*/*Environmental Management Act* Permit
mags	Metres above ground surface
masl	Metres above sea level
Matrix spikes	Field samples to which known concentrations of analytes are added and analyzed to determine the percent recovery; used to determine analytical accuracy and precision
MB	Method blank
MAD	Mean annual discharge (computed as an average discharge over the course of a year)
Meso-eutrophic	Trophic level (total phosphorus 0.02 to 0.035 mg/L)
Method blank	Samples of analyte-free matrix (i.e., distilled water) that are prepared and analyzed using the same methods as a regular sample; used to assess laboratory contamination.
mg	Milligram(s)
mg/dm²/day	Milligrams per square decimetre per day (accumulation)
mg/L	Milligram/litre
mm	Millimetre
MMER	Metal Mine Effluent Regulations
MOE	Ministry of Environment
Mt	Million tonnes
N	Nitrogen
NAAQO	National Ambient Air Quality Objectives
NAD	North American Datum. A datum is a reference system for computing or correlating the results of a survey. The NAD83 was used for this report and is based on spheroid (GRS80).
Na-HCO_3	Sodium-bicarbonate
Nival	Relating to snow (i.e., Snowmelt-dominated seasonal stream flow pattern)
nm	Not measured
NO_2	Nitrogen dioxide

NR	Northern route site
Ns	Not sampled
NTU	Nephelometric turbidity unit
O_3	Ozone
Observation Interval	The interval surrounding a vertical that extends half way between the previous and latter verticals along a stream cross section in a manual discharge measurement.
°C	Degree Celsius
OD	Outer diameter
ORP	Oxidation-reduction potential
OVB	Overburden
P	p-value
PAH	Polycyclic aromatic hydrocarbons
PEL	Probable effects level
PM_{10}	Particulate matter smaller than 10 microns in diameter
$PM_{2.5}$	Particulate matter smaller than 2.5 microns in diameter
ppb	Parts per billion (concentration)
PQ	Drill hole diameter (4.83 inch drill bit outside diameter)
Project, the	The proposed Tenas Project
Proponent, the	Telkwa Coal Limited, as subsidiary of Allegiance Coal Limited
PVC	Polyvinyl chloride
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
R2	R squared
Rating curves	A curve derived from concurrently measure stage and discharge data that is used to estimate the discharge for any given observed stage. Often referred to as a stage-discharge relationship for a streamflow monitoring station.

Reference material	Standards with known concentrations that are analyzed using the same methods as a regular sample; used to determine methodological accuracy
Replicates	Subsamples of field samples that are analyzed separately using the same analytical methods; used to determine the precision of analytical methods.
RGS	Regional geochemistry survey
RIC	Resource Inventory Committee (currently known as the Resource Information Standards Committee)
RISC	Resource Information Standards Committee (previously known as the Resource Inventory Committee)
RMS	Root mean square
RPD	Relative percent difference
s	second(s)
SARA	*Species at Risk Act*
SBEB	Science-based environmental benchmarks
SD	standard deviation
Simpson's D	Simpson's Diversity index
SL	Slack Road
SO_2	Sulphur dioxide
Specific Conductivity	A measure of a solution's ability to conduct electricity, report in Siemens per metre (S/m)
SPL	Sound Pressure Level. The level of received sound pressure, as measured at a distance by a standard sound level meter with a microphone.
SRK	SRK Consulting
Stage	The height of the water surface in a water course or a channel above a fixed datum
SWE	Snow-water-equivalent
TKN	Total Kjeldahl nitrogen
TL	Tail length
TOC	Total organic carbon

Travel blank	Samples of distilled water that remain unopened in the field and are analyzed using the same methods as a regular sample; used to identify sources of contamination.
TSS	Total suspended solids
Ultra-oligotrophic	Trophic level (total phosphorus <0.004 mg/L)
US EPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator. A mathematical transformation (map projection) of the earth's surface to create a flat map sheet.
V	Volt
Vertical	The vertical line along a stream cross section where depth and velocity measurements are made when conducting a manual discharge measurement using a current meter.
W/m²	Watts per square metre
Watershed	The geographical area drained by a river and its tributaries; an area characterized by all runoff being conveyed to the same outlet.
WDR	Waste discharge regulation
WQG	Water Quality Guideline
WQO	Water Quality Objective
WSA	*Water Sustainability Act*
WSC	Water Survey of Canada
wwt	Wet weight

1. INTRODUCTION

1.1 PROJECT PROPONENT

Telkwa Coal Limited (Telkwa Coal; the Company) a Canadian company, is a wholly owned subsidiary of Allegiance Coal Limited, an Australian-based company listed on the ASX (ASX:AHQ). The Company focuses on metallurgical coal projects in Canada.

Telkwa Coal maintains an office local to the Project at:

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1.2 PROJECT DESCRIPTION

The proposed Tenas Project (the Project) is located 20 km south of Smithers, and 10 km southwest of Telkwa within the Regional District of Bulkley-Nechako (Figure 1.2-1). Coal mining has historically occurred in the region between 1918 and 1985.

The Project occurs within the Telkwa Coalfield, which contains three identified deposits: Tenas, Goathorn, and Telkwa North. The Tenas Project specifically concentrates on the Tenas deposit (Figure 1.2-2).

Annual production could range between 240,000 and 900,000 tonnes, with an overall footprint between 250 and 1,000 ha, subject to confirmation of the regulatory project description.

Components and activities associated with the Project include:

- open pit;
- topsoil, till, and rock piles;
- coal processing plant;
- water treatment plant;
- water management infrastructure;
- explosives site facility and magazine;
- administrative office and maintenance shop;
- bridge over Goathorn Creek;
- rail loadout;
- new three km 25 kV powerline and substation connecting to the existing 25kV BC Hydro distribution line south of the Project area; and
- a transportation corridor involving potential use of existing roads, upgrades to existing forest service roads, and construction of new access road(s).

Figure 1.2-1
Project Location

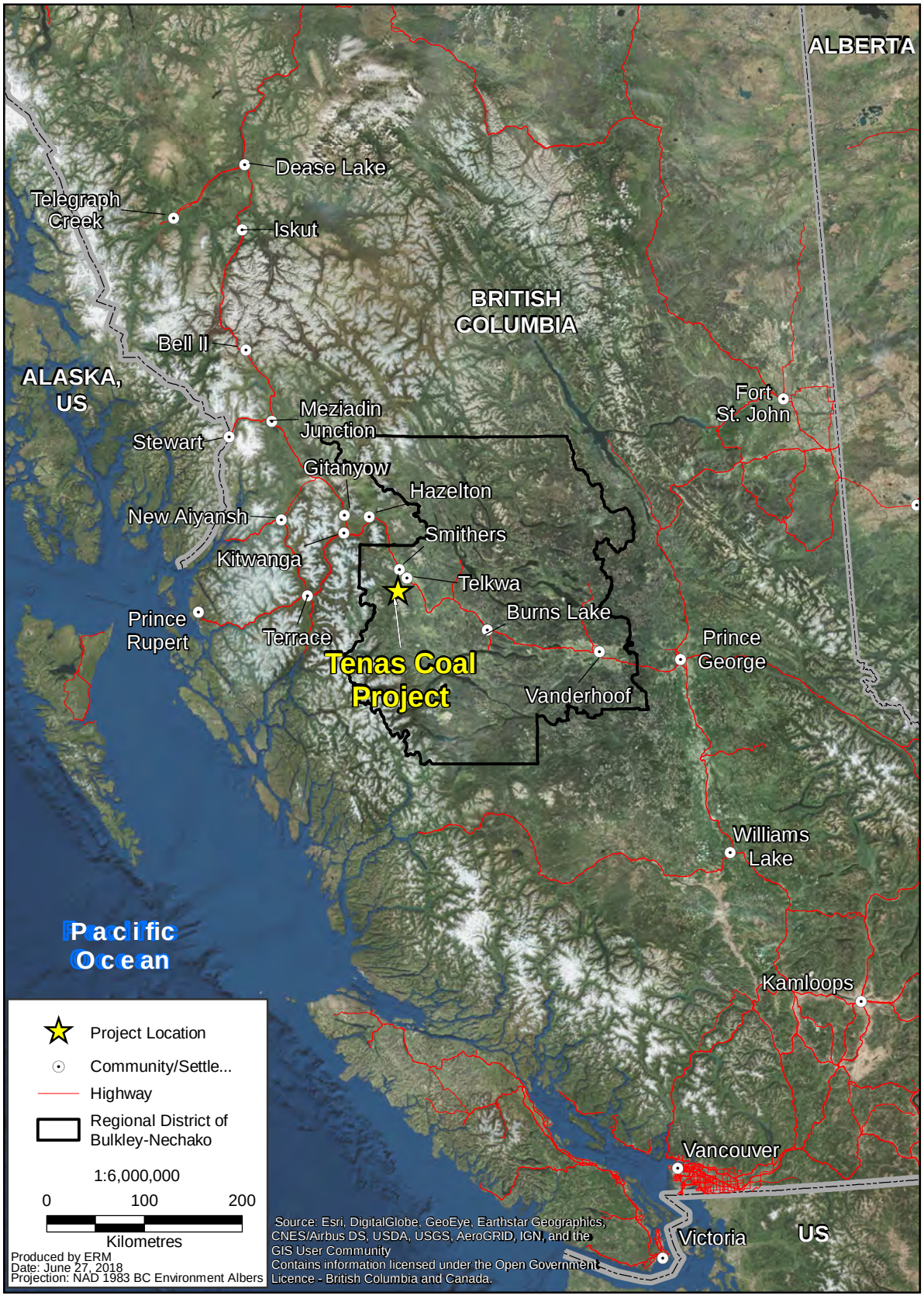
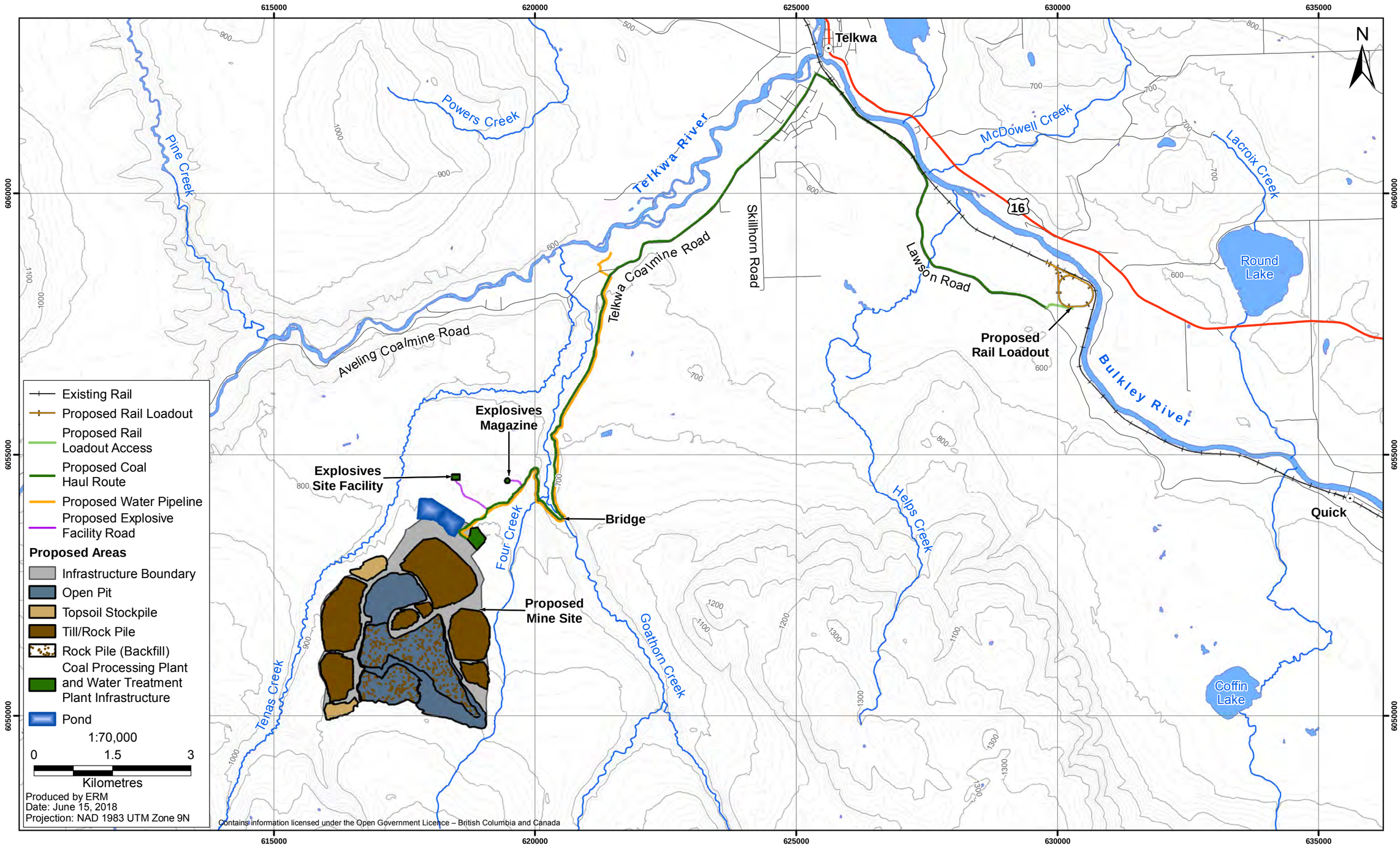


Figure 1.2-2
General Project Layout



Constructions activities will include site logging, topsoil salvage, and construction of buildings, roads, the rail loadout, bridges, and onsite utilities and services. The Project is planned to operate as a conventional truck and backhoe surface mine, with daytime pit operations four days a week (Monday to Thursday).

At closure, site infrastructure will be decommissioned and removed from the site. Pit and material piles will be re-sloped and revegetated. Disturbed lands and watercourses will be reclaimed to restore the land to pre-approved land use objectives in accordance with the *Mines Act* and Health, Safety and Reclamation Code for Mines in BC. At this time, it is anticipated that water treatment will continue into the post-closure phase of the Project. Other acid rock drainage (ARD) management strategies are being investigated as an alternative to water treatment.

1.3 ENVIRONMENTAL BASELINES

This consolidated baseline report provides information on the field programs and their respective data summaries for the 2017 to spring 2018 programs. The data summaries are supplemented with existing information, where applicable. Work was completed by ERM Consultants Canada Ltd. and Cassiar Geoscience Consulting Ltd. (see Acknowledgements).

Baseline programs covered by this report include:

- meteorology;
- air quality;
- noise;
- hydrogeology;
- groundwater water quality;
- hydrology;
- surface water quality;
- sediment quality;
- aquatics;
- fish and fish habitat; and
- visual quality.

2. METEOROLOGY

This chapter presents the methods and results of the meteorological monitoring program, initiated in September 2017. The purpose of the 2017 to 2018 program was to collect data on site specific meteorological conditions. Project-specific meteorological and climate data will inform a wide variety of potential Project planning and future operational and closure activities, including mine design, water management planning, road maintenance, water resource studies, air emission permitting, air dispersion modelling, and air quality management.

Specific objectives of the program were to:

- install and maintain a new automated meteorological station; and
- monitor air temperature, relative humidity, precipitation, snow depth, wind speed and direction, solar radiation, and barometric pressure.

2.1 STUDY AREA

Meteorological conditions in the general area of the Tenas Project have moderate spatial variability due to topography and regional gradients of key climate parameters such as precipitation, temperature, and wind. There are no active regional meteorological stations (e.g., those operated by the government) in the immediate vicinity of the Project area, thus site specific monitoring was deemed necessary. The closest regional meteorological stations operated are at Telkwa, 14 km to the northeast of the Tenas Deposit, and the Smithers Airport, 26 km to the north of the Tenas Deposit.

2.2 REGULATORY AND POLICY FRAMEWORK

Project specific meteorological monitoring for the Tenas Project is a component of the *Joint Application Information Requirements for Mines Act and Environmental Management Act Permits* (Joint AIR for MA/EMA Permits; BC MEM and MOE 2016) and the *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (BC MOE 2016a) in order to "demonstrate an understanding of how weather and climate will affect all aspects of the project" (BC MEM and MOE 2016).

2.3 EXISTING INFORMATION

Readily available sources of existing meteorological and climate information were reviewed and a summary of the review is provided in Table 2.3-1.

Table 2.3-1. Meteorological Data Information Table

Data Sources Reviewed	• ECCC historical meteorological and climate database. (ECCC. 2018a. *Historical Data – Climate*. http://climate.weather.gc.ca/historical_data/search_historic_data_e.html (accessed April 2018).)

(continued)

Table 2.3-1. Meteorological Data Information Table (continued)

Data Sources Reviewed *(cont'd)*	• ECCC *Climate Trends and Variations Bulletin* (ECCC. 2018b. *Climate Trends and Variations Bulletin*. https://www.canada.ca/en/environment-climate-change/services/climate-change/trends-variations.html and ftp://ccrp.tor.ec.gc.ca/pub/CTVB/ (accessed April 2018).) • ECCC Climate Normal database (ECCC. 2018c. *Canadian Climate Normals 1981 – 2010 Station Data* for Smithers A station. http://climate.weather.gc.ca/climate_normals/results_1981_2010_e.html?searchType=stnName&txtStationName=smithers&searchMethod=contains&txtCentralLatMin=0&txtCentralLatSec=0&txtCentralLongMin=0&txtCentralLongSec=0&stnID=487&dispBack=1 (accessed April 2018).) • BC ENV *BC Air Data Archive* database (BC ENV. 2018a. *Envista – Air Resources Manager*. https://envistaweb.env.gov.bc.ca/ (accessed April 2018).) • BC ENV snow survey data (BC ENV. 2018b. *Snow Survey Data*. https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-science-data/water-data-tools/snow-survey-data and https://catalogue.data.gov.bc.ca/dataset/manual-snow-survey-observations-data-archive (accessed April 2018).) • BC MOT historical weather data (BC MOT. 2018. *Avalanche and Weather Programs*. https://prdoas3.pub-apps.th.gov.bc.ca/saw-paws/weatherstation (accessed April 2018).) • Pacific Climate Impacts Consortium BC station database (Pacific Climate Impacts Consortium. 2018. BC Station Data. http://tools.pacificclimate.org/dataportal/pcds/map/ (accessed April 2018).) • *Davidson Project Application for Environmental Assessment Certificate* (2008) and supplemental information (BC EAO. 2018a. EAO Project Information and Collaboration website for the Davidson project. https://projects.eao.gov.bc.ca/p/davidson/docs?folder=75 (accessed April 2018).) • *Telkwa Coal Project Application for a Project Approval Certificate* (1997; BC EAO. 2018b. EAO Project Information and Collaboration website for the Telkwa Coal project. https://projects.eao.gov.bc.ca/p/telkwa-coal/docs?folder=4 (accessed April 2018).)
General Remarks	Reviewed information included publicly available sources for data collected in the general regional area of the Tenas Project. Additional potential sources of relevant public and private information may be available.
Sampling Required by Joint AIR for MA/EMA Permits	Recent project specific meteorological monitoring is a requirement of the Joint AIR in order to "demonstrate an understanding of how weather and climate will affect all aspects of the project".
Existing Data	Data are available from over 117 meteorological stations that have operated at one time or another since 1922 within a 50 km radius of the Tenas Project.
Existing Data Issues	Most of these stations only measured specific meteorological parameters, do not have continuous datasets (e.g., seasonal operation), or not operational in recent years.
Missing Data	There were no existing stations located in the general area of the Tenas Deposit with recent meteorological data.
2017–March 2018 Baseline Program	After reviewing the existing data, four stations were identified as being suitable for characterizing the recent regional meteorological conditions of the Project. One station was identified as being suitable for characterizing the long term Climate Normal conditions of the region. These stations are described in Section 2.4.1.

(continued)

Table 2.3-1. Meteorological Data Information Table (completed)

2017–March 2018 Baseline Program *(cont'd)*	The Tenas Project's meteorological monitoring program was designed to address the lack of recent meteorological data in the Project area. The suitable regional data described above were also incorporated into the monitoring program.

2.4 METHODOLOGY

2.4.1 Automated Meteorological Station

The Tenas Deposit meteorological station was installed and became operational on September 29, 2017 (Plates 2.4-1 and 2.4-2). It is located in the Tenas coal deposit area, in a cutblock clearing. The Tenas Deposit station is located 14 km southwest of the closest BC ENV meteorological station (Telkwa) and 26 km south of the ECCC meteorological stations at the Smithers Airport (Smithers A and Smithers AUTO). All station locations are listed in Table 2.4-1 and shown in Figure 2.4-1.

Plate 2.4-1. The Tenas Deposit meteorological station after installation. September 29, 2017. Looking west.

Plate 2.4-2. The Tenas Deposit meteorological station on arrival. March 22, 2018. Looking northeast.

Table 2.4-1. Currently Active Project and Select Regional Meteorological Stations

Station Type	Station Name	Reporting Organization	Station Operating Period	UTM Coordinates (Zone 9U WGS84)		Elevation (masl)[a]	Data Source Reference
				Easting (m)	Northing (m)		
Standard meteorological station	Tenas Deposit	Telkwa Coal	Sep 29, 2017 - Present	616847	6051099	993	n/a
	Smithers AUTO	ECCC	Aug 19, 2013 - Present	616318	6076727	521	ECCC (2018a)
	Smithers A	ECCC	Jun 1, 1942 - Present	616744[b]	6076800[b]	525	Time Series: ECCC (2018a) Climate Normals: ECCC (2018c)
Air quality monitoring station with limited meteorological monitoring	Telkwa	BC ENV	Jan 20, 1998 - Present	625405	6062198	515	BC ENV (2018a)
	Smithers St. Josephs	BC ENV	Jun 3, 1997 - Present	617212	6072196	497	BC ENV (2018a)
	Houston	BC ENV	No. 21, 1994 - Present	652757	6030420	603	BC ENV (2018a)
Manual snow course survey station	Hudson Bay Mtn	BC ENV	Jan 30, 1972 - Present	611242	6069734	1,363	BC ENV (2018b)

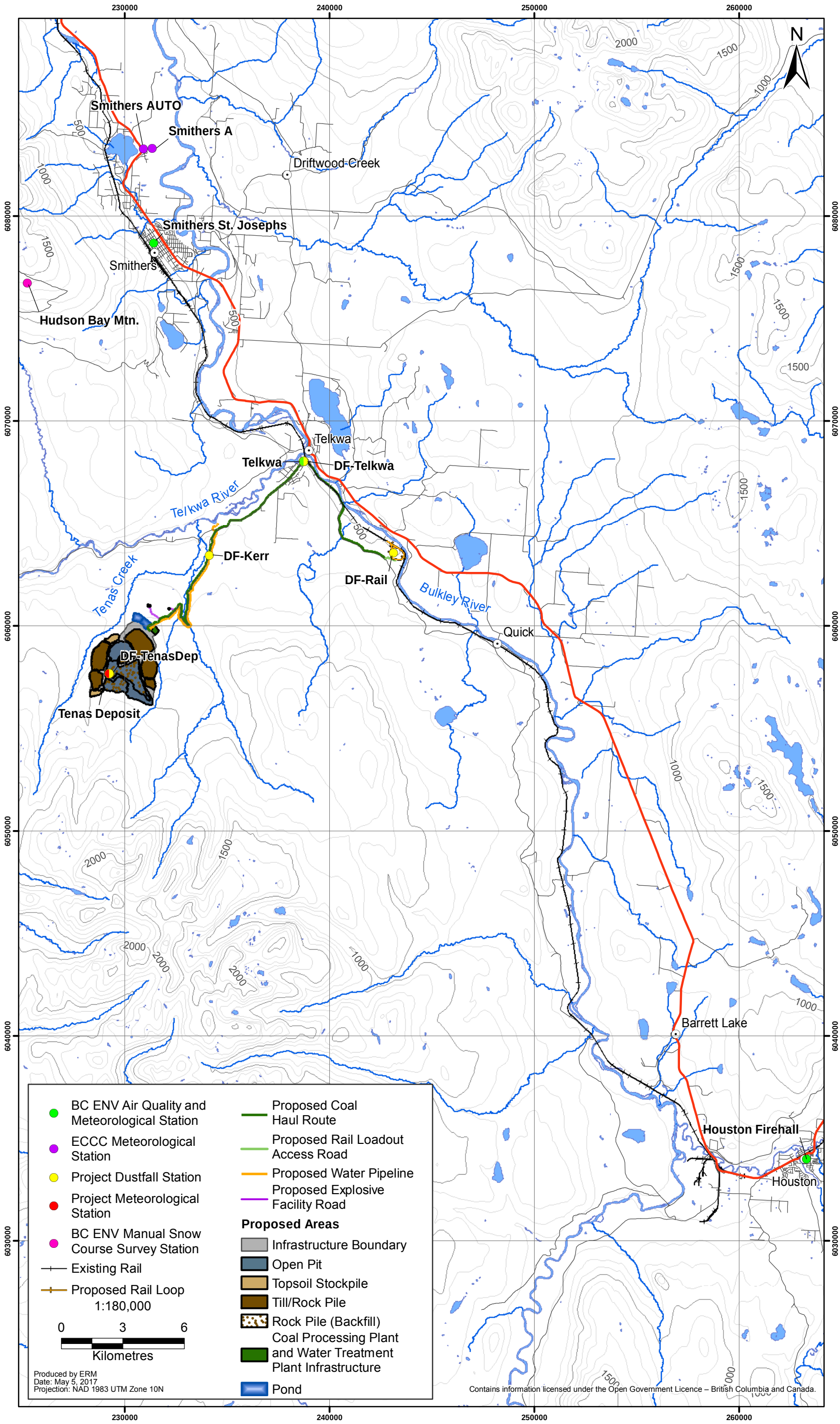
Notes:
n/a = not applicable
[a] Some station elevations reported by ECCC and BC ENV are known to be inaccurate compared to established topography datasets; corrected elevations are used in this table.
[b] Coordinates provided by ECCC for the Smithers A station point to a location in the middle of the airport runway and are known to be inaccurate by about 500 m.

The Tenas Deposit station and sensors were installed according to sensor siting guidelines from ECCC (EC 2004, 2012) and the BC ENV (BC MOE 2016). These guidelines, wherever possible, follow standards set by the World Meteorological Organization which were established to promote standardization and describe practices, procedures, and specifications for proper siting of instruments, precision and accuracy of measurements, and archive formats.

The Project is located in a densely forested area, and finding a station location that fulfilled all sensor siting guidelines was challenging. The primary concerns when selecting an appropriate location for the meteorological station were to:

- monitor meteorological conditions representative of conditions in the Tenas Deposit area;
- avoid obstructions (e.g., existing and potential infrastructure and trees) that would bias wind speed and direction;
- avoid shaded areas that would bias solar radiation data and reduce exposure of the solar power panel to sunlight; and
- identify a suitable tower anchor foundation.

Figure 2.4-1
Meteorological and Air Quality Monitoring Stations



As the station is located in a remote region and unattended for long periods of time (months), consideration was also given to helicopter and vehicle accessibility.

The wind sensor is located over open and relatively level terrain, as far as possible from the edge of the forest (70 m away from the closest cutblock edges to the north and south of the station). The sensor is mounted 10 m above the ground, which is the standard reference height for wind measurements (EC 2004, 2012). Temperature and humidity sensors are shielded from solar radiation, and adequately ventilated. The precipitation gauge uses a single Alter wind screen to reduce precipitation undercatch due to wind turbulence.

The meteorological station is programmed according to the ECCC guidelines. The datalogger clock is set to Pacific Standard Time with no adjustment for daylight savings (as per meteorological monitoring standards). Automatically logged data include:

- hourly average wind speed, wind direction, and standard deviation of wind direction;
- hourly average air temperature;
- hourly average relative humidity;
- hourly average solar radiation;
- hourly sampled snow depth;
- hourly average barometric pressure;
- 5-minute and hourly total accumulated precipitation; and
- hourly average battery power supply voltage.

Each day at midnight, the following data are also automatically recorded:

- daily maximum and minimum air temperature;
- daily maximum wind speed, and the wind direction at maximum speed;
- total daily precipitation; and
- diagnostic information.

A continuous record of these data is being maintained by ERM.

2.4.2 Station Sensors and Equipment

The sensors and equipment that were installed on the Tenas Deposit station are summarized in Table 2.4-2.

The meteorological station consists of a 9 m high aluminum tower that is used to mount all sensors except for the precipitation gauge. The tower is anchored at the base and strengthened with guy wires. The tower base, most guy wires, and the Pluvio precipitation gauge pedestal are anchored into rock outcrops in the cutblock. One guy wire is anchored using a soil anchor.

Table 2.4-2. Tenas Deposit Station Sensors and Equipment Installed in September 2017

Description	Make	Model	Serial Number
Wind speed and direction sensor	RM Young	05305	WM154553
Air temperature and relative humidity sensor	Rotronic	HC2-S3 (-50 to +50°C version)	20180200
Solar radiation shield for air temperature and humidity sensor	RM Young	41003-X	-
Solar radiation sensor	Kipp & Zonen	SP Lite2	173213
Snow depth sensor	Campbell Scientific	SR50A	9103
Barometric pressure sensor	Vaisala	CS106	N3030363
Precipitation sensor (with single Alter wind screen)	OTT	Pluvio² L (400 cm² version)	417512
Datalogger	Campbell Scientific	CR1000-XT	85763

Note: dash (-) = not available or not applicable

Wind speed and direction are measured with an RM Young 05305 wind sensor, installed at a height of 10 m above the ground, extended above the tower frame. Wind speed is measured in metres per second (m/s) and wind direction in degrees from geographic north.

Air temperature and relative humidity are measured with sensors that are combined into a single Rotronic HC2-S3 probe. The probe is mounted on the tower, about two metres above the ground. The sensors are shaded from solar radiation by a multi-plate passive solar radiation shield (RM Young 41003-X). Air temperature is measured in degrees Celsius (°C) and relative humidity in percent (%).

Direct and diffuse incoming solar radiation (combined) are measured with a Kipp & Zonen SP Lite2 pyranometer. The sensor is mounted on the tower, about two metres above the ground. Solar radiation is reported in watts per square metre (W/m^2).

Snow depth is measured with a Campbell Scientific SR50A sonic snow depth sensor that is mounted to the station tower with a cross arm about two metres above the ground. Snow depth is reported in centimetres (cm).

Barometric pressure is measured with a Vaisala CS106 barometer. The sensor is mounted inside the station's datalogger enclosure. The enclosure is vented with a hydrophobic filter and entry seal to equalize the pressure in the enclosure with the ambient pressure. Barometric pressure is reported as station-level pressure and sea-level corrected pressure, in units of kPa.

Precipitation is measured with an OTT Pluvio² L (400 cm² version) all-weather precipitation gauge. The larger 400 cm² orifice area was chosen to reduce the amount of snow buildup on the rim of the orifice that can lead to orifice blocking and a reduced catch efficiency. The station is located far away from an AC line power tie-in point, and therefore a heated precipitation gauge was not feasible. The precipitation gauge is mounted on a 1 m pedestal in order to keep the top of the gauge from being buried in snow. The precipitation gauge uses a single Alter wind screen to reduce precipitation undercatch caused by wind. During winter, the gauge is winterized with propylene glycol to prevent freezing. The gauge automatically adjusts the data output to account for evaporation and does not require the addition of oil.

All station sensors are connected to a Campbell Scientific CR1000-XT datalogger that controls the operation of the station. The datalogger's program monitors each sensor every 5 seconds and generates hourly and daily data tables with instantaneous, average, maximum, minimum, total, and standard deviation values, depending on which meteorological variable is being measured. These tables are stored in internal memory. The station is powered with a solar panel, a 12 volt 75 amp hour deep cycle absorbent glass mat battery and a solar controller. The station is grounded and has a lightning rod to help prevent lightning from damaging the electronics.

2.4.3 Quality Assurance and Quality Control

2.4.3.1 Station Maintenance

A maintenance program is in place for the Tenas Deposit meteorological station. When necessary, the sensors are returned to the supplier for calibration because specialized equipment is required for most calibration procedures. The recommended recalibration interval for this station's application is every two years (BC MOE 2016).

Meteorological station maintenance site visits were conducted by experienced technicians to ensure the station continued to function correctly. Station maintenance fieldwork tasks are summarized in Table 2.4-3. Detailed trip reports were prepared to document field observations and completed tasks. During each station visit, sensors and equipment were checked to ensure they were operating normally.

Table 2.4-3. Tenas Deposit Station Visits and Sensor Maintenance, September 2017 to March 2018

Station Visit Dates	Tasks Performed
Aug 31, 2017	• Reconnaissance to identify suitable installation locations for a meteorological station
Sep 26-29, 2017 (Plate 2.4-1)	• Installed Tenas Deposit meteorological station
Oct 16, 2017	• Inspected station • Downloaded data • Winterized the precipitation gauge with propylene glycol and water • Cleared snow off the station
Nov 28, 2017	• Inspected station • Downloaded data • Updated datalogger program to correct a problem with the barometric pressure sensor measurements • Emptied and re-winterized the precipitation gauge
Dec 11, 2017	• Inspected station Downloaded data • Cleared rime ice off the station
Jan 17, 2017	• Inspected station • Downloaded data • Cleared snow off the station
Feb 19, 2018	• Inspected station • Downloaded data • Cleared snow off the station • Emptied and re-winterized the precipitation gauge

(continued)

Table 2.4-3. Tenas Deposit Station Visits and Sensor Maintenance, September 2017 to March 2018 (completed)

Station Visit Dates	Tasks Performed
Mar 22, 2018 (Plate 2.4-2)	• Inspected station • Downloaded data • Cleared snow off the station

2.4.3.2 Data Review

All meteorological data were reviewed after collection to remove or correct any erroneous values. The screening process used by ERM draws on screening criteria used by the United States Environmental Protection Agency (US EPA 2000), ECCC (EC 2004), and the BC ENV (BC MOE 2016), as well as using professional judgement and experience (Figure 2.4-2). Any erroneous data were marked as missing and the periods of missing data are summarized in Section 2.5. After data were screened, the recorded hourly and daily values were analysed and processed into daily and monthly summaries.

As an example, during months with snowfall, the snow depth data were used to verify precipitation events. If snow depth increased but the precipitation gauge did not record any precipitation during the same time period, it was likely that there was a snow cap blocking the precipitation gauge orifice. In these cases, precipitation data were marked as missing. Large winter precipitation events recorded by the precipitation gauge were also verified by comparing the event with the snow depth change over the same period. Data were also compared against concurrent regional meteorological station data.

2.4.3.3 Precipitation Classification

Total precipitation data were then separated into daily rainfall and snowfall based on daily air temperature data, and followed the methodology provided by Quick (1995). The algorithm is as follows:

if T > 2 then
R = P
SWE = 0

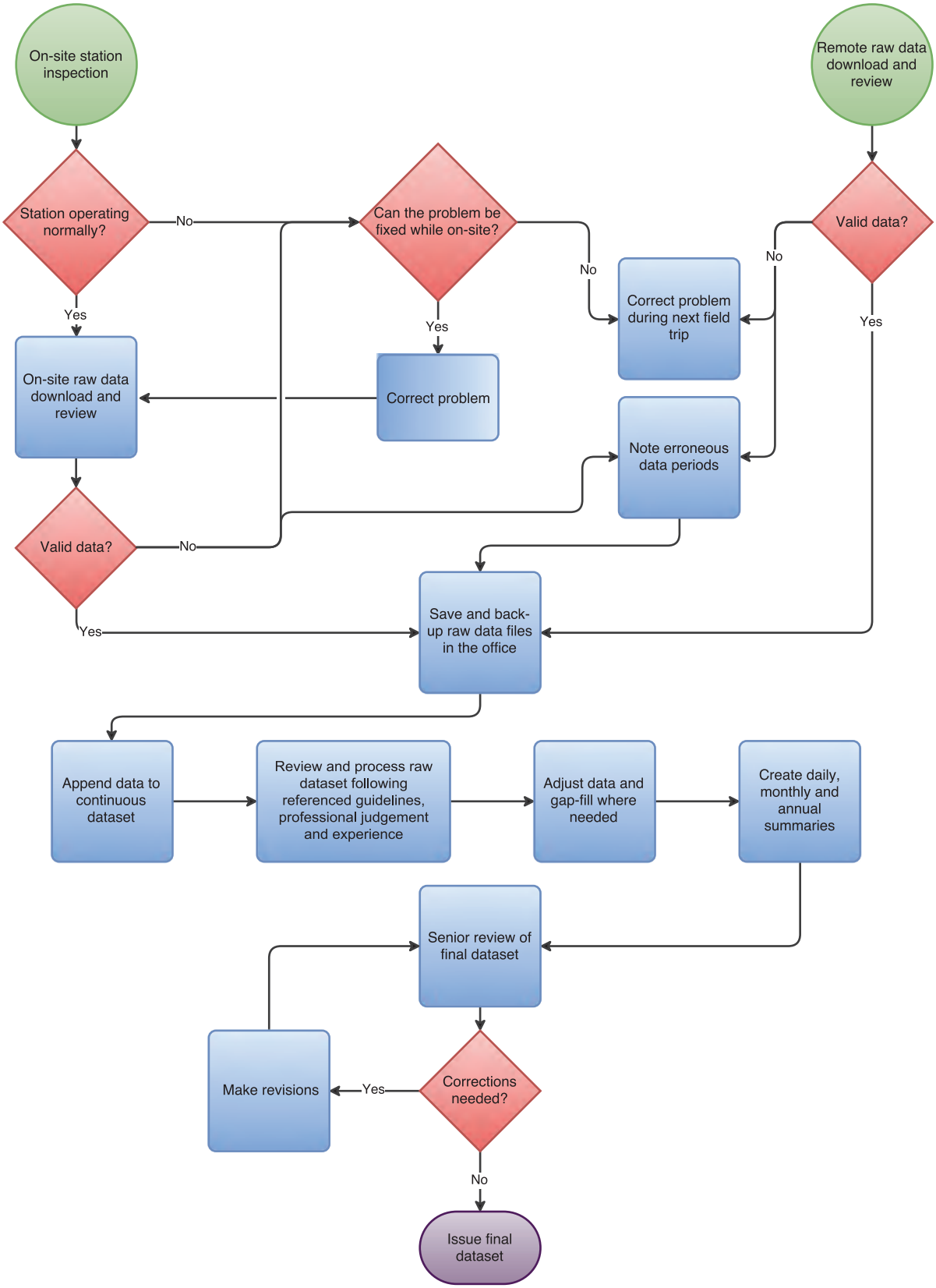
if T < 0 then
R = 0
SWE = P

if 0 < T < 2 then
R = P × T/2
SWE = P × (1 - (T/2))

where:
T = Mean Daily Air Temperature (^{o}C)
P = Daily Precipitation (mm)
R = Daily Rainfall (mm)
SWE = Daily Snowfall Snow-Water-Equivalent (SWE; mm)

Figure 2.4-2

Overview of Meteorological Monitoring Program Quality Assurance and Quality Control Process



2.4.3.4 Estimating Missing Precipitation and Temperature Data

Where possible, any missing daily precipitation and temperature data from the Tenas Deposit station were estimated using the linear equations presented in Table 2.4-4.

Table 2.4-4. Daily Precipitation and Temperature Relationship Equations

Dependent Variable	Independent Variable	Equation	R^2	N (No. of Pairs[a])
Daily Total Precipitation (mm)				
$P_{TenasDeposit}$	$P_{SmithersA}$	$P_{TenasDeposit} = 1.098 * P_{SmithersA} + 0.857$	0.773	173
$P_{TenasDeposit}$	$P_{SmithersAUTO}$	$P_{TenasDeposit} = 1.183 * P_{SmithersAUTO} + 0.618$	0.776	139
Daily Mean Air Temperature (°C)				
$T_{TenasDeposit}$	$T_{SmithersA}$	$T_{TenasDeposit} = 0.864 * T_{SmithersA} - 1.886$	0.878	173
$T_{TenasDeposit}$	$T_{SmithersAUTO}$	$T_{TenasDeposit} = 0.838 * T_{SmithersAUTO} - 1.495$	0.884	171

Notes:
When applying these equations, if the input precipitation value was zero then the output was set to zero. Any resulting negative precipitation values were also set to zero.
[a] The number of concurrent data point pairs (dependent and independent variable pairs) used to develop the linear regression equations.

Precipitation equations were derived using linear regressions on concurrent historical (September 30, 2017 to March 21, 2018) daily precipitation amounts between the stations. When applying these equations, if the input precipitation value was zero then the output was set to zero. Any resulting negative precipitation values were also set to zero. When possible, the station with the larger R^2 value was used to gap-fill the Tenas Deposit station.

Temperature equations were derived using linear regressions on concurrent historical (September 30, 2017 to March 21, 2018) daily mean temperatures between the stations, and were applied to the daily dataset. When possible, the station with the larger R^2 value was used to gap-fill the Tenas Deposit station.

2.5 DATA SUMMARY

The purpose of this section is to describe the on-site meteorological conditions measured by the Tenas Deposit station. Regional data are also incorporated to a limited extent. References to the full regional station datasets are listed in Table 2.4-1.

The Tenas Deposit meteorological station air temperature, relative humidity, precipitation, snow depth, wind speed and direction, solar radiation, and barometric pressure data are briefly summarized in the sections below for the September 30, 2017 to March 21, 2018 period. Gap-filled air temperature and precipitation data from January 1, 2017 to September 29, 2017 are also included (see Section 2.4.3.4 for gap-fill methodology).

There were a number of days with missing data from the Tenas Deposit station during the January 1, 2017 to March 21, 2018 period. The unavailable data periods are summarized in Table 2.5-1.

Table 2.5-1. Tenas Deposit Station Data Gaps from January 2017 to March 2018

Parameter	Dates of Missing Data		Reason for Missing Data
	2017	2018	
All Parameters	Jan 1 – Sep 29	Mar 22 – 31	Station was first installed on Sep 29, 2017. Temperature and precipitation were gap-filled. At the time of reporting, the latest data download was on Mar 22, 2018.
Wind Speed and Direction	Oct 16, 17, 24; Nov 18, 19, 22, 23	Jan 29, 30	Sensor frozen
Solar Radiation	Oct 21 – 24; Nov 6 – Dec 10, 21 – 31	Jan 1 – Feb 13, 28	Sensor covered in snow. Low wind speeds prevented natural snow clearing of the sensor.
Barometric Pressure	Sep 30 – Nov 28	-	Datalogger programming error. This period was gap-filled using adjusted regional data.
Snow Depth	Nov 29 – Dec 10	-	A large piece of snow fell from the tower, landing directly under the sensor, resulting in inaccurate data. The issue was resolved during the Dec 11 fieldtrip by levelling the snow surface.

Note:
This table only lists days that had less than 75% of valid hourly data. Missing temperature and precipitation data were gap-filled using the methods described in Section 2.4.3.4.

Table 2.5-2 summarizes the monthly meteorological data at the Tenas Deposit station, and daily data records are included in Appendix 2-A. Hourly and five-minute datasets are available by request.

2.5.1 Air Temperature

Figure 2.5-1 and Appendix 2-A present the daily mean, maximum and minimum air temperatures calculated and monitored at the Tenas Deposit station and monthly data are presented in Table 2.5-2. Figure 2.5-1 also includes the temperature data from the ECCC Smithers A and Smithers AUTO stations.

At the Tenas Deposit station, temperatures ranged from -26.0°C (January 11, 2017) to 25.4°C (August 6, 2017). Temperatures were generally cooler at this station (993 masl) compared to the lower valley elevation airport stations (525 masl), except during temperature inversion conditions. The temperature gap-filling methodology used for January 1, 2017 to September 29, 2017 data does not accurately account for temperature inversions. Between September 30, 2017 and March 21, 2018 there were 31 days that experienced temperature inversions with a difference of more than 1°C between the Tenas Deposit and Smithers A stations.

The ECCC *Climate Trends and Variations Bulletin* (ECCC 2018b) reported that the 2016/2017 Pacific Coast Region winter was cooler than normal, and spring, summer, fall and winter 2017/2018 were warmer than normal, compared to the past 70 years of data (Table 2.5-3). In the smaller region of the Tenas Project and Bulkley Valley area, winter 2016/2017 and fall 2017 temperatures were normal, spring and summer were warmer than normal, and winter 2017/2018 was cooler than normal.

Table 2.5-2. Tenas Deposit Meteorological Data Summary, January 2017 to March 2018

Month	Gap-filled[a] Air Temperature (°C)					Relative Humidity (%)	Wind Speed (m/s)		Unadjusted Precipitation (mm)	Gap-filled[a] and Undercatch Adjusted Precipitation (mm)			Snow Depth (cm)	Solar Radiation (W/m²)	Station Elevation Barometric Pressure (kPa)
	Mean	Mean Daily Max.	Mean Daily Min.	Absolute Max.	Absolute Min.	Mean	Mean	Absolute Max. Gust	Total Precipitation	Total Precipitation	Total Rainfall	Total Snowfall SWE	Mean	Mean	Mean
2017															
Jan	-7.5	-4.3	-10.6	4.3	-26.0	-	-	-	-	44.4	6.8	37.6	-	-	-
Feb	-6.8	-2.8	-10.8	6.3	-21.0	-	-	-	-	15.3	6.9	8.4	-	-	-
Mar	-2.3	1.6	-6.2	8.5	-12.5	-	-	-	-	14.7	3.9	10.8	-	-	-
Apr	3.1	8.2	-2.1	12.0	-5.4	-	-	-	-	19.4	16.2	3.2	-	-	-
May	7.4	12.5	2.2	22.5	-4.3	-	-	-	-	109.8	107.9	1.9	-	-	-
Jun	9.4	14.8	4.0	22.7	-2.4	-	-	-	-	72.0	72.0	0.0	-	-	-
Jul	10.8	16.3	5.1	23.9	1.0	-	-	-	-	44.7	44.7	0.0	-	-	-
Aug	12.3	18.3	6.4	25.4	2.5	-	-	-	-	26.0	26.0	0.0	-	-	-
Sep	8.5	13.3	3.6	23.2	-2.1	-	-	-	-	101.6	101.6	0.0	-	-	-
Oct	1.9	6.7	-2.0	14.2	-5.9	83.2	1.2	13.3	147.2	147.2	114.5	32.7	4.1	79.8	89.8
Nov	-5.6	-3.0	-8.6	2.5	-15.9	90.0	1.1	11.5	133.8	133.8	0.0	133.8	28.2	-	89.3
Dec	-8.9	-6.0	-11.9	3.4	-24.9	88.3	0.9	11.2	9.6	9.6	0.0	9.6	46.9	-	90.7
2018															
Jan	-7.6	-5.0	-10.5	0.8	-24.7	92.0	0.7	8.3	50.2	50.2	0.0	50.2	63.0	-	89.5
Feb	-9.8	-5.6	-13.6	2.2	-21.0	83.2	1.2	10.5	150.4	150.4	0.0	150.4	101.4	-	90.0
Mar[b]	-3.5	1.4	-8.0	8.3	-19.7	73.7	1.4	10.6	21.8	21.8	0.7	21.1	113.6	112.7	89.9

Notes:

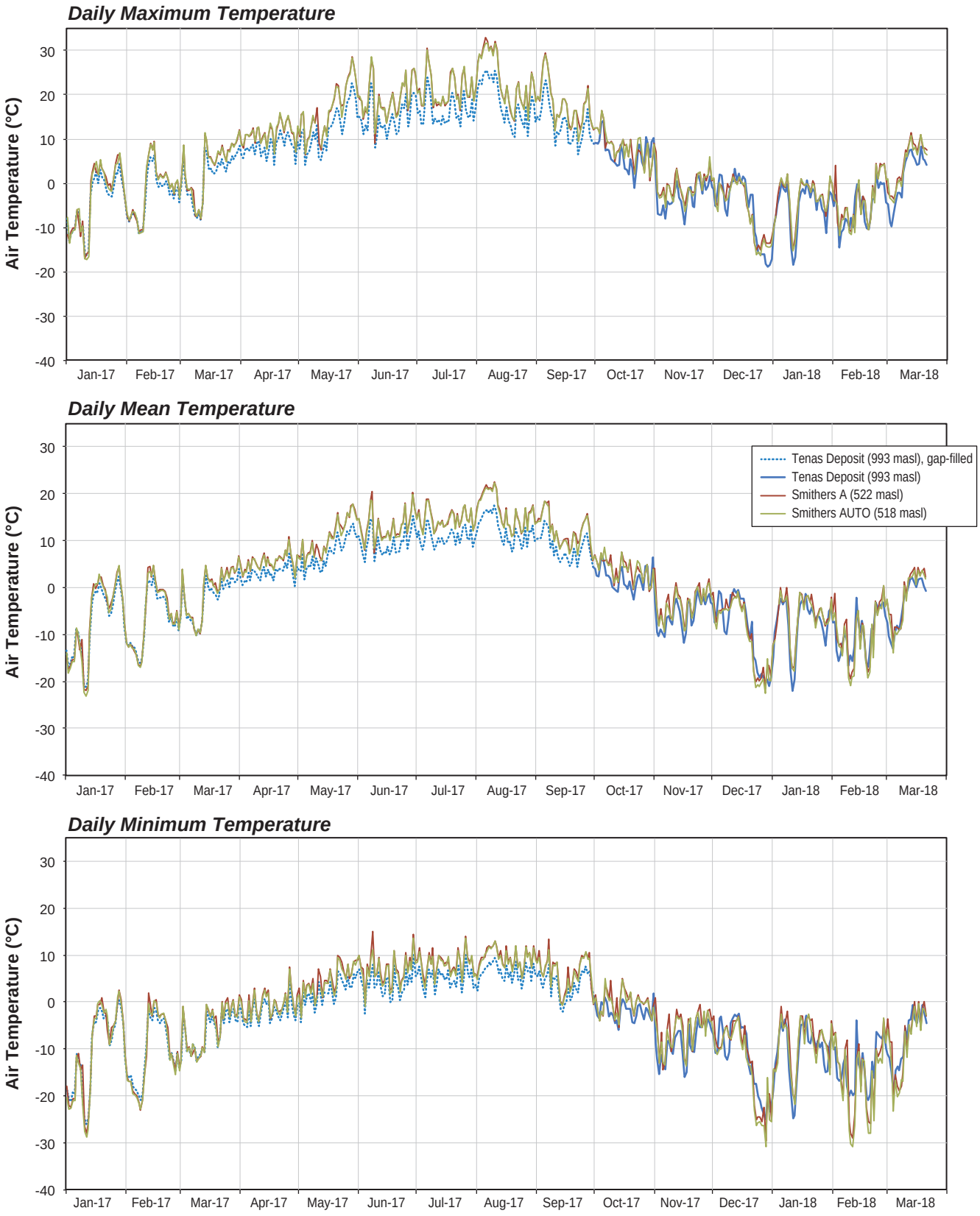
dash (-) = not available. Less than 75% data availability for calculation of the mean or total. See Table 2.5-1 for a summary of missing data

[a] *The station was installed on September 29, 2017. The January to September 2017 temperature and precipitation data were gap-filled using correlation to ECCC Smithers A and Smithers AUTO stations (see Section 2.4.3.4).*

[b] *The March 2018 monthly data are calculated from the available March 1 to 21 data.*

Figure 2.5-1

Daily Air Temperatures, January 2017 - March 2018



Note: See Table 2.5-1 for periods of missing data. Missing data have been gap-filled where possible using the methods described in Section 2.4.3.4.

Table 2.5-3. Temperature and Precipitation Departures for the Pacific Coast and Project Region

Season	Temperature Departure			Precipitation Departure		
	Pacific Coast Region		Tenas Project Region	Pacific Coast Region		Tenas Project Region
	Rank (Warmest to Coldest, out of 70 years)[a]	Departure (°C)[b]	Departure (°C)[b,d]	Rank (Wettest to Driest, out of 70 years)[c]	Departure (%)[b]	Departure (%)[b,e]
Winter 2016/2017	57	-0.8	0.0	67	-34.5	-40
Spring 2017	26	+0.4	+1.0	10	+23.8	+30
Summer 2017	17	+0.8	+0.5	57	-20.0	-10
Fall 2017	25	+0.6	0.0	-	-	-
Winter 2017/2018	35	+0.3	-1.0	-	-	-

Notes:
dash (-) = data not available at the time of reporting
Winter = December to February; Spring = March to May; Summer = June to August; Fall = September to November
Data source: ECCC (2018b)
[a] Ranked warmest to coldest. The seasonal rank is based on 70 years of data from 1948 to 2017.
[b] The reference value used to calculate the departure is the mean value over the 1961 – 1990 reference period.
[c] Ranked wettest to driest. The seasonal rank is based on 70 years of data from 1948 to 2017.
[d] Interpreted from the bulletin's isotherm maps.
[e] Interpreted from the bulletin's isohyet maps.

2.5.2 Precipitation

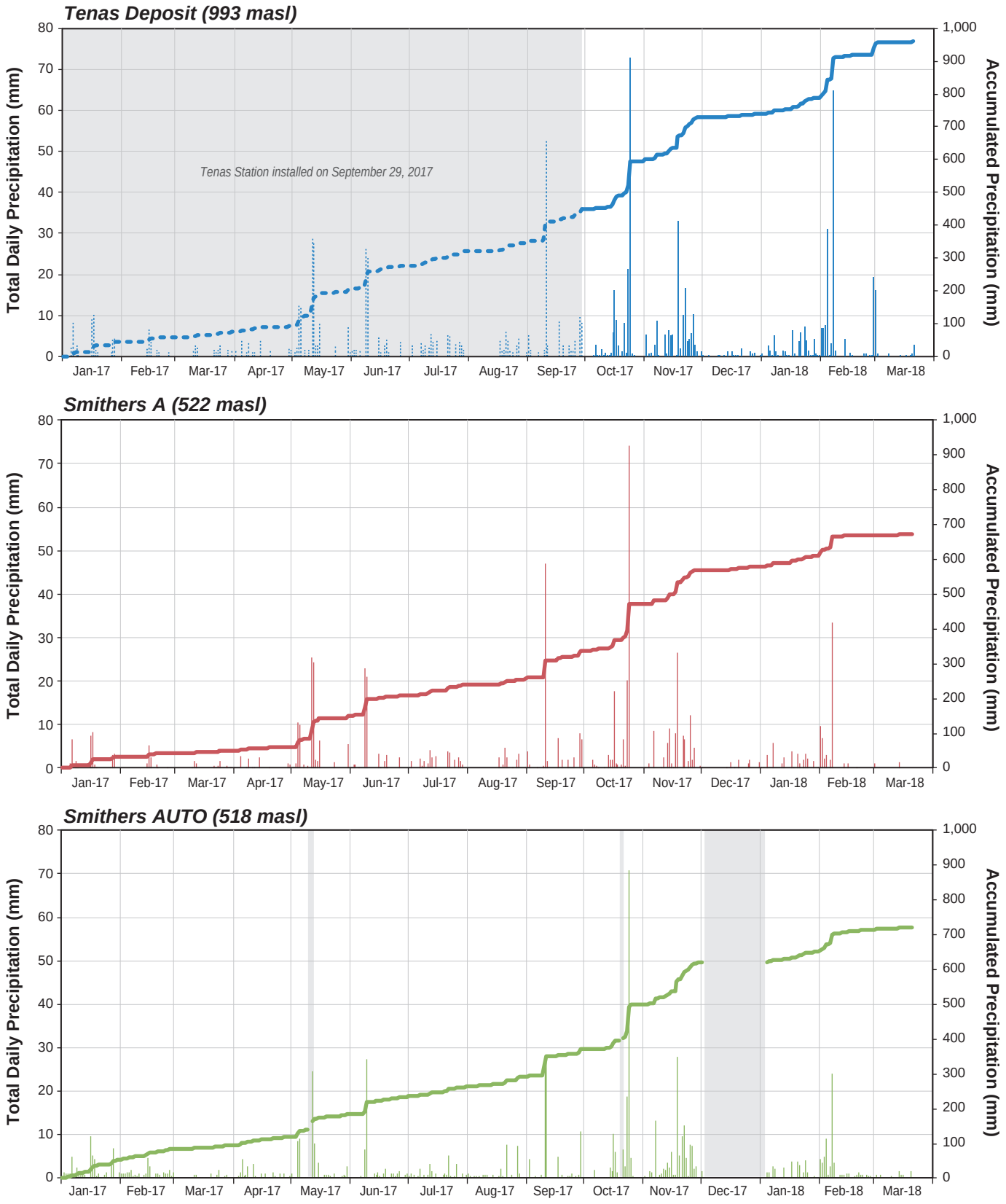
Figure 2.5-2 and Appendix 2-A present daily gap-filled precipitation data for the Tenas Deposit station and monthly data are presented in Table 2.5-2. Figure 2.5-2 also includes the daily precipitation data for the Smithers A and Smithers AUTO stations. The top 10 daily precipitation intensities for all three stations are summarized in Table 2.5-4 and the top 10 hourly and five-minute precipitation intensities for the Tenas Deposit station are summarized in Table 2.5-5.

Table 2.5-4. Top 10 Daily Precipitation Ranks, January 2017 to March 2018

Rank	Tenas Deposit Station[a]		Smithers A Station		Smithers AUTO Station	
	Precipitation (mm)	Date	Precipitation (mm)	Date	Precipitation (mm)	Date
1	72.8	24-Oct-17	74.0	24-Oct-17	70.7	24-Oct-17
2	65.0	7-Feb-18	47.0	10-Sep-17	27.9	18-Nov-17
3	52.5	10-Sep-17	33.4	7-Feb-18	27.4	9-Jun-17
4	33.1	18-Nov-17	26.6	18-Nov-17	27.3	11-Sep-17
5	31.2	4-Feb-18	25.4	11-May-17	25.4	10-Sep-17
6	28.7	11-May-17	24.4	12-May-17	24.5	12-May-17
7	27.6	12-May-17	23.0	8-Jun-17	24.0	7-Feb-18
8	26.1	8-Jun-17	21.0	9-Jun-17	18.8	23-Oct-17
9	23.9	9-Jun-17	20.2	23-Oct-17	13.3	7-Nov-17
10	21.4	23-Oct-17	17.6	16-Oct-17	12.1	22-Nov-17

Note:
[a] The Tenas Deposit daily precipitation data are gap-filled for data prior to September 30, 2017 using the methodology described in Section 2.4.3.4.

Figure 2.5-2
Daily Precipitation, January 2017 - March 2018



Note: Time periods in grey represent missing data. Missing data for the Tenas Deposit station have been gap-filled where possible (dashed lines) using the methods described in Section 2.4.3.4. See Table 2.5-1 for periods of missing data.

Table 2.5-5. Top 10 Hourly and Five-Minute Precipitation Ranks, September 30, 2017 to March 21, 2018

Rank	Tenas Deposit Station[a]			
	Hourly Precipitation (mm)	Date and Time	Five-Minute Precipitation (mm)	Date and Time
1	7.94	24-Oct-17 16:00	1.09	22-Nov-17 06:40
2	7.92	22-Nov-17 06:00	1.04	24-Oct-17 14:05
3	7.81	7-Feb-18 11:00	1.04	22-Nov-17 06:45
4	6.94	24-Oct-17 13:00	1.03	24-Oct-17 14:00
5	6.71	7-Feb-18 12:00	1.00	17-Oct-17 10:40
6	6.60	24-Oct-17 14:00	0.97	24-Oct-17 16:35
7	6.41	24-Oct-17 19:00	0.97	22-Nov-17 06:05
8	5.96	7-Feb-18 18:00	0.97	22-Nov-17 06:10
9	5.95	7-Feb-18 19:00	0.92	24-Oct-17 13:35
10	5.58	24-Oct-17 18:00	0.92	24-Oct-17 18:05

Notes:
All times are reported in Pacific Standard Time with no adjustment for daylight savings.
[a] Tenas Deposit hourly and five-minute precipitation data are not gap-filled for data prior to October 1, 2017. Hourly and five-minute precipitation data are not available for the ECCC Smithers A and Smithers AUTO stations.

The 2017 annual precipitation at the Tenas Deposit station was estimated to be 739 mm, with 32% falling as snowfall and 68% falling as rainfall. The highest observed monthly total precipitation was 150 mm from 1 to 28 February 2018 and the lowest observed monthly total precipitation was 10 mm from 1 to 31 December 2017.

The highest observed daily precipitation was 72.8 mm on October 24, 2017 (midnight to midnight). The Smithers A and Smithers AUTO stations both recorded record-breaking daily precipitation on this day (74.0 and 70.7 mm, respectively), and this event was the highest on record at the Smithers A station, with data spanning back to 1942. The previous record was 61 mm on January 16, 1947. This unusually high rainfall event had significant impacts on rivers (e.g., bank erosion) and infrastructure.

The highest observed hourly total precipitation at the Tenas Deposit station occurred on October 24, 2017 as well and was 7.9 mm. Five of the top ten hourly and five-minute precipitation values occurred on the same day. The highest five-minute total precipitation was 1.1 mm on November 22, 2017.

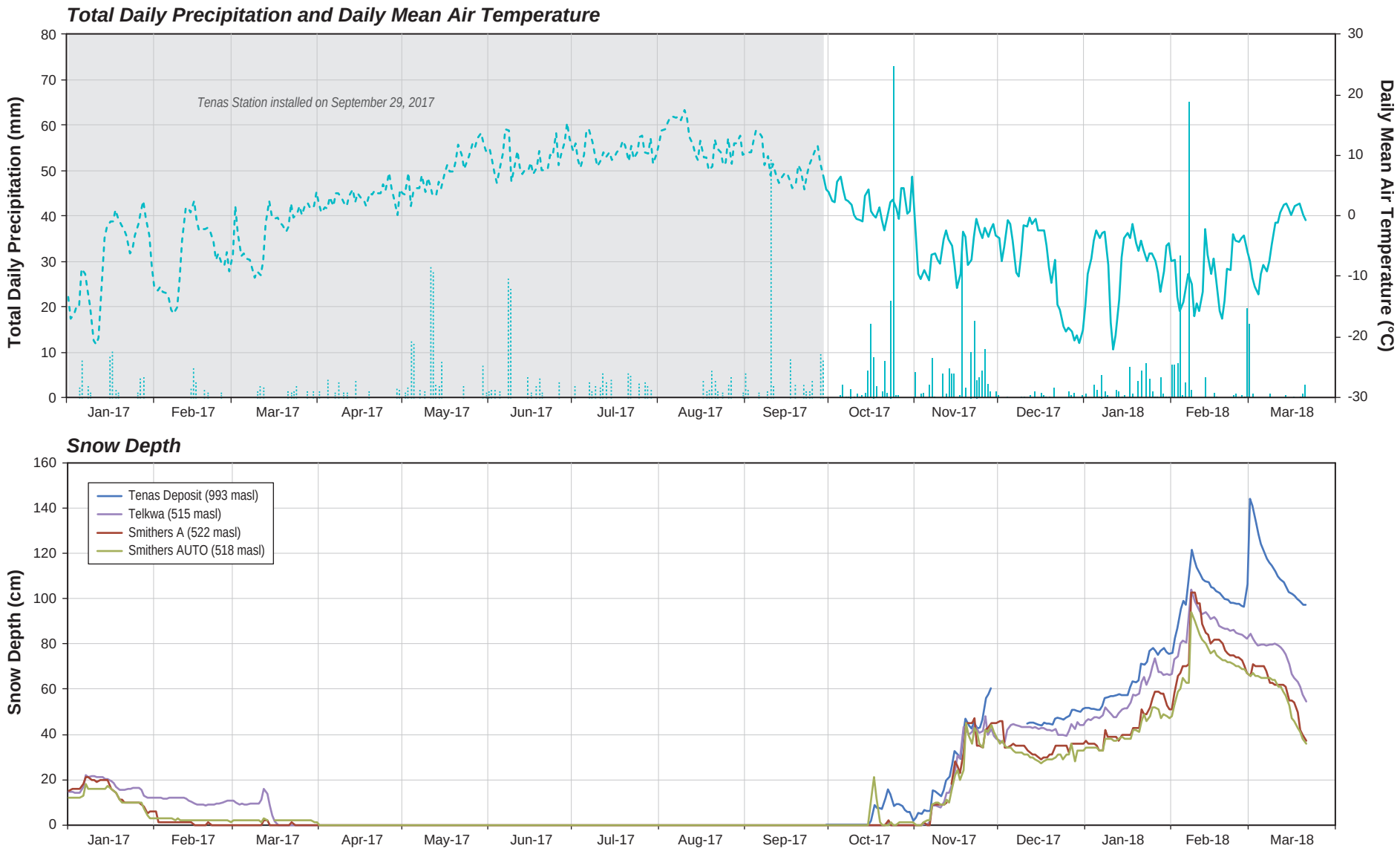
The ECCC *Climate Trends and Variations Bulletin* (ECCC 2018b) reported that the 2016/2017 Pacific Coast Region winter was much drier than normal (the 4th driest in 70 years). Spring 2017 was wetter than normal and summer was drier than normal, compared to the past 70 years of data (Table 2.5-3). In the smaller region surrounding the Tenas Project, the same trends were observed. Fall 2017 and winter 2017/2018 precipitation variation data were not available from ECCC at the time of reporting.

2.5.3 Snow Depth and Snow-Water-Equivalent

Figure 2.5-3 and Appendix 2-A present daily mean snow depth data for the Tenas Deposit station and monthly data are presented in Table 2.5-2. Figure 2.5-3 also includes the daily mean snow depth data for the Smithers A and Smithers AUTO stations, and the daily temperature and precipitation data for the Tenas Deposit station.

Figure 2.5-3

Daily Mean Snow Depth January 2017 - March 2018



Note: See Table 2.5-1 for periods of missing data. Tenas Deposit station temperature and precipitation data were gap-filled (dashed lines) using the methods described in Section 2.4.3.4.

At the Tenas Deposit station, the snowpack began accumulating on October 16, 2017 and peaked at 144 cm on March 1, 2018.

The highest daily snowpack depth at the Smithers A station was 103 cm on February 8, 2017. This snowpack depth was the highest on record at the Smithers A station, with data spanning back to 1942. The previous record was 102 cm on March 3, 1972. The unusually deep snowpack in winter 2017/2018 resulted in numerous residential and commercial building roof collapses in Smithers and Telkwa.

The snowpack at the Tenas Deposit station does not have a large potential to be redistributed by the wind as the general surrounding area is forested and the recorded wind speeds are low. Therefore the snowpack depths are representative of the general Project area.

Manual snow course surveys are completed on a monthly basis at the BC ENV Hudson Bay Mtn. snow course survey station (Table 2.4-1, Figure 2.4-1). This station is located 20 km north-northwest of the Tenas Deposit station and 370 m higher in elevation. The 2017 and 2018 data from this snow course survey station are presented in Table 2.5-6. Based on the concurrent January 4, 29 and February 28, 2018 snow depth measurements, the snow depth at the snow course station was approximately 43 cm deeper on average compared to the Tenas Deposit station. In 2017, the snowpack's SWE peaked at 443 mm during the May 2, 2017 measurement and 530 mm during the March 28, 2018 measurement. May and June 2018 data were not available at the time of reporting.

Table 2.5-6. Hudson Bay Mtn. Manual Snow Course Survey Data

Sampling Date	Snowpack Depth (cm)	Snowpack SWE (mm)	Snowpack Density (%)	Snowpack Snow Water Equivalent % of Normal	Snowpack Depth at Tenas Deposit Meteorological Station (cm)
January 4, 2017	82	218	27	83	-
January 30, 2017	128	326	25	90	-
March 1, 2017	120	369	31	83	-
March 30, 2017	134	408	30	82	-
May 2, 2017	126	443	35	87	-
June 1, 2017	25	76	30	29	
January 4, 2018	93	286	31	108	51.1
January 29, 2018	123	364	30	101	78.0
February 28, 2018	149	478	32	108	106.5
March 28, 2018	174	530	30	106	-

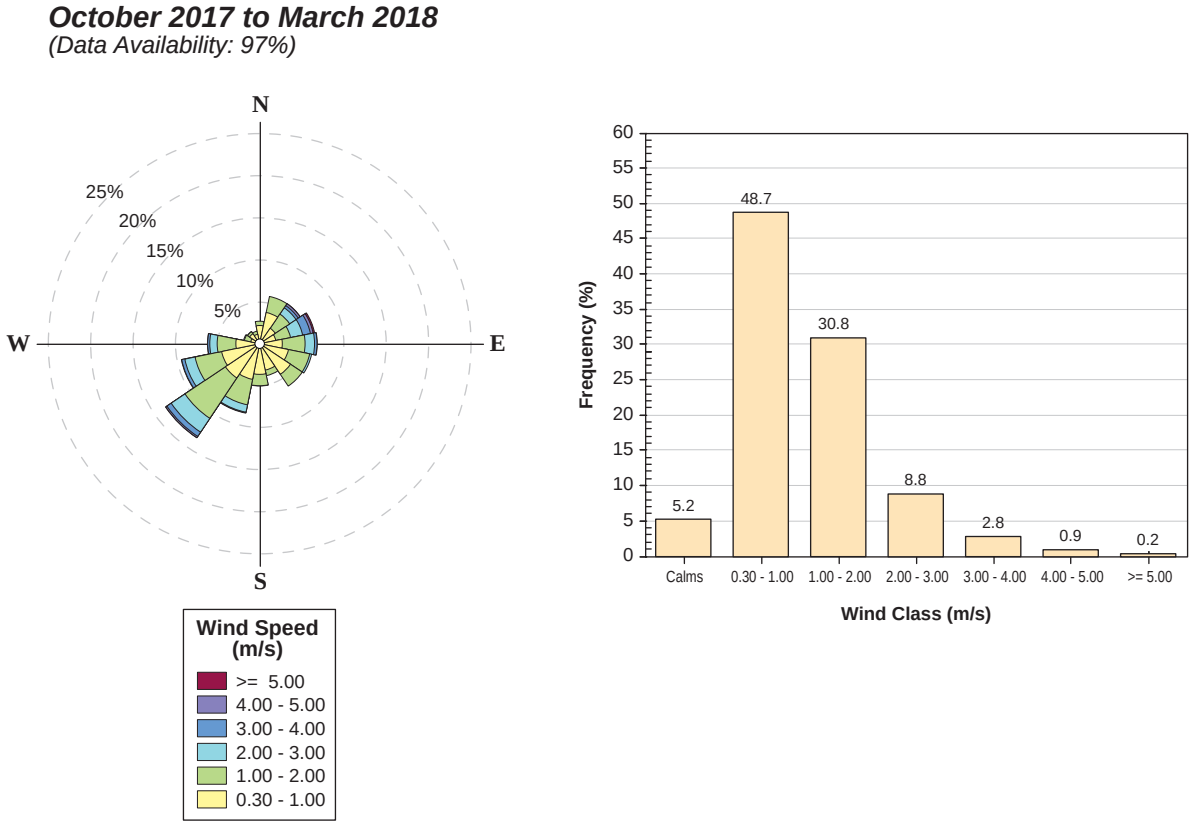
Notes:
dash (-) = data not available at time of reporting
Snow Course Survey Data Source: BC ENV (2018b)
The Hudson Bay Mtn. snow course survey station is 20 km north-northwest of the Tenas Deposit meteorological station, and at 370 m higher elevation.

2.5.4 Wind Speed and Direction

Figures 2.5-4 to 2.5-6 present seasonal wind roses and wind speed frequency distributions for the Tenas Deposit, Smithers AUTO and Telkwa stations, respectively. Concurrent October 2017 to March 2018 wind roses from these stations are mapped on Figure 2.5-7. Daily wind speed data for the Tenas Deposit station are presented in Appendix 2-A and monthly data are presented in Table 2.5-2.

Figure 2.5-4

Tenas Station Wind Rose and Wind Speed Frequency Distribution, October 2017 - March 2018

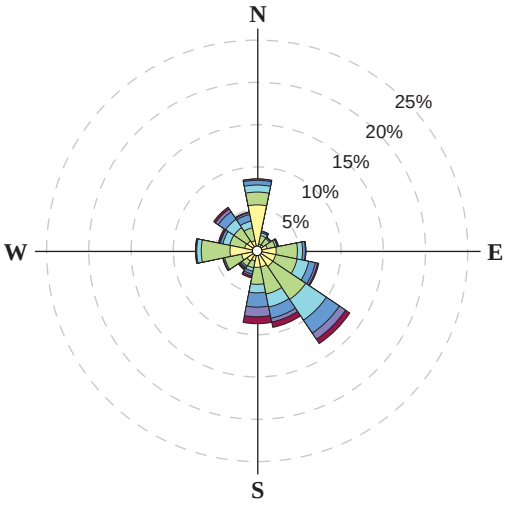


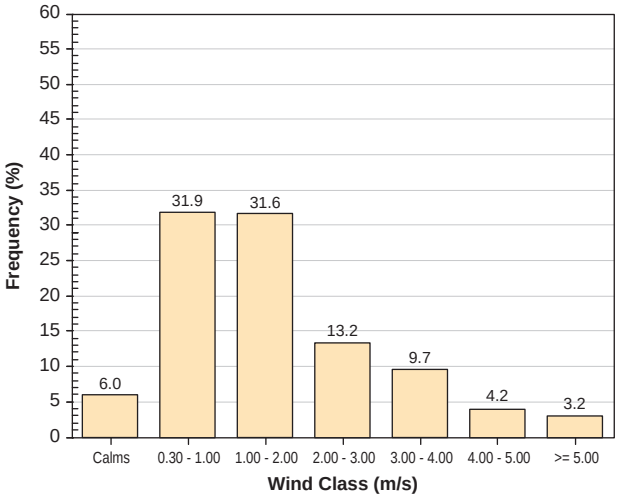
Note: See Table 2.5-1 for periods of missing data. Wind rose petals represent the direction the wind is coming from.

Figure 2.5-5

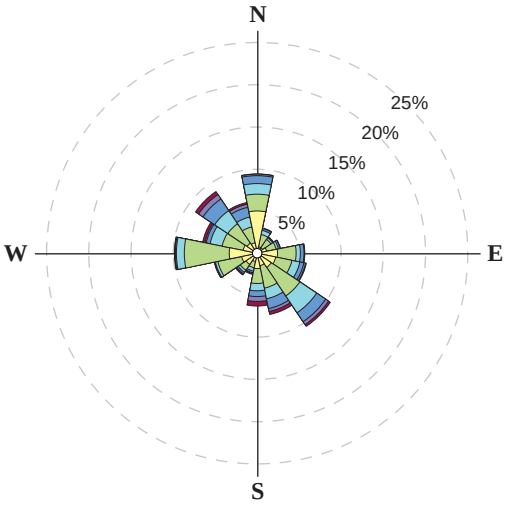
Smithers AUTO Station Wind Rose and Wind Speed Frequency Distribution, January 2017 - March 2018

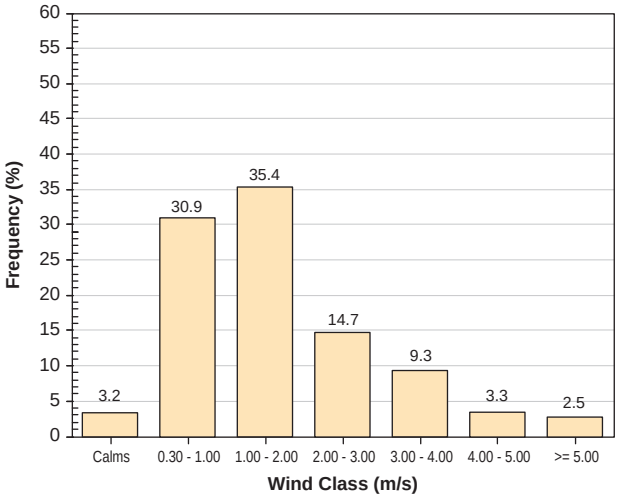
January 2017 to December 2017
(Data Availability: 100%)



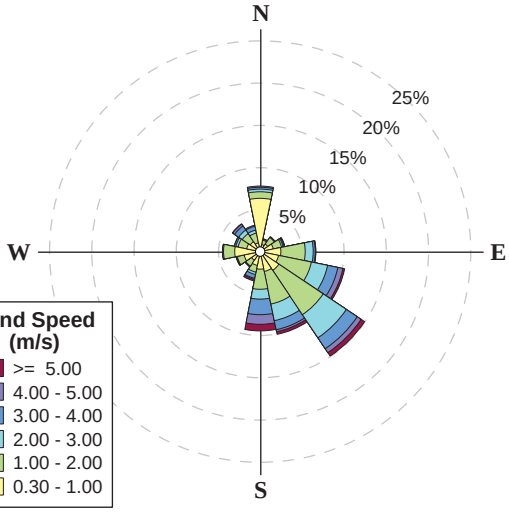


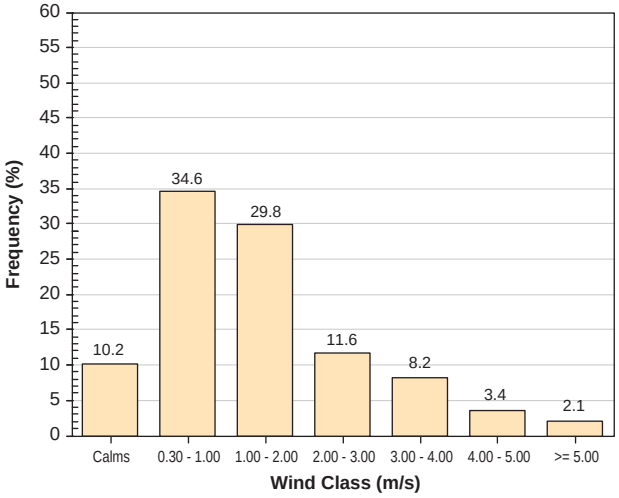
April 2017 to September 2017
(Data Availability: 99%)





October 2017 to March 2018
(Data Availability: 100%)



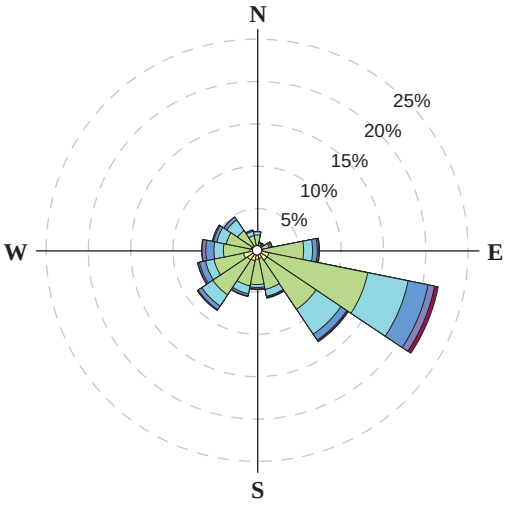


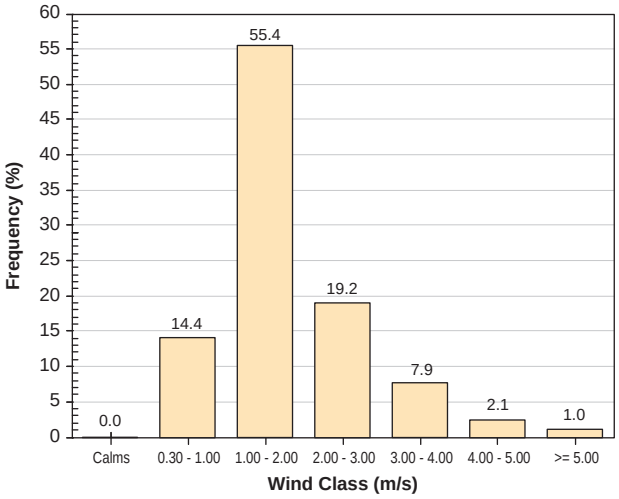
Note: See Table 2.5-1 for periods of missing data. Wind rose petals represent the direction the wind is coming from.

Figure 2.5-6

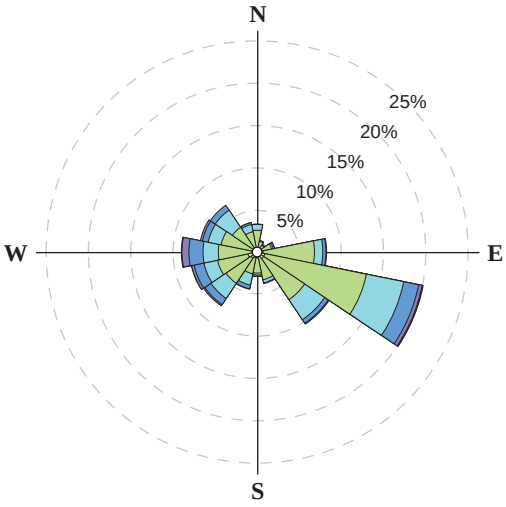
Telkwa Station Wind Rose and Wind Speed Frequency Distribution, January 2017 - March 2018

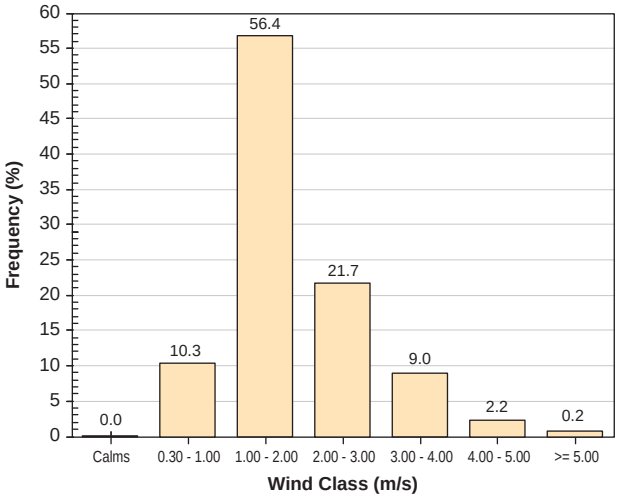
January 2017 to December 2017
(Data Availability: 100%)



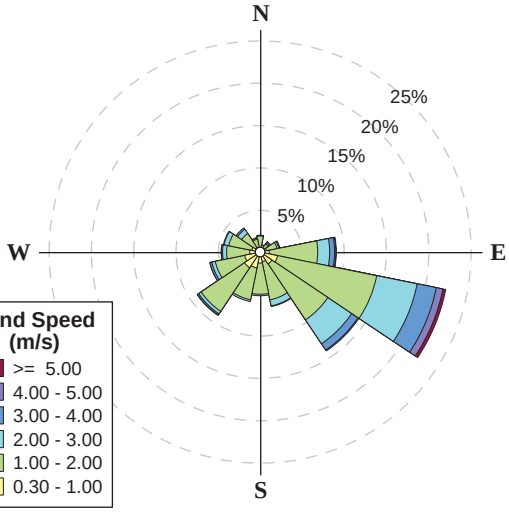


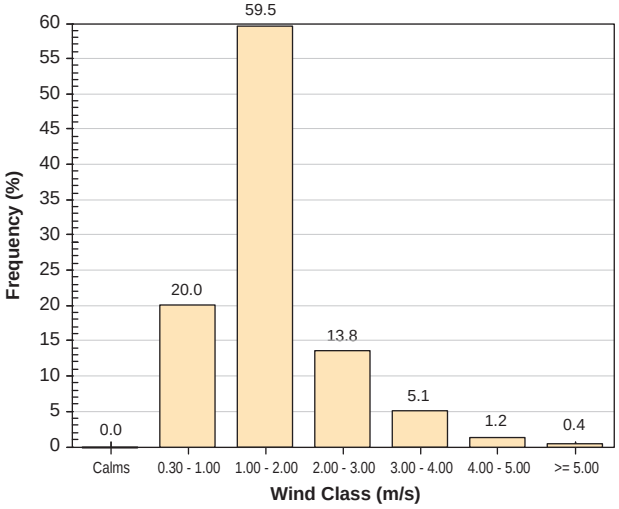
April 2017 to September 2017
(Data Availability: 100%)

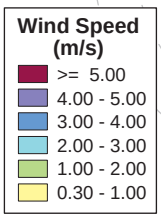




October 2017 to March 2018
(Data Availability: 100%)







Note: See Table 2.5-1 for periods of missing data. Wind rose petals represent the direction the wind is coming from.

Based on the October 2017 to March 2018 data, winds at the Tenas Deposit station predominately come from the southwest (traveling down the Tenas Creek drainage basin). Wind speeds were generally low and calm winds under 0.3 m/s occurred 5% of the time. During the same periods, the winds at the Smithers AUTO and Telkwa stations were predominantly travelling down the Bulkley Valley axis (from the southeast at Smithers AUTO and from the east-southeast at Telkwa). Wind speeds at these two stations were also predominantly low.

The maximum hourly mean wind speed recorded at the Tenas Deposit station was 5.4 m/s and the maximum wind gust speed was 13.3 m/s.

2.5.5 Solar Radiation

Figure 2.5-8 and Appendix 2-A present daily mean solar radiation for the Tenas Deposit station, and monthly data are presented in Table 2.5-2. As described in Table 2.5-1, there were many periods of erroneous solar radiation data removed from the dataset due to snow accumulation on top of the sensor, resulting in measurement values that were much lower than actual conditions. This is a common challenge in the winter for stations that rely on off-grid power, experience low wind speeds and are unattended.

During the September 30, 2017 to March 21, 2018 reporting period, the maximum daily mean solar radiation was 171 W/m^2 (March 18) and the maximum hourly mean solar radiation was 653 W/m^2 on the same day.

Incoming solar radiation has diurnal and annual cycles and is primarily dependant on the sun's position in the sky, followed by cloud cover and the local horizon angle profile. Solar radiation is lowest at nighttime (zero W/m^2) and highest during the daytime. It is lower during the winter, and mornings and evenings, and higher during the summer and at midday.

2.5.6 Barometric Pressure

Figure 2.5-9 and Appendix 2-A present daily mean station-level barometric pressure for the Tenas Deposit station and monthly data are presented in Table 2.5-2. Figure 2.5-9 also includes data from the ECCC Smithers AUTO station.

During the September 30, 2017 to March 21, 2018 reporting period, the hourly mean station-level barometric pressure remained between 87 and 92 kPa at the Tenas Deposit station. Based on the Smithers AUTO station data, during the fall and winter months, pressure was generally lower and there were a greater number of large pressure fluctuations compared to the spring and summer, due to winter storms from the Pacific that are more frequent and intense during the fall and winter (Figure 2.3-7).

Generally, low and decreasing pressure indicates current or approaching adverse weather, and high and increasing pressure indicates current or approaching favorable weather. Because barometric pressure changes slowly over time and horizontal distance compared to other meteorological parameters, sea level barometric pressure in a region (i.e., tens of km, horizontally) is approximately the same at a given time. Absolute pressure (station-level pressure), however, is variable over the Project area because it is directly dependent on elevation differences.

Figure 2.5-7
Wind Roses for October 2017 to March 2018

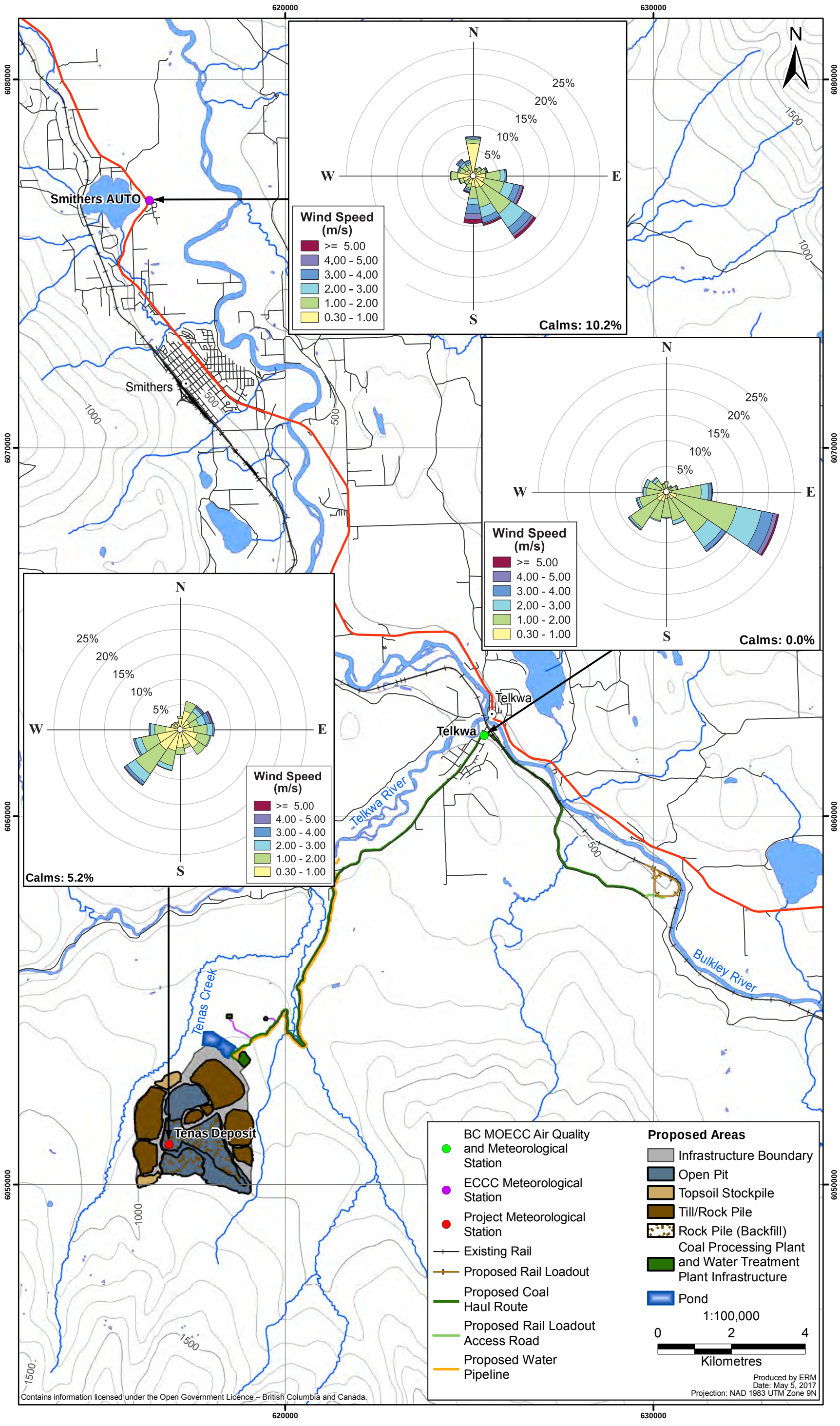
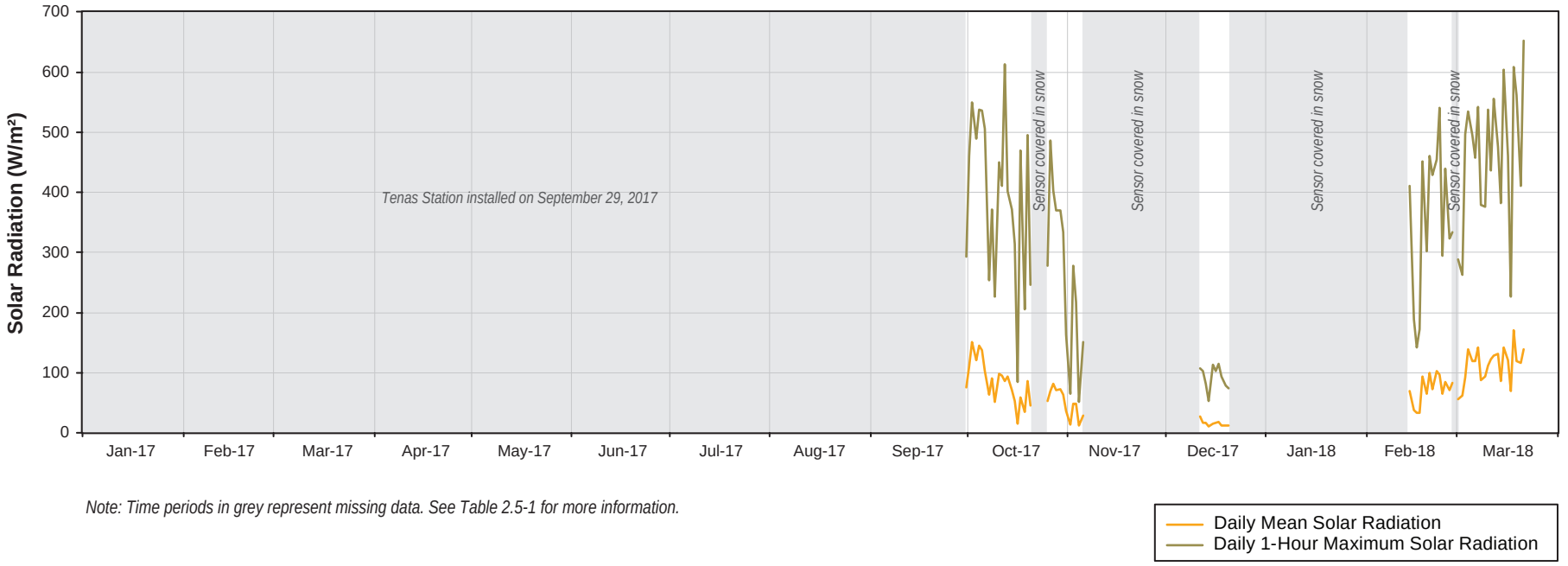


Figure 2.5-8

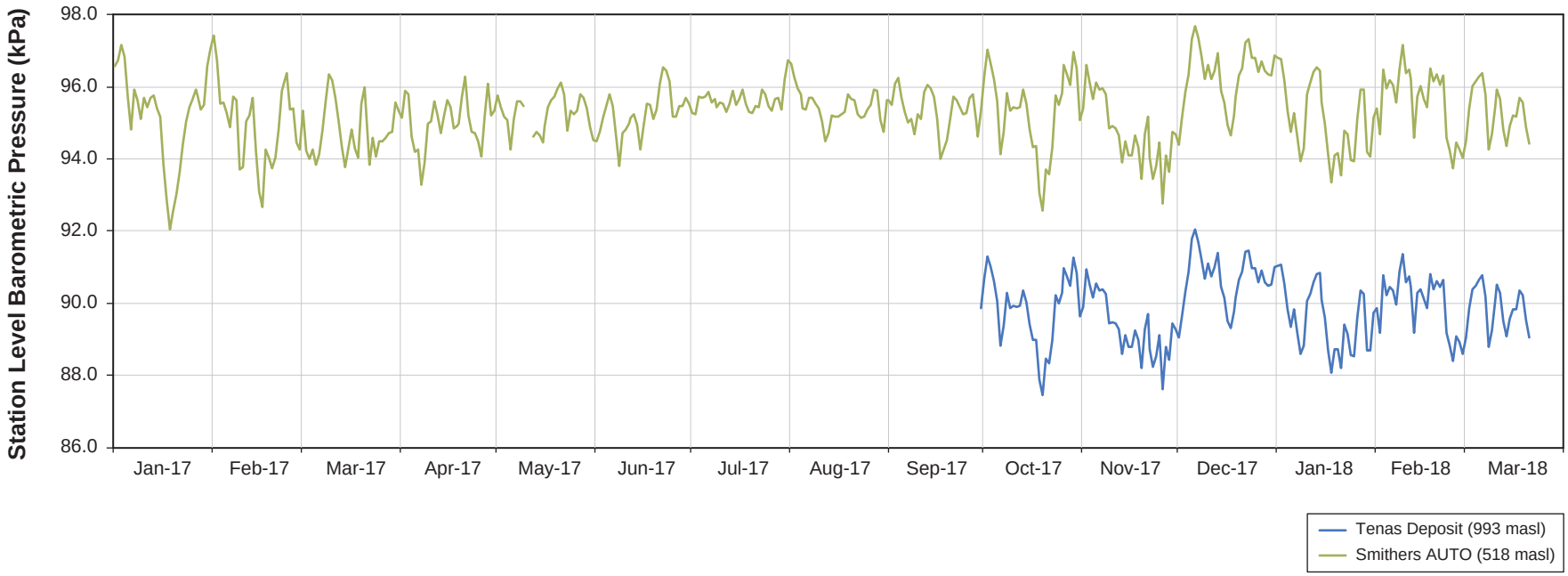
Daily Solar Radiation, January 2017 - March 2018



Note: Time periods in grey represent missing data. See Table 2.5-1 for more information.

Figure 2.5-9

Daily Mean Barometric Pressure, January 2017 - March 2018



3. AIR QUALITY

This chapter provides a summary of the available air quality monitoring data in the Project area and the surrounding southern Bulkley Valley region from Smithers to Houston. Data presented are current on-site Project data, and historical data for the region collected by the BC Ministry of Environment and Climate Change (BC ENV) and by other projects in the region.

An ambient air quality monitoring program was initiated for the Tenas Project in September 2017. Ambient air quality data are important for Project planning including potential air emission permitting and air dispersion modelling, and future operational and closure activities relating to air quality management.

The objective of the air quality baseline program is to:

- monitor local baseline dust deposition (dustfall) in the Project area, including the deposit, proposed haul routes along existing roads, and the proposed rail loadout area.

Characterization of other ambient air quality baseline pollutants (e.g., PM_{10}, $PM_{2.5}$, NO_2 and O_3) relied on BC Ministry of Environment and Climate Change (BC ENV) ambient air quality monitoring stations in Telkwa, Smithers and Houston.

3.1 STUDY AREA

The Project is located in west-central BC, in the Bulkley Valley Lakes District (BVLD), where the primary ambient air pollutants of concern are particulate matter (e.g., PM_{10} and $PM_{2.5}$). The BVLD Airshed Management Society (AMS) has identified six primary categories of PM emissions in the region that affect the ambient air quality in the region (BVLD AMS 2012):

- open burning;
- industrial sources;
- wood burning appliances (e.g., wood burning stoves are commonly used in the area for home heating);
- backyard burning;
- road dust; and
- vehicle emissions.

3.2 REGULATORY AND POLICY FRAMEWORK

Project specific ambient air quality monitoring for the Tenas Project is a component of the Joint AIR for MA/EMA Permits (BC MEM and MOE 2016) and the *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (BC MOE 2016a) in order to "characterize the current state of the substances in the atmosphere and develop an understanding of:

1. Potential incremental influences that a project can have on air quality, climate, and the hydrological environment; and
2. Potential cumulative influences that a project and existing emission sources in the area can have on air quality, climate and the hydrological environment." (BC MOE 2016)

Under the BC *Environmental Management Act* (EMA; 2003) *Waste Discharge Regulation* (WDR; 2004), coal mining is a Schedule 1 activity that requires a permit to authorize waste discharges, including air emissions (BC ENV 2018). Permit applications for air emissions often require an air quality dispersion modeling study, which incorporates ambient air quality baseline data.

Provincial and federal ambient air quality objectives and standards for numerous contaminants are in place for the protection of human health and the environment. Table 3.2-1 summarizes the BC Air Quality Objectives (BC AQO), Canadian Ambient Air Quality Standards (CAAQS) and the National Ambient Air Quality Objectives (NAAQO) for select contaminants that are being reported as part of this report's data summary (Section 3.5).

3.3 EXISTING INFORMATION

Readily available sources of existing air quality information were reviewed, and a summary of the review is provided in Table 3.3-1. The reviewed information included publicly available sources. The list of reviewed information is not exhaustive and additional potential sources of relevant public and private information may be available.

3.4 METHODOLOGY

3.4.1 Dustfall

Dustfall was monitored by the Project at four stations (Table 3.4-1; Figure 2.4-1; Plates 3.4-1 to 3.4-4): one in the Tenas deposit area where mining is proposed, two along one of the routes proposed for trucks to haul mined material from the deposit to the proposed rail loadout, and one in the proposed rail loadout area where the material would be transferred to railcars.

Dustfall monitoring was completed in accordance with sampling method ASTM International D1739-98 (ASTM International 2017). Dustfall was monitored during consecutive periods of approximately 30 days each, as specified in Table 3.4-2, beginning in September/October 2017. For this baseline report, data is included up to February 2018. As part of the QA/QC program, fieldwork was conducted by or under direction of a trained, experienced atmospheric scientist. Chain of custody (COC) forms were used for all samples collected, as part of the QA/QC program.

At the end of each sampling period, dustfall canisters were collected and sent to the ALS Laboratory Group (Canadian Association for Laboratory Accreditation [CALA] accreditation no. A1719) for analysis. Samples were analyzed for particulates (total, soluble, and insoluble), anions (sulphate, nitrate, chloride, and ammonia), various cations, and total metals. Laboratory analysis results from the 2017 – 2018 dustfall monitoring period can be found in Appendix 3-A.

Table 3.2-1. Select BC and Federal Ambient Air Quality Objectives and Standards

Contaminant	Averaging Period	Units	Value	Calculation Metric	Effective Year	Source	Reference
SO_2	1-hour	ppb	<u>75</u>	Achievement based on annual 97th percentile of daily 1-hour maximum averaged over 2015-2017, annual 97.5th percentile of daily 1-hour maximum averaged over 2016-2018, and annual 98th percentile of daily 1-hour maximum averaged over 2017-2019, with one allowable excursion above 75 ppb to a maximum of 85 ppb over a three-year period prior to 2020.	Current	BC Interim AQO	(BC ENV 2018b)
	1-hour	ppb	70	Achievement based on annual 99th percentile of daily 1-hour maximum, averaged over three consecutive years.	2020	CAAQS	(Canada Gazette 2017b)
	1-hour	ppb	65	Achievement based on annual 99th percentile of daily 1-hour maximum, averaged over three consecutive years.	2025	CAAQS	(Canada Gazette 2017b)
	Annual	ppb	<u>5.0</u>	Achievement based on annual average of 1-hour concentrations, over one year.	2020[a]	CAAQS	(Canada Gazette 2017b)
	Annual	ppb	4.0	Achievement based on annual average of 1-hour concentrations, over one year.	2025	CAAQS	(Canada Gazette 2017b)
NO_2	1-hour	ppb	<u>100</u>	Achievement based on annual 98th percentile of daily 1-hour maximum over one year.	Current	BC Interim AQO	(BC ENV 2018b)
	1-hour	ppb	60	Achievement based on annual 98th percentile of daily 1-hour maximum, averaged over three consecutive years.	2020	CAAQS	(Canada Gazette 2017)
	1-hour	ppb	42	Achievement based on annual 98th percentile of daily 1-hour maximum, averaged over three consecutive years.	2025	CAAQS	(Canada Gazette 2017)
	Annual	ppb	<u>32</u>	Achievement based on annual average of 1-hour average concentrations, over one year.	Current	BC Interim AQO	(BC ENV 2018b)
	Annual	ppb	17	Achievement based on annual average of 1-hour average concentrations, over one year.	2020	CAAQS	(Canada Gazette 2017)
	Annual	ppb	12	Achievement based on annual average of 1-hour average concentrations, over one year.	2025	CAAQS	(Canada Gazette 2017)
O_3	1-hour	ppb	<u>82</u>	-	Current	NAAQO	(BC ENV 2018b)
	8-hour	ppb	<u>63</u>	Achievement based on annual 4th highest daily 8-hour maximum, averaged over three consecutive years.	Current	CAAQS	(Canada Gazette 2013)
	8-hour	ppb	62	Achievement based on annual 4th highest daily 8-hour maximum, averaged over three consecutive years.	2020	CAAQS	(Canada Gazette 2013)
PM_{10}	24-hour	µg/m^3	<u>50</u>	-	Current	BC AQO	(BC ENV 2018b)
$PM_{2.5}$	24-hour	µg/m^3	<u>25</u>	Achievement based on annual 98th percentile of daily average, over one year.	Current	BC AQO	(BC ENV 2018b)
	24-hour	µg/m^3	28	Achievement based on annual 98th percentile of daily average, over three consecutive years.	Current	CAAQS	(Canada Gazette 2013)
	24-hour	µg/m^3	27	Achievement based on annual 98th percentile of daily average, over three consecutive years.	2020	CAAQS	(Canada Gazette 2013)
	Annual	µg/m^3	<u>8.0</u>	Achievement based on annual average, over one year.	Current	BC AQO	(BC ENV 2018b)
	Annual	µg/m^3	10.0	Achievement based on annual average, averaged over three consecutive years.	Current	CAAQS	(Canada Gazette 2013)
	Annual	µg/m^3	8.8	Achievement based on annual average, averaged over three consecutive years.	2020	CAAQS	(Canada Gazette 2013)
Dust Deposition (Dustfall)	30-days	mg/dm^2/day	1.7 – 2.9[b]	-	No longer applicable[c]	BC AQO	(BC MOE 2016d)

Notes:
Underlined values are the most stringent value currently in effect for the BC jurisdiction at the time of reporting.
[a]: Used to inform new air management decisions beginning January 1, 2017 and all air management decisions beginning January 1, 2020.
[b]: Control objective ranged from 1.7 to 2.9 mg/dm^2/day.
[c]: The BC AQO for dust deposition was removed starting from the November 2016 publication of the revised BC AQOs. The objective values used in this table were the values from the January 18, 2016 BC AQO document revision.

Table 3.3-1. Air Quality Data Information Table

Documents Reviewed	**Davidson Project** • *Davidson Project: Application for Environmental Assessment Certificate*. Submitted by Blue Pearl Mining Inc. (Rescan. 2008. *Davidson Project Application for Environment Assessment Certificate- Section 6.1 Air Quality and Climate*. Prepared for Blue Pearl Mining Ltd. by Rescan Environmental Services Ltd.: Vancouver, BC.) • *Davidson Project Meteorology, Air Quality and Noise Baseline Study* (Rescan. 2007. *Davidson Project Meteorology, Air Quality and Noise Baseline Study*. Prepared for Blue Pearl Mining Ltd. by Rescan Environmental Services Ltd.: Vancouver, BC.) **Dome Mountain Project** • *Dome Mountain Project: 2009/10 Meteorology and Air Quality Baseline Report* (Rescan. 2010. *Dome Mountain Project: 2009/10 Meteorology and Air Quality Baseline Report*. Prepared for Metal Mountain Resources Inc. by Rescan Environmental Services Ltd.: Smithers, BC.) **Telkwa Coal Project** • *Telkwa Coal Project: Application for a Project Approval Certificate – Volumes I-V*. Submitted by Manalta Coal Ltd. (Manalta Coal Ltd. 1997. *Telkwa Coal Project: Application for a Project Approval Certificate.* Prepared by Manalta Coal Ltd.: Vancouver, BC.) • *Air Quality Data from the BC Ministry of Environment and Climate Change BC Air Data Archive Website* (BC ENV. 2018. *BC Air Data Archive Website*. https://envistaweb.env.gov.bc.ca/ (accessed May 2018).) • *BC State of the Air Reports* (2018. *BC State of the Air Reports*. https://bc.lung.ca/protect-your-lungs/air-quality-lung-health/bc-state-air-report (accessed June 2018).)
General Remarks	Reviewed information included publicly available sources for data collected in the general regional area surrounding the Tenas Project. The list of reviewed information is not exhaustive and additional potential sources of relevant public and private information may be available.
Sampling Required by *Joint AIR for Mines Act and Environmental Management Act Permits* (Joint AIR for MA/EMA Permits)	Project specific ambient air quality monitoring for the Tenas Project is a component of the Joint AIR for MA/EMA Permits in order to *"characterize the current state of the substances in the atmosphere and develop an understanding of:* 1. *Potential incremental influences that a project can have on air quality, climate, and the hydrological environment; and* 2. *Potential cumulative influences that a project and existing emission sources in the area can have on air quality, climate and the hydrological environment."* (BC MOE 2016)
Existing Data	**Davidson Project** • Dustfall data summary statistics for various stations (August 2005 to September 2006.) **Dome Mountain Project** • One passive ambient air quality monitoring station monitoring NO_2, SO_2 and Ozone with data summary statistics for July 2009 to March 2010. **Telkwa Coal Project** • No relevant ambient air quality data were included in the application.

(continued)

Table 3.3-1. Air Quality Data Information Table (continued)

Existing Data *(cont'd)*	**Ambient air quality data from the BC Ministry of Environment and Climate Change BC Air Data Archive Website** (https://envistaweb.env.gov.bc.ca/). • Data were available for many monitoring stations throughout BC with many long periods of record. • There were three stations closest to the Project with more recent relevant raw data: ▪ Houston Station, ▪ $PM_{2.5}$ raw data (January 2014 to March 2018); ▪ PM_{10} raw data (January 2014 to March 2018); ▪ Smithers Station, ▪ $PM_{2.5}$ raw data (January 2014 to March 2018); ▪ PM_{10} raw data (January 2014 to March 2018); ▪ NO_2 raw data (January 2014 to March 2018); ▪ Ozone raw data (January 2014 to March 2018); ▪ Telkwa Station, ▪ $PM_{2.5}$ raw data (January 2014 to May 2015). **Ambient air quality data from the BC Lung Association annual BC *State of the Air* reports.** • Reviewed and finalized statistical datasets were available for many monitoring stations throughout BC. • There were three stations closest to the Project with more recent relevant raw data: ▪ Houston Station, ▪ $PM_{2.5}$ data summary statistics (2014 to 2016); ▪ Smithers Station, ▪ $PM_{2.5}$ data summary statistics (2014 to 2016); ▪ NO_2 data summary statistics (2014 to 2016); ▪ Ozone data summary statistics (2015 to 2016); ▪ Telkwa Station, ▪ $PM_{2.5}$ data summary statistics (2014). Overall, enough background air quality data for $PM_{2.5}$, PM_{10}, NO_2, and ozone are available from various active and historical BC ENV ambient air quality monitoring stations to characterize the background air quality within the communities that are in proximity to the Project, with the exception of the Telkwa community that no longer has an active monitoring station. There are no BC ENV monitoring data in the Bulkley Valley that are representative of rural or remote air quality conditions outside the direct influence of close proximity community air emissions. A limited amount of historical background air quality data for dustfall, $PM_{2.5}$, PM_{10}, NO_2, SO_2 and ozone are available from the Davidson and Dome projects in the region, outside of the Smithers and Telkwa communities.
Existing Data Issues	The 2017 raw ambient air quality data from the BC Ministry of Environment and Climate Change stations in Houston, Smithers and Telkwa are preliminary and may change before the data are published in future BC Lung Association annual *BC State of the Air reports*. Station maintenance and calibration information are not available from the data archive website.

(continued)

Table 3.3-1. Air Quality Data Information Table (completed)

Existing Data Issues *(cont'd)*	These stations are also located within each of these communities and are within residential areas that are subject to nearby air emission sources (e.g., residential wood heating appliances, vehicle emissions and road dust). Because the Project's deposit area is located outside of these residential communities in an inactive forestry cut block and away from these emission sources, it is expected that the baseline ambient air quality in the deposit area is of better quality compared to within the residential communities. Therefore, using this data to inform baseline ambient air quality conditions in the deposit area may result in a more conservative baseline. The summary statistics provided from the *BC State of the Air* Reports are of reasonable quality; however, not all air quality parameters were monitored/reported for all stations. For example, although PM_{10} is measured at some stations, the report does not provide PM_{10} summaries for any of them. SO_2 was not monitored at any of the three stations during the more recent monitoring years (likely because overall SO_2 emissions have generally decreased over time and are becoming less of a concern). In addition, NO_2 and ozone levels were not monitored at the Houston and Telkwa stations during the more recent monitoring years. The only source of background dustfall data are from the Davidson Project, monitored at various stations from August 2005 to September 2006. More recent background dustfall data at a more representative location would be preferable and better represent background dustfall levels for the Project.
Missing Data from Existing Conditions	• Background dustfall levels close to the Project area. • Background NO_2, SO_2 and ozone concentrations close to the Project area. • Background particulate matter monitoring in Telkwa after 2015.
2017–March 2018 Baseline Program	The primary air emissions of concern for the proposed Tenas Project are from direct and indirect particulate matter emissions (e.g., dust). These are common emissions from mining projects. The Bulkley Valley region already experiences poor ambient air quality events caused by particulate matter emissions from other sources (e.g., open burning, wood burning appliances, etc.) and meteorological and topographic conditions that can be unfavorable for pollutant dispersion and dilution. The Tenas Project is not expected to emit a large amount of gaseous contaminants (e.g., NO_2, SO_2, and ozone formation), and these contaminants are not much of a concern in the Bulkley Valley region (e.g., no poor ambient air quality events due to these contaminants), compared to particulate matter. In order to increase the amount of dust-related monitoring, four dustfall stations were installed in various locations in the Project area to monitor baseline dust deposition.
Key Issues	The BC Ministry of Environment and Climate Change recommended that the proponent conduct airborne particulate matter monitoring for PM_{10} and $PM_{2.5}$ within the Project area to better inform the baseline particulate matter conditions within the Project area. It is known that the available particulate matter data from the regional BC Ministry of Environment and Climate Change stations is conservative when applied to the Project area for baseline studies. If the project requires a permit application for air emissions and an air quality dispersion modeling study (see Section 3.2), in the absence of project specific data, the conservative particulate matter baseline data would be incorporated into the model. The conservative baseline data may make it more difficult for the Project's predicted emissions and resulting air quality to satisfy the ambient air quality objectives and standards (Table 3.2-1.)
Other Comments	No further comments.

Table 3.4-1. Dustfall Monitoring Station Locations

Station Identification	Station Location	Station Coordinates (UTM Zone 9U, WGS84)		Station Purpose
		Easting(m)	Northing (m)	
DF-TenasDep	Within the proposed pit areas for the Tenas Deposit, 53 m northeast of the Tenas Deposit Meteorological Station.	616892	6051126	Pre-project Baseline
DF-Kerr	On the west side of the Kerr farm. Approximately 14 m from the edge of the Telkwa Coalmine Road.	621212	6057273	Pre-project Baseline
DF-Telkwa	Adjacent to the BC ENV Telkwa meteorological station and historical air quality station. Within the fenced-in area, close to the intersection of Telkwa Coalmine Road and Birch Street.	625411	6062206	Pre-project Baseline
DF-Rail	Within the proposed rail loadout track loop. 150 m east of farmland.	630156	6058144	Pre-project Baseline

Plate 3.4-1. Dustfall station DF-TenasDep after installation, looking east. September 29, 2017.

Plate 3.4-2. Dustfall station DF-Kerr after installation, looking southwest. September 29, 2017.

Plate 3.4-3. Dustfall station DF-Telkwa after installation, looking southwest. The BC ENV Telkwa meteorology and decommissioned air quality station can be seen in the background. September 25, 2017.

Plate 3.4-4. Dustfall station DF-Rail after installation, looking east. October 4, 2017.

There are currently no federal or BC dustfall air quality objectives in effect for comparing the dustfall results; therefore, dustfall levels were summarized for each deployment period and for each monitoring station. There were historical BC AQO for dustfall as described in Table 3.2-1.

During some monitoring periods, it was noted that snow had built up and blocked the opening of the dustfall sample canisters. To try and adjust the results to compensate for this blockage, dustfall results were calculated for each station during the entire deployment period as well as during the snow adjusted period. Dustfall results for the snow adjusted periods were calculated using Equation 1 below. The estimated number of snow free days was estimated using snow depth data from the Tenas Deposit Meteorological Station (see Section 2).

$$Dustfall_{Snow\ Adjusted\ Period} = Dustfall_{Deployment\ Period} \times \frac{\#\ of\ days\ used\ by\ the\ lab}{estimated\ \#\ of\ snow\ free\ days} \quad \text{[Equation 1]}$$

where:

Dustfall Snow Adjusted Period	=	Dustfall results adjusted to exclude periods when the containers were potentially covered or blocked by snow
Dustfall Deployment Period	=	Dustfall results for the entire period when dustfall monitoring equipment was deployed at a given station
# of days used by the lab	=	Total number of days when dustfall monitoring equipment was deployed at a station
Estimated # of snow free days	=	Number of days when the containers were estimated to be free of snow

Table 3.4-2. Dustfall Monitoring Station Deployment Dates

Monitoring Period	Station:	DF-Telkwa	DF-Kerr	DF-TenasDep	DF-Rail
September/ October	Deployment Start Date:	25-Sep-17	29-Sep-17	29-Sep-17	4-Oct-17
	Deployment End Date:	18-Oct-17	18-Oct-17	16-Oct-17	18-Oct-17
	Deployment Duration (Days):	22.8	19.2	16.8	14.0
	Est. Snow-free Duration (Days):	22.8	19.2	16.8	14.0
October/ November	Deployment Start Date:	18-Oct-17	18-Oct-17	16-Oct-17	18-Oct-17
	Deployment End Date:	22-Nov-17	22-Nov-17	28-Nov-17	22-Nov-17
	Deployment Duration (Days):	35.0	34.9	43.0	34.9
	Est. Snow-free Duration (Days):	19.0	19.0	21.0	19.0
November/ December	Deployment Start Date:	22-Nov-17	22-Nov-17	28-Nov-17	22-Nov-17
	Deployment End Date:	15-Dec-17	15-Dec-17	14-Dec-17	15-Dec-17
	Deployment Duration (Days):	22.8	22.8	15.9	22.7
	Est. Snow-free Duration (Days):	22.8	22.8	15.9	22.7
December/ January	Deployment Start Date:	15-Dec-17	15-Dec-17	14-Dec-17	15-Dec-17
	Deployment End Date:	17-Jan-18	17-Jan-18	17-Jan-18	17-Jan-18
	Deployment Duration (Days):	33.1	33.1	34.0	33.1
	Est. Snow-free Duration (Days):	33.1	33.1	24.0	33.1
January/ February	Deployment Start Date:	17-Jan-18	17-Jan-18	17-Jan-18	17-Jan-18
	Deployment End Date:	19-Feb-18	19-Feb-18	19-Feb-18	19-Feb-18
	Deployment Duration (Days):	33.0	33.0	33.0	33.0
	Est. Snow-free Duration (Days):	9.8	3.2	3.3	3.2

Note: See Appendix 3-A for deployment start and end times. Deployment durations are calculated using both the date and time.

3.4.2 Nitrogen Dioxide, Ozone, and Particulate Matter

BC Ministry of Environment and Climate Change (BC ENV) raw monitoring data from the Smithers, Telkwa, and Houston ambient air quality monitoring stations were downloaded for the years 2014 to 2017, where available (BC ENV 2018c). The reviewed and published monitoring data from these stations were used from the BC Lung Association *BC State of the Air* reports, available up to the 2016 monitoring year (BC Lung Association 2015, 2016, 2017).

Contaminants being monitored were: nitrogen dioxide (NO_2), ozone (O_3), particulate matter smaller than 10 microns in diameter (PM_{10}), and particulate matter smaller than 2.5 microns in diameter ($PM_{2.5}$). Not all stations monitored all of these contaminants in all years. The stations and their locations are listed in Table 3.4-3 and shown in Figure 2.4-1.

Table 3.4-4 shows the raw, and the reviewed and published data availability by station, year, and contaminant at the time of reporting. The raw preliminary data is subject to future review and revisions. The station with the most available data is Smithers.

Table 3.4-3. BC ENV Monitoring Stations – Locations

Station Identification	Station Location	Station Coordinates (UTM Zone 9U, WGS84)		Station Purpose
		Easting (m)	Northing (m)	
BC ENV-Smithers	Approximately 70 m south-southeast of the intersection of Manitoba St and 1 Ave, on the property of St. Joseph's School	617212	6072196	Pre-project Baseline
BC ENV-Telkwa	Approximately 70 m south-southeast of the intersection of Telkwa Coalmine Rd and Birch St, in a fenced-in area	625405	6062198	Pre-project Baseline
BC ENV-Houston	Approximately 35 m southwest of the intersection of 11 St and Poulton Ave, at the BC government building at 3400 11 St	652757	6030420	Pre-project Baseline

Table 3.4-4. BC ENV Monitoring Stations – 2014 to 2017 Data Availability

Station Identification	Year	NO_2		O_3		PM_{10}		$PM_{2.5}$	
		Raw Data, *BC Air Data Archive*	Published Data, *BC State of the Air Report*	Raw Data, *BC Air Data Archive*	Published Data, *BC State of the Air Report*	Raw Data, *BC Air Data Archive*	Published Data, *BC State of the Air Report*	Raw Data, *BC Air Data Archive*	Published Data, *BC State of the Air Report*
BC ENV-Smithers	2014	✓	✓	✓	-	✓	-	✓	✓
	2015	✓	✓	✓	✓	✓	-	✓	✓
	2016	✓	✓	✓	✓	✓	-	✓	✓
	2017	✓	-	✓	-	✓	-	✓	-
BC ENV-Telkwa	2014	-	-	-	-	-	-	✓	✓
	2015	-	-	-	-	-	-	✓	-
	2016	-	-	-	-	-	-	-	-
	2017	-	-	-	-	-	-	-	-
BC ENV-Houston	2014	-	-	-	-	✓	-	✓	✓
	2015	-	-	-	-	✓	-	✓	✓
	2016	-	-	-	-	✓	-	✓	✓
	2017	-	-	-	-	✓	-	✓	-

Note: dash (-) = data not available

3.5 DATA SUMMARY

3.5.1 Tenas Project Dustfall

Total dustfall results and a statistical summary of the other parameters are presented in this section. The laboratory analysis results are found in Appendix 3-A, and include information on nitrate and sulphate deposition rates along with the metals content.

Table 3.5-1 summarizes the Project's dustfall monitoring station results sampled during the September 2017 to February 2018 monitoring period.

There are no federal or BC dustfall benchmarks currently in use for comparing the dustfall results; therefore, dustfall levels were summarized for each deployment period and for each monitoring station. However, the dustfall results were below the former BC AQO for monthly average dustfall of 2.9 mg/dm^2/day for all stations. Dustfall rates in the Project area ranged from less than 0.10 mg/dm^2/day at various stations during the December/January and January/February monitoring periods to 1.71 mg/dm^2/day at DF-Kerr during the September/October monitoring period, without adjusting for potential blockage from snow (Table 3.5-1). After adjusting for potential snow blockage, dustfall rates ranged from less than 0.10 mg/dm^2/day at various stations during the December/January and January/February monitoring periods to 1.96 mg/dm^2/day at DF-Kerr during the January/February monitoring period (Table 3.5-1).

Dustfall rates were generally higher at DF-Kerr, likely because of the unpaved Telkwa Coalmine Road which is located approximately 14 meters from the DF-Kerr station; they were generally lower at DF-Rail, which is on undeveloped land and is located over 300 m from the nearest road or rail line.

Tables 3.5-2 and 3.5-3 provide statistical summaries of the dustfall deposition data for nutrients and metals at the four stations. The results of the laboratory analysis are provided in Appendix 3-A. After excluding periods when the station gauge was potentially covered, the maximum observed metal deposition rate was 0.072 mg/dm^2/day (sodium at the DF-Telkwa station), and without consideration of snow accumulation and dustfall gauge blockage the maximum observed metal deposition rate was 0.0215 mg/dm^2/day (again for sodium at the DF-Telkwa station).

3.5.2 BC ENV Nitrogen Dioxide, Ozone, and Particulate Matter

Table 3.5-4 presents the NO_2 data from the BC ENV Smithers station, the only one of the three with NO_2 data available. All observed maximum concentrations were less than 25% of the applicable BC AQO.

Table 3.5-5 presents the O_3 data from the BC ENV Smithers station, the only one of the three with O_3 data available. All observed maximum concentrations were below the applicable BC AQO, except for two values that were unusually high. The 2017 data are raw preliminary data and are subject to future review and revisions, so it is likely that the unusually high outlier values are erroneous.

Table 3.5-6 presents the PM_{10} data from the BC ENV Smithers and Houston stations (the Telkwa station did not monitor PM_{10}). All observed maximum daily concentrations each year were above the applicable BC AQO and there were between one and six daily exceedances per year. In the 1-hour average data, of the eight 75th percentile values, the maximum was 17.2 µg/m^3, meaning that 75% of the time, at both stations during all four years, the 1-hour PM_{10} concentration was at or below s17.2 µg/m^3. In other words, although both stations had episodes of high PM_{10} concentrations during each year, the concentrations were not uniformly high throughout each year.

Table 3.5-1. Total Dustfall Results, September 2017 to February 2018 (mg/dm²/day)

	Full Deployment Period					Snow Adjusted Period [a]				
Monitoring Period	DF-Telkwa	DF-Kerr	DF-TenasDep	DF-Rail	Monitoring Period Average	DF-Telkwa	DF-Kerr	DF-TenasDep	DF-Rail	Monitoring Period Average
September/October	0.800	1.710	0.470	0.105*	**0.771**	0.800	1.710	0.470	0.105	**0.771**
October/November	0.280	0.400	0.320	0.160	**0.290**	0.516	0.735	0.655	0.294	**0.550**
November/December	0.270	0.190	0.065*	0.065*	**0.148**	0.270	0.190	0.065	0.065	**0.148**
December/January	0.050*	0.110	0.050*	0.050*	**0.065**	0.050	0.110	0.071	0.050	**0.070**
January/February	0.200	0.190	0.050*	0.050*	**0.123**	0.673	1.959	0.500	0.516	**0.912**
Dustfall Station Average	**0.320**	**0.520**	**0.191**	**0.086**		**0.462**	**0.941**	**0.352**	**0.206**	

Notes:

** Values below detection limit were considered to be half the detection limit (0.5 DL) for calculation purposes.*

[a] The snow adjusted period isolates the period of time when the container openings were not blocked by snow and dust accumulated without snow interference. Periods when the container openings were suspected to be blocked due to snow accumulation were not included for calculation of total dustfall based on field observations.

Table 3.5-2. Summary of Dustfall (Nutrients and Metal Deposition), September 2017 to February 2018, Full Deployment Period

Parameter	# of Obs. Below DL (out of 20 total obs.)	Dustfall Full Deployment Period (mg/dm²/day)					
		Mean	Median	Standard Deviation	Minimum	Maximum	Station of Maximum
Anions and Nutrients							
Total Ammonia (as N)	11	2.00E-03	1.00E-03	1.59E-03	4.50E-04	5.93E-03	DF-Telkwa
Chloride	20	1.22E-01	1.30E-01	3.85E-02	6.00E-02	1.80E-01	DF-TenasDep
Nitrate (as N)	11	8.65E-04	7.55E-04	4.76E-04	2.25E-04	1.87E-03	DF-TenasDep
Sulphate	19	9.86E-03	9.25E-03	5.89E-03	4.30E-03	3.20E-02	DF-Kerr
Metals							
Aluminum	9	1.14E-03	5.55E-04	1.21E-03	5.00E-05	3.91E-03	DF-Kerr
Antimony	20	2.49E-06	1.85E-06	1.53E-06	8.50E-07	6.00E-06	DF-TenasDep
Arsenic	19	2.94E-06	2.18E-06	3.21E-06	8.50E-07	1.52E-05	DF-Rail
Barium	4	3.37E-05	1.42E-05	5.25E-05	1.78E-06	2.31E-04	DF-Kerr
Beryllium	20	8.63E-06	8.75E-06	2.64E-06	4.15E-06	1.25E-05	DF-TenasDep
Bismuth	20	8.63E-06	8.75E-06	2.64E-06	4.15E-06	1.25E-05	DF-TenasDep
Boron	20	1.74E-04	1.75E-04	5.31E-05	8.50E-05	2.55E-04	DF-TenasDep
Cadmium	20	8.63E-07	8.75E-07	2.64E-07	4.15E-07	1.25E-06	DF-TenasDep
Calcium	16	4.58E-03	3.28E-03	4.92E-03	8.00E-04	1.83E-02	DF-Telkwa
Chromium	20	8.63E-06	8.75E-06	2.64E-06	4.15E-06	1.25E-05	DF-TenasDep
Cobalt	20	1.74E-06	1.75E-06	5.31E-07	8.50E-07	2.55E-06	DF-TenasDep
Copper	10	8.58E-04	4.33E-04	9.57E-04	4.15E-06	2.74E-03	DF-Rail
Iron	12	1.35E-03	6.50E-04	1.36E-03	2.50E-04	4.70E-03	DF-Rail
Lead	9	3.13E-06	1.96E-06	3.33E-06	4.15E-07	1.44E-05	DF-Rail
Lithium	20	8.63E-05	8.75E-05	2.64E-05	4.15E-05	1.25E-04	DF-TenasDep
Magnesium	0	1.34E-03	1.01E-03	1.19E-03	9.30E-05	4.28E-03	DF-Telkwa
Manganese	5	1.21E-04	5.01E-05	2.22E-04	4.15E-06	1.02E-03	DF-Kerr
Mercury	20	8.63E-07	8.75E-07	2.64E-07	4.15E-07	1.25E-06	DF-TenasDep
Molybdenum	19	9.55E-07	9.25E-07	3.99E-07	4.15E-07	2.29E-06	DF-Rail
Nickel	18	9.76E-06	9.50E-06	3.99E-06	4.15E-06	2.30E-05	DF-TenasDep
Phosphorus	15	2.26E-03	9.50E-04	3.00E-03	4.15E-04	1.18E-02	DF-Kerr
Potassium	13	3.94E-03	9.75E-04	6.04E-03	4.15E-04	2.08E-02	DF-Kerr
Selenium	20	1.74E-05	1.75E-05	5.31E-06	8.50E-06	2.55E-05	DF-TenasDep
Silicon	12	2.30E-03	9.75E-04	2.28E-03	4.15E-04	7.40E-03	DF-Kerr
Silver	20	1.74E-07	1.75E-07	5.31E-08	8.50E-08	2.55E-07	DF-TenasDep
Sodium	12	3.48E-03	2.88E-03	4.40E-03	9.50E-04	2.15E-02	DF-Telkwa
Strontium	0	3.32E-05	1.56E-05	5.78E-05	2.40E-06	2.59E-04	DF-Telkwa
Thallium	20	1.74E-06	1.75E-06	5.31E-07	8.50E-07	2.55E-06	DF-TenasDep
Tin	20	1.74E-06	1.75E-06	5.31E-07	8.50E-07	2.55E-06	DF-TenasDep
Titanium	20	1.74E-04	1.75E-04	5.31E-05	8.50E-05	2.55E-04	DF-TenasDep
Uranium	14	3.72E-07	2.35E-07	4.05E-07	8.50E-08	1.60E-06	DF-Telkwa
Vanadium	20	1.74E-05	1.75E-05	5.31E-06	8.50E-06	2.55E-05	DF-Telkwa & DF-TenasDep
Zinc	16	1.32E-04	1.15E-04	8.85E-05	2.50E-05	4.00E-04	DF-Rail

Table 3.5-3. Summary of Dustfall (Nutrients and Metal Deposition), September 2017 to February 2018, Snow Adjusted Period

Parameter	Dustfall Snow Adjusted Period (mg/dm²/day)					
	Mean	Median	Standard Deviation	Minimum	Maximum	Station of Maximum
Anions and Nutrients						
Total Ammonia (as N)	3.78E-03	3.20E-03	2.99E-03	4.50E-04	9.77E-03	DF-Telkwa
Chloride	3.58E-01	1.30E-01	4.61E-01	6.00E-02	1.44E+00	DF-Rail
Nitrate (as N)	2.81E-03	8.85E-04	3.91E-03	2.25E-04	1.32E-02	DF-Rail
Sulphate	2.70E-02	1.10E-02	3.35E-02	4.30E-03	1.03E-01	DF-Rail & DF-Kerr
Metals						
Aluminum	2.39E-03	1.51E-03	2.58E-03	7.08E-05	9.18E-03	DF-Rail
Antimony	9.78E-06	1.85E-06	1.74E-05	1.10E-06	6.00E-05	DF-TenasDep
Arsenic	1.40E-05	2.73E-06	3.50E-05	8.50E-07	1.57E-04	DF-Rail
Barium	6.03E-05	2.76E-05	9.54E-05	2.52E-06	4.24E-04	DF-Kerr
Beryllium	2.52E-05	9.25E-06	3.25E-05	4.35E-06	1.00E-04	DF-TenasDep
Bismuth	2.52E-05	9.25E-06	3.25E-05	4.35E-06	1.00E-04	DF-TenasDep
Boron	5.08E-04	1.85E-04	6.56E-04	8.50E-05	2.05E-03	DF-TenasDep
Cadmium	2.52E-06	9.25E-07	3.25E-06	4.35E-07	1.00E-05	DF-TenasDep
Calcium	1.07E-02	4.43E-03	1.51E-02	8.00E-04	6.16E-02	DF-Telkwa
Chromium	2.52E-05	9.25E-06	3.25E-05	4.35E-06	1.00E-04	DF-TenasDep
Cobalt	5.08E-06	1.85E-06	6.56E-06	8.50E-07	2.05E-05	DF-TenasDep
Copper	3.63E-03	6.49E-04	7.73E-03	4.50E-06	2.83E-02	DF-Rail
Iron	2.73E-03	1.68E-03	2.62E-03	2.70E-04	8.63E-03	DF-Rail
Lead	7.02E-06	4.30E-06	8.41E-06	5.50E-07	2.89E-05	DF-Kerr
Lithium	2.52E-04	9.25E-05	3.25E-04	4.35E-05	1.00E-03	DF-TenasDep
Magnesium	3.66E-03	2.06E-03	5.08E-03	1.32E-04	1.88E-02	DF-Kerr
Manganese	2.30E-04	1.01E-04	4.08E-04	5.88E-06	1.87E-03	DF-Kerr
Mercury	2.52E-06	9.25E-07	3.25E-06	4.35E-07	1.00E-05	DF-TenasDep
Molybdenum	2.61E-06	1.05E-06	3.22E-06	4.35E-07	1.00E-05	DF-TenasDep
Nickel	2.64E-05	1.16E-05	3.20E-05	4.50E-06	1.00E-04	DF-TenasDep
Phosphorus	4.10E-03	2.38E-03	4.09E-03	4.35E-04	1.18E-02	DF-Kerr
Potassium	6.13E-03	3.43E-03	6.36E-03	4.35E-04	2.08E-02	DF-Kerr
Selenium	5.08E-05	1.85E-05	6.56E-05	8.50E-06	2.05E-04	DF-TenasDep
Silicon	5.47E-03	2.73E-03	6.21E-03	4.35E-04	2.06E-02	DF-Kerr
Silver	5.08E-07	1.85E-07	6.56E-07	8.50E-08	2.05E-06	DF-TenasDep
Sodium	8.64E-03	3.25E-03	1.61E-02	1.30E-03	7.24E-02	DF-Telkwa
Strontium	1.22E-04	1.56E-05	2.47E-04	3.40E-06	8.72E-04	DF-Telkwa
Thallium	5.08E-06	1.85E-06	6.56E-06	8.50E-07	2.05E-05	DF-TenasDep
Tin	5.08E-06	1.85E-06	6.56E-06	8.50E-07	2.05E-05	DF-TenasDep
Titanium	5.08E-04	1.85E-04	6.56E-04	8.50E-05	2.05E-03	DF-TenasDep
Uranium	1.70E-06	2.80E-07	3.28E-06	8.50E-08	1.30E-05	DF-Kerr
Vanadium	5.08E-05	1.85E-05	6.56E-05	8.50E-06	2.05E-04	DF-Telkwa
Zinc	3.76E-04	1.47E-04	4.85E-04	2.70E-05	1.75E-03	DF-Kerr

Table 3.5-4. Air Quality Data Summary – BC ENV: NO_2

Year	BC ENV Station Identification	Averaging Period	Maximum Observed NO_2 (ppb)	Current BC AQO (ppb)	No. of Exceedances
2016	Smithers	1-hour[a]	23.0[a]	100[a]	0
2016	Smithers	Annual	5.0	32	0
2017	Smithers	1-hour[a]	21.0[a]	100[a]	0
2017	Smithers	Annual	5.6	32	0

Notes:
2017 data is raw preliminary data and is subject to future review and revisions by the reporting agency
[a] 98th percentile of daily 1-hour maximum (D1HM), over one year

Table 3.5-5. Air Quality Data Summary – BC ENV: O_3

Year	BC ENV Station Identification	Averaging Period	Maximum Observed O_3 (ppb)	Current BC AQO (ppb)	No. of Exceedances
2015	Smithers	1-hour	58.0	82	0
2015	Smithers	8-hour	47.0[a]	63[b]	0
2016	Smithers	1-hour	56.0	82	0
2016	Smithers	8-hour	46.0[a]	63[b]	0
2017	Smithers	1-hour	327.9	82	2
2017	Smithers	8-hour	52.0[b]	63[b]	0

Notes:
2017 data is raw preliminary data and is subject to future review and revisions by the reporting agency.
[a] Annual 4th highest daily 8-hour maximum, averaged over one year. Not enough data were available to do the full three year calculation metric (see Table 3.2-1).
[b] Annual 4th highest daily 8-hour maximum, averaged over three consecutive years.

Table 3.5-6. Air Quality Data Summary – BC ENV: PM_{10}

Year	BC ENV Station Identification	Averaging Period	Maximum Observed PM_{10} (µg/m³)	Current BC AQO (µg/m³)	No. of Exceedances
2014	Smithers	24-hour	78.1	50	4
2014	Houston	24-hour	55.0	50	3
2015	Smithers	24-hour	80.6	50	6
2015	Houston	24-hour	62.7	50	4
2016	Smithers	24-hour	70.7	50	4
2016	Houston	24-hour	61.3	50	1
2017	Smithers	24-hour	83.0	50	3
2017	Houston	24-hour	83.2	50	6

Note: All PM_{10} data are raw preliminary data and are subject to future review and revisions by the reporting agency.

Table 3.5-7 presents the $PM_{2.5}$ data from the BC ENV Smithers, Telkwa, and Houston stations. Only two of the nine station-years of 98th percentile 24-hour average observations were below the applicable BC AQO. Only one of the nine station-years of annual average observations was below the applicable BC AQO. The 24-hour and annual average concentrations together indicate that all three stations are subject to episodes of high $PM_{2.5}$ concentrations during each year, and that relative

to the BC AQO, the concentrations were uniformly high throughout each year. These consistent PM_{10} and $PM_{2.5}$ exceedances support the findings that smoke and road dust particulate matter emission sources have the largest impacts on local air quality in the Bulkley Valley (BVLD AMS 2012) compared to other contaminant emissions and formation (e.g., SO_2, NO_2 and O_3).

Table 3.5-7. Air Quality Data Summary – BC ENV: $PM_{2.5}$

Year	BC ENV Station Identification	Averaging Period[a]	Maximum[a] Observed $PM_{2.5}$ (µg/m³)	Current BC AQO (µg/m³)	No. of Exceedances[b]
2014	Smithers	24-hour	29.0	25	16
2014	Smithers	Annual	8.2	8.0	1
2014	Telkwa	24-hour	34.0	25	28
2014	Telkwa	Annual	10.7	8.0	1
2014	Houston	24-hour	-	25	-
2014	Houston	Annual	-	8.0	-
2015	Smithers	24-hour	24.0	25	5
2015	Smithers	Annual	8.3	8.0	1
2015	Telkwa	24-hour	34.2	25	8
2015	Telkwa	Annual	12.6	8.0	1
2015	Houston	24-hour	31.0	25	15
2015	Houston	Annual	9.7	8.0	1
2016	Smithers	24-hour	22.0	25	3
2016	Smithers	Annual	7.3	8.0	0
2016	Telkwa	24-hour	-	25	-
2016	Telkwa	Annual	-	8.0	-
2016	Houston	24-hour	28.0	25	10
2016	Houston	Annual	8.8	8.0	1
2017	Smithers	24-hour	33.7	25	14
2017	Smithers	Annual	8.3	8.0	1
2017	Telkwa	24-hour	-	25	-
2017	Telkwa	Annual	-	8.0	-
2017	Houston	24-hour	31.5	25	21
2017	Houston	Annual	9.6	8.0	1

Notes:
2017 data (all stations), and 2016 - 2015 data from the Telkwa station are raw preliminary data and are subject to future review and revisions by the reporting agency.
dash (-) = data not available for this station and year.
[a] The 24-hour calculation metric is the annual 98th percentile of daily average, over one year. The annual calculation metric is the annual average, over one year. See Table 3.2-1 for more information.
[b] For daily average values, the number of exceedances represent the number days in the year when the daily average concentration was greater than 25 µg/m³, regardless of percentile. For annual average values, the number of exceedances represent if the annual average of the year was greater than 8.0 µg/m³.

3.5.3 Nearby Projects Data Summary – Dustfall, Nitrogen Dioxide, Ozone, Particulate Matter, and Sulphur Dioxide

This section presents air quality data as reported by nearby historical Projects. See Table 3.3-1 for the list of data sources.

Table 3.5-8 presents the dustfall data reported by nearby projects. The observed range of rates, from 0.3 to 0.6 mg/dm^2/day, is similar to the range observed for the Project (0.2 to 0.9 mg/dm^2/day for the snow adjusted data).

Table 3.5-8. Nearby Projects – Dustfall (Davidson Project, 2005 to 2006)

Station	Averaging Period	Average Observed Dustfall Rate (mg/dm^2/day)
CN - Railway Ave (CN)	Annual	0.487
Chad's House (CH)	Annual	0.595
Slack Road (SL)	Annual	0.323
Kathlyn Lake Elementary School (KL)	Annual	0.328
Glacier Gulch Site (GG)	Annual	0.328
Adit Road (AR)	Annual	0.370
Northern Route Site (NR)	Annual	0.321
Davidson Road (DR)	Annual	0.482

Table 3.5-9 presents the SO_2 data reported by nearby projects. The maximum values were well below the current BC AQOs.

Table 3.5-9. Nearby Projects – SO_2 (Dome Mountain and Davidson Projects)

Years	Station Identification	Averaging Period	Maximum Observed SO_2 (ppb)	Current BC AQO (ppb)
2009-2010	Dome Mountain	Monthly	0.08	-[a]
2009-2010	Dome Mountain	Annual	0.06	5
1996-2006	Davidson-St Joseph	1-hour	10.3[b,d]	75[c]
1996-2006	Davidson-St Joseph	Annual	1.3[d]	5

Notes:

[a] *There is no BC AQO for monthly SO_2*

[b] *98th percentile*

[c] *Achievement based on annual 97th percentile of daily 1-hour maximum averaged over 2015-2017*

[d] *Data reported as µg/m^3 in the source dataset and converted to ppb in this table using 25°C and 1 atmosphere.*

Table 3.5-10 presents the NO_2 data reported by nearby projects. The observed maximum concentrations are significantly lower than the applicable BC AQOs.

Table 3.5-10. Nearby Projects – NO_2 (Dome Mountain and Davidson Projects)

Years	Station Identification	Averaging Period	Maximum Observed NO_2 (ppb)	Current BC AQO (ppb)
2009-2010	Dome Mountain	Monthly	0.3	-[a]
2009-2010	Dome Mountain	Annual	0.2	32
1997-2006	Davidson-St Joseph	1-hour[a]	18.6[b,c]	100[b]
1997-2006	Davidson-St Joseph	Annual	5.9[c]	32

Table 3.5-10. Nearby Projects – NO_2 (Dome Mountain and Davidson Projects) (Completed)

Notes:
[a] There is no BC AQO for monthly NO_2.
[b] 98th percentile of daily 1-hour maximum (D1HM), over one year.
[c] Data reported as µg/m³ in the source dataset and converted to ppb in this table using 25°C and 1 atmosphere.

Table 3.5-11 presents the O_3 data reported by nearby projects. The 2009 – 2010 maximum observed monthly average concentration is similar to the 2015 – 2017 maximum 1-hour and 8-hour values at the BC ENV-Smithers station.

Table 3.5-11. Nearby Projects – O_3 (Dome Mountain Project)

Years	Station Identification	Averaging Period	Maximum Observed O_3 (ppb)	Current BC AQO (ppb)
2009-2010	Dome Mountain	Monthly	50.6	-[a]
2009-2010	Dome Mountain	Annual	30.5	-[a]

Note: [a] There is no BC AQO for monthly or annual O_3.

Table 3.5-12 presents the PM_{10} data reported by nearby projects. The maximum observed 24-hour average concentration was reported by the data source as a 98th percentile rather than a 100th percentile as used by the BC AQO. This 98th percentile is below the current BC AQO, and it is likely the 100th percentile would have been above the BC AQO.

Table 3.5-12. Nearby Projects – PM_{10} (Davidson Project)

Years	Station Identification	Averaging Period	Maximum Observed PM_{10} (µg/m³)	Current BC AQO (µg/m³)
1997-2006	Davidson-St Joseph	24-hour	43.6[a]	50
1997-2006	Davidson-St Joseph	Annual	15.9	-[b]

Notes:
[a] The data source document reports this value as the 98th percentile, while the current BC AQO uses the 100th percentile.
[b] There is no BC AQO for annual PM_{10}.

Table 3.5-13 presents the $PM_{2.5}$ data reported by nearby projects. Both the 24-hour and annual values from 2004 to 2006 are similar to the more recent 2014 to 2017 24-hour and annual values, respectively (Table 3.5-7).

Table 3.5-13. Nearby Projects – $PM_{2.5}$ (Davidson Project)

Years	Station Identification	Averaging Period[a]	Maximum[a] Observed $PM_{2.5}$ (µg/m³)	Current BC AQO (µg/m³)
2004-2006	Davidson-St Joseph	24-hour	27.2	25
2004-2006	Davidson-St Joseph	Annual	9.8	8.0

Note:
[a]: The 24-hour calculation metric is the annual 98th percentile of daily average, over one year. The annual calculation metric is the annual average, over one year. See Table 3.2-1 for more information.

4. NOISE

Elevated noise levels can have direct and indirect health effects on wildlife and human populations. Noise may affect wildlife populations by causing them to avoid important habitats and/or take time away from other key behaviors such as feeding, breeding, or watching for predators, which can ultimately lead to reduced reproductive productivity and/or increased mortality.

The detailed objectives of the noise baseline monitoring program are to:

- establish noise monitoring locations in the vicinity of project infrastructure (mine site and rail loadout); and
- characterize existing ambient and background baseline noise levels prior to the generation of Project-related noise.

The baseline noise monitoring program will allow for comparison of measured ambient levels to measured or modelled noise levels that may be done in the future, associated with the proposed Tenas Project. Potential applications of noise monitoring may include supporting adaptive management, supporting the resolution of potential noise complaints, and informing other baseline and assessment programs (e.g., wildlife monitoring).

4.1 STUDY AREA

The Project is located in west-central BC, in the Bulkley Valley Lakes District (BVLD). The Tenas coal deposit is approximately 13 km from the community of Telkwa. The primary sources of ambient sound in the general project area include wildlife, traffic, aircraft, trains, other machinery, hunting, surface water, rain, and wind.

Figure 4.1-1 provides the noise monitoring stations.

4.2 REGULATORY AND POLICY FRAMEWORK

BC does not have any regulations or guidelines for mining or community noise. The following list of documents provide examples of noise guidelines published by other jurisdictions:

- The village of Telkwa has *Noise Control Bylaw No. 495, 2001* (2001) that describes noise restrictions within the community in order to prevent noise nuisance.
- BC oil and gas industry noise guidelines and noise limit calculation processes described in the BC Oil & Gas Commission *BC Noise Control Best Practices Guideline* (2009).
- Environment Canada *Environmental Code of Practice for Metal Mines* (2009): *"In residential areas adjacent to mine sites, the equilibrium sound pressure level (L_{eq}) from mining activities should not exceed 55 dBA during the day and 45 dBA at night. Ambient noise can also affect wildlife, so sites in remote locations should also work to meet these objectives for off-site ambient noise levels."*

- World Health Organization (1999) has published guidelines on recommended noise levels to minimize sleep disturbance: *"If negative effects on sleep are to be avoided the equivalent sound pressure level should not exceed 30 dBA indoors for continuous noise"* and *"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB Lmax more than 10 to 15 times per night."*

4.3 EXISTING INFORMATION

Readily available sources of existing noise information were reviewed, and a summary of the review is provided in Table 4.3-1. The reviewed information included publicly available sources. The list of reviewed information is not exhaustive and additional potential sources of relevant public and private information may be available.

4.4 METHODOLOGY

The noise monitoring program was developed in accordance with *ASTM E1686-03 Standard Guide for Selection Environmental Noise Measurements & Criteria* (ASTM 2008) to monitor baseline noise levels in the Project area. Noise samples were collected using a Bruel & Kjaer Type 2250 (Class 1) sound level meter capable of logging data and audible noise.

The sound level meter was configured to sample in decibels using the "A and C" standardized frequency ratings (dBA, designed to match the frequency response of the human ear; dBC, designed to take into account low-frequency components of noise within the audibility range of humans), depending on the metric being recorded. The sound level meter was fitted with a microphone protected by a wind screen to help reduce the affects of the wind hitting the microphone and generating noise from the microphone itself. This windscreen reduces wind noise by approximately 15 dB for wind speeds up to 120 km/h and fulfils IEC 61672 class 1 and ANSI S1.4 Type 2 standards.

Noise measurements were logged once every minute at approximately 1.5 m above ground. Measurements were taken for approximately 24 hours at each sampling season and each location. For QA/QC purposes, the sound level meter was calibrated before and after each monitoring period. The hand held calibrator used for this purpose was a Bruel & Kjaer Type 4231 calibrator. At the time of use, both devices held manufacturers calibrations certificates within their recommended recalibration interval.

The software setup of the instrument and list of monitoring parameters were discussed with Ardea Biological Consulting before monitoring (L. Turney, pers. comm.) in order to ensure that the measurements were appropriate for informing wildlife baselines and assessments.

Noise was monitored at three stations (S-Plant, S-TenasDep, and S-Rail); their locations are summarized in Table 4.4-1 and mapped on Figure 4.1-1. The S-Plant and S-TenasDep station locations were chosen by Ardea Biological Consulting for the purpose of measuring baseline noise in the area of the proposed mine site to inform wildlife studies. S-Plant is near the proposed coal processing plant infrastructure, in a cutblock with young trees (Plate 4.4-1). S-TenasDep is near the edge of the proposed open pit, in a mature forest (Plate 4.4-2). The S-Rail station location was chosen for the purpose of measuring baseline noise in the area of the proposed rail load out to inform wildlife and human health studies. S-Rail is located within the proposed rail load out loop, in a cutblock with young trees (Plate 4.4-3).

Figure 4.1-1
Tenas Project Baseline Noise Monitoring Locations

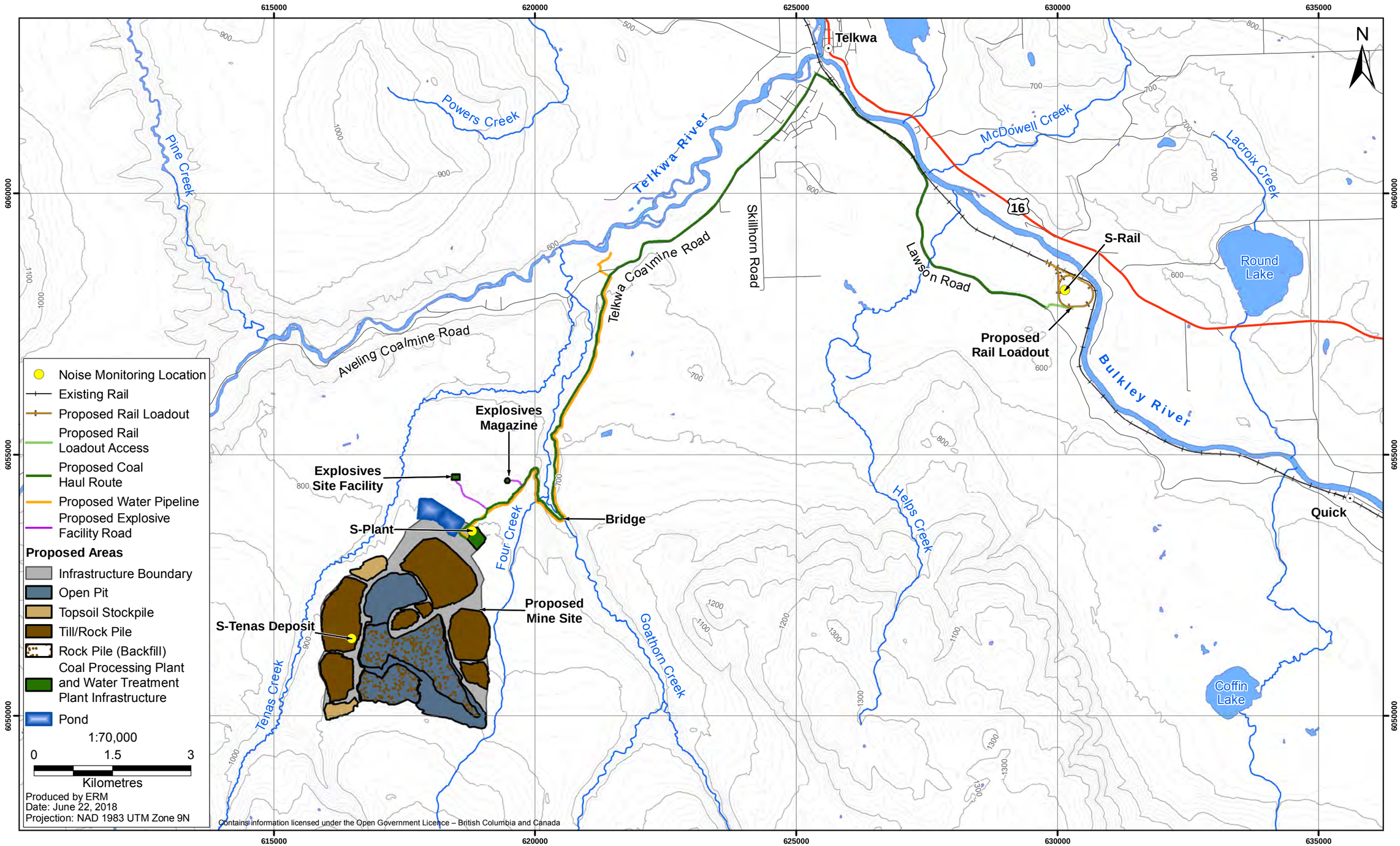


Table 4.3-1. Baseline Noise Monitoring Data Information Table

Documents Reviewed	**Davidson Project** • *Davidson Project: Application for Environmental Assessment Certificate*. Submitted by Blue Pearl Mining Inc. (Rescan. 2008. *Davidson Project Application for Environment Assessment Certificate* - Section 6.15 Noise. Prepared for Blue Pearl Mining Ltd. by Rescan Environmental Services Ltd.: Vancouver, BC.) • Davidson Project Meteorology, *Air Quality and Noise baseline Study* (Rescan. 2007. *Davidson Project Meteorology, Air Quality and Noise Baseline Study*. Prepared for Blue Pearl Mining Ltd. by Rescan Environmental Services Ltd.: Vancouver, BC.) **Telkwa Coal Project** • *Telkwa Coal Project: Application for a Project Approval Certificate* – Volumes I-V. Submitted by Manalta Coal Ltd. (Manalta Coal Ltd. 1997. *Telkwa Coal Project: Application for a Project Approval Certificate.* Prepared by Manalta Coal Ltd.: Vancouver, BC.)
General Remarks	Reviewed information included publicly available sources for data collected in the general regional area surrounding the Tenas Project. The list of reviewed information is not exhaustive and additional potential sources of relevant public and private information may be available.
Sampling Required by *Joint AIR for Mines Act and Environmental Management Act Permits* (Joint AIR for MA/EMA Permits)	There are no noise baseline sampling requirements described in the Joint AIR.
Existing Monitoring Data	**Davidson Project** • Extensive baseline ambient noise data from eight monitoring stations close to the proposed Davidson Project and within the town of Smithers. 11,000 hours of noise data were recorded during four seasonal periods from September 2005 to August 2006. **Telkwa Coal Project** • No relevant ambient noise data were included in the application. The application only qualitatively described noise emission sources.
Existing Data Issues	Representative on-site noise monitoring data are required to inform wildlife studies and potential future human health and noise assessment studies. The eight Davidson Project noise monitoring stations were located close to the Davidson Project or within the town of Smithers. They are outside of and not representative of the Tenas Project area or the community of Telkwa. However the existing data may be useful for comparison to on-site noise monitoring.
Missing Data	Baseline ambient noise data for the Tenas Project area or for the community of Telkwa were not available.
2017–March 2018 Baseline Program	The primary noise emissions of concern for the proposed Tenas Project are from machinery and blasting. These are common noise emissions from mining projects. In order to determine baseline ambient noise levels for the Project, three noise monitoring stations were established to monitor baseline ambient noise in each season. The data are intended to be used to inform additional studies, including wildlife and potential future human health and noise assessments.
Key Issues	None
Other Comments	None

Table 4.4-1. Baseline Noise Monitoring Stations

Monitoring Station ID	UTM Zone 9U Coordinates		Station Description	Monitoring Dates
	Easting	Northing		
S-Plant	618794	6053543	Located in a forest cut block within the proposed location of the plant/water treatment area. Station surrounded by small young trees on gentle mountain slope.	October 16 – 17, 2017 December 12 – 13, 2017 March 20 – 21, 2018
S-TenasDep	616490	6051477	Located in mature forest adjacent to the proposed location of the Tenas deposit open pit. Station is on a gentle mountain slope.	October 17 – 18, 2017 December 11 – 12, 2017 March 21 – 22, 2018
S-Rail	630146	6058143	Located in a forest cut block within the proposed rail load out loop. A small 10 m high steep hill is 40 m south of the station, farm land is 140 m west, existing active train tracks are 340 m northeast, and Highway 16 is 900 m northeast.	December 15 – 18, 2017 March 22 – 23, 2018

Monitoring took place at S-Plant and S-TenasDep in October and December 2017, and March 2018. The S-Rail station was added in December 2017 and was monitored in December 2017 and March 2018. All stations measured one 24 hour period in each of these months, except for S-Rail in December when three consecutive days were measured to take advantage of favorable fieldwork schedule logistics. See Table 4.4-1 for monitoring dates.

Detailed field notes were recorded for each monitoring event and are presented in Appendix 4-A.

Plate 4.4-1. Noise monitoring station location S-Plant after deployment. October 16, 2017. Looking south.

Plate 4.4-2. Noise monitoring station location S-TenasDep after deployment. October 17, 2017. Looking east.

Plate 4.4-3. Noise monitoring at new station S-Rail after deployment. December 15, 2017. Looking west.

4.5 DATA SUMMARY

4.5.1 Tenas Project Noise Monitoring

Tenas Project baseline ambient noise data are summarized in the sections below. One-minute LA_{eq} data graphs with noise source descriptions are presented in Appendix 4-B. Hourly noise data and weather conditions are tabulated in Appendix 4-C.

Noise metrics used in this report (e.g., LA_{eq}, LA_{max}, LA_{10}, LA_{90}, LA_{min}) are defined in the Glossary and Abbreviations section and described below:

- LA_{eq}: The equivalent or average noise level during a measurement period, in dBA.
- LA_{max}: The absolute maximum noise level in a noise measurement period, in dBA.
- LA_{10}: The noise level exceeded for 10% of the time and is approximately the average of the maximum noise levels, in dBA.
- LA_{90}: The noise level exceeded for 90% of the time and is approximately the average of the minimum noise levels, in dBA.
- LA_{min}: The absolute minimum noise level in a noise measurement period, in dBA.

4.5.1.1 S-Plant Baseline Noise Results

Table 4.5-1 presents the overall (day, night, and day + night) noise metrics for each monitoring season at the S-Plant location.

Table 4.5-1. S-Plant Baseline Noise Results (dBA) for Fall 2017, Winter 2017, and Spring 2018

Season	Period	Start time	End time	Duration (hh:mm)	LA_{eq}	LA_{max}	LA_{10}	LA_{90}	LA_{min}
Fall 2017	Day and Night	Oct. 16 12:18	Oct. 17 12:48	24:30	35.9	71.1	33.9	20.7	17.5
	Day only	Oct. 16 12:18	Oct. 17 12:48	15:30	37.7	71.1	35.8	21.5	19.2
	Night only	Oct. 16 22:00	Oct. 17 07:00	9:00	26.1	47.6	28.4	20.0	17.5
Winter 2017	Day and Night	Dec. 12 12:18	Dec. 13 12:55	24:37	21.3	53.0	20.4	17.4	16.5
	Day only	Dec. 12 12:18	Dec. 13 12:55	15:37	21.3	50.3	20.8	17.3	16.6
	Night only	Dec. 12 22:00	Dec. 13 07:00	9:00	21.4	53.0	19.5	17.4	16.5
Spring 2018	Day and Night	Mar. 20 10:13	Mar. 21 09:28	23:15	35.0	73.3	35.5	16.8	16.4
	Day only	Mar. 20 10:13	Mar. 21 09:28	14:15	37.1	73.3	38.2	17.7	16.5
	Night only	Mar. 20 22:00	Mar. 21 07:00	9:00	17.8	45.9	17.5	16.7	16.4

Notes:
Daytime noise occurs between 7:00 and 22:00; Nighttime noise occurs between 22:00 and 7:00.
Metrics are defined in the Glossary and Abbreviations section of this report.

Noise levels at the S-Plant monitoring location are generally consistent with a quiet, forested area away from most anthropogenic noise sources. Natural sources of noise identified during the fall, winter, and spring monitoring periods include rainfall, wildlife, bird calls, and wind. Relative to the fall and spring monitoring periods, lower noise levels (LA_{eq}) recorded during the winter monitoring period

(December 12 and 13, 2017) are attributed to lower levels of audible wind gusts. Anthropogenic sources of noise were identified as occasional aircraft noise (e.g., helicopters, planes), and distant train horns.

4.5.1.2 S-TenasDep Baseline Noise Results

Table 4.5-2 presents the overall (day, night, and day + night) noise metrics for each monitoring season at the S-TenasDep location.

Table 4.5-2. S-TenasDep Baseline Noise Results (dBA) for Fall 2017, Winter 2017, and Spring 2018

Season	Period	Start time	End time	Duration (hh:mm)	LA_{eq}	LA_{max}	LA_{10}	LA_{90}	LA_{min}
Fall 2017	Day and Night	Oct. 17 17:40	Oct. 18 18:18	24:38	27.3	64.3	28.4	17.1	16.3
	Day only	Oct. 17 17:40	Oct. 18 18:18	15:38	28.6	64.3	29.5	17.0	16.3
	Night only	Oct. 17 22:00	Oct. 18 07:00	9:00	22.9	48.0	25.3	17.1	16.6
Winter 2017	Day and Night	Dec. 11 10:54	Dec. 12 10:03	23:09	20.0	55.4	18.1	16.4	16.1
	Day only	Dec. 11 10:54	Dec. 12 10:03	14:09	20.5	55.4	18.7	16.5	16.1
	Night only	Dec. 11 21:59	Dec. 12 07:00	9:00	19.1	49.9	17.1	16.4	16.1
Spring 2018	Day and Night	Mar. 21 11:42	Mar. 22 09:14	21:32	36.4	68.8	39.5	17.8	17.1
	Day only	Mar. 21 11:42	Mar. 22 09:14	12:32	37.8	68.8	40.9	18.9	17.2
	Night only	Mar. 21 22:00	Mar. 22 07:00	9:00	33.1	68.0	36.6	17.6	17.1

Notes:
Daytime noise occurs between 7:00 and 22:00; Nighttime noise occurs between 22:00 and 7:00.
Metrics are defined in the Glossary and Abbreviations section of this report.

Noise levels at the S-TenasDep monitoring location are generally consistent with a quiet, forested area away from most anthropogenic noise sources. Natural sources of noise identified during the fall, winter, and spring monitoring periods include rainfall, wildlife, bird calls, and wind. Relative to the fall and winter monitoring periods in 2017, higher noise levels (LA_{eq}) recorded during the spring monitoring period (March 21 and 22, 2018) are attributed to frequent and strong gusts of wind, and tree and leaf movement/rustling (see Appendix 4-B and 4-C). Anthropogenic sources of noise were identified as aircraft noise (, and distant train horns.

4.5.1.3 S-Rail Baseline Noise Results

Table 4.5-3 presents the overall (day, night, and day + night) noise metrics for each monitoring season at the S-Rail location.

The S-Rail location was not monitored in the fall of 2017. In contrast to the S-Plant and S-TenasDep monitoring locations, noise levels at the S-Rail monitoring location were substantially influenced by nearby highway (900 m away) and rail activity (340 m away) noises. As a result, natural sources of noise are generally blended with or drained out by anthropogenic noise originating from the highway (vehicular traffic), railway (train cars, engines, and horns), or by occasional overflying aircraft. Noise spikes attributed to close proximity natural noise are limited and are associated with bird calls and wind.

Table 4.5-3. S-Rail Baseline Noise Results (dBA) for Winter 2017 and Spring 2018

Season	Period	Start time	End time	Duration (hh:mm)	LA_{eq}	LA_{max}	LA_{10}	LA_{90}	LA_{min}
Winter 2017	Day and Night	Dec. 15 10:37	Dec. 16 11:17	24:40	41.9	70.9	44.7	24.9	19.9
	Day only	Dec. 15 10:37	Dec. 16 11:17	15:40	42.7	70.9	45.3	32.4	21.6
	Night only	Dec. 15 22:00	Dec. 16 07:00	9:00	40.1	63.8	43.0	22.5	19.9
	Day and Night	Dec. 16 11:46	Dec. 17 12:45	24:59	41.1	65.0	42.3	27.2	20.3
	Day only	Dec. 16 11:46	Dec. 17 12:45	15:59	41.4	65.0	43.0	30.4	22.4
	Night only	Dec. 16 22:00	Dec. 17 07:00	9:00	40.5	62.2	39.6	25.7	20.3
	Day and Night	Dec. 17 13:00	Dec. 18 10:02	21:01	40.3	67.3	43.2	25.1	18.8
	Day only	Dec. 17 14:00	Dec. 18 10:02	11:02	40.8	67.3	43.3	30.3	21.9
	Night only	Dec. 17 22:00	Dec. 18 07:00	9:00	39.9	58.4	43.3	22.2	18.8
Spring 2018	Day and Night	Mar. 22 13:10	Mar. 23 14:04	24:54	39.4	80.4	40.0	19.1	17.1
	Day only	Mar. 22 13:10	Mar. 23 14:04	15:54	40.9	80.4	41.0	21.9	17.1
	Night only	Mar. 22 22:00	Mar. 23 07:00	9:00	33.5	52.2	35.3	18.4	17.1

Notes:
Daytime noise occurs between 7:00 and 22:00; Nighttime noise occurs between 22:00 and 7:00.
Metrics are defined in the Glossary and Abbreviations section of this report.

5. HYDROGEOLOGY

This chapter presents the methods and results of the hydrogeology baseline monitoring program. The purpose of the 2017 to 2018 program was to collect Project specific baseline hydrogeology data. An understanding of this information will contribute to engineering analysis and water management feature design; support future development of predictive models, effects assessments, management plans, and closure planning; support permitting; and monitor changes in the local hydrogeology.

The objective of the 2017 to 2018 program was to:

- Characterize the baseline groundwater quality and quantity of the Project area. The new information will be compared to the historical data.

5.1 STUDY AREA

The local study area (LSA), in regards to the hydrogeology baseline program, is currently being defined by SRK Consulting (SRK). Once the study area has been defined it will be incorporated into the final hydrogeology baseline report and shown on a figure.

5.2 REGULATORY AND POLICY FRAMEWORK

Groundwater is a valued component of the biological and physical environment and is protected under the Groundwater Protection Regulation of the British Columbia (BC) *Water Sustainability Act* (2016). Groundwater baseline studies for the Project were designed to meet the requirements of the *Mines Act* and *Environmental Management Act* Permits Joint Application Information Requirements (Joint AIR for MA/EMA Permits; BC MEM and BC MOE 2016).

5.3 EXISTING INFORMATION

Exploration was conducted on the Telkwa Coal Property in the 1980's and 1990's, and extensive environmental baseline work was also collected over the decades. Table 5.3-1 below summarizes the hydrogeology data information for the project, as well as the baseline work conducted in 2017 to 2018.

Table 5.3-1. Hydrogeology Data Information Table

Documents Reviewed	• *Baseline Data – Surface Water and Groundwater, Telkwa Coal Project*. Prepared by Piteau Engineering Ltd. Prepared for Manalta Coal Ltd. (1994). • *Preliminary Assessment of Potential Groundwater Inflows and Dewatering Requirements in the Tenas Creek Region, Telkwa Coal Project*. Prepared by Piteau Engineering Ltd. Prepared for Manalta Coal Ltd. (1996). • *Baseline Hydrogeological Investigations in the Tenas Pit, Waste Dumps, and Mine Pit 3, Telkwa Coal Project*. Prepared by Piteau Engineering Ltd. Prepared for Manalta Coal Ltd. (1997). • *Baseline Hydrogeological Conditions in the Telkwa Coat Project Area – Volumes I and II*. Prepared by Piteau Engineering Ltd. Prepared for Manalta Coal Ltd. (1998).

(continued)

Table 5.3-1. Hydrogeology Data Information Table (completed)

General Remarks	Insufficient seasonal measurement data acquired during the historical sampling events. Measurements were only collected during the late summer/early fall of 1995, 1996, and 1997. Installing transducers in monitoring wells which provide adequate spatial coverage of the proposed pit area. The transducers will record water levels twice daily for a minimum of one year.
Sampling Required by *Joint AIR for Mines Act and Environmental Management Act Permits (*Joint AIR)	Summarize the results of the groundwater study of the mine property. One year of monthly groundwater levels and a credible database of low-flow streamflow measurements over two years is recommended.
Existing Data	• 1995: Tenas Pit - Rising head permeability tests. • 1996: Tenas Pit - Preliminary assessment of potential groundwater inflows and dewatering requirements for the Tenas Pit. Borehole drilling and installation of 5 piezometers within bedrock and 6 within surficial sediments. Rising head permeability tests.
Existing Data Issues	• Prior to initiating the 2017 to 2018 baseline field work there was uncertainty on the usability of the existing monitoring wells. • Historical data (i.e., well locations) did not support the configuration of the Small Mine and new locations were recommended as part of the 2017 to 2018 baseline study. • Existing hydraulic conductivity (K) dataset provided a reasonable estimation of the range associated with coal seems, but it was not suitable to characterize properties of the rocks below the main coal-bearing sequence and differentiate low permeability layers that may limit groundwater flows down-gradient of the mine pit.
Missing Data	• No baseline hydrogeology work was conducted between 1997 and 2016. • Nine monitoring wells were inspected by Stantec in November 2016 within the northern portion the Tenas pit area. Three wells were damaged (blockage below surface or damaged casing), and three were dry.
2017 to 2018 Baseline Program	• 22 existing monitoring wells were inspected to determine their usability on July 25 and 26, 2017. • Quarterly groundwater monitoring at 13 wells was initiated in July 2017 and will continue through July 2018 • Five new hydrogeology monitoring wells were installed in February 2018 to support the Small Mine configuration. In addition, one pumping test well (ARD 2) and three new geotechnical wells (GEO 11, GEO 13, and GEO 22) were also installed. The water level for these wells will be measured in conjunction with the other five new wells. • Packer injection tests were performed on one of the newly installed groundwater wells (W1) and two of the ARD boreholes (ARD 1 and ARD 6) during the February 2018 drilling program. • Well development was performed on the five newly installed baseline wells during the March/April 2018 baseline groundwater program. Well development was also performed at the newly installed pump test well -ARD 2. • Slug tests were performed on three of the five newly installed hydrogeology baseline wells during the March/April 2018 baseline groundwater program. Slug tests were also performed on the newly installed pump test well at ARD 2.
Key Issues	*n/a*
Other Comments	*n/a*

5.4 METHODOLOGY

The objective of the 2017 to 2018 baseline hydrogeology monitoring program is to expand the existing baseline database in areas that could potentially be affected by the development of the Small Mine, and to capture seasonal and annual variability in groundwater levels.

The following sub-sections describe the field methodologies for the baseline hydrogeology monitoring program from July 2017 to April 2018. Additional monitoring is scheduled in mid to late June 2018 and will be described in a future version of the baseline report.

5.4.1 Inspection of Existing Monitoring Wells

In July 2017, 22 existing monitoring wells in the Tenas Pit Area of the Telkwa coal field were inspected to evaluate the suitability of the existing monitoring wells for use in the groundwater baseline program (Table 5.4-1). Nine of the wells were previously inspected by Stantec in November 2016 and were included in the 2017 program to record a water level measurement and to confirm the 2016 observations.

Table 5.4-1. Monitoring Wells Inspected, July 2017

Area	Well ID
Within Tenas Pit	T96TP-01-10
	T96TP-02-07
	T96R-16-19 and T96R-16-28 (nested pair)
	T97R-108C-70
	T93R-17
	T95R-15C
	T96R-34-67 and T96R-34-87 (nested pair)
	T95R-40
	T95R-39C
	T95R-64
	T96R-56C-83
Outside of Tenas Pit	TOB96-01-05
	TOB96-02-06 and TOB96-02-20 (nested pair)
	TOB96-11-04 and TOB96-11-19 (nested pair)
	TOB97-07-24
	TOB97-06-21
	TOB96-12-04
	T93R-18

The following data was recorded at each well that was inspected:

- date of inspection;
- depth to water (m btoc);
- depth to bottom (m btoc);
- stick up (mags);
- diameter of well casing (in);

- damage (yes / no); and
- dry (yes / no).

Field notes and photographs were also taken at each well location.

5.4.2 Groundwater Monitoring

Manual groundwater level measurements were recorded from 13 of the existing monitoring wells in July 2017, September 2017, January 2018 and March/April 2018 and from nine newly installed monitoring wells in March/April 2018 using a Solinst water level tape. Manual groundwater level measurements were also recorded at three of the 13 existing monitoring wells in August 2017 (Table 5.4-2).

Table 5.4-2. Monitoring Wells Manually Monitored for Groundwater Levels (2017/2018)

Well ID Existing Wells	July 2017	August 2017 [1]	September 2017	January 2018	March/April 2018
T95R-64 (Bedrock)	x	x	x	x	x
T95R-40 (Bedrock)	x	x	x	x	x
T96R-34-87 (Bedrock)	x	x	x	frozen	x
T95R-15C (Bedrock)	x	*nm*	x	frozen	x
T96R-16-19 (Bedrock)	x	*nm*	x	x	x
T96R-16-28 (Bedrock)	x	*nm*	x	x	x
TOB97-07-24 (OVB)	dry	*nm*	*nm*	*nm*	dry
TOB97-06-21 (OVB)	dry	*nm*	*nm*	dry	*nm*
TOB96-02-06 (OVB)	x	*nm*	x	x	x
TOB96-02-20 (OVB)	*nm*	*nm*	dry	dry	dry
TOB96-11-04 (OVB)	x	*nm*	x	x	x
TOB96-11-19 (OVB)	dry	*nm*	dry	dry	dry
TOB96-01-05 (OVB)	x	*nm*	x	x	x
Well ID New Wells [2]	**July 2017**	**August 2017 [1]**	**September 2017**	**January 2018**	**March/April 2018**
W1 Deep (Bedrock)	-	-	-	-	x
W3 Deep (Bedrock)	-	-	-	-	x
ARD 2 (Bedrock)	-	-	-	-	x
W1 Shallow (OVB)	-	-	-	-	x
W3 Shallow (OVB)	-	-	-	-	x
W2 (OVB)	-	-	-	-	x
GEO 11	-	-	-	-	x
GEO 13	-	-	-	-	dry
GEO 22	-	-	-	-	dry

Notes:
nm – not measured
OVB – overburden wells
1 – August 2017 was not a scheduled monitoring event as three wells were sampled for water quality.
2 – The new wells were installed during the winter 2018 drilling program, therefore only one monitoring event has occurred.

Five Solinst Levelogger transducers (M10) and one Solinst barologger were installed in September 2017 and programmed to record every 12 hours for continuous water level measurements. Three transducers were installed in monitoring wells screened in bedrock coal seams (T95R-15C, T96R-16-19, and T95R-64) and two were installed in glacial overburden soils (TOB96-02-06/TOB96-02-20). These wells were selected for continuous monitoring as they provide adequate spatial coverage for a more detailed understanding of groundwater flow patterns within the proposed pit area. The barologger was installed at T95R-64 which is located at the mid-point elevation of the Project to capture average barometric pressure.

Data from each of the five transducers and the barologger were downloaded and reprogrammed in March 2018.

5.4.3 Installation and Development of New Groundwater Monitoring Wells

Nine new monitoring wells were installed during the January/February 2018 hydrogeology drilling program (five groundwater monitoring/sampling wells, three geotechnical wells and one pumping test/monitoring well). These wells were installed for various purposes including the following:

- enhancing the hydrogeological database by collecting additional hydraulic conductivity information which can be used to improve predictions of pit inflow, potential dewatering requirements and slope pore pressures;
- improve the spatial coverage in the area of Tenas and Goathorn Creeks in regards to the hydrogeology baseline quality and quantity data; and
- monitor groundwater elevations below proposed waste rock piles.

Seven of the new groundwater monitoring/sampling wells are comprised of 2-inch (53 millimeter [mm]) diameter, schedule 40 PVC (polyvinyl chloride) with a 0.01 inch (0.25 mm) slot-size screen while the other groundwater monitoring/sampling well is comprised of a 1.5-inch (38 mm) diameter schedule 40 PVC with a 0.01 inch (0.25 mm) slot-size screen. The 3-inch (76 mm) well (ARD2) was installed for a future pumping testing and will be monitored as part of the baseline monitoring program. ARD2 is also comprised of schedule 40 PVC with a 0.01 inch (0.25 mm) slot-size screen. Each of the new monitoring wells has a screen length of 3.05 meters (m).

A sand filter pack was placed to approximately one meter above the top of the screen in each well, and each borehole was backfilled with bentonite pellets or chips to provide a surface seal as required by the Groundwater Protection Regulation of the BC *Water Sustainability Act* (2016). ARD2 was grouted above the bentonite pellet seal.

Each PVC well was capped with a J-plug and a steel well monument was constructed to protect the PVC stickup. Additional well details and borehole logs are currently being produced by SRK and will be provided in a future version of the baseline report.

Well development was conducted during the March/April 2018 hydrogeology field program by using a combination of inertial pumping with a Waterra Hydrolift, pumping with a submersible pump and bailing. Each well was developed to remove stagnant water and fine-grained materials from outside the well screen to obtain representative water for sampling with the goal of achieving the lowest possible

turbidity. Additional methods regarding well development, including estimated volumes of groundwater purged from each well, will be provided in a future version of the baseline report.

5.4.4 Hydraulic Conductivity (K) Testing

A total of 13 pneumatic constant head packer injection tests were completed at three locations (W 1, ARD 1 and ARD 6) during the January/February 2018 hydrogeology drilling program. The packer tests were conducted using one meter length P-sized (designed for a PQ borehole) pneumatic straddle packers purchased from RST Instruments Ltd.

The packer tests were conducted in the open borehole after the final drilling depth was reached and the geophysics was completed. The borehole was flushed with clean water for a minimum of one hour before commencing the packer tests. Nitrogen gas was used to inflate the packers and fresh water was injected downhole to create a pressure response. The injection rate and pressure response were recorded using an Inflatable Packers International (IPI) flow meter, which was provided by SRK. An In-Situ Level TROLL 700 data logger was used to record the pressure within the packer test zones which provides additional pressure measurements along with the surface measurements. The data logger was placed within a specially designed capsule below the upper packer within the test zone. The data was downloaded onto Winsitu software once the packer tests were completed at each borehole.

The packer test zones were chosen based on core logging (lithology, fractures, bedding planes, etc.) conducted by the field geologist and correlated with the geophysical data. The geophysical data was used to confirm the competency of the borehole wall for proper packer placement and to confirm changes in lithology. A detailed geology log of each of these boreholes will be produced by SRK and will be incorporated in a future version of the baseline report.

A total of eight slug tests (six falling head tests and two rising head tests) were completed at four locations (W1 Shallow, W2, W3 Shallow and ARD 2) during the March/April 2018 hydrogeology baseline field program. The falling head tests were conducted by pouring a known quantity of water down the well and then measuring the rate at which the water descends back to the static level. The rising head tests were conducted by removing a known volume of water out of the well with a bailer and then measuring the rate at which the water recovers back to the static level. A Solinst Levelogger transducer was temporarily installed inside the well and was used to record the water levels at one second intervals. The slug tests were conducted after the wells were sufficiently developed and were not initiated until the groundwater had reached its static elevation.

Slug tests were not conducted at W1 Deep and W3 Deep due to time constraints, therefore these tests will be completed during the June 2018 field program.

The analysis of the slug test and packer test data has not been completed and will be provided in a future version of the baseline report.

5.4.5 Quality Assurance / Quality Control

The monitoring program design and quality assurance/quality control (QA/QC) standards were developed in conformance with the *British Columbia Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (BC MOE 2016).

QA/QC procedures specific to water level measurements include: correcting pressure measurements from atmospheric pressure using records from the barometric pressure transducer (barologger) and conducting manual groundwater level measurements before and after every transducer download to calibrate and verify the automatic measurement data.

5.5 DATA SUMMARY

5.5.1 Inspection of Existing Monitoring Wells

Eleven of the 22 existing monitoring wells were considered to be useable at the time of the well inspection on July 25th and 26th, 2017. An additional five monitoring wells were considered to be potentially useable or useable but possibly dry (Figure 5.5-1). All 16 of these monitoring wells appeared to be in good condition and the casings were not obstructed.

Four of the 22 monitoring wells were too damaged to be used for baseline monitoring and two wells could not be located at the coordinates provided from the historical data.

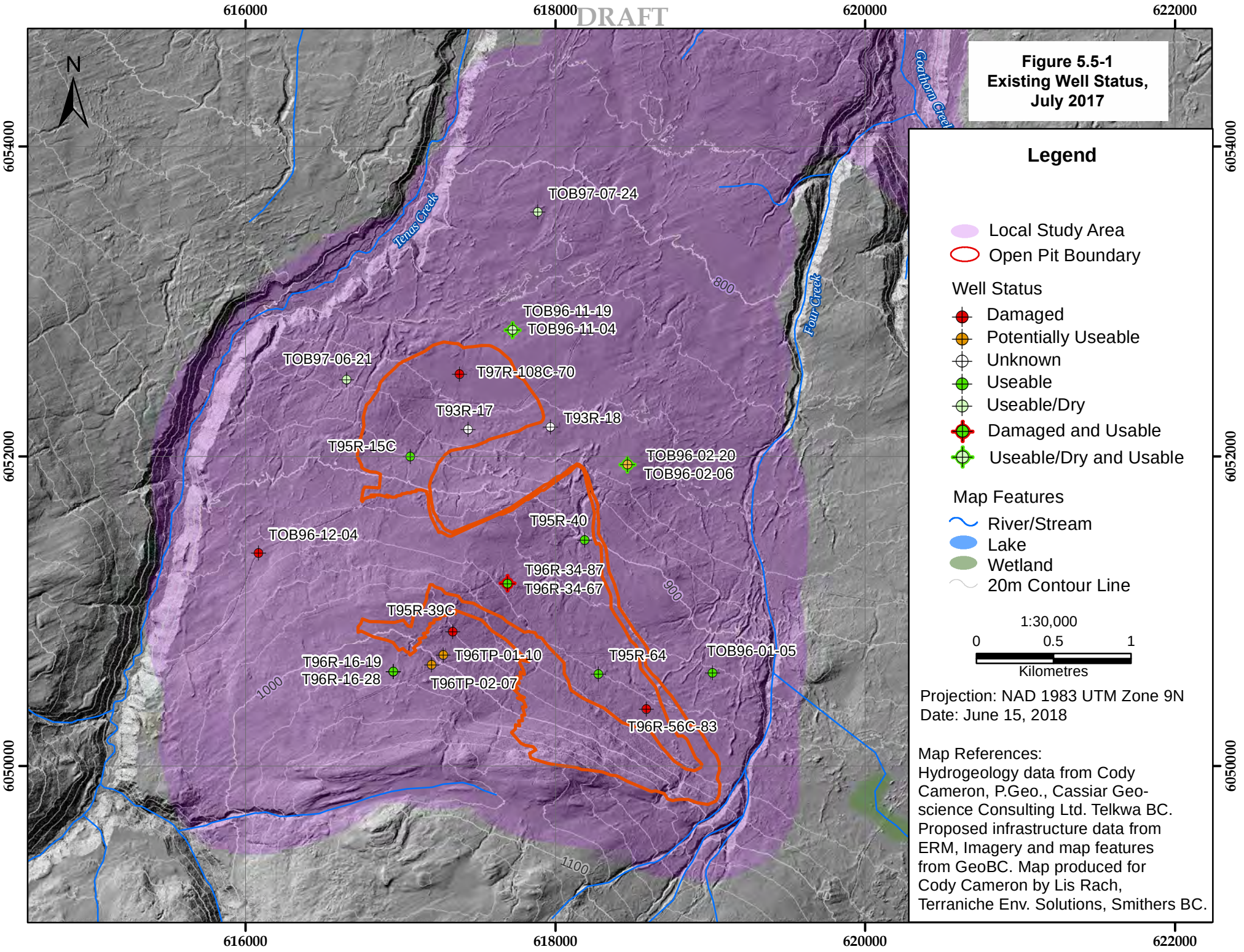
After further consideration and field observations an additional three existing monitoring wells (T96TP-01-10, TP96TP-02-07 and T96R-34-67) were deemed unusable for the hydrogeology baseline monitoring program. T96TP-01-10 and TP96TP-02-07 were installed in 1996 as test pit wells, therefore they may not be representative of natural groundwater conditions due to historical ground disturbance. And during groundwater sampling in August 2017, the inside of the well casing at T96R-34-67 was noted to be cracked approximately 14 to 15 m below the ground surface, making it unusable for monitoring (and sampling).

This results in 13 of the 22 existing monitoring wells being deemed as useable for the purposes of the hydrogeology baseline program. Figure 5.5-1 shows the status of existing monitoring wells and Table 1 of Appendix 5-A provides details for each of the wells inspected.

5.5.2 Groundwater Monitoring

5.5.2.1 Manual Groundwater Level Measurements

Groundwater level measurements were manually recorded in the new and existing wells to monitor seasonal groundwater elevations. Of the thirteen existing wells, six are located in bedrock and seven are located in overburden. Manual groundwater levels were recorded in all six bedrock wells and five of the seven overburden wells in July and September 2017, and January 2018 and March/April 2018. The other two existing overburden wells (TOB97-07-24 and TOB97-06-21) were dry during the monitoring events. Manual groundwater levels were also recorded in three bedrock wells in August 2017 as part of the groundwater quality sampling event.


DRAFT
616000
618000
620000
622000
6054000
6052000
6050000
N
Figure 5.5-1
Existing Well Status,
July 2017
Legend
Local Study Area
Open Pit Boundary
Well Status
Damaged
Potentially Useable
Unknown
Useable
Useable/Dry
Damaged and Usable
Useable/Dry and Usable
Map Features
River/Stream
Lake
Wetland
20m Contour Line
1:30,000
0
0.5
1
Kilometres
Projection: NAD 1983 UTM Zone 9N
Date: June 15, 2018
Map References:
Hydrogeology data from Cody Cameron, P.Geo., Cassiar Geo-science Consulting Ltd. Telkwa BC. Proposed infrastructure data from ERM, Imagery and map features from GeoBC. Map produced for Cody Cameron by Lis Rach, Terraniche Env. Solutions, Smithers BC.
Tenas Creek
Four Creek
Goathorn Creek
800
900
1000
1100
TOB97-07-24
TOB96-11-19
TOB96-11-04
TOB97-06-21
T97R-108C-70
T93R-17
T93R-18
T95R-15C
TOB96-02-20
TOB96-02-06
T95R-40
TOB96-12-04
T96R-34-87
T96R-34-67
T95R-39C
T96TP-01-10
T95R-64
TOB96-01-05
T96R-16-19
T96R-16-28
T96TP-02-07
T96R-56C-83

Of the nine newly installed monitoring wells, three are located in bedrock and six are located in overburden. Manual groundwater levels were recorded in each of the new monitoring wells during the March/April 2018 hydrogeology field program after the well development process was completed. Two of the wells (MW1 Shallow and Deep) had water levels above the ground surface (flowing artesian) while the three new wells installed for geotechnical purposes (GEO 11, GEO 13 and GEO 22) were all dry. As these new wells have only been monitored once since their installation there will not be any discussion regarding seasonal fluctuations until more data is acquired.

Manual groundwater elevations are provided in Table 2 of Appendix 5-A.

Bedrock Monitoring Wells

In general, each of the existing bedrock wells showed the lowest water levels in July to September 2017 and the highest water levels in January to April 2018 (Figure 5.5-2).

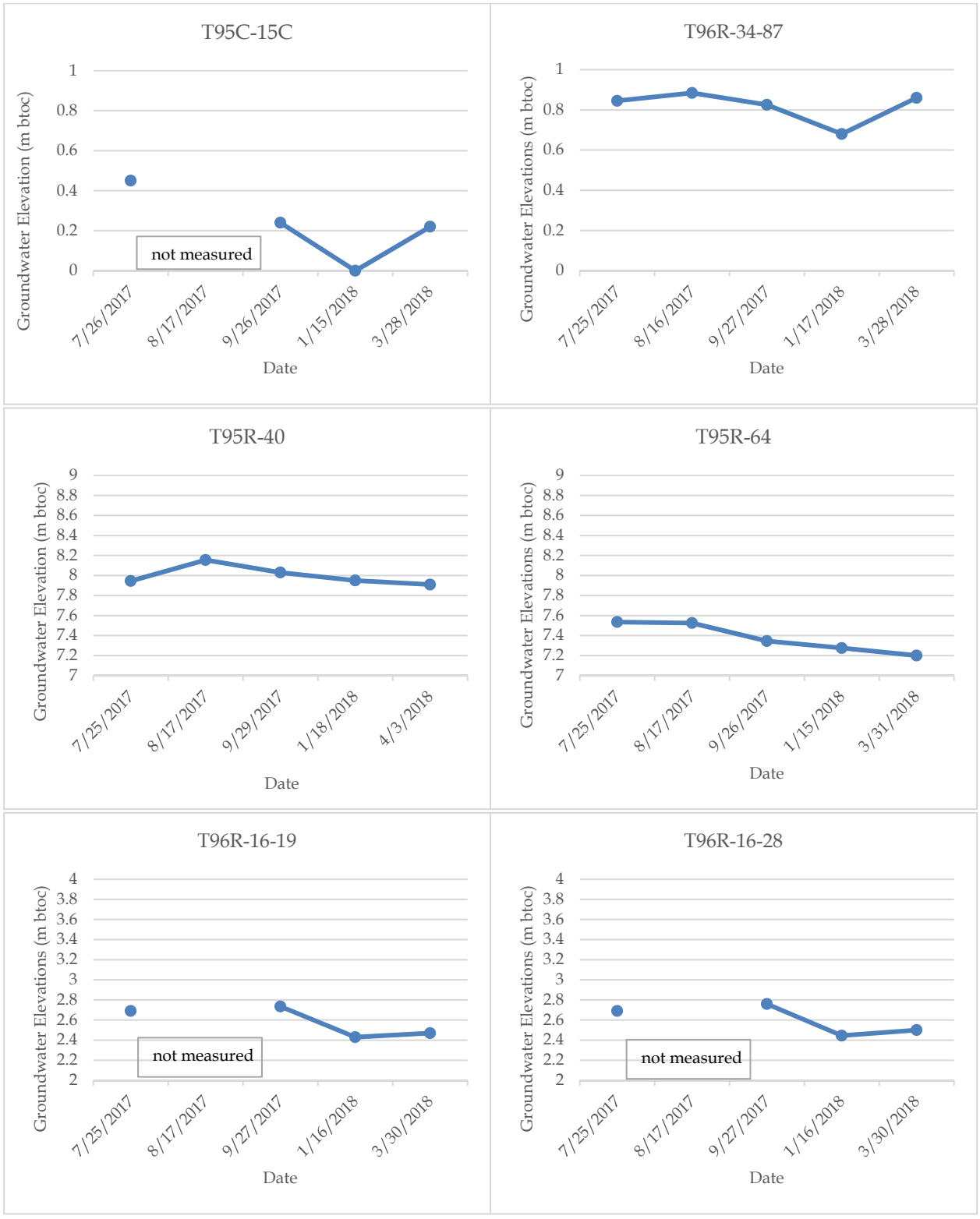
Two of the existing monitoring wells (T95R-15C and T96R-34-87) had groundwater level elevations above the ground surface (flowing artesian) during each of the monitoring events in 2017/2018. These two wells were observed to be frozen above the ground within the PVC casing during the January and March 2018 groundwater monitoring events. Both wells had thawed out by early April. T95R-15C and T96R-34-87 were observed to have flowing artesian conditions during previous monitoring events in late summer/early autumn of 1996 and 1997 (Piteau Engineering Ltd. 1998).

A 2-inch PVC casing extension was added to T95R-15C in order to accurately measure the artesian water level as the existing casing was cracked 0.24 m below the top of casing. The PVC casing was cut off below the crack and then a coupler was attached to join the extension to the existing casing. Both T95R-15C and T96R-34-87 will have a sub-frost artesian plug installed after the fall 2018 baseline program is complete in order to prevent freezing within the upper casing and to comply with the Groundwater Protection Regulations of the BC WSA.

The other four bedrock wells had manually measured groundwater depths ranging from 1.63 m bgs (T96R-16-28) to 7.90 m bgs (T95R-40) during the monitoring events in July and September 2017, January 2018 and March/April 2018. When comparing the manual groundwater elevation data from 2017/2018 with the historical data (1995, 1996 and 1997) from similar seasons (late summer/early autumn) there has been a slight decline (<0.85 m) in water elevations from four of the wells over the past 20 years (Piteau Engineering Ltd. 1998). The current manual groundwater elevation at T95R-64 showed a slight increase (<0.73 m) in groundwater elevation in comparison to the historical data for the same seasonal period (late summer/early autumn).

The groundwater level fluctuations from July 2017 to March/April 2018 within the existing bedrock wells ranged from 0.20 m to 0.45 m. The least amount of fluctuation (0.20 m) was observed at T96R-34-87 while the largest fluctuation (0.45 m) was observed at T95R-15C. It should be noted that the measurements at T95R-15C were taken before the crack was fixed, therefore the actual fluctuation may be larger.

Figure 5.5-2. Manual Groundwater Elevations in Bedrock Wells (July 2017 to April 2018)

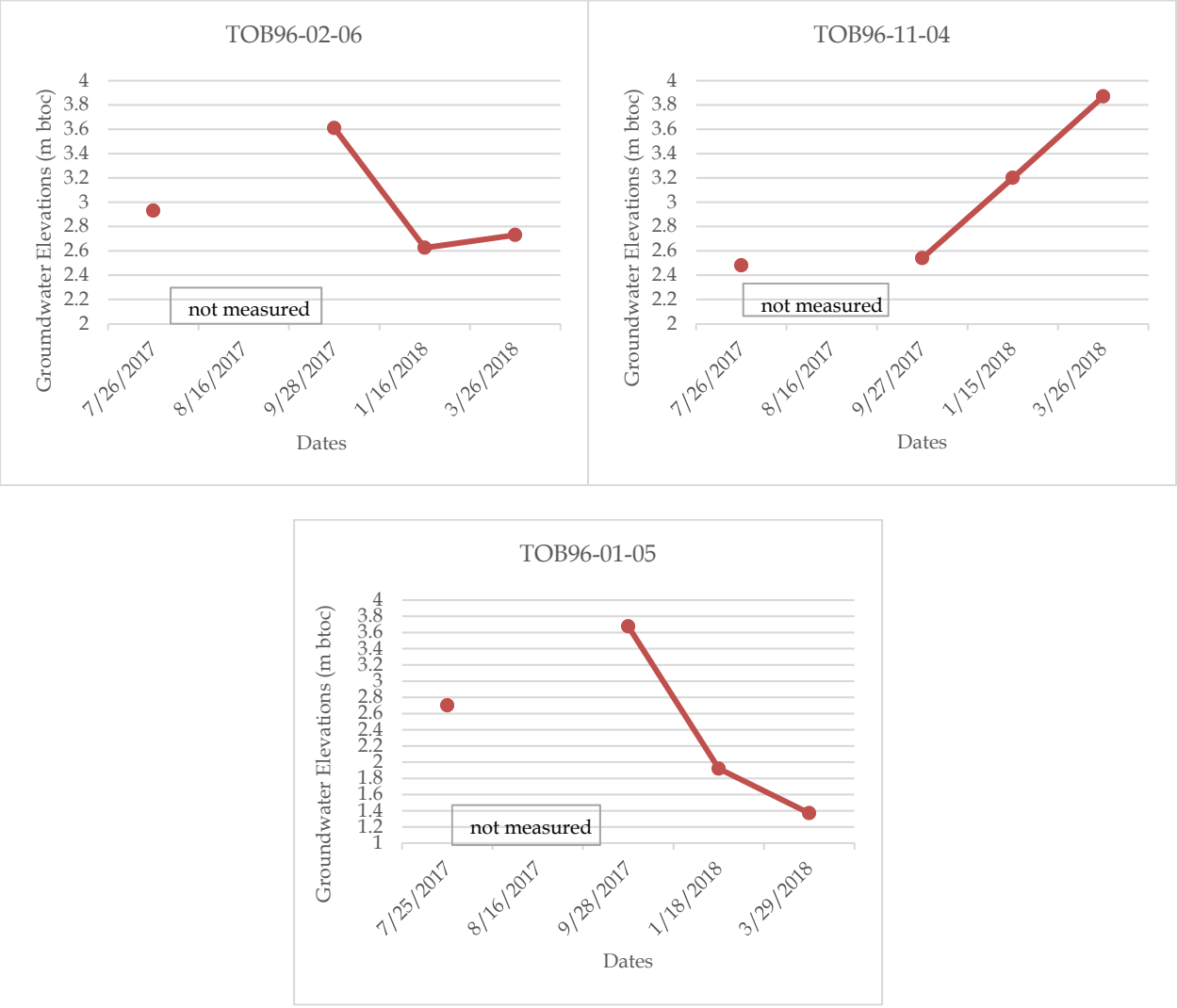


Overburden Monitoring Wells

Four of the seven existing overburden wells (TOB96-11-19, TOB96-06-20, TOB97-07-24 and TOB97-06-21) were measured as dry during each of the 2017 and 2018 monitoring events. This correlates with the historical seasonal data from 1996 and 1997 where each of these wells were dry with the exception of TOB96-06-20 which was fairly close to dry (approximately 1.6 m of standing water in 1996 and 0.3 m of standing water in 1997) (Piteau Engineering Ltd 1997; Piteau Engineering Ltd. 1998).

Of the three existing overburden wells that were not dry (TOB96-01-05, TOB96-02-06 and TOB96-11-04), the measured groundwater level was lowest in September 2017 at two of them (TOB96-01-05 and TOB96-02-06), with the third well's (TOB96-11-04) lowest measured groundwater level recorded in March 2018. The highest measured groundwater levels for each of these three wells varied – (TOB96-01-05 – March 2018), (TOB96-02-06 – January 2018) and (TOB96-11-04 – July 2017) (Figure 5.5-3).

Figure 5.5-3. Manual Groundwater Elevations in Overburden Wells (July 2017 to March 2018)



Manually measured groundwater depths from TOB96-01-05, TOB96-02-06 and TOB96-11-04 ranged from 1.37 m btoc (TOB96-01-05) to 3.87 m btoc (TOB96-11-04) during the 2017 and 2018 monitoring events (Figure 5.5-3). When compared to the historical data (1995, 1996 and 1997) from similar seasons (late summer/early autumn) there is an overall decline in water levels ranging from 1.6 m to 2.6 m in two of the wells (TOB96-01-05 and TOB96-02-06) over the past 20 years. The current manual groundwater elevation at TOB96-11-04 showed a slight increase in groundwater elevation (0.2 m) in comparison to the historical data for the same seasonal period (late summer/early autumn).

Groundwater level fluctuations from July 2017 to March/April 2018 within TOB96-01-05, TOB96-02-06 and TOB96-11-04 ranged from 0.99 m to 2.30 m. The least amount of fluctuation (0.99 m) was observed at TOB96-02-06 while the largest fluctuation (2.30 m) was observed at TOB96-01-05 (Figure 5.5-3).

5.5.2.2 Continuous Groundwater Level Measurements

Groundwater level measurements were recorded twice daily (every 12 hours) with Solinst Levelogger transducers in five of the existing wells from September 2017 to March 2018. Of these five existing wells, three are located in bedrock (T95R-64, T95R-15C and T96R-16-19) and two are located in overburden (TOB96-02-06 and TOB96-02-20). One Solinst Barologger was also used to compensate the pressure data from the transducers and placed in T95R-64 which is located at the mid-point elevation of the Project to capture average barometric pressure.

Bedrock Wells

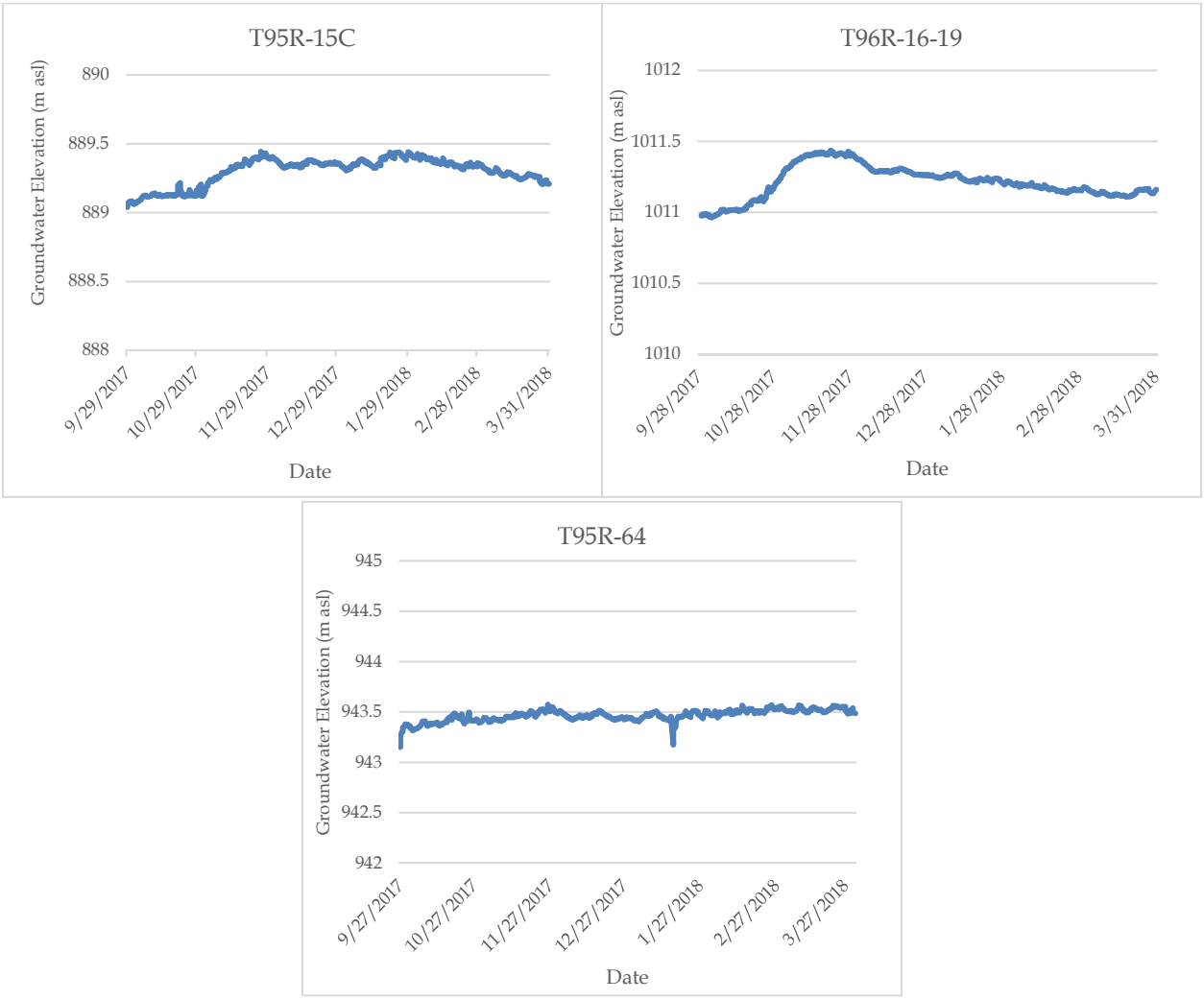
In general, continuous water level measurement data from two of the existing bedrock wells (T95R-15C and T96R-16-19) shows that the groundwater levels increased from the end of September 2017 to the end of November 2017 and then declined throughout the winter months (Figure 5.5-4). The continuous water level measurement data from the other bedrock well (T95R-64) shows a similar trend as the other two bedrock wells from September 2017 to November 2017 with a brief decline in water levels from November 2017 to January 2018 and then a slight increase until the end of March 2018 (Figure 5.5-4).

From September 28, 2017 to March 31, 2018, the three existing bedrock wells had groundwater level fluctuations ranging from 0.30 m (T95R-64) to 0.48 m (T96R-16-19). T95R-15C showed a groundwater level fluctuation of 0.37 m during this time period although it should be noted that due to the crack in this well near the top of casing, the actual groundwater level highs may not be accurate.

Overburden Wells

In general, continuous water level measurement data from overburden well TOB96-02-06 shows that the groundwater levels increased from the end of September 2017 to the end of January 2018 and then began to slightly decline until the end of March 2018. The groundwater elevations fluctuated 1.26 m at TOB96-02-06 during this time period with the highest groundwater elevation on January 18, 2018 (851.32 m asl) and the lowest groundwater elevation on October 23, 2017 (850.06 m asl; Figure 5.5-5).

Figure 5.5-4. Continuous Groundwater Level Measurements – Bedrock Wells (September 2017 to March 2018)

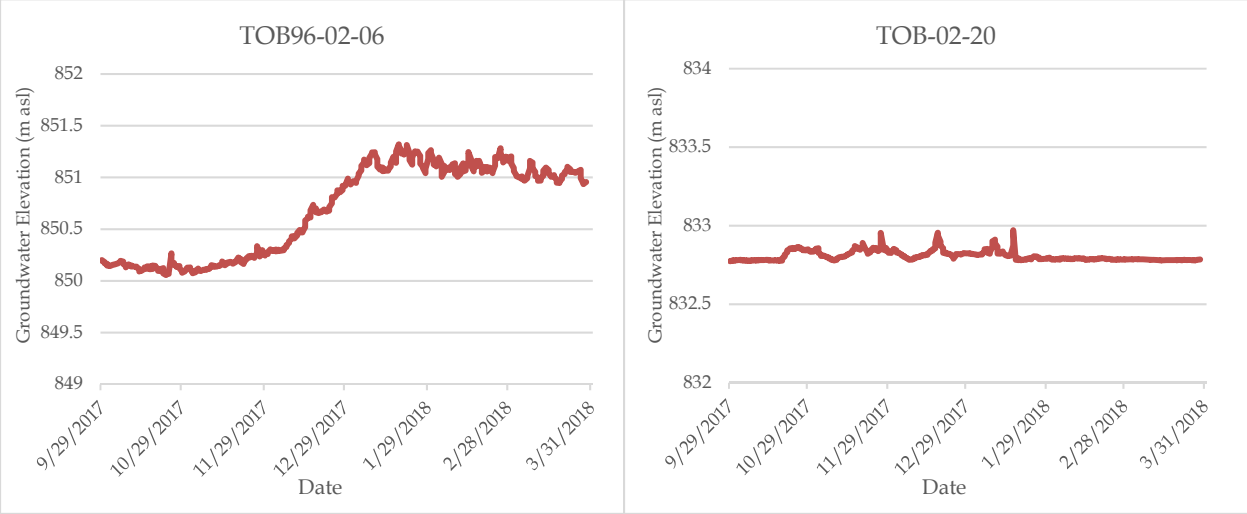


The continuous water level measurement data from overburden well TOB96-02-20 shows that the well was predominantly dry from the end of September 2017 to the end of March 2018 with the exception of brief groundwater inputs from mid October 2017 to mid-January 2018. The highest groundwater level at TOB96-02-20 was on January 16, 2018 with 0.20 m of standing water (Figure 5.5-5).

5.5.3 Groundwater Flow Direction and Horizontal/Vertical Hydraulic Gradients

Groundwater levels from one monitoring event (July 25 and 26, 2017) were used to map the general direction of groundwater flow within the bedrock and the overburden. The bedrock flow directions were derived from five of the historical wells screened in coal seam #1 (T95R-15C, T95R-40, T95R-64, T96R-16-19 and T96R-34-87) while the overburden flow directions are derived from three of the historical wells screened at similar depths in the surficial soils below the proposed waste dumps (TOB96-02-06, TOB96-11-04 and TOB96-01-05).

Figure 5.5-5. Continuous Groundwater Level Measurements – Overburden Wells (September 2017 to March 2018)



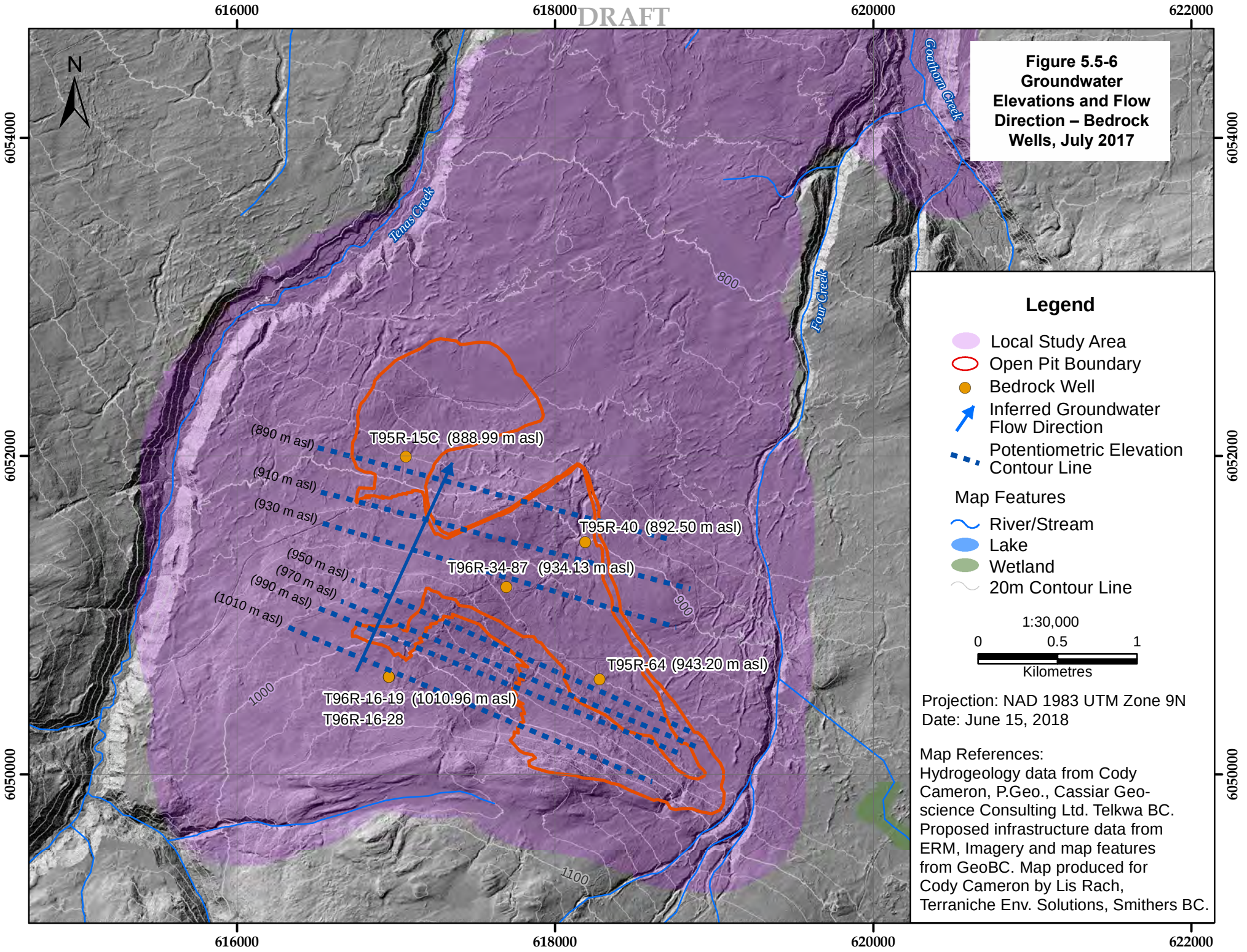
Bedrock Wells

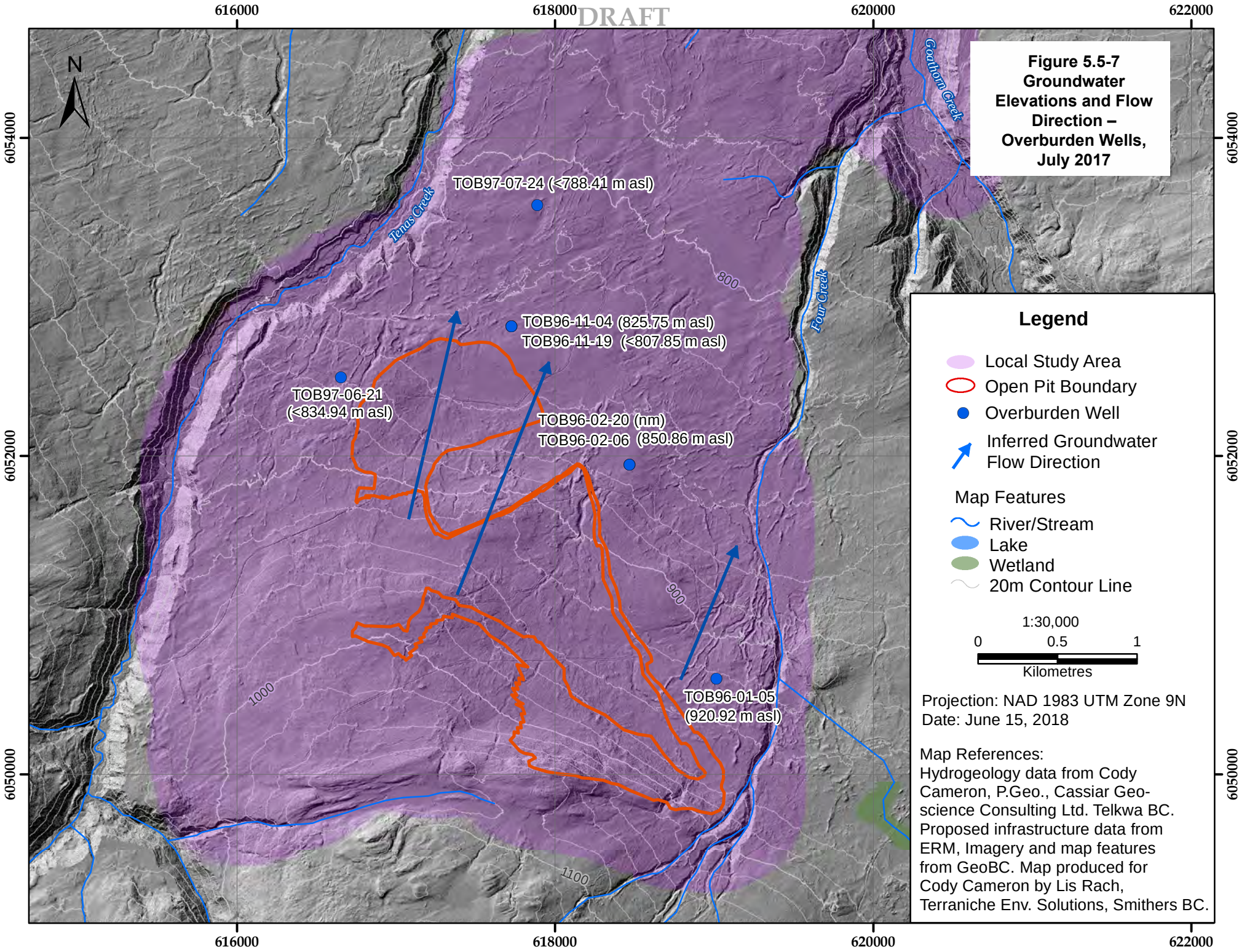
For the wells screened in coal seam #1 (bedrock), the groundwater elevations during late July 2017 ranged from 1010.96 m asl (T96R-16-19) to 888.99 m asl (T95R-15C) with the general direction of groundwater flow towards the north-northeast under a horizontal hydraulic gradient of approximately 0.09 (Figure 5.5-6). The groundwater flow direction and horizontal hydraulic gradient from July 2017 are very similar in comparison to the historical information from August 1997 (Piteau Engineering Ltd. 1998).

Nested monitoring wells T96R-16-19 and T96R-16-28 were used for determining the vertical hydraulic gradient between coal seam #1 and a deeper unnamed coal seam in the upper portions of the proposed pit. Based on four sets of monitoring data (July 2017, September 2017, January 2018 and March 2018), the deeper well (T96R-16-28) had a slightly higher groundwater elevation than the shallower well (T96R-16-19) for each measurement which infers a very minor upward vertical hydraulic gradient (0.004 to 0.007) at this location. With a vertical hydraulic gradient this low it is possible that the two coal seams may be hydraulically connected.

Overburden Wells

For the wells screened in the shallow overburden, the groundwater elevations during late July 2017 ranged from 920.92 m asl (TOB96-01-05) to 825.75 m asl (TOB96-11-04) with the general direction of groundwater flow towards the north (similar to the topography) under a horizontal hydraulic gradient of approximately 0.04 (Figure 5.5-7). The groundwater flow direction and horizontal hydraulic gradient from July 2017 are very similar in comparison to the historical information from August 1997 for these same wells (Piteau Engineering Ltd. 1998).


DRAFT
616000
618000
620000
622000
6054000
6052000
6050000
N
Figure 5.5-6
Groundwater Elevations and Flow Direction – Bedrock Wells, July 2017
Tenas Creek
Four Creek
Gootnorm Creek
800
900
1000
1100
(890 m asl)
(910 m asl)
(930 m asl)
(950 m asl)
(970 m asl)
(990 m asl)
(1010 m asl)
T95R-15C (888.99 m asl)
T95R-40 (892.50 m asl)
T96R-34-87 (934.13 m asl)
T95R-64 (943.20 m asl)
T96R-16-19 (1010.96 m asl)
T96R-16-28
Legend
Local Study Area
Open Pit Boundary
Bedrock Well
Inferred Groundwater Flow Direction
Potentiometric Elevation Contour Line
Map Features
River/Stream
Lake
Wetland
20m Contour Line
1:30,000
0
0.5
1
Kilometres
Projection: NAD 1983 UTM Zone 9N
Date: June 15, 2018
Map References:
Hydrogeology data from Cody Cameron, P.Geo., Cassiar Geo-science Consulting Ltd. Telkwa BC. Proposed infrastructure data from ERM, Imagery and map features from GeoBC. Map produced for Cody Cameron by Lis Rach, Terraniche Env. Solutions, Smithers BC.


616000
618000
620000
622000
6054000
6052000
6050000
N
Tenas Creek
Goathorn Creek
Four Creek
800
900
1000
1100
TOB97-07-24 (<788.41 m asl)
TOB96-11-04 (825.75 m asl)
TOB96-11-19 (<807.85 m asl)
TOB97-06-21
(<834.94 m asl)
TOB96-02-20 (nm)
TOB96-02-06 (850.86 m asl)
TOB96-01-05
(920.92 m asl)
Figure 5.5-7
Groundwater
Elevations and Flow
Direction –
Overburden Wells,
July 2017
Legend
Local Study Area
Open Pit Boundary
Overburden Well
Inferred Groundwater
Flow Direction
Map Features
River/Stream
Lake
Wetland
20m Contour Line
1:30,000
0
0.5
1
Kilometres
Projection: NAD 1983 UTM Zone 9N
Date: June 15, 2018
Map References:
Hydrogeology data from Cody
Cameron, P.Geo., Cassiar Geo-
science Consulting Ltd. Telkwa BC.
Proposed infrastructure data from
ERM, Imagery and map features
from GeoBC. Map produced for
Cody Cameron by Lis Rach,
Terraniche Env. Solutions, Smithers BC.

Nested monitoring well TOB96-02-06/20 will be used for determining the vertical hydraulic gradient between the upper and lower water-bearing overburden deposits. An accurate vertical hydraulic gradient has not yet been calculated as the deep well in this nested pair was dry during each of the monitoring events in 2017/2018. It is inferred that there is a strong downward hydraulic gradient between the upper and lower water-bearing overburden deposits at TOB96-02 as there has been recorded water levels in the deeper well during previous monitoring events in 1996 and 1997 (Piteau Engineering Ltd. 1998).

6. GROUNDWATER WATER QUALITY

The 2017 to 2018 baseline groundwater quality program was initiated in August 2017 with the sampling of a subset of historical monitoring wells in and around the Tenas Pit. An understanding of this information will contribute to engineering analysis and design of water management features; support development of water quality and water balance models, effects assessments, management plans, and closure planning; support permitting; and monitor changes in groundwater quality.

This chapter describes the baseline groundwater quality data collected to the end of January 2018 during which time two quarterly sampling events were conducted. The historical groundwater quality data from 1995 to 1997 and 2016 is also discussed in comparison to the current data. Additional groundwater sampling is scheduled for late March and mid to late June 2018 and will be incorporated into future versions of the baseline report.

The objective of the groundwater quality baseline is to:

- expand the existing baseline data in areas that could potentially be affected by the development of the s mine;
- capture the seasonal and annual variability in groundwater quality to assess the existing (baseline) groundwater quality before the proposed mine occurs; and
- identify any existing exceedances of relevant water quality guidelines.

6.1 STUDY AREA

The local study area (LSA), in regards to the hydrogeology baseline program, is currently being defined by SRK Consulting (SRK). Once the study area has been defined it will be incorporated into the final hydrogeology baseline report and shown on a figure.

6.2 REGULATORY AND POLICY FRAMEWORK

Groundwater quality is a valued component of the biological and physical environment and is protected under the Groundwater Protection Regulation of the British Columbia (BC) *Water Sustainability Act* (2016). Groundwater baseline studies for the Project were designed to meet the requirements of the *Mines Act* and *Environmental Management Act* Permits Joint Application Information Requirements (Joint AIR for MA/EMA Permits; BC MEM and BC MOE 2016).

6.3 EXISTING INFORMATION

Groundwater quality data collection in the area of the Tenas Pit occurred concurrently with exploration investigations during the mid 1990's. No data was collected from 1997 to 2016 and in 2016 only nine monitoring wells were inspected in the Tenas Pit area. Of these nine, three were suitable for sampling; three were damaged (blockage below surface or damaged casing), and three were dry or did not have enough water to allow sampling (Stantec undated). Table 6.3-1 below summarizes the groundwater quality data information for the Project as well as the baseline work conducted in 2017 to 2018.

Table 6.3-1. Groundwater Quality Data Information Table

Documents Reviewed	• *Baseline Data – Surface Water and Groundwater, Telkwa Coal Project.* Prepared by Piteau Engineering Ltd. Prepared for Manalta Coal Ltd. June 1994. • *Preliminary Assessment of Potential Groundwater Inflows and Dewatering Requirements in the Tenas Creek Region, Telkwa Coal Project.* Prepared by Piteau Engineering Ltd. Prepared for Manalta Coal Ltd. January 1996. • *Baseline Hydrogeological Investigations in the Tenas Pit, Waste Dumps, and Mine Pit 3, Telkwa Coal Project*. Prepared by Piteau Engineering Ltd. Prepared for Manalta Coal Ltd. January 1997. • *Baseline Hydrogeological Conditions in the Telkwa Coal Project Area – Volumes I and II*. Prepared by Piteau Engineering Ltd. Prepared for Manalta Coal Ltd. June 1998. • Stantec lab data, 2016. No report available.
General Remarks	The historical groundwater quality data is lacking in seasonal data as samples were only collected during the late summer/early fall of 1995, 1996, and 1997.
Sampling Required by *Joint AIR for Mines Act and Environmental Management Act Permits (*Joint AIR)	Collect eight samples quarterly (i.e., within each of the four seasons) over two years.
Existing Data	• 1995: Tenas Pit - Groundwater sampling. • 1996: Tenas Pit - Groundwater sampling. • 1997: Pit 3, Tenas Pit, Pit 7 & 8 - A 7h aquifer test in the northern portion of Pit 3. Domestic well survey in area extending three to five km north of Pit 3. Borehole drilling and installation of 27 piezometers in Reclamation Pit (test pit originally excavated in 1983). Groundwater sampling from nearby domestic wells and from all piezometers, where possible. • 2016: Tenas Pit – nine monitoring wells were inspected by Stantec in November 2016 within the Tenas area.
Existing Data Issues	• Prior to initiating the 2017 to 2018 baseline field work there was uncertainty on the usability of the existing monitoring wells. • Historical data (i.e., well locations) did not support the configuration of the Small Mine and new locations were recommended as part of the 2017 to 2018 baseline study. • General age of historical groundwater quality data.
Missing Data	• No baseline groundwater quality work was conducted between 1997 and 2016. • In 2016, only nine monitoring wells were inspected by Stantec in November 2016 within the Tenas area. Of these nine, three were suitable for sampling; three were damaged (blockage below surface or damaged casing), and three were dry or did not have enough water to allow sampling (Stantec undated).
2017–to 2018 Baseline Program	• 22 existing monitoring wells were inspected to determine usability. • Quarterly groundwater monitoring was initiated in August 2017. • Five new monitoring wells were installed in January 2018 to support the Small Mine configuration.
Key Issues	None
Other Comments	None

6.4 METHODOLOGY

The following sections describe the field methodologies for the August 2017 to January 2018 baseline groundwater quality monitoring program, during which time two quarterly groundwater sampling events were conducted. Additional sampling was conducted in March/April 2018 and the results will be incorporated into future versions of the baseline report. The final baseline report will also include the results from the summer and fall 2018 sampling events.

Five new monitoring wells were installed during the winter 2018 drilling program and will be incorporated into the hydrogeology baseline program going forward.

6.4.1 Groundwater Sampling

Groundwater sampling procedures were followed in general accordance, per the protocols in the British Columbia Field Sampling Manual (BC MOE 2013). Groundwater was purged from each well prior to sampling so that a representative sample could be obtained. Field parameters (pH, specific conductivity, temperature, dissolved oxygen, and oxidation-reduction potential) were measured in situ during the purging process using a YSI 556 multi-parameter reader and/or Oakton multi-parameter probes. Turbidity was measured during the January 2018 field program using a LaMotte 2020 turbidity reader. Purging was considered complete when the field parameters stabilized indicating natural groundwater.

Purging and sampling methods differed based on the depth and location of the well:

- Deep wells - Waterra foot valve with 5/8-inch outer diameter (OD) high density polyethylene (HDPE) tubing (inertial pump system) combined with a Hydrolift pump or a Waterra Mini-Monsoon submersible pump with ½-inch OD low density polyethylene (LDPE) tubing.
- Shallows bedrock wells – Waterra Mini-Monsoon submersible pump, with ½-inch OD LDPE tubing.
- Shallow overburden wells – 1.6-inch diameter, standard-weighted bailer or a Geotech peristaltic low-flow pump.

After purging was considered complete, groundwater samples were collected by pumping directly into the appropriate bottles supplied by ALS Environmental Laboratory (ALS). Groundwater samples were collected for the analysis of:

- general parameters (pH, specific conductivity, total dissolved solids, total suspended solids, turbidity, color, total hardness);
- major anions;
- alkalinity and acidity;
- nutrients (nitrate, nitrite, total nitrogen, ammonia, total and dissolved phosphorus);
- total and dissolved organic carbon;
- total metals (including total mercury);

- dissolved metals (including dissolved mercury); and
- polycyclic aromatic hydrocarbons (PAH) (will be collected during the March/April and June 2018 sampling events).

The listed analytes were chosen based on the requirements set out in the BC Ministry of Environment (BC MOE) document *Technical Guidance 6: Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (BC MOE 2016).

The parameters to be analyzed for dissolved constituents were filtered in the field and all of the required preservatives were added in the field after the sample was collected. Samples were stored in coolers with ice and/or frozen ice packs to minimize the potential for chemical alteration. Coolers were transported to the ALS in Burnaby, BC by Air Canada Cargo from Smithers, BC with the accompanying chain-of-custody forms.

The analytical results for the groundwater samples were compared to the BC MOE approved and working water quality guidelines - freshwater aquatic life (BC WQG - FAL).

6.4.2 Quality Assurance / Quality Control

The monitoring program design and quality assurance/quality control (QA/QC) standards were developed in conformance with *Technical Guidance 6: Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (BC MOE 2016).

During each sampling event, one duplicate sample was collected for QA/QC from the same location and time as the original sample, and using the same sampling procedures. Duplicate samples were submitted as 'blind' samples to provide a QA/QC check on the field sampling and laboratory precision. The relative percent difference (RPD) between the original sample and their respective duplicate sample was calculated. A duplicate sample with an RPD of less than 20% of the original sample is considered an accepted level of precision, if at least one of the values is greater than five times the detection limit. A travel blank and a field blank were also taken during each sampling event.

6.5 DATA SUMMARY

The following section summarizes the groundwater quality results for the monitoring wells sampled during the August and September 2017 (fall) sampling events and January 2018 (winter) sampling event. A total of nine existing monitoring wells (four bedrock wells and five overburden wells) have been included as part of the hydrogeology baseline groundwater quality program. Of these nine monitoring wells, two have been consistently dry (TOB96-02-20 and TOB96-11-19), which results in seven sampled wells up to January 2018.

Water quality samples were collected from three wells in August 2017, six wells in September 2017 and five wells in January 2018. Samples could not be collected from all the wells during each sampling event as some of the wells were dry or frozen (Table 6.5-1).

Table 6.5-1. Groundwater Quality Sampling Schedule (2017/2018)

Well ID	August 2017	September 2017	January 2018
T95R-64 (Bedrock)	x	x	x
T95R-40 (Bedrock)	x	x	x
T96R-34-87 (Bedrock)	x	x	frozen
T95R-15C (Bedrock)	ns	x	frozen
TOB96-02-06 (OVB)	ns	x	x
TOB96-02-20 (OVB)	ns	dry	dry
TOB96-11-04 (OVB)	ns	x	x
TOB96-11-19 (OVB)	ns	dry	dry
TOB96-01-05 (OVB)	ns	dry	x

Notes: x – sampled; ns – not sampled

The laboratory results for each of the wells sampled in 2017 and 2018 has been tabulated and compared to the BC WQG – FAL guidelines and is presented in Table 6A-1 in Appendix 6-A. The tabulated data for the 2017 and 2018 sampling events has been added to the historical tabulated data in Table 6A-2 in Appendix 6-A. The results of the duplicate sample analyses as well as the RPD for each laboratory parameter are provided in Table 6A-3 in Appendix 6-A.

Table 6A-4 in Appendix 6-A presents the field measurements that were collected at the end of the purging process at each monitoring well for the three events in 2017 to 2018. This table also includes the other parameters that were recorded during the purging process such as oxidation-reduction potential (ORP), dissolved oxygen, specific conductivity and temperature.

Laboratory certificate of analysis for the three monitoring events is provided in Appendix 6-B, copies of field notes and field data sheets are also provided in Appendix 6-C.

6.5.1 Physical Parameters

Turbidity and pH are the only two parameters that have guidelines under the BC WQG – FAL in terms of physical parameters. Other parameters such as conductivity and hardness are also briefly discussed in this section.

6.5.1.1 pH

The field pH value for the wells sampled during each monitoring event in 2017/2018 was within the range of 6.5 to 9.0, thereby not exceeding the BC WQG – FAL (Table 6A-1, Appendix 6-A). The pH value for the bedrock wells ranged from 7.11 to 8.20 and 7.20 to 7.70 for the overburden wells. The field pH measurements for the current baseline program were relatively similar to the field pH measurements for the historical baseline program (Table 6A-2, Appendix 6-A).

6.5.1.2 Turbidity

Turbidity value for the wells sampled during each monitoring event in 2017/2018 did not exceed the BC WQG – FAL value of 50 NTU (Nephelometric Turbidity Unit) with the exception of one sample

during the January 2018 sampling event (T95R-40 – 489 NTU) (Table 6A-1, Appendix 6-A). The turbidity values for the bedrock wells was generally below 5 NTU with the exception of T95R-40 in January 2018. The turbidity values for the overburden wells was generally below 21 NTU with the exception of the one sample from TOB96-01-05 (47.1 NTU) from January 2018. The turbidity values are generally expected to be slightly higher in the overburden wells in comparison to the bedrock wells due to the fine-grained nature of the glacially deposited material.

The turbidity values from the current (2017/2018) sampling events are considerably lower in comparison to the turbidity values from the 2016 sampling event and turbidity was not measured during any of the sampling events from 1995 to 1997 (Table 6A-2, Appendix 6-A).

6.5.1.3 Conductivity

Three of the bedrock wells (T95R-15C, T95R-64 and T96R-34-87) had conductivity values ranging from 1220 µS/cm to 1330 µS/cm for each of the sampling events in 2017/2018 while the other bedrock well (T95R-40) had conductivities ranging from 2600 µS/cm to 2790 µS/cm. The conductivity of the overburden wells ranged from 392 µS/cm (TOB96-01-05) to 695 µS/cm (TOB96-11-04) for each of the sampling events in 2017/2018 (Table 6A-1, Appendix 6-A).

When comparing seasonal (late summer/early fall) conductivity data between the current (2017/2018) and historic (1995 to 1997) water samples, the values are generally within 8% of each other (Table 6A-2, Appendix 6-A).

6.5.1.4 Hardness

The bedrock wells can generally be considered "soft" with hardness values ranging from 18.3 mg/L to 57.2 mg/L for three of the sampled wells (T95R-64, T96R-34-87, and T95R-15C) while T95R-40 can be considered slightly hard with a hardness value averaging 108 mg/L for the two times this well was sampled (Table 6A-1, Appendix 6-A).

The overburden wells can be considered "hard" with hardness values ranging from 154 mg/L (TOB96-01-05 (January 2018)) to 405 mg/L (TOB96-11-04 (September 2017); Table 6A-1, Appendix 6-A). The hardness values for these wells are similar between the current and historical sampling events (Table 6A-2, Appendix 6-A).

6.5.2 Anions and Nutrients

Fluoride was the only anion or nutrient which exceeded the BC WQG – FAL guidelines for the sampling events in 2017/2018. The fluoride exceedance criteria ranges from 0.4 mg/L to 2.0 mg/L and is hardness dependent. The criterion for fluoride was exceeded in three (T95R-64, T96R-34-87, and T95R-15C) of the four bedrock wells with concentrations ranging from 1.48 mg/L (T95R-64 (September 2017)) to 2.24 mg/L (T95R-15C (September 2017); Table 6A-1, Appendix 6-A).

For the sampling events in 2017/2018, concentrations of chloride, nitrate, nitrite, and sulfate were below detection limits in all the bedrock samples while chloride and nitrite were also below detection limits in the samples from the overburden wells. Two of the overburden wells had minor

concentrations of nitrate ranging from 0.014 mg/L (TOB96-02-06 (January 2018)) to 0.153 mg/L (TOB96-11-04 (January 2018)) while relatively low concentrations of sulfate were detected in each of the three overburden wells with values ranging from 4.27 mg/L (TOB96-01-05 (January 2018)) to 22.4 mg/L (TOB96-11-04 (January 2018); Table 6A-1, Appendix 6-A).

Ammonia was detected in the majority of the wells with substantially lower concentrations in the overburden wells in relation to the bedrock wells. The measured concentrations of ammonia in the two overburden wells with detectable levels was less than 0.021 mg/L while the measured concentrations of ammonia in the bedrock wells ranged from 0.246 mg/L (T95R-15C (September 2017)) to 0.695 mg/L (T95R-40 (January 2018); Table 6A-1, Appendix 6-A).

A trend analysis comparing the analytical data from 2017/2018 with the historical data will be tabulated for the major ions after a year's worth of field data is collected. The trend analysis will be presented in a later version of the hydrogeology baseline report.

6.5.3 Total and Dissolved Metals

The total and dissolved metals concentrations for each of the wells sampled in 2017/2018 were generally below the BC WQG – FAL approved guidelines with the exception of a few parameters.

Monitoring well T95R-40 had concentrations of total arsenic (0.006 mg/L), total copper (0.0349 mg/L), and total iron (8.39 mg/L) which exceeded the approved guidelines during the January 2018 sampling event. The applicable working guidelines were also exceeded at T95R-40 during the January 2018 sampling event for total barium (5.01 mg/L) and total chromium (0.0062 mg/L). When comparing the January 2018 total and dissolved metal concentrations for T95R-40 it is evident that the total metal concentrations are a by-product of the turbidity of the sample which was abnormally high (489 NTU). The dissolved concentrations of these same metals for the January 2018 sampling event are generally below detection limits (Table 6A-1, Appendix 6-A).

TOB96-11-04 was the only overburden well which met or had an exceedance of the BC WQG – FAL approved guidelines for a total and/or dissolved metal. The approved guideline for total iron (1.0 mg/L) was exceeded during the September 2017 event (2.39 mg/L) and was met during the January 2018 event (1.0 mg/L; Table 6A-1, Appendix 6-A).

The concentration of dissolved iron exceeded the BC WQG – FAL approved guidelines (0.35 mg/L) in three of the four bedrock wells (T95R-64, T95R-40, and T96R-34-87). Dissolved iron was exceeded during each of the three sampling events at T95R-64, during two sampling events (August and September 2017) at T96R-34-87 and during one event (September 2017) at T95R-40. In regards to these exceedances, the concentration of dissolved iron ranged from 0.386 mg/L at T95R-64 (January 2018) to 0.681 mg/L at T95R-40 (September 2017; Table 6A-1, Appendix 6-A).

A trend analysis comparing the analytical data from 2017/2018 with the historical data will be tabulated for specific trace metals after a year's worth of field data is collected. The trend analysis will be presented in a later version of the hydrogeology baseline report.

6.5.4 Total and Dissolved Organic Carbon

Currently there are no BC WQG – FAL approved/working guidelines for total or dissolved organic carbon although the data is briefly discussed as these analytes were requirements set out in the BC MOE document *Technical Guidance 6: Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (BC MOE 2016).

Total and dissolved organic carbon were below detection limits in two (T95R-64 and T96R-34-87) of the four bedrock wells for each of the sampling events in 2017/2018. For the other two bedrock wells (T95R-40 and T95R-15C), the concentration of total and/or dissolved organic carbon was generally below 1.20 mg/L with the exception of the January 2018 sampling event at T95R-40 where the total organic carbon concentration was 64.8 mg/L. As with the total metal exceedances reported at this well during the January 2018 sampling event, the abnormally high total organic carbon value is attributed to the turbidity encountered in this sample. The dissolved organic carbon concentration at T95R-40 during this same sampling event was 1.11 mg/L (Table 6A-1, Appendix 6-A).

The total organic carbon concentrations for the overburden wells ranged from 1.18 mg/L (TOB96-02-06 (January 2018) to 11.6 mg/L (TOB96-01-05 (January 2018)) while the dissolved organic concentrations ranged from 1.36 mg/L to 10.4 mg/L for the same wells during the January 2018 event (Table 6A-1, Appendix 6-A).

6.5.5 Quality Assurance / Quality Control

One duplicate sample was collected during each of the sampling events in August and September 2017 and January 2018. The duplicate sample was collected from T96R-34-87 during the August 2017 event, T95R-15C during the September 2017 event and T95R-40 during the January 2018 event.

The RPD values that were calculated for the three sampling events were all below 20% with the majority being below 10%, therefore these duplicate samples are considered to be acceptable (Table 6A-3, Appendix 6-A). The RPD was only calculated when the results for a given parameter were greater than five times the detection limit.

Trip and field blanks were also analyzed during each of the three sampling events in 2017/2018. All of the analyzed parameters were below detection limits indicating that the samples were not contaminated while in the field or during transport to the laboratory. The trip and field blank results are presented within the ALS certificate of analysis in Appendix 6-C.

The results of the laboratory's internal QA/QC testing are provided in the laboratory certificates of analysis found in Appendix 6-C. In general, the lab reported that percent recoveries for matrix spikes, spiked blanks, and method blanks were within acceptable ranges or were less than detection limits.

6.5.6 Piper Plot and Groundwater Types

A trilinear diagram (Piper diagram) using percentages of total milliequivalents per liter of the major cations (calcium, magnesium, and sodium + potassium) and major anions (bicarbonate, sulfate, and chloride) was used to classify the groundwater from the seven sample locations (Figure 6.5-1).

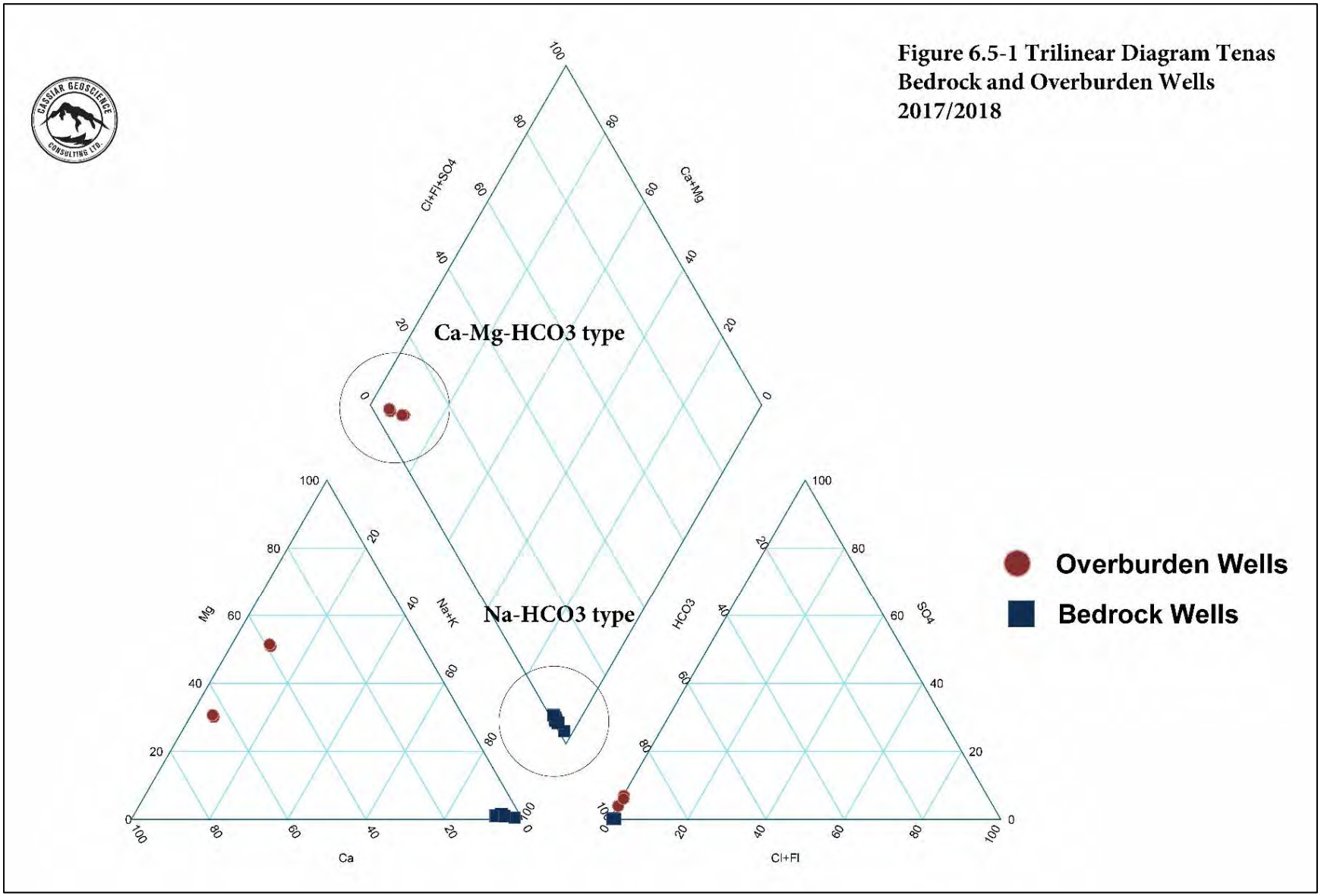
Overall, there are distinct hydrochemical differences between the bedrock and overburden wells. The groundwater from the overburden wells can be classified as a calcium-magnesium-bicarbonate (Ca-Mg-HCO_3) type while the groundwater from the bedrock wells can be classified as sodium-bicarbonate (Na-HCO_3) water type. In general, a (Ca-Mg-HCO_3 water type is indicative of recently recharged groundwater while a Na-HCO_3 water type is representative of older groundwater with a longer residence time.

The dominant cation for the overburden wells is calcium and magnesium with equivalent percentages ranging from 39 to 65% for calcium and 32 to 52% for magnesium. The dominant cation for the bedrock wells is sodium with over 90% of the equivalent percentage.

The dominant anion for the overburden and bedrock wells is bicarbonate (HCO_3) with equivalent percentages of 90 to 95% and 100%, respectively. The overburden wells have very minor amounts of sulfate with equivalent percentages ranging from 0 to 10%.

The distinct water types between the bedrock and overburden wells is consistent with the historical hydrochemical analysis conducted by Piteau for the same wells (Piteau Engineering Ltd. 1998).

Figure 6.5-1. Trilinear Diagram Tenas Bedrock and Overburden Wells 2017/2018



7. HYDROLOGY

This chapter presents the methods and results of the surface water hydrology baseline monitoring program. The purpose of the 2017 to 2018 hydrometric program was to collect Project specific baseline surface water data. An understanding of the hydrologic characteristics within and downstream of the Project area will contribute to engineering analysis and the design of water management features; support future development of water balance and water quality models, effects assessments, management plans, and closure planning; support permitting; support fisheries monitoring programs; and monitor changes in local hydrology.

The detailed objectives of the 2017 to 2018 program were to:

- establish three hydrometric monitoring stations within and near of the Project area;
- develop the stage-discharge rating curves for each of the hydrometric monitoring stations;
- calculate flow discharge estimates and generate annual hydrographs for the hydrometric monitoring stations; and
- generate hydrologic indices to characterize the hydrologic regime of the monitored streams.

7.1 STUDY AREA

The Project is located within the Telkwa River watershed, which is a tributary of the Bulkley River and ultimately the Skeena River, which discharges into the Pacific Ocean approximately 180 km west of the Project. Two main watersheds that contain sites of potential Project infrastructure are Tenas Creek and Goathorn Creek (Figure 1.2-2). The Project is bound by the Goathorn Creek to the east, and Tenas Creek to the north and west. Downstream of the Project, Tenas Creek joins Goathorn Creek, which in turn flows into the Telkwa River. The Telkwa River flows northwest approximately six (6) km from the confluence with Goathorn creek before discharging into the Bulkley River.

7.1.1 Hydrologic Setting

The Project is located in the transition zone between the wetter Coast Mountains and the drier Interior Plateau. The streamflow regime of the area is nival (snowmelt) with the majority of runoff occurring in the spring and early summer due to the melting winter snowpack. Following the snowmelt-driven high flow, there is typically a period of low flow throughout the late summer and early fall when inputs from snow have diminished. Throughout the fall period, short duration high intensity rain events may produce substantial peak events. Annual low flows occur during the winter when air temperatures remain below freezing and snow falls to be stored in the snowpack until spring. During the winter low flow period, most streams retain baseflow from groundwater discharge. Some streams in the region have glacier inputs, but this is less prominent in the project area, as most of the substantial glacier coverage is west of the Project.

7.2 REGULATORY AND POLICY FRAMEWORK

Surface water is a critical component of the biological and physical environment and is protected under the British Columbia (BC) *Water Sustainability Act* (2014) and the *Canada Water Act* (1985). Surface water baseline studies for the Project were designed to meet the *Joint Application Information Requirements for Mines Act and Environmental Management Act Permits* (Joint AIR for MA/EMA Permits; BC MEM and BC MOE 2016).

7.3 EXISTING INFORMATION

Readily available sources of existing hydrology data were reviewed, and a summary of the review is provided in Table 7.3-1.

Table 7.3-1. Hydrology Data Information Table

Documents Reviewed	• Extracted from the Environment and Climate Change Canada Real-time Hydrometric Data web site (https://wateroffice.ec.gc.ca/mainmenu/real_time_data_index_e.html) ▪ Telkwa River Below Tsai Creek (08EE020) ▪ Bulkley River at Quick (08EE0004) ▪ Bulkey River Near Smithers (08EE0005) • Extracted from the Environment and Climate Change Canada Historical Hydrometric Data web site (https://wateroffice.ec.gc.ca/mainmenu/historical_data_index_e.html) ▪ Goathorn Creek Near Telkwa (08EE008) • Extracted from the BC Environmental Assessment Office Project web site (https://www.projects.eao.gov.bc.ca/project) ▪ Telkwa Coal – Type: Mine ▪ Final Project Report Specifications for Manalta Coal Ltd.'s Proposed Telkwa Coal Project. Submitted by the Telkwa Coal Project Committee. August 1997. ▪ Telkwa Coal Project: Application for a Project Approval Certificate – Volumes I-V. Submitted by Manalta Coal Ltd. January 31, 1997. ▪ Davidson – Type: Mine ▪ Davidson Project: Application for Environmental Assessment Certificate. Submitted by Blue Pearl Mining Inc. August 2008. ▪ Davidson Project Meteorology and Hydrology Baseline report 2006-2008. Submitted by Blue Pearl Mining Inc. May 2009. • Extracted from historical records provided by the Client ▪ Piteau Engineering Ltd. (August 1998). *Water Management for the Telkwa Coal Project*. Manalta Coal Ltd. ▪ R. Nijman. (April 1986). *Ambient Water Quality Objectives for the Bulkley River Basin: Overview Report.* B.C. Ministry of Environment. ▪ R. Nijman. (April 1986). *Ambient Water Quality Objectives for the Bulkley River Basin: Technical Appendix*. B.C. Ministry of Environment. ▪ AGRA Earth & Environmental Ltd. (February 1999). *Telkwa Coal Mine Surface Water Monitoring Program 1998.* AGRA Earth & Environmental Ltd. ▪ AGRA Earth & Environmental Ltd. (March 2000). *Telkwa Coal Project 1999 Baseline Surface Flow and Water Quality Final Data Report.* AGRA Earth & Environmental Ltd.

(continued)

Table 7.3-1. Hydrology Data Information Table (continued)

General Remarks	Overall, the amounts of existing relevant data are small in extent but the quality of the data that is available for the general project region is good. Some of the regional daily discharge data records from the Water Survey of Canada date back to 1915 while daily water level data becomes available as of 2011. A detailed and high quality analysis was performed for the Davidson project, located in the greater watershed of the Tenas Project area, and a similar analysis is available for the original Telkwa Mine Project in the 1990s.
Sampling Required by *Joint AIR for Mines Act and Environmental Management Act Permits (*Joint AIR for MA/EMA Permits)	• A recommended minimum two year surface water hydrology study of the mine property. • Identify relevant existing data and whether they represent un-impacted baselines or are influenced by development. • Provide detailed analysis of key drainages within the project area and establish continuous hydrometric data collection of drainages potentially affected by effluent discharge, water diversions, and/ or seepage from waste rock and/or tailings. • Provide detailed maps of hydrometric stations relevant to effluent discharge locations, seepages, points of diversion and water quality or other aquatic monitoring locations. • Include a database of manual low-flow streamflow measurement and document hydrometric station installation, sampling and QA/QC procedures. • Determine critical low-flow metrics for waters important to aquatic life, drinking water, wildlife, irrigation and other water users. • Develop a quantitative water balance model for the study area including worst case scenarios, upper and lower bound estimates, expected groundwater recharge and justifications for inclusion an exclusion of all components and their estimation methods. • Identify spatial and/or temporal gaps in the database.
Existing Data	**Telkwa Coal Project: Application for a Project Approval Certificate (1997)** • Overview of local hydrological features and characteristics within the project boundaries and the greater Skeena Watershed such as watershed area, tributaries, and sediment loading. Provides a summary of information on three Water Survey of Canada hydrometric stations active at the time of reporting with data dating back to 1930. **Final Project Report Specifications for Manalta Coal Ltd.'s Proposed Telkwa Coal Project (1997)** • Details regarding Manalta's permits regarding hydrology and water management, including a requirement for the development of flow estimates and water balance modelling. **Goathorn Creek Near Telkwa - WSC Station ID 08EE008 (1960-2016)** • Daily discharge data 1960-2014; Daily water level data 2011-2014. **Telkwa River Below Tsai Creek - WSC Station ID 08EE020 (1975-Present)** • Daily discharge data 1975 to present; Daily water level 2011 to present. **Bulkley River at Quick - WSC Station ID 08EE004 (1930-Present)** • Daily discharge data 1930 to present; Daily water level 2011 to present. Sporadic seasonal discharge measurements prior to 1957. **Bulkley River Near Smithers - WSC Station ID 08EE0005 (1915-Present)** • Daily discharge data 1915 to present; Daily water level 2011 to present. Station not operational between the years 1916-1945, 1952-1970, and 1972-2007.

(continued)

Table 7.3-1. Hydrology Data Information Table (continued)

Existing Data *(cont'd)*	**Davidson Project: Application for Environmental Assessment Certificate (2008)** • Detailed description of hydrological setting, local field data, regional analysis, and summary of the site's key hydrological parameters. **Davidson Project Meteorology and Hydrology Baseline Report 2006-2008 (2006-2008)** • Hydrological baseline study of WSC hydrometric stations Bulkley River at Quick and Simpson Creek, as well as six hydrometric stations established for the Davidson Project. **Ambient Water Quality Objectives for the Bulkley River Basin – Overview Report and Technical Appendix (1986)** • Very high level overview of Bulkley River and its tributaries with one-in-ten-year 7-day flow estimates for hydrometric stations near Houston, at Quick and at Smithers. **Water Management For the Telkwa Coal Project (1998)** • Mean annual, maximum mean monthly, and minimum mean monthly flow rates for the WSC station #08EE020 for the 1975-1995 period are summarized. **Telkwa Coal Mine Surface Water Monitoring Program 1998 (1999)** • A report on the streamflow monitoring for the baseline hydrological analysis completed for the Telkwa Coal Project. It encompasses monitoring data from eleven monitoring locations deemed to have the potential to be impacted the mine's activities, including three WSC stations: 08EE020, 08EE008, and 08EE004. **Telkwa Coal Project 1999 Baseline Surface and Water Quality Final Data Report (2000)** • Baseline hydrology and water quality report for five hydrometric stations located on Tenas Creek, Four Creek, Hubert Creek, and Goathorn Creek. Consists of a compilation of memos sent to Luscar Ltd. As updates on the surface water monitoring program.
Existing Data Issues	There are existing hydrology data available for the region including streams within the greater Bulkley River watershed. However, detailed site specific data for potentially affected streams are lacking. The Water Survey of Canada provides historical data for streams in the Bulkey, Telkwa and Goathorn watersheds which includes some that are relatively close to the Project, but they are not site specific. Additionally, not all of these stations are active, and no analysis has been completed on raw hydrometric data. The detailed analysis undertaken by the proposed Davidson project was specific to the proposed Davidson site, limiting its relevancy to the Tenas Project. While there are some hydrometric analysis data for the original Telkwa Mine Project it is now almost 20 years old.
Missing Data	There are no current site specific data available for the Project, including three locations within the Project area where hydrometric stations were installed in May 2017.
2017–March 2018 Baseline Program	Historically, there are no site specific hydrometric data available for the Project. The baseline program addresses this gap with the installation of three hydrometric stations. These stations will be used to provide seasonal water level and discharge hydrometric data from May-October as of 2017. Additionally, monthly winter low flow discharge measurements provide data during the periods (winter) when the stations are inactive (ice cover prevents continuous monitoring).

(continued)

Table 7.3-1. Hydrology Data Information Table (completed)

Key Issues	Without the collection of site specific data for the mine property it will not be possible to meet the minimum requirements of the Joint AIR permit application.
Other Comments	N/A

The Water Survey of Canada maintains, and has maintained in the past, numerous hydrometric stations in the region surrounding the Project. The Environmental Assessment Office of British Columbia also provides public access to a number of documents from previous, mining projects within the region, some of which include varying extents of hydrometric data and analysis pertaining to their respective sites. The Client also supplied various historical documents pertaining to the hydrology of the Project and the surrounding watershed. These data files and documents were reviewed to ascertain their relevance to the Project and mine site.

Historical regional flow data are available from the WSC from a number of stations as far back as 1915. While there have been various studies of regional hydrology, they generally focussed on major hydrological features such as regional watersheds and major tributaries. A small number of more in-depth baseline studies have been completed for historical mining project proposals in the area, with those pertaining to the Telkwa Coal Mine being the most relevant to the Project. The AGRA Earth & Environmental (1998) report is the most detailed site specific report, although the monitoring program experienced various instrumental problems which limited its analysis of the local hydrology to one open-water season (1998) and one short low-flow period (1997).

7.4 METHODOLOGY

7.4.1 Overview

This section describes the monitoring network and methodology used in the 2017 to 2018 baseline hydrometric monitoring program. The monitoring program design and quality assurance/quality control (QA/QC) standards were developed in conformance with the *British Columbia Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (BC MOE 2016).

7.4.2 Hydrometric Monitoring Network

A network of three automated hydrometric monitoring stations was established and operated in and around the Project area as a part of the 2017 to 2018 baseline monitoring program. In addition to Project specific hydrometric monitoring stations, four regional Water Survey Canada (WSC) hydrometric monitoring stations were identified as providing important regional data. Details about the hydrometric monitoring stations are provided in Table 7.4-1 and Project monitoring locations are shown in Figure 7.4-1.

Table 7.4-1. Tenas Project Hydrometric Monitoring Stations

Waterbody	Station	UTM Location[1]		Area (km²)	Median Elevation (masl)	Glacier Coverage (%)	Period of Operation[2]
		Easting (m)	Northing (m)				
Project Stations							
Tenas Creek	Tenas-Hydro	616914	6053490	47.4	1292	0	May 18 - Aug 16
Goathorn Creek	Goathorn-Hydro	621100	6057441	121.6	1164	0.5	May 17 - Oct 25
Telkwa River	Telkwa-Hydro	617964	6057860	966.9	1222	1.3	May 16 - Nov 17
Regional Stations							
Goathorn Creek	Goathorn Creek Near Telkwa (08EE008)	621106	6057277	125	N/A	N/A	1960 - 2016
Telkwa River	Telkwa River Below Tsai Creek (08EE020)	597101	6052062	367	N/A	N/A	1975 - Present
Bulkley River	Bulkley River at Quick (08EE0004)	635614	6054348	7340	N/A	N/A	1930 - Present
Bulkley River	Bulkley River Near Smithers (08EE0005)	620101	6070765	8940	N/A	N/A	1915 - Present

Notes:
1.UTM Zone 9U; NAD83
2. http://www.hach.com/fh950-portable-velocity-meter-with-20-cable/product?id=10379735623
For regional stations the periods of operation do not represent the total years of data collected as stations have not all operated continuously
N/A = Information not available

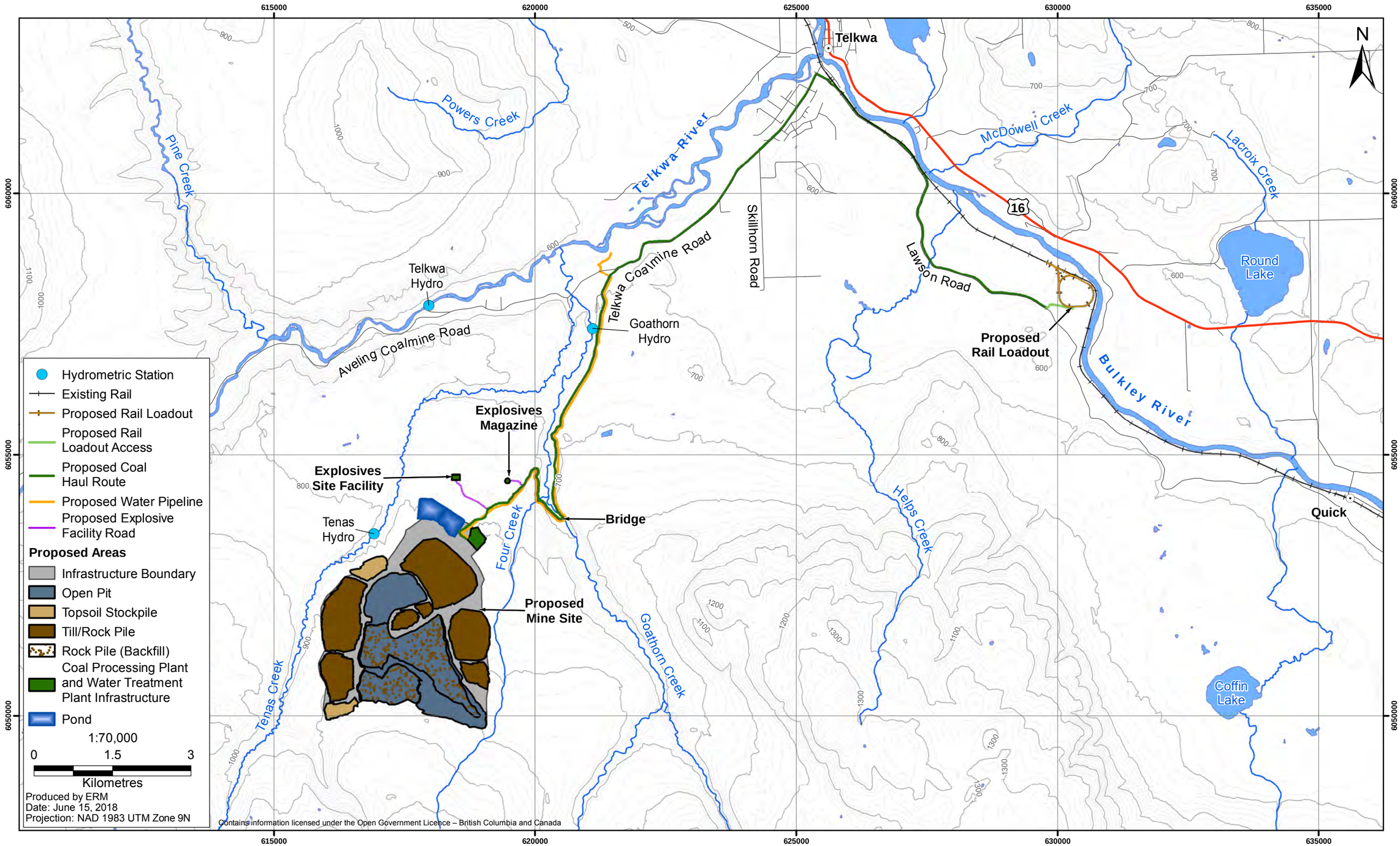
7.4.3 Hydrometric Station Setup

Across the monitoring network, hydrometric monitoring stations consisted of a PS98i® 0-5 PSI vented pressure transducer GDL® data logger (Instrumentation Northwest Inc.).

The transducers and cabling were inserted into a flexible aluminum conduit with one end of the conduit secured in a 1.5 m long aluminum tube. The aluminum tube was open at both ends and a series of small diameter holes were drilled along its length to allow water to pass in and out of the pipe freely. The aluminum tube was then placed into the water and secured to the bank. The data loggers were housed in steel waterproof enclosures attached to trees on the adjacent channel bank above the expected high water level. Specific details for each station setup are provided in Sections 7.4.3.1 through 7.4.3.3 below.

At each station, pressure transducers were installed as deep in the channel as possible to allow for continuous monitoring of water levels at all ranges of flows. Pressure transducers continuously recorded water level at a ten-minute interval.

Figure 7.4-1
Tenas Project Hydrometric Monitoring Stations



7.4.3.1 Tenas-Hydro

Hydrometric monitoring station Tenas-Hydro was established on Tenas Creek downstream of the proposed pit (Figure 7.4-1; Plate 7.4-1). The station was co-located with water quality site WQS02. The pressure transducer and cabling were inserted into a flexible aluminum conduit with one end of the conduit secured in an aluminum pipe. The aluminum pipe was then placed into the water and fixed to re-bar that was pounded into the streambed and bank. The data logger was housed in a steel waterproof enclosure and secured to a mature tree well above the high water mark.

Plate 7.4-1. Hydrometric monitoring station Tenas-Hydro. May 18, 2017.

7.4.3.2 Goathorn-Hydro

Hydrometric monitoring station Goathorn-Hydro was established on Goathorn Creek downstream of the proposed pit (Figure 7.4-1; Plate 7.4-2). The station was co-located with water quality site WQS06, and is in close proximity to a WSC hydrometric station (08EE008), which has data available from 1960 to the end of 2016. The pressure transducer and cabling were inserted into a flexible aluminum conduit with one end of the conduit secured in an aluminum pipe. The aluminum pipe was then placed into the water and secured to bedrock along the bank using threaded anchor rods. The rods were drilled into the bedrock and anchored in place with quick setting epoxy. The data logger was housed in a steel waterproof enclosure and secured to a mature tree well above the high water mark.

Plate 7.4-2. Hydrometric monitoring station Goathorn-Hydro. May 17, 2017.

7.4.3.3 Telkwa-Hydro

Hydrometric monitoring station Telkwa-Hydro was established on the Telkwa River upstream of the confluence with Goathorn Creek (Figure 7.4-1; Plate 7.4-3). The station was co-located with water quality site WQS08. The pressure transducer and cabling were inserted into a flexible aluminum conduit with one end of the conduit secured in an aluminum pipe. The aluminum pipe was then placed into the water and secured to a large boulder along the bank using threaded anchor rods. The rods were drilled into the boulder and anchored in place with quick setting epoxy. The data logger was housed in a steel waterproof enclosure and secured to a mature tree well above the high water mark.

7.4.4 Hydrometric Station Surveys

Pressure transducers can be subject to electronic drift and sensor fouling, which can complicate the development of rating curves if controlled elevations are not used. To establish and maintain water level elevation, all water level (stage) data are referenced to the height of the water surface above an arbitrary (gauge) datum. The water surface is surveyed relative to this datum during station visits, allowing the continuous data to be corrected to gauge height, and to adjust for fouling or sensor drift. The gauge datum is a critical concept in hydrometric monitoring, and is established using a series of physically installed bench marks at each monitoring station. Concrete expansion bolts secured into bedrock and/or large stable boulders near the station, or stainless steel spikes pounded into the base of large healthy trees, are frequently used as bench marks. Consistency of the gauge datum throughout the monitoring program is assured through correct installation of bench marks and completion of stations surveys.

Plate 7.4-3. Hydrometric Monitoring Station Telkwa-Hydro. May 16, 2017.

Assigning bench mark elevations, and thus the gauge datum, can be done in a variety of ways, but consistency throughout data collection is critical. Three bench marks were installed at each station (Table 7.4-2) above the maximum expected water level. One bench mark at each station was assigned to be the primary reference point, and given an arbitrary local elevation of 100.000 m. All bench marks and recorded water levels were referenced to the primary bench mark. It is important to note that although primary bench marks at each station are given an elevation of 100.000 m, the datum assigned to each station is local, and not comparable to other stations, which have independent local datum elevations assigned.

Table 7.4-2. Hydrometric Monitoring Station Bench Marks

Station	Bench Mark	Elevation[1] (m)	Bench Mark Information
Tenas-Hydro	78	100.000	Spike in the base of tree ~7 m downstream of station
	79	97.972	Spike in the base of tree ~4 m downstream of station
	80	99.904	Spike in the base of tree ~2 m downstream of station
Goathorn-Hydro	72	100.000	Concrete expansion bolt in bedrock ~2 m downstream of station
	73	100.376	Concrete expansion bolt in bedrock in line with station
	74	100.247	Concrete expansion bolt in bedrock ~1 m upstream of station
Telkwa-Hydro	69	100.000	Spike in the base of tree ~5 m downstream of station
	70	100.068	Spike in the base of tree ~1 m upstream of station
	71	100.416	Spike in the base of tree ~3 m upstream of station

Note: [1] Elevation is height (m) relative to the gauge datum

7.4.5 Discharge Measurements

Manual flow measurements were completed during each site visit during the 2017 to 2018 monitoring period to obtain a range of measured discharges under varying conditions. Manual flow measurements were carried out at each site using one of two methods, depending on flow conditions and stream morphology. When stream channels could be safely waded, a hand-held current velocity meter was used to complete velocity-area measurements. When the stream channels were too deep or swift to wade safely, tracer dilution was used to measure discharge. In all cases, the adopted methods followed the provincial standard operating procedures for British Columbia (RISC 2009).

7.4.5.1 Velocity-Area Measurements

The location of the metered section at each site was determined based on channel geometry and flow conditions at the time of measurement. Generally, the stream was measured along a straight reach near the monitoring station where the bed and flow conditions were relatively uniform. Areas with highly turbulent flow and/or immovable rocks were avoided where feasible. Current velocities were measured using a Hach FH950™ handheld electromagnetic current meter (accuracies of ± 2% of reading and ± 0.015 m/s). A fixed sampling interval of 40 seconds was selected for each velocity measurement, during which an average velocity was determined.

To determine the total stream discharge during each station visit, measurements of water current velocity, depth of flow, and distance across the channel were obtained (Plate 7.4-4). Typically, a minimum of 20 current velocity measurements were taken across the width of a channel, with the aim of having each vertical or observation interval account for less than 10% of the total discharge (RISC 2009). This method assumes that the velocity measured at each vertical represents the mean velocity in a segment. During the velocity measurements, if the observed water depth was less than 0.75 m, the water velocities were measured at 60% of the water depth, measured from the water surface. The measurement at 60% of the water depth is generally accepted as representing the mean velocity of the vertical water column (Herschy 2009). If water depth was greater than 0.75 m the water velocities were measured at 20% and 80% of the water depth, with the average of the two readings taken to represent the mean velocity for the vertical water column. In all cases, where feasible, the methodologies employed adhered to the *British Columbia Manual of Standard Operating Procedures for Hydrometric Surveys* (RISC 2009) and Water Survey of Canada (WSC) operating procedures (Terzi 1981).

7.4.5.2 Tracer Dilution Measurements

Tracer dilution is a simple and reliable method of calculating discharge in channels that are sufficiently steep and turbulent (Hudson and Fraser 2002; Moore 2004). This method can yield results that are comparable to the conventional velocity-area procedure when used appropriately. In settings where high gradient and turbulent flow conditions exist along mountain streams, it has been reported that tracer dilution procedures produce better results than the velocity-area method (Elder and Kattelmann 1990; Spence and McPhie 1997).

Flow measurements conducted using tracer dilution followed the standard slug injection methodologies (Moore 2004; Hudson and Fraser 2005). This method consists of injecting a known mass of dry salt (sodium chloride, NaCl) into the stream at an upstream release point. For a given mass of salt injected, greater stream discharges will result in greater salt dilution and lower concentrations measured at the downstream site (i.e., the higher the flow, the greater the dilution).

Plate 7.4-4. Velocity-area discharge measurement on Goathorn Creek. May 17, 2017.

The concentration of salt was measured as specific conductivity. The specific conductivity of the stream water was measured using WTW 3410 conductivity probes (MultiLine® Intelligent Digital Systems). The reported accuracies were 0.5% of conductivity reading and +/-0.15ºC of the temperature reading. Measurement of the salt slug was conducted sufficiently far downstream of the injection (approximately 4 km) to ensure complete lateral mixing of the salt slug.

For each measurement, two conductivity probes were used. Probes were placed at two locations approximately 450 m apart and separated by a bend and sections of converging and diverging flow to confirm complete mixing was achieved. Specific conductivity measured in the field was related to the concentration of salt within the mixing reach through the use of a calibrated coefficient. The average of the measurements obtained from each probe was taken to be the average discharge. The deviation of the measured value, from the average value, provides the range of error for the calculated flow.

7.4.6 Rating Curve Development

To provide a continuous record of the discharge at hydrometric monitoring sites, empirical relationships between measured stage and discharge (i.e., rating curves) were developed (ISO 2010). Once the rating curve is established for a monitoring site, continuous stage data can be converted into continuous discharge data by applying the rating curve equation to the recorded stage values. Data are then presented as discharge hydrographs. The quality of a rating curve, and therefore the quality of the discharge hydrograph, depends on the number, accuracy, and distribution of the rating points used to generate the curve, as well as the hydraulic characteristics of the monitoring location. Although a rating curve can theoretically be developed with as few as two points, to properly develop a rating curve, a minimum of ten (RISC 2009) or 15 (ISO 2010) stage and discharge measurements,

well distributed through the range of flows, is recommended. A minimum of five discharge measurements per year is recommended to meet "Grade A" standards for discharge data based on the *Manual of British Columbia Hydrometric Standards* (RISC 2009). Each additional stage-discharge measurement at varying flow conditions increases the range and robustness of the rating curve. Discharge measurements at the higher end of the discharge range are especially important as they help define the upper end of the rating curve. These measurements are important since high discharges often require extrapolation beyond the range of the field data used to generate the rating curve. The rating curve can also change from low flow periods to high flow periods due to seasonal influences, such as vegetation (Herschy 2009).

Rating curves are hydraulic functions expressed as a parabolic equation of the form:

$$Q = C\,(h - a)^b \quad \textbf{(1)}$$

where Q is the discharge (m^3/s), C and b are regression coefficients, h is the stage (water level; m), and a is the stage at zero flow (datum correction; m).

The rating curves were developed using Aquarius™ Time Series Hydrologic Software (Aquatics Informatics Inc.). The software uses standard methods outlined by the United States Geological Survey and the International Organization for Standardization (Kennedy 1984, ISO 2010). The Aquarius™ interface allows the user to draw the rating curve in a logarithmic plot. Equation (1) is logarithmically transformed to:

$$Log\ Q = log\ C + b\ log\ (h - a) \quad \textbf{(2)}$$

which is in the form of the equation of a straight line. The hydrometric technician can then determine characteristics that are evident in logarithmic plots and relate these to the type of hydraulic control, the stream cross section, cross-section shape changes, and shifting control patterns (Sauer 2002). Root Mean Square (RMS) error, used by the Aquarius™ software as an overall measure of error of the stage-discharge relationship, is provided as an indicator of uncertainty. RMS error is a statistical parameter that describes how well the values predicted by the stage-discharge relationship fit or represent the observed data. The departure from true values computed by this statistic combines both potential bias and lack of precision in the field data.

Rating curve uncertainty is critical in interpreting discharge records, and much of the uncertainty is associated with the extrapolation of the rating curve beyond field measurements. Guidelines suggest that 1.5 times (ISO 2010) or 2 times (Rantz et al. 1982) above the greatest manually measured discharge is the recommended limit of reliable extrapolation. All discharges obtained from curves extrapolated above the recommended limit recommended by Rantz et al. 1982, are noted as having higher uncertainty in the daily discharge tables provided in Appendix 7-A of this report.

7.4.7 Discharge Hydrographs

Annual hydrographs, presented as mean daily discharge, were generated for each hydrometric monitoring station operated in 2017. For the operational period at each hydrometric station, discharge was calculated at ten minute intervals by applying the developed rating curve equation to the

recorded stage data. The ten minute discharge data were averaged over a 24-hour period to compute mean daily discharge.

For periods where data were unavailable as a result of winter demobilization (removal of pressure transducers for damage protection from freezing), water level going below the sensor height, or data loss due to data logger malfunctions, discharge was estimated by correlating discharge time series from nearby hydrometric stations in the watershed with similar characteristics.

7.4.8 Hydrologic Indices

Observed and calculated discharge values were used to generate a series of hydrologic indices including annual runoff, mean annual discharge, seasonal runoff distribution, and annual peak and low flows.

Annual runoff (expressed as a depth of water) represents the proportion of precipitation, snowmelt, and glacial melt that becomes stream flow. Runoff is valuable for obtaining gross estimates of the water available in a watershed. Runoff is normalized to drainage area, making it a useful index for comparing the hydrological response of watersheds of different sizes.

Seasonal runoff distribution is determined by summing the daily runoff by month for each watershed. Monthly runoff is calculated and presented to illustrate the spatial and temporal distribution of runoff in the Project area.

Mean annual discharge, computed as an average discharge over the year, gives an indication of the potential amount of water a watershed can provide as a function of drainage area, geology and climate.

Peak flows represent the maximum stream discharges that are produced from a drainage area over the year in response to precipitation events, snowmelt, and glacial melt. Conversely, low flows provide an estimate of the normal baseflow conditions for the year (annual low flow) and during the open water season (summer low flow), which is important for the sustained health of a stream's aquatic community.

7.4.9 Quality Assurance/Quality Control

The hydrotechnical standards and methods employed on the Project are consistent with standards published by the British Columbia Ministry of Environment (RISC 2009). These standards complement the national standards developed by the Water Survey of Canada (WSC 1999).

RISC (2009) outlines four criteria for both water level data and discharge data that are used to assess and grade (i.e., A, B, C, E [estimated], and U [unknown]) the overall quality of hydrometric data. The criteria are: instrumentation, stream channel condition, field procedures, and data calculation and assessment. The list provided below details the methods used in the hydrometric monitoring program, with the aim of acheiving high quality data based on the standards in each of the four criteria:

1. **Instrumentation**

   All instrumentation used and calibration/verification procedures comply with the highest quality data collection outlined by in the RISC manual (i.e., Grade A). High accuracy recording data loggers and pressure transducers are used for the recording and determining of continuous water level at the hydrometric stations.

2. **Stream Channel Condition**

   The channel conditions affecting control of water level and discharge measurements meet the upper end of quality standards outlined by RISC (Grade B). Although the monitoring locations are sited to best meet the desirable criteria defined by RISC, natural channel conditions (instability, weed growth and boulder) at the measurement locations makes the highest level of data quality in this criterion unfeasible for the monitoring sites.

3. **Field Procedures**

   The field procedures are designed to follow the highest standards outlined by RISC. This included 20 or more verticals (each accounting for less than 10% of the total flow) in each manual streamflow measurement where achievable, a minimum of three bench marks at each station, two or more level checks per year and five or more manual measurements per year.

4. **Data Calculation and Assessment**

   Data calculations follow the highest standards outlined by RISC. Results are reviewed for anomalies/deficiencies and with other stations for the year. Data collected to date does not currently meet the minimum recommended number of points used to develop rating curves (resulting rating curves are considered preliminary). Standards suggest that 10 (RISC 2009) to 15 (ISO 2010) field measurements are required to develop a robust rating curve.

7.5 DATA SUMMARY

Results from the 2017 to 2018 hydrometric monitoring program are presented as follows: 1) stage-discharge field measurements; 2) stage-discharge rating curves; 3) daily discharge hydrographs; and 4) hydrologic indices.

7.5.1 Stage-Discharge Measurements

A total of 34 discharge measurements were conducted across the hydrometric network over the 2017 and 2018 monitoring period. During the open water season while stage were not affected by ice in the channel, measurements of both stage and discharge were made to support rating curve development. Additionally once ice formed in the channel and stations were removed to prevent freezing, winter low flow measurements was completed on each stream to obtain the baseflow conditions for the 2017 to 2018 winter period (Table 7.5-1).

Table 7.5-1. Summary of 2017 to 2018 Stage-Discharge Measurements

Station	Date	Stage (m)	Discharge (m^3/s)	Difference From Curve[1] (%)	Method	Instrument[2]
Tenas-Hydro	May 18, 2017	98.223	2.50	0.47	Velocity-Area	Hach FH950
	Jun 20, 2017	98.155	1.84	1.63	Velocity-Area	Hach FH950
	Jun 20, 2017	98.155	1.79	1.19	Velocity-Area	Hach FH950
	Aug 16, 2017	97.862	0.16	1.97	Velocity-Area	Hach FH950
	Sep 21, 2017	97.908	0.28	1.85	Velocity-Area	Hach FH950
	Oct 18, 2017	97.952	0.26	42.5	Velocity-Area	Hach FH950
	Nov 28, 2017	N/A[3]	0.25	N/A[3]	Velocity-Area	Hach FH950
	Dec 14, 2017	N/A[3]	0.15	N/A[3]	Velocity-Area	Hach FH950
	Jan 17, 2018	N/A[3]	0.08	N/A[3]	Velocity-Area	Hach FH950
	Feb 19, 2018	N/A[3]	0.06	N/A[3]	Velocity-Area	Hach FH950
	Mar 20, 2018	N/A[3]	0.05	N/A[3]	Velocity-Area	Hach FH950
Goathorn-Hydro	May 17, 2017	98.986	5.78	2.54	Velocity-Area	Hach FH950
	Jun 19, 2017	98.868	3.87	0.15	Velocity-Area	Hach FH950
	Jun 19, 2017	98.868	3.95	1.76	Velocity-Area	Hach FH950
	Aug 1, 2017	98.591	1.22	6.32	Velocity-Area	Hach FH950
	Aug 15, 2017	98.558	0.93	1.32	Velocity-Area	Hach FH950
	Sep 21, 2017	98.599	1.02	15.0	Velocity-Area	Hach FH950
	Oct 19, 2017	98.494	0.65	6.39	Velocity-Area	Hach FH950
	Nov 20, 2017	N/A[3]	0.74	N/A[3]	Velocity-Area	Hach FH950
	Dec 11, 2017	N/A[3]	0.53	N/A[3]	Velocity-Area	Hach FH950
	Jan 16, 2018	N/A[3]	0.29	N/A[3]	Velocity-Area	Hach FH950
	Feb 13, 2018	N/A[3]	0.25	N/A[3]	Velocity-Area	Hach FH950
	Mar 19, 2018	N/A[3]	0.15	N/A[3]	Velocity-Area	Hach FH950
Telkwa-Hydro	May 16, 2017	99.022	67.08	5.48	Salt Dilution	WTW 3410
	Jun 19, 2017	99.092	69.01	5.12	Salt Dilution	WTW 3410
	Aug 1, 2017	98.612	22.91	0.43	Salt Dilution	WTW 3410
	Aug 15, 2017	98.549	18.56	0.55	Salt Dilution	WTW 3410
	Sep 21, 2017	98.489	14.94	0.22	Salt Dilution	WTW 3410
	Oct 19, 2017	98.518	17.53	0.82	Salt Dilution	WTW 3410
	Nov 20, 2017	N/A[3]	9.78	N/A[3]	Velocity-Area	Hach FH950
	Dec 13, 2017	N/A[3]	7.46	N/A[3]	Velocity-Area	Hach FH950
	Jan 16, 2018	N/A[3]	6.47	N/A[3]	Velocity-Area	Hach FH950
	Feb 13, 2018	N/A[3]	2.53	N/A[3]	Velocity-Area	Hach FH950
	Mar 19, 2018	N/A[3]	1.65	N/A[3]	Velocity-Area	Hach FH950

Notes:

[1] Difference from curve indicates how far the rating point was above or below the established rating curve.

[2] http://www.hach.com/fh950-portable-velocity-meter-with-20-cable/product?id=10379735623: https://www.wtw.com/en/products/product-catalog/lab-products/multi-parameter-measurement/sensors-and-probes.html

[3] N/A Stage measurement was not conducted due to snowpack/ice affecting measurement. Not used in rating curve due to no stage measurement.

7.5.2 Rating Curves

The relationships between stage and discharge were established for the three monitoring stations. Five to seven rating points were used to develop each curve and therefore they are considered preliminary at this point. The rating equations are summarized in Table 7.5-2.

Table 7.5-2. Preliminary Stage-Discharge Rating Equations

Station	Rating Equation $Q = C(h - a)^b$	Root Mean Square - Error	Number of Measurements Used
Tenas-Hydro	$Q = 11.221(h - 97.720)^{2.191}$	1.5	5
Goathorn-Hydro	$Q = 9.383(h - 98.180)^{2.361}$	6.7	7
Telkwa-Hydro	$Q = 52.566(h - 97.930)^{2.160}$	3.7	6

Note:
Equation Q = C(h – a)b : Q is the discharge (m3/s), C and b are regression coefficients, h is the stage (m), and a is the stage at zero flow (m).

7.5.3 Discharge Hydrographs

Annual discharge hydrographs were generated for each hydrometric station for 2017. Hydrographs are presented in Figures 7.5-1 through 7.5-3, and include daily rainfall data from the *Environment and Climate Change Canada* (ECCC) regional meteorological station *Smithers A* located near the Smithers airport (UTM 616,743 E; 6,076,862 N; Zone 9U; NAD 83). Hydrographs are presented in tabular form in Appendix 7-A. The hydrographs were generated for the entire 2017 year and include both observed data from the period of operation at each station and estimated data for periods without recorded data. Data collected after December 2017 (January through March of 2018) are included in Table 7.5-1, but hydrographs and indices computed are based on the calendar year to provide summary statistics that can be compared on an annual basis.

Discharge estimates were, at times, required in place of measured field data. In regions where streams freeze during the winter months it is common practice to deactivate stations to ensure pressure transducers are not damaged by ice. Additionally, recorded stage data are often unreliable when streams are frozen or partially frozen and therefore discharge data needs to be estimated. Gaps in the data caused by station deactivation, malfunctioning pressure transducers, and water levels dropping below the sensor elevation were filled with estimated data by means of unranked correlation analysis.

Daily discharge values for the missing periods of data at Tenas-Hydro were required from January 1, 2017 to May 18, 2017 when the station was installed, and from August 18, 2017 to December 31, 2017 due to a data logger malfunction and the winter ice affected period. The station was paired with a reference station (Goathorn-Hydro) based on having comparable watershed characteristics resulting in similar hydrologic response. Concurrent periods of record from each station were used to determine the regression equations (two equations selected, one for low flow estimates and one for high flow estimates) which were then applied to the data from the reference station to model daily discharge for the station with missing data (Table 7.5-3). Stations, Goathorn-Hydro and Telkwa-Hydro also required modelled data for the ice affected periods prior to installation and after removal of the stations as well as a few short periods when water levels dropped below the transducer elevations (see Table 7.5-3 for specific dates). Similar to Tenas-Hydro, the data gaps were modelled by means of unranked correlation analysis using WSC station 08EE020 (*Telkwa River Below Tsai Creek*) on the Telkwa River as a reference station (Table 7.5-3).

Figure 7.5-1
Discharge Hydrograph for Tenas-Hydro

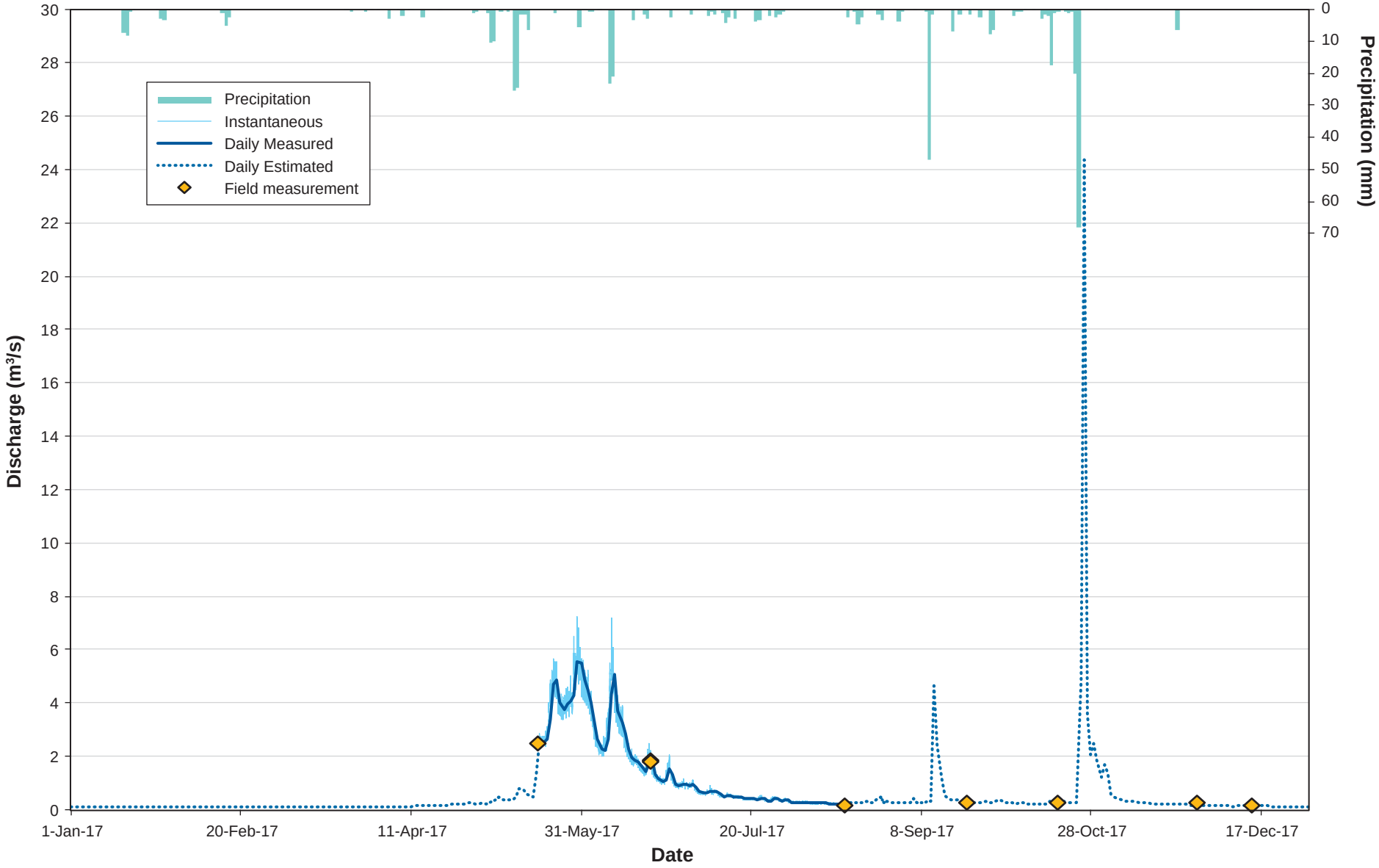


Figure 7.5-2
Discharge Hydrograph for Goathorn-Hydro

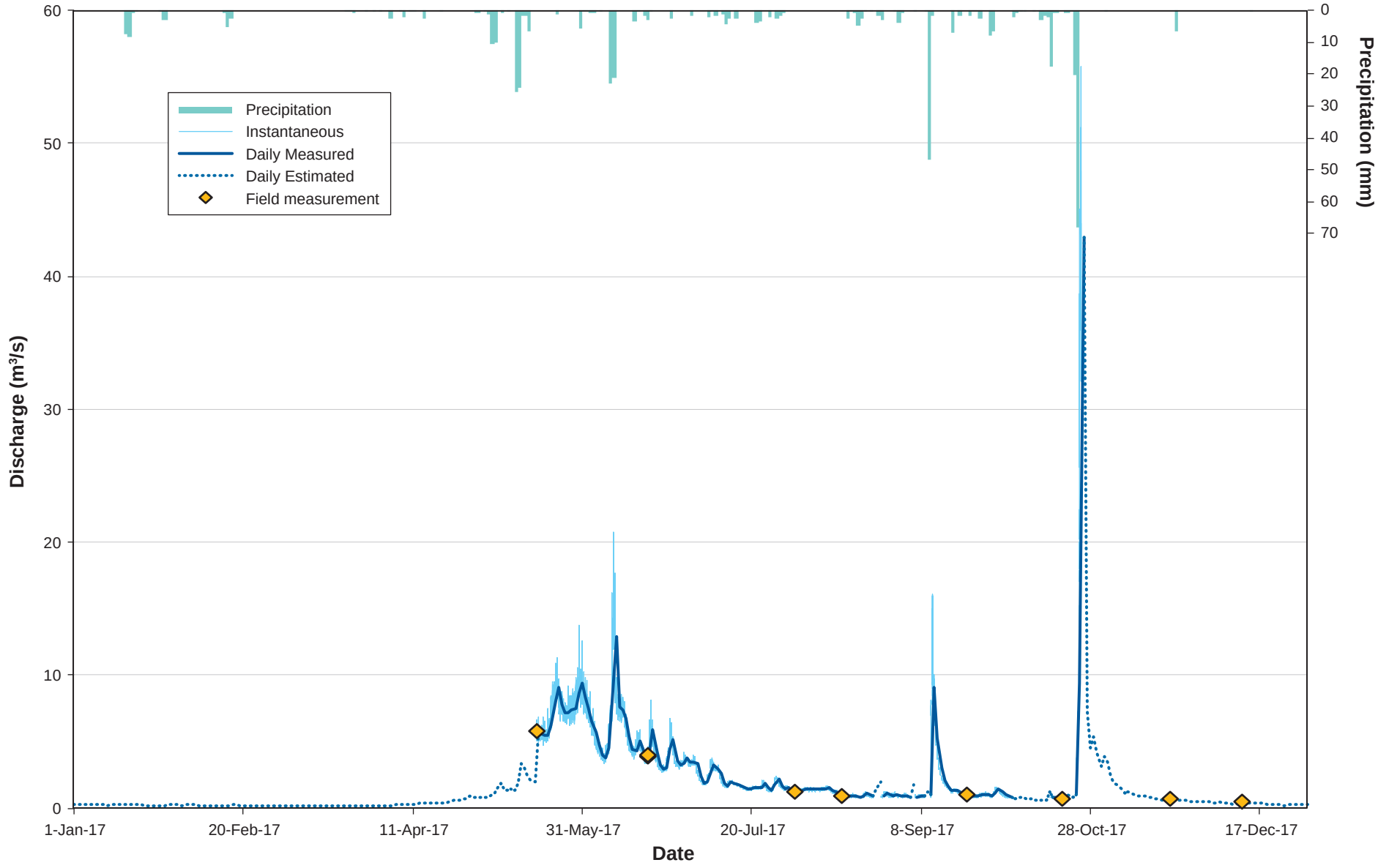


Figure 7.5-3
Discharge Hydrograph for Telkwa-Hydro

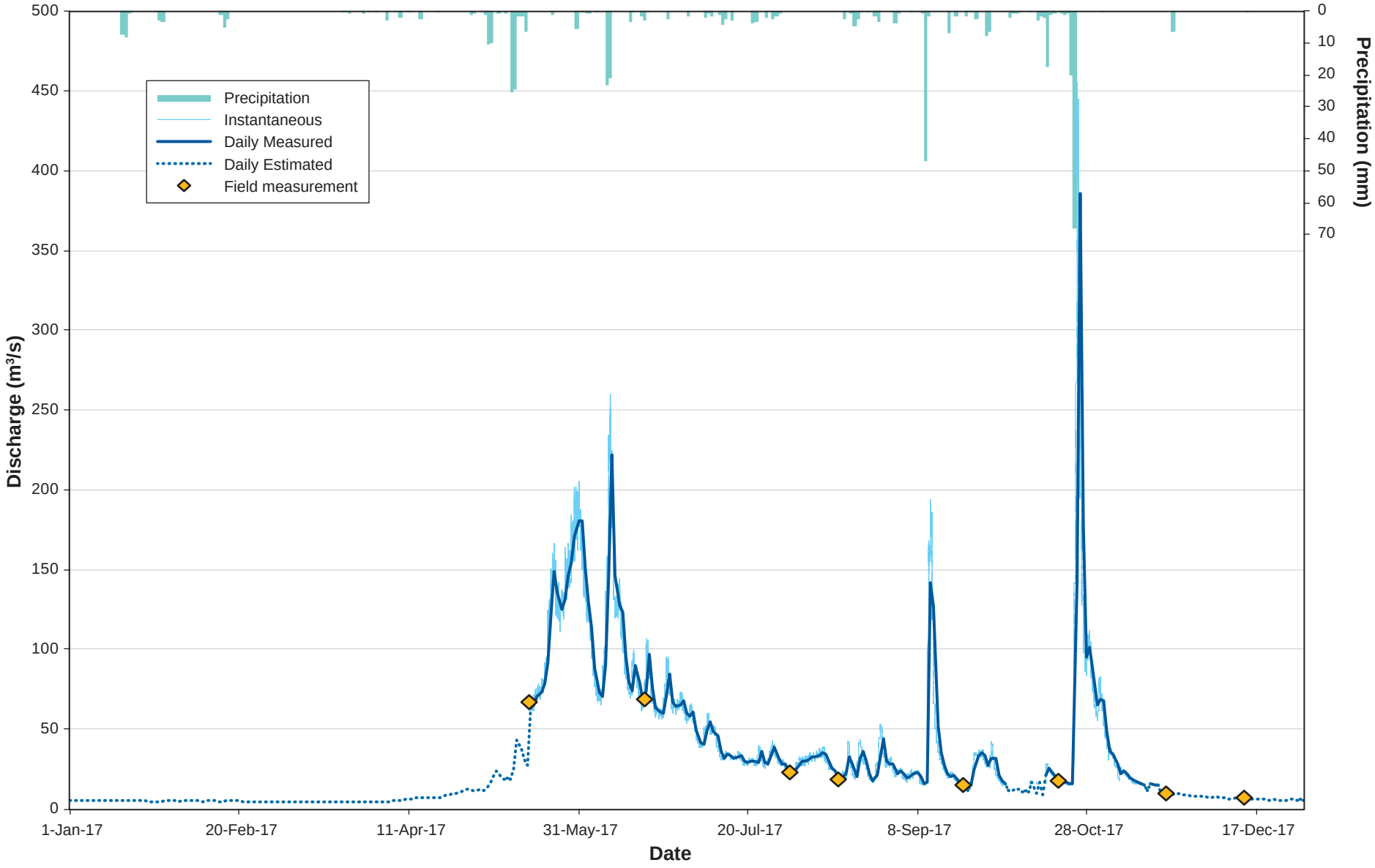


Table 7.5-3. Correlation Analysis Summary for Hydrograph Estimation (2017)

Station	Reference Station	Concurrent Period	Regression Equation	R^2	Estimated Periods
Tenas-Hydro	Goathorn-Hydro	Jul 4 – Aug 2	Y = 0.2186(X) + 0.068; Low Flow: Q < 1 m^3/s	0.78	Jan 1 – May 18 Aug 18 – Sep 11 Sep 15 – Oct 24 Nov 3 – Dec 31
		May 19 – Aug 17	Y = 0.5815(X) – 0.5925; High Flow: Q < 1 m^3/s	0.93	Sep 12 – Sep 14 Oct 25 – Nov 2
Goathorn-Hydro	08EE020	Sep 14 – Sep 24	Y = 0.1065(X) + 0.0494	0.98	Jan 1 – May 17 Aug 26 – Aug 27 Sep 6 Sep 10 Oct 6 – Oct 16 Oct 20 – Oct 23 Oct 27 – Dec 31
Telkwa-Hydro	08EE020	Jul 15 – Sep 11	Y = 1.2648(X) + 1.8394	0.78	Jan 1 – May 16 Sep 23 Oct 5 – Oct 11 Oct 13 Oct 15 Nov 15 Nov 19 – Dec 31

Note:
Regression Equation Y = mX +b : Y is the mean daily discharge (m^3/s) for the station with the missing data, m and b are regression coefficients and X is the mean daily discharge (m^3/s) for the reference station.

7.5.4 Annual Runoff and Seasonal Runoff Distribution

Annual runoff values for and seasonal runoff distribution for 2017 are presented in Table 7.5-4. Annual runoff in 2017 for the three monitored watersheds ranged from approximately 450 mm for the Tenas and Goathorn stations to 981 mm at Telkwa-Hydro. The majority of runoff for all stations occurred in May and June as a result of snowmelt and in October due to a large storm event near the end of the month. Runoff distribution was similar between the three monitored sites with slightly more runoff in May and June, and less in July and August at Tenas-Hydro Relative to the other two stations. This maybe attributed to watershed area and the amount of glacier coverage in each watershed, with Goathorn and Telkwa receiving some glacier inputs during July and August. It was also observed that the October peak flow event resulted in a larger percent of the annual runoff in the smaller watersheds (Tenas and Goathorn) relative to the larger Telkwa-Hydro watershed (Figure 7.5-4).

Figure 7.5-4
Monthly Runoff (%) Distribution

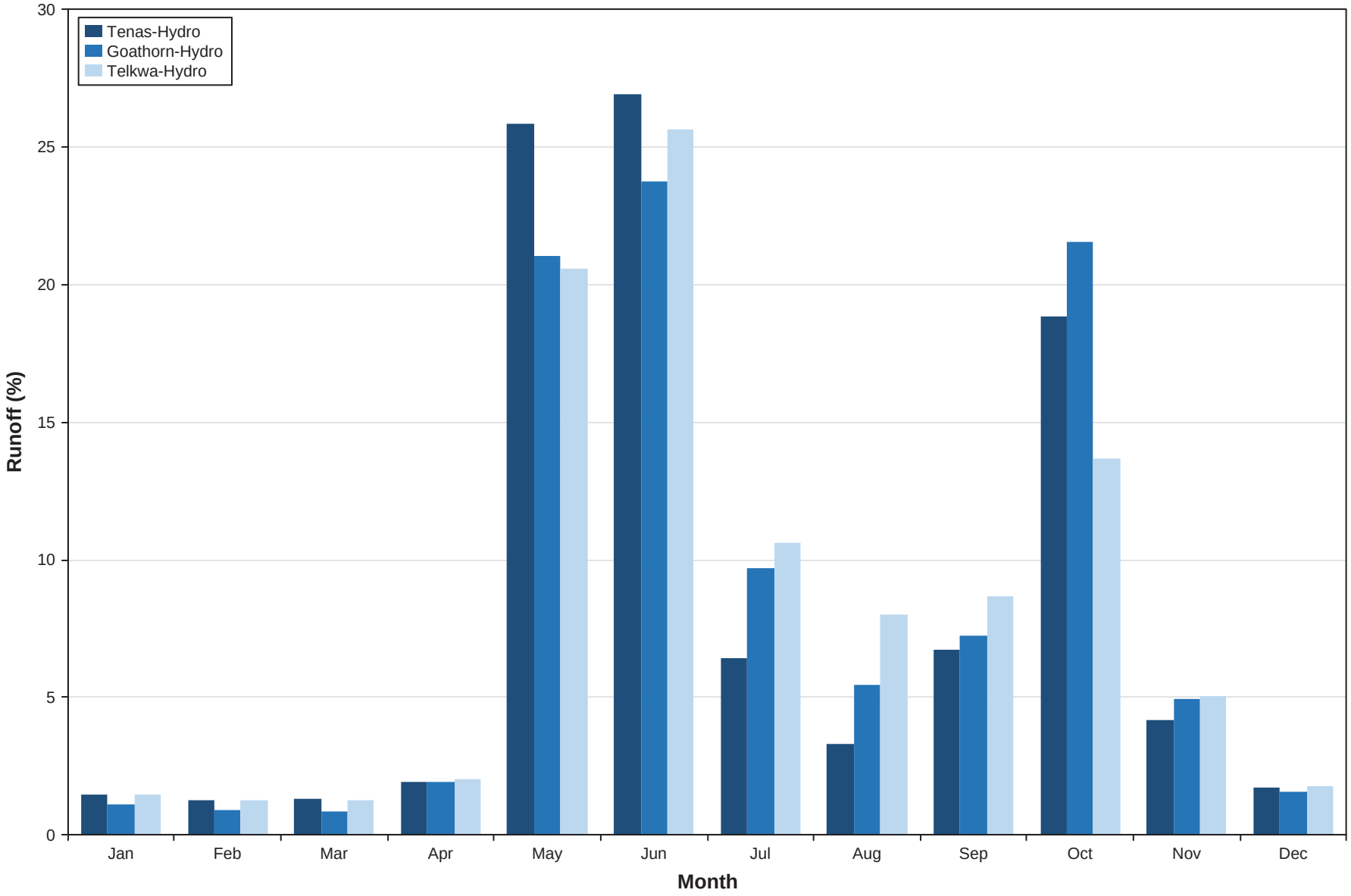


Table 7.5-4. Annual Runoff and Seasonal Runoff Distribution (2017)

	Runoff (mm)												
Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Tenas-Hydro	7	6	6	9	117	122	29	15	30	85	19	8	**452**
Goathorn-Hydro	5	4	4	9	96	109	44	25	33	98	23	7	**457**
Telkwa-Hydro	14	12	12	20	202	252	104	78	85	134	49	17	**981**

7.5.5 Mean Annual Discharge

Mean annual discharge (MAD) for 2017 is presented in Table 7.5-5. MAD increased with watershed area for the three monitoring locations ranging from 0.68 m^3/s for Tenas-Hydro to 29.98 m^3/s for Telkwa-Hydro.

Table 7.5-5. Mean Annual Discharge (2017)

Station	Watershed Area (km^2)	Mean Annual Discharge (m^3/s)
Tenas-Hydro	47.4	0.68
Goathorn-Hydro	121.6	1.76
Telkwa-Hydro	966.9	29.98

7.5.6 Annual Peak Flows

Annual peak flows are present in Table 7.5-6. Instantaneous and daily peak flows were determined for the Goathorn and Telkwa monitoring stations but at the Tenas Creek station only daily peak flows are available as the data gap due to the data logger malfunction occurred during the October peak event and estimated discharges through correlation analysis were completed at a daily time step. Daily peak flows ranged from 24.83 m^3/s at Tenas-Hydro to 385.51 m^3/s at Telkwa-Hydro. Annual peak flows were driven by a high intensity, short duration precipitation event at the end of October. The daily rainfall total that resulted in the annual peak flows was the highest on record (68 mm daily total) at the regional meteorological station in Smithers (Smithers A) since data collection began in 1942 (ECCC 2018).

Table 7.5-6. Instantaneous and Daily Peak Flow (2017)

Station	Timing	Peak Flow (m^3/s)	Date
Tenas-Hydro	Instantaneous	N/A[1]	N/A
	Daily	24.38	Oct-26
Goathorn-Hydro	Instantaneous	55.72	Oct-25
	Daily	42.94	Oct-25
Telkwa-Hydro	Instantaneous	455.71	Oct-25
	Daily	385.51	Oct-25

Note:

[1] *Data estimated at a daily time step during the October peak flow event. Instantaneous data not available for the same period.*

7.5.7 Low Flows

Low flows were calculated using a 7-day average from the daily discharge. Summer (June to September) and annual low flows are presented in Table 7.5-7 alongside historic data for site. Summer low flows ranged from 0.20 m^3/s at Tenas-Hydro to 17.19 m^3/s at Telkwa-Hydro and occurred between mid-August and late September. Winter low were all based on data estimated through correlation analysis and occurred on March 25, 2017 when ground water discharge would typically be at its lowest prior to the start of the open water season. Annual low flows ranged from 0.10 m^3/s at Tenas-Hydro to 4.38 m^3/s at Telkwa-Hydro.

Table 7.5-7. Summer and Annual 7-Day Low Flows (2017)

Station	7-Day Summer Low Flow (m^3/s)	Date	7-Day Winter Low Flow (m^3/s)	Date
Tenas-Hydro	0.20	Aug-16	0.10	Mar-25
Goathorn-Hydro	0.87	Sep-6	0.16	Mar-25
Telkwa-Hydro	17.19	Sep-22	4.38	Mar-25

7.5.8 Summary

The 2017 hydrologic year generally exhibited similar seasonal stream flow patterns across the monitored streams and rivers in the Project area.

The timing of runoff was generally typical of the regional stream flow regime, with the majority of runoff resulting from snowmelt during the spring and early summer.

There were slight differences observed in seasonal runoff distribution between the monitoring locations, with a marginal increase in the proportion of runoff occurring in late summer in the larger watersheds and those with higher glacier coverage.

Annual peak flow resulted from a high intensity rain event that occurred in late October. The October rain event was the largest daily rainfall event on record at the regional Smithers A meteorological station (see section 2.5 for details), and the resulting peak flows were of short duration but very high, ranging approximately 45% to 80% higher than the observed freshet driven peak flows at the same locations. Summer low flows were observed in August in Tenas Creek and in September at Goathorn Creek and the Telkwa River. Annual low flows occurred in late March throughout the Project area.

8. SURFACE WATER QUALITY

This chapter presents the methods and results of the surface water quality baseline monitoring program. The purpose of the 2017 to 2018 water quality program was to collect Project specific baseline surface water chemistry data. An understanding of the aquatic characteristics within and downstream of the Project area will contribute to engineering analysis and the design of water management features; support future development of water quality and water balance models, effects assessments, management plans, and closure planning; support permitting; support fisheries monitoring programs; and monitor changes in the local environment.

The detailed objectives of the 2017 to 2018 program were to:

- collect monthly water quality samples at select project locations; and
- upload project data to the BC EMS system

8.1 STUDY AREA

The study area for surface water quality contained sampling sites upstream and downstream of proposed Project infrastructure and activities, and focused on the three primary creeks that flow from the Tenas Project area - Tenas Creek, Goathorn Creek, and Four Creek.

These creeks flow north and into The Telkwa River. Four Creek lies east of the proposed Tenas Project, and enters Goathorn Creek before Tenas Creek. Tenas Creek is west of the proposed Tenas Project, and its confluence with Goathorn Creek is approximately 1.25 km upstream of where Goathorn Creek merges with the Telkwa River. The Telkwa River flows northeast for approximately 6 km before it empties into the Bulkley River. The Bulkley River is a tributary of the Skeena River, which empties into the Pacific Ocean.

The main objectives of the 2017 to March 2018 surface water quality baseline program were to:

- characterize the spatial and temporal variability of surface water quality in creeks and rivers near the Project area; and
- establish surface water quality sites upstream and downstream of the proposed Project infrastructure to provide baseline data to support permitting and future monitoring programs.

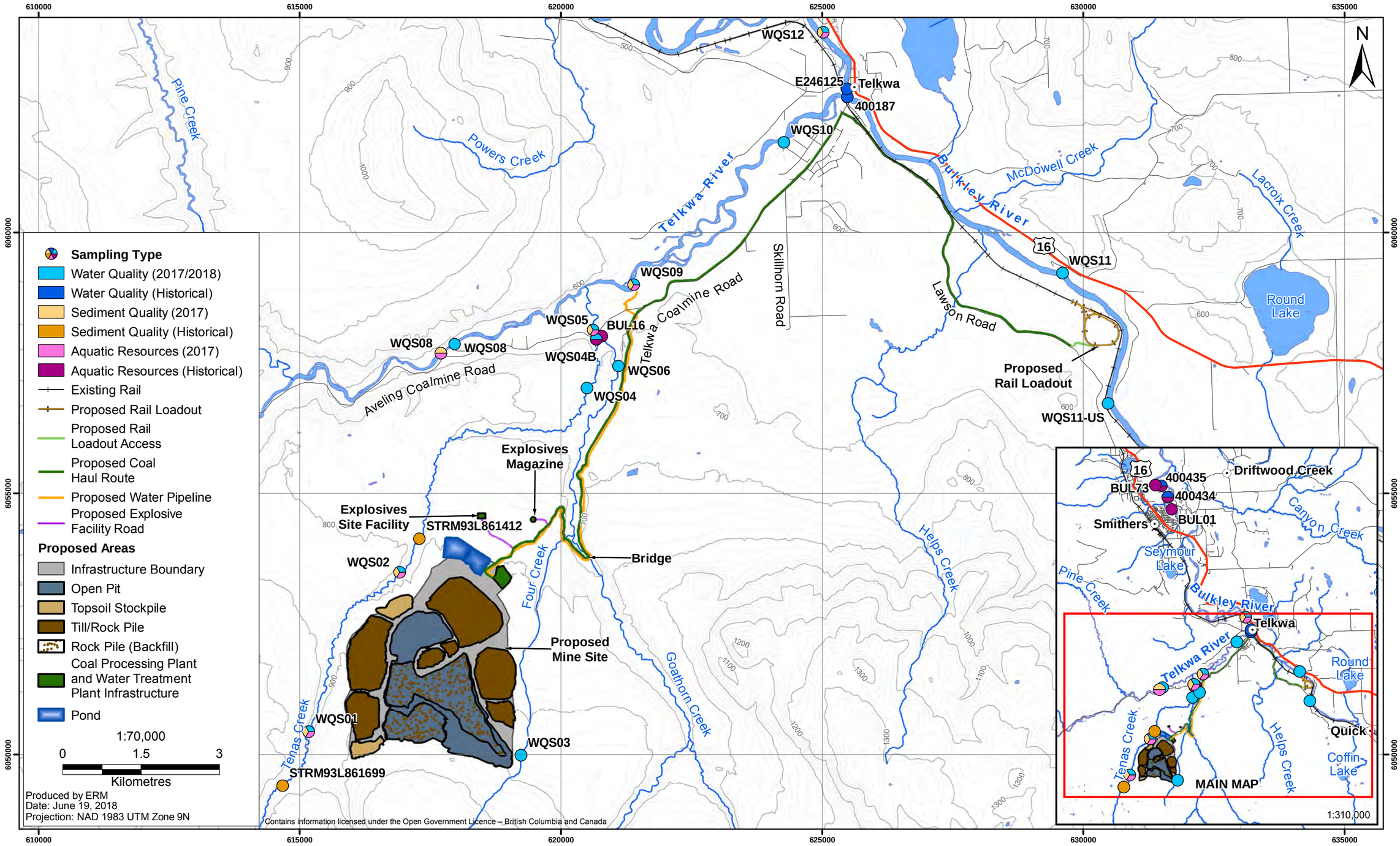
Several surface water quality sites on creeks and rivers near proposed Project infrastructure were sampled from May 2017 to April 2018 (Table 8.1-1; Figure 8.1-1). Sampling sites were established upstream and downstream (i.e., near-, mid-, and far-field) of the proposed Project infrastructure. Samples were collected monthly. In October 2017, the mid-field downstream site on Tenas Creek (WQS04) was shifted downstream approximately 1 km (WQS04B) to allow better and safer site access. In November 2017, a new site was established on the Bulkley River (WQS11-US) to provide a suitable upstream reference site for the updated proposed Rail Load Out. Samples were not collected from the Bulkley River in January to April 2018 due to substantial ice cover and unsafe sampling conditions.

Table 8.1-1. Water Quality Sampling Sites, Tenas Project, 2017 to 2018

Waterbody	Site	Easting	Northing	Sampling Period	Description
Tenas Creek	WQS01	615171	6050438	May 2017 to April 2018	Upstream reference for proposed Project infrastructure
	WQS02	616914	6053490	May 2017 to April 2018	Near-field downstream of deposits and proposed associated Project infrastructure
	WQS04	620499	6057020	May 2017 to September 2017	Mid-field downstream of deposits and proposed associated Project infrastructure
	WQS04B	620676	6057950	October 2017 to April 2018	Mid-field downstream of deposits and proposed associated Project infrastructure
	E242646	-	-	2006 to 2008	Unknown point in Tenas Creek (EMS UTM not in stream)
Four Creek	WQS03	619235	6049989	May 2017 to April 2018	Upstream reference for proposed Project infrastructure
Goathorn Creek	WQS06	621100	6057441	May 2017 to April 2018	Upstream reference; above confluence with Tenas Creek
	E242647	-	-	2004 and 2006 to 2008	Unknown point on Goathorn Creek (EMS UTM not in stream); description states above Tenas Creek confluence
	WQS05	620615	6058133	May 2017 to April 2018	Mid-field downstream of confluence with Tenas Creek
Telkwa River	WQS08	617964	6057860	May 2017 to April 2018	Upstream reference; above confluence with Goathorn Creek
	WQS09	621394	6058998	May 2017 to April 2018	Mid-field downstream of confluence with Goathorn Creek
	WQS10	624269	6061725	May 2017 to April 2018	Far-field downstream before confluence with the Bulkley River
	400187	625481	6062592	1974, 1975, 1983 to 1988, and 2006 to 2009	At mouth of river at village
Bulkley River	WQS11-US	630472	6056723	November and December 2017	Upstream reference for proposed rail loadout
	WQS11	629601	6059221	May to December 2017	Near-field downstream of proposed rail loadout
	E246125	625477	6062748	2001 and 2002	Immediately downstream of Telkwa River confluence, likely not fully mixed; water intake for Telkwa
	WQS12	625021	6063831	May to December 2017 and March to April 2018	Mid-field downstream of proposed rail loadout and confluence with the Telkwa River
	400434	618410	6074024	1974, 1975, 1983, 1984, 1987 to 1992, and 2012	Far-field downstream of Project; downstream of Smithers and upstream of sewage discharge
	400435	617870	6074979	1974, 1975, 1983, 1984, 1987 to 1992, 2007, and 2012	Far-field downstream of Project; downstream of Smithers and downstream of sewage discharge

Notes:
WQS04 was moved approximately 1 km downstream to WQS04B for improved site access and safety.
WQS11-US was added in November 2017 to provide an upstream sampling site for the updated footprint of the rail loadout.
Samples were not collected in January to April 2018 from the Bulkley River due to safety issues.

Figure 8.1-1
Surface Water, Sediment Quality, and Aquatic Resources Sampling Sites, Tenas Project



8.2 REGULATORY AND POLICY FRAMEWORK

This section provides an overview of the relevant provincial and federal statutory framework, guidance documents, and policies related to potential Project-related surface water quality effects.

At the provincial level, the *Environmental Management Act* (EMA; 2003) requires authorization of specified discharges to the environment, including the aquatic receiving environment. The legislation provides enforcement options to protect human health and the quality of water, land, and air in BC. Mines require authorization under the EMA to discharge mine-affected effluent to receiving waters, and are required to register effluent (or have it included in the mine effluent permit) from sewage treatment facilities. Under the EMA, mines are also required to comply with requirements for the production, storage, treatment, or discharge of prescribed quantities of hazardous waste. The *BC Mines Act* (1996) and its associated Health, Safety and Reclamation Code for Mines in BC require mines to have programs for the environmental protection of land and watercourses throughout mine life, including plans for the prevention of erosion and sediment release. Watercourses are required to be reclaimed, and the Ministry of Energy, Mines and Petroleum Resources (MEMPR) has the authority to require monitoring and/or remediation programs to protect watercourses and water quality. Further, the Ministry of Environment and Climate Change Strategy (BC ENV, formerly Ministry of Environment [MOE]) provides specific guidance for baseline programs (BC MOE 2016), field sampling methodologies (Clark 2002, 2013 edition), and laboratory analyses (BC MOE 2015). There are surface water quality guidelines for the protection of aquatic life in BC (BC ENV 2018a and 2018b), including some that are based on presently approved and working Canadian Council of Ministers of the Environment (CCME) guidelines (CCME 2018). The Bulkley River also has provisional water quality objectives (BC MOE 1986).

At the federal level, surface water quality and aquatic habitat are subject to several federal legislations including the *Fisheries Act* (1985) and the *Canadian Environmental Protection Act* (1999), and the regulations therein. Regulations designed to protect surface water quality, and, by extension, aquatic resources and fish and fish habitat, are premised on the avoidance of deleterious impacts to water quality, quantity, sediment quality, and aquatic organisms. Specific regulations do not exist for individual contaminants; however, the CCME has developed consensus-based guidelines for the protection of aquatic life (CCME 2018).

Surface water quality studies for the Project were designed to meet the requirements of the Mines Act and Environmental Management Act Permits Joint Application Information Requirements (Joint AIR for MA/EMA Permits; BC MEM and BC MOE 2016).

8.3 EXISTING INFORMATION

Review of existing data included examining public sources of water quality data and historical reports completed for the Tenas Project (Table 8.3-1). Data were reviewed for quality, relevance (i.e., geographic), and compliance with the Joint AIR for MA/EMA Permits (BC MEM and MOE 2016), which recommends following the guidance outlined in the *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (BC MOE 2016) and the *BC Field Sampling Manual* (Clark 2002, 2013 edition).

Table 8.3-1. Surface Water Quality Data Information Table

Documents Reviewed	**Public** • *British Columbia Environmental Management System (EMS).* https://a100.gov.bc.ca/pub/ems/listDataFiles.do?userAction=mainmenu&selectionIndex=0&.x=55&.y=12 • BC MOE. 2006. *Drinking Water Source Quality Monitoring 2002-03; Bulkley Valley Surface Water Sources: Smithers Lakes, Kirby Lake, Chicago Creek, Bulkley River, Tobaggan Creek, and Thompson Creek.* • BC MOE. 1986. *Skeena-Nass Area Bulkley River Basin Water Quality Assessment and Objectives.* **Client-Supplied** • AGRA Earth & Environmental. 1999. *Telkwa Coal Mine Surface Water Monitoring Program 1998.* • AGRA Earth & Environmental. 2000. *Telkwa Coal Project 1999 Baseline Surface Flow and Water Quality Final Data Report.* • Frontier Geosciences. 1999. *Report to Stephen Day: BC Research Selenium Results.* • Piteau Engineering. 1994. *Baseline Data, Surface Water and Groundwater, Telkwa Coal Project.* • SRK Consultants. 1996. *Summary of Fisheries, Aquatic Habitat and Water Quality Information for the Telkwa Project Area: A Literature Review.* • Telkwa Coal Project Approval Certificate Application: *Environmental Baseline.* **Existing reports not obtained** • Beaudry, P.G., J.W. Schwab and D. Septer. 1991. *Suspended Sediment: Telkwa River Watershed.* • Crows Nest Resources and READ Environmental & Planning Associates. 1983. *Telkwa Project: Stage I Application.* • MacLaren Plansearch Services. 1985. *Water Quality Investigation: Telkwa Coal Project.* • Wilkes, B. and R. Lloyd. 1990. *Water Quality Summaries for Eight Rivers in the Skeena River Drainage, 1983 – 1987: the Bulkley, Upper Bulkley, Morice, Telkwa, Kispiox, Skeena, Lakelse, and Kitimat Rivers.*
General Remarks	The data available in EMS (as described in the two BC MOE reports) does have relevant stations within the Project area. The client-supplied reports have older data available within the Project area. Many of these reports do not include raw data, or the site coordinates. It would require considerable effort to extract the raw data from the PDFs into electronic format. While not thoroughly reviewed, it is likely the historical data have higher detection limits and outdated laboratory methodologies.
Sampling Required by *Joint AIR for Mines Act and Environmental Management Act Permits* (Joint AIR for MA/EMA Permits)	*"Minimum of monthly sapling for a period of two years is recommended, and more is preferred to assess trends and seasonal variation. To determine water quality guideline (WQG) or water quality objective (WQO) attainment, 5 samples in 30 days during critical flows (high and/or low) or biologically relevant periods are necessary. To assess inter-annual variation, or to prepare WQOs or science-based environmental benchmarks (SBEBs), multiple years of water quality data are required."* *"Conduct surface toxicity tests if required (this may be needed if WQGs are exceeded due to historic mining or site disturbance and should be discussed with Environmental Protection Division staff)."*

(continued)

Table 8.3-1. Surface Water Quality Data Information Table (completed)

Existing Data	The below data were deemed useful and included in the data summary: • EMS ▪ E242646 – Tenas Creek; 2006-2008 ▪ E242647 – Goathorn Creek above Tenas Creek confluence; 2004, 2006-2008 ▪ 400187 – Telkwa River at village; 1974-1975, 1983-1988, 2006-2009 ▪ E246125 – Bulkley River at Telkwa water system intake; 2001-2002 ▪ 400434 – Bulkley River upstream from Smithers sewage; 1974-1975, 1983-1984, 1987-1992, 2012 ▪ 400435 – Bulkley River IDZ at Smithers; 1974-1975, 1983-1984, 1987-1992, 2007, 2012 The below data were deemed not useful and were not included in the data summary: • EMS ▪ E237472 – SW2 Bulkley River downstream STTS; one day of data ▪ E242645 – Goathorn Creek (on Telkwa coalmine Creek); one sample ▪ E242735 – Raymond Road backchannel; one day of data ▪ E249692 – Bulkley River, upstream Fort Telkwa River; limited parameters (turbidity, bacteria) and only two months of data ▪ E249693 – Bulkley River, Fort Telkwa River water intake; one day of data ▪ E249694 – Bulkley River, 150 m upstream of Telkwa Bridge; limited parameters (turbidity, bacteria) and samples ▪ E249733 – Bulkley River, George Frontage Road (RV Park); limited parameters (turbidity, bacteria) and samples ▪ 400436 – Bulkley River below Smithers sewage plant; old data (1974, 1975) and limited parameters ▪ 920088 – Bulkley River at Quick; old data (1966-1976, 1982-1990) and well upstream of Project area • Client-supplied reports
Existing Data Issues	The EMS data had the following issues: • Undetectable data (i.e., non-detects) not identified (i.e., not entered as "<"); • Suspected detection limits (i.e., majority of measurements had the same value) poor for metals data prior to 2002; • A few samples had possible sample contamination (anomalously high turbidity and metal content); and • Limited to no quality assurance/quality control (i.e., field duplicates, blanks).
Missing Data	None.
2017–March 2018 Baseline Program	The 2017–2018 baseline program collected monthly water quality samples from Tenas Creek, Four Creek, Goathorn Creek, the Telkwa River, and the Bulkley River.
Key Issues	Two years of data and 5-in-30 sampling are listed as required components for the Joint AIR for MA/EMA Permits. Additional stations on Four and Goathorn creeks will be important for establishing natural conditions, and will be important for future monitoring programs.
Other Comments	None.

8.4 METHODOLOGY

8.4.1 Sample Collection

The collection of water samples followed the *British Columbia Field Sampling Manual* (Clark 2002, 2013 edition) and the *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (BC MOE 2016). Water samples were collected in creeks by facing upstream and submersing the lab-certified clean sample bottles below the surface until filled. The scientist wore nitrile gloves and where safety considerations allowed, water samples were collected mid-stream. Surface water quality samples were collected for the analysis of:

- general parameters (pH, specific conductivity, total dissolved solids, total suspended solids, turbidity, color, total hardness);
- major anions;
- alkalinity and acidity;
- nutrients (nitrate, nitrite, ammonia, total and dissolved phosphorus, sulfate);
- total and dissolved organic carbon;
- total metals (including total mercury);
- dissolved metals (including dissolved mercury);
- BTEX and Phenols; and
- polycyclic aromatic hydrocarbons (PAH)

The listed analytes were chosen based on the requirements set out in the BC Ministry of Environment (BC MOE) document *Technical Guidance 6: Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (BC MOE 2016).

Preservatives were added at the time of collection, except for dissolved metals samples which were filtered under trace-metal clean conditions at the laboratory, to avoid contamination associated with field filtration and to achieve the lowest possible detection limits. After preservation, samples were kept cool (4°C) until analysis by ALS Environmental Laboratories (ALS; Burnaby, BC).

Field parameters (temperature, pH, conductivity) were measured in situ using a YSI ProPlus multiparameter probe or an Oakton PCS Tester multi-parameter probe. The probes were placed in the water and allowed to stabilize for several minutes before data was recorded.

8.4.2 Analysis

Water quality parameters were compared to their respective BC ENV and CCME water quality guidelines for the protection of freshwater aquatic life (BC ENV 2018a and 2018b; CCME 2018) (Table 8.5-1). Hardness-dependent guidelines were calculated using each sites' hardness. Bulkley River water quality was also compared to the Skeena-Nass Area Bulkley River Basin Water Quality Assessment and Objectives (BC MOE 1986).

Samples below their analytical detection limit were replaced with half the detection limit for the purposes of graphing and analyses. Parameters above BC and CCME guidelines were summarized as the percentage of samples that were greater than a specific guideline, and the average factor samples were above the guideline level. Samples that had concentrations that were below the analytical detection limit and had detection limits that were above the guidelines (i.e., ambiguous if above guideline), or had missing data were excluded from all table calculations. The average factor was calculated from only those samples that were above the guideline (i.e., samples below and equal to the guideline were excluded).

8.4.3 Quality Assurance/Quality Control

8.4.3.1 Field

Standard field QA/QC procedures included the use of chain of custody forms (COCs) and the collection of sample blanks and replicates. A field blank and travel blank were collected during each sampling trip. The field blank was pre-filled with DI water, and was opened and exposed to the air at a randomly chosen sampling site for one minute. This gave an indication of potential contamination during field sampling (i.e., exposure to aerial particulates), and possibly during transport and analysis at the laboratory. The travel blank was not opened and provided an assessment of potential contamination from travel or from laboratory handling.

Field duplicate samples were also collected during each sampling trip. Field duplicate samples were used to provide an indication of the variability inherent in field sampling (environmental heterogeneity or sampler handling leading to contamination) by using the relative percent difference (RPD) calculation, where:

$$RPD = 100 \times |rep1 - rep2| / [(rep1 + rep2) / 2] \quad \text{[Equation 1]}$$

where:
rep = field duplicate water sample, or sediment splits

The *BC Field Sampling Manual* (Clark 2002, 2013 edition) suggests if one or both of the duplicate values are less than five times the analytical detection limit, they are not to be included in the RPD calculations. This is because the water quality measurement is more sensitive to variation as values approach the analytical detection limit. Thus, only the water quality variables with concentrations greater than five times the detection limit were considered. Overall, RPD values greater than 20% may indicate possible issues (i.e., high *in situ* variation, or sample contamination), while RPD values greater than 50% indicate definite issues that warrant further investigation.

8.4.3.2 Laboratory

The 2017/2018 laboratory QA/QC program included the examination of potential contamination (i.e., method blanks), analytical precision (i.e., laboratory replicates), and analytical accuracy (i.e., reference materials and matrix spikes). Method blanks were analyte-free matrices (i.e., distilled water) that were prepared and analyzed using the same methodology as a regular sample. Laboratory replicates were field samples that were sub-sampled in the lab and analyzed separately to assess analytical precision. Reference materials were standards with known concentrations, analyzed using

the same methods as a regular sample, to assess accuracy. Finally, matrix spikes were field samples to which known concentrations of a standard were added to assess the recovery in the sample matrix, to determine the analytical precision and accuracy.

8.5 DATA SUMMARY

Water quality analytical results for May 2017 to April 2018 are provided in Appendix 8-A, with the associated QA/QC results in Appendices 8-B and 8-C. The historical data from EMS included in this data summary are provided in Appendix 8-D. It should be noted that metals data prior to 2002 were excluded due to (suspected) poor detection limits. There were also anomalous samples that were excluded due to suspected contamination, including 400187 (June 2, 1975 and September 4, 1986; high turbidity and metals) and E246125 (October 2001; high metals).

8.5.1 General

Project area streams had neutral to slightly basic pH (range: 7.20 to 8.48 pH), with low sensitivities to acid-inputs (total alkalinity >20 mg $CaCO_3$/L; Figure 8.5-1; Saffran and Trew 1996). In general, Four Creek had hard water (120 to 180 mg $CaCO_3$/L), while Tenas and Goathorn creeks had moderately hard water (61 to 120 mg $CaCO_3$/L), and the Telkwa and Bulkley rivers had soft water (0 to 60 mg $CaCO_3$/L; Figure 8.5-2). Total alkalinity, conductivity, and hardness were generally higher in the streams than rivers, particularly in Four Creek (Figure 8.5-2). Alkalinity, pH, conductivity, and hardness all displayed strong seasonal patterns, with peak concentrations in the winter during low flow (see Section 7) and lower concentrations in the summer following May/June freshet. A second peak of these parameters also occurred in July and August at Four Creek for all general parameters, and at E242646 on Tenas Creek for pH and WQS01 WQS02 at Tenas Creek for conductivity and hardness.

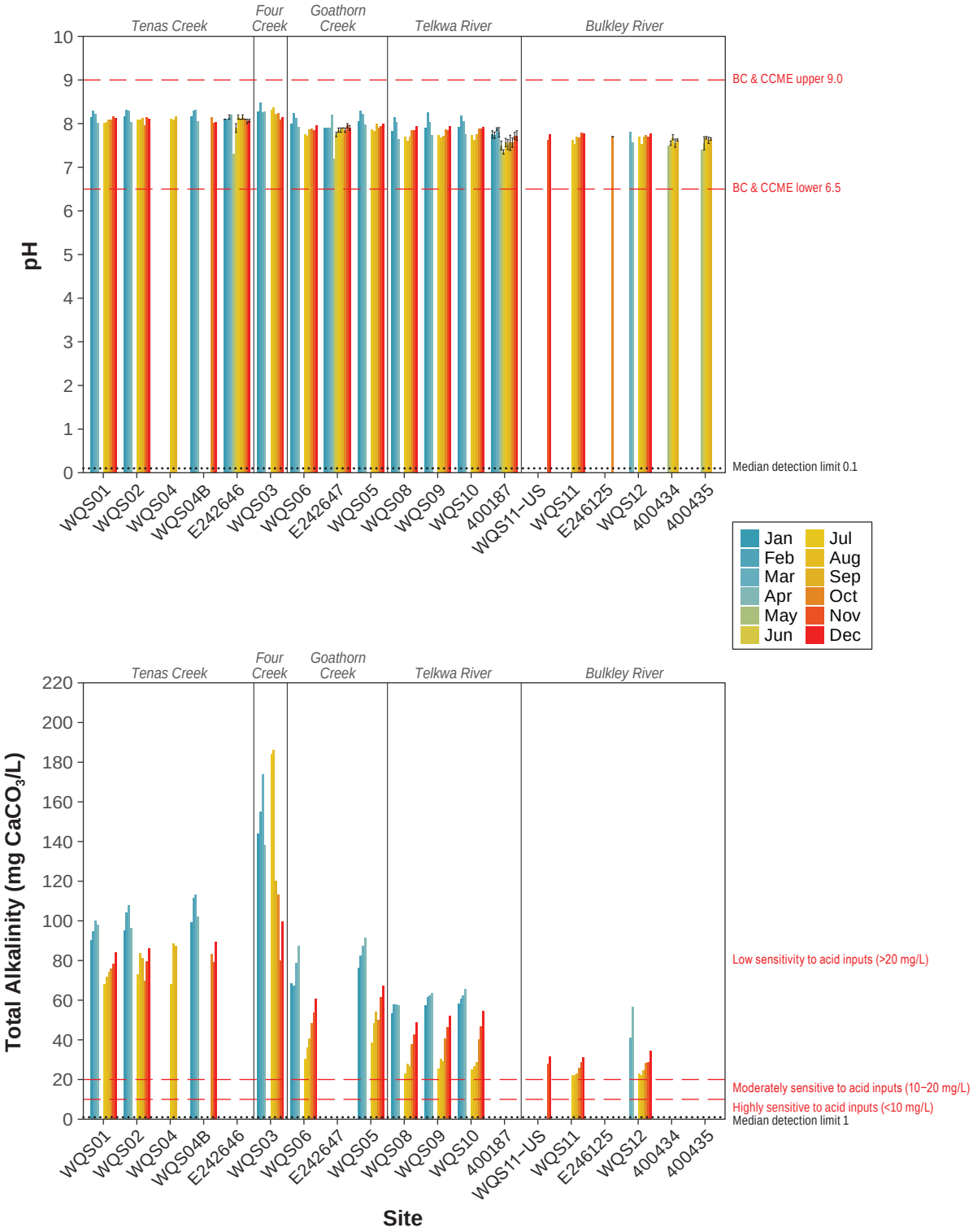
Total suspended solids (TSS) and turbidity were generally low in Project area streams (<15 mg/L and <15 NTU, respectively), except for elevated levels in the Telkwa River in September during high rain and flow (see Section 7), and some sporadically high levels during other months at WQS08 and in Tenas Creek (Figure 8.5-3).

8.5.2 Anions

Sulphate was the dominant anion in Project area streams, with concentrations in Goathorn Creek two to three times greater than measured at other sites within the same month (except in May; Figure 8.5-4). Sulphate concentrations were lowest at all sites in May during the spring freshet, low in the fall during high flow/rain events, and generally peaked in the summer during low flow and into the winter. Fluoride was usually highest in Four Creek, with Project stream concentrations highest during September/October (fall rains) and in the winter, and lowest in the spring. The majority of chloride samples from 2017 and 2018 were below detection limits (96%; Appendix 8-A).

Figure 8.5-1

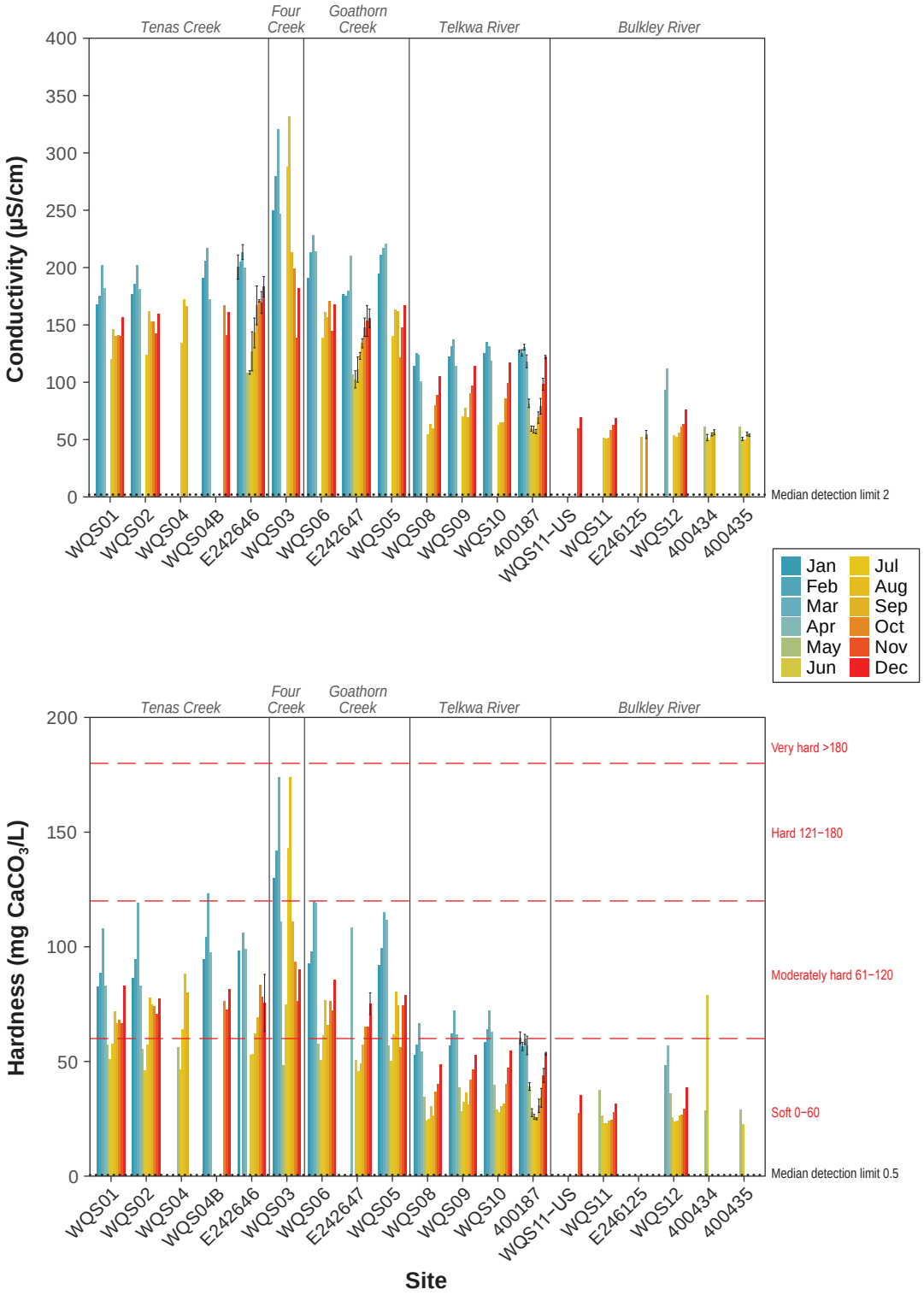
pH and Total Alkalinity in Tenas Project Streams, 1974 to 2018



Note: Error bars represent the standard error of the mean.
Values below the detection limit were plotted as half the detection limit.

Figure 8.5-2

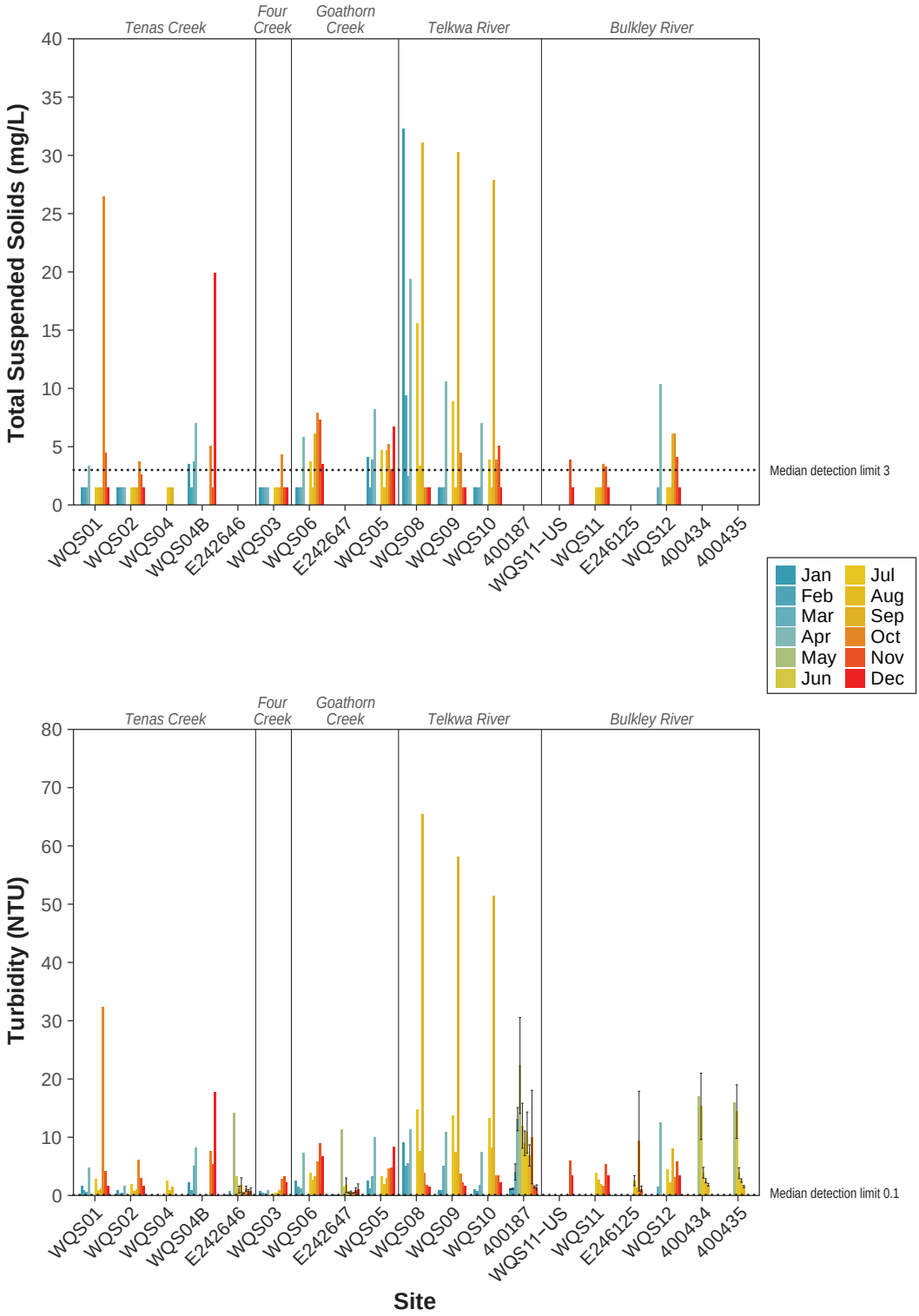
Conductivity and Hardness in Tenas Project Streams, 1974 to 2018



Note: Error bars represent the standard error of the mean.
Values below the detection limit were plotted as half the detection limit.

Figure 8.5-3

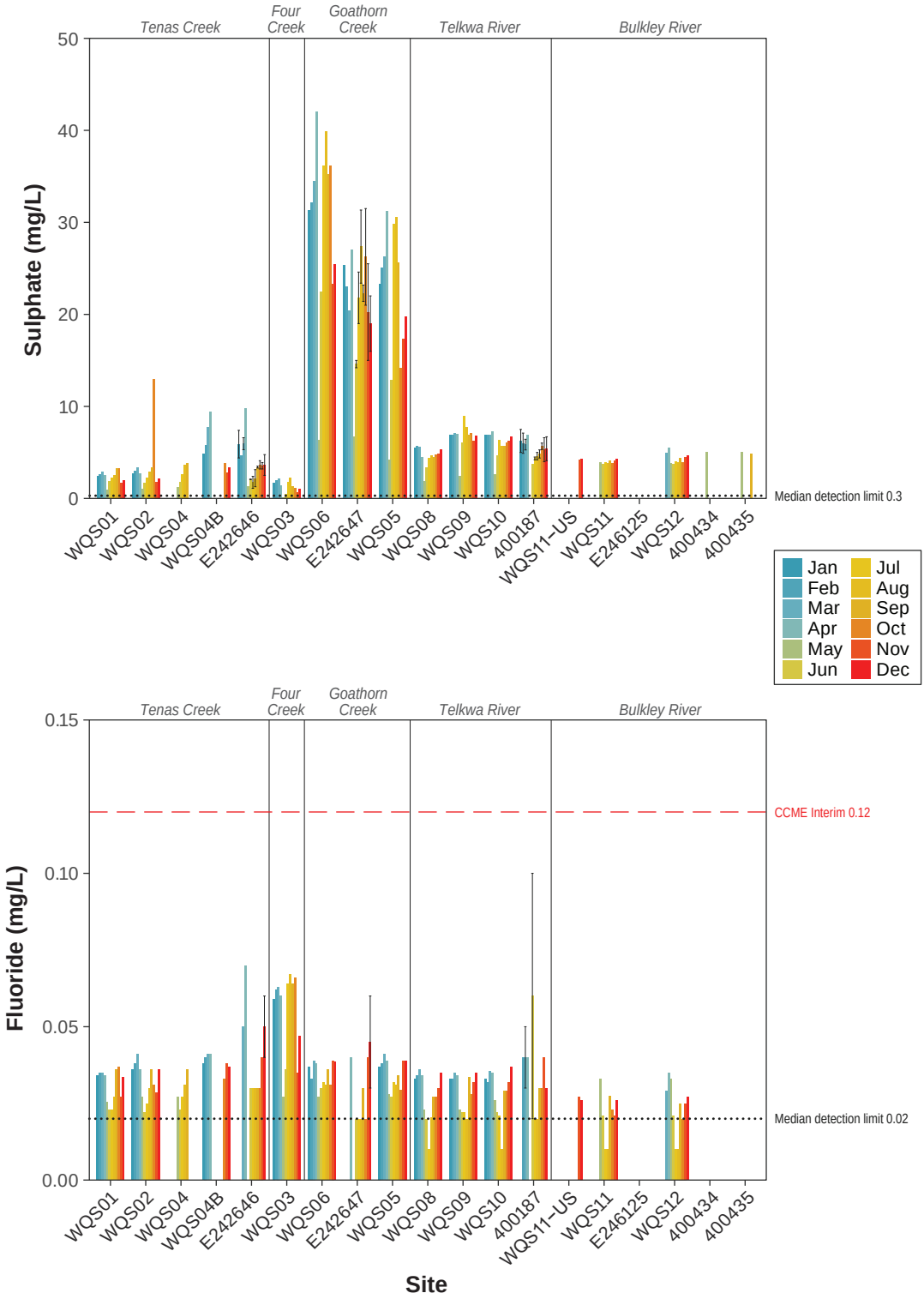
Total Suspended Solids and Turbidity in Tenas Project Streams, 1974 to 2018



Note: Error bars represent the standard error of the mean.
Values below the detection limit were plotted as half the detection limit.
CCME and BC guidelines for turbidity are dependent on background levels see Appendix 8−A.

Figure 8.5-4

Sulphate, and Fluoride in Tenas Project Streams, 1974 to 2018



Note: Error bars represent the standard error of the mean.
Values below the detection limit were plotted as half the detection limit.
BC fluoride guideline is hardness dependent, see Appendix 8−A.

8.5.3 Nutrients

Nitrogen in the Project area streams was principally in the form of organic nitrogen, with total Kjeldahl nitrogen (TKN) making up a large proportion of total nitrogen concentrations, and ammonia being below analytical detection in most samples (94% <0.005 mg/L; Figure 8.5-5). Total nitrogen, TKN, and nitrate concentrations were low in the summer and peaked in the winter, with the highest concentrations typically in May during freshet. Nitrite concentrations were usually below detection limits (<0.0010 mg/L), with only one detectable concentration at WQS12 in April 2018 (0.0016 mg/L).

Like most nitrogen constituents, total phosphorus concentrations peaked in the Project area streams in May (meso-eutrophic to eutrophic) and were ultra-oligotrophic (<0.004 mg/L) over the summer (Figure 8.5-6). This likely reflects runoff during freshet contributing nutrients to streams, and biological uptake of nutrients in the summer. In contrast, the Telkwa River total phosphorus concentrations remained elevated over the summer and peaked in September.

Total organic carbon (TOC) concentrations peaked during freshet in May, and to a lesser degree during the fall rains (Figure 8.5-6). Across sampled streams, concentrations were highest in Four Creek.

8.5.4 Cyanide

Total, free, and weak acid dissociable cyanides were measured in Project area streams in May, June, and August (no total) in 2017. Cyanides were below detection limits in all samples (Appendix 8-A).

8.5.5 Metals

Metal (total and dissolved) concentrations displayed a strong seasonal pattern in Project area streams, with elevated concentrations during freshet (May) and fall rains (September; Figures 8.5-7 to 8.5-16). Peak concentrations typically occurred during freshet in all creeks, except the Telkwa River where concentrations were higher in the fall and associated with elevated TSS. In contrast, antimony and molybdenum concentrations typically peaked during low flow in the summer months, while selenium and uranium peaked during the winter.

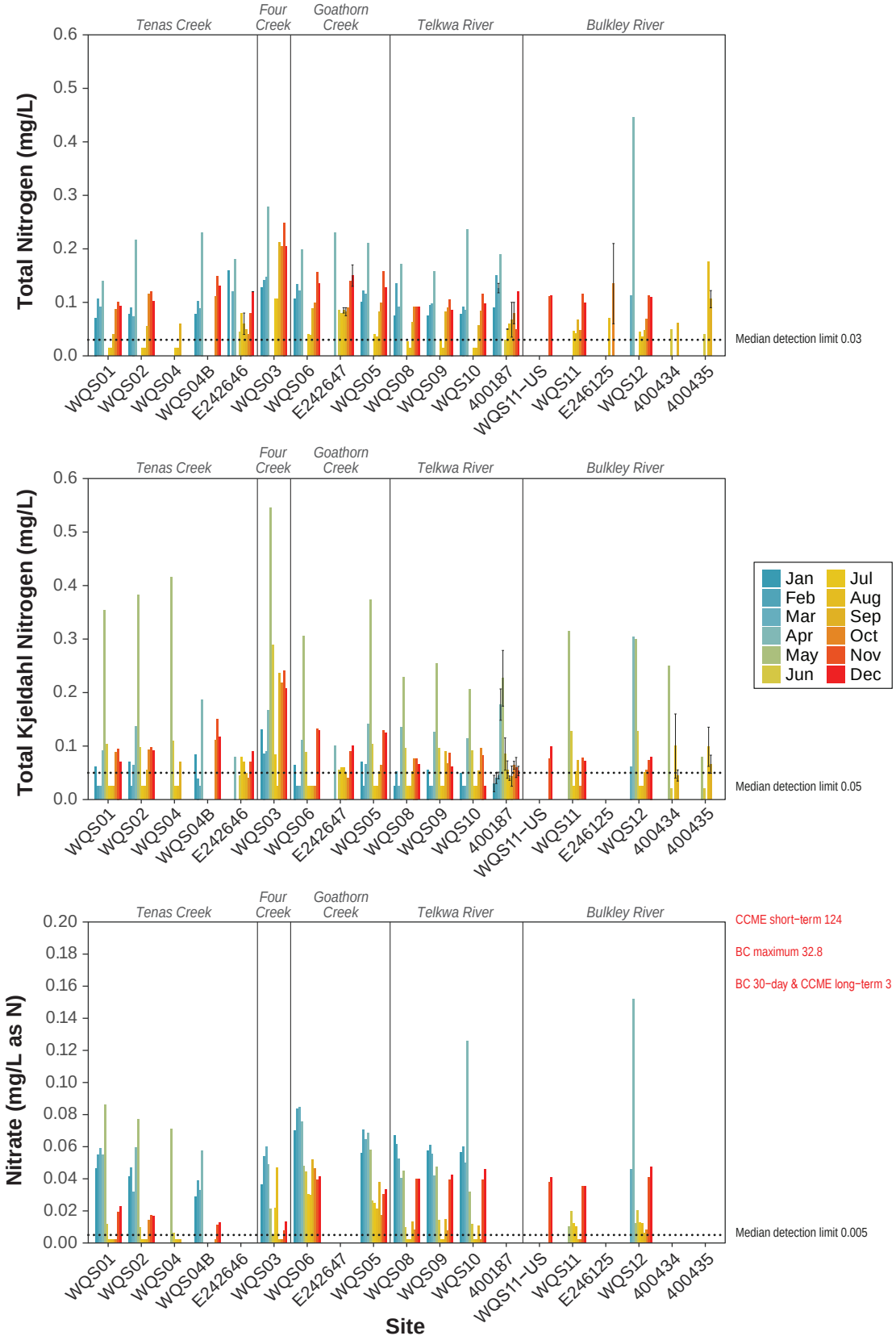
The Telkwa River had elevated concentrations of several metals compared to other sampled streams, including aluminum, cadmium, lead, iron, manganese, and molybdenum (which was also elevated in Goathorn Creek). Tenas Creek had elevated uranium and antimony, while Four Creek had comparatively high concentrations of arsenic and barium.

8.5.6 Hydrocarbons and Organic Compounds

Polycyclic aromatic hydrocarbons (PAHs) were measured monthly at all sampling stations. All PAH concentrations were below detection limits (Appendix 8-A). Benzene, toluene, ethylbenzene, and xylene (BTEX) were measured during five sampling events, and all concentrations were below detection limits (Appendix 8-A). Most samples were below detection limits for phenols (96% <0.0010 mg/L), with only four detections that occurred in May and September (Appendix 8-A). Due to the high number of non detects, BTEX samples will be discontinued going forward.

Figure 8.5-5

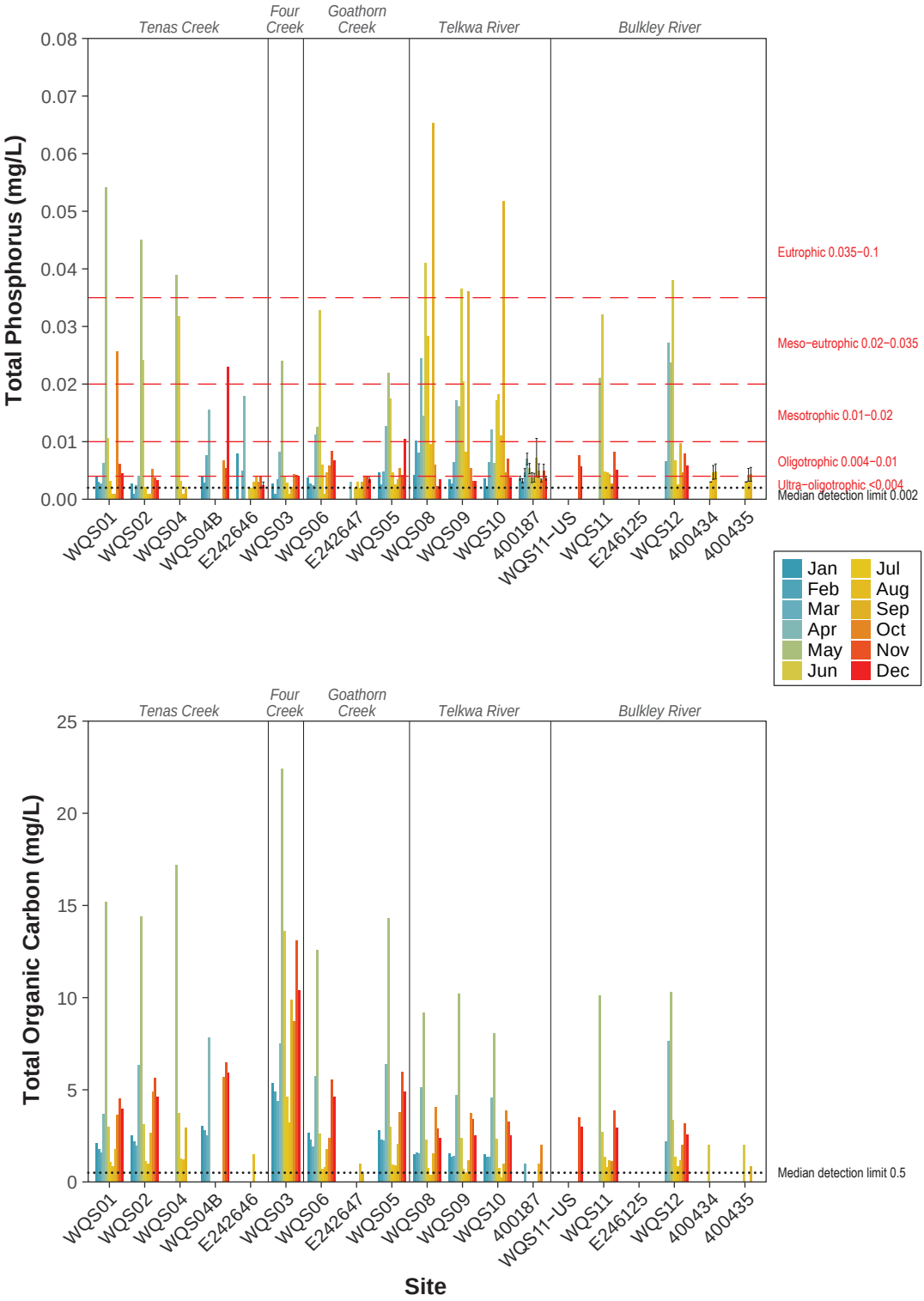
Total Nitrogen, Total Kjeldahl Nitrogen, and Nitrate in Tenas Project Streams, 1974 to 2018



Note: Error bars represent the standard error of the mean.
Values below the detection limit were plotted as half the detection limit.

Figure 8.5-6

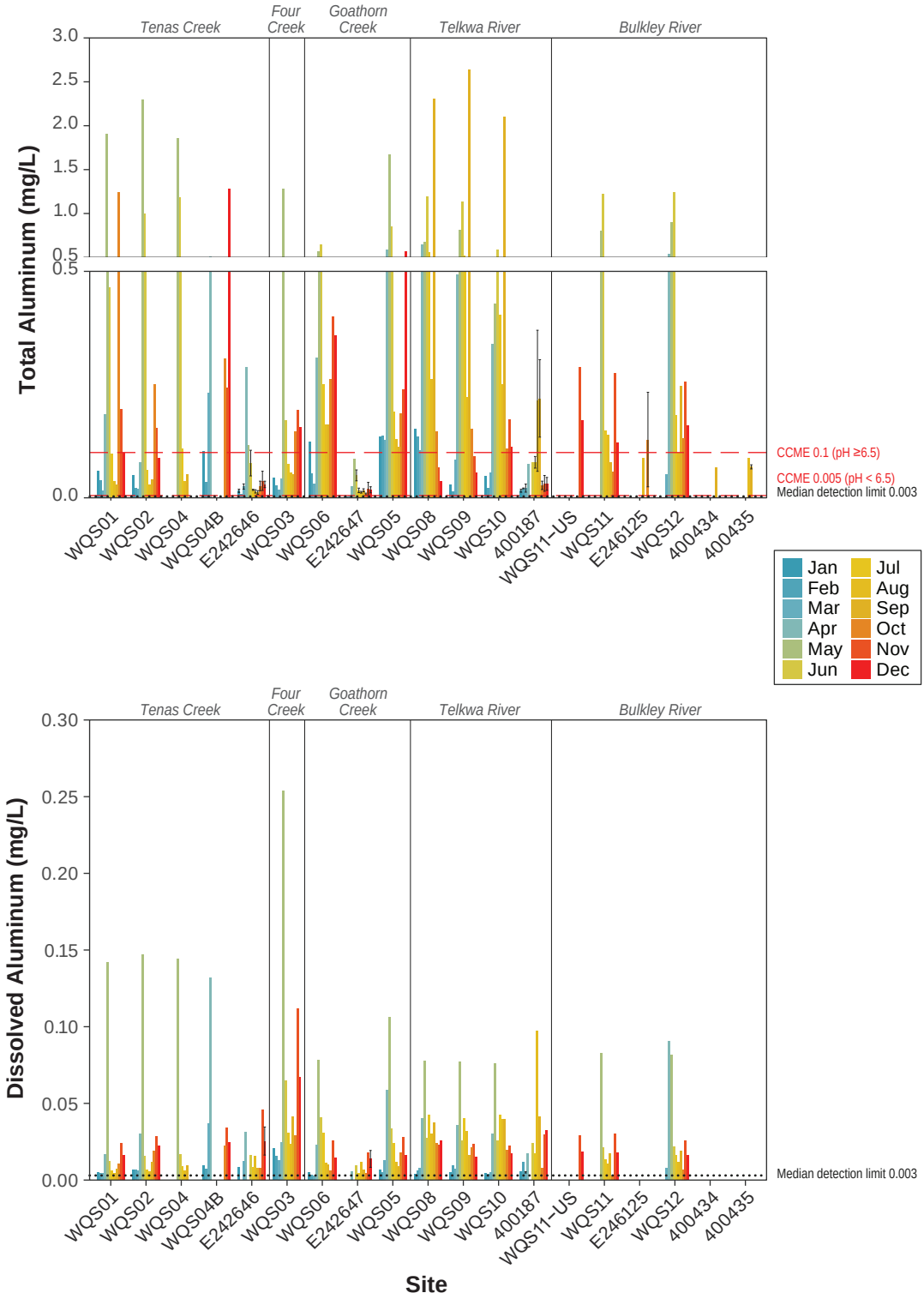
Total Phosphorus and Total Organic Carbon in Tenas Project Streams, 1974 to 2018



Note: Error bars represent the standard error of the mean.
Values below the detection limit were plotted as half the detection limit.
BC guideline for total organic carbon is dependent on background levels, see Appendix 8–A.

Figure 8.5-7

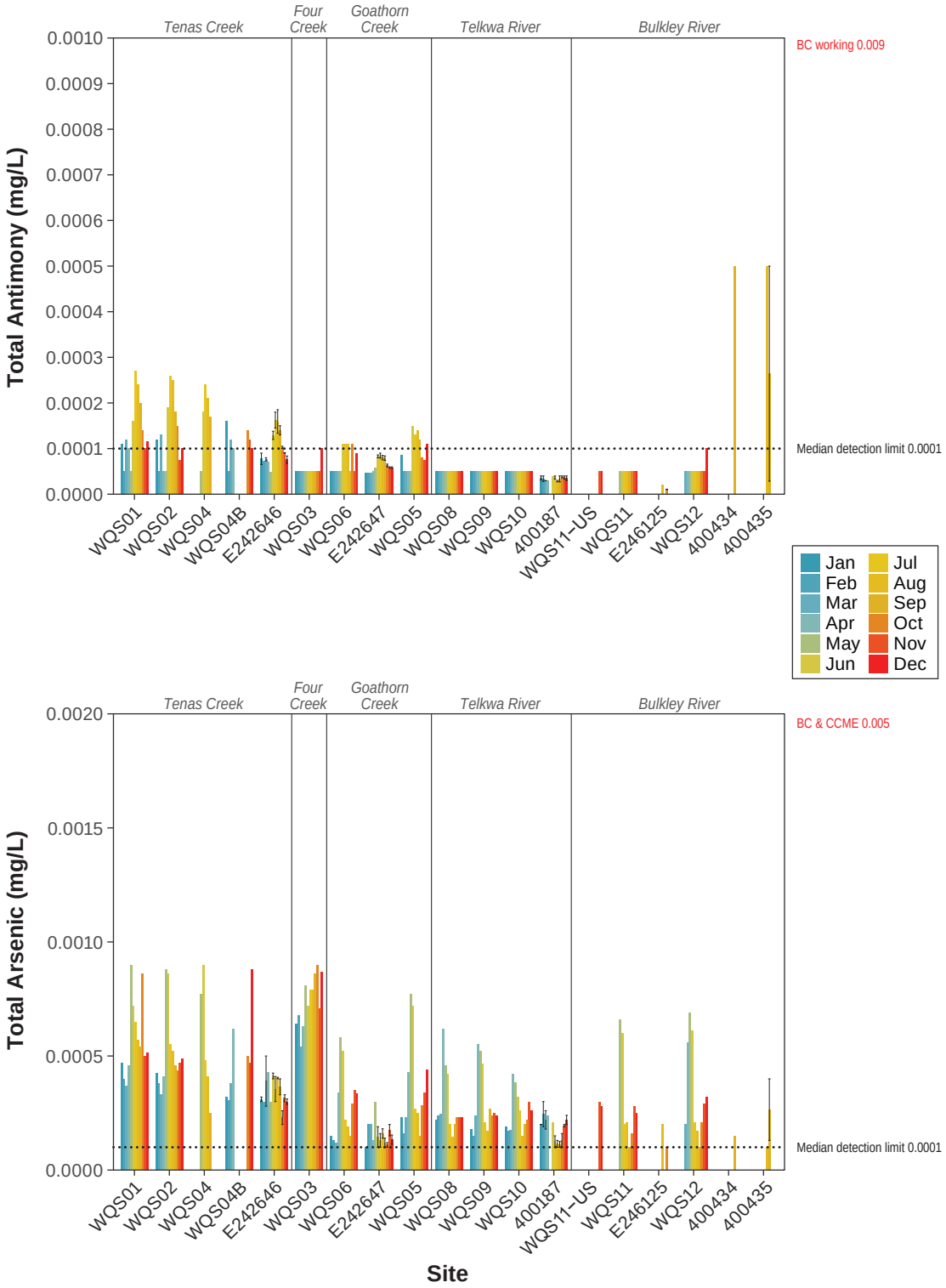
Total and Dissolved Aluminum in Tenas Project Streams, 2002 to 2018



Note: Error bars represent the standard error of the mean.
Values below the detection limit were plotted as half the detection limit.
BC dissolved aluminum guideline is pH dependent, see Appendix 8-A.

Figure 8.5-8

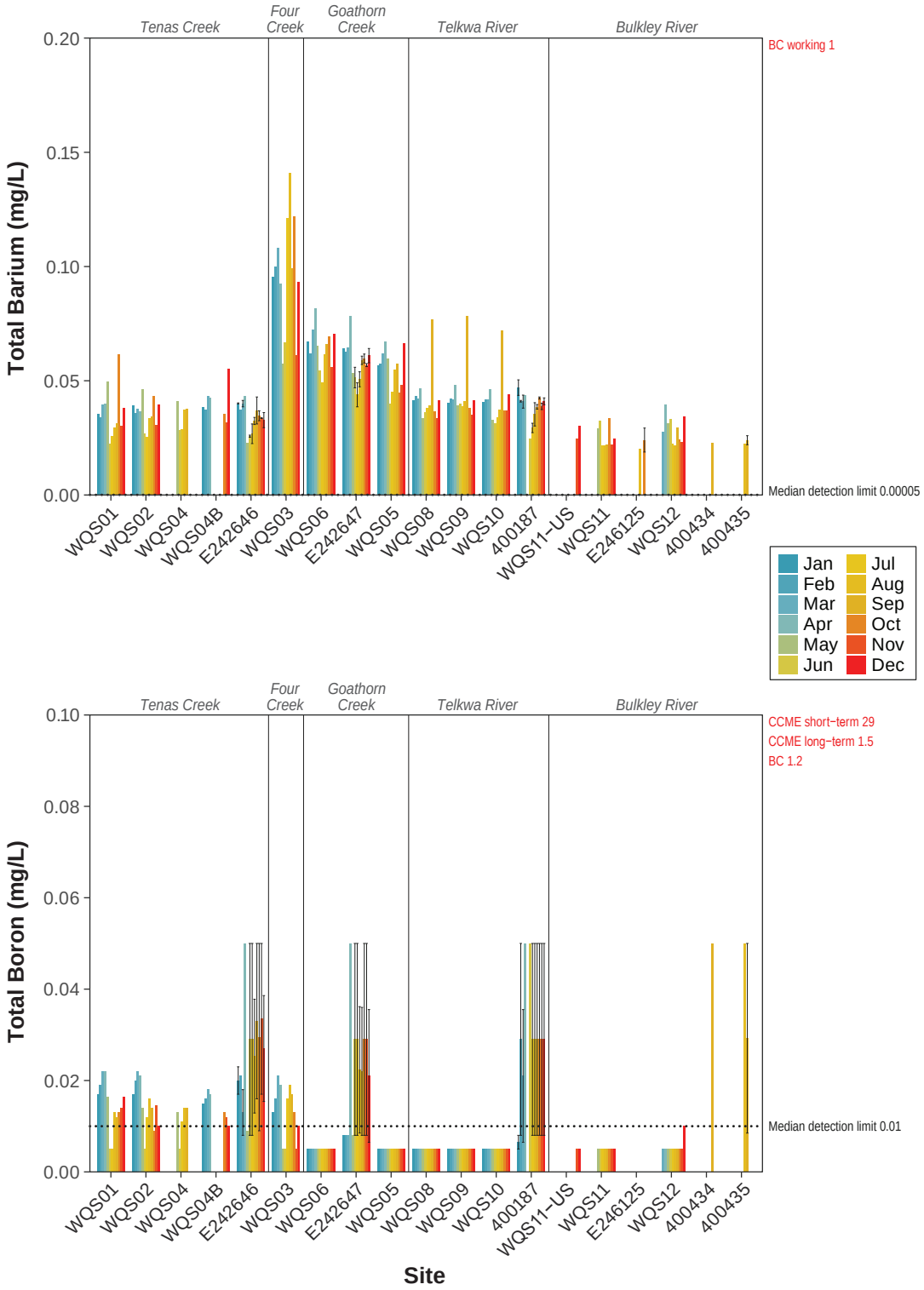
Total Antimony and Arsenic in Tenas Project Streams, 2002 to 2018



Note: Error bars represent the standard error of the mean.
Values below the detection limit were plotted as half the detection limit.

Figure 8.5-9

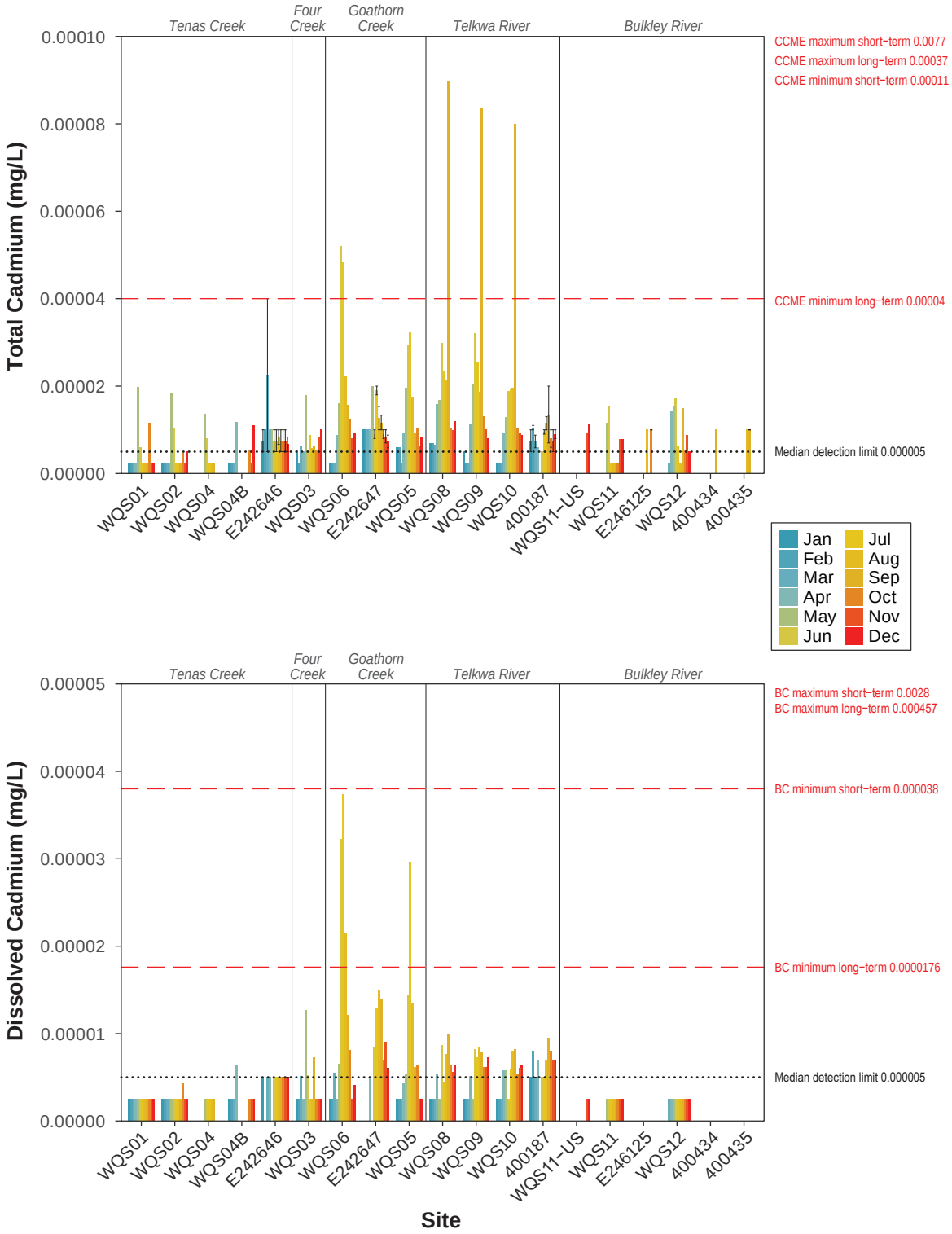
Total Barium and Boron in Tenas Project Streams, 2002 to 2018



Note: Error bars represent the standard error of the mean.
Values below the detection limit were plotted as half the detection limit.

Figure 8.5-10

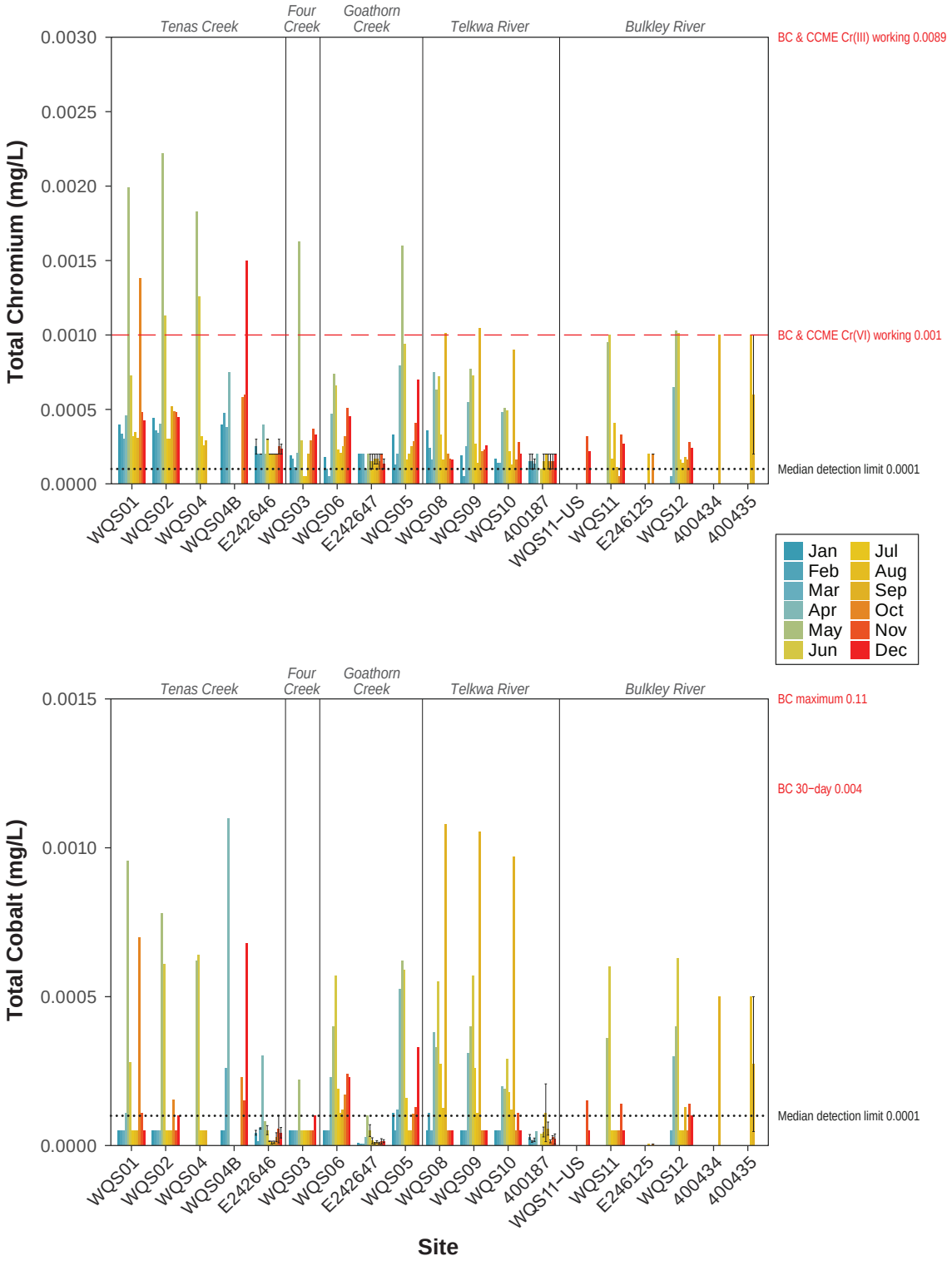
Total and Dissolved Cadmium in Tenas Project Streams, 2002 to 2018



Note: Error bars represent the standard error of the mean.
Values below the detection limit were plotted as half the detection limit.
BC dissolved cadmium guideline is hardness dependent, see Appendix 8−A.

Figure 8.5-11

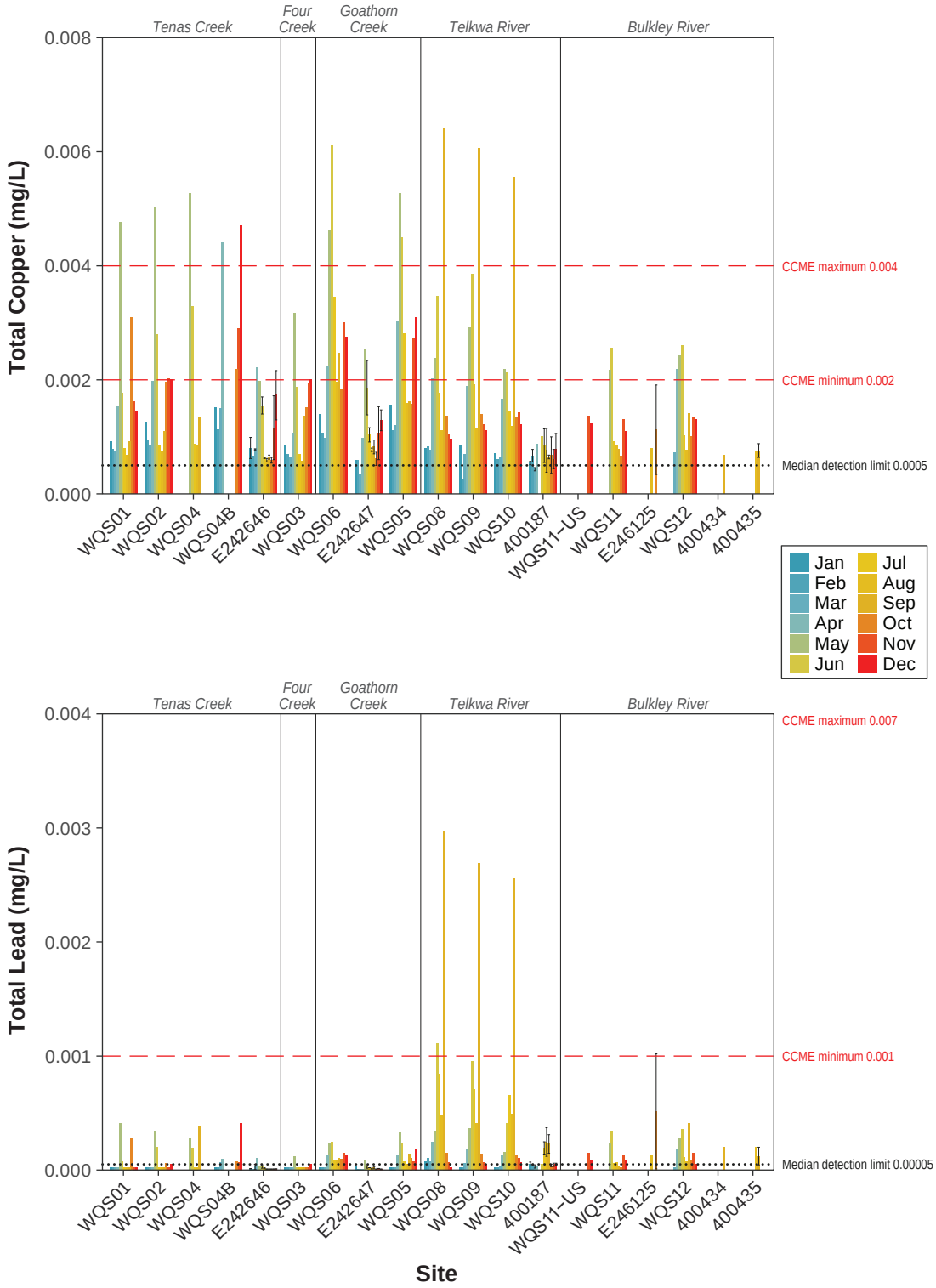
Total Chromium and Cobalt in Tenas Project Streams, 2002 to 2018



Note: Error bars represent the standard error of the mean.
Values below the detection limit were plotted as half the detection limit.

Figure 8.5-12

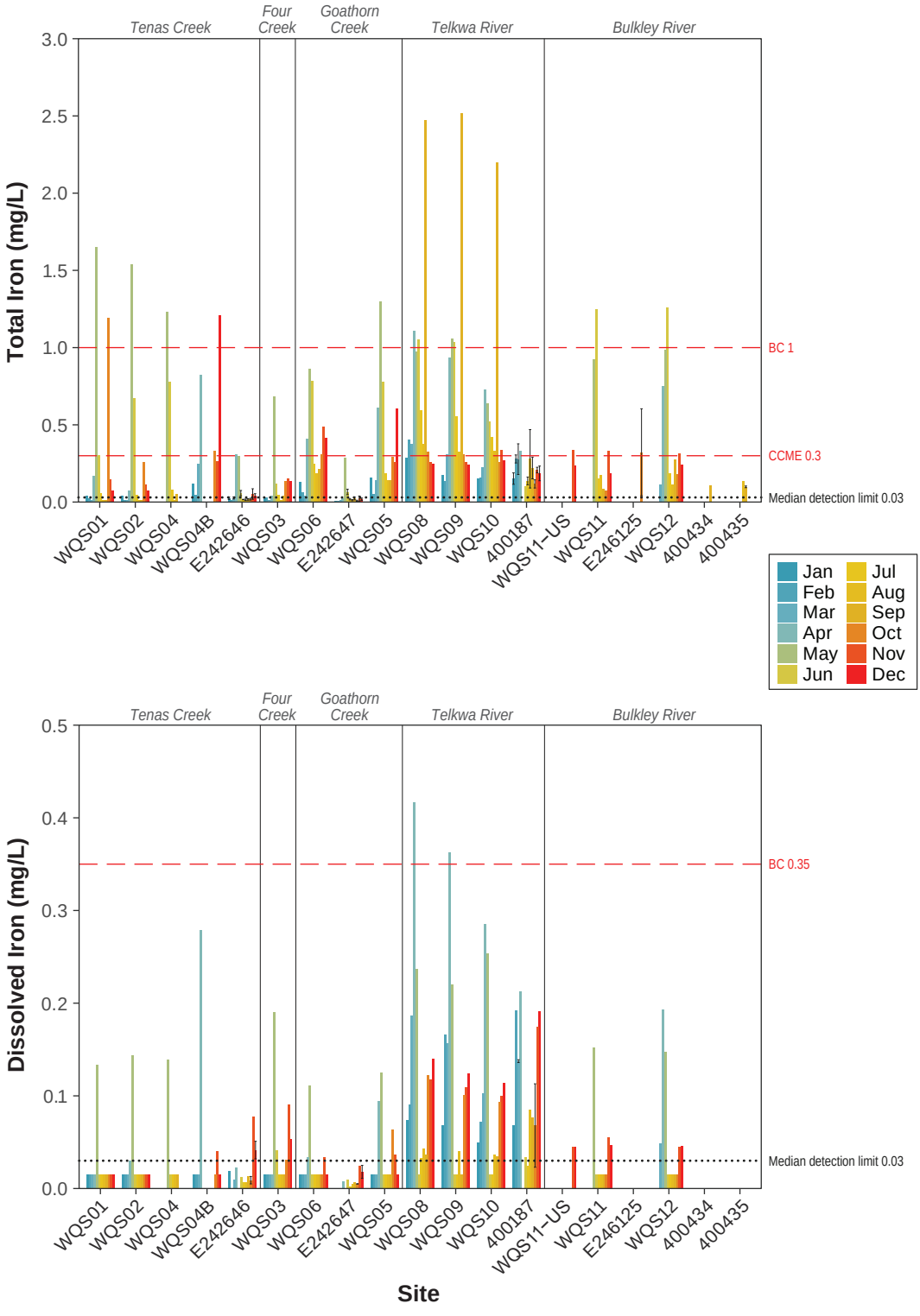
Total Copper and Lead in Tenas Project Streams, 2002 to 2018



Note: Error bars represent the standard error of the mean.
Values below the detection limit were plotted as half the detection limit.
BC and CCME copper and lead guidelines are hardness dependent (see Appendix 8-A).

Figure 8.5-13

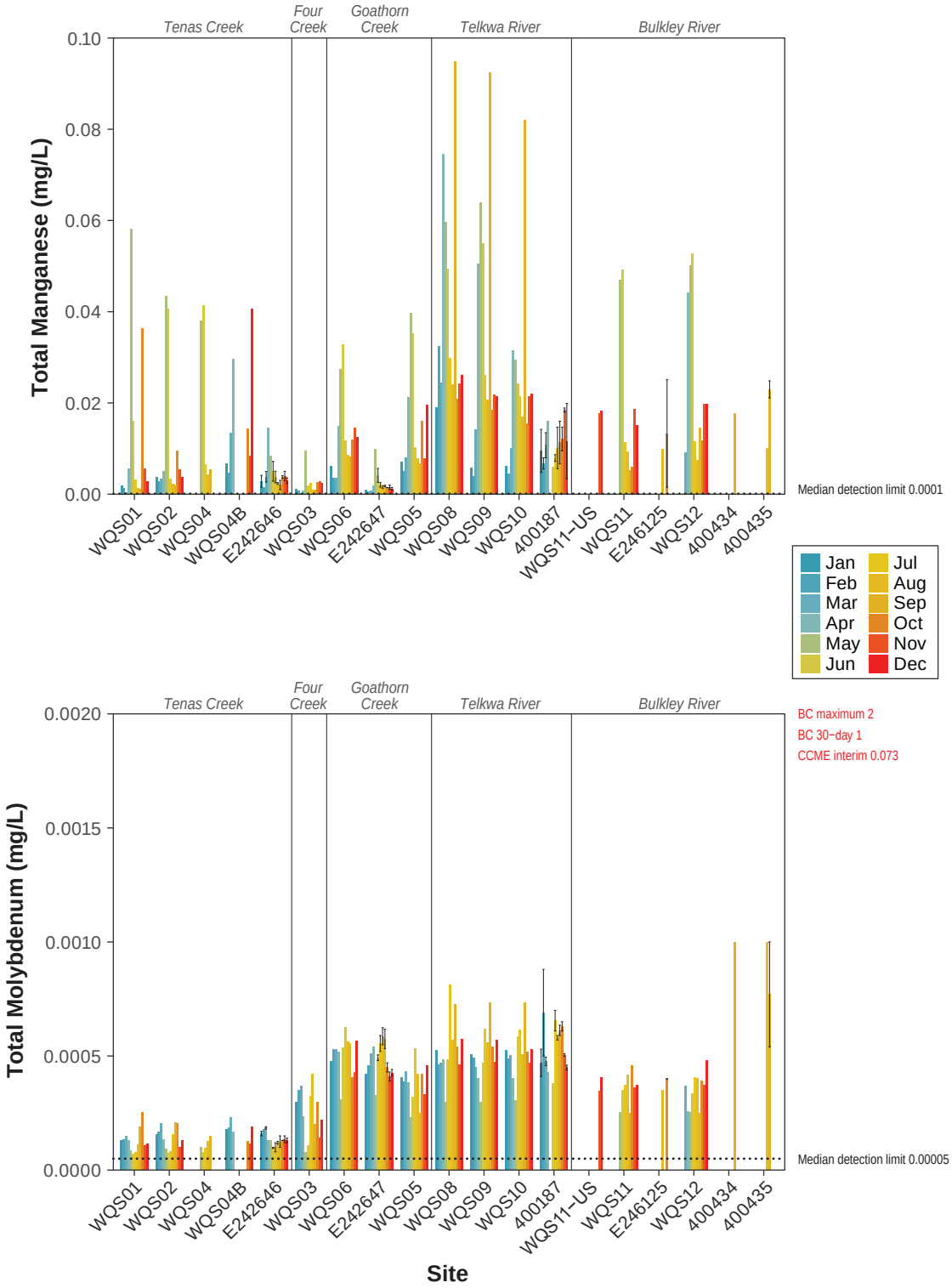
Total and Dissolved Iron in Tenas Project Streams, 2002 to 2018



Note: Error bars represent the standard error of the mean.
Values below the detection limit were plotted as half the detection limit.

Figure 8.5-14

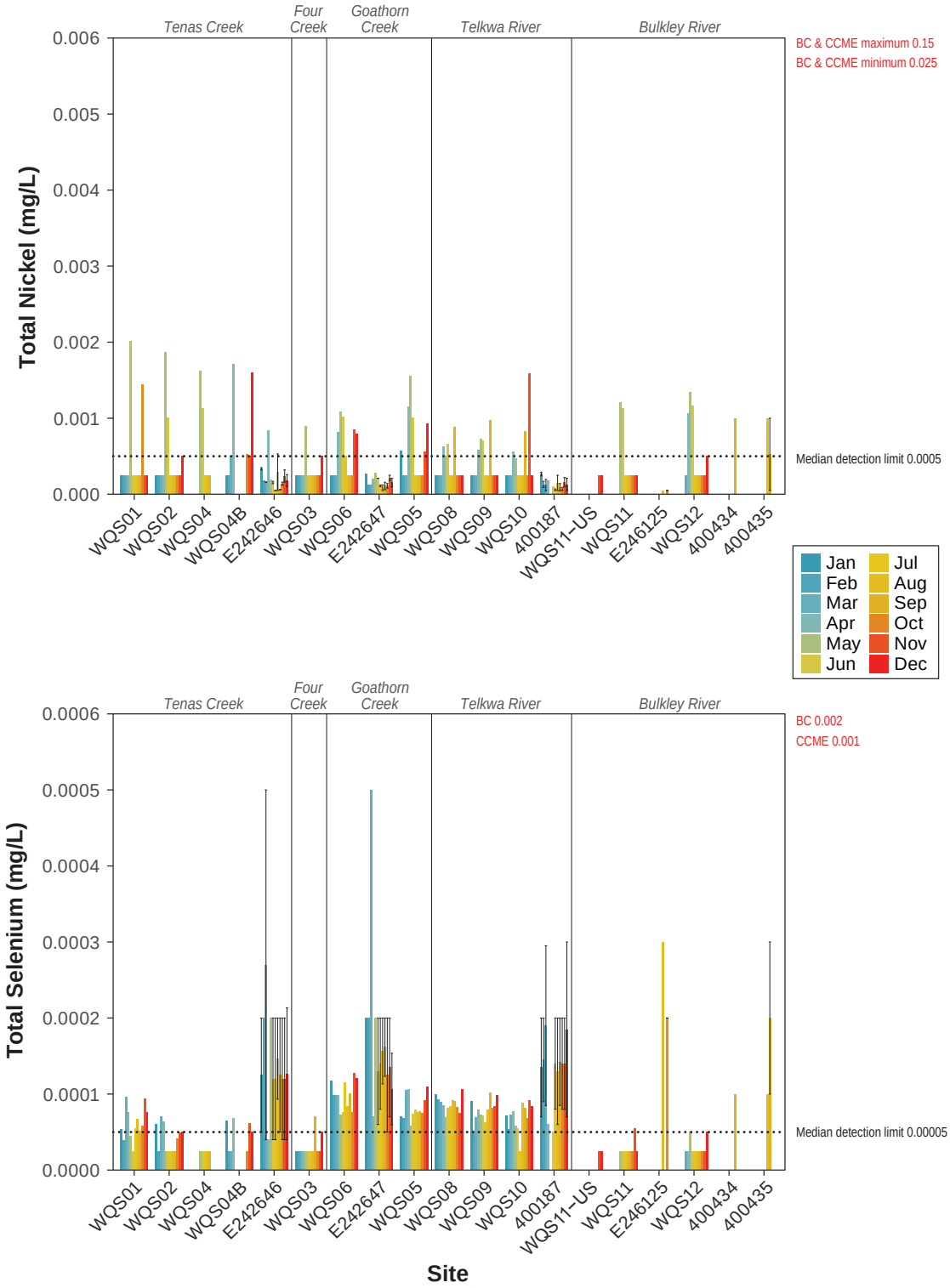
Total Manganese and Molybdenum in Tenas Project Streams, 2002 to 2018



Note: Error bars represent the standard error of the mean.
Values below the detection limit were plotted as half the detection limit.
BC manganese guideline is hardness-dependent, see Appendix 8-A.

Figure 8.5-15

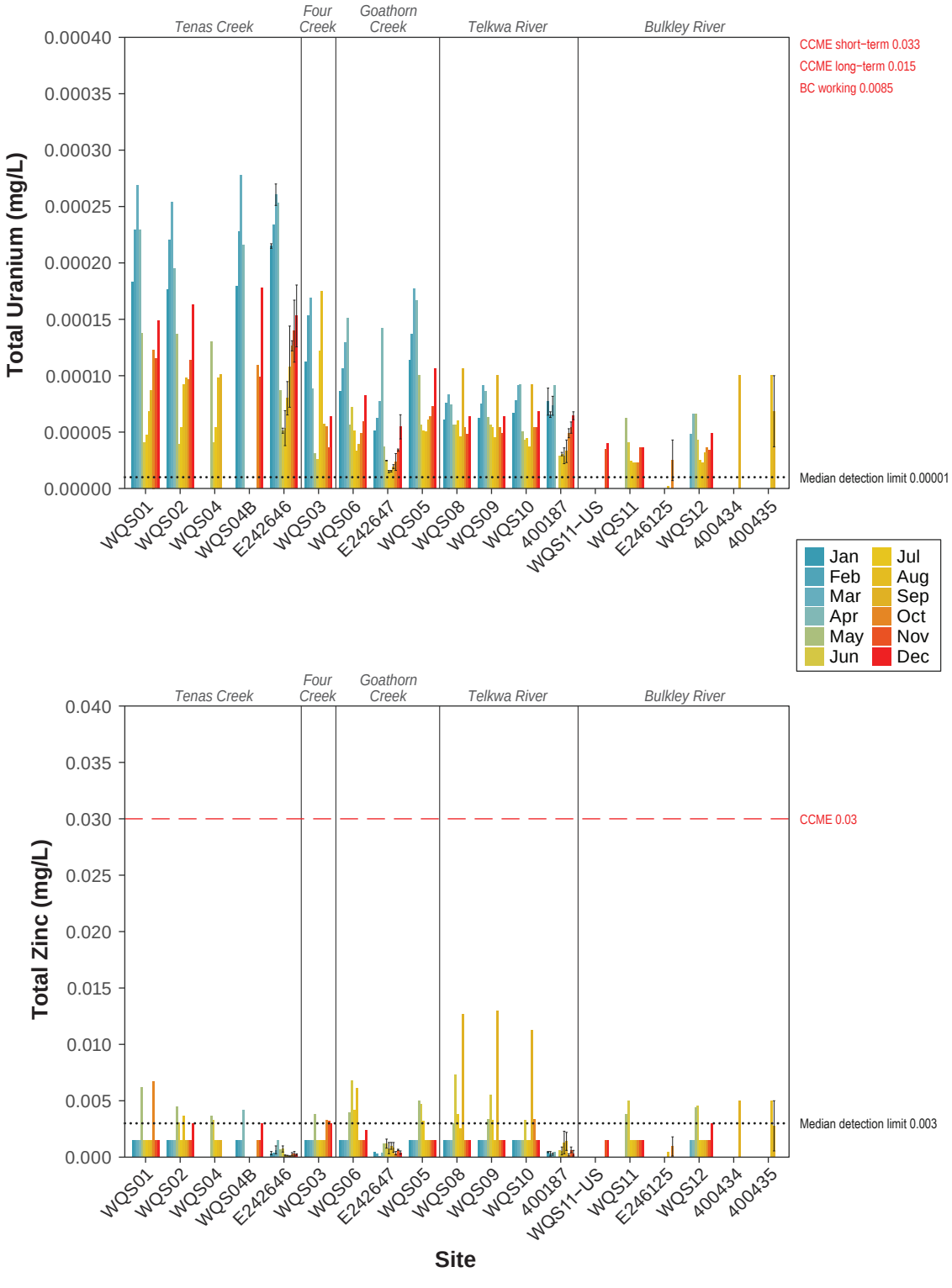
Total Nickel and Selenium in Tenas Project Streams, 2002 to 2018



Note: Error bars represent the standard error of the mean.
Values below the detection limit were plotted as half the detection limit.

Figure 8.5-16

Total Uranium and Zinc in Tenas Project Streams, 2002 to 2018



Note: Error bars represent the standard error of the mean.
Values below the detection limit were plotted as half the detection limit.
BC zinc guideline is hardness dependent, see Appendix 8−A.

8.5.7 Isotopes

Radium-226 was measured in August 2017, and ranged from <0.0054 to 0.012 Bq/L (Appendix 8-A).

8.5.8 Guideline Comparison

Project area streams (Tenas, Four, Goathorn, and Telkwa Creeks) were above BC and CCME guidelines for eight metals. Elevated metal concentrations above guidelines typically occurred during freshet (May/June), except in the Telkwa River where they were more common in September. Aluminum (total and dissolved), total copper, and total iron are elevated in the Project area, as every creek both upstream and downstream of the Project had concentrations frequently above the BC and CCME guidelines. Dissolved aluminum concentrations in Tenas, Four, and Goathorn creeks were above the BC maximum guideline during peak flows. Copper concentrations were above the BC maximum guideline in the Telkwa River in September. Concentrations were above the CCME long-term guideline for Cadmium in WQS06 on Goathoarn Creek and the Cadmium BC long-term guideline at both sites on Goathoarn Creek. Total chromium was above guidelines in all creeks, mostly commonly during freshet, except for the Telkwa River where elevated concentrations were in September. It should be noted that total chromium concentrations were compared against the guideline for hexavalent chromium. Exceedance factors and percentages presented here would therefore only be accurate if all chromium in the sample was present as hexavalent chromium (Cr (VI)), which is likely not the case.

The Telkwa River had concentrations above guidelines for eight metals, more than any other Project area stream. Telkwa River samples were above the CCME and BC guidelines for aluminum, chromium, copper, and iron, total cadmium, lead, silver, zinc, and dissolved iron. These elevated total metal concentrations were typically in September and associated with high TSS, while dissolved iron was elevated in April.

All anions and nutrients were below BC and CCME guidelines, and the Bulkley River provisional objectives for nitrite.

The dissolved oxygen guideline is unique as it represents a minimum value of dissolved oxygen that should be present, as opposed to a maximum value that should not be exceeded. Exceedances therefore indicate that enough oxygen is present to satisfy the guideline. Dissolved oxygen measured in September during the aquatic resources sampling (Section 10) ranged from 10.58 to 11.79 mg/L, well above CCME and BC guidelines, and the Bulkley River provisional objective.

All PAHs and organics were below detection limits, which were below BC and CCME guidelines. However, values of anthracene and benz[a]anthracene from May to August 2017 were below detection limits, but the detection limits were above CCME guidelines. Detection limits will be revised with the laboratory prior to the next sampling round to determine if detection limits below the guideline can be achieved.

8.5.9 Quality Assurance/Quality Control

8.5.9.1 Field

Field and travel blanks were collected during each monthly sampling trip from May 2017 to April 2018 (Appendix 8-B). Overall, sample contamination was low and the QA/QC blanks indicated that the water quality results were of good quality and reliable. There were sporadic detections of total phosphorus, dissolved organic carbon, total barium, magnesium, and manganese in the field blanks. The travel blanks had irregular detections of total alkalinity, ammonia, total and dissolved barium, and Ra-226. Detections of acidity were common in both the field and travel blanks, which reflects the lower pH of the distilled water used by the lab.

A total of 21 duplicate water quality samples were collected from May 2017 to April 2018 (Appendix 8-C). The RPD was calculated for parameters that had concentrations at least five times greater than their detection limit, which was 22% (596/2,751) of the duplicate measurements. Of these, the calculated RPD was between 20% and 50% for 44 (7%) of the duplicate concentrations, and above 50% for 17 (3%) of the duplicate concentrations. Elevated RPDs were generally sporadic, except for the duplicates collected in October 2017 from WQS02 and WQS05, which accounted for 29 of the 44 RPD values over 20%. This elevated variability could be linked to the increased flow from precipitation events (see Section 7, Hydrology). The field duplicate results indicate that sampling heterogeneity was low, and the data are of good quality, but with increased variability noted in October that could have been linked to peak flow events.

8.5.9.2 Laboratory

Laboratory contamination was low, as method blanks were below detection limits with the exception of a few sporadic detections (acidity, total nitrogen, aluminum, antimony, manganese, molybdenum, nickel, and zinc). The limit of reporting was adjusted for all associated samples, and sample ranges were at or above the detections in the method blanks.

Analytical accuracy was high, as all reference materials and matrix spikes were within their target ranges. Some lab control samples were marginally outside (<10% total) of their target range for dissolved magnesium and dissolved sulphur. The April 2018 lab control samples had a few high recoveries for PAHs; however, all samples were below detection limits so this did not affect the results. There were some matrix spike recoveries that could not be determined due to high analyte background in the sample. Analytical precision was also high, as laboratory replicate concentration RPD values were low (<20%), and all within defined limits.

All samples were analyzed within their recommended holding times, with the following exceptions: pH which has a short holding time (15 minutes) and was measured in the field (within the 15 minute holding time); several parameters with three day holding times (colour, turbidity, nitrate, nitrite, and dissolved orthophosphate; 24 to 50 samples), TSS (7 day holding time analyzed 1 day after for 13 samples), and acidity (14 day holding time analyzed 1 day after for 2 samples).

Table 8.5-1. BC and CCME Water Quality for the Protection of Freshwater Aquatic Life Guideline Screening, Tenas Project

Site	Total Phosphorus Trigger Range	Total Aluminum		Dissolved Aluminum				Total Cadmium		Total Chromium		Total Copper					
		CCME		BC				CCME		BC		CCME		BC			
				30-day		Maximum		Long-tern		Cr(VI)*				30-day		Maximum	
		0.1		0.05		0.1		Hardness-dependent		0.001		Hardness-dependent		Hardness-dependent		Hardness-dependent	
		Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
Tenas Creek																	
WQS01	Ultra-oligotrophic - Eutrophic	8.0	42%	2.8	8%	1.4	8%	-	0%	1.7	17%	2.0	17%	1.6	17%	-	0%
WQS02	Ultra-oligotrophic - Eutrophic	9.3	33%	2.9	8%	1.5	8%	-	0%	1.7	17%	1.6	25%	1.8	17%	-	0%
WQS04	Ultra-oligotrophic - Eutrophic	10.5	60%	2.9	20%	1.4	20%	-	0%	1.5	40%	2.1	40%	2.0	40%	-	0%
WQS04B	Ultra-oligotrophic - Meso-eutrophic	4.5	86%	2.6	14%	1.3	14%	-	0%	1.5	14%	1.7	57%	1.3	29%	-	0%
E242646	Ultra-oligotrophic - Mesotrophic	1.7	14%	-	0%	-	0%	-	0%	-	0%	1.3	4%	-	0%	-	0%
Four Creek																	
WQS03	Ultra-oligotrophic - Meso-eutrophic	3.9	42%	2.5	33%	1.8	17%	-	0%	1.6	8%	1.6	8%	1.6	8%	-	0%
Goathorn Creek																	
WQS06	Ultra-oligotrophic - Meso-eutrophic	3.3	85%	1.6	8%	-	0%	-	0%	-	0%	1.8	54%	1.9	31%	-	0%
E242647	Ultra-oligotrophic - Oligotrophic	-	0%	-	0%	-	0%	-	0%	-	0%	1.2	9%	-	0%	-	0%
WQS05	Ultra-oligotrophic - Meso-eutrophic	4.1	100%	1.6	17%	1.1	8%	-	0%	1.6	8%	1.7	50%	1.9	25%	-	0%
Telkwa River																	
WQS08	Ultra-oligotrophic - Eutrophic	5.9	85%	1.6	8%	-	0%	1.7	8%	1.0	8%	1.8	31%	2.0	23%	1.4	8%
WQS09	Ultra-oligotrophic - Eutrophic	8.5	58%	1.5	8%	-	0%	1.4	8%	1.0	8%	2.1	25%	2.1	25%	1.2	8%
WQS10	Ultra-oligotrophic - Eutrophic	5.0	75%	1.5	8%	-	0%	1.3	8%	-	0%	1.6	25%	1.6	25%	1.1	8%
400187	Ultra-oligotrophic - Mesotrophic	2.7	14%	1.9	8%	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%
Bulkley River																	
WQS11-US	Oligotrophic	2.3	100%	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%
WQS11	Ultra-oligotrophic - Meso-eutrophic	4.5	75%	1.7	13%	-	0%	-	0%	-	0%	1.2	25%	1.2	25%	-	0%
E246125	-	2.3	50%	n/a	n/a	n/a	n/a	n/a	n/a	-	0%	-	0%	n/a	n/a	n/a	n/a
WQS12	Ultra-oligotrophic - Eutrophic	4.6	80%	1.7	20%	-	0%	-	0%	1.0	20%	1.2	30%	1.3	20%	-	0%
400434	Ultra-oligotrophic - Oligotrophic	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-	0%	-	0%	n/a	n/a	n/a	n/a
400435	Ultra-oligotrophic - Oligotrophic	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-	0%	-	0%	n/a	n/a	n/a	n/a

(continued)

Table 8.5-1. BC and CCME Water Quality for the Protection of Freshwater Aquatic Life Guideline Screening, Tenas Project (completed)

	Total Iron				Dissolved Iron		Total Lead		Total Silver		Total Zinc	
	CCME 0.3		BC 1		BC 0.35		CCME Hardness-dependent		BC 30-day Hardness-dependent		BC 30-day Hardness-dependent	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
Tenas Creek												
WQS01	3.5	25%	1.4	17%	-	0%	-	0%	-	0%	-	0%
WQS02	3.7	17%	1.5	8%	-	0%	-	0%	-	0%	-	0%
WQS04	3.3	40%	1.2	20%	-	0%	-	0%	-	0%	-	0%
WQS04B	2.6	43%	1.2	14%	-	0%	-	0%	-	0%	-	0%
E242646	1.0	4%	-	0%	-	0%	-	0%	-	0%	-	0%
Four Creek												
WQS03	2.3	8%	-	0%	-	0%	-	0%	-	0%	-	0%
Goathorn Creek												
WQS06	1.8	54%	-	0%	-	0%	-	0%	-	0%	-	0%
E242647	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%
WQS05	2.7	33%	1.3	8%	-	0%	-	0%	-	0%	-	0%
Telkwa River												
WQS08	2.7	77%	1.5	23%	1.2	8%	2.0	15%	-	0%	1.7	8%
WQS09	2.9	67%	1.5	25%	1.0	8%	2.7	8%	1.3	8%	1.7	8%
WQS10	2.5	58%	2.2	8%	-	0%	2.6	8%	-	0%	1.5	8%
400187	1.3	19%	-	0%	-	0%	-	0%	-	0%	-	0%
Bulkley River												
WQS11-US	1.1	50%	-	0%	-	0%	-	0%	-	0%	-	0%
WQS11	2.8	38%	1.3	13%	-	0%	-	0%	-	0%	-	0%
E246125	2.0	50%	-	0%	n/a	n/a	1.0	33%	n/a	n/a	n/a	n/a
WQS12	2.8	40%	1.3	10%	-	0%	-	0%	-	0%	-	0%
400434	-	0%	-	0%	n/a	n/a	-	0%	n/a	n/a	n/a	n/a
400435	-	0%	-	0%	n/a	n/a	-	0%	n/a	n/a	n/a	n/a

Notes:

All units in mg/L; only parameters above guidelines are shown.

Canadian Council of Ministers of Environment water quality guidelines for the protection of aquatic life (accessed May 2018).

British Columbia water quality guidelines for the protection of freshwater aquatic life (accessed May 2018).

Half the detection limit was substituted for values below the detection limit.

Field duplicate samples were averaged before calculations.

Factor represents the factor by which average sample concentrations were greater than guideline concentrations.

Percent represents the percentage of replicates collected at each site that were greater than guidelines.

Metals data prior to 2002 was excluded due to poor detection limits.

9. SEDIMENT QUALITY

This chapter presents the methods and results of the sediment quality baseline monitoring program. The purpose of the 2017 to 2018 sediment quality program was to collect Project specific baseline sediment chemistry data. An understanding of site-specific aquatic characteristics will contribute to engineering analysis and water management feature design; support future development of water quality/water balance models, effects assessments, management plans, and closure planning; support permitting; support fisheries monitoring programs; and monitor changes in the local environment.

The main objectives of the 2017 sediment quality baseline program were to:

- characterize the spatial variability of sediment quality in creeks and rivers near the Project area; and
- establish sediment quality sites upstream and downstream of proposed Project infrastructure to support permitting and future monitoring programs.

9.1 STUDY AREA

The study area for sediment quality was the same as for surface water quality, as described in Section 8.1.

Sediment quality was sampled from six sites in the Project area, which overlapped with water quality and aquatic resources sampling (Table 9.1-1; Figure 8.1-1). Sampling was conducted in September 2017 concurrently with aquatic resources sampling. Historical information was also available within the Project area from two sites in Tenas Creek collected in 1986 (Section 9.3).

Table 9.1-1. Sediment Quality Sampling Sites, Tenas Project, 1986 and 2017

Waterbody	Site	Easting	Northing	Year Sampled	Description
Tenas Creek	STRM93L861699	614672	6049404	1986	Tenas Creek above confluence with unnamed tributary; ~1.4 km upstream of WQS01
	WQS01	615171	6050438	2017	Upstream reference for proposed Project infrastructure
	WQS02	616914	6053490	2017	Near-field downstream of deposits and proposed associated Project infrastructure
	STRM93L861412	617290	6054135	1986	Near-field downstream of deposits and proposed associated Project infrastructure; ~800 m downstream of WQS02
Goathorn Creek	WQS05	620615	6058133	2017	Mid-field downstream of confluence with Tenas Creek
Telkwa River	WQS08	617702	6057686	2017	Upstream reference; above confluence with Goathorn Creek; ~300 m upstream of water quality site
	WQS09	621394	6058998	2017	Mid-field downstream of confluence with Goathorn Creek
Bulkley River	WQS12	625021	6063831	2017	Mid-field downstream of proposed rail loadout and confluence with the Telkwa River

9.2 REGULATORY AND POLICY FRAMEWORK

The provincial and federal policies and regulations discussed in Section 8.2 for surface water quality are also applicable to sediment quality. There are also federal and working provincial sediment quality guidelines for the protection of aquatic life (BC ENV 2018, CCME 2018).

9.3 EXISTING INFORMATION

The review of existing information included examining public sources of sediment quality data and historical reports completed for the Tenas Project (Table 9.3-1). Data were reviewed for quality, relevance (i.e., geographic), and compliance with the Joint AIR for MA/EMA Permits (BC MEM and MOE 2016), which recommends following the guidance outlined in the *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (BC MOE 2016) and the *BC Field Sampling Manual* (Clark 2002, 2013 edition).

Table 9.3-1. Sediment Quality Data Information Table

Documents Reviewed	**Public** • Regional Geochemistry Survey (RGS) ▪ Stumpf. 2012. *Till Geochemistry and Clast Lithology Studies of the Bulkley River Valley, West-Central British Columbia (parts of NTS 093L).* Geoscience BC 2008-012. ▪ Geoscience BC. 2009. *Quest-West Project Sample Reanalysis*. Geoscience BC 2009-05. **Client-Supplied** • Frontier Geosciences Inc. 1999. *Report to Stephen Day BC Research Selenium Results*.
General Remarks	The RGS stream sediment data included in the Quest-West sample reanalysis had data available within the Project area that was included in the below data summary. Archived samples collected in 1986 were re-analyzed by inductively coupled plasma mass spectrometry (ICP-MS). The data presented in Stumpf (2012) and Frontier Geosciences (1999) have limited use due to sampling focus or missing/incomplete data.
Sampling Required by *Joint AIR for Mines Act and Environmental Management Act Permits (*Joint AIR for MA/EMA Permits)	Minimum of once per year during summer low-flow periods.
Existing Data	Below data were deemed useful and included in the data summary: • Geoscience BC ▪ STRM93L861699 – Tenas Creek upstream of WQS01; 1986 ▪ STRM93L861412 – Tenas Creek downstream of WQS02; 1986 Below data were deemed not useful and were not included in the data summary: • Stumpf till geochemistry • Frontier Geosciences ▪ HC3 to HC6, HC15 to HC18, and HC23; January 1999

(continued)

Table 9.3-1. Sediment Quality Data Information Table (completed)

Existing Data Issues	It is unclear from the Geoscience BC 2009 report if the stream sediment metal analysis was performed on the <0.63 µm size fraction. Data are included in the summary below, but should be interpreted with caution. Further, no replicates were collected and no QA/QC data are available (field splits, lab results). The Bulkley River Valley focused on till geochemistry instead of stream sediment geochemistry. Frontier Geosciences collected samples in January instead of during the summer low-flow period (as recommended by the Joint AIR for MA/EMA Permits). No map or UTMs were provided in the report, so it is uncertain where samples were collected. Further, samples were analyzed using hydride generation-atomic fluorescence spectrometry (HG-AFS). The report did not indicate if sediment samples were sieved to <63 µm prior to metals analysis.
Missing Data	None.
2017 Baseline Program	The 2017 baseline program collected sediment quality from Tenas Creek, Goathorn Creek, the Telkwa River, and the Bulkley River.
Key Issues	An upstream reference site on the Bulkley River is needed as an important station for the Joint *Mines Act*/*Environmental Management Act* application, baseline information for this site will be important for future monitoring programs.
Other Comments	None.

9.4 METHODOLOGY

9.4.1 Sampling

Sediment samples were collected from six sites in the Project area in September 2017, with three replicate samples collected from each site (Figure 8.1-1). Replicates were collected from distinct areas of each stream (e.g., different stretches of the main channel) covering 50 to 100 m depending on stream size and site access. For each replicate, sediment was spooned from the top 3 to 5 cm in depositional zones (areas of slow moving water). The subsamples were pooled until sufficient sample was obtained for a complete replicate. Excess water was drained and the sample was manually homogenized before being placed into pre-labelled Whirl-Pack bags. Samples were then sealed (no air bubbles) and kept cool in the dark until analyzed by ALS.

9.4.2 Analysis

Whole sediment samples from streams were analyzed for pH, particle size, nutrients, and TOC. Metal analyses were conducted on the <63 µm fraction of the sample because this is more bioavailable to benthic organisms and tends to contain greater concentrations of metals and other contaminants than the coarse sediment fraction (BC MOE 2016).

Sediments were compared to the current BC ENV working sediment quality criteria (BC ENV 2018) and CCME sediment quality guidelines (CCME 2018). BC sediment quality criteria includes a lower guideline and an upper guideline that provide a flexible interpretive tool for evaluating the toxicological significance of sediment chemistry data (BC ENV 2018). Sediment chemical concentrations below the lower guideline are rarely associated with adverse effects on biological

communities and concentrations between the lower and upper guideline are occasionally associated with adverse biological effects. Sediment concentrations above the upper guideline are frequently associated with adverse effects on biological communities. Similarly, the CCME guidelines include the Interim Sediment Quality Guidelines (ISQG) and the Probable Effect Levels (PEL), analogous to the BC lower and upper guidelines.

The percentage of stream sediment samples with concentrations greater than BC and CCME guidelines and the mean factor by which concentrations were greater than guideline were calculated. The mean factor and percentage of sediment concentrations greater than BC ENV and CCME guidelines are presented together in this report because many provincial and national guidelines overlap.

9.4.3 Quality Assurance/Quality Control

9.4.3.1 Field

The sediment quality assurance/quality control (QA/QC) program in 2017 included three sediment replicate samples collected at each stream site. Chain of custody (COC) forms were used for all samples. To determine the effectiveness of sample homogenization, 17% of samples were split in the field and submitted to ALS as a blind sample and analyzed separately (three samples total). The relative percent difference (RPD) between sediment splits were calculated for every parameter greater than five times the analytical detection limit (Equation 1 in Section 8.4.3.1; Clark 2013).

9.4.3.2 Laboratory

The ALS sediment QA/QC program included method blanks, laboratory replicates, and reference material. Potential laboratory contamination was assessed using method blanks, where analyte-free matrices were prepared and analyzed using the same methods as regular samples. Laboratory replicates were used to assess analytical precision by taking subsamples of field samples that were subsequently analyzed separately using the same analytical methods. Finally, reference materials are standards with known concentrations that are analyzed using the same methods as a regular sample to assess the methodological accuracy.

9.5 DATA SUMMARY

Sediment quality analytical results are presented in Appendix 9-A.

Project area sediments were principally sand (0.063 to 2.0 mm), which comprised 60 to 80% of stream sediments, followed by gravel (Figure 9.5-1). Sediment fines, silt and clay, were rare in Project area streams, with a maximum of 17% of the total composition at WQS09 in the Telkwa River.

Sediment total organic carbon was low in the Project area, ranging from 0.066% at WQS08 to 0.729% at WQS09, both in the Telkwa River (Figure 9.5-1).

Sediment metal concentrations were broadly comparable across Project area streams, although there were some areas with elevated concentrations (Figures 9.5-2 to 9.5-7). Goathorn Creek at WQS05 had the highest sediment concentrations of arsenic, cadmium, copper, mercury, and zinc, while arsenic,

chromium, iron, manganese, and nickel were greatest in the Tenas Creek samples. Silver concentrations were comparable in Goathorn Creek, and the Telkwa and Bulkley rivers, and comparatively low in Tenas Creek. Selenium concentrations were low in Project area streams, with a maximum of 0.3 mg/kg at the downstream Tenas Creek site in 1986.

Sediment arsenic, iron, manganese, and nickel appear to be elevated in the Project area as all sites, including upstream of the Project, were above BC lower sediment quality guidelines (Table 9.5-1). Iron and manganese concentrations were high, at sites upstream and downstream of the Project were also above the BC upper sediment quality guidelines. The majority of stations sampled in 2017 were also above the BC lower guideline for copper. The elevated sediment cadmium and zinc in Goathorn Creek at WQS05 noted above were higher than the BC lower guidelines. The 2017 samples from Tenas Creek were marginally above the BC chromium guideline. Goathorn Creek sediment concentrations were above guidelines for seven metals, and typically had the highest concentrations of all sampled sites. In contrast, the Bulkley River typically had the lowest sediment metal concentrations, and was above guidelines for the fewest parameters. Project area stream sediment concentrations were below federal and provincial guidelines for lead, mercury, selenium, and silver.

9.5.1 Quality Assurance/Quality Control

9.5.1.1 Field

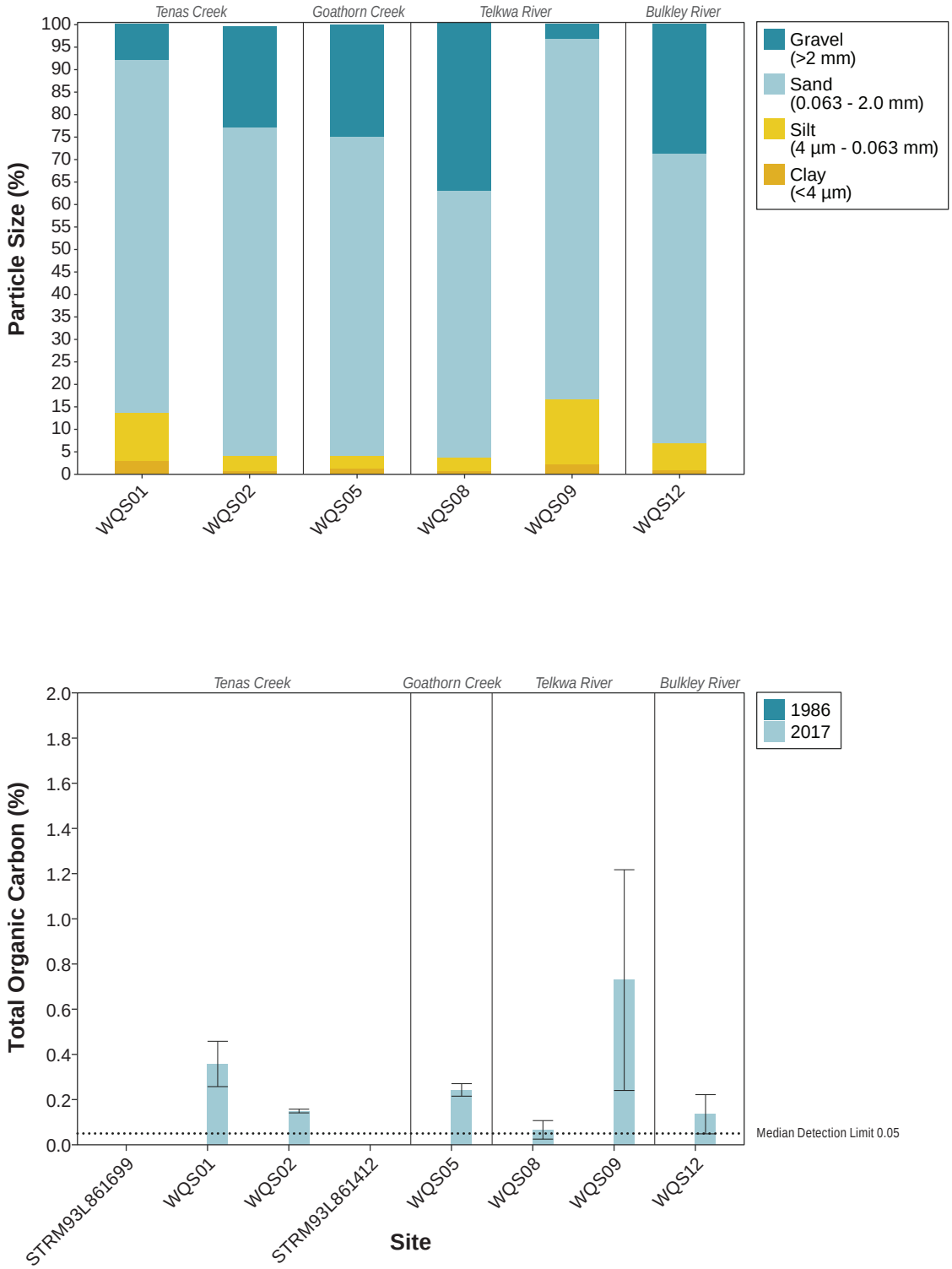
Three of the 2017 sediment quality replicates were split in the field and analyzed separately (Appendix 9-B). The RPD was calculated for parameters that had concentrations at least five times greater than their detection limit, which was 67% (76/114) of the duplicate split measurements. Of these, the calculated RPD was between 20% and 50% for 17 (22%) of the duplicate concentrations. The majority of these elevated RPDs (15) were associated with metals from WQS02. This indicates some heterogeneity remained in the sample following homogenization.

9.5.1.2 Laboratory

The results of the 2017 laboratory QA/QC program indicated that the data are of good quality. Laboratory duplicates and reference materials were within ALS's data quality objectives and there were no analyte detections in the methods blanks, except a single laboratory duplicate measurement of mercury that had an elevated RPD (49%). All samples were analyzed within their recommended holding times.

Figure 9.5-1

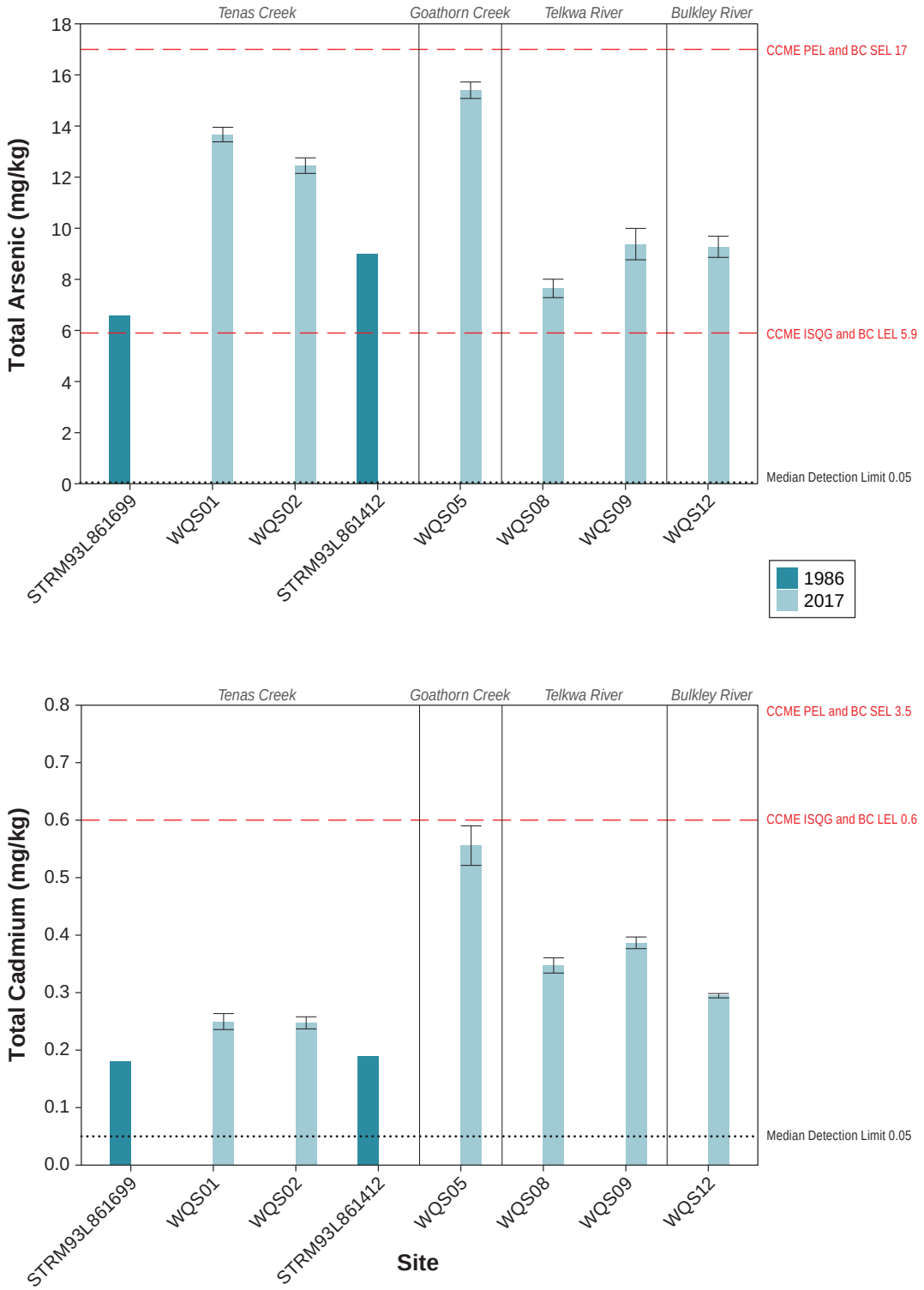
Particle Size and Total Organic Carbon in Tenas Project Stream Sediments, 2017



Notes: Stacked bars are the means of the overall sampling period (1986 and 2017).
Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.

Figure 9.5-2

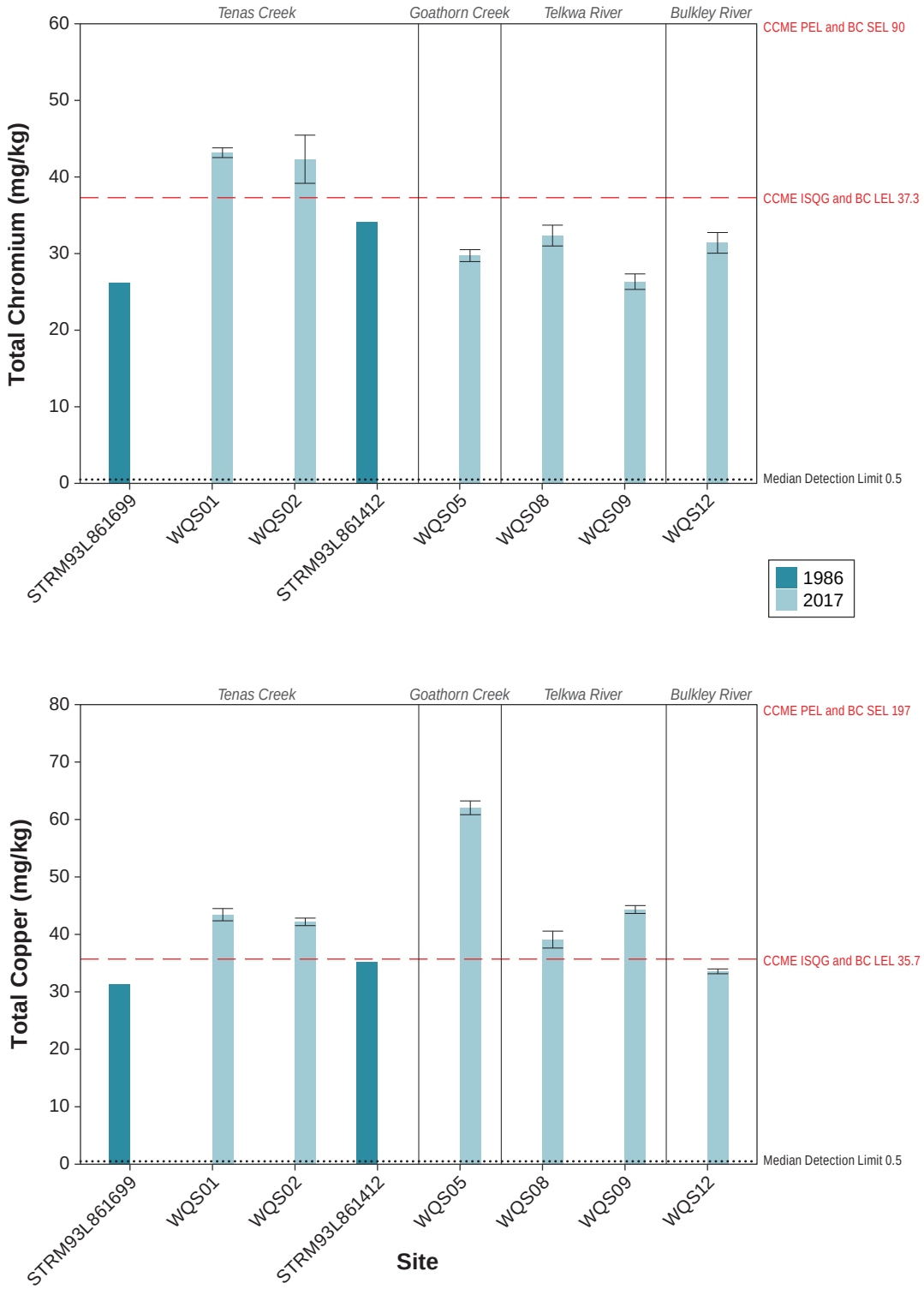
Arsenic and Cadmium in Tenas Project Stream Sediments, 1986 and 2017



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME sediment quality guideline: PEL = probable effect level; ISQG = interim sediment quality guideline.
BC sediment quality guideline: SEL = severe effect level; LEL = lower effect level.

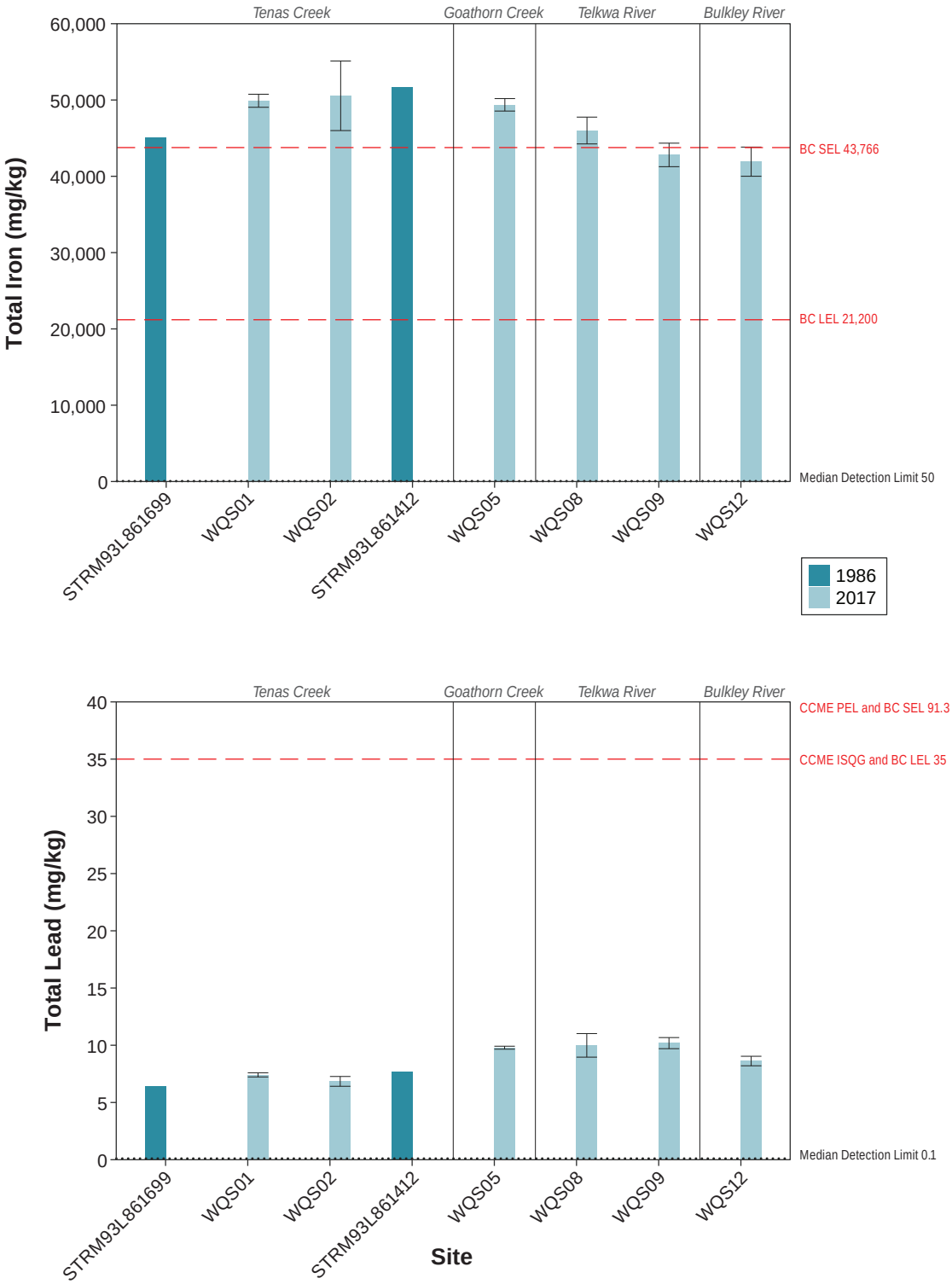
Figure 9.5-3

Chromium and Copper in Tenas Project Stream Sediments, 1986 and 2017



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME sediment quality guideline: PEL = probable effect level; ISQG = interim sediment quality guideline.
BC sediment quality guideline: SEL = severe effect level; LEL = lower effect level.

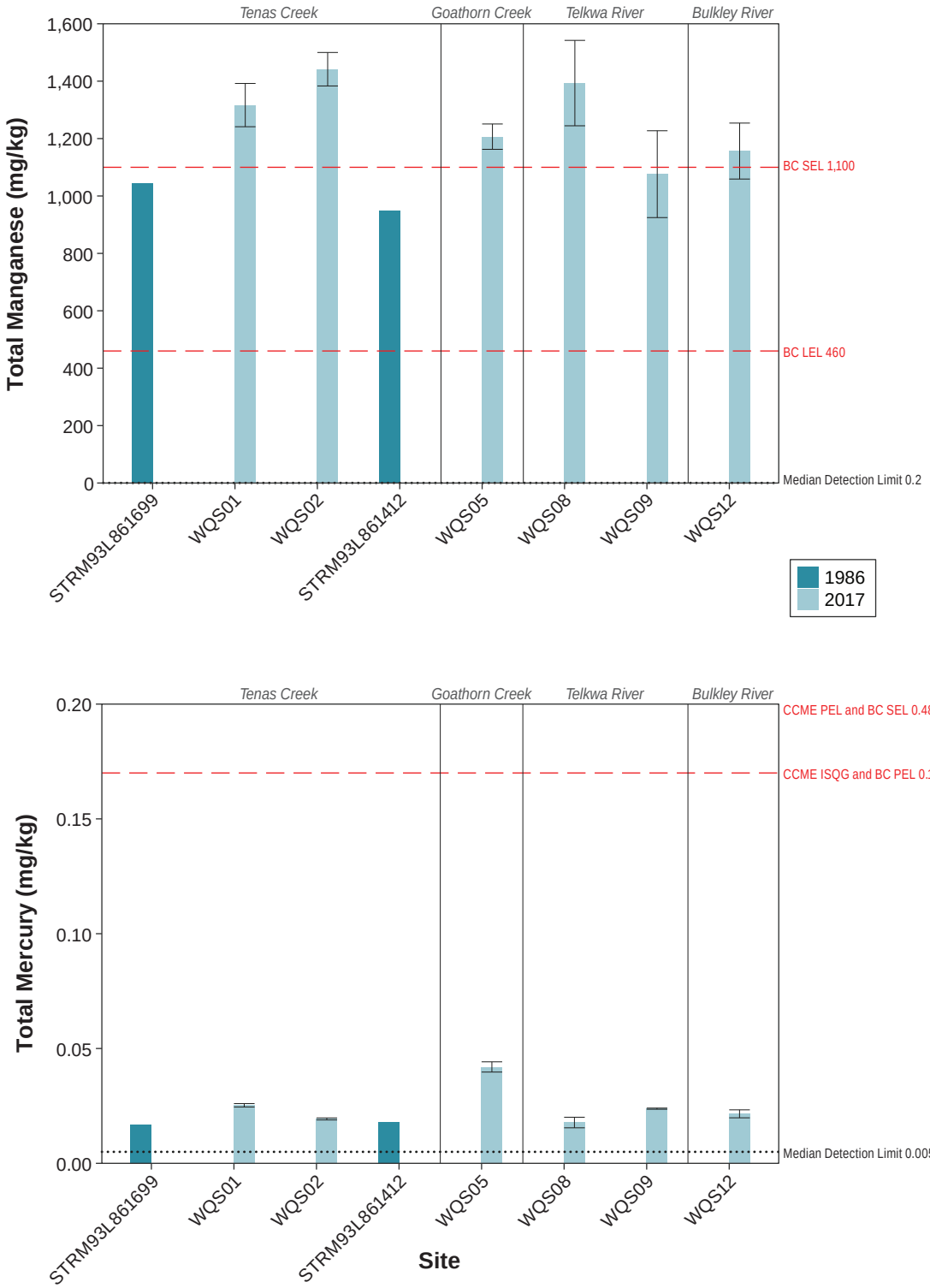
Figure 9.5-4
Iron and Lead in Tenas Project Stream Sediments, 1986 and 2017



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME sediment quality guideline: PEL = probable effect level; ISQG = interim sediment quality guideline.
BC sediment quality guideline: SEL = severe effect level; LEL = lower effect level.

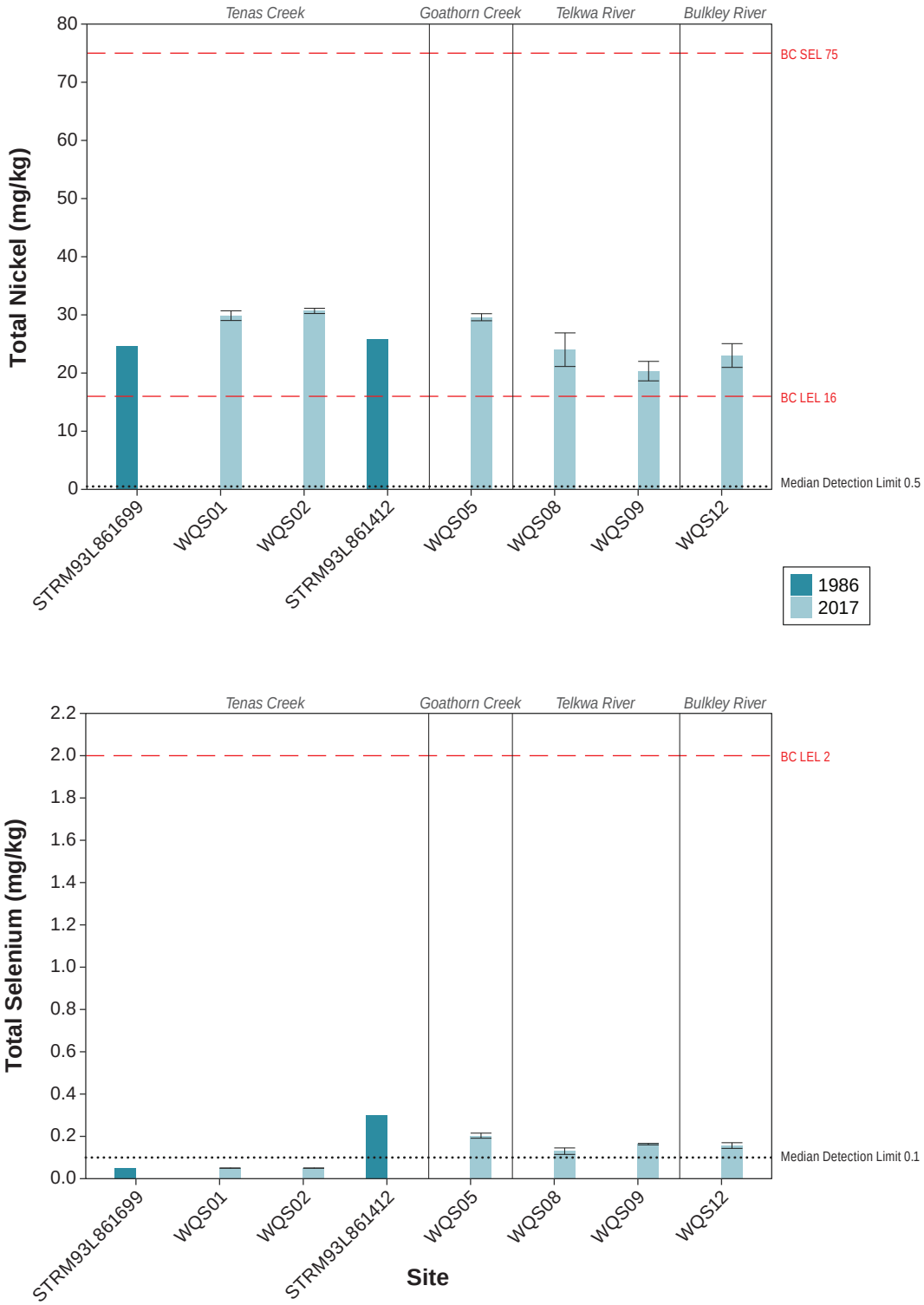
Figure 9.5-5

Manganese and Mercury in Tenas Project Stream Sediments, 1986 and 2017



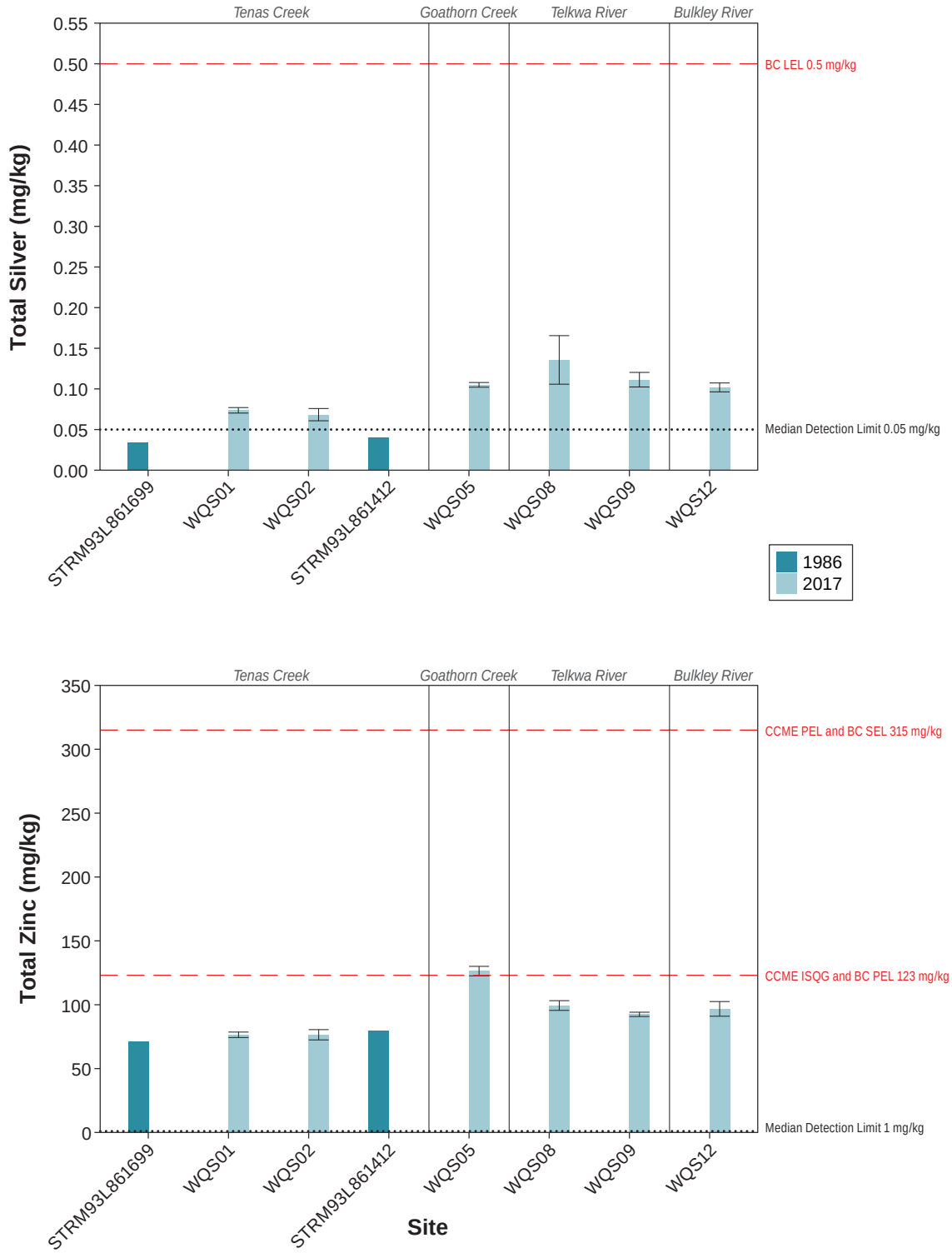
Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME sediment quality guideline: PEL = probable effect level; ISQG = interim sediment quality guideline.
BC sediment quality guideline: SEL = severe effect level; LEL = lower effect level.

Figure 9.5-6
Nickel and Selenium in Tenas Project Stream Sediments, 1986 and 2017



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC sediment quality guideline: SEL = severe effect level; LEL = lower effect level.

Figure 9.5-7
Silver and Zinc in Tenas Project Stream Sediments, 1986 and 2017



Note: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME sediment quality guideline: PEL = probable effect level; ISQG = interim sediment quality guideline.
BC sediment quality guideline: SEL = severe effect level; LEL = lower effect level.

Table 9.5-1. BC and CCME Sediment Quality for the Protection of Freshwater Aquatic Life Guideline Screening, Tenas Project, 1986 and 2017

		Arsenic BC = CCME ISQG 5.9		Cadmium BC = CCME ISQG 17		Chromium BC = CCME ISQG 37.3		Copper BC = CCME ISQG 35.7		Iron BC Lower 21,200		Iron BC Upper 43,766		Manganese BC Lower 460		Manganese BC Upper 1,100		Nickel BC Lower 16		Zinc BC = CCME ISQG 123	
Site	Year	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
Tenas Creek																					
STRM93L861699	1986	1.1	100%	-	0%	-	0%	-	0%	2.1	100%	1.0	100%	2.3	100%	-	0%	1.5	100%	-	0%
WQS01	2017	2.3	100%	-	0%	1.2	100%	1.2	100%	2.4	100%	1.1	100%	2.9	100%	1.2	100%	1.9	100%	-	0%
WQS02	2017	2.1	100%	-	0%	1.1	100%	1.2	100%	2.4	100%	1.2	100%	3.1	100%	1.3	100%	1.9	100%	-	0%
STRM93L861412	1986	1.5	100%	-	0%	-	0%	-	0%	2.4	100%	1.2	100%	2.1	100%	-	0%	1.6	100%	-	0%
Goathorn Creek																					
WQS05	2017	2.6	100%	1.0	33%	-	0%	1.7	100%	2.3	100%	1.1	100%	2.6	100%	1.1	100%	1.9	100%	1.1	67%
Telkwa River																					
WQS08	2017	1.3	100%	-	0%	-	0%	1.1	100%	2.2	100%	1.1	67%	3.0	100%	1.3	100%	1.5	100%	-	0%
WQS09	2017	1.6	100%	-	0%	-	0%	1.2	100%	2.0	100%	1.0	33%	2.3	100%	1.2	33%	1.3	100%	-	0%
Bulkley River																					
WQS12	2017	1.6	100%	-	0%	-	0%	-	0%	2.0	100%	1.0	33%	2.5	100%	1.2	33%	1.4	100%	-	0%

Notes:
All units in mg/kg; only parameters above guidelines are shown.
British Columbia working sediment quality guidelines for the protection of freshwater aquatic life (accessed February 2018).
Canadian Council of Ministers of Environment sediment quality guidelines for the protection of aquatic life (accessed February 2018).
Half the detection limit was substituted for values below the detection limit.
Split samples were averaged before calculations.
Factor represents the factor by which average sample concentrations were greater than guideline concentrations.
Percent represents the percentage of replicates collected at each site that were greater than guidelines.

10. AQUATIC RESOURCES

This chapter presents the methods and results of the aquatic resources baseline monitoring program. The purpose of the 2017 to 2018 aquatic resources program was to collect Project specific baseline aquatic data. An understanding of site-specific aquatic characteristics will contribute to engineering analysis and the design of water management features; support future development of water quality and water balance models, effects assessments, management plans, and closure planning; support permitting; support fisheries monitoring programs; and monitor changes in the local environment.

The main objectives of the 2017 aquatic resource baseline program were to:

- characterize the spatial variability of aquatic resources in creeks and rivers near the Project area; and
- establish aquatic resources sites upstream and downstream of proposed Project infrastructure to support permitting and future monitoring programs.

10.1 STUDY AREA

The study area for aquatic resources was the same as for surface water quality, as described in Section 8.1. Aquatic resources were sampled from six sites in the Project area, which overlapped with water quality and sediment quality sampling (Table 10.1-1; Figure 8.1-1). Sampling was conducted in September 2017 concurrently with sediment quality sampling. Historical aquatic resources information was also available within the Project area (Section 10.3). Historical aquatic resources data included benthic invertebrate samples from Tenas Creek, Goathorn Creek, and the Bulkley River, and periphyton biomass data from the Bulkley River.

Table 10.1-1. Aquatic Resources Sampling Sites, Tenas Project

Waterbody	Site	Easting	Northing	Year Sampled	Component	Description
Tenas Creek	WQS01	615171	6050438	2017	All	Upstream reference for proposed Project infrastructure
	WQS02	616914	6053490	2017	All	Near-field downstream of deposits and proposed associated Project infrastructure
	WQS04B*	620676	6057950	2000 and 2006	CABIN	Mid-field downstream of deposits and proposed associated Project infrastructure; CABIN site name BUL15
Goathorn Creek	BUL16*	620784	6058012	2000, 2004, and 2006	CABIN	Upstream reference; above confluence with Tenas Creek and the bridge
	WQS05	620615	6058133	2017	All	Mid-field downstream of confluence with Tenas Creek
Telkwa River	WQS08	617702	6057686	2017	All	Upstream reference; above confluence with Goathorn Creek; ~300 m upstream of water quality site
	WQS09	621394	6058998	2017	All	Mid-field downstream of confluence with Goathorn Creek

(continued)

Table 10.1-1. Aquatic Resources Sampling Sites, Tenas Project (completed)

Waterbody	Site	Easting	Northing	Year Sampled	Component	Description
Bulkley River	WQS12	625021	6063831	2017	All	Mid-field downstream of proposed rail loadout and confluence with the Telkwa River
	BUL01*	618742	6072980	2016	CABIN	Far-field downstream of Project; adjacent to Riverside Park in Smithers
	400434*	618410	6074024	1987 to 1990	Periphyton biomass	Far-field downstream of Project; downstream of Smithers and upstream of sewage discharge
	400435*	617870	6074979	1987 to 1990	Periphyton biomass	Far-field downstream of Project; downstream of Smithers and downstream of sewage discharge
	BUL73*	617361	6075053	2007	CABIN	Far-field downstream of Project; downstream of Smithers and downstream of sewage discharge (~500 m downstream of 400435)

** Publically available data.*

10.2 REGULATORY AND POLICY FRAMEWORK

The provincial and federal policies and regulations discussed in Section 8.2 for surface water quality are also applicable to aquatic resources. Additionally, there is a provincial guideline for periphyton biomass for the protection of aquatic life (BC ENV 2018).

10.3 EXISTING INFORMATION

The review of existing information included examining public sources of aquatic resources data and historical reports completed for the Tenas Project (Table 10.3-1). Data were reviewed for quality, relevance (i.e., geographic), and compliance with the Joint AIR for MA/EMA Permits (BC MEM and MOE 2016), which recommends following the guidance outlined in the *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (BC MOE 2016) and the *BC Field Sampling Manual* (Clark 2002, 2013 edition).

10.4 METHODOLOGY

10.4.1 Periphyton

10.4.1.1 Sampling

Periphyton biomass (as chlorophyll *a*) was sampled from six stream sites in 2017. Three replicates were collected from randomly selected rocks at each site. Each replicate consisted of three composite subsamples scrubbed from an individual rock using a template of known surface area (19.6 cm^2), a modified toothbrush, syringe, and wash bottle.

Periphyton biomass samples were prepared by gently filtering samples through a 0.45 µm filter using a hand pump and filter apparatus. Filters were folded in half, placed in an opaque tube, and kept frozen until they were analyzed for chlorophyll *a* by ALS.

Table 10.3-1. Aquatic Resources Data Information Table

Documents Reviewed	**Public** • Bio Logic. 2003. *A Benthic Invertebrate Index of Biological Integrity for Streams in the Bulkley TSA: Field Season 2002.* • Bio Logic. 2005. *A Multimetric Approach to Skeena Region Stream Assessments.* • Bustard. 1983. *Assessment of Benthic Invertebrate and Juvenile Fish Populations in Goathorn and Tenas Creeks and the Lower Telkwa River, September 1983.* • *Canadian Aquatic Biomonitoring Network (CABIN) database.* https://www.canada.ca/en/environment-climate-change/services/canadian-aquatic-biomonitoring-network.html • *British Columbia Environmental Monitoring System (BC EMS).* https://a100.gov.bc.ca/pub/ems/listDataFiles.do?userAction=mainmenu&selectionIndex=0&.x=55&.y=12 **Client-Supplied** • Bustard. 1985. *Telkwa Coal Project: Aquatic Resource Assessment.*
General Remarks	The CABIN database and BC EMS have data available within the Project area that was included in the below data summary. CABIN is a standardized protocol developed by Environment and Climate Change Canada (ECCC) and field personnel require formal training. It is the recommended approach in the 'Joint AIR for MA/EMA Permits' (BC MEM and MOE 2016). The data collected by Bustard (1983 and 1985) and Bio Logic (2003 and 2005) have limited use. Methodologies were either not approaches recommended by BC ENV, or were unclear. Raw data were also unavailable for the Bio Logic reports. These reports do have some broad value for understanding benthic invertebrate communities in the Project area, but due to methodological differences or lack of raw data, were not directly comparable to the data collected in 2017.
Sampling Required by *Joint AIR for Mines Act and Environmental Management Act Permits* (Joint AIR for MA/EMA Permits)	• A minimum of one year of data. • Replicate sampling required for periphyton and benthic invertebrates (unless CABIN protocols are implemented).
Existing Data	Below data were deemed useful and included in the data summary: • BC EMS - Periphyton biomass ▪ Bulkley River U/S from Smithers Sewage (400434); 1987 to 1992, 2012 ▪ Bulkley River IDZ at Smithers (400435); 1987 to 1992, 2012 • CABIN - Benthic Invertebrates ▪ Tenas Creek (BUL15, same location at WQS04B); 2000 and 2006 ▪ Goathorn Creek (BUL 16) approximately 80 m upstream of Tenas Creek confluence; 2000, 2004, and 2006 ▪ Bulkley River at Smithers (BUL01); 2016 ▪ Bulkley River downstream of Smithers (BUL73); 2007 Below data were not deemed useful and not included in the data summary: • Bustard ▪ Goathorn Creek periphyton biomass (chlorophyll a) accumulation, taxonomy, and tissue nitrogen:phosphorus (N:P) ratios in 1984 ▪ Goathorn Creek, Tenas Creek, and Telkwa River benthic invertebrate taxonomy in 1983 and 1984 ▪ Goathorn Creek benthic invertebrate drift in 1984 • Bio Logic ▪ Benthic invertebrates from Goathorn Creek

(continued)

Table 10.3-1. Aquatic Resources Data Information Table (completed)

Existing Data Issues	**Bustard (1983 and 1985)** The survey completed by Bustard (1985) did not conform to methodologies currently recommended by the BC Field Sampling Manual (Clark 2002, 2013 edition). Periphyton sampling was completed with an artificial substrate, and therefore doesn't necessarily represent the natural community (as particle size and texture can affect periphyton biomass and/or composition; Biggs 2000). Indeed, only diatoms (Bacillariophyceae) were found in this survey. Benthic invertebrate sampling was conducted with a Waters-Knapp sampler (similar to a Hess), with six replicates collected. This approach is acceptable; however, the 'Joint Application Information Requirements for *Mines Act* and *Environmental Management Act* Permits' does recommend CABIN sampling, which was not developed at the time of historical sampling. Benthic invertebrates were also collected with a drift net. No taxonomy QA/QC was completed. **Bio Logic (2003 and 2005)** Limited use as raw data not provided, and unclear mixture of sampling methodologies (i.e., Surber and kick net).
Missing Data	None.
2017 Baseline Program	The 2017 baseline program collected periphyton (biomass and taxonomy) and benthic invertebrates (taxonomy, CABIN) from Tenas Creek, Goathorn Creek, the Telkwa River, and the Bulkley River.
Key Issues	An upstream reference site on the Bulkley River is needed as an important station for the Joint *Mines Act*/*Environmental Management Act* application, baseline information for this site will be important for future monitoring programs. Baseline water toxicity and tissue residue sampling will also be required once the discharge location is finalized.
Other Comments	None.

Three periphyton taxonomy replicates were also collected at six stream sites in 2017. Field sampling protocols followed the same protocols as for biomass, with each replicate composed of three composite subsamples. Each replicate was placed in a 500 mL plastic jar and preserved with Lugol's iodine solution. Taxonomy samples were sent to Biologica Environmental Services Ltd. (Biologica) in Victoria, BC for identification and enumeration.

10.4.1.2 Analysis

Chlorophyll *a* (chl *a*) concentration was used as an estimate of periphyton biomass (as µg chl a/cm^2).

Periphyton density was calculated by dividing the total number of cells counted by the area sampled, and corrected for subsampling. Taxa not identified to family were included in density estimations, but removed from community composition, richness, and Simpson's diversity calculations.

Periphyton were grouped into genera for richness and Simpson's diversity calculations. Richness and diversity were calculated according to the *Metal Mining Technical Guidance for Environmental Effects Monitoring* (EC 2012c):

$$D = 1 - \sum_{i=1}^{S} (p_i)^2 \qquad \text{[Equation 2]}$$

where:
S = the number of taxa in the replicate
p_i = the proportion of the i^{th} taxon in the replicate

Simpson's diversity can range from 0 (lowest diversity) to 1 (maximum diversity). The use of Simpson's diversity index accounts for both the number of taxa present and the relative density of organisms from each taxa (evenness).

10.4.1.3 Quality Assurance/Quality Control

The periphyton field QA/QC program in 2017 involved three replicates for biomass and three replicates for periphyton taxonomy. Chain of custody forms were used for all samples.

The laboratory chlorophyll *a* QA/QC included method blanks and reference material (see Section 9.4.3.2).

Biologica followed their own internal QA/QC procedures for periphyton taxonomy that included the analysis of a minimum of 10% of samples (two samples) by two separate taxonomists to ensure taxonomic accuracy and the reproducibility of sample processing methods.

10.4.2 Benthic Invertebrates

10.4.2.1 Sampling

Kick net sampling was conducted by CABIN-certified field personnel once at each site in 2017 according to the CABIN protocol (EC 2012a). A standard CABIN kick net (400 µm mesh) was used for sampling. Samples were collected by placing the kick net downstream of the collector with the flat bottom of the net resting on the substrate. The sampler then moved upstream, dragging the net along the bottom of the stream, disturbing the substrate to a depth of 5 to 10 cm using a kicking motion. The sampler zigzagged continuously over the stream bottom for three minutes. The contents of the kick net sample were transferred to a sieve, and sample debris was washed from the net using a wash bottle. Large rocks were scrubbed, rinsed, and removed from the sample. The contents were transferred into clean 1 L, pre-labelled plastic jars and preserved to a final concentration of 10% buffered formalin. Samples were sent to Biologica for enumeration and identification.

10.4.2.2 Analysis

Invertebrates were sorted and identified to the lowest possible taxonomic level (usually genus). Ostracoda, Cladocera, Nematoda, Copepoda, Porifera, Platyhelminthes, and terrestrial organisms were excluded from all analysis following Environment Canada CABIN protocols (EC 2012b). Immature, damaged, or specimens not identified to the family level were included in abundance estimations, but were excluded from all other analyses. Benthic invertebrate abundance, richness, and Simpson's diversity (D) indices were calculated for each sample at the family level. Simpson's diversity was calculated using Equation 2 (Section 10.4.1.2).

10.4.2.3 Quality Assurance/Quality Control

Chain of custody forms were used for all benthic invertebrate samples. Benthic invertebrate QA/QC followed CABIN protocols (ECCC 2012b), which included determining the sorting efficiency of the subsampled benthic invertebrates, and the percent similarity of samples identified by two separate taxonomists to ensure taxonomic accuracy and the reproducibility of sample processing results.

10.5 DATA SUMMARY

Raw periphyton data for biomass (as chlorophyll a) and taxonomy are presented in Appendices 10-A and 10-B. Periphyton QA/QC results are available in Appendix 10-C. Raw benthic invertebrate data are presented in Appendix 10-D and the QA/QC results in Appendix 10-E.

10.5.1 Periphyton

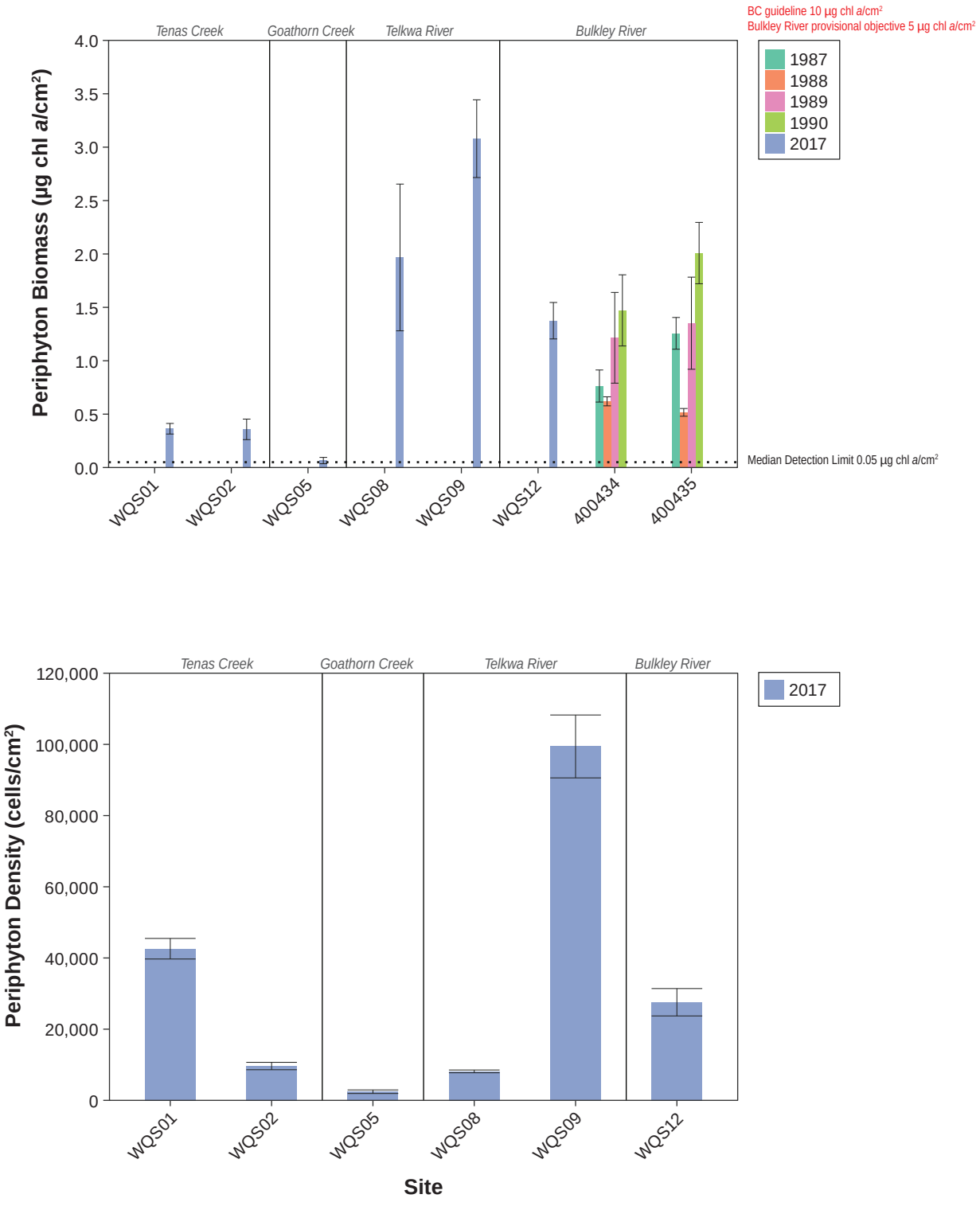
Periphyton biomass, as chlorophyll *a*, was higher in the larger rivers than the smaller tributary creeks (Figure 10.5-1). The Telkwa River at WQS09 had the highest mean biomass (3.08 µg chl *a*/cm²) and density (99,400 cells/cm²) and were dominated by diatoms (Figure 10.5-2), primarily *Achnanthidium* and *Fragilaria* spp. (Table 10.5-1). Conversely, mean biomass (0.0652 µg chl *a*/cm²) and density (2,430 cells/cm²) were lowest in Goathorn Creek at WQS05. The historical periphyton biomass data for the Bulkey River displayed considerable interannual variability. Periphyton biomass was well below the BC guideline and the Bulkley River provisional objective (Figure 10.5-1).

Table 10.5-1. Dominant Periphyton, Tenas Project, 2017

Watershed	Site	Class	Genus	Percent
Tenas Creek	WQS01	Cyanophyceae	*Heteroleibeinia*	90%
		Cyanophyceae	*Leptolyngbya*	6%
		Cyanophyceae	*Pseudanabaena*	3%
	WQS02	Cyanophyceae	*Heteroleibeinia*	77%
		Cyanophyceae	*Phormidium*	9%
		Cyanophyceae	*Leptolyngbya*	6%
Goathorn Creek	WQS05	Cyanophyceae	*Heteroleibeinia*	41%
		Cyanophyceae	*Leptolyngbya*	24%
		Cyanophyceae	*Tapinothrix*	9%
Telkwa River	WQS08	Bacillariophyceae	*Achnanthidium*	29%
		Bacillariophyceae	*Fragilaria*	23%
		Cyanophyceae	*Leptolyngbya*	14%
	WQS09	Bacillariophyceae	*Achnanthidium*	43%
		Bacillariophyceae	*Fragilaria*	36%
		Cyanophyceae	*Pseudanabaena*	8%
Bulkley River	WQS12	Bacillariophyceae	*Fragilaria*	25%
		Cyanophyceae	*Phormidium*	21%
		Bacillariophyceae	*Achnanthidium*	14%

Figure 10.5-1

Periphyton Biomass and Density in Tenas Project Streams 1987 to 1990, 2017



Note: Error bars represent the standard error of the mean.

Periphyton communities in Tenas Creek were dominated by Cyanophyceae (blue-green algae; 98 to 99% of the community), which were also abundant in Goathorn Creek (85%; Figure 10.5-2). Bacillariophyceae (diatoms) comprised the remainder of the periphyton identified in Goathorn Creek (15% of the community). Within Tenas and Goathorn creeks, *Heteroleibeinia* and *Leptolyngbya* were among the dominant genera at each site (Table 10.5-1). Diatoms dominated periphyton communities in the Telkwa and Bulkley rivers (67 to 87% of the community), with Cyanophyceae and Ulvophyceae being the next most abundant. Diatoms were largely represented by *Achnanthidium* and *Fragilaria* at each site in the Telkwa and Bulkley rivers (Table 10.5-1).

Periphyton genus richness and diversity was lowest in Tenas Creek, with a mean of 8 to 10 genera/sample and mean Simpson's D less than 0.4 (Figure 10.5-3). The low diversity in Tenas Creek reflects the dominance of *Heteroleibeinia* at these sites. Richness and diversity were moderately to highly diverse and comparable across all other sites, with mean richness ranging from 11 to 16 genera/sample and Simpson's D from 0.65 to 0.85.

The invasive *Didymosphenia*, also known as rock snot, was identified in the Telkwa River at WQS08 and WQS09. As such, extra precautions should be taken to clean equipment and clothing when sampling the Telkwa River.

10.5.2 Benthic Invertebrates

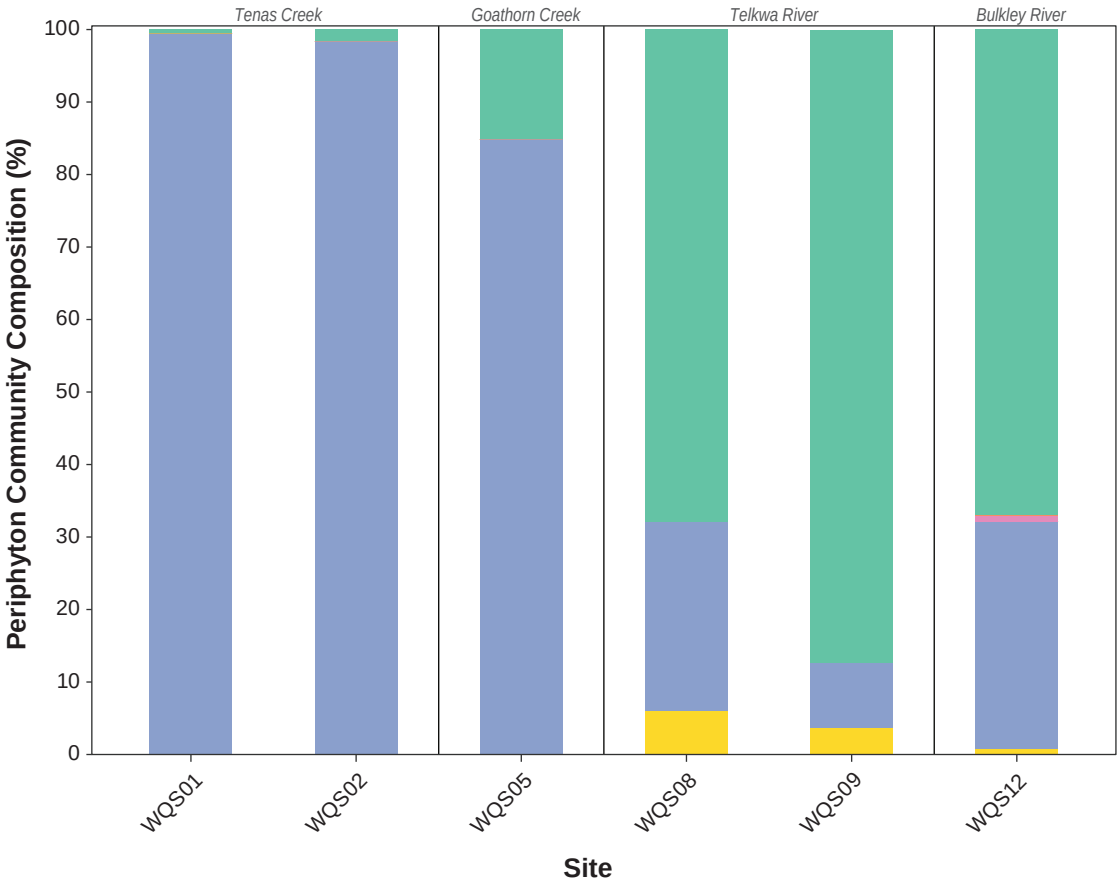
Benthic invertebrate abundance displayed high temporal and spatial variability, ranging from 103 to 5,517 organisms/sample (Figure 10.5-4). Benthic invertebrate abundances were highest in Tenas Creek at WQS02, and lowest in upper Goathorn Creek at BUL16.

Benthic invertebrate communities were dominated by the pollution-tolerant taxa, Ephemeroptera (mayflies; 26 to 62% of the community) and Plecoptera (stoneflies; 4 to 38% of the community; Figure 10.5-4). Ephmeroptera were largely represented by *Baetis*, and Plecoptera by *Zapada* and *Taenionema* (Table 10.5-2). A third pollution-tolerant taxon, Trichoptera (caddisflies), was abundant in the lower Bulkley River. Ephemeroptera, Plecoptera, and Trichoptera, collectively termed EPTs, generally comprised the majority of the community at most sites (> 75%), except lower Tenas Creek at WQS04B, upper Goathorn Creek at BUL16, and the Telkwa River where Diptera (true flies), and particularly Chironomidae (non-biting midges), were more abundant.

Benthic invertebrate richness ranged from 11 to 25 families/sample, with EPTs comprising a large portion (56 to 81% of the family richness; Figure 10.5-5). Family richness was generally higher in the larger Telkwa and Bulkley rivers compared to the smaller tributary streams, although the 2006 samples were particularly high from WQS04B and BUL16. Benthic invertebrate family diversity was high (> 0.7 Simpson's D), and comparable across sites.

Figure 10.5-2

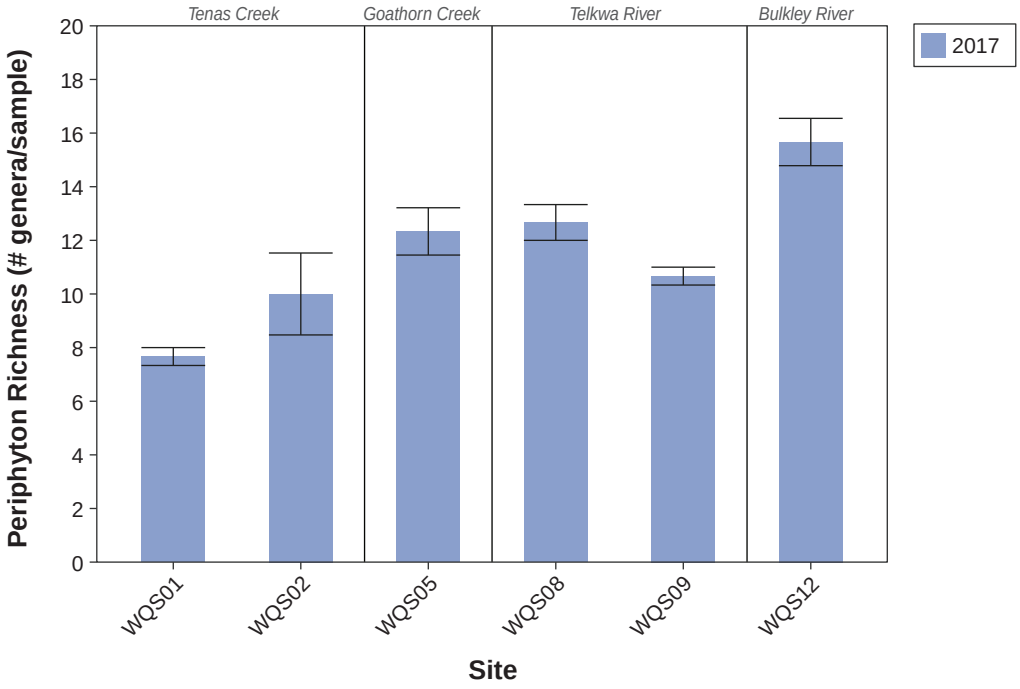
Periphyton Community Composition in Tenas Project Streams 2017

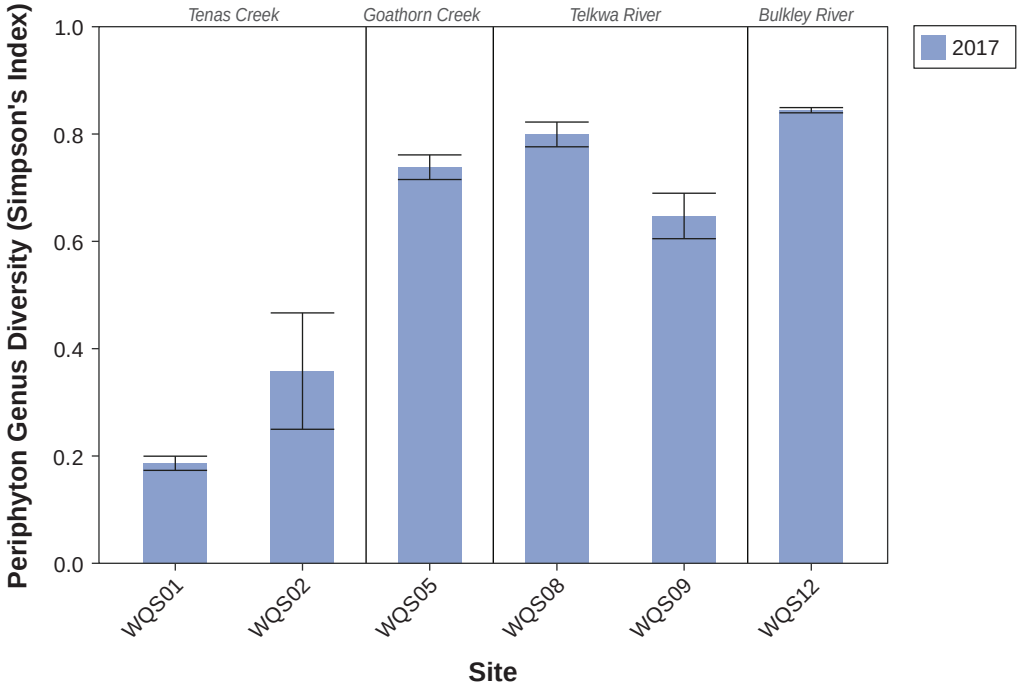


Note: Community composition values represent the mean of replicates. Immature, damaged and unidentified individuals were excluded from all analyses except density calculations.

Figure 10.5-3

Periphyton Richness and Diversity in Tenas Project Streams 2017

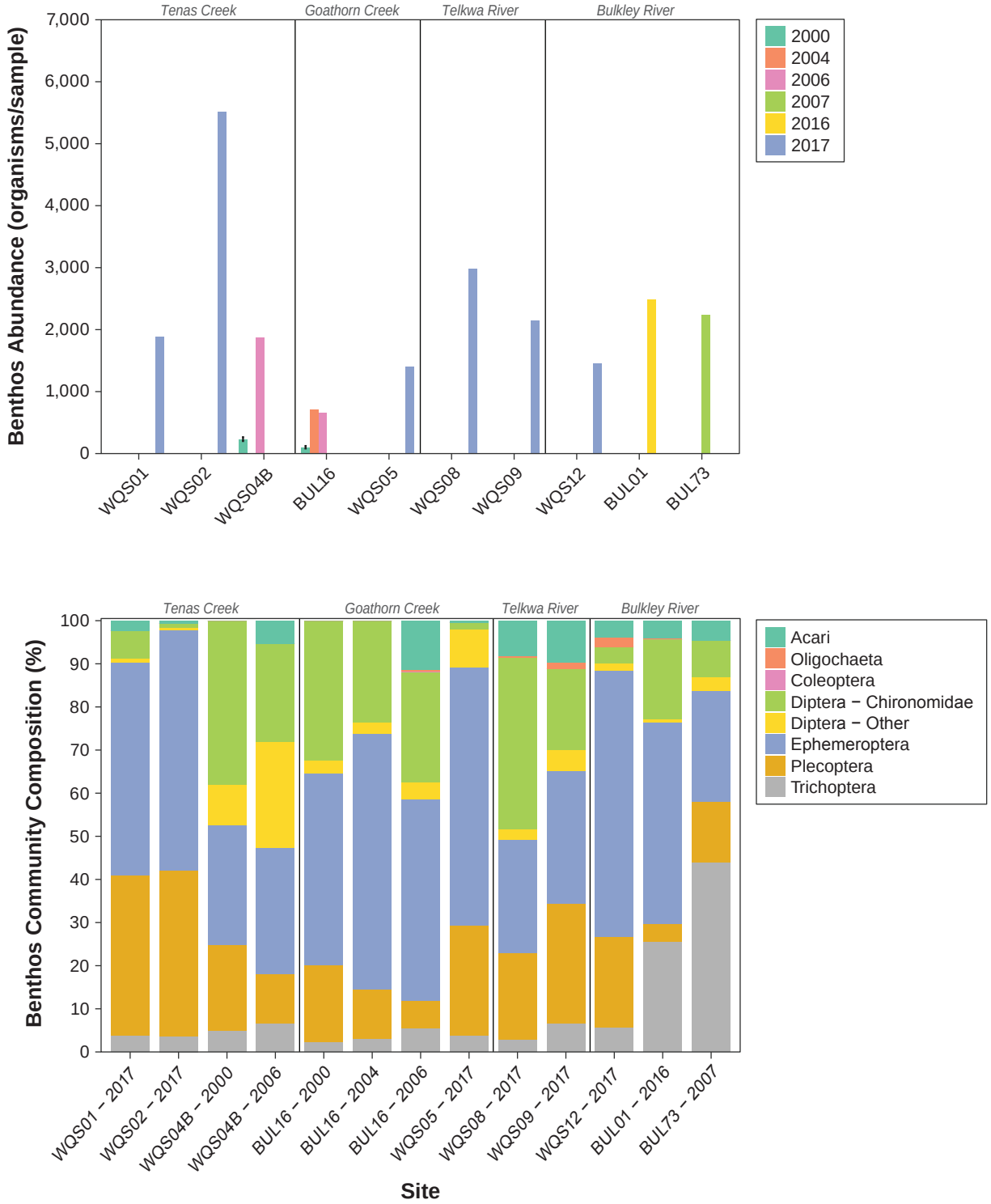




Note: Error bars represent the standard error of the mean.
Immature, damaged and unidentified individuals were excluded from all analyses except density calculations.

Figure 10.5-4

Benthic Invertebrate Abundance and Community Composition in Tenas Project Streams, 2000 to 2017



Note: Error bars represent the standard error of the mean.
Immature, damaged and unidentified individuals were excluded from all analyses except density calculations.
Ostracoda, Cladocera, Copepoda, Porifera, Nematoda, Platyhelminthes, fish and terrestrial invertebrates were excluded from all calculations.

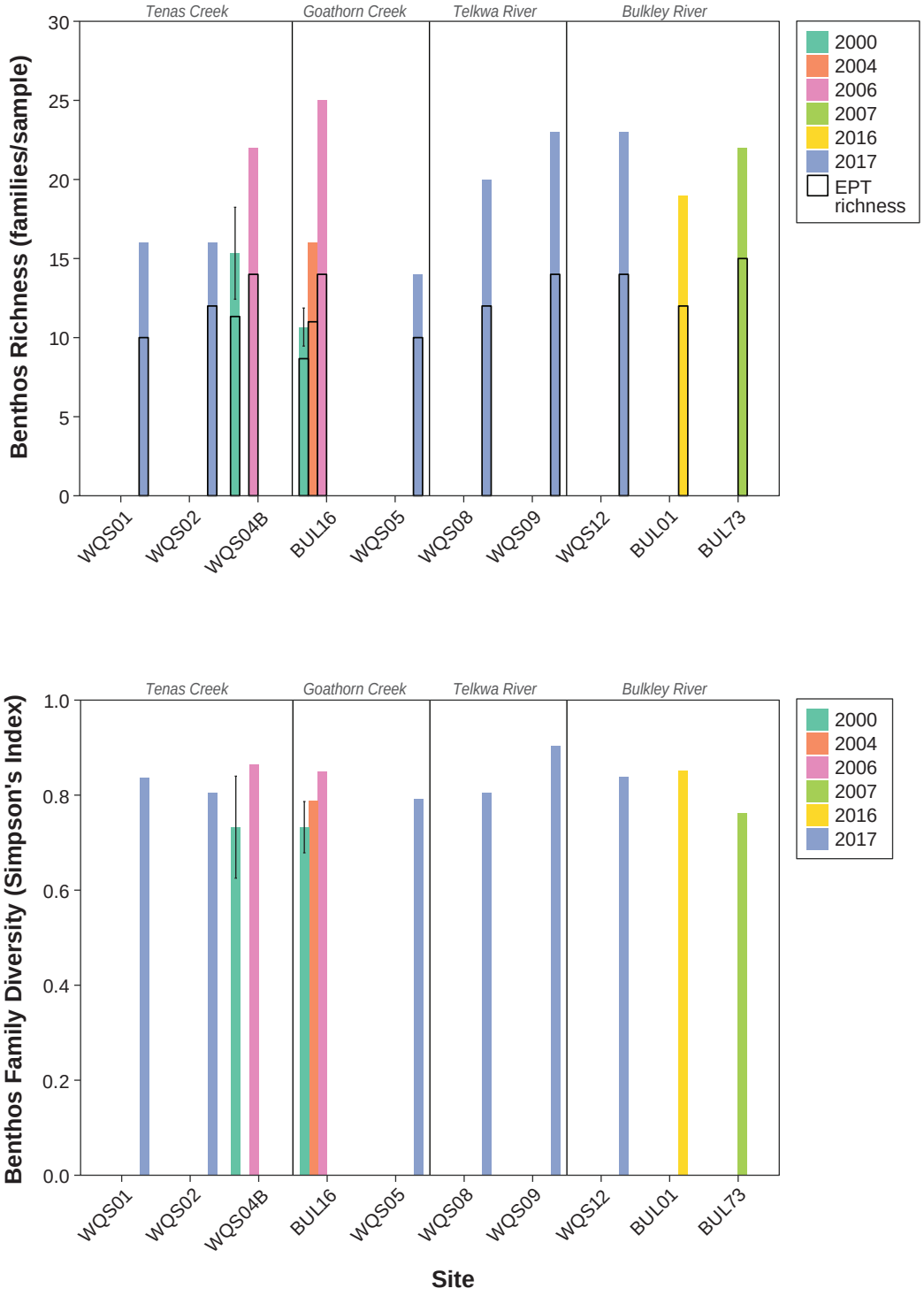
Table 10.5-2. Dominant Benthic Invertebrates, Tenas Project, 2000 to 2017

Watershed	Site	Year	Major Group	Genus	Percent
Tenas Creek	WQS01	2017	Plecoptera	*Zapada*	27%
			Ephemeroptera	*Baetis*	17%
			Ephemeroptera	*Rhithrogena*	9%
	WQS02	2017	Plecoptera	*Zapada*	20%
			Plecoptera	*Taenionema*	14%
			Ephemeroptera	*Drunella*	9%
	WQS04B	2000	Plecoptera	*Taenionema*	13%
			Diptera - Other	*Pericoma*	8%
			Ephemeroptera	*Baetis*	8%
		2006	Diptera - Other	*Pericoma*	21%
			Ephemeroptera	*Baetis*	13%
			Plecoptera	*Zapada*	7%
Goathorn Creek	BUL16	2000	Ephemeroptera	*Baetis*	18%
			Ephemeroptera	*Rhithrogena*	4%
			Ephemeroptera	*Drunella*	4%
		2004	Ephemeroptera	*Baetis*	33%
			Ephemeroptera	*Rhithrogena*	5%
			Ephemeroptera	*Epeorus*	3%
		2006	Ephemeroptera	*Baetis*	15%
			Ephemeroptera	*Cinygmula*	8%
			Acari	*Lebertia*	5%
	WQS05	2017	Ephemeroptera	*Baetis*	40%
			Plecoptera	*Taenionema*	9%
			Diptera - Other	*Simulium*	8%
Telkwa River	WQS08	2017	Diptera - Chironomidae	*Tvetenia*	22%
			Ephemeroptera	*Baetis*	10%
			Ephemeroptera	*Drunella*	8%
	WQS09	2017	Diptera - Chironomidae	*Cricotopus/Orthocladius*	8%
			Ephemeroptera	*Baetis*	7%
			Acari	*Lebertia*	6%
Bulkley River	WQS12	2017	Plecoptera	*Taenionema*	14%
			Ephemeroptera	*Rhithrogena*	13%
			Ephemeroptera	*Baetis*	6%
	BUL01	2016	Ephemeroptera	*Baetis*	19%
			Trichoptera	*Arctopsyche*	12%
			Trichoptera	*Hydropsyche*	5%
	BUL73	2007	Trichoptera	*Arctopsyche*	8%
			Trichoptera	*Hydropsyche*	8%
			Plecoptera	*Taenionema*	7%

Note: WQS04B entered at BUL15 in CABIN database.

Figure 10.5-5

Benthic Invertebrate Richness and Diversity in Tenas Project Streams, 2000 to 2017



Notes: Error bars represent the standard error of the mean.
Immature, damaged and unidentified individuals were excluded from all analyses except density calculations. Ostracoda, Cladocera, Copepoda, Porifera, Nematoda, Platyhelminthes, fish and terrestrial invertebrates were excluded from all calculations.
EPT = Ephemeroptera, Plecoptera, and Trichoptera

10.5.3 Quality Assurance/Quality Control

10.5.3.1 Periphyton

Laboratory QA/QC for chlorophyll *a* samples included reference materials and method blanks. The concentrations of all reference materials were within their target data quality objective ranges and all method blanks were below detection limits. Chlorophyll *a* samples were not analyzed within their recommended holding time (28 days). This may have resulted in under-estimations of chlorophyll *a*, as it degrades over time.

To determine periphyton taxonomic precision, specimens from two samples were sent to an independent taxonomist for quality control sorting (Appendices 10-B and 10-C). The percent similarity between the original and QC taxonomist was high (82% and 87%). The QC results indicated that the data are of good quality.

10.5.3.2 Benthic Invertebrates

The debris estimated recovery was 99.7% (Appendix 10-E), indicating that benthic invertebrate specimen recovery from sample debris was very high. To determine taxonomic precision, specimens from WQS12 were sent to an independent taxonomist (Appendix 10-E). Between taxonomists, there were no disagreements or misidentifications, the taxonomic resolution differed for six specimens, and there was one specimen difference in enumeration. Overall, the percent taxonomic agreement was 100%, indicating the data are of good quality.

11. FISH AND FISH HABITAT

This chapter describes the fish and fish habitat baseline study conducted for the Project in 2017. The purpose of the 2017 fish and fish habitat baseline study was to characterize fish habitat and fish community structure in the project area. This information will inform mine design and the assessment of potential project effects on fish and fish habitat, will support future permitting, and will support future monitoring programs and management plans.

The specific objectives of the 2017 fish and fish habitat baseline program were to:

- summarize existing fish and fish habitat data for waterbodies within the study area;
- assess and characterize fish habitat at proposed waterbody crossings;
- sample fish in order to:
  - confirm fish presence and community composition in study area streams; and
  - characterize biological data for fish species captured, including tissue metal concentrations.

11.1 STUDY AREA

The Tenas Project lies between Tenas Creek and Goathorn Creek, both of which form part of the Telkwa River watershed. The Telkwa River is a tributary to the Bulkley River, which ultimately feeds into the Skeena River.

The 2017 fish and fish habitat baseline program study area focused primarily on the main streams and rivers surrounding the proposed Tenas project area, and included Goathorn Creek, Tenas Creek, the Telkwa River, and the Bulkley River. Sampling sites were set up to reflect proposed project infrastructure and included upstream reference and downstream receiving environment sites. Figure 11.1-1 shows, and the locations of sampling sites in relation to proposed project infrastructure; the sampling locations overlap with the water quality sites (Figure 8.1-1) where possible.

11.2 REGULATORY AND POLICY FRAMEWORK

Project specific fish and fish habitat data collection for the Tenas Project is a component of the Joint AIR for MA/EMA AIR Permits (BC MEM and MOE 2016), and will allow for the determination of potential project-related effects to fish and fish habitat. Collection of baseline data is also recommended in the *Metal Mining Environmental Effects Monitoring (EEM) Technical Guidance Document* (Environment Canada 2011) in order to implement a Before-After-Control-Impact (BACI) study that will allow the influences of the mine to be separated from the influence of natural environmental factors.

Fish and fish habitat baseline data collection will also inform permit applications that may be required for the Project.

Fisheries Act

The *Fisheries Act* prohibits causing *serious harm to fish* that are part of, or support, a commercial, recreational or Aboriginal (CRA) fishery (section 35 of the *Fisheries Act).* If proponents are unable to completely avoid or mitigate *serious harm to fish*, their projects will normally require authorization under subsection 35(2) of the *Fisheries Act* in order for the project to proceed without contravening the Act. DFO interprets *serious harm to fish* as:

- The death of fish.
- A permanent alteration to fish habitat on a spatial scale, duration, or intensity that limits or diminishes the ability of fish to use such habitats as spawning grounds, nursery, rearing, food supply areas, migration corridors, or any other area in order to carry out one or more of their life processes. The destruction of fish habitat of a spatial scale, duration, or intensity that results in fish no longer being able to rely on such habitats for use as spawning grounds, nursery, rearing, food supply areas, migration corridor, or any other area in order to carry out one or more of their life processes.

After efforts have been made to avoid and mitigate impacts, any residual *serious harm to fish* is required to be offset. An offset measure is one that counterbalances unavoidable *serious harm to fish* resulting from a project with the goal of maintaining or improving the productivity of the CRA fishery. Where possible, offset measures should support available fisheries' management objectives and local restoration priorities.

Determination of *serious harm,* submission of a Request for Project Review and/or application for Authorization, and identification of offsetting measures all require a thorough understanding of baseline conditions, as do the permit applications outlined in the sections below.

Navigation Protection Act

The Navigation Protection Act protects the public right of navigation. An Approval is required for works or construction within a scheduled water course. None of the study area watercourses are currently included on the List of Scheduled Waters.

Species at Risk Act

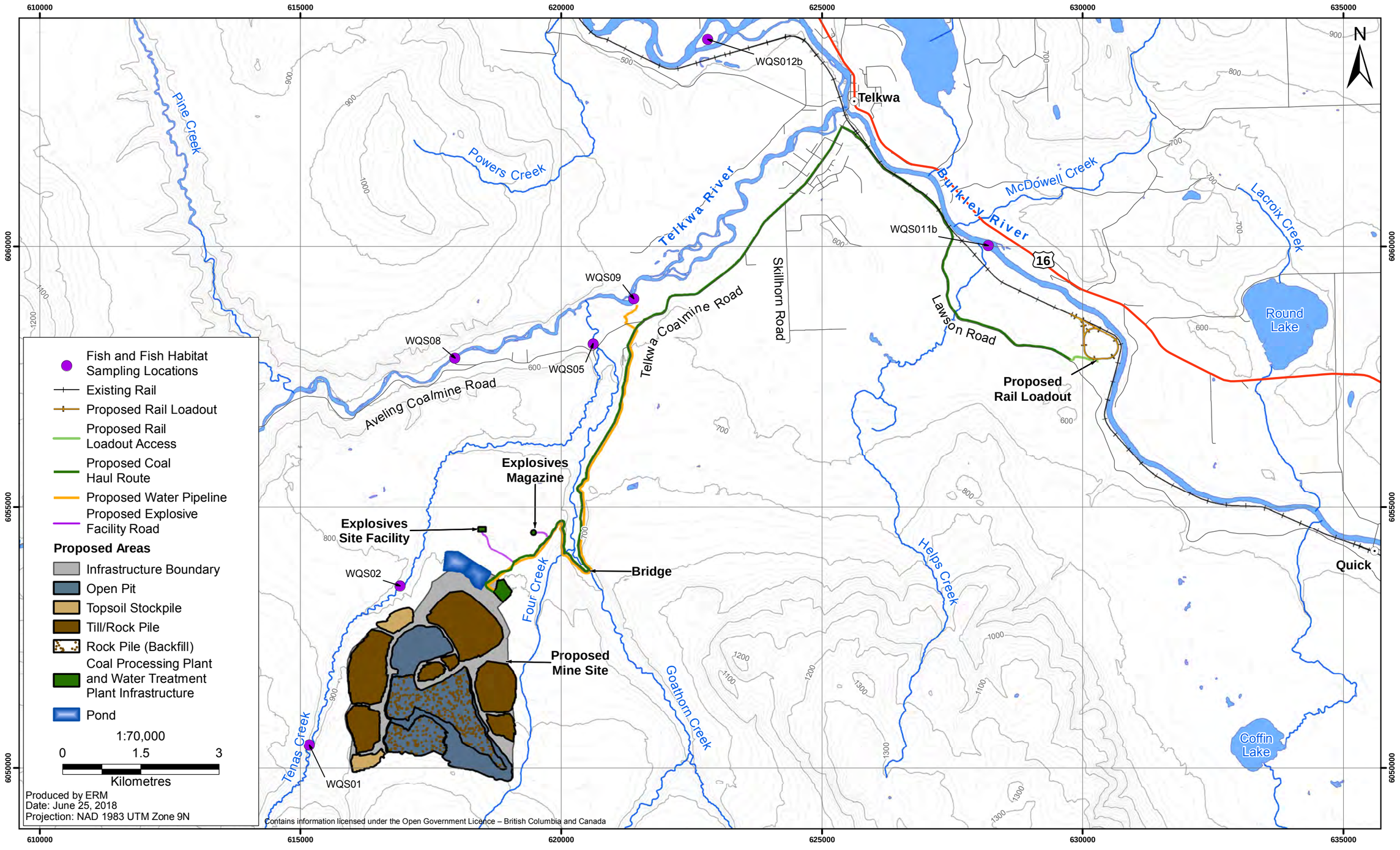
The *Species at Risk Act* (SARA) protects Schedule 1 listed species from being killed, harmed, harassed, captured, or taken, and their designated critical habitat from being destroyed. No Schedule 1 listed aquatic species, nor any designated critical habitat, have been identified in the study area.

Water Sustainability Act

The provincial *Water Sustainability Act* (WSA) protects streams in British Columbia. "Stream" as defined by the WSA includes lakes, ponds, rivers, creeks, ravines, gulches, wetlands, and glaciers, whether or not usually containing water (or ice).

Project works in or around water will require application for a Change Approval or submission of Notification of Instream Works, depending on the scope and complexity of proposed activities.

Figure 11.1-1
Fish and Fish Habitat Sampling Locations



The WSA also provides special protection for 15 designated *sensitive streams* within British Columbia. None of the study area watercourses are currently included on this list.

11.3 EXISTING INFORMATION

Baseline studies began with a review of existing information on the freshwater environment in the study area, as described in Table 11.3-1. Most information on fish distribution and habitat in the Project area was collected from Habitat Wizard (BC ENV 2018), which compiles information collected from various public reports, including consultant reports, government report, and permit summary reports. Some reports were available in full text, including aquatic resource assessments conducted by previous Project proponents.

Table 11.3-1. Fish and Fish Habitat Data Information Table

Documents Reviewed	• Bustard, D. 1983. 1982 *Investigations of Adult Coho Salmon in the Telkwa River*. Smithers, BC: Produced by Dave Bustard and Associates for Crowsnest Resources Ltd.). • Bustard, D. 1983, 1982 Investigations of adult pink salmon in the Telkwa River. For READ Environmental & Planning Associates Ltd. • Bustard, D. 1984. *Assessment of Benthic Invertebrate and Juvenile Fish Populations in Goathorn and Tenas Creeks and the Lower Telkwa River, 1983*. • Bustard, D. 1985. *Telkwa Coal Project Aquatic Resource Assessment*. Prepared by D. Bustard and Associates for the Telkwa Coal Project: Smithers, BC. • Crows Nest Resource Ltd. and READ Environmental & Planning Associates Ltd. 1983. *Telkwa Project: Stage I Application*. For Energy, Mines and Petroleum Resources, Government of British Columbia, Victoria, BC • BC ENV. 2018. HabitatWizard. British Columbia Ministry of Environment and Climate Change Strategey Habitat Wizard website. <http://www.env.gov.bc.ca/habwiz/>. Accessed Mar 2018.
General Remarks	• Considerable data on fish habitat and community composition is available for the main Project streams via Habitat Wizard (Four, Goathorn, Tenas, Telkwa, Bulkley) (BC MOE 2009) • Little to no data available for smaller tributaries on the proposed mine site. • General data on fish community is out of date (early 80's) and should be updated to identify changes. • Little to no information on salmon spawning locations in Goathorn Creek.
Sampling Required by *Joint AIR for Mines Act and Environmental Management Act Permits* (Joint AIR)	• Describe fish populations and presence of provincially listed species or ecological communities, federally listed species, and genetically distinct populations. • Describe current and potential use of fish resources by First Nations, sport, or commercial fisheries. • Assess and describe fish habitat relative to access roads and utility corridors, waste rock piles, and effluent discharge or seepage locations. • Identify which data reflect un-impacted baseline vs. conditions affected by previous development. • Provide brief description and rationale for a conceptual fish habitat compensation plan, if applicable. • Identify spatial and/or temporal gaps in the database. • Develop a tissue residue database for metals and, if appropriate, organic contaminants.

(continued)

Table 11.3-1. Fish and Fish Habitat Data Information Table (completed)

Existing Data	• Telkwa River, Goathorn Creek, Tenas Creek: Pre 1985 • Bulkley River: 1999 • Telkwa River: 1986-2000 • Goathorn Creek: 1998, 2009 • Tenas Creek: 1998 • Four Creek: 1997, 1998
Existing Data Issues	Much of the existing information on fish resources in Goathorn and Tenas creeks is decades old and should be updated
Missing Data	MMER guidelines (Environment Canada 2011) suggest that fish sampling include: • Fecundity estimates • Sampling in two seasons • Sampling of two species
2017–March 2018 Baseline Program	Tissue sampling is focused on collecting data (including metrics such as fecundity, energy storage, and energy usage) from Rainbow Trout, which are the most widespread species in the Project area. Sampling has occurred in October 2017 and is scheduled for June 2018. A second species is not available due to the low species diversity in Goathorn and Tenas creeks.
Key Issues	• Spawning surveys are important to identify critical habitat in lower Goathorn and Tenas Creeks. Some species (i.e., pink) leave freshwater as soon as they hatch; thus, the only way to identify their habitat is to see the adults spawning. • MMER sampling – Sampling in October was conducted with a fall spawning sentinel species in mind (I.e., Dolly Varden); however, rainbow trout were the most widespread species available. Spring sampling should be conducted to maximize the probability of capturing mature, fecund rainbow trout for a complete dataset. A second season of sampling is also useful to track seasonal differences in tissue quality, fish health, and habitat usage (through CPUE)
Other Comments	No further comments.

Fish species presence is relatively well documented within and adjacent to the Project area, particularly in the Telkwa River and in the Bulkley River. Tenas Creek and Goathorn Creek provide fish habitat for most of their lengths. Three salmon species, as well as mountain whitefish (*Prosopium williamsoni*), have been reported in lower Goathorn Creek, while rainbow trout (*Oncorhynchus mykiss*) and Dolly Varden (*Salvelinus malma*) have been reported in both streams. Four Creek, which runs along the north side of the Project site, provides habitat for Dolly Varden, as well as an unidentified salmonid species. The Telkwa River supports an important run of coho salmon (*O. kisutch*), and also provides habitat for chinook (*O. tshawytscha*) and pink salmon (*O. gorbuscha*), rainbow trout/steelhead, Dolly Varden, mountain whitefish, and some coarse fish species. The Bulkley River supports populations of all five Pacific salmon species, as well as a world-renowned steelhead run. It also contains numerous other salmonids as well as several coarse fish species (BC MOE 2009). Several of these species, primarily salmonids, are utilized in CRA fisheries. Table 11.3-2 describes fish species presence in study area waterbodies.

Table 11.3-2. Fish Species Present in Project Area Waterbodies

Stream	Fish Species	
	Common Name	Scientific Name
Goathorn Creek	chinook salmon	*Oncorhynchus tshawytscha*
	coho salmon	***Oncorhynchus kisutch***
	pink salmon	*Oncorhynchus gorbuscha*
	rainbow trout/steelhead	***Oncorhynchus mykiss***
	Dolly Varden	***Salvelinus malma***
Four Creek	Dolly Varden	*Salvelinus malma*
	unidentifiable trout	*Oncorhynchus spp.*
Tenas Creek	**Dolly Varden**	***Salvelinus malma***
	bull trout	***Salvelinus confluentus***
	mountain whitefish	*Prosopium williamsoni*
	rainbow trout/steelhead	***Oncorhynchus mykiss***
Telkwa River	chinook salmon	*Oncorhynchus tshawytscha*
	coho salmon	***Oncorhynchus kisutch***
	pink salmon	*Oncorhynchus gorbuscha*
	rainbow trout/steelhead	***Oncorhynchus mykiss***
	Dolly Varden	***Salvelinus malma***
	mountain whitefish	***Prosopium williamsoni***
	peamouth chub	*Mylocheilus caurinus*
	sucker (general)	*Catostomus spp.*
Bulkley River	chinook salmon	*Oncorhynchus tshawytscha*
	coho salmon	***Oncorhynchus kisutch***
	pink salmon	***Oncorhynchus gorbuscha***
	sockeye salmon	*Oncorhynchus nerka*
	chum salmon	*Oncorhynchus keta*
	rainbow trout/steelhead	***Oncorhynchus mykiss***
	coastrange sculpin	*Cottus aleuticus*
	redside shiner	*Richardsonius balteatus*
	white sucker	*Catostomus commersonii*
	brassy minnow	*Hybognathus hankinsoni*
	lake chub	*Couesius plumbeus*
	burbot	*Lota lota*
	Dolly Varden	*Salvelinus malma*
	bull trout	*Salvelinus confluentus*
	longnose sucker	***Catostomus catostomus***
	longnose dace	*Rhinichthys cataractae*
	prickly sculpin	*Cottus asper*
	slimy sculpin	*Cottus cognatus*
	lamprey (general)	***Lampetra spp.***

(continued)

Table 11.3-2. Fish Species Present in Project Area Waterbodies (completed)

Stream	Fish Species	
	Common name	Scientific name
Bulkley River *(cont'd)*	cutthroat trout	*Oncorhynchus clarkii*
	threespine stickleback	*Gasterosteus aculeatus*
	lake trout	*Salvelinus namaycush*
	lake whitefish	*Coregonus clupeaformis*
	largescale sucker	*Catostomus macrocheilus*

Data summarized from Habitat Wizard (BC ENV 2018)
Bold text indicates species captured during 2017 field studies

Fish habitat and community assessments were conducted in 1983 and 1984 as part of an aquatic resources assessment for a previous owner of the Telkwa Coal Project (Bustard 1985). Habitat assessments indicated that the lower reaches of Goathorn and Tenas creeks were suitable for steelhead spawning and rearing, and fish community assessments generally captured steelhead and rainbow trout juveniles in abundance in both creeks. Habitat in the upper reaches of the watershed was more suitable for Dolly Varden, and abundance of this species was higher in the upper reaches than in the lower reaches.

Steelhead spawning population sizes were estimated for Goathorn Creek, Tenas Creek and the lower Telkwa River during the 1984 aquatic resources assessment (Bustard 1985). These estimates rely heavily on assumptions of survival from fry through adulthood, and were not supplemented by spawning surveys. The assessment estimated that Goathorn Creek supported approximately 52 spawning steelhead, Tenas Creek supported approximately 107 spawning steelhead, and the lower Telkwa River supported approximately 347 spawning steelhead.

Coho salmon spawning surveys showed that, as predicted, the upper Telkwa River is an important spawning area for this species, and juvenile coho salmon are found throughout the Telkwa and Bulkley Rivers and their tributaries (Bustard 1985). The low water levels and presence of anchor and frazil ice in Goathorn and Tenas Creek limit their use by late-fall spawning fish such as coho; however, the lower reaches are used by juveniles for rearing.

Tissue metal concentrations measured in 1984 in Goathorn and Tenas Creeks were similar among species, and similar to those of fish from other Bulkley River tributaries (Bustard 1985).

11.4 METHODOLOGY

The 2017 fish and fish habitat field program was designed to supplement historical data, as well as to provide robust fish and fish habitat data at the receiving environment (i.e., downstream of mine influence) and at reference sites (i.e., outside of the mine influence) in near-field, mid-field, and far-field locations. The study design was based on methods recommended in the *Metal Mining Environmental Effects Monitoring (EEM) Technical Guidance Document* (Environment Canada 2011), in order that baseline data collected will be suitable for use in a BACI monitoring program after development.

The 2017 field program occurred between October 11 and 14, at seven individual sites (Table 11.4-1; Figure 11.1-1). Habitat assessment and fish sampling, including collection of tissue metals samples, occurred at all seven sites. Sites were chosen to reflect near-field, mid-field, and far-field receiving environment sites, as well as upstream reference sites.

11.4.1 Fish Habitat

Stream habitat assessments were conducted at all sites. At each site, the watercourse was assessed using methods based on the Reconnaissance 1:20,000 Fish and Fish Habitat Inventory Protocol (RISC 2001) and the Reconnaissance 1:20,000 Fish and Fish Habitat Inventory: Site Card Field Guide (RISC 1999a). This protocol involves characterizing fish habitat over a 100 metre (m)-long section of watercourse by measuring physical attributes (e.g., channel width, gradient, temperature, and water quality), characterizing cover types and substrate (dominant and sub-dominant cover and substrate type, cover abundance, and location), and describing stream morphology (Table 11.4-2). Data and field observations are recorded on the Reconnaissance 1:20,000 Fish and Fish Habitat Inventory Site Card (RISC 1999b).

Data collected for each habitat variable were used to evaluate the overall quality of fish habitat. Professional knowledge and expertise was used to rank habitat suitability for each fish life history stage (i.e., spawning, rearing, and over-wintering), and overall habitat quality (categorized as none, marginal, important, or critical; Table 11.4-3).

11.4.2 Fish Community

Fish sampling at the Tenas Project was conducted during October 2017 to determine fish presence, species composition, and to collect fish for tissue metal analysis. Fish sampling occurred at WQS01, WQS08, and WQS11b reference and WQS02, WQS05, WQS09, and WQS12b receiving environment sites (See Table 11.4-1 and Figure 11-1.1).

The study design for fish community sampling followed Resource Inventory Standards Committee (RISC) Fish Collection Methods and Standards (RISC 1997), Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures (RISC 2001), and the Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Fish Collection Field Guide (RISC 1999a). For the determination of fish presence and species composition, electrofishing was conducted over a minimum 100 m stream section using one pass with no stop nets. A systematic sweep was conducted across the entire wetted width from the downstream to the upstream site boundary. Electrofisher voltage (V), duty cycle (%) and frequency (Hz) settings remained consistent where possible. To collect fish for tissue metal analysis, extra effort was expended to collect the required number of fish. Electrofishing in spawning areas during fish spawning activity was avoided to reduce the chance of harming fish and impacting spawning activities.

Table 11.4-1. 2017 Fish and Fish Habitat Baseline Sample Locations

Watercourse	Site ID	Easting	Northing	Type	Habitat Assessment	Fish Sampling	Tissue Metals
Tenas Creek	WQS01	615171	6050438	Reference	X	X	X
Tenas Creek	WQS02	616914	6053490	Near-field receiving environment	X	X	X
Goathorn Creek	WQS05	620615	6058133	Near-field receiving environment	X	X	X
Telkwa River	WQS08	617964	6057860	Reference	X	X	X
Telkwa River	WQS09	621394	6058998	Mid-field receiving environment	X	X	X
Bulkley River	WQS11b	629601	6059221	Reference	X	X	X
Bulkley River	WQS12b	625021	6063831	Far-field receiving environment	X	X	X

Note: UTM Coordinates are in NAD 83 Zone 9V

Table 11.4-2. Physical and Biological Habitat Attributes Assessed at Each Study Site

Substrate Types	Physical Measurements	Habitat	Cover
• % Sand	• Length (m)	• Habitat Type	• % Deep Pool
• % Gravel	• Mean Depth (m)	• Pool Type	• % Boulder
• % Cobble	• Bankfull Depth (m)	• Pool Residual Depth	• % Instream Vegetation
• % Boulder	• Wetted Width (m)	• Bank Stability	• % Undercut
• % Bedrock	• Bankfull Width (m)	• Confinement	• % Large Woody Debris
• Bank Texture	• Gradient (%)	• Hill-slope Coupling	• % Small Woody Debris
	• Bank Height (m)	• Stream Pattern	• % Canopy Closure
		• Islands/Bars	• % Riparian Cover
		• Fish Passage Barriers	• % Overhanging Vegetation

Table 11.4-3. Life History Habitat Suitability and Overall Habitat Quality Criteria Assessed at Stream Sites

Life Stage Suitability Rank	Criteria
None	No habitat present for any life history stage
Poor	Most of the necessary physical/biological components of the habitat for this life history stage are missing or severely deficient
Fair	Some of the necessary physical/biological components of the habitat for this life history stage are present, but a key component is missing
Good	All of the necessary physical/biological components of the habitat for this life history stage are present
Overall Habitat Quality Rank	**Criteria**
None	No habitat present
Marginal	Low productive capacity
Important	Common habitat which supplies basic needs of fish (typically includes rearing habitat with some spawning habitat potential)
Critical	Rare or exceptionally productive or unusual habitat with very high habitat values, which are uncommon and/or highly valuable

11.4.3 Fish Biology

Fish captured during the 2017 baseline program were sampled for biological data including fork length, weight, condition, and age. Following capture, fish were identified to species and given a unique sample number. Length was measured to the nearest 1 millimetre (mm) with a measuring board. Species with a forked tail (e.g., rainbow trout) were measured from the nose to the tail notch for fork length (FL). Species without a forked tail (e.g., suckers) were measured from the nose to the end of the tail for total length (TL). Wet weight was collected (to the nearest 0.01 gram (g)) with an Ohaus 200 g or 300g scale. Observations were recorded on the general condition of fish, noting the presence of deformities, erosions, lesions, and tumours (DELTs), and age (through the collection of scale and fin ray samples from a subsample of fish).

To determine fish age, scales were collected with tweezers below the posterior margin of the dorsal fin on the left side of the sampled fish. Two to three rays of the left pelvic fin were also collected with scissors or pliers. Aging structures from each fish were placed on wax paper and kept in an envelope labeled with the site, date, species, and unique sample number and sent to North/South Consultants Inc. (Winnipeg, Manitoba) for analysis. Age was estimated by counting the number of annuli (yearly rings) on each structure. Scales were attached to plastic fiches and annuli were counted with a microfiche reader. Fin rays were air-dried and then mounted in an epoxy medium. Microsections were cut from the fin rays using a saw and mounted on slides for inspection using a compound microscope.

11.4.4 Fish Tissue Metals

Fish health and tissue metal sampling was conducted at receiving and reference environment sites (see Table 11.4-5). Rainbow trout of similar fork length (generally between 90 and 140 mm) were targeted for tissue metals analysis at each site. Fish were dissected in the field for individual tissue samples. Each fish was also sampled for length, body weight, sex, maturity, gonad weight, liver

weight, and age. All muscle tissues were washed, placed in labelled plastic bags, frozen and shipped to ALS Environmental of Vancouver, BC for metals analysis.

Once in the laboratory, samples were placed in aluminum weigh boats and weighed to the nearest 0.001 g to provide a total sample weight. Tissue samples were analysed for metals concentrations according to procedures adapted from the United States Environmental Protection Agency (EPA; US EPA 1995). The tissue samples were then placed in a Precision mechanical convection oven at a temperature of 100.3°C for a period of 24 to 36 hrs. Once the tissue samples were dried, they were weighed in the weigh boat to determine the dry weight of the tissue. Tissue samples were homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with repeated additions of hydrogen peroxide. Analysis was by Inductively Coupled Plasma – Mass Spectrometry (ICP-MS). Mercury concentrations were analyzed by atomic fluorescence spectrophotometry. The 35 metals analyzed and their detection limits are presented in Table 11.4-5.

Table 11.4-5. Metal Analyses and Detection Limits for Fish Tissue Metals

Parameter	Lowest Detection Limit	Units	Parameter	Lowest Detection Limit	Units
Physical Tests (Tissue)			**Metals (Tissue)** *(cont'd)*		
Moisture	0.50	%	Manganese (Mn)-Total	0.010	mg/kg wwt
Metals (Tissue)			Mercury (Hg)-Total	0.0010	mg/kg wwt
Aluminum (Al)-Total	0.40	mg/kg wwt	Molybdenum (Mo)-Total	0.0040	mg/kg wwt
Antimony (Sb)-Total	0.0020	mg/kg wwt	Nickel (Ni)-Total	0.040	mg/kg wwt
Arsenic (As)-Total	0.0040	mg/kg wwt	Phosphorus (P)-Total	2.0	mg/kg wwt
Barium (Ba)-Total	0.010	mg/kg wwt	Potassium (K)-Total	4.0	mg/kg wwt
Beryllium (Be)-Total	0.0020	mg/kg wwt	Rubidium (Rb)-Total	0.010	mg/kg wwt
Bismuth (Bi)-Total	0.0020	mg/kg wwt	Selenium (Se)-Total	0.010	mg/kg wwt
Boron (B)-Total	0.20	mg/kg wwt	Silver (Ag)-Total	0.0010	mg/kg wwt
Cadmium (Cd)-Total	0.0010	mg/kg wwt	Sodium (Na)-Total	4.0	mg/kg wwt
Calcium (Ca)-Total	4.0	mg/kg wwt	Strontium (Sr)-Total	0.010	mg/kg wwt
Cesium (Cs)-Total	0.0010	mg/kg wwt	Tellurium (Te)-Total	0.0040	mg/kg wwt
Chromium (Cr)-Total	0.010	mg/kg wwt	Thallium (Tl)-Total	0.00040	mg/kg wwt
Cobalt (Co)-Total	0.0040	mg/kg wwt	Tin (Sn)-Total	0.020	mg/kg wwt
Copper (Cu)-Total	0.020	mg/kg wwt	Uranium (U)-Total	0.00040	mg/kg wwt
Iron (Fe)-Total	0.60	mg/kg wwt	Vanadium (V)-Total	0.020	mg/kg wwt
Lead (Pb)-Total	0.0040	mg/kg wwt	Zinc (Zn)-Total	0.10	mg/kg wwt
Lithium (Li)-Total	0.10	mg/kg wwt	Zirconium (Zr)-Total	0.040	mg/kg wwt
Magnesium (Mg)-Total	0.40	mg/kg wwt			

Note: wwt = wet weight

11.4.5 Quality Assurance/Quality Control

To ensure consistency and accuracy of collected data, a quality assurance/quality control (QA/QC) program was established at the outset of the field program. For all fish habitat and community

surveys, data sheets were reviewed at the end of each field day to ensure data were complete and collected properly. Field notes were transcribed onto electronic spreadsheets once in the office and all transcriptions were checked visually against the field forms and any errors corrected.

The data were plotted (e.g., weight-length plots) to identify outliers that may have resulted from transcription errors. If transcription errors could not be amended, then those data were excluded from further analysis. No data were excluded in this study.

To assess the accuracy of the fish tissue metal analyses, ALS conducted two measures of quality control: method blanks (or MB) and comparison with reference material (or CRM). A method blank is a test where no tissue was added. To further assess the accuracy of the metal analyses, CRM was employed, where samples of a reference material, VA-NRC-TORT2 or lobster hepatopancreas, certified by the National Research Council of Canada, were subjected to the same analytical procedures as the tissue samples. The measured concentrations of each metal were then compared to the known metal concentrations in the certified material to determine if they fell within the 95% confidence limits expected for each metal.

11.4.6 Data Analysis

The variables used to assess fish community and biological data included: relative species abundance, length, weight, condition, and catch-per-unit-effort (CPUE). Data analysis and interpretation for these variables followed Guy and Brown (2007). Several of these variables required calculation. A description of the calculations is presented below.

The CPUE statistic is used as an estimate of relative abundance of fish. A key factor that allows comparison of CPUE data is the standardization (type of trap, mesh size, etc.) of sampling devices. Fishing gear and methods (e.g., electrofisher duty cycle, type and size of minnow traps, and a consistent amount of bait) were applied consistently at all sites to facilitate comparison of CPUE data.

For electrofishing, CPUE was calculated as the number of fish caught per 100 seconds (s) of electrofishing:

$$CPUE = number\ of\ fish\ caught/100\ s$$

Where sample sizes were less than 10, we performed bootstrap resampling of our data (10,000 resamples) in order to generate a mean, standard deviation (SD) of the mean, and 95% confidence interval (CI) of the mean. Bootstrapping involves resampling a dataset with replacement. For example, if a dataset contained four values (A, B, C, D), bootstrapping could hypothetically return the following resamples (A, A, C, D; A, B, B, B; A, B, D, D; A, B, C, D; and so on). In such cases, the bootstrap 95% CI are likely narrower than true 95% CI whereas the regular 95% CI are likely larger than the true 95% CI. Thus, bootstrapping provides a less conservative estimate of error variance than conventional estimates for comparing the mean from small sample sizes.

Condition and weight-length regressions are indicators of the relative health of fish within a lake. Condition factor was based on the following formula from Ricker (1975):

$$Condition\ (K) = weight\ (g) \times 10^5/length^3\ (mm)$$

Weight was multiplied by 10^5 to avoid fractional values, and a length-weight exponent of exactly 3 was assumed to apply to all species of fish.

Measurements of liver size relative to body size are indicative of energy storage in fish. Livers were extracted from rainbow trout sacrificed for tissue metal analysis, and were weighed to the nearest 0.01 g. Liver weight was regressed on total body weight for fish collected from each waterbody, and the slopes of the regression lines were compared using a generalized linear model (GLM). If the slopes of the regressions were equal, then y-intercepts were compared to determine if there were differences in energy storage among fish from different streams. If the slopes of the regression lines were significantly different, then the calculated hepatosomatic index (HSI) was used as a proxy to compare energy storage. HSI is calculated using the following equation:

HSI = 100 (liver weight/body weight)

All tissue metals data were reported in units of milligrams/ kilogram (mg/kg) wet weight (wwt). Tissue metals concentration data were summarized in descriptive statistics tables for each fish species, and sampling site. Mean metals concentrations (mg/kg wwt), standard error (SE), and minimum and maximum values were calculated.

Selenium data for rainbow trout were converted from mg/kg wwt to mg/kg dry weight (dwt) for direct comparison with selenium guidelines for British Columbia (Beatty and Russo 2014), using the following formula:

[Selenium] mg/kg dw = [Selenium] mg/kg ww /((100 - % moisture)/100)

All data were managed using Microsoft Excel 2010. All statistics were conducted according to Zar (1999). R software (R Core Team 2016) was used for statistical analyses.

11.5 DATA SUMMARY

11.5.1 Fish Habitat

11.5.1.1 Overview

Complete Reconnaissance 1:20,000 (RISC 2001) data for each sampling site are presented in Appendix 11-A. This information is summarized below. Sampling site locations are shown in Figure 11.1-1.

11.5.1.2 Tenas Creek

Fish habitat within Tenas Creek was surveyed upstream of the proposed mine project at WQS01 (Plate 11.5-1) and adjacent to the proposed mine at WQS02 (Plate 11.5-2).

Plate 11.5-1. Tenas Creek fish habitat site WQS01 located upstream of proposed mine site (upstream view).

Plate 11.5-2. Tenas Creek fish habitat adjacent to the proposed mine site at WQS02 (downstream view).

Channel width ranged from 3.4 m to 4.5 m with a mean of 4.1 m, making Tenas Creek S3[1]-sized at WQS01. Cobbles and gravels represented the dominant and subdominant substrate types. Boulder and trace amounts of large woody debris (LWD) provided the majority of cover for fish at upstream sites.

WQS01 was ranked as *important*[2] for resident Dolly Varden and Rainbow Trout. Spawning and rearing habitat were *good*, based on the presence of appropriate-sized gravel and abundant rearing habitat. Overwintering and migratory habitat were fair: a few slack water pools were observed, and no barriers prevented passage to similar habitat upstream.

WQS02 had channel widths ranging from 8 m to 15 m, with a mean of 10.6 m width, making Tenas Creek S2-sized at this location. Cobbles and boulders represented the dominant and subdominant substrate types. Boulder and trace amounts of LWD provided the majority of cover for fish.

Overall, WQS02 was rated an *important* site. Spawning and rearing habitat were *good*. Many patches of appropriate spawning gravels for Dolly Varden and rainbow trout were present at the site, as was abundant cobble providing cover and potential for invertebrate production. Migratory habitat was also *good*, as no barriers to fish passage were evident and more good rearing and spawning habitat were noted upstream. Dolly Varden were observed both at the site and further upstream. Overwintering habitat was *fair*, as pools and slack water areas were limited.

11.5.1.3 Goathorn Creek

Fish habitat within Goathorn Creek was surveyed downstream of the proposed mine project at WQS05 (Plate 11.5-3), located just below the confluence of Tenas, Four, and Goathorn creeks.

Goathorn Creek at WQS05 is an S2-sized stream, with channel widths ranging from 14 m to 20 m (mean 16.8 m). Gravel and cobbles represented the dominant and subdominant substrate types. Habitat cover was dominated by LWD with boulders and undercut banks noted as sub-dominant.

Spawning habitat is *good* for salmon and resident fish, with patches of gravels and sufficient stream flow. Rearing and migration are also *good*. The site has abundant cover and is well connected to Dolly Varden spawning habitat upstream. As with the Tenas Creek sites, overwintering habitat is only *fair*, as the site is shallow and contains few pools. Overall, upstream Goathorn Creek was rated an *important* site.

11.5.1.4 Telkwa River

Fish habitat within Telkwa River was surveyed upstream at WQS08, and downstream at the Goathorn Creek confluence into the Telkwa River at WQS09.

[1] Refer to Table 11.4-4 for stream size rating criteria

[2] Refer to Table 11.4-3 for habitat rating criteria.

Plate 11.5-3. Goathorn Creek fish habitat site WQS05 located downstream of the confluence of Tenas Creek, Four Creek, and Goathorn Creek (downstream view).

Gravel and cobbles represented the dominant and subdominant substrate types at Site WQS08. LWD dominated habitat cover for small fish with both boulders and undercut banks ranking as subdominant. Channel width ranged from 35 m to 38 m with a mean of 36 m, for an S1-sized watercourse. Site WQS08 provides *good* rearing habitat with abundant cobble and boulder cover for invertebrate production (Plate 11.5-4). This site has *good* migration habitat that can be used to access upstream spawning and rearing habitat. Spawning and overwintering habitat are both *fair*. Some small areas with appropriate gravels and flow are present. Few pools or slack water areas were observed. Overall, this is an *important* site.

Downstream from WQS08 and the Goathorn Creek / Telkwa River confluence is WQS09 (Plate 11.5-5). WQS09 includes high quality (i.e., *good*) spawning areas for salmon and *good* rearing habitat with abundant boulder cover for small fish. Overwintering habitat is *good*: the site has sufficient flow but few slack water areas. Migration potential is considered *good* with connectivity to major spawning habitat upstream. The Telkwa River is S1-sized at WQS09. Channel width ranged from 42 m to 45 m with a mean channel width of 44 m. Cobbles and boulders represented the dominant and subdominant substrate types. Overall, there was a moderate amount of cover, with boulders dominating. This site is listed as *critical* with a fisheries-sensitive zone[3] and a back channel providing rearing habitat for salmon fry.

[3] Fisheries-sensitive zones are side and back channels, ponds, swamps, seasonally flooded depressions, lake littoral zones, and estuaries that are seasonally occupied by overwintering fish (BC Environment 1995).

Plate 11.5-4. Telkwa River fish habitat site WQS08 located upstream of the Goathorn and Telkwa rivers' confluence (upstream view).

Plate 11.5-5. Telkwa River fish habitat site WQS09 located downstream of the Goathorn and Telkwa rivers' confluence (downstream view).

11.5.1.5 Bulkley River

Fish habitat within Bulkley River was surveyed upstream at WQS11b and downstream of the Telkwa River confluence into the Bulkley River at site WQS12b. The Bulkley River is an S1-sized stream at both sites: channel width was approximately 120 m at both WQS11b and WQS12b.

The main substrates at Site WQS11b was gravel (dominant) and cobbles (sub-dominant) at the site. Site WQS11b provides *good* spawning habitat with patches of suitable gravels (dead pink salmon were noted along banks at time of survey; Plate 11.5-6). This is a *good* migration site with major spawning habitat located upstream. Rearing habitat is *fair*, as very little cover is available for fry. Overwintering habitat is also *fair*, given the short supply of slack water pools at WQS11b. Overall, this site was ranked as *important*, given its spawning values.

Plate 11.5-6. Bulkley River fish habitat site WQS11b located upstream of the Telkwa River and Bulkley River confluence (downstream view).

Downstream of WQS11b and the confluence of the Bulkley and Telkwa rivers is site WQS12b (Plate 11.5-7), which features a fisheries sensitive zone. Similar to WQS11b, the main substrate is gravel (dominant) and cobbles (sub-dominant). Site WQS12b was ranked as *critical,* as it has abundant available *good* pink salmon spawning habitat. Although there is limited cover for small fish, extensive back-channel sloughs do provide important rearing habitat for these fish, resulting in a ranking of *good*. Overwintering and migratory habitat were also ranked as *good*. The mainstem is deep enough to provide refugia in the wintertime, and the site is well-connected to additional salmon spawning habitat upstream.

Plate 11.5-7. Bulkley River fish habitat site WQS12b located downstream of the Telkwa River and Bulkley River confluence (downstream view).

11.5.2 Fish Community

Total CPUE (Appendix 11-B) was highest in the Bulkley River, ranging from 3.32 fish/100 s at site WQS11b, to 5.12 fish/100 s at WQS12b. Total CPUE in the three other streams was similar among sites, ranging from 2.52 fish/100 s at WQS08 on the Telkwa River to 2.88 fish/100 s at WQS02 on Tenas Creek.

The fish community of all four project area streams tended to be dominated by rainbow trout, with mean CPUE ranging from 1.62 fish/100 s (Tenas Creek) to 2.17 fish/100 s (Bulkley River). Juvenile coho salmon were sub-dominant in the Telkwa and Bulkley Rivers, while Dolly Varden were sub-dominant in Goathorn and Tenas creeks. Other species captured include mountain whitefish, suckers, and lamprey. Table 11.5-1 summarizes the mean standard and bootstrapped CPUE for each species in each stream.

11.5.3 Fish Biology

Raw data are presented in Appendix 11-C. Overall length, weight, and condition of the primary species (rainbow trout, coho salmon, Dolly Varden) captured throughout the study area were similar among sites. Most of the fish captured were fry and parr; no adults were observed or captured. Fish condition was generally within the range considered ideal for healthy salmonids. Table 11.5-2 presents a summary of the mean fork length, weight, and condition for each species at each site.

Table 11.5-1. Summary of Electrofishing CPUE in Project Area Streams, 2017

			Standard CPUE							Bootstrapped CPUE			
Stream	Species	N	Mean	Min	Max	SD	SE	Lower CI	Upper CI	Mean	SD	Lower CI	Upper CI
Bulkley River	Coho Salmon	2	1.65	1.55	1.75	0.14	0.10	1.56	1.75	1.65	0.07	1.55	1.75
Bulkley River	Lamprey (General)	1	0.15	0.15	0.15	-	-	0.15	0.15	-	-	-	-
Bulkley River	Rainbow Trout	2	2.17	1.55	2.78	0.87	0.61	1.58	2.75	2.17	0.44	1.55	2.78
Bulkley River	Sucker (General)	2	0.33	0.22	0.44	0.16	0.11	0.23	0.43	0.33	0.08	0.22	0.44
Goathorn Creek	Coho Salmon	1	0.19	0.19	0.19	-	-	0.19	0.19	-	-	-	-
Goathorn Creek	Dolly Varden	1	0.39	0.39	0.39	-	-	0.39	0.39	-	-	-	-
Goathorn Creek	Rainbow Trout	1	2.13	2.13	2.13	-	-	2.13	2.13	-	-	-	-
Telkwa River	Coho Salmon	2	0.56	0.24	0.89	0.46	0.32	0.26	0.87	0.56	0.23	0.24	0.89
Telkwa River	Dolly Varden	2	0.20	0.16	0.24	0.06	0.04	0.16	0.24	0.20	0.03	0.16	0.24
Telkwa River	Mountain Whitefish	2	0.16	0.08	0.24	0.11	0.08	0.08	0.24	0.16	0.06	0.08	0.24
Telkwa River	Rainbow Trout	2	1.77	1.38	2.17	0.56	0.40	1.40	2.15	1.77	0.28	1.38	2.17
Tenas Creek	Dolly Varden	2	1.17	0.70	1.63	0.66	0.46	0.72	1.61	1.16	0.33	0.70	1.63
Tenas Creek	Rainbow Trout	2	1.62	1.05	2.18	0.80	0.57	1.08	2.15	1.62	0.40	1.05	2.18

N = number of samples
Min = minimum
Max = maximum
SD = standard deviation
SE = standard error
CI = confidence interval

Table 11.5-2. Length, Weight, and Condition of Fish in Project Area Streams, 2017

				Length (mm)					Weight (g)					Condition (g/mm³)				
Species	Waterbody	Site	N	Mean	SD	SE	Min	Max	Mean	SD	SE	Min	Max	Mean	SD	SE	Min	Max
Coho salmon	Goathorn Creek	WQS05	2	80	25	18	62	97	6.06	5.23	3.69	2.37	9.76	1.03	0.06	0.04	0.99	1.07
	Telkwa River	WQS08	11	69	12	4	55	90	3.90	2.05	0.62	1.57	7.58	1.10	0.11	0.03	0.94	1.37
	Telkwa River	WQS09	2	79	37	27	52	105	11.83	-	-	11.83	11.83	1.02	-	-	1.02	1.02
	Bulkley River	WQS11	12	63	13	4	47	85	3.46	2.33	0.88	0.90	6.75	1.06	0.20	0.08	0.76	1.32
	Bulkley River	WQS12	21	64	16	3	44	95	3.92	2.25	0.53	1.74	8.38	1.18	0.14	0.03	0.98	1.56
Dolly Varden	Tenas Creek	WQS01	14	111	22	6	74	155	13.77	8.02	2.14	4.00	32.98	0.93	0.07	0.02	0.83	1.06
	Tenas Creek	WQS02	7	106	23	9	77	128	12.45	6.60	2.49	4.40	19.67	0.97	0.07	0.03	0.85	1.07
	Goathorn Creek	WQS05	4	85	43	21	51	141	9.73	13.19	6.60	1.01	28.93	0.88	0.12	0.06	0.76	1.03
	Telkwa River	WQS08	2	95	5	4	91	98	7.72	1.35	0.96	6.77	8.68	0.91	0.01	0.01	0.90	0.92
	Telkwa River	WQS09	2	166	8	6	160	171	45.11	2.51	1.78	43.33	46.88	1.00	0.08	0.06	0.94	1.06
Lamprey (general)	Bulkley River	WQS11	1	80	-	-	80	80	-	-	-	-	-	-	-	-	-	-
Mountain whitefish	Telkwa River	WQS08	1	97	-	-	97	97	7.18	-	-	7.18	7.18	0.79	-	-	0.79	0.79
	Telkwa River	WQS09	2	59	5	4	55	62	1.58	0.34	0.24	1.34	1.82	0.78	0.04	0.03	0.76	0.81
Rainbow trout	Tenas Creek	WQS01	9	114	9	3	103	132	15.64	4.08	1.36	9.59	24.18	1.04	0.11	0.04	0.88	1.23
	Tenas Creek	WQS02	22	90	36	8	42	178	12.22	13.79	2.94	0.77	62.25	1.13	0.12	0.03	0.90	1.34
	Goathorn Creek	WQS05	22	74	27	6	39	116	5.97	5.29	1.13	0.68	16.69	1.10	0.15	0.03	0.90	1.48
	Telkwa River	WQS08	17	82	30	7	40	161	8.43	10.83	2.63	0.64	47.43	1.08	0.10	0.02	0.97	1.35
	Telkwa River	WQS09	18	83	19	5	39	126	6.71	4.24	1.00	0.49	18.86	1.04	0.09	0.02	0.83	1.25
	Bulkley River	WQS11	19	108	32	7	50	170	20.24	14.16	3.54	2.66	57.25	1.10	0.15	0.04	0.69	1.34
	Bulkley River	WQS12	21	83	29	6	40	151	9.67	9.31	2.14	1.39	36.29	1.16	0.10	0.02	1.00	1.36
Sucker (general)	Bulkley River	WQS11	3	93	41	23	53	134	16.77	11.50	8.13	8.64	24.91	1.06	0.02	0.02	1.04	1.07
	Bulkley River	WQS12	3	114	24	14	100	142	19.54	11.83	6.83	12.43	33.20	1.22	0.07	0.04	1.16	1.30

N = number of samples
SD = standard deviation
SE = standard error
Min = minimum
Max = maximum

Length-frequency distributions for rainbow trout captured at each of the sampling streams show that the majority of fish captured were fry and parr (Figure 11.5-1). In the Bulkley River and the Telkwa River, the majority of fish captured ranged in size between 60 and 100 mm. In Goathorn Creek, the majority of captured fish were in the 40 to 50 mm size range. In Tenas Creek, most fish fell into the 100 to 110 mm size range.

A length-frequency distribution for Dolly Varden could only be presented for Tenas Creek due to the low numbers of Dolly Varden caught in other streams. The distribution revealed that most fish fell into the 80 to 90 mm and 110 to 120 mm size ranges (Figure 11.5-2).

The length-frequency distributions for coho salmon captured in the Bulkley and Telkwa rivers was suggestive of two age classes. One cluster of results was evident between 50 and 55 mm, with another between 75 and 85 mm (Figure 11.5-3). This is consistent with coho life history, wherein juveniles spend one to two years in freshwater before migrating to the ocean.

The mean length and weight of fish was compared among streams for rainbow trout, Dolly Varden, and coho salmon. There was statistically significant evidence that rainbow trout captured in Tenas Creek were longer (ANOVA, $F_{3,124} = 3.48$, $p < 0.05$) and heavier (ANOVA, $F_{3,119} = 5.66$, $p < 0.01$) than rainbow trout from Goathorn Creek. No statistically significant difference was evident between Tenas Creek rainbow trout and those in the Bulkley River or Telkwa River; there was no statistically significant difference between the fish in the Bulkley and Telkwa rivers.

Weight-length regressions were tested for rainbow trout, Dolly Varden, and coho salmon. For rainbow trout, the weight-length regression was significant for all waterbodies ($R^2 = 0.98$, $p < 0.01$), and there were no differences in the slopes of the weight-length regressions among waterbodies (Figure 11.5-4). Thus, weight-at-length was compared and no significant differences among waterbodies were found ($p > 0.05$ for all comparisons).

For Dolly Varden, the weight-length regressions were significant for all waterbodies ($R^2 = 0.99$, $p < 0.01$); however, there was a significant difference in the slopes of the regression lines among watershed (GLM, $F_{5,23} = 1{,}286$, $p < 0.01$; Figure 11.5-5). As a result, weight-at-length could not be compared directly. In this case, mean condition factor was compared among waterbodies. Mean Dolly Varden condition was not significantly different among waterbodies (ANOVA, $F_{2,26} = 1.59$, $p = 0.22$).

For coho salmon, the weight-length regression was significant for all waterbodies ($R^2 = 0.95$, $p < 0.01$), and there were no significant differences in the slopes of the regressions among waterbodies (Figure 11.5-6). No differences in weight-at-length were found among waterbodies, indicating that fish weight relative to length was the same for fish from all waterbodies ($p > 0.05$ for all comparisons).

Energy storage among rainbow trout sacrificed for tissue metals analysis was also examined through liver weight analyses. Liver weight-body weight regressions were significant for all waterbodies ($R^2 = 0.67$, $p < 0.01$), and there were no significant differences in the slopes of the regressions among waterbodies ($p > 0.05$ for all comparisons). This indicates that the relationship between liver weight and body weight was similar among all fish. There were also no significant differences in intercept among waterbodies, indicating that liver size and energy storage were similar among all fish tested. Similarly, HSI did not differ significantly among waterbodies (ANOVA, $F_{3,52} = 0.34$, $p = 0.80$).

Figure 11.5-1

Length Frequency Distributions of Rainbow Trout in Tenas Project Area Water Bodies, October 2017

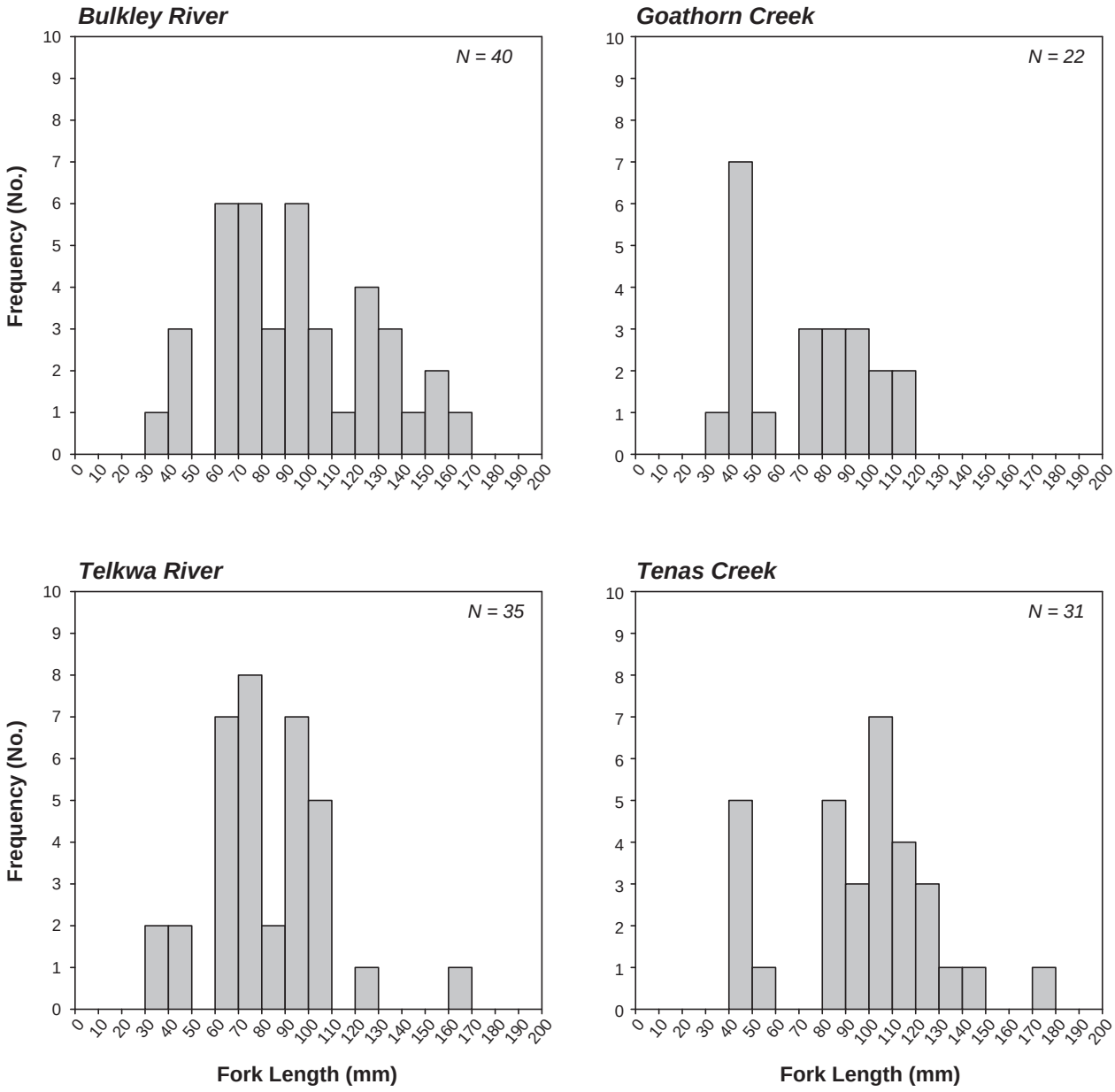


Figure 11.5-2

Length Frequency Distributions of Dolly Varden in Tenas Project Area Water Bodies, October 2017

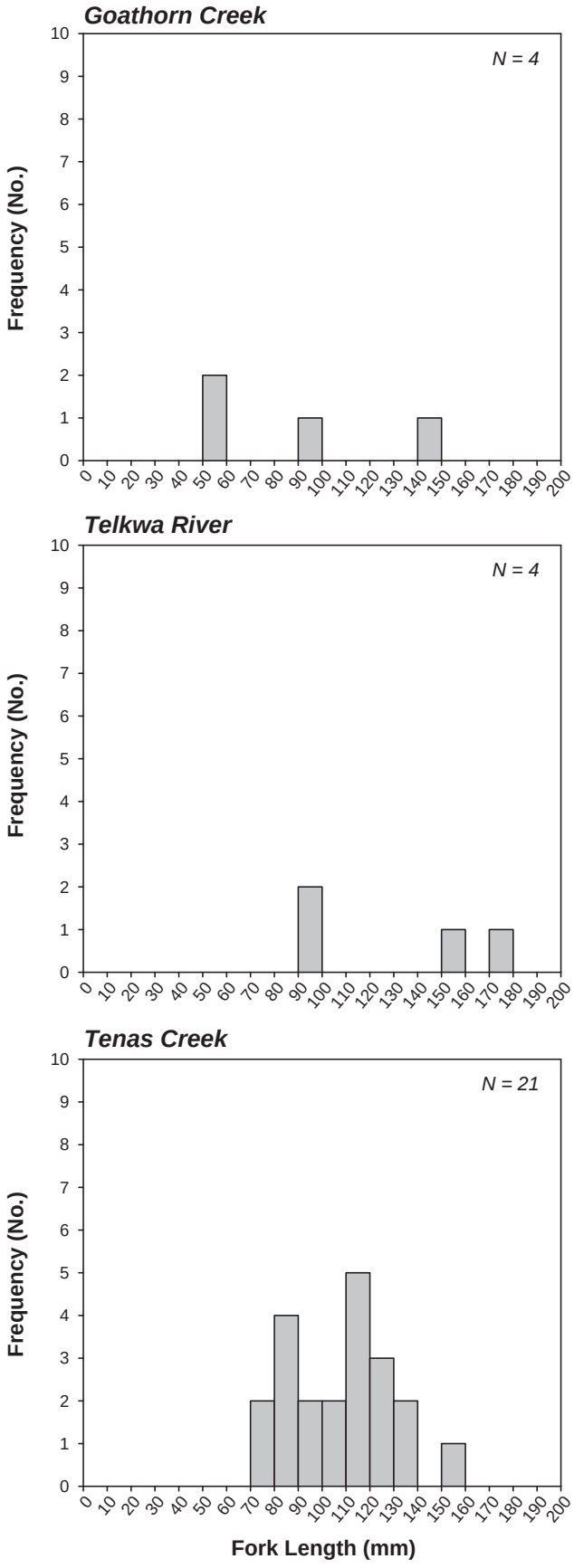
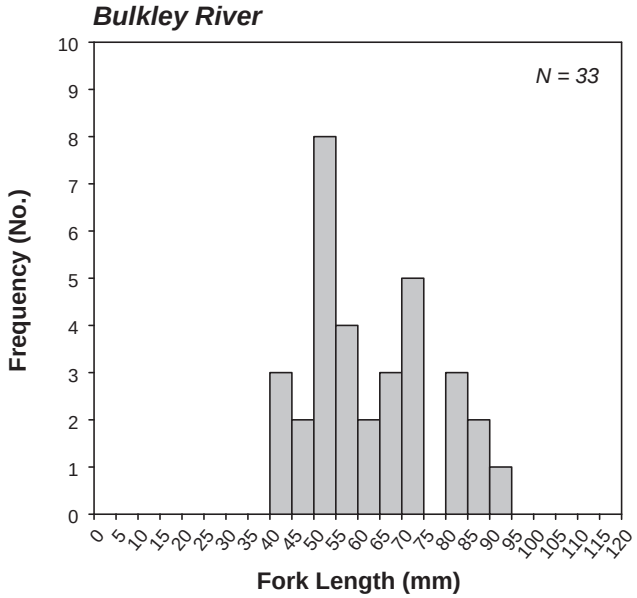


Figure 11.5-3

Length Frequency Distributions of Coho Salmon in Tenas Project Area Water Bodies, October 2017



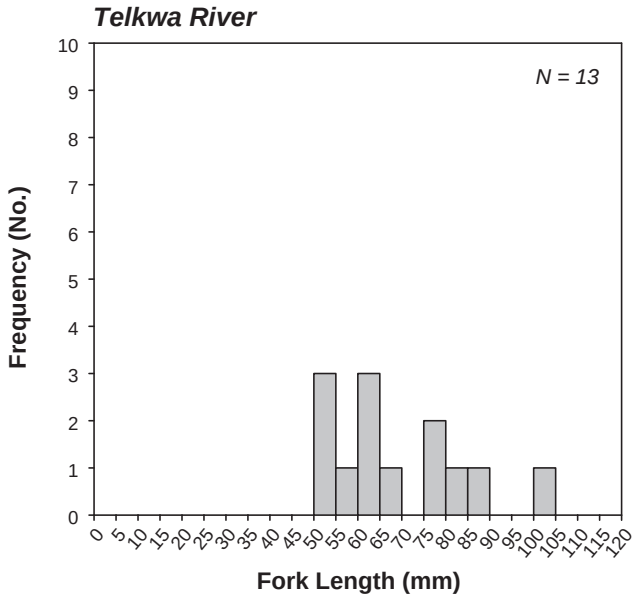
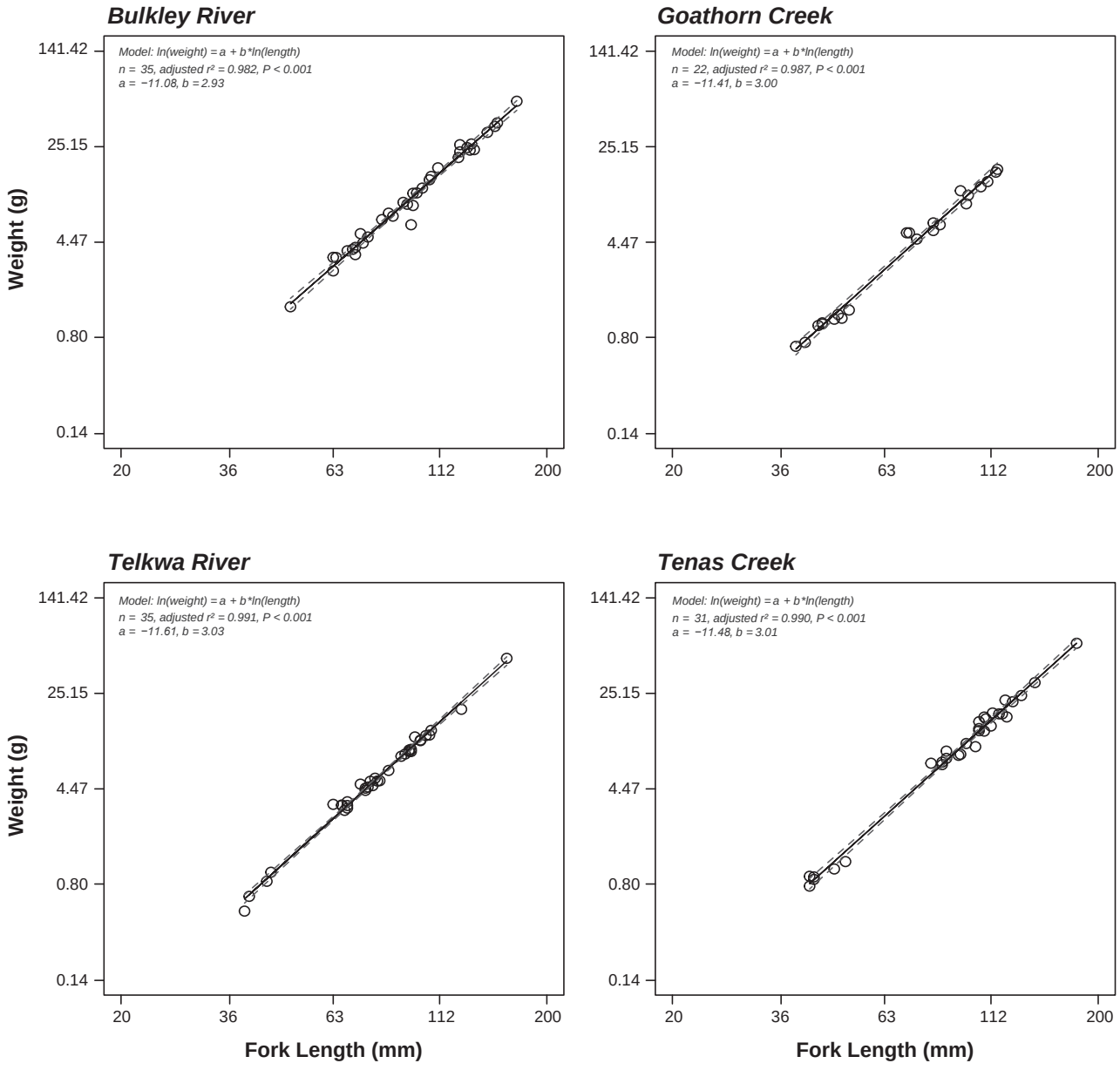


Figure 11.5-4

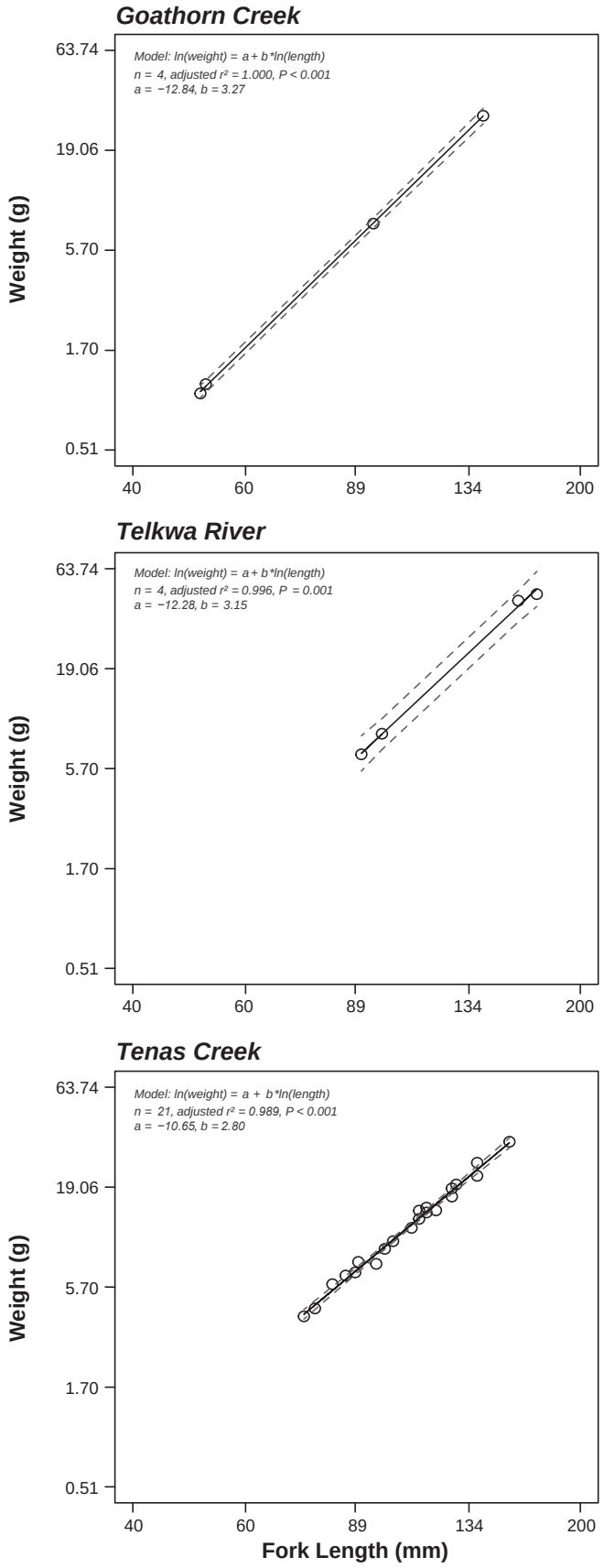
Weight-Length Regressions for Rainbow Trout in Tenas Project Area Water Bodies, October 2017



Note: Axis values have been backtransformed from the natural log (Ln).

Figure 11.5-5

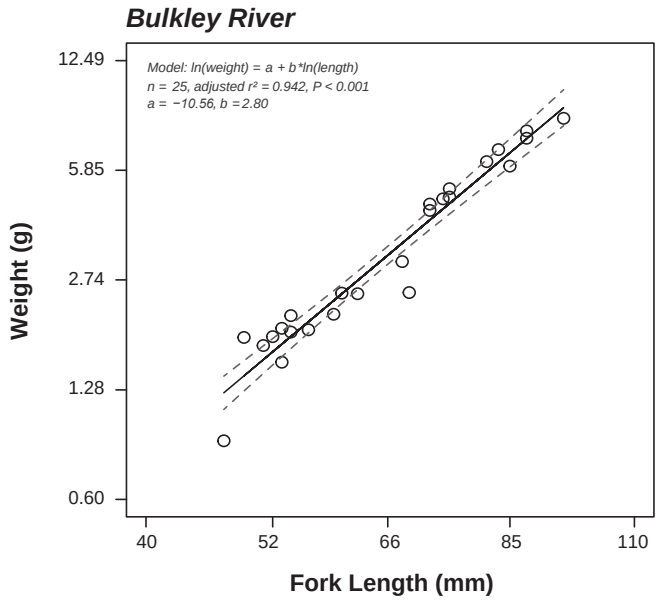
Weight-Length Regressions for Dolly Varden in Tenas Project Area Water Bodies, October 2017

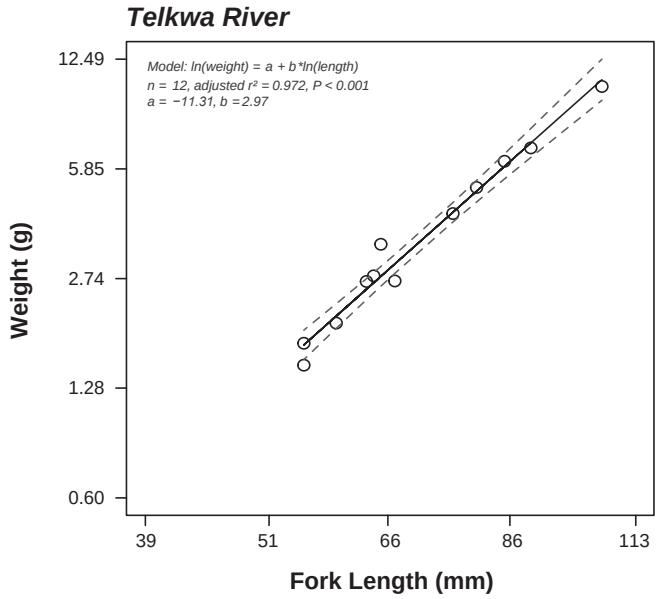


Note: Axis values have been backtransformed from the natural log (Ln).

Figure 11.5-6

Weight-Length Regressions for Coho Salmon in Tenas Project Area Water Bodies, October 2017





Note: Axis values have been backtransformed from the natural log (Ln).

11.5.4 Tissue Metals

Analysis and QA/QC results for tissue metals are presented in Appendix 11-D. Tissue metal concentrations for rainbow trout from the Bulkley River, Telkwa River, Goathorn Creek, and Tenas Creek were analyzed in October 2017. Table 11.5-3 summarizes the mean tissue metal concentrations for those metals.

BC's tissue quality guideline for selenium is based on whole-body concentration and is reported for dry weight: 4 micrograms (µg)/g. An interim guideline for muscle tissue has also been established at the same concentration (BC MOE 2014). To compare selenium concentrations from tissue samples collected in the study area, the BC guideline was converted to a wet weight measurement using an average moisture concentration of 78% (moisture content in samples ranged from 76% to 81.3%, and averaged 78.3%). The resulting approximate guideline was 0.88 mg/kg wwt.

Muscle tissue selenium concentrations collected from rainbow trout in the study area ranged from 0.208 mg/kg to 0.710 mg/kg. The average across all samples was 0.396 mg/kg. No samples exceeded the interim BC tissue quality guideline for muscle tissue.

Tissue mercury concentrations did not exceed Health Canada guidelines (0.5 mg/kg wwt; Health Canada 2007) for any of the samples tested.

Table 11.5-3. Summary of Rainbow Trout Tissue Metal Concentrations in Tenas Project Waterbodies

	Bulkley River (n=16)				Goathorn Creek (n=8)				Telkwa River (n=16)				Tenas Creek (n=16)			
Variable	Min	Max	Mean	SE	Min	Max	Mean	SE	Min	Max	Mean	SE	Min	Max	Mean	SE
Fork Length (mm)	71	151	112	5	82	116	103	4	78	126	97	3	81	132	109	3
Moisture (%)	76.6	81.3	78.7	0.3	77.7	78.6	78.1	0.1	77.6	80.9	79.4	0.2	76.0	78.9	77.2	0.2
Arsenic (mg/kg wwt)	0.0225	0.1560	0.0496	0.0088	0.0171	0.0966	0.0321	0.0095	0.0109	0.0519	0.0199	0.0024	0.0155	0.0527	0.0344	0.0031
Barium (mg/kg wwt)	0.146	1.240	0.343	0.066	0.125	0.381	0.237	0.037	0.132	0.672	0.270	0.035	0.071	0.337	0.161	0.017
Calcium (mg/kg wwt)	429	1,680	849	82	468	1,430	842	115	373	2,160	813	111	374	1,600	781	90
Cesium (mg/kg wwt)	0.0038	0.0106	0.0072	0.0005	0.0785	0.1010	0.0916	0.0027	0.0148	0.0527	0.0253	0.0025	0.1320	0.3430	0.2096	0.0147
Cobalt (mg/kg wwt)	0.0055	0.0646	0.0140	0.0035	0.0194	0.0485	0.0345	0.0037	0.0085	0.0792	0.0272	0.0043	0.0079	0.0222	0.0140	0.0011
Copper (mg/kg wwt)	0.205	0.378	0.299	0.014	0.201	0.487	0.339	0.035	0.183	0.409	0.302	0.015	0.339	0.531	0.404	0.017
Iron (mg/kg wwt)	2.1	15.0	4.2	0.7	2.5	5.6	3.9	0.4	2.9	6.9	4.3	0.3	3.1	5.4	4.1	0.2
Magnesium (mg/kg wwt)	233	309	270	6	233	263	254	4	241	297	263	3	232	295	267	5
Manganese (mg/kg wwt)	0.264	1.810	0.659	0.103	0.209	0.571	0.349	0.056	0.305	1.270	0.545	0.069	0.160	1.410	0.394	0.075
Mercury (mg/kg wwt)	0.0097	0.0681	0.0259	0.0037	0.0172	0.0266	0.0215	0.0012	0.0129	0.0236	0.0171	0.0007	0.0121	0.0297	0.0190	0.0010
Phosphorus (mg/kg wwt)	2,010	2,950	2,542	71	2,140	2,630	2,380	58	2,110	2,940	2,391	54	2,060	2,880	2,413	63
Potassium (mg/kg wwt)	3,480	4,230	3,843	70	3,630	4,160	3,881	62	3,790	4,170	3,991	29	3,570	4,290	3,883	52
Rubidium (mg/kg wwt)	1.12	2.71	1.70	0.12	3.57	5.57	4.84	0.22	2.36	4.90	3.36	0.17	2.95	4.64	3.85	0.13
Selenium (mg/kg wwt)	0.208	0.533	0.292	0.018	0.305	0.394	0.350	0.013	0.283	0.545	0.396	0.018	0.395	0.710	0.546	0.023

(continued)

Table 11.5-3. Summary of Rainbow Trout Tissue Metal Concentrations in Tenas Project Waterbodies (completed)

	Bulkley River (n=16)				Goathorn Creek (n=8)				Telkwa River (n=16)				Tenas Creek (n=16)			
Variable	Min	Max	Mean	SE	Min	Max	Mean	SE	Min	Max	Mean	SE	Min	Max	Mean	SE
Sodium (mg/kg wwt)	509	733	584	17	505	684	600	20	527	736	636	17	536	635	588	8
Strontium (mg/kg wwt)	0.378	1.410	0.793	0.073	0.282	1.300	0.610	0.120	0.266	1.730	0.674	0.096	0.277	1.450	0.637	0.092
Thallium (mg/kg wwt)	0.00110	0.00269	0.00170	0.00009	0.00393	0.00609	0.00489	0.00029	0.00142	0.00316	0.00229	0.00014	0.00257	0.00483	0.00356	0.00018
Zinc (mg/kg wwt)	4.51	9.99	6.30	0.32	5.42	10.00	6.73	0.56	4.27	7.76	5.73	0.27	5.02	9.50	6.48	0.30

12. VISUAL QUALITY

This chapter presents the methods and results of the visual quality baseline program. The purpose of the visual quality program was to collect Project specific baseline about the visual landscape and identify areas in the Bulkley Valley where the Project would be visible. An understanding of the visual setting will contribute to contribute to the effects assessment and may inform project design to mitigate impacts to visual quality.

The objective of the 2017 visual quality baseline was to:

- define a viewshed for the project; and
- identify viewpoints within the viewshed that could potentially be influenced by the Project.

The *Visual Impact Assessment Guidebook, Second Edition* (BC MOF 2001) was used for guidance in geographic extent, data collection standards and objectives. This methodology prescribes documenting the existing view from specific viewpoints looking towards the Project as well as assessing the Projects footprint relative to areas with defined visual quality management objectives.

12.1 STUDY AREA

The Project is located in the Bulkley Valley in the northwest Central Interior of British Columbia. It is approximately 10 km southwest of Telkwa and 20 km south of the Town of Smithers. The region is heavily utilized by anglers and hunters, as well as recreational tourists engaged in hiking, biking, canoeing, rafting, kayaking, bird watching and wilderness photography explorations during summer months. Outdoor recreational activities in the winter include cross-country, backcountry and downhill skiing, snowmobiling, ice climbing, and snowshoeing (RDBN 2017).

The study area uses the three types of viewscape:

- the foreground extending from the edge of the scene to a distance of 1 km;
- the mid-ground extending 1 km from the scene to 8 km from the scene; and
- the background beyond 8 km (BC MOF 1997).

The WMO defines the minimum size limitation of perceivable objects as 0.5 degrees of the field of view (WMO 2006). This limit and approximately a 300 m vertical extent of the project was used to limit the extent of the "background" to 34.4 kilometers.

The visibility of the Project area within this background extent will be limited by the surrounding topography. A preliminary viewshed model was built using Canadian Digital Elevation Model (CDEM) data mine site infrastructure data. The result of this viewshed and the 34.4 km visibility limit confirmed areas with a potential view of the project occur within the Bulkley Land and Resource Management Plan area as well as the Bulkley, Telkwa, Copper, Reiseter, and Deep Creek Landscape Unit plan areas.

12.2 REGULATORY AND POLICY FRAMEWORK

The (Joint AIR for MA/EMA Permits (BC MEM and MOE 2016) has no formal requirement for visual quality reporting. However, the *Guide to Preparing Mine Applications for Aggregate Pit and Quarries in British Columbia* does recognize visual impact as an important consideration in developing positive community relationships (BC MEMPR 2010).

The Project occurs within two resource management plan areas: the provincial Bulkley Land and Resource Management Plan (LRMP) and the regional Bulkley Valley Sustainable Resource Management Plan (SRMP; BVLRMP 1998; BVSRMP 2005). They share the same viewpoints and objectives. The LRMP contains additional viewpoints associated with recreational use. The LRMP specifies that all development shall consider major corridors, recreation focus points, and specific viewpoints identified in Landscape Unit Plans.

12.3 EXISTING INFORMATION

Baseline studies began with a review of existing information on the visual quality environment in the study area, as described in Table 12.3-1.

Table 12.3-1. Visual Quality Data Information Table

Documents Reviewed	• MCL. 1997. Telkwa Coal Project: Application for a Project Approval Certificate – Volumes I-V. Submitted by Manalta Coal Ltd. *https://projects.eao.gov.bc.ca/api/document/5886a859eed3c0016f855d00/fetch* (accessed December 2017) • TCPC. 1997. *Final Project Report Specifications for Manalta Coal Ltd.'s Proposed Telkwa Coal Project*. Prepared by the Telkwa Coal Project Committee, https://projects.eao.gov.bc.ca/api/document/5886a860eed3c0016f855d02/fetch (accessed April 2018). • BPM. 2008. *Davidson Project: Application for Environmental Assessment Certificate*. Submitted by Blue Pearl Mining Inc. *https://projects.eao.gov.bc.ca/p/davidson/docs* (accessed December 2017)
General Remarks	The nature of the analysis requires existing data specific to the current site that reflects the current appearance of both the project site and potential viewing locations. No existing information was found to be relevant to the current analysis. Several titles indicated within summaries of existing documents held by Allegiance may contain information useful in a historical context and may hold value in public discussions to progress the project. This data was available at the time of this report, but was not required for the analysis.
Sampling Required by *Joint AIR for Mines Act and Environmental Management Act Permits (*Joint AIR for MA/EMA Permits)	The Joint AIR for MA/EMA Permits has no formal requirement for Visual Quality reporting. However, the Guide to Preparing Mine Applications for Aggregate Pit and Quarries in British Columbia (BC MEMPR 2010) does recognize visual impact as an important consideration in developing positive community relationships.
Existing Data	There was no existing data available.

(continued)

Table 12.3-1. Visual Quality Data Information Table (completed)

Existing Data Issues	The assessment framework for visual quality is targeted at forestry. Many of the objectives are unachievable for other development types. The planning processes (LRMP/SRMP) through which this system was intended to be developed was not finalized.
Missing Data	Heights of Project features
2017–March 2018 Baseline Program	The program focused on defining a viewshed for the project, and on providing current "baseline" photo documentation specific to viewpoints and viewing features defined provincially and regionally.
Key Issues	Intermittent impacts of haul truck activities difficult to quantify in a meaningful way
Other Comments	None

12.4 METHODOLOGY

12.4.1 Overview

The methods used for this study follow the *Visual Impact Assessment Guidebook* (BC MOFR 2001).

12.4.2 Planning and Pre-field

12.4.2.1 Viewshed Development

The viewshed was developed using ESRI ArcGIS 10.5.1 Spatial Analyst Visibility tool to identify the areas that could potentially be viewed from proposed Project location. An assumption in the analysis is that a person seen from the Project infrastructure can also view the Project infrastructure.

Vegetation heights were not taken into account for the baseline study. This is a more cautionary approach, indicating possible views of the project from locations that, on inspection, have little or no opportunity to observe the Project area.

The viewshed is specific to the mine site area and does not include the rail loadout area. Smaller disturbance such as the access road and ancillary buildings will become imperceptible at "background" distances and are more likely to benefit from vegetative screening. The rail loadout was modelled separately to evaluate its viewshed and determine applicable viewpoints, because it has a small scale of disturbance and site infrastructure, limiting visibility to much smaller distances. The haul road was not modelled for a viewshed as its impact is seen as intermittent, smaller scale, and as not having a significant effect in the beyond foreground and mid-ground view scales.

12.4.2.2 Viewpoint Screening and Identification

Viewpoints identified in Bulkley Land and Resource Management Plan and Landscape Unit Plan sub-documents (Table 12.4-1; Figure 12.4-1) were screened out from further study as they fell outside the viewshed, or following WMO (2006) guidance, were more than 35 km from the Project site (Grassy Mountain and Harvey Mountain Viewpoints from the Reiseter LUP).

Table 12.4-1. Summary of Viewpoints from the Bulkley Land and Resource Management Plan and Landscape Unit Plan Sub-documents Screened Out of Field Baseline Study

Viewpoint Name	Rationale for Preliminary Consideration	Viewpoint Association	Viewpoint of Project Area?
Telkwa\Hubert Rest Stop	Bulkley LUP/Provincial Dataset	Highway 16	No
Smithers Goat Statue	Bulkley LUP/Provincial Dataset	Highway 16	No
Smithers Airport	Bulkley LUP/Provincial Dataset	Highway 16	No
Adams Igloo	Bulkley LUP/Provincial Dataset	Highway 16	No
Evelyn Hall	Provincial Dataset	Highway 16	No
McDonnell Lake	Copper LUP	Foresty Recreation Site	No
Dennis Lake	Copper LUP	Foresty Recreation Site	No
Skihill	Copper LUP/Telkwa LUP	Recreation Tourism	No. Alternate established
Quick School	Deep Creek LUP/Bulkley LUP	Highway 16	No
Hungry Hill Reststop	Deep Creek LUP/Bulkley LUP	Highway 16	No
Grassy Mountain	Reiseter LUP	Hiking/Snowmobile Area	No
Harvey Mountian	Reiseter LUP	Hiking/Snowmobile Area	No. Alternate investigated
Aldrich	Telkwa LUP	Foresty Recreation Site	No
Jonas Creek Rec Site	Telkwa LUP	Foresty Recreation Site	No
Mooseskin Johnny Lake	Telkwa LUP	Foresty Recreation Site	No

Table 12.4-2 contains a record of viewpoint sites considered and Figure 12.4-1 shows their distribution in relationship to the project and viewshed. The Landscape Unit Plan specifically names Highway 16, Telkwa High Road and the Bulkley River as corridors functioning as viewpoints along their route. Tyhee Lake Road was also included as it is the natural extension of Telkwa High Road, it is associated with Tyhee Lake Provincial Park, and has at least one Bed and Breakfast along the road. Round Lake Road was included as the lake has a community hall on its shoreline and both the lake and hall are used for community and recreation events. The trailheads of the Babine Mountain Park Trails Protected Area along Old Babine Lake Road were included as they are used in the winter by snowmobile groups and in the summer by hikers.

12.4.2.3 Effect of Project Component Heights

Definitive information regarding the height of project components was not available. Three additional viewsheds were developed with elevation added to each point used in the model to provide an indication of the viewshed changes that could be expected within a range of heights. The Telkwa Coal Project, Application for a Project Approval Certificate from 1997 references "*the use of low dump profiles to blend in with the topography*" (TCPC 1997). With the removal of large volumes of coal from the pit, and the use of backfilling mined pit areas this should be achievable. However, the value for "*maximum facility height*" indicated by SRK in a PowerPoint presentation shown to the Ministry of Mines on November 2, 2017 was 130 m (SRK 2017). Therefore, these additional viewsheds with elevations of 30, 60 and 120 m were used in the model.

Figure 12.4-1
Tenas Project Preliminary Viewshed Result Relative to Bulkley Land and Resource Management Plan Bulkley Landscape Unit Plan Derived Viewpoints, Strategic Land and Resource Plan Non-legal Planning Feature Viewpoints and Project Specific Viewpoints

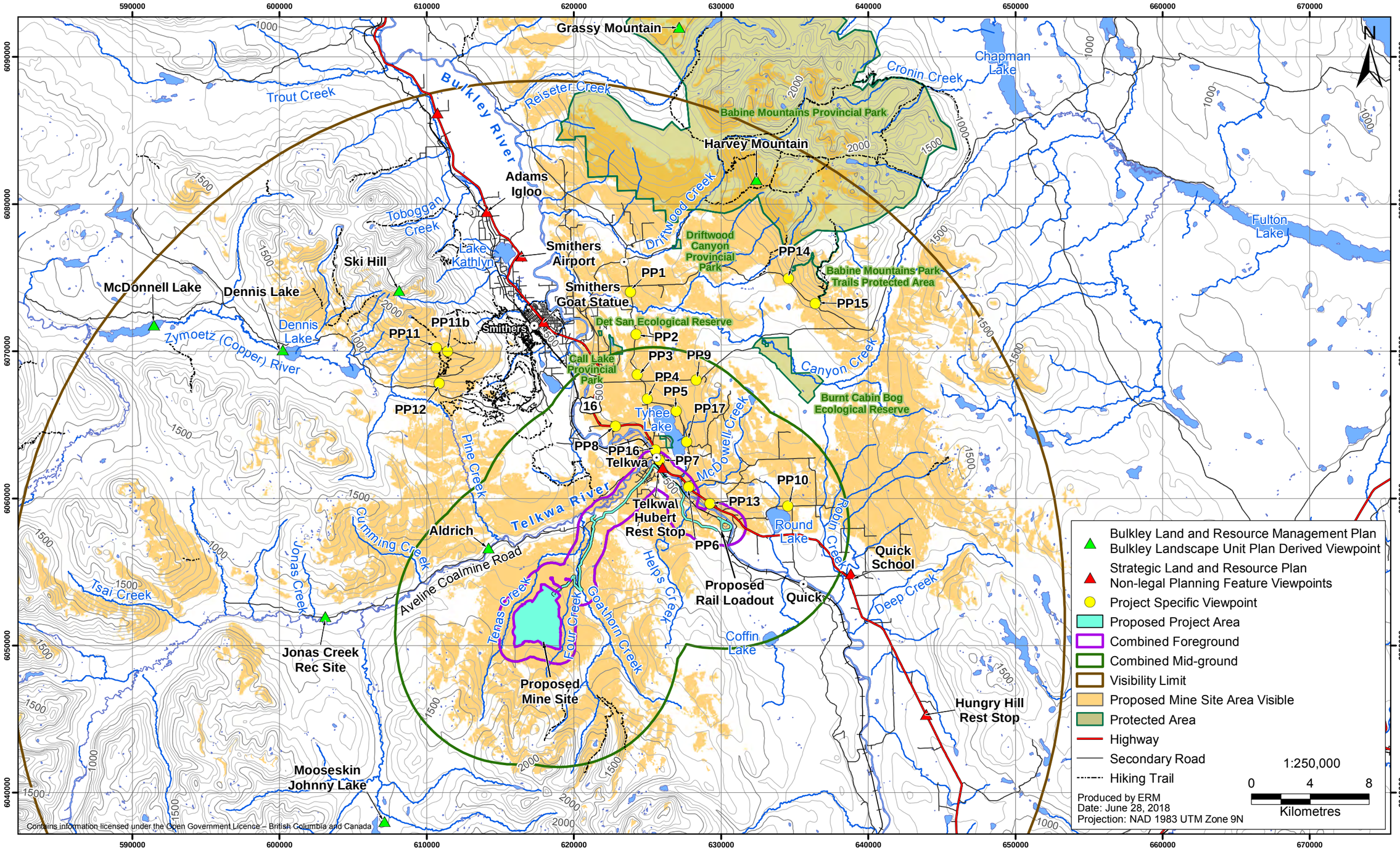


Table 12.4-2. Summary of Viewpoints Included in the Field Baseline Study

Viewpoint Name	Rationale for Preliminary Consideration	Viewpoint Association	Viewpoint of Project Area	Rationale for Inclusion in Baseline Study
PP1	LUP Travel Corridor	Telkwa High Road	Yes	Along VQ travel corridor
PP2	LUP Travel Corridor	Telkwa High Road	Yes	Along VQ travel corridor
PP3	LUP Travel Corridor	Telkwa High Road	Yes	Along VQ travel corridor
PP4	LUP Travel Corridor	Telkwa High Road	Yes	Along VQ travel corridor
PP5	LUP Travel Corridor	Tyhee Lake Road	Yes	Along VQ travel corridor
PP6	LUP Travel Corridor	Highway 16	Yes	Along VQ travel corridor
PP7	LUP Travel Corridor	Highway 16	Yes	Along VQ travel corridor
PP8	LUP Travel Corridor	Highway 16	Yes	Along VQ travel corridor
PP9	Key recreation travel corridor	Babine Lake Road	Yes	Key recreation travel corridor
PP10	Community/recreation site	Round Lake Road	Yes	Community/ recreation site
PP11 (Hudson Bay Mountain)	Economic/recreation site	Hudson Bay Mountain	Yes	Economic/recreation site
PP11b (Hudson Bay Mountain)	Economic/recreation site	Hudson Bay Mountain	Yes	Economic/recreation site
PP12 (Piper Down)	Community/recreation site	Piper Down Recreation	No	Vegetative screening
PP13	LUP Travel Corridor	Highway 16	Yes	Along VQ travel corridor
PP14	Community/recreation site	Babine Mountain Trails	No	Vegetative screening
PP15	Community/recreation site	Babine Mountain Trails	No	Vegetative screening
PP16 (Eddy Park)	Community/recreation site/LUP Travel Corridor	Eddy Park	Yes	Along VQ travel corridor
PP17	LUP Travel Corridor	Tyhee Lake Road	No	Vegetative screening

The visual change relating to the height of project components was found to be more pronounced in the foreground and mid-ground areas. The viewshed outputs contain a count of how many input points are visible from each location. The results of this analysis are summarized in Table 12.4-3 and mapped in Figure 12.4-2 and Figure 12.4-3.

Table 12.4-3. Comparison of the Effect of Project Height on Visibility within the Foreground, Mid-ground and Background Areas

	Percentage of Area with a View of a Portion of the Project			Mean Percent of Site Visible from Locations with a View of a Portion of the Project		
	Foreground	Mid-ground	Background	Foreground	Mid-ground	Background
Existing Elevation	69.4	38.9	12.6	17.2	34.1	54.9
30 metre Height	84.7	43.4	13.4	42.6	53.1	64.2
60 metre Height	92.3	47.1	14.1	53.2	59.5	65.9
120 metre Height	96.8	53.6	15.5	66.4	66.7	68.2

12.4.2.4 Visual Landscape Inventory

A summary of the various classifications and their objectives is provided in Table 12.4-4 and the current site layout is shown with the VLI polygons layer in Figure 12.4-5.

Table 12.4-4. Visual Quality Class and Visual Quality Objective Definitions[1]

Class	Description
Preservation (P)	No visible human-caused alteration. Alteration, when assessed from a significant public viewpoint, is very small in scale, and not easily distinguished from the pre-development conditions.
Retention (R)	Human-caused alterations are visible, but not evident. Alteration, when assessed from a significant public viewpoint is: (i) difficult to see, (ii) small in scale, and (iii) natural in appearance.
Partial Retention (PR)	Human-caused alteration is evident, but subordinate and therefore not dominant. Alteration, when assessed from a significant public viewpoint, is (i) easy to see, (ii) small to medium in scale, and (iii) natural and not rectilinear or geometric in shape.
Modification (M)	Alteration, when assessed from a significant public viewpoint, (i) is very easy to see, and (ii) is (A) large in scale and natural in its appearance, or (B) small to medium in scale, but with some angular characteristics.
Maximum Modification (MM)	Alteration, when assessed from a significant public viewpoint, (i) is very easy to see, and (ii) (A) very large in scale, (B) rectilinear and geometric in shape, or (C) both.

Note:

[1] *2016. Forest Planning and Practices Regulation,* Forest and Range Practices Act*, BC Reg 14/2004, Part 1.1*

Under the Bulkley LRMP, the majority of site infrastructure is located within areas classified as moderately sensitive to alteration *(Modification)*, while the part of the haul route and approximately 1/3 of the main site is in an area classified as *Partial Retention*. The proposed rail loop facility falls partially within a moderately sensitive VLI polygon associated with the Bulkey River. The portion of rail loop that occurs within this VLI area is parallel the existing rail in the background from the perspective on Bulkley River which is the associated "viewpoint" feature.

12.4.3 Photo Capture

Viewpoints were visited and information was gathered in site visits undertaken on September 27, 2017 and November 3, 2017. At each viewpoint, current conditions were recorded. Pictures were taken from the ground, using a Canon 5D 12.8 megapixel digital camera. On the September 27, additional photographs were taken in a 360° swath around the site from a helicopter hovering as close to the ground as possible above the proposed mine development site to further screen for visible signs of human use, following the assumption that locations visible from the site can conversely view the Project site.

Information gathered at each viewpoint included:

- GPS coordinates for the viewpoint (using a Garmin 60CX - Accuracy 3 - 5 metres,
  - 95% typical - Wide Area Augmentation System (WAAS) accuracy in North America or <10 metres 95% typical where WAAS not available); and
- current weather conditions.

Figure 12.4-2

Percentage of the Mine Area Visible within the Foreground and Mid-ground of the Mine Area Modelled at the Existing Surface Elevations and at 30 metres above the Existing Surface Elevation

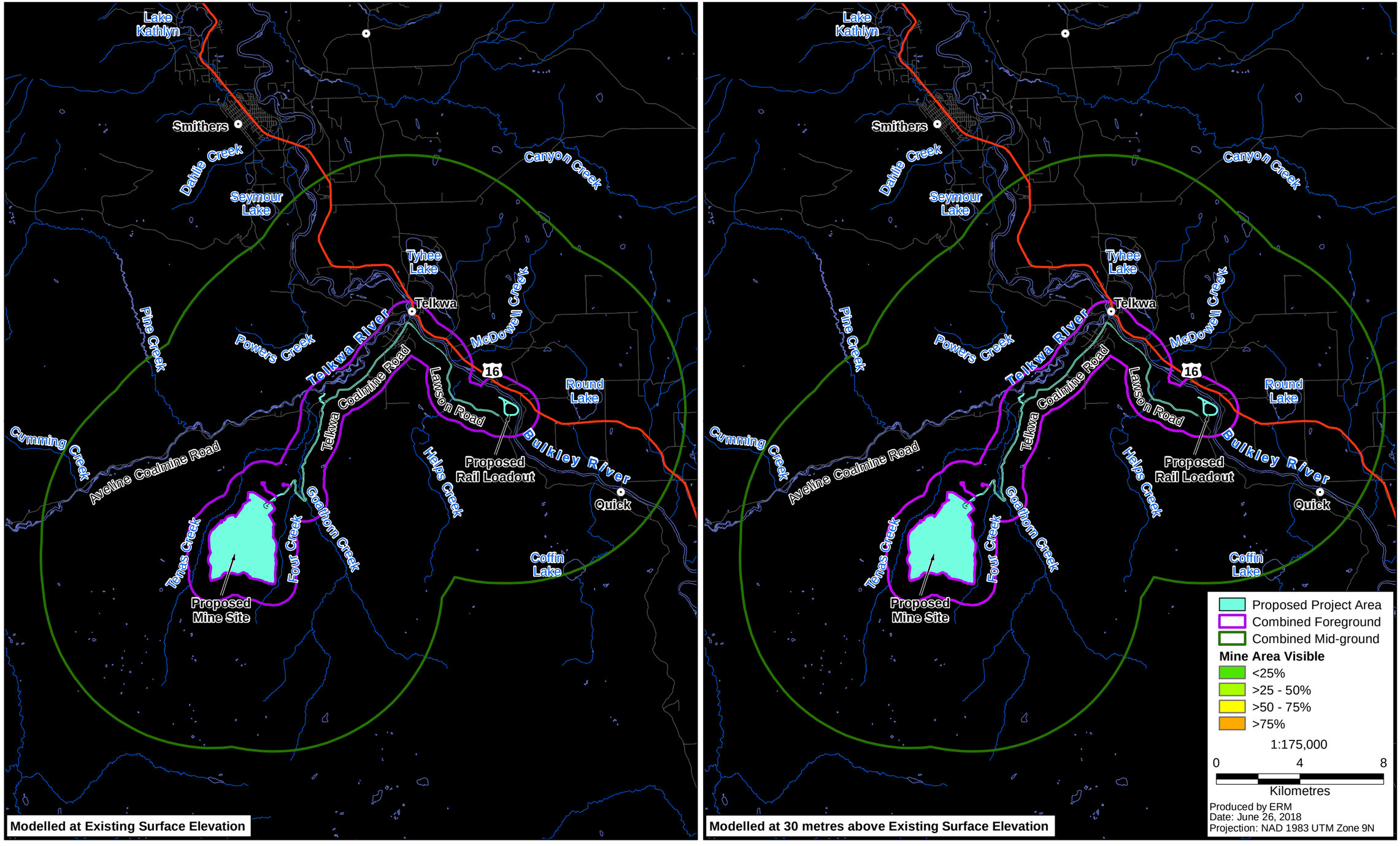


Figure 12.4.3

Percentage of the Mine Area Visible within the Foreground and Mid-ground of the Mine Area Modelled at 60 and 120 metres above the Existing Surface Elevation

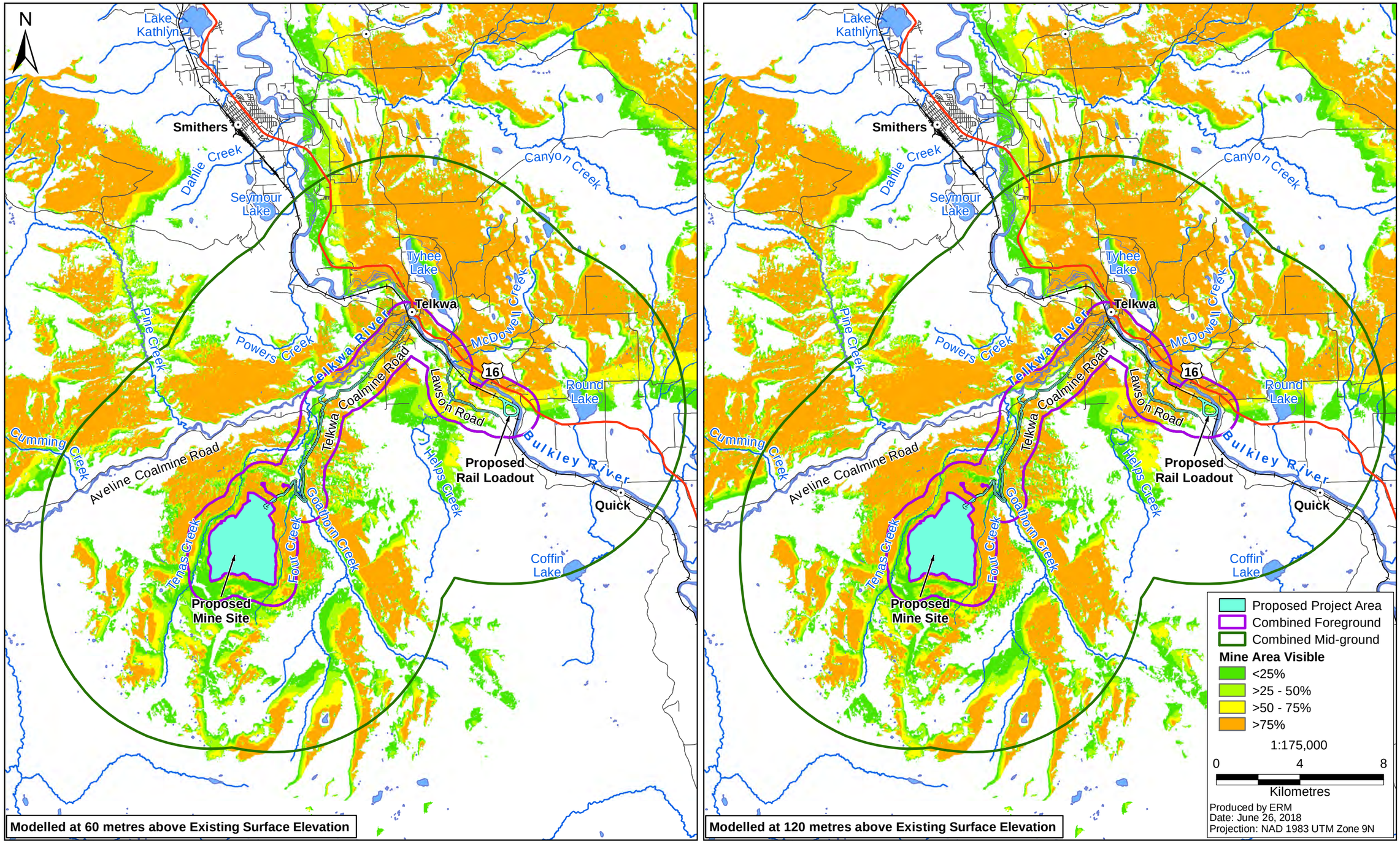
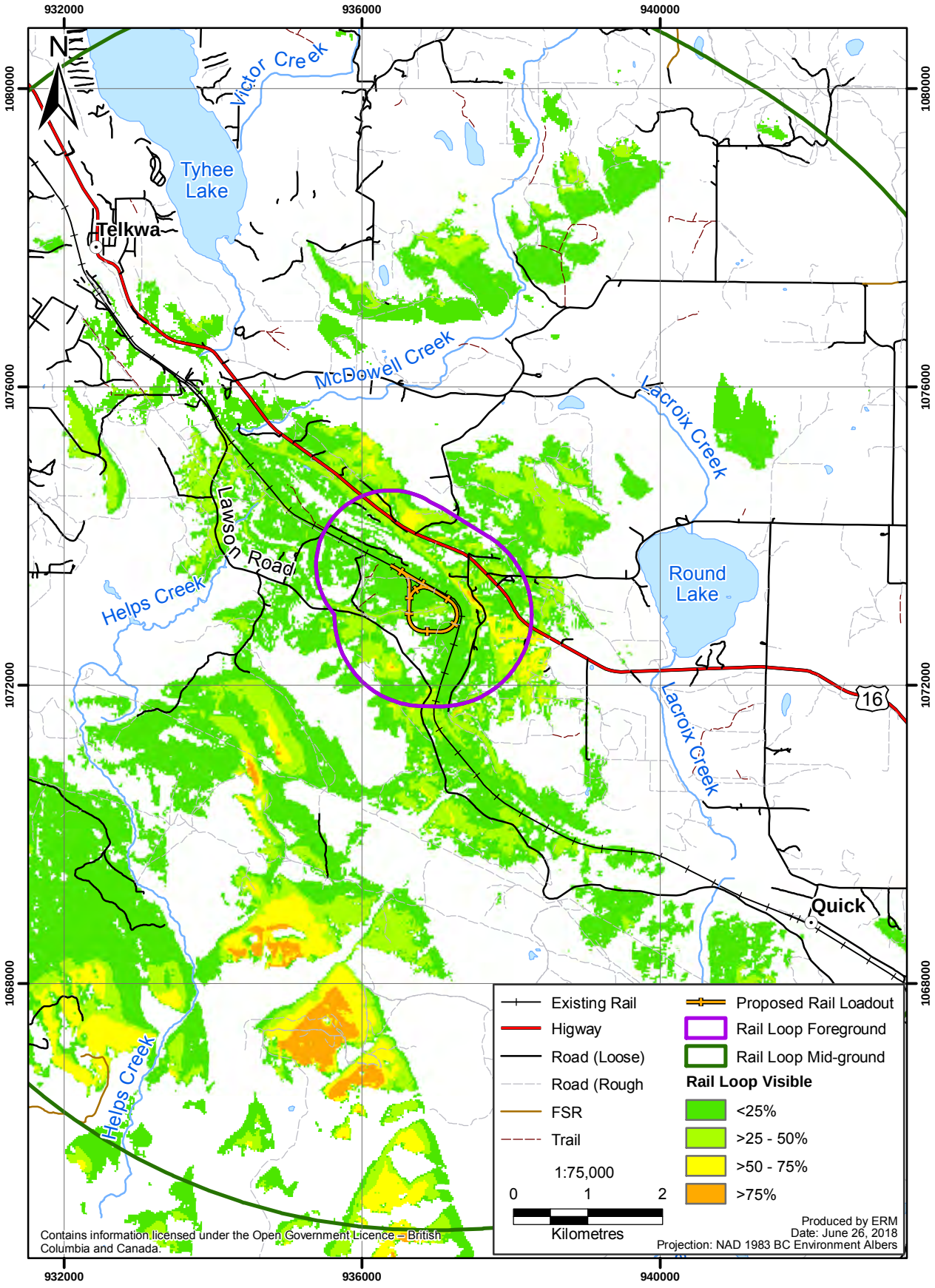


Figure 12.4-4

Percent Visible within the Foreground and Mid-ground of the Proposed Rail Loadout Facility



12.5 DATA SUMMARY

Fifteen sites from the Bulkley Land and Resource Management Plan and Landscape Unit Plan Sub-documents were screened out of field baseline studies. Eighteen sites along corridors identified by the Landscape Unit Plan that also fell within the Project's viewshed were selected for further study. The results of the field baseline studies for these 18 sites are presented in Figures 12.5-1 to 12.5-14.

12.5.1 Viewpoints PP1 to PP8

Field visits to Project Viewpoints PP1 to PP8 occurred on September 27, 2017. Conditions were clear and sunny. Temperatures ranged from 18-21°C, and winds were moderate and from the south (10 to 20 km). Local climate stations that record visibility parameters (Smithers, Smithers A) both recorded their sensors' maximum values during this time period, indicating visibility could be described as "unlimited". Despite indications that visibility was very good at the time the photos were taken, atmospheric haze is apparent in the images and limits the amount of detail visible at this distance.

12.5.1.1 Project Viewpoint PP1

Project Viewpoint PP1 is located along Telkwa High Road approximately 450 metres south of the intersection with Old Babine Lake Road at approximately 631 metres above sea level (masl). It is along a crest adjacent to a cleared field with a view in the direction of the Project.

12.5.1.2 Project Viewpoint PP2

Project Viewpoint PP2 is located along Telkwa High Road about halfway between the intersection with Babine Lake Road and the intersection with Old Babine Lake Road, with an approximate elevation of 582 m. It is along a crest in the topography adjacent a cleared field in the direction of the Project, providing the most unobstructed view in this section of road.

12.5.1.3 Project Viewpoint PP3

Project Viewpoint PP3 is located along Telkwa High Road approximately 600 metres northwest of the intersection with Babine Lake Road, with an approximate elevation of 592 metres. It is along a crest in the topography adjacent a cleared field in the direction of the Project, providing the most unobstructed view in this section of road.

12.5.1.4 Project Viewpoint PP4

Project Viewpoint PP4 is located along Telkwa High Road approximately 230 metres north of the intersection with Tyhee Lake Road, with an approximate elevation of 573 metres. It is along a crest in the topography adjacent a cleared field in the direction of the Project, providing the most unobstructed view in this section of road.

12.5.1.5 Project Viewpoint PP5

Project Viewpoint PP5 is located along Tyhee Lake Road approximately 180 metres southeast of the intersection with Hidber Road, with an approximate elevation of 552 metres. It is representative of much of the road around the backside of the lake with an unobstructed view towards the Project.

Figure 12.4-5
Tenas Project Relative to Provincial Visual Landscape Inventory (VLI), Visual Quality Objectives (VQO) and Visual Sensitivity Class (VSC)

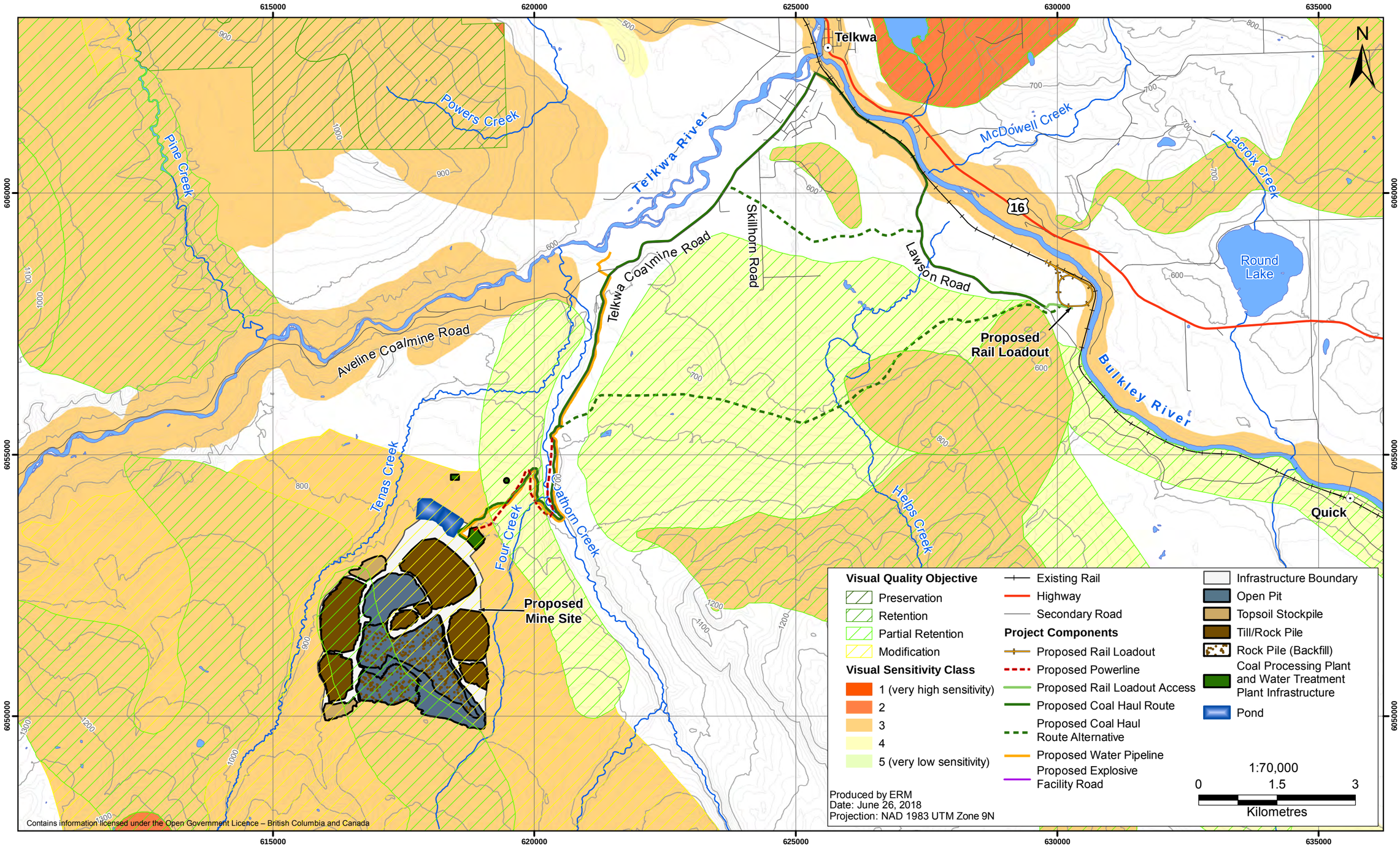
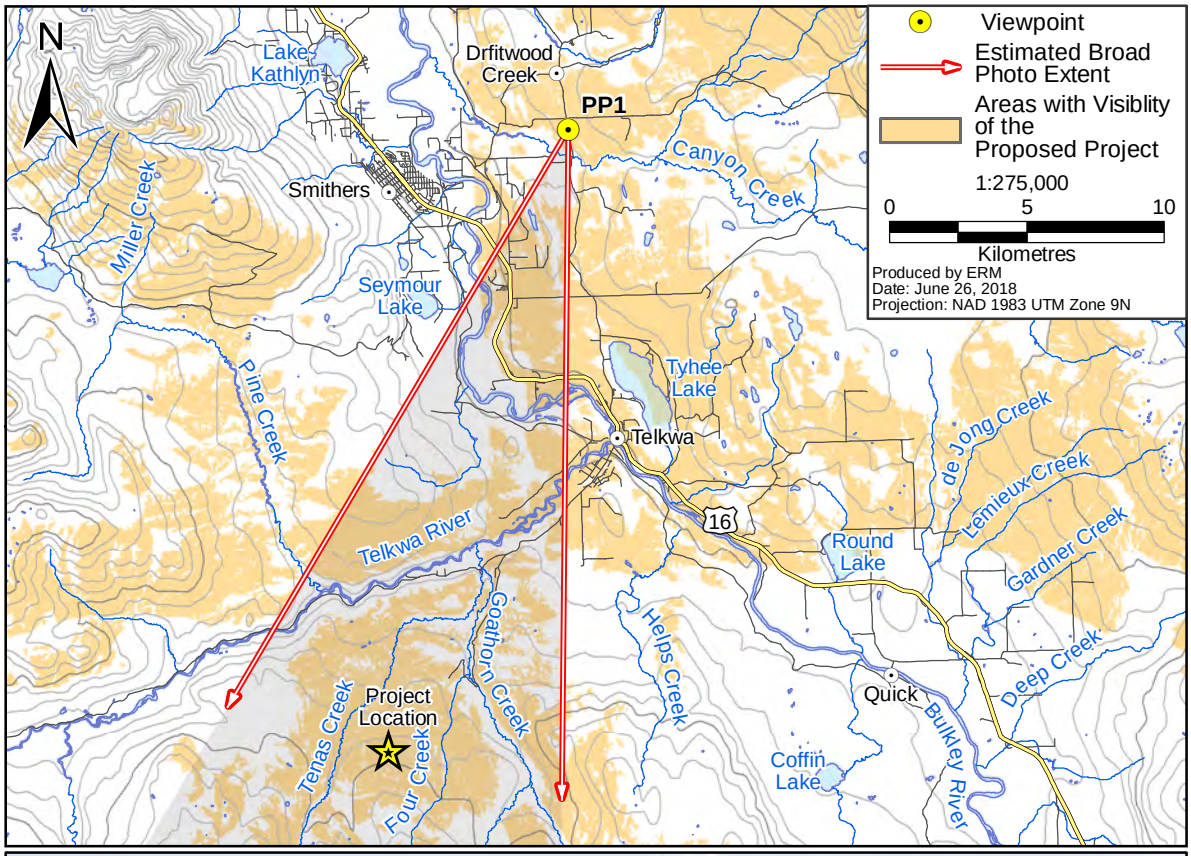
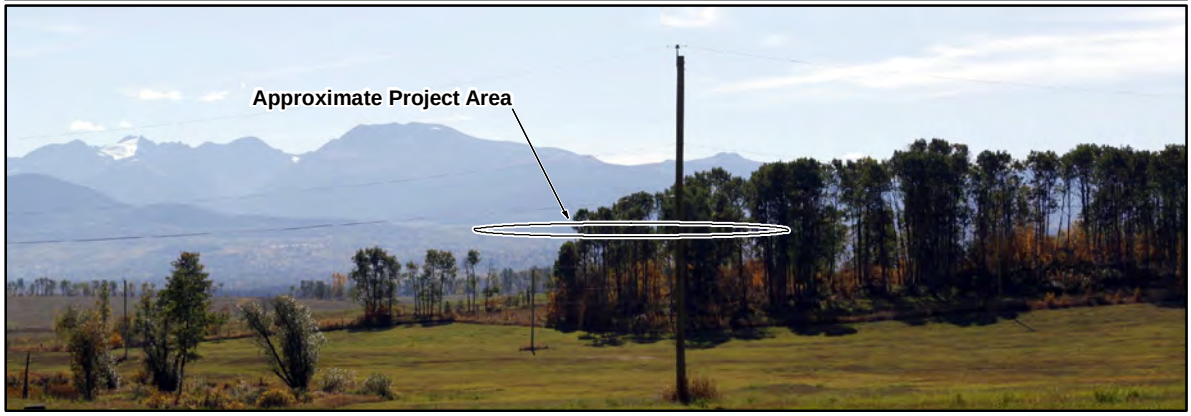


Figure 12.5-1
Visual Quality Photo Site PP1, Tenas Coal Project





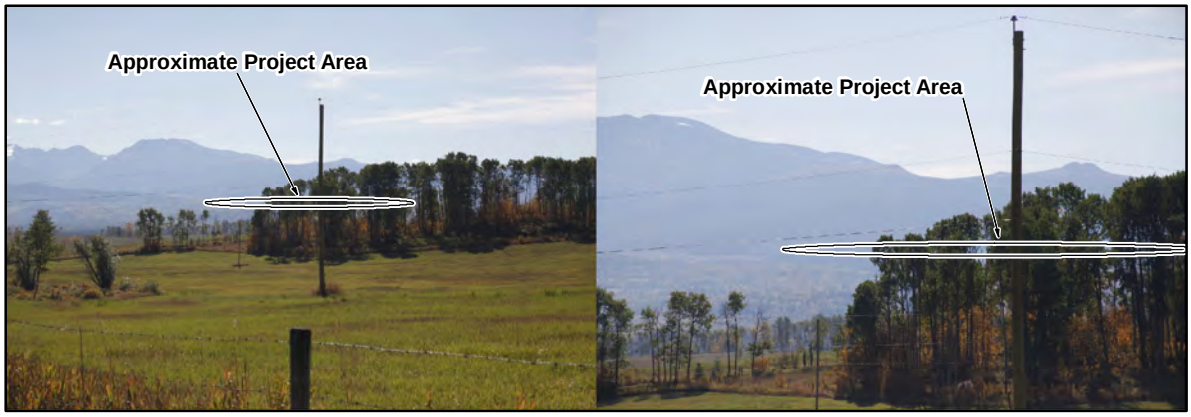
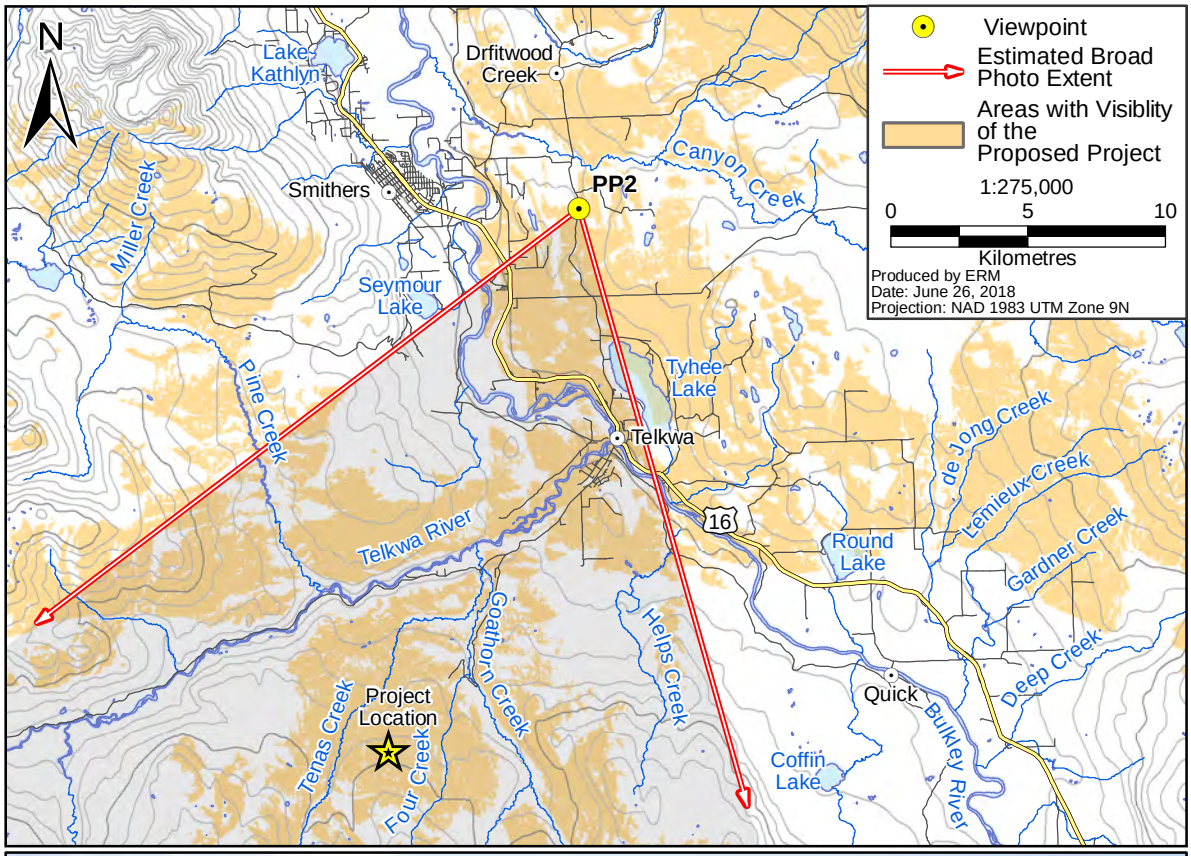
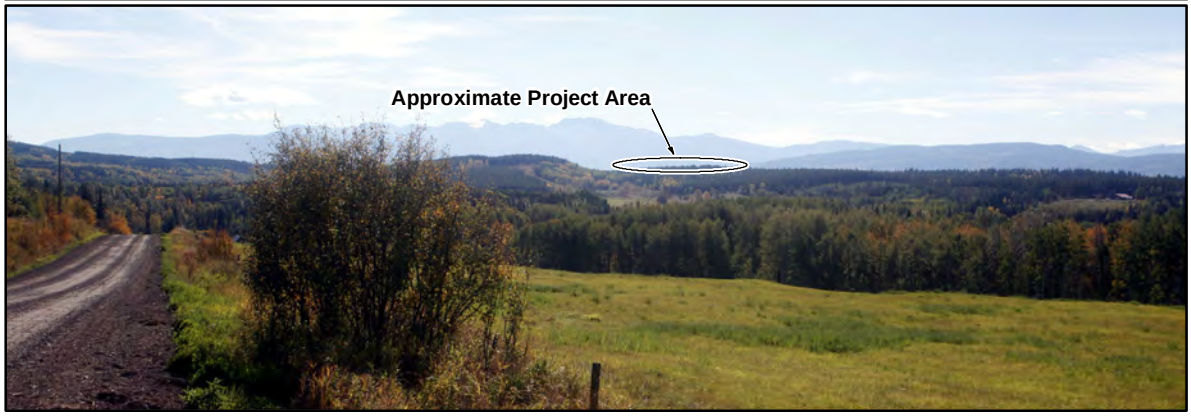


Figure 12.5-2
Visual Quality Photo Site PP2, Tenas Coal Project





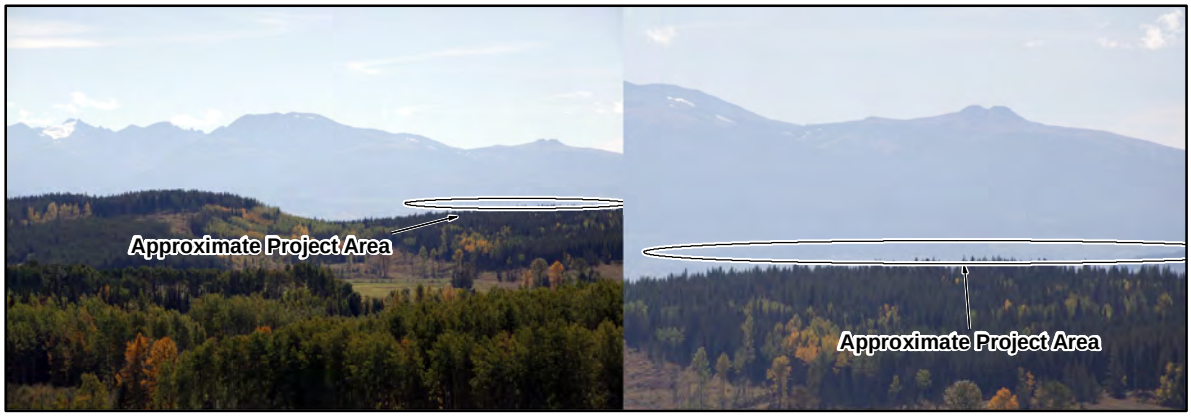
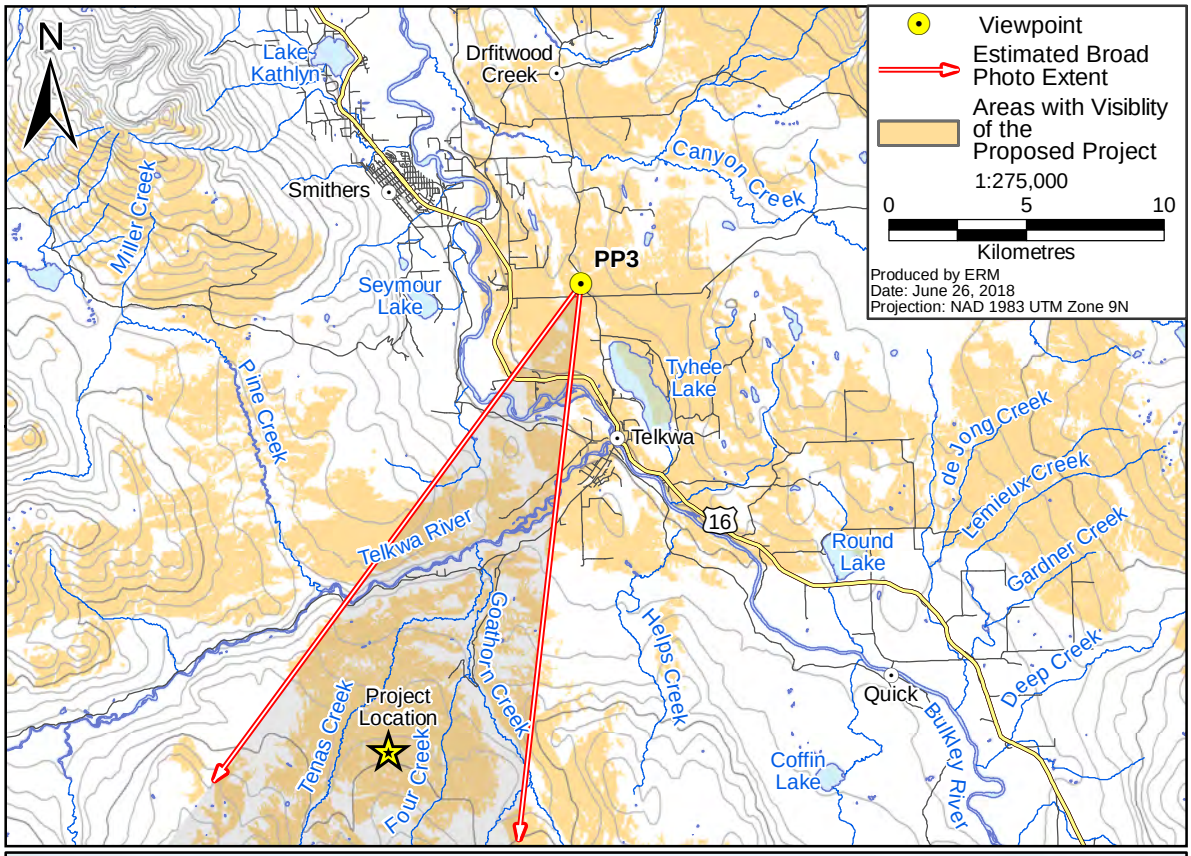
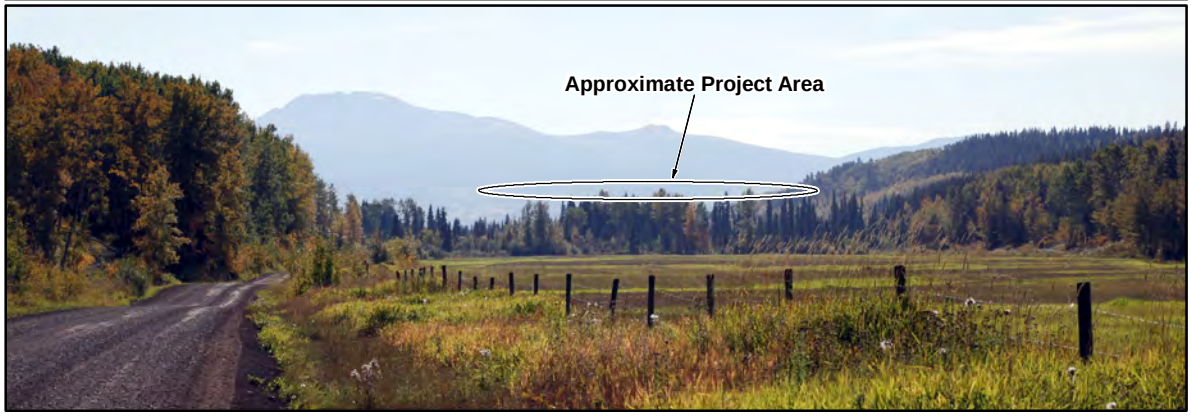


Figure 12.5-3
Visual Quality Photo Site PP3, Tenas Coal Project





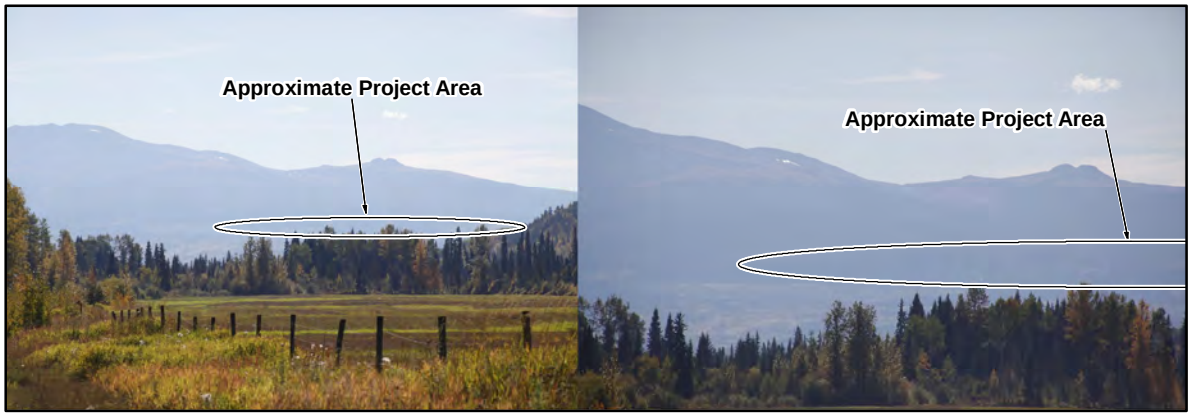
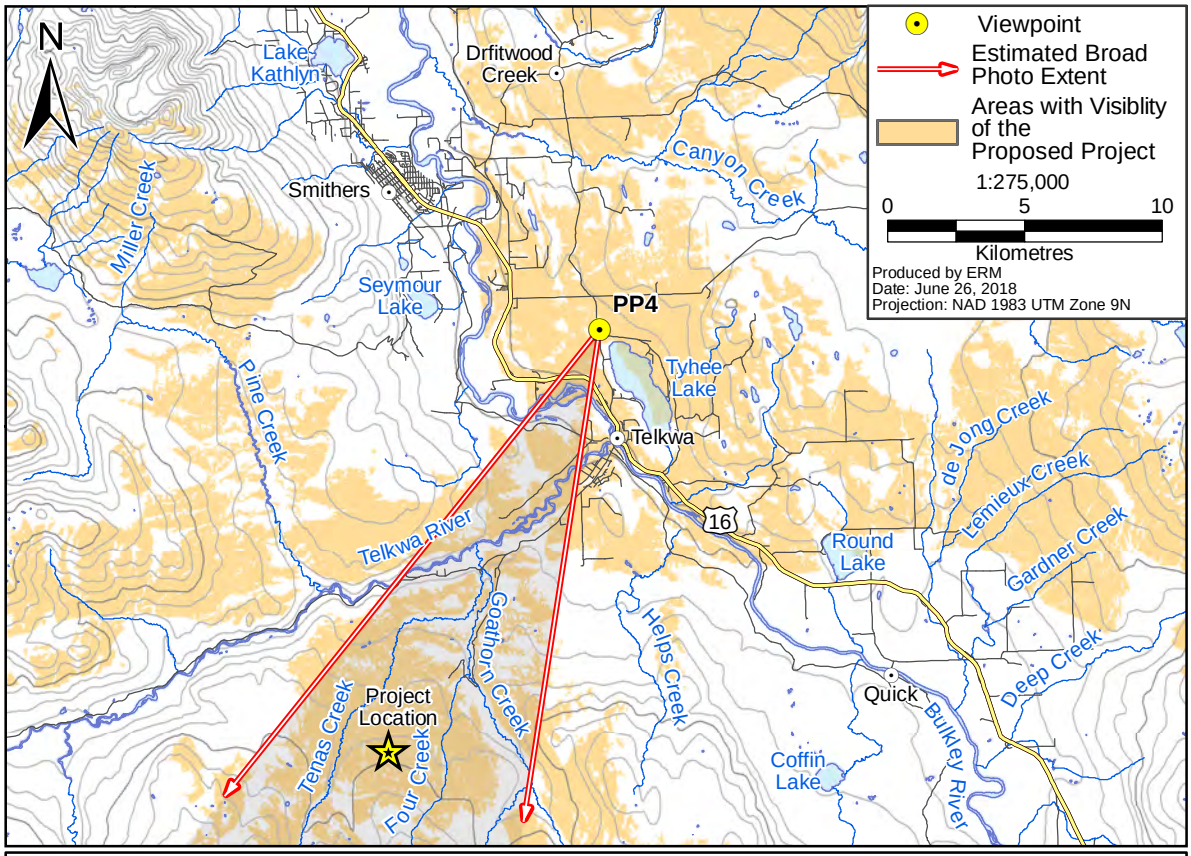


Figure 12.5-4
Visual Quality Photo Site PP4, Tenas Coal Project



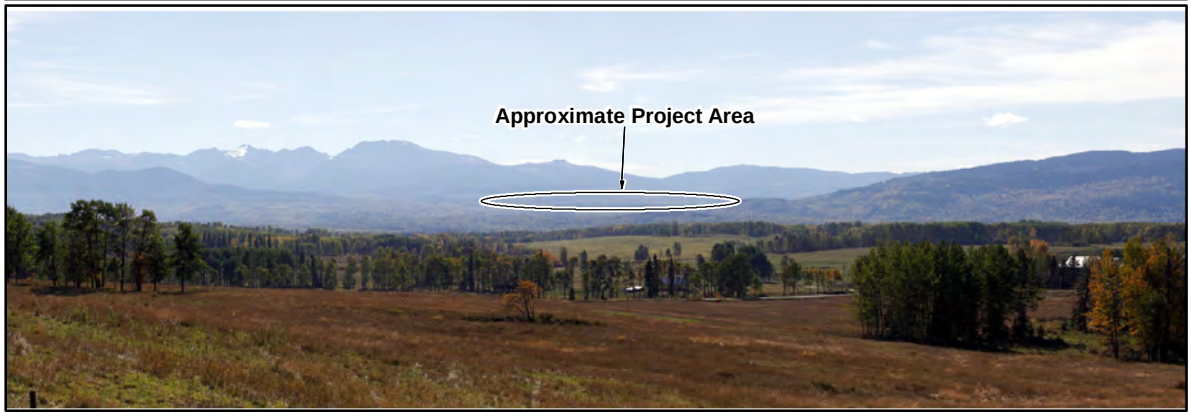
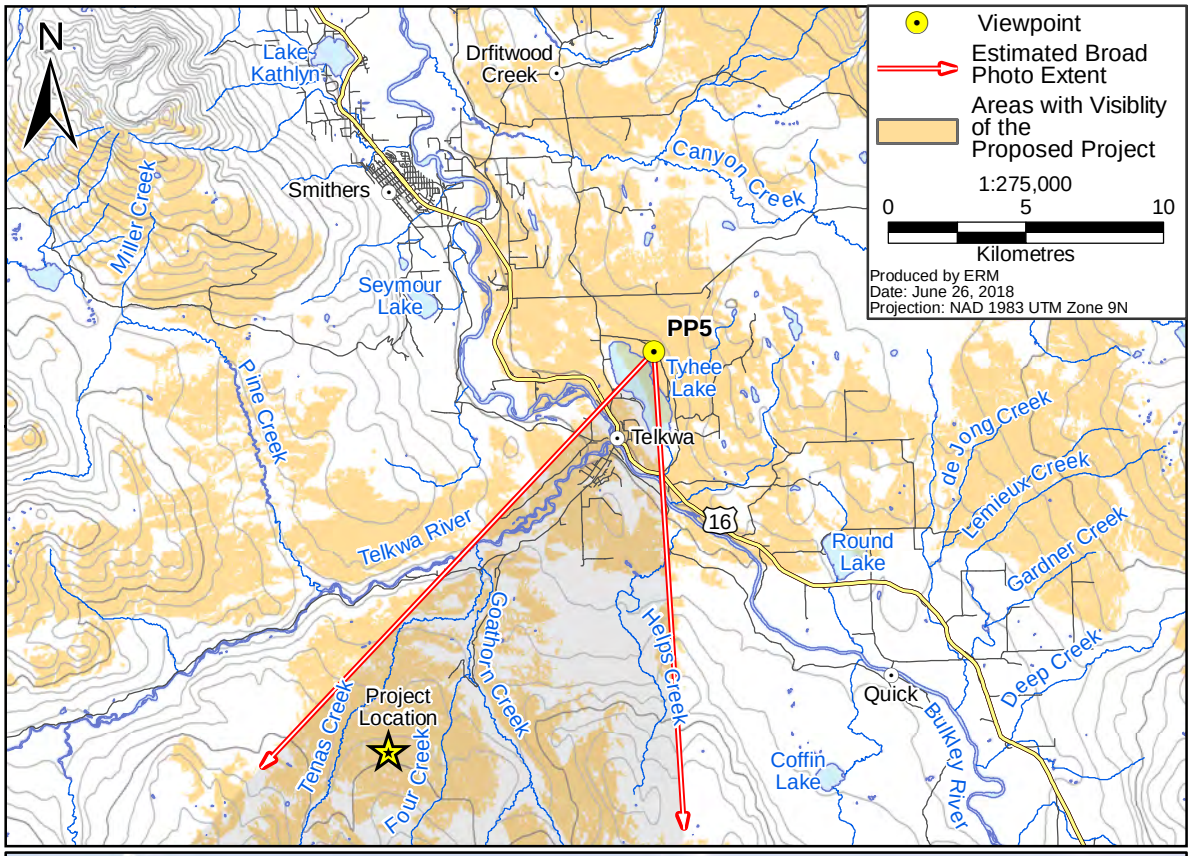


Figure 12.5-5
Visual Quality Photo Site PP5, Tenas Coal Project



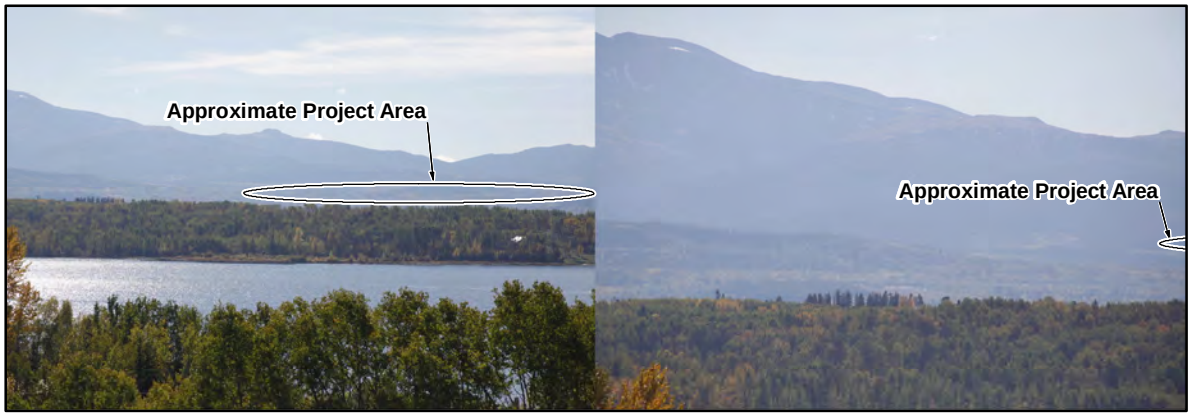
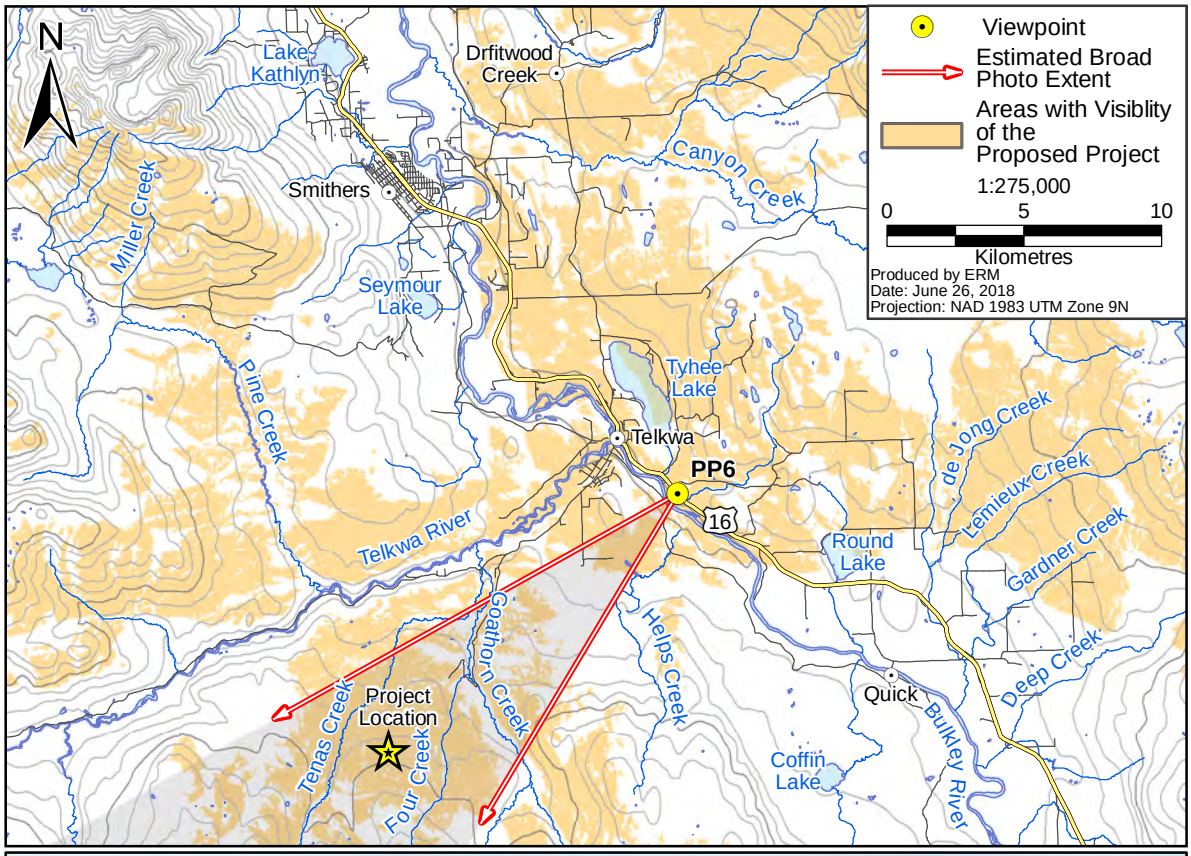
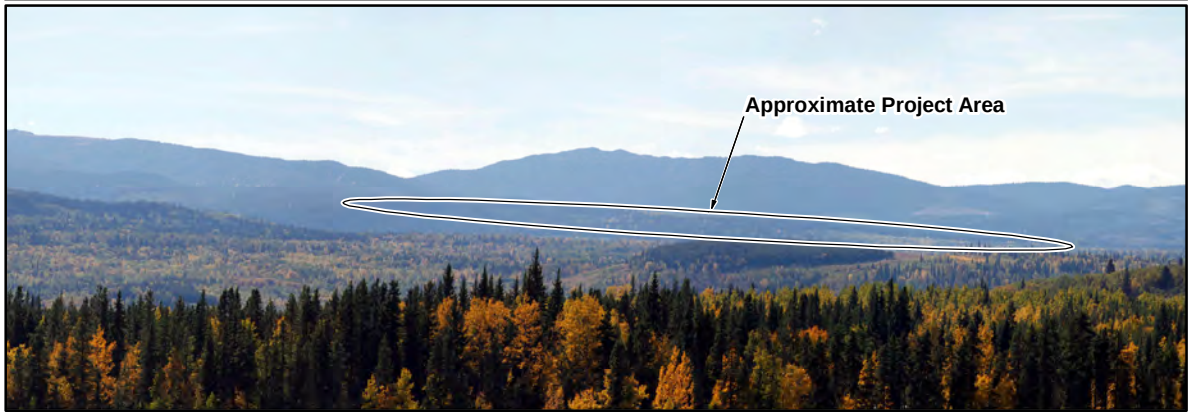


Figure 12.5-6
Visual Quality Photo Site PP6, Tenas Coal Project





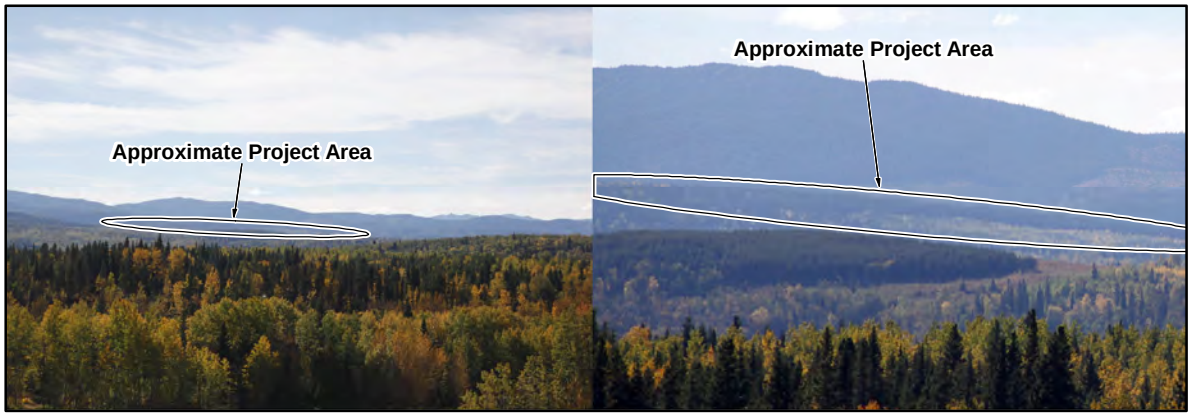


Figure 12.5-7
Visual Quality Photo Site PP7, Tenas Coal Project

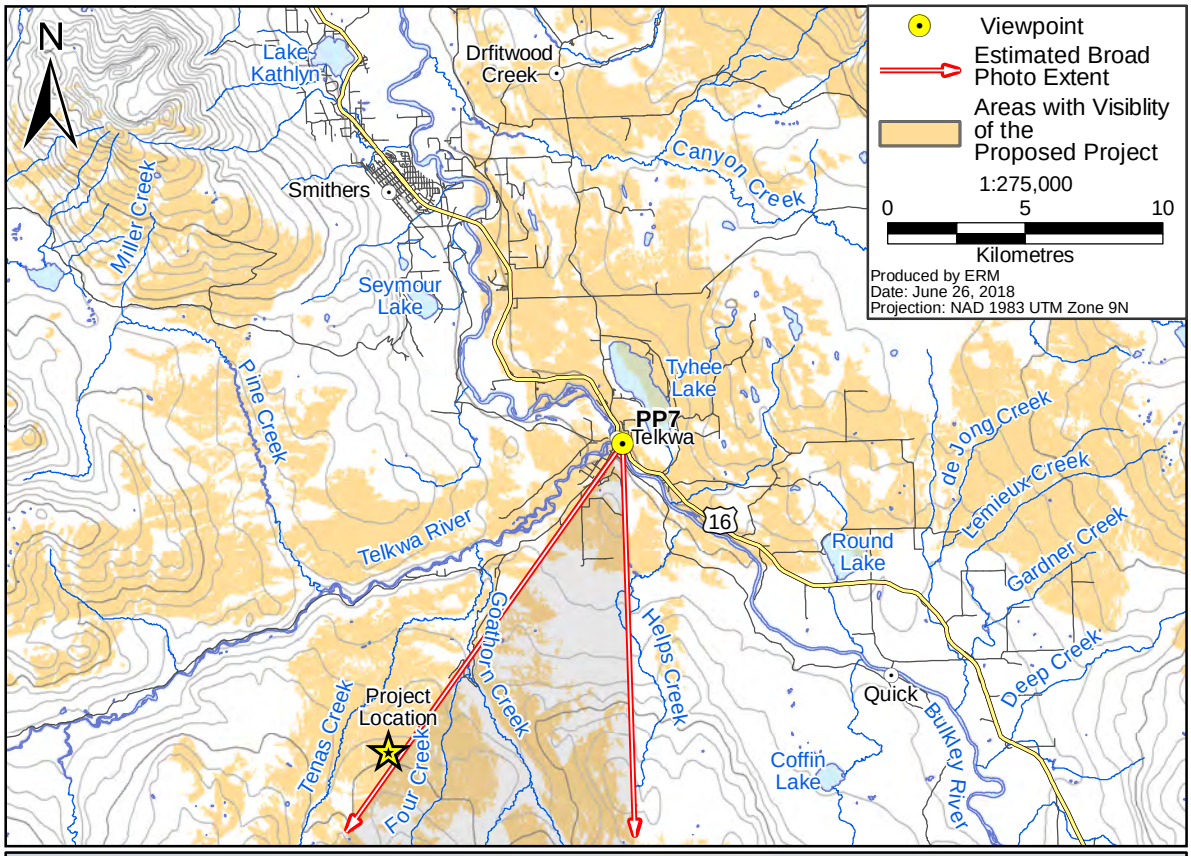
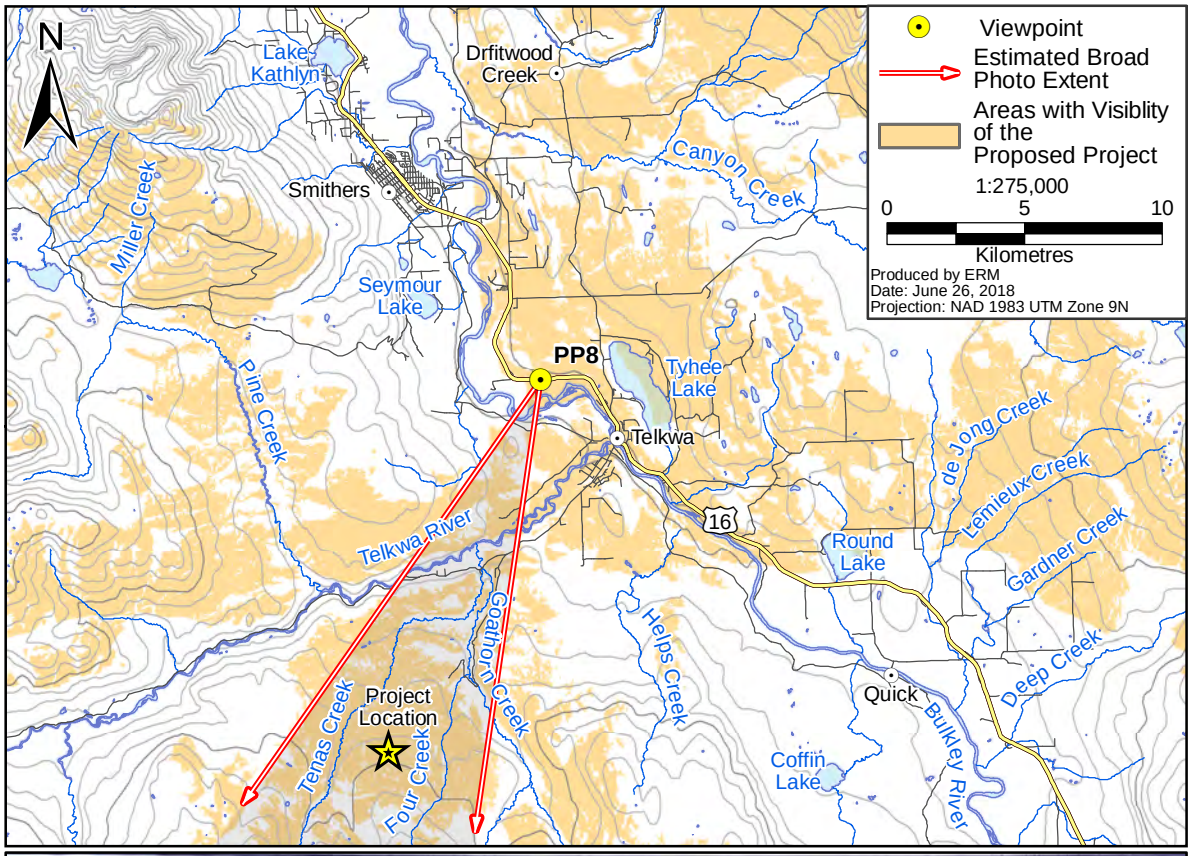
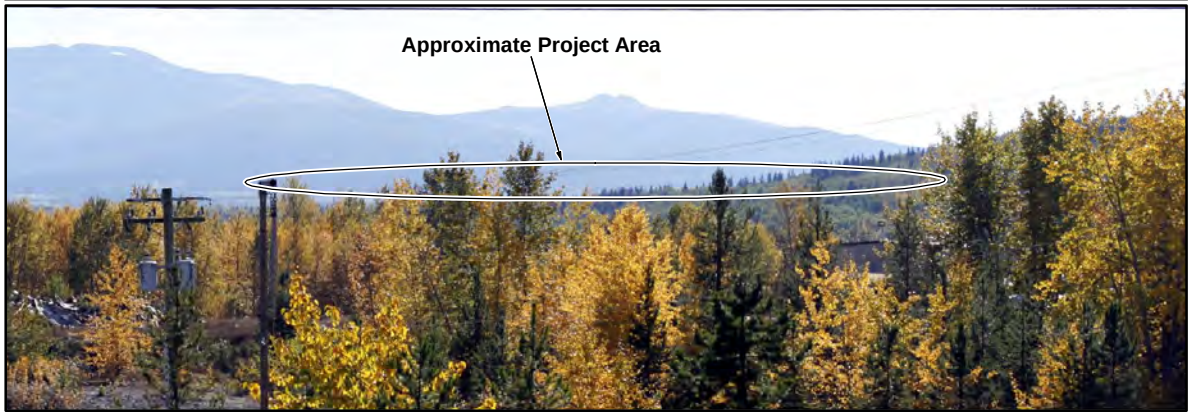


Figure 12.5-8
Visual Quality Photo Site PP8, Tenas Coal Project





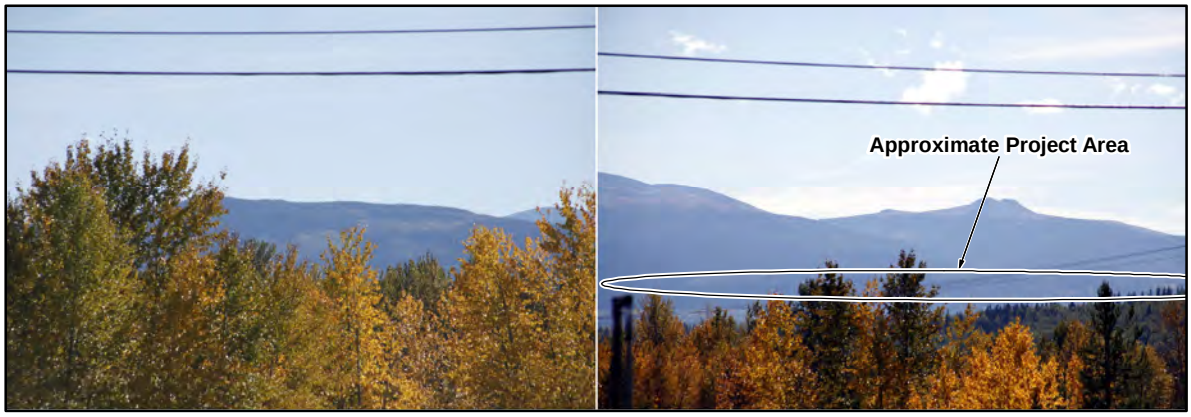
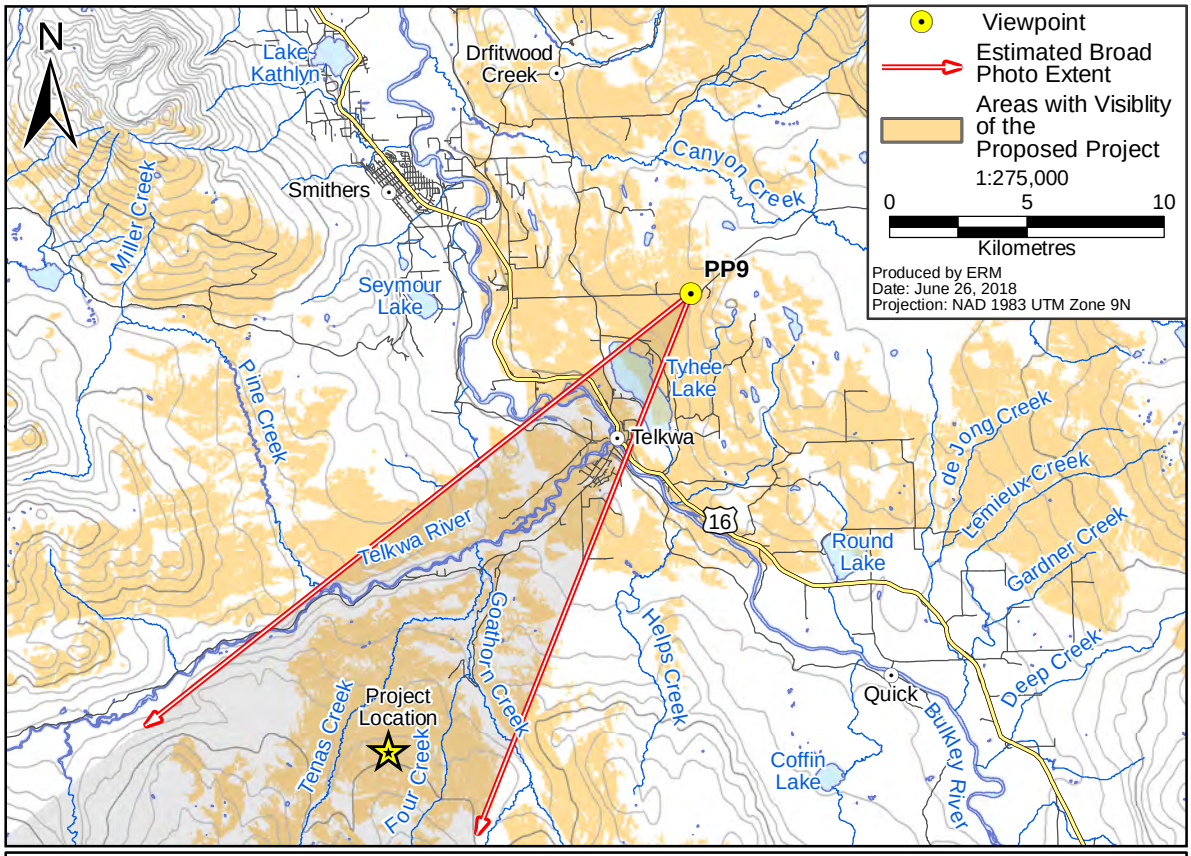


Figure 12.5-9
Visual Quality Photo Site PP9, Tenas Coal Project



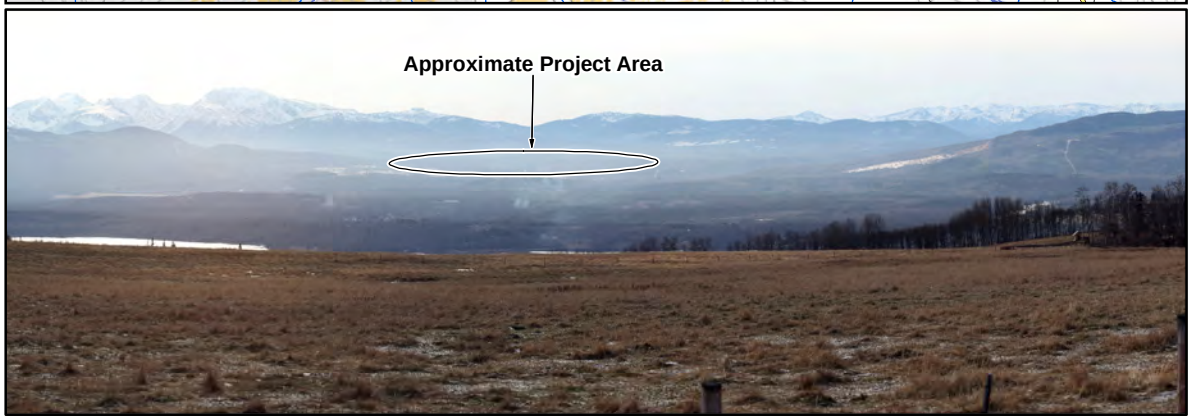


Figure 12.5-10
Visual Quality Photo Site PP10, Tenas Coal Project

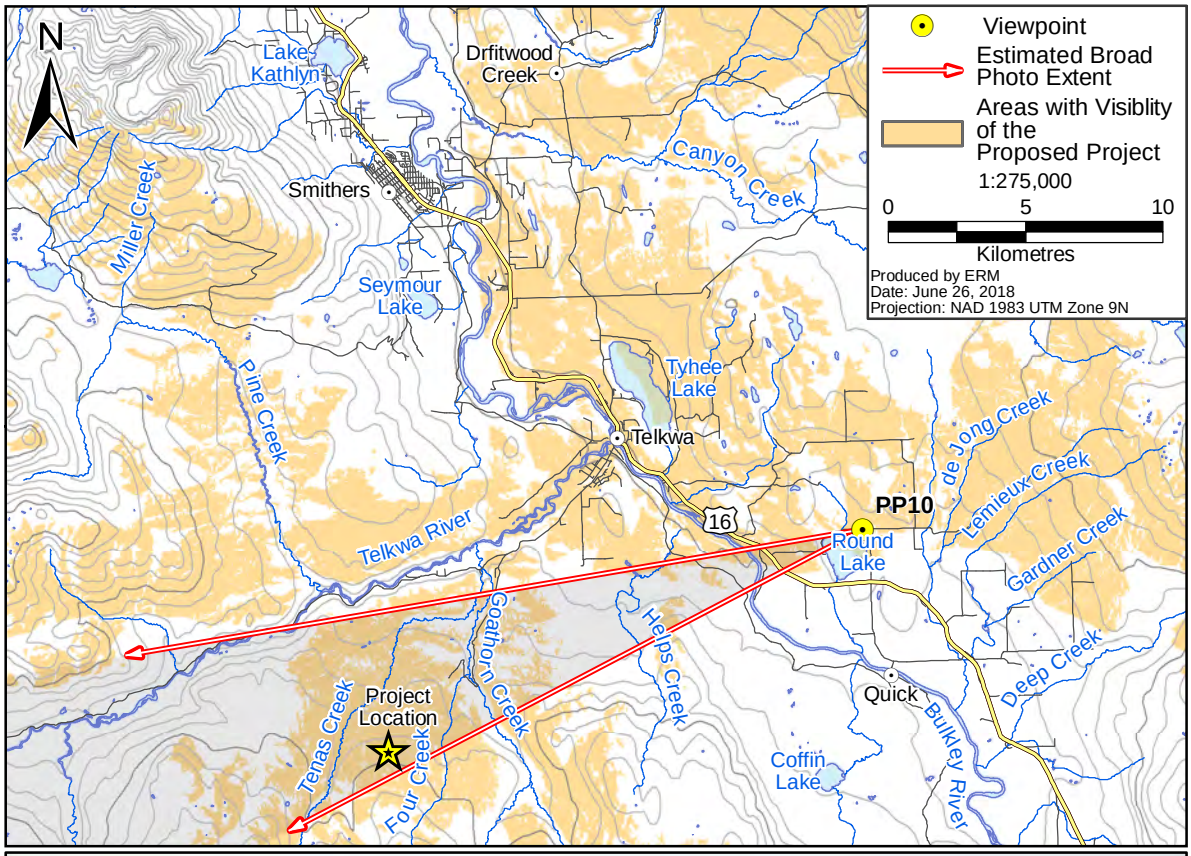
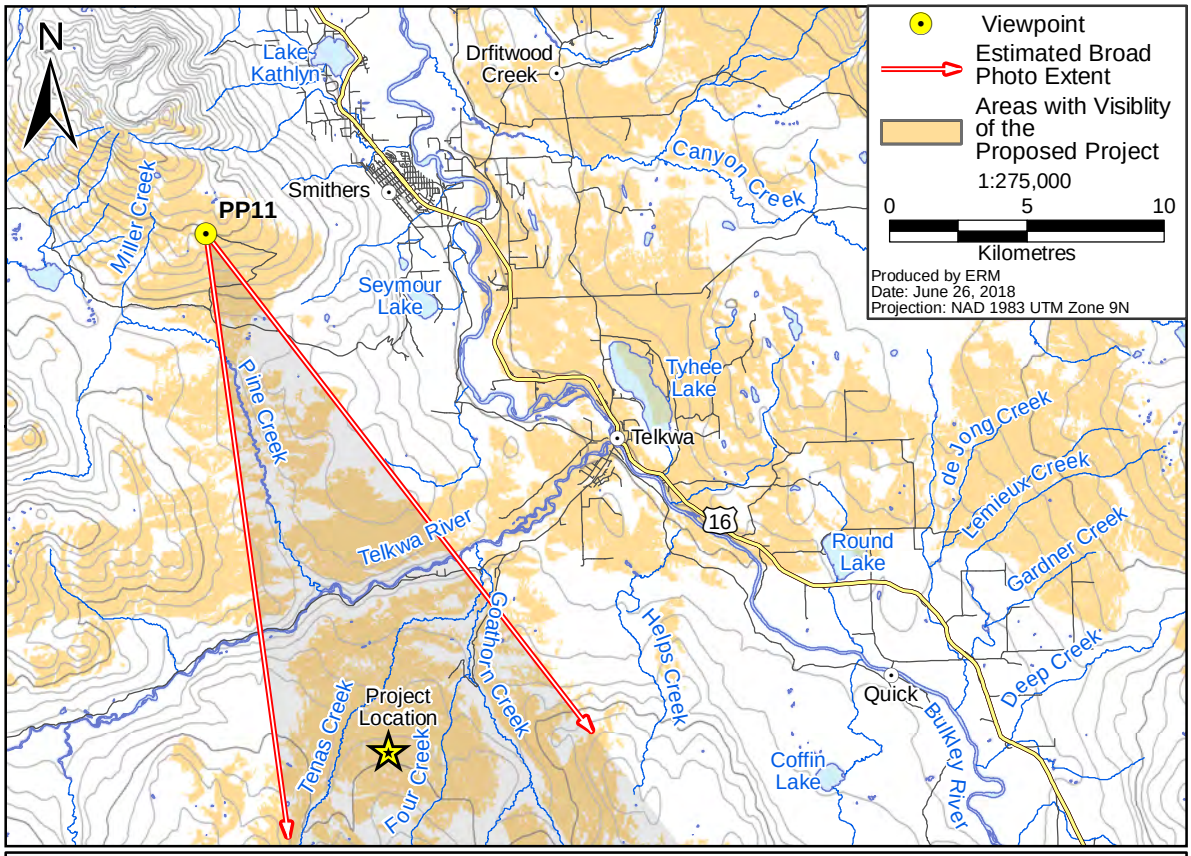


Figure 12.5-11
Visual Quality Photo Site PP11, Tenas Coal Project



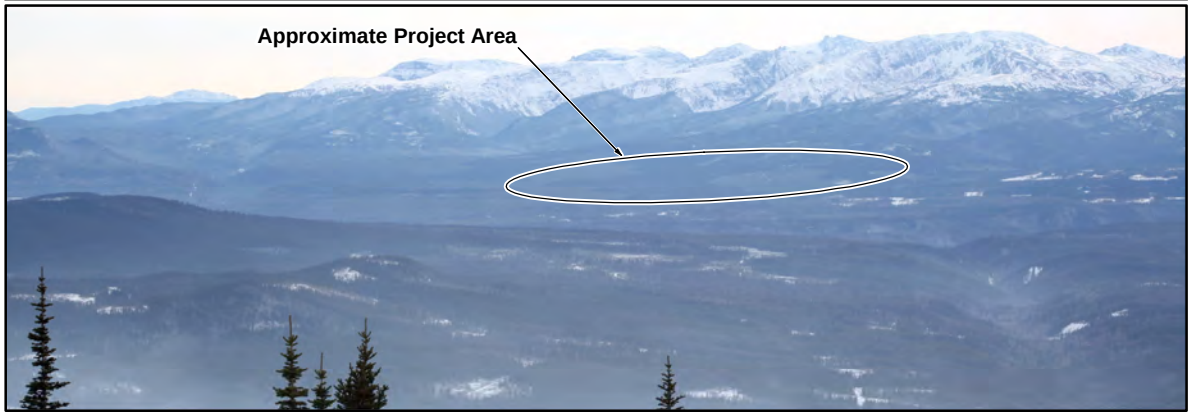
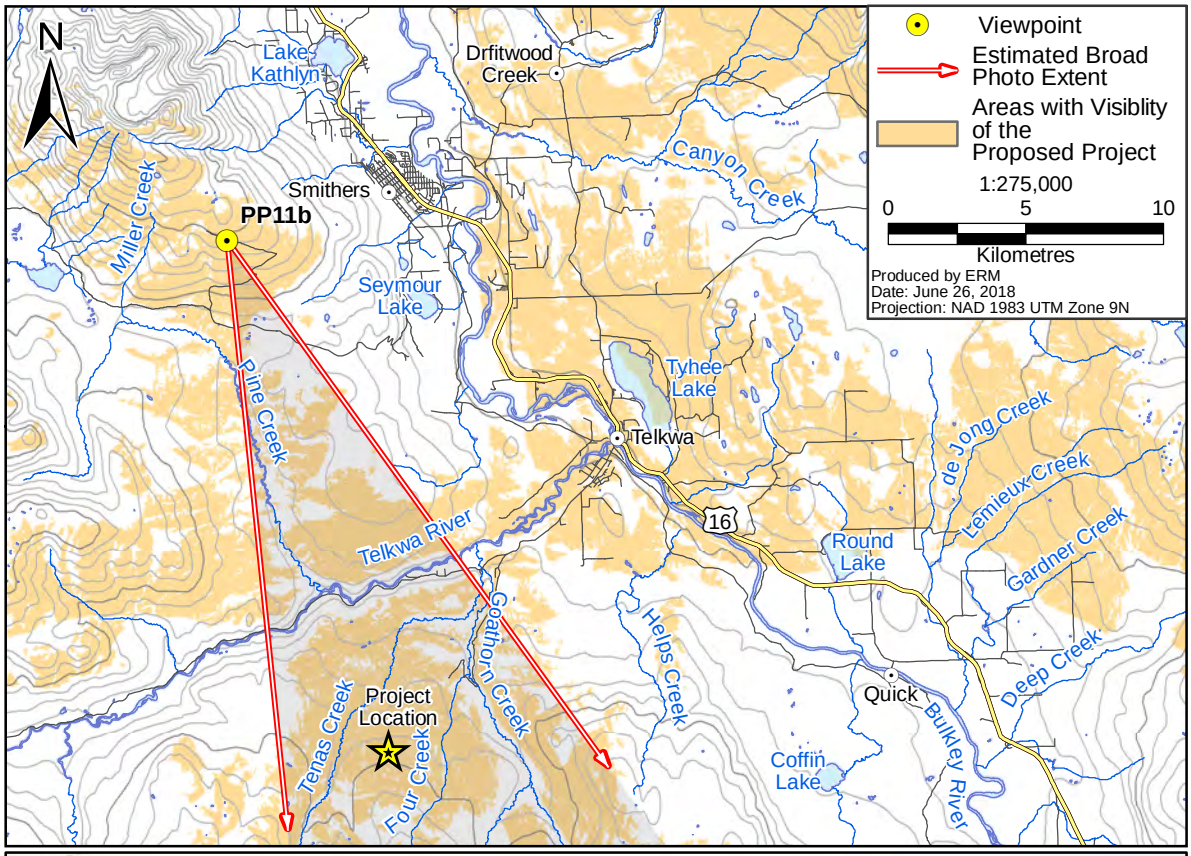
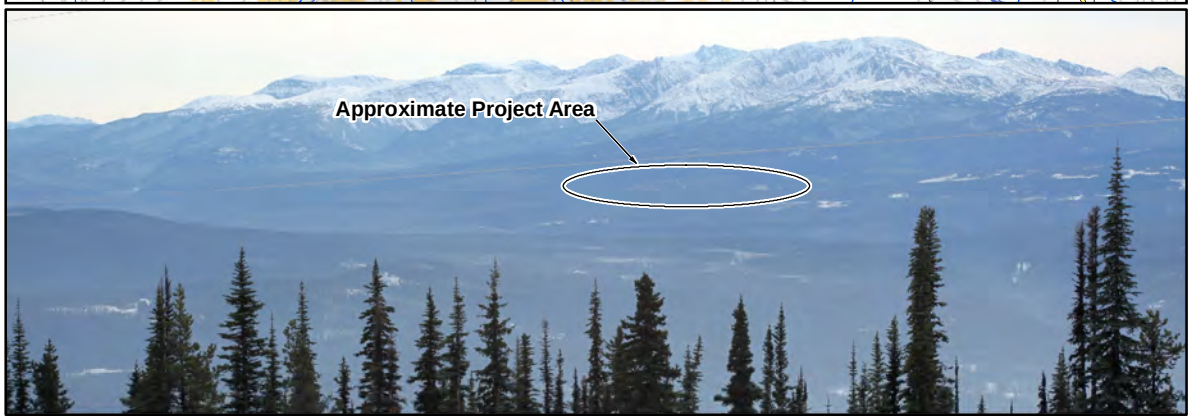


Figure 12.5-12
Visual Quality Photo Site PP11b, Tenas Coal Project





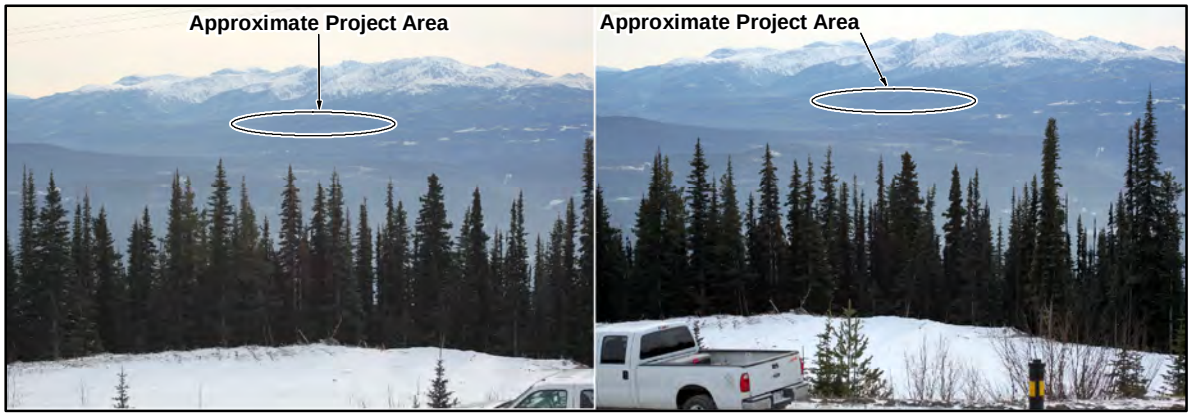
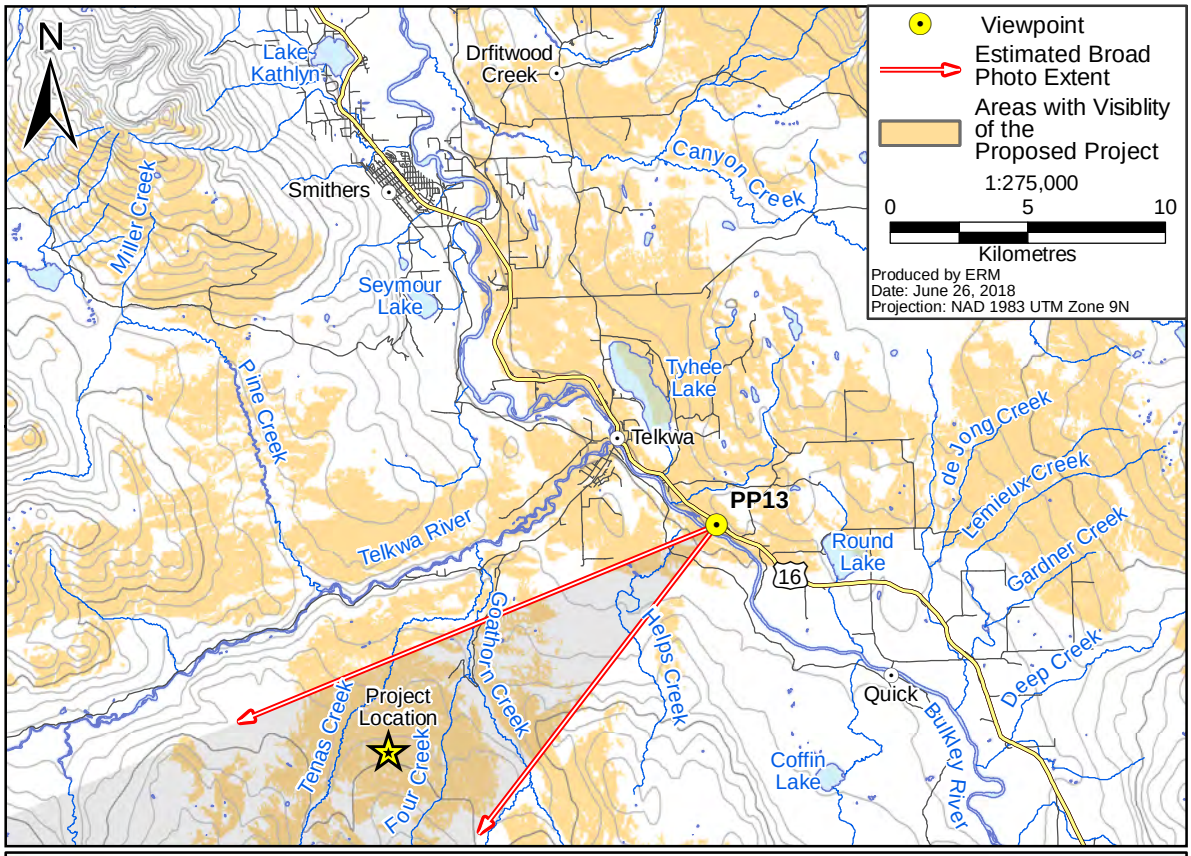
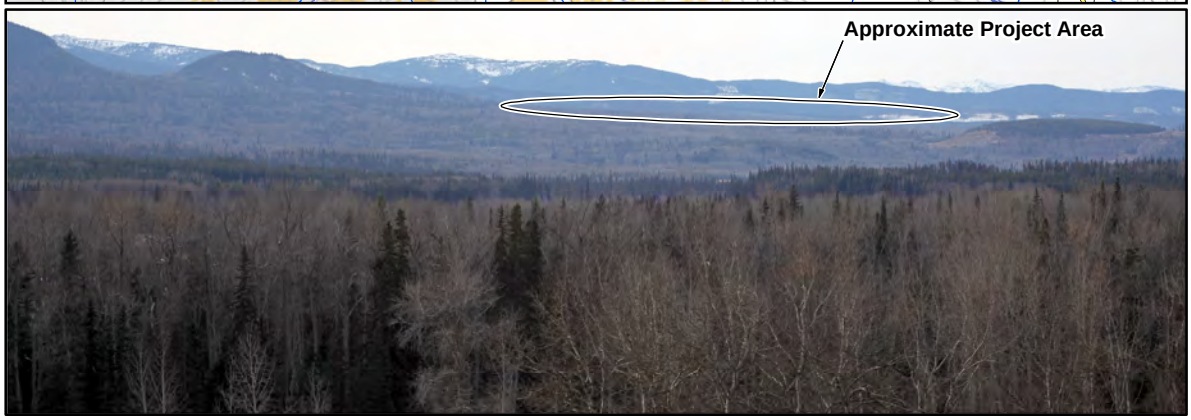


Figure 12.5-13
Visual Quality Photo Site PP13, Tenas Coal Project





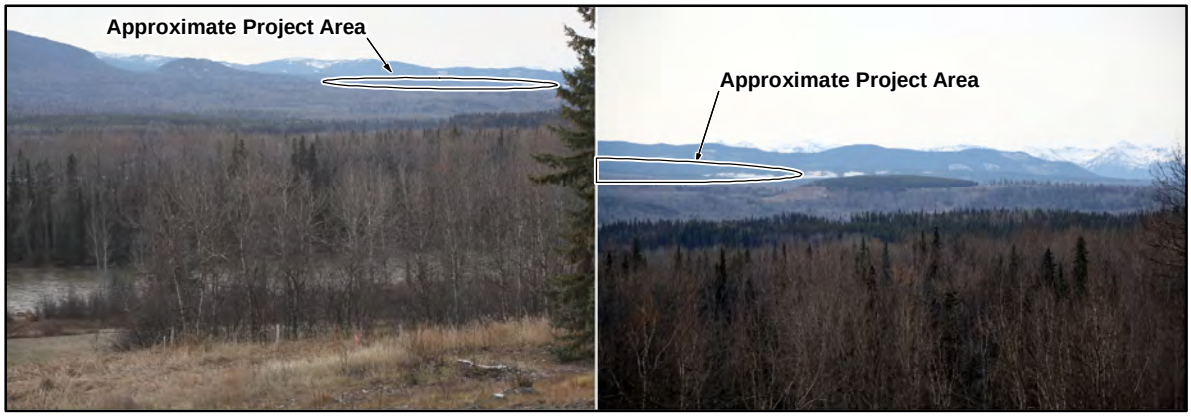
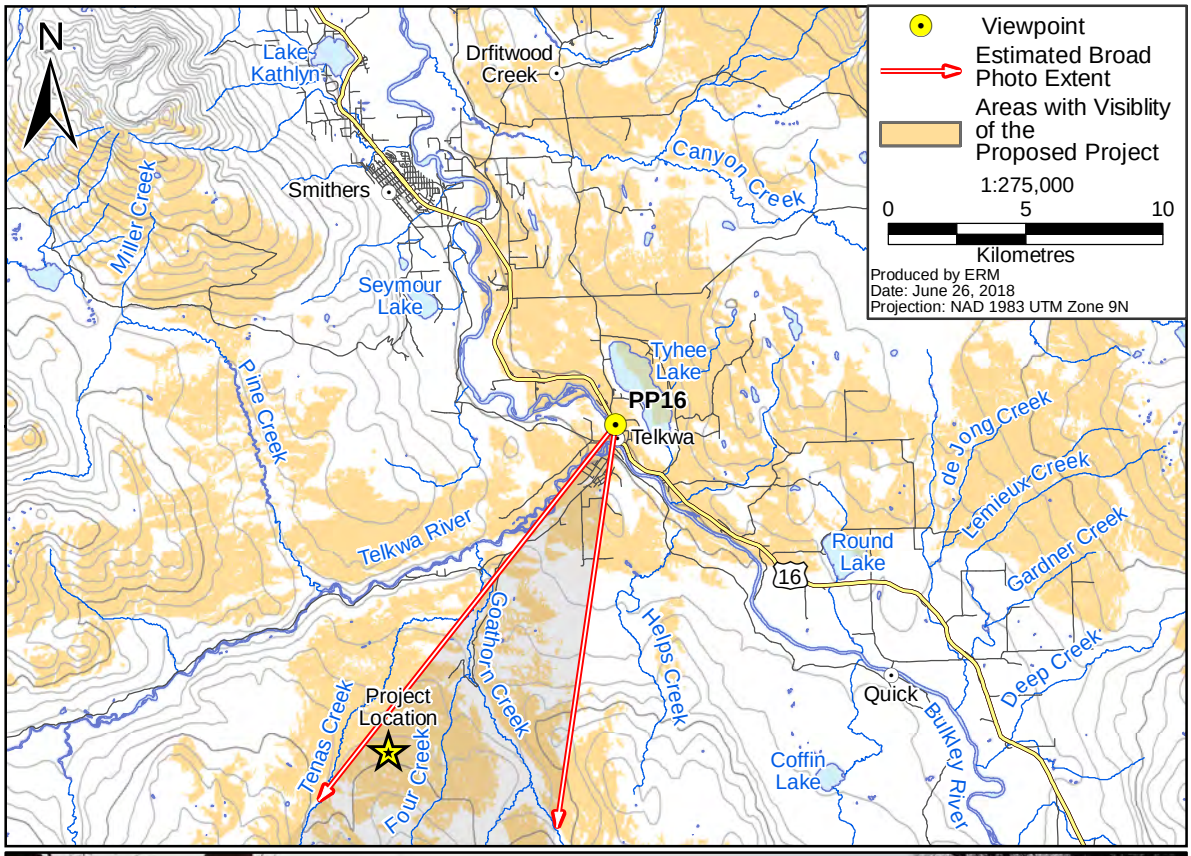
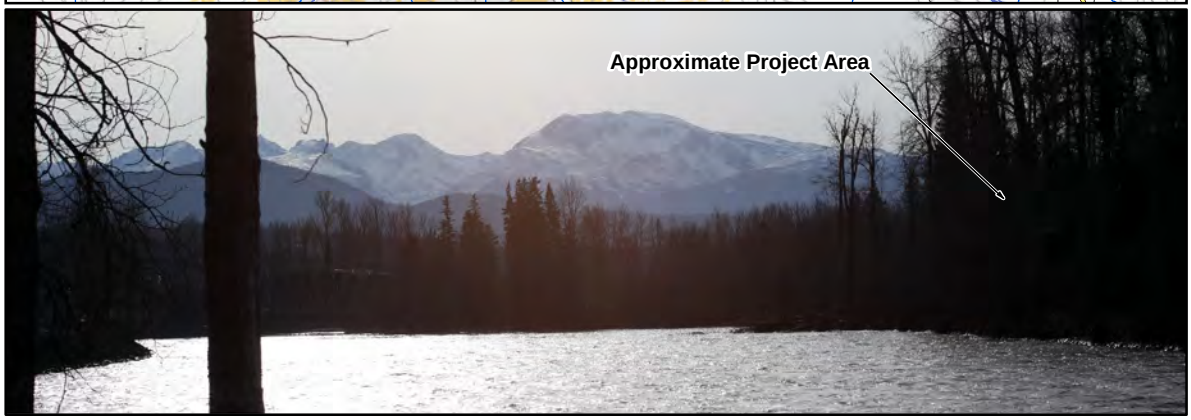


Figure 12.5-14
Visual Quality Photo Site PP16, Tenas Coal Project





12.5.1.6 Project Viewpoint PP6

Project Viewpoint PP6 is located along Highway 16 approximately 360 metres southeast of the intersection with Woodmere Road, with an approximate elevation of 547 metres. The site has an unobstructed view of the Project and was included as one of several Highway 16 associated sites. The site is not an area where people would typically stop.

12.5.1.7 Project Viewpoint PP7

Project Viewpoint PP7 is located along Highway 16 approximately 190 metres northwest of the intersection with Tower Street, with an approximate elevation of 530 metres. The site has an unobstructed view of the Project and was included as one of several Highway 16 associated sites. The site is not an area where people would typically stop.

12.5.1.8 Project Viewpoint PP8

Project Viewpoint PP8 is located along Highway 16 approximately 4 kilometres northwest of Telkwa at the intersection with Good Road, with an approximate elevation of 511 metres. The site has an unobstructed view of the Project and was included as one of several Highway 16 associated sites. The site is not an area where people would typically stop.

12.5.2 Viewpoints PP9 to PP13

Field visits to Project Viewpoints PP9 to PP15 (including PP11b) occurred during the morning of November 4, 2017. Light winds (5 – 10 km) were from the south. Local climate stations that record visibility parameters (Smithers, Smithers A) both recorded their sensors' maximum values during this time period, indicating visibility could be described as *"unlimited"*. Despite indications that visibility was very good at the time the photos were taken, atmospheric haze is apparent in the images and limits the amount of detail visible at this distance.

12.5.2.1 Project Viewpoint PP9

At the time of the field visit to Project Viewpoint PP9 it was clear and sunny with a temperature of 7°C.

The site is located along Babine Lake Road approximately 3.6 kilometres east of the intersection with Telkwa High Road, with an approximate elevation of 796 metres. This is a main road accessing much of the recreational back country. The specific location was chosen for its unobstructed view of the Project.

12.5.2.2 Project Viewpoint PP10

At the time of the field visit to Project Viewpoint PP10, the sky was filled with high thin cloud and the temperature was -6°C.

The site is located along Round Lake Road approximately 300 metres west of the intersection with Woodmere Road, with an approximate elevation of 620 metres. The site was chosen based on the surrounding topography and vegetation, where it provided the most unobstructed view of the Project.

12.5.2.3 Project Viewpoint PP11

Ate the time of the field visit to Project Viewpoint PP11, there were some high, overcast conditions, and thin ground level cloud was observed looking down into the valley below, and the temperature was -11°C.

The site is located within the Hudson Bay Mountain Resort at the northwest corner of the Piper Down Recreation Site. It is near the base of the Prairie T-Bar, with an approximate elevation of 1,501 m.

12.5.2.4 Project Viewpoint PP11b

At the time of the field visit to Project Viewpoint PP11b, the temperature was -11°C, there were some high, overcast conditions, and thin, ground level cloud was observed looking down into the valley below.

The site is located within the Hudson Bay Mountain Resort bordering the Piper Down Recreation Site. It is near the main lodge and the base of the Panorama T-Bar, with an approximate elevation of 1,441 m.

12.5.2.5 Project Viewpoint PP12

At the time of the field visit to Project Viewpoint PP12, the sky was filled with high thin cloud and the temperature was -10°C.

The site is located at the base of the Piper Down Recreational Site along the road accessing Hudson Bay Mountain, at approximately 920 metres elevation. This site is used for hiking, mountain biking, and snowmobiling, and was selected because it fell within the Project viewshed. Upon visiting the site, it was apparent that vegetative screening obscured any view of the potential Project area.

12.5.2.6 Project Viewpoint PP13

At the time of the field visit to Project Viewpoint PP13, the sky was filled with high thin cloud and the temperature was -6°C.

The site is located along Highway 16, approximately 985 metres northwest of the intersection with Hubert Road at a recently reconfigured highway rest-stop. The site has an approximate elevation of 551 metres.

12.5.3 Viewpoints PP14 to PP17

Field visits to Project Viewpoints PP14 to PP16 occurred the afternoon of November 4, 2017, and PP17 was visited the afternoon of September 27, 2017. Local climate stations that record visibility parameters (Smithers, Smithers A) both recorded their sensors' maximum values during this time period, indicating visibility could be described as "unlimited".

12.5.3.1 Project Viewpoints PP14 and PP15

At the time of the field visit to Project viewpoints PP14 and PP15, the sky was filled with high thin cloud, the temperature was -7°C, and there was a light wind (5 – 10 km) from the south.

The sites are located at two trailheads of the Babine Mountain Park Trails Protected Area along Old Babine Lake Road, 5.9 and 3.3 km from the intersection with Babine Lake Road, at approximately 1,006 and 1,031 metres elevation. This sites are used for hiking, mountain biking, and snowmobiling.

Upon visiting the sites, it was apparent that terrain and vegetative screening obscured any view of the potential Project area. No identifiable terrain features were visible looking through the vegetation towards the Project.

12.5.3.2 Project Viewpoint PP16

At the time of the field visit to Project Viewpoint PP16, the sky was filled with high thin cloud, the temperature was -8°C, and there was a light wind (5 – 10 km) from the south.

The site is located just off Highway 16 in Telkwa, on Howson Avenue in the parking area at Eddy Park. This community park runs along the edge of the Bulkley River and is adjacent to several commercial lodging facilities. The viewpoint has an approximate elevation of 499 metres.

The site's view is unobstructed by vegetation in the foreground; however, the treeline on the far edge of the river masks any potential view of the site. The park walkway continues north along the river from this site where the view of the proposed Project becomes increasingly unlikely.

12.5.3.3 Project Viewpoint PP17

At the time of the September field visit to Project Viewpoint PP17, it was clear and sunny with a temperature of 19°C, and moderate wind (10 – 20 km) from the south.

The site is located adjacent a residential Bed and Breakfast along Tyhee Lake Road, 370 metres north of the intersection with Hislop Road.

Local climate stations that record visibility parameters (Smithers, Smithers A) both recorded their sensors' maximum values during this time period, indicating visibility could be described as "unlimited". The area is heavily treed and no view of the site was possible.

REFERENCES

Definitions of the acronyms and abbreviations used in this reference list can be found in the Glossary and Abbreviations section.

Chapter 2 Meteorology

BC EAO. 2018a. EAO Project Information and Collaboration website for the Davidson project. https://projects.eao.gov.bc.ca/p/davidson/docs?folder=75 (accessed April 2018).

BC EAO. 2018b. EAO Project Information and Collaboration website for the Telkwa Coal project. https://projects.eao.gov.bc.ca/p/telkwa-coal/docs?folder=4 (accessed April 2018).

BC MEM and MOE. 2016. *Joint Application Information Requirements for Mines Act and Environmental Management Act Permits*. Prepared by British Columbia Ministry of Energy and Mines and British Columbia Ministry of Environment. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/permitting/minesact-ema_application_information_requirements_feb2016.pdf (accessed April 2018).

BC MOE. 2016. *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators*. Prepared by British Columbia Ministry of Environment. https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/water_air_baseline_monitoring.pdf (accessed April 2018).

BC ENV. 2018a. *Envista – Air Resources Manager*. https://envistaweb.env.gov.bc.ca/ (accessed April 2018).

BC ENV. 2018b. *Snow Survey Data*. https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-science-data/water-data-tools/snow-survey-data and https://catalogue.data.gov.bc.ca/dataset/manual-snow-survey-observations-data-archive (accessed April 2018).

BC MOT. 2018. *Avalanche and Weather Programs*. https://prdoas3.pub-apps.th.gov.bc.ca/saw-paws/weatherstation (accessed April 2018).

EC. 2004. *Meteorological Services of Canada (MSC) guidelines for co operative climatological autostations, version 3.0*. N.p.: Environment Canada, MSC, Surface Weather, Climate & Marine Division, Atmospheric Monitoring Water Survey Branch.

EC. 2012. *Automatic Weather Station: Sensor Siting Classification*. Prepared by Environment Canada. http://www.wmo.int/pages/prog/www/IMOP/SitingClassif/Canada/Siting%20Classification%20System7%20-%20Sep%202012.pdf (accessed April 2018).

ECCC. 2018a. *Historical Data – Climate*. http://climate.weather.gc.ca/historical_data/search_historic_data_e.html (accessed April 2018).

ECCC. 2018b. *Climate Trends and Variations Bulletin*. https://www.canada.ca/en/environment-climate-change/services/climate-change/trends-variations.html and ftp://ccrp.tor.ec.gc.ca/pub/CTVB/ (accessed April 2018).

ECCC. 2018c. *Canadian Climate Normals 1981 – 2010 Station Data* for Smithers A station. http://climate.weather.gc.ca/climate_normals/results_1981_2010_e.html?searchType=stnName&txtStationName=smithers&searchMethod=contains&txtCentralLatMin=0&txtCentralLatSec=0&txtCentralLongMin=0&txtCentralLongSec=0&stnID=487&dispBack=1 (accessed April 2018).

Pacific Climate Impacts Consortium. 2018. *BC Station Data*. http://tools.pacificclimate.org/dataportal/pcds/map/ (accessed April 2018).

Quick, M. C. 1995. The UBC Watershed Model. In *Computer Models of Watershed Hydrology.* Ed. V. P. Singh. 233-80.

US EPA. 2000. *Meteorological Monitoring Guidance for Regulatory Modeling Applications.* United States Environmental Protection Agency. https://www3.epa.gov/ttn/scram/guidance/met/mmgrma.pdf (accessed April 2018).

Chapter 3 Air Quality

Environmental Management Act, SBC, 2003, C. 53

Environmental Management Act Waste Discharge Regulation, BC Reg. 320/2004

ASTM International. 2017. ASTM D1739-98 (Reapproved 2017), *Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter)*. American Society for Testing and Materials: West Conshohocken, PA. http://www.astm.org/cgi-bin/resolver.cgi?D1739 (Accessed April 2018)

BC ENV. 2018. Waste Discharge Authorizations. https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization (accessed May 2018)

BC ENV. 2018b. *British Columbia Ambient Air Quality Objective*. Updated May 9, 2018. https://www2.gov.bc.ca/assets/gov/environment/air-land-water/air/reports-pub/aqotable.pdf (accessed May 2018)

BC ENV. 2018c. *BC Air Data Archive Website*. https://envistaweb.env.gov.bc.ca/ (accessed May 2018)

BC MOE. 2016a. *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators*. Prepared by British Columbia Ministry of Environment. https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/water_air_baseline_monitoring.pdf (accessed May 2018).

BC MOE. 2016d. *B.C. Ambient Air Quality Objectives - Updated January 18, 2016.* British Columbia Minstiry of Environment.

BC Lung Association. 2015. *BC State of the Air Report 2015*. https://bc.lung.ca/protect-your-lungs/air-quality-lung-health/bc-state-air-report (Accessed April 2018)

BC Lung Association. 2016. *BC State of the Air Report 2016*. https://bc.lung.ca/protect-your-lungs/air-quality-lung-health/bc-state-air-report (Accessed April 2018)

BC Lung Association. 2017. *BC State of the Air Report 2017*. https://bc.lung.ca/protect-your-lungs/air-quality-lung-health/bc-state-air-report (Accessed April 2018)

BC MOE. 2016a. *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators*. Prepared by British Columbia Ministry of Environment. https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/water_air_baseline_monitoring.pdf (accessed May 2018).

BVLD AMS. 2012. BVLD *Airshed Management Plan: A Community Action Plan for Clean Air*. Prepared by the Bulkely Valley Lakes District Airshed Management Society: Smithers, BC. https://cleanairplan.ca/cleanairplan2012.pdf (Accessed April 2018)

Canada Gazette. 2013. *Government Notices Vol. 147, No. 21 – May 25, 2013*. http://gazette.gc.ca/rp-pr/p1/2013/2013-05-25/html/notice-avis-eng.html (accessed May 2018)

Canada Gazette. 2017. *Government Notices Vol. 151, No. 49 – December 9, 2017*. http://gazette.gc.ca/rp-pr/p1/2017/2017-12-09/html/notice-avis-eng.html (accessed May 2018)

Canada Gazette. 2017b. *Government Notices Vol. 151, No. 43 – October 28, 2017*. http://www.gazette.gc.ca/rp-pr/p1/2017/2017-10-28/html/notice-avis-eng.html (accessed May 2018)

Manalta Coal Ltd. 1997. *Telkwa Coal Project: Application for a Project Approval Certificate*. Prepared by Manalta Coal Ltd.: Vancouver, BC.

Rescan. 2007. *Davidson Project Meteorology, Air Quality and Noise Baseline Study*. Prepared for Blue Pearl Mining Ltd. by Rescan Environmental Services Ltd.: Vancouver, BC.

Rescan. 2008. *Davidson Project Application for Environment Assessment Certificate - Section 6.1 Air Quality and Climate*. Prepared for Blue Pearl Mining Ltd. by Rescan Environmental Services Ltd.: Vancouver, BC.

Rescan. 2010. *Dome Mountain Project: 2009/10 Meteorology and Air Quality Baseline Report*. Prepared for Metal Mountain Resources Inc. by Rescan Environmental Services Ltd.: Smithers, BC.

Chapter 4 Noise

ASTM. 2008. *Guide for Selection of Environmental Noise Measurements and Criteria*. ASTM International: West Conshohocken, PA.

BC Oil & Gas Commission. 2009. *British Columbia Noise Control Best Practices Guideline* https://www.bcogc.ca/node/8152/download (accessed June 2018).

Environment Canada. 2009. *Environmental Code of Practice for Metal Mines.* https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/publications/code-practice-metal-mines.html (accessed June 2018).

Health Canada. 2017. *Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise*. Health Canada, January 2017: Ottawa, ON.

Rescan. 2007. *Davidson Project Meteorology, Air Quality and Noise Baseline Study*. Prepared for Blue Pearl Mining Ltd. by Rescan Environmental Services Ltd.: Vancouver, BC.

Telkwa. 2001. *Noise Control Bylaw No. 495, 2001.* https://telkwa.civicweb.net/filepro/documents/?preview=2592 (accessed June 2018).

World Health Organization. 1999. *Guidelines for Community Noise.* A68672. http://apps.who.int/iris/handle/10665/66217 (accessed June 2018).

Personal Communications

Turney, L. 2017. Ardea Biological Consulting Ltd. Emails to Korina Houghton (ERM) discussing noise sampling locations and parameters. Personal Communication: October 3 and 17, 2017.

Chapter 5 Hydrogeology

BC MOE. 2016. *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators.* Prepared by the BC Ministry of Environment (MOE). Version 2. file:///C:/Users/Cody/Downloads/water_air_baseline_monitoring%20(3).pdf.

British Columbia Ministry of Energy and Mines, and British Columbia Ministry of Environment. 2016. J*oint Application Information Requirements for Mines Act and Environmental Management Act Permits*. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/permitting/minesact-ema_application_information_requirements_feb2016.pdf.

Piteau Engineering Ltd. 1994. *Baseline Data – Surface Water and Groundwater, Telkwa Coal Project*. Prepared by Piteau Engineering Ltd. Prepared for Manalta Coal Ltd.

Piteau Engineering Ltd. 1996. *Preliminary Assessment of Potential Groundwater Inflows and Dewatering Requirements in the Tenas Creek Region, Telkwa Coal Project*. Prepared by Piteau Engineering Ltd. Prepared for Manalta Coal Ltd.

Piteau Engineering Ltd. 1997. B*aseline Hydrogeological Investigations in the Tenas Pit, Waste Dumps, and Mine Pit 3, Telkwa Coal Project*. Prepared by Piteau Engineering Ltd. Prepared for Manalta Coal Ltd.

Piteau Engineering Ltd. 1998. *Baseline Hydrogeological Conditions in the Telkwa Coat Project Area* – Volumes I and II. Prepared by Piteau Engineering Ltd. Prepared for Manalta Coal Ltd.

Chapter 6 Groundwater Water Quality

BC MOE. 2013. *British Columbia Field Sampling Manual. Prepared by the BC Ministry of Environment (MOE).* https://www2.gov.bc.ca/assets/gov/environment/research-monitoring-and-reporting/monitoring/emre/bc_field_sampling_manual_complete.pdf.

BC MOE. 2016. *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators*. Prepared by the BC Ministry of Environment (MOE). Version 2."

BC MEM and BC MOE. 2016. *Joint Application Information Requirements for* Mines Act *and* Environmental Management Act *Permits.* https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/permitting/minesact-ema_application_information_requirements_feb2016.pdf.

Piteau Engineering Ltd. 1998. *Baseline Hydrogeological Conditions in the Telkwa Coat Project Area – Volumes I and II*. Prepared by Piteau Engineering Ltd. Prepared for Manalta Coal Ltd.

Stantec. undated. *2016 Sampling Results*. Prepared by Stantec, Prepared for Allegiance Coal.

Chapter 7 Hydrology

1985. *Canada Water Act*, RSC. C. C-11.

2014. *Water Sustainability Act, SBC. C. 15.*

BC MOE. 2016. *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators*. British Columbia Ministry of Environment: Victoria, BC.

Elder, K. and R. Kattelmann. 1990. Refinements in dilution gauging for mountain streams, In *Hydrology in Mountainous Regions. I – Hydrological Measurements; the Water Cycle*. IAHS Publication No. 193, pp. 247-254.

Herschy, R.W. 2009. *Stream flow Measurement.* Taylor & Francis, New York.

Hudson, R. and J. Fraser. 2002. *Alternative methods of flow rating in small coastal streams. BC* Ministry of Forests, Vancouver Forest Region, Nanaimo, B.C. Extension Note EN-014. 11 pp.

Hudson, R.O. and J. Fraser. 2005. Introduction to Salt Dilution Gauging for Stream flow Measurement Part IV: The Mass Balance (or Dry Injection) Method. *Streamline Watershed Management Bulletin 9(1).* Fall 2005, pp. 6-12.

International Organization for Standardization (ISO). 2010. *ISO 1100-2: 2010. Hydrometry – Measurement of liquid flow in open channels – Part 2: Determination of the stage discharge relationship*. 3rd ed. ISO, Switzerland.

Kennedy, E. J. 1984. *Discharge ratings at gauging stations*. U.S. Geological Survey Techniques of Water Resources Investigations. Book 3. United States Geological Survey: n.p.

Moore, R.D. 2004. Introduction to salt dilution gauging for stream flow measurement: Part 1. *Streamline Watershed Management Bulletin*, 7(4): 20-23.

Rantz et al. 1982 *Measurement and Computation of Stream flow: Volume 2. Computation of Discharge* Geological Survey Water-Supply Paper 2175. Washington, D.C.

RISC. 2009. *Manual of British Columbia Hydrometric Standards.* Resources Information Standards Committee, BC Ministry of Environment.

Sauer, V.B. 2002. *Standards for the analysis and processing of surface-water data and information using electronic methods*. United States Geological Survey Water-Resources Investigations Report 01-4044. United States Geological Survey: n.p.

Spence, C., and M. McPhie. 1997. Stream flow measurement using salt dilution in tundra streams, Northwest Territories, Canada. *Journal of the American Water Resources Association*, 33(2): 285-291.

Terzi, R.A. 1981. *Hydrometric field manual - measurement of stream flow*. Environment Canada, Inland Waters Directorate. Ottawa, ON.

WSC. 1999. *National Hydrometric Training Development Manual*. Volumes 1 to 5. Water Survey of Canada, Environment Canada: Ottawa, ON.

BC MEM and MOE. 2016. *Joint Application Information Requirements for Mines Act and Environmental Management Act Permits*. Prepared by British Columbia Ministry of Energy and Mines and British Columbia Ministry of Environment. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/permitting/minesact-ema_application_information_requirements_feb2016.pdf (accessed April 2018).

Chapter 8 Surface Water Quality

1985. *Fisheries Act*, RSC 1985, c. F-14.

1996. *British Columbia Mines Act*, RSBC 1996, c. 293.

1999. *Canadian Environmental Protection Act*, SC 1999, c. 33.

2003. *Environmental Management Act*, SBC 2003 c 53.

BC MOE. 1986. *Skeena-Nass Area Bulkey River Basin Water Quality Assessment and Objectives: Technical Appendix.* British Columbia Ministry of Environment and Climate Change Strategy, Resource Quality Section, Water Management Branch. Victoria, BC.

BC MOE. 2015. *British Columbia Environmental Laboratory Manual.* British Columbia Ministry of Environment and Climate Change Strategy, Environmental Monitoring, Reporting & Economics Knowledge Management Branch.

BC MOE. 2016. *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators.* British Columbia Ministry of Environment and Climate Change Strategy.

BC ENV. 2018a. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines (accessed May 2018).

BC ENV. 2018b. *Working Water Quality Guidelines for British Columbia.* British Columbia Ministry of Environment and Climate Change Strategy. http://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/waterqualityguidesobjs/final_2015_wwqgs_26_nov_2015.pdf (accessed May 2018).

BC MEM and BC MOE. 2016. *Joint Application Information Requirements for Mines Act and Environmental Management Act Permits.* British Columbia Ministry of Energy, Mines, and Petroleum Resources, and the British Columbia Ministry of Environment and Climate Change Strategy.

CCME. 2018. *Canadian Water Quality Guidelines for the Protection of Aquatic Life.* http://st-ts.ccme.ca/en/index.html (accessed May 2018).

Clark, M. 2002 (2013 edition). *British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples.* Water, Air and Climate Change Branch, Ministry of Water, Land and Air Protection.

Saffran, K. and D. Trew. 1996. *Sensitivity of Alberta Lakes to Acidifying Deposition: An Update of Sensitivity Maps with Emphasis on 109 Northern Lakes.* W9603.

Chapter 9 Sediment Quality

BC ENV. 2018. *Working Water Quality Guidelines for British Columbia.* British Columbia Ministry of Environment and Climate Change Strategy. http://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/waterqualityguidesobjs/final_2015_wwqgs_26_nov_2015.pdf (accessed May 2018).

BC MEM and BC MOE. 2016. *Joint Application Information Requirements for Mines Act and Environmental Management Act Permits.* British Columbia Ministry of Energy, Mines, and Petroleum Resources, and the British Columbia Ministry of Environment and Climate Change Strategy.

BC MOE. 2016. *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators.* British Columbia Ministry of Environment and Climate Change Strategy.

CCME. 2018. *Canadian Sediment Quality Guidelines for the Protection of Aquatic Life.* http://st-ts.ccme.ca/en/index.html (accessed May 2018).

Clark, M. 2002 (2013 edition). *British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples.* Water, Air and Climate Change Branch, Ministry of Water, Land and Air Protection.

Chapter 10 Aquatic Resources

BC ENV. 2018a. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines (accessed May 2018).

BC MEM and BC MOE. 2016. *Joint Application Information Requirements for Mines Act and Environmental Management Act Permits.* British Columbia Ministry of Energy, Mines, and Petroleum Resources, and the British Columbia Ministry of Environment and Climate Change Strategy.

BC MOE. 2016. *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators.* British Columbia Ministry of Environment and Climate Change Strategy.

Biggs, BJF. 2000. *New Zealand Periphyton Guideline: Detecting, Monitoring and Managing Enrichment of Streams.* Prepared for the Ministry of Environment. NIWA, Christchurch.

Clark, M. 2002 (2013 edition). *British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples.* Water, Air and Climate Change Branch, Ministry of Water, Land and Air Protection.

EC. 2012a. *Canadian Aquatic Biomonitoring Network Field Manual for Wadeable Streams.* En84-87/2012E-PDF. Water Quality Monitoring and Surveillance Division.

EC. 2012b. *Canadian Aquatic Biomonitoring Network Laboratory Methods for Processing, Taxonomy, and Quality Control of Benthic Invertebrate Samples.* En84-86/2012E-PDF. Water Quality Monitoring and Surveillance Division.

EC. 2012c. *Metal Mining Technical Guidance for Environmental Effects Monitoring.* En14-61/ 2012E PDF.

Chapter 11 Fish and Fish Habitat

Bustard, D. 1983. *1982 Investigations of Adult Coho Salmon in the Telkwa River*. Smithers, BC: Produced by Dave Bustard and Associates for Crowsnest Resources Ltd.

Bustard, D. 1984. *Assessment of Benthic Invertebrate and Juvenile Fish Populations in Goathorn and Tenas Creeks and the Lower Telkwa River*, 1983.

BC Environment, editor. 1995. *Riparian management area guidebook*. Forest Service, British Columbia : BC Environment, Victoria, BC.

BC Environment, Forest Service, and British Columbia, editors. 1998. *Fish-stream identification guidebook* -- 2d ed2d ed. BC Environment ; Forest Service, Victoria, BC.

1985. *Fisheries Act*, RSC, 1985, C F-14.

BC ENV. 2018. *HabitatWizard*. British Columbia Ministry of Environment and Climate Change Strategey Habitat Wizard website. <http://www.env.gov.bc.ca/habwiz/>. Accessed Mar 2018.

BC MOE. 2014. *Ambient Water Quality Guidelines for Selenium - Technical Report Update*. Prepared for the Water Protection and Sustainability Branch, Environmenta Sustainability and Strategic Policy Division, British Columbia Ministry of Environment: Victoria, BC.

Bustard, D. 1985. *Telkwa Coal Project Aquatic Resource Assessment*. Prepared by D. Bustard and Associates for the Telkwa Coal Project: Smithers, BC.

Environment Canada. 2011. *2011 Metal Mining Environmental Effects Monitoring (EEM) Technical Guidance Document*. Environment Canada: Ottawa, ON.

Guy, C. S. and M. L. Brown, eds. 2007. *Analysis and Interpretation of Freshwater Fisheries Data*. Bethesda, Maryland: American Fisheries Society.

Health Canada. 2007. Human Health *Risk Assessment of Mercury in Fish and Health Benefits of Fish Consumption.* Bureau of Chemical Safety Food Directorate Health Products and Food Branch. Ottawa, ON.

Johnston, N. T. and P. A. Slaney. 1996. *Fish Habitat Assessment Procedures*. Watershed Technical Circular 8.

R Core Team. 2016. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing: Vienna, Austria.

Ricker, W. E. 1975. *Computation and interpretation of biological statistics of fish populations*. Bulletin of the Fisheries Research Board of Canada, 191,

RISC. 2001. *Reconnaissance (1:20,000) fish and fish habitat inventory: Standards and procedures*. Victoria, BC: Resources Inventory Standards Committee.

Zar, J. H. 1999. *Biostatistical Analysis, 4th edition*. 4 ed. Upper Saddle River, NJ: Prentice Hall.

Chapter 12 Visual Quality

2016. Forest Planning and Practices Regulation, *Forest and Range Practices Act*, BC Reg. 14/2004, Part 1.1

BC MOF. 2001. *Visual Impact Assessment Guidebook, Second Edition*. British Columbia Ministry of Forests, Forest Practices Branch, Victoria, BC.

BC MOF. 1997. *Visual Landscape Inventory, Procedure and Standards Manual,* British Columbia Ministry of Forests, Forest Practices Branch, Victoria, BC.

BC MEM/MOE. 2016. *Joint Application Information Requirements for* Mines Act *and* Environmental Management Act *Permit*, Prepared by BC MEM/MOE. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/permitting/minesact-ema_application_information_requirements_feb2016.pdf (accessed April 2018).

BC MEMPR. 2010. *Guide to Preparing Mine Applications for Aggregate Pit and Quarries in British Columbia,* Prepared by BC MEMPR. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/permitting/aggappguidefeb2010.pdf (accessed April 2018).

WMO. 2006. *Guide to Meteorological Instruments and Methods of Observation - Measurement of Meteorological Variables – Part I*. Secretariat of the World Meteorological Organization. Geneva, Switzerland. http://www.seedmech.com/documents_folder/wmo_no_8.pdf (accessed November 2012).

BVSRMP. 2005. *Bulkley Valley Sustainable Resource Management Plan,* Prepared by BC Integrated Land Management Bureau. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/skeena-region/bulkleyvalley-srmp/bulkley_srmp.pdf (accessed April 2018).

BVLRMP. 1998. *Bulkley Land and Resource Management Plan*, Prepared by Bulkley Valley Community Resources Board Interagency Planning Team. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/skeena-region/bulkley-lrmp/bulkley_lrmp.pdf (accessed April 2018).

TCPC. 1997. *Final Project Report Specifications for Manalta Coal Ltd.'s Proposed Telkwa Coal Project*, Prepared by the Telkwa Coal Project Committee. https://projects.eao.gov.bc.ca/api/document/5886a860eed3c0016f855d02/fetch (accessed April 2018).

RDBN. 2017. *Telkwa and Surrounding Area Profile*. Prepared by Regional District of Bulkley-Nechako. https://www.rdbn.bc.ca/images/pdf/EconDev/Profiles/RDBN_Telkwa_WEB.pdf (accessed June 2018)

SRK. 2017. Tenas Project, Ministry of Energy and Mines Presentation, Victoria – November 2, 2017. \\server04\new\0403488 Tenas Project\0003 Project Management\0.8 Meetings\2017-11-02_Allegiance MEMPR\ Telkwa_MEM_Meeting_2017_11-02_FINAL.pdf (accessed December 2017)

Appendix 2-A

Tenas Deposit Meteorological Station Daily Data, January 1, 2017 to March 21, 2018

Appendix 2-A. Tenas Deposit Meteorological Station Daily Data, January 1, 2017 to March 21, 2018

Date	Mean Air Temperature (°C)	Maximum Air Temperature (°C)	Minimum Air Temperature (°C)	Mean Relative Humidity (%)	Mean Wind Speed (m/s)	Maximum Wind Speed (m/s)	Mean Solar Radiation (W/m^2)	1-Hour Maximum Solar Radiation (W/m^2)	Mean Barometric Pressure at Station Elevation (kPa)	Mean Snow Depth (cm)	Total Precipitation (mm)	Total Rainfall (mm)	Total Snow-Water-Equivalent (mm)
1-Jan-17	-13.4	-8.0	-18.8	-	-	-	-	-	-	-	0.0	0.0	0.0
2-Jan-17	-17.0	-13.0	-20.9	-	-	-	-	-	-	-	0.0	0.0	0.0
3-Jan-17	-16.1	-11.4	-20.8	-	-	-	-	-	-	-	0.0	0.0	0.0
4-Jan-17	-14.9	-10.6	-19.3	-	-	-	-	-	-	-	0.0	0.0	0.0
5-Jan-17	-14.9	-10.4	-19.4	-	-	-	-	-	-	-	2.1	0.0	2.1
6-Jan-17	-8.8	-6.5	-11.1	-	-	-	-	-	-	-	8.0	0.0	8.0
7-Jan-17	-9.5	-6.5	-12.6	-	-	-	-	-	-	-	0.0	0.0	0.0
8-Jan-17	-12.2	-10.9	-13.6	-	-	-	-	-	-	-	2.5	0.0	2.5
9-Jan-17	-14.9	-9.8	-19.9	-	-	-	-	-	-	-	1.0	0.0	1.0
10-Jan-17	-20.5	-16.1	-24.9	-	-	-	-	-	-	-	0.0	0.0	0.0
11-Jan-17	-21.1	-16.2	-26.0	-	-	-	-	-	-	-	0.0	0.0	0.0
12-Jan-17	-20.1	-15.5	-24.6	-	-	-	-	-	-	-	0.0	0.0	0.0
13-Jan-17	-10.2	-2.5	-17.8	-	-	-	-	-	-	-	0.0	0.0	0.0
14-Jan-17	-3.6	0.3	-7.3	-	-	-	-	-	-	-	0.0	0.0	0.0
15-Jan-17	-1.7	1.3	-4.6	-	-	-	-	-	-	-	0.0	0.0	0.0
16-Jan-17	-0.9	2.6	-4.3	-	-	-	-	-	-	-	8.9	0.0	8.9
17-Jan-17	-0.9	0.1	-1.9	-	-	-	-	-	-	-	10.0	0.0	10.0
18-Jan-17	0.9	3.1	-1.2	-	-	-	-	-	-	-	1.6	0.8	0.9
19-Jan-17	-0.3	1.4	-2.0	-	-	-	-	-	-	-	1.0	0.0	1.0
20-Jan-17	-1.4	0.6	-3.5	-	-	-	-	-	-	-	0.0	0.0	0.0
21-Jan-17	-2.2	-1.4	-2.9	-	-	-	-	-	-	-	0.0	0.0	0.0
22-Jan-17	-3.2	-2.3	-4.1	-	-	-	-	-	-	-	0.0	0.0	0.0
23-Jan-17	-6.1	-2.9	-9.3	-	-	-	-	-	-	-	0.0	0.0	0.0
24-Jan-17	-5.5	-3.1	-7.9	-	-	-	-	-	-	-	0.0	0.0	0.0
25-Jan-17	-3.3	-0.7	-5.9	-	-	-	-	-	-	-	0.0	0.0	0.0
26-Jan-17	-1.4	2.1	-4.8	-	-	-	-	-	-	-	1.0	0.0	1.0
27-Jan-17	0.8	2.2	-0.6	-	-	-	-	-	-	-	4.1	1.7	2.3
28-Jan-17	2.4	4.3	0.4	-	-	-	-	-	-	-	4.3	4.3	0.0
29-Jan-17	-0.3	1.0	-1.7	-	-	-	-	-	-	-	0.0	0.0	0.0
30-Jan-17	-3.2	-1.3	-5.2	-	-	-	-	-	-	-	0.0	0.0	0.0
31-Jan-17	-8.2	-4.8	-11.7	-	-	-	-	-	-	-	0.0	0.0	0.0

Dashes (-) indicate not enough data were not available or were erroneous. Underlined values indicate data that were gap-filled.

Appendix 2-A. Tenas Deposit Meteorological Station Daily Data, January 1, 2017 to March 21, 2018

Date	Mean Air Temperature (°C)	Maximum Air Temperature (°C)	Minimum Air Temperature (°C)	Mean Relative Humidity (%)	Mean Wind Speed (m/s)	Maximum Wind Speed (m/s)	Mean Solar Radiation (W/m^2)	1-Hour Maximum Solar Radiation (W/m^2)	Mean Barometric Pressure at Station Elevation (kPa)	Mean Snow Depth (cm)	Total Precipitation (mm)	Total Rainfall (mm)	Total Snow-Water-Equivalent (mm)
1-Feb-17	-11.6	-7.6	-15.7	-	-	-	-	-	-	-	0.0	0.0	0.0
2-Feb-17	-12.3	-8.6	-16.0	-	-	-	-	-	-	-	0.0	0.0	0.0
3-Feb-17	-11.7	-7.6	-15.8	-	-	-	-	-	-	-	0.0	0.0	0.0
4-Feb-17	-12.6	-7.0	-18.1	-	-	-	-	-	-	-	0.0	0.0	0.0
5-Feb-17	-12.7	-7.1	-18.3	-	-	-	-	-	-	-	0.0	0.0	0.0
6-Feb-17	-13.7	-8.5	-18.9	-	-	-	-	-	-	-	0.0	0.0	0.0
7-Feb-17	-15.5	-11.2	-19.9	-	-	-	-	-	-	-	0.0	0.0	0.0
8-Feb-17	-16.1	-11.0	-21.0	-	-	-	-	-	-	-	0.0	0.0	0.0
9-Feb-17	-15.1	-10.9	-19.3	-	-	-	-	-	-	-	0.0	0.0	0.0
10-Feb-17	-10.4	-5.8	-14.9	-	-	-	-	-	-	-	0.0	0.0	0.0
11-Feb-17	-4.1	1.6	-9.8	-	-	-	-	-	-	-	0.0	0.0	0.0
12-Feb-17	1.1	4.0	-1.9	-	-	-	-	-	-	-	0.0	0.0	0.0
13-Feb-17	1.4	5.9	-3.3	-	-	-	-	-	-	-	0.0	0.0	0.0
14-Feb-17	0.5	4.9	-3.9	-	-	-	-	-	-	-	1.9	0.5	1.4
15-Feb-17	2.5	6.3	-1.2	-	-	-	-	-	-	-	6.5	6.5	0.0
16-Feb-17	-0.6	0.4	-1.6	-	-	-	-	-	-	-	3.4	0.0	3.4
17-Feb-17	-2.4	-0.9	-3.8	-	-	-	-	-	-	-	0.0	0.0	0.0
18-Feb-17	-2.2	0.0	-4.4	-	-	-	-	-	-	-	0.0	0.0	0.0
19-Feb-17	-2.1	-0.5	-3.7	-	-	-	-	-	-	-	1.6	0.0	1.6
20-Feb-17	-2.0	-0.4	-3.6	-	-	-	-	-	-	-	1.0	0.0	1.0
21-Feb-17	-2.4	0.4	-5.1	-	-	-	-	-	-	-	0.0	0.0	0.0
22-Feb-17	-4.2	-0.5	-7.9	-	-	-	-	-	-	-	0.0	0.0	0.0
23-Feb-17	-7.3	-2.5	-12.1	-	-	-	-	-	-	-	0.0	0.0	0.0
24-Feb-17	-6.3	-1.6	-10.9	-	-	-	-	-	-	-	0.0	0.0	0.0
25-Feb-17	-8.2	-3.5	-12.7	-	-	-	-	-	-	-	1.0	0.0	1.0
26-Feb-17	-8.2	-1.6	-14.6	-	-	-	-	-	-	-	0.0	0.0	0.0
27-Feb-17	-5.9	-0.9	-10.9	-	-	-	-	-	-	-	0.0	0.0	0.0
28-Feb-17	-9.2	-4.3	-13.9	-	-	-	-	-	-	-	0.0	0.0	0.0

Dashes (-) indicate not enough data were not available or were erroneous. Underlined values indicate data that were gap-filled.

Appendix 2-A. Tenas Deposit Meteorological Station Daily Data, January 1, 2017 to March 21, 2018

Date	Mean Air Temperature (°C)	Maximum Air Temperature (°C)	Minimum Air Temperature (°C)	Mean Relative Humidity (%)	Mean Wind Speed (m/s)	Maximum Wind Speed (m/s)	Mean Solar Radiation (W/m^2)	1-Hour Maximum Solar Radiation (W/m^2)	Mean Barometric Pressure at Station Elevation (kPa)	Mean Snow Depth (cm)	Total Precipitation (mm)	Total Rainfall (mm)	Total Snow-Water-Equivalent (mm)
1-Mar-17	-6.5	-0.5	-12.4	-	-	-	-	-	-	-	0.0	0.0	0.0
2-Mar-17	1.7	5.8	-2.4	-	-	-	-	-	-	-	0.0	0.0	0.0
3-Mar-17	-2.9	0.3	-6.1	-	-	-	-	-	-	-	0.0	0.0	0.0
4-Mar-17	-6.5	-2.5	-10.4	-	-	-	-	-	-	-	0.0	0.0	0.0
5-Mar-17	-6.2	-2.6	-9.8	-	-	-	-	-	-	-	0.0	0.0	0.0
6-Mar-17	-7.0	-2.5	-11.4	-	-	-	-	-	-	-	0.0	0.0	0.0
7-Mar-17	-7.2	-5.4	-9.1	-	-	-	-	-	-	-	0.0	0.0	0.0
8-Mar-17	-8.7	-7.4	-9.9	-	-	-	-	-	-	-	0.0	0.0	0.0
9-Mar-17	-10.2	-7.8	-12.5	-	-	-	-	-	-	-	0.0	0.0	0.0
10-Mar-17	-9.1	-6.5	-11.6	-	-	-	-	-	-	-	1.2	0.0	1.2
11-Mar-17	-9.7	-8.2	-11.1	-	-	-	-	-	-	-	2.5	0.0	2.5
12-Mar-17	-7.4	-4.9	-9.8	-	-	-	-	-	-	-	2.1	0.0	2.1
13-Mar-17	-1.3	8.2	-10.7	-	-	-	-	-	-	-	0.0	0.0	0.0
14-Mar-17	2.5	7.0	-2.0	-	-	-	-	-	-	-	0.0	0.0	0.0
15-Mar-17	0.3	3.3	-2.9	-	-	-	-	-	-	-	0.0	0.0	0.0
16-Mar-17	-0.4	3.3	-4.2	-	-	-	-	-	-	-	0.0	0.0	0.0
17-Mar-17	-0.3	2.5	-3.1	-	-	-	-	-	-	-	0.0	0.0	0.0
18-Mar-17	-1.2	2.1	-4.5	-	-	-	-	-	-	-	0.0	0.0	0.0
19-Mar-17	-1.5	2.9	-5.9	-	-	-	-	-	-	-	0.0	0.0	0.0
20-Mar-17	-2.5	4.6	-9.6	-	-	-	-	-	-	-	0.0	0.0	0.0
21-Mar-17	-1.8	4.2	-7.7	-	-	-	-	-	-	-	1.4	0.0	1.4
22-Mar-17	2.0	5.4	-1.6	-	-	-	-	-	-	-	1.0	0.9	0.0
23-Mar-17	-0.3	4.0	-4.5	-	-	-	-	-	-	-	1.4	0.0	1.4
24-Mar-17	0.4	2.7	-1.9	-	-	-	-	-	-	-	2.5	0.5	2.0
25-Mar-17	1.5	4.8	-1.7	-	-	-	-	-	-	-	0.0	0.0	0.0
26-Mar-17	0.2	4.5	-4.2	-	-	-	-	-	-	-	0.0	0.0	0.0
27-Mar-17	2.0	6.1	-2.2	-	-	-	-	-	-	-	0.0	0.0	0.0
28-Mar-17	2.0	5.4	-1.4	-	-	-	-	-	-	-	1.4	1.4	0.0
29-Mar-17	1.2	6.3	-4.0	-	-	-	-	-	-	-	0.0	0.0	0.0
30-Mar-17	1.6	7.3	-4.2	-	-	-	-	-	-	-	1.2	1.0	0.2
31-Mar-17	4.0	8.5	-0.6	-	-	-	-	-	-	-	0.0	0.0	0.0

Dashes (-) indicate not enough data were not available or were erroneous. Underlined values indicate data that were gap-filled.

Appendix 2-A. Tenas Deposit Meteorological Station Daily Data, January 1, 2017 to March 21, 2018

Date	Mean Air Temperature (°C)	Maximum Air Temperature (°C)	Minimum Air Temperature (°C)	Mean Relative Humidity (%)	Mean Wind Speed (m/s)	Maximum Wind Speed (m/s)	Mean Solar Radiation (W/m^2)	1-Hour Maximum Solar Radiation (W/m^2)	Mean Barometric Pressure at Station Elevation (kPa)	Mean Snow Depth (cm)	Total Precipitation (mm)	Total Rainfall (mm)	Total Snow-Water-Equivalent (mm)
1-Apr-17	2.1	5.9	-1.6	-	-	-	-	-	-	-	1.2	1.2	0.0
2-Apr-17	0.6	5.8	-4.6	-	-	-	-	-	-	-	0.0	0.0	0.0
3-Apr-17	1.4	7.7	-5.1	-	-	-	-	-	-	-	0.0	0.0	0.0
4-Apr-17	1.3	7.8	-5.4	-	-	-	-	-	-	-	3.8	2.4	1.4
5-Apr-17	3.1	7.5	-1.2	-	-	-	-	-	-	-	0.0	0.0	0.0
6-Apr-17	1.5	8.2	-5.2	-	-	-	-	-	-	-	0.0	0.0	0.0
7-Apr-17	3.7	8.7	-1.3	-	-	-	-	-	-	-	1.0	1.0	0.0
8-Apr-17	3.6	6.5	0.7	-	-	-	-	-	-	-	3.2	3.2	0.0
9-Apr-17	2.9	9.1	-3.4	-	-	-	-	-	-	-	0.0	0.0	0.0
10-Apr-17	2.1	9.3	-5.2	-	-	-	-	-	-	-	1.0	1.0	0.0
11-Apr-17	1.6	6.2	-3.0	-	-	-	-	-	-	-	1.0	0.8	0.2
12-Apr-17	3.3	7.1	-0.5	-	-	-	-	-	-	-	0.0	0.0	0.0
13-Apr-17	4.3	8.1	0.6	-	-	-	-	-	-	-	0.0	0.0	0.0
14-Apr-17	2.3	5.0	-0.5	-	-	-	-	-	-	-	3.6	3.6	0.0
15-Apr-17	3.7	7.3	0.2	-	-	-	-	-	-	-	0.0	0.0	0.0
16-Apr-17	2.8	9.9	-4.4	-	-	-	-	-	-	-	0.0	0.0	0.0
17-Apr-17	2.7	8.9	-3.5	-	-	-	-	-	-	-	0.0	0.0	0.0
18-Apr-17	1.5	4.1	-1.1	-	-	-	-	-	-	-	0.0	0.0	0.0
19-Apr-17	3.7	9.3	-1.8	-	-	-	-	-	-	-	1.2	1.2	0.0
20-Apr-17	3.5	10.1	-3.1	-	-	-	-	-	-	-	0.0	0.0	0.0
21-Apr-17	4.1	12.0	-3.8	-	-	-	-	-	-	-	0.0	0.0	0.0
22-Apr-17	3.7	10.4	-2.9	-	-	-	-	-	-	-	0.0	0.0	0.0
23-Apr-17	3.6	8.6	-1.3	-	-	-	-	-	-	-	0.0	0.0	0.0
24-Apr-17	5.2	10.4	0.0	-	-	-	-	-	-	-	0.0	0.0	0.0
25-Apr-17	4.2	11.5	-3.3	-	-	-	-	-	-	-	0.0	0.0	0.0
26-Apr-17	7.2	10.0	4.4	-	-	-	-	-	-	-	0.0	0.0	0.0
27-Apr-17	4.5	8.4	0.5	-	-	-	-	-	-	-	0.0	0.0	0.0
28-Apr-17	2.9	8.2	-2.5	-	-	-	-	-	-	-	0.0	0.0	0.0
29-Apr-17	0.3	4.4	-4.0	-	-	-	-	-	-	-	1.9	0.2	1.6
30-Apr-17	4.4	9.4	-0.7	-	-	-	-	-	-	-	1.6	1.6	0.0

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Appendix 2-A. Tenas Deposit Meteorological Station Daily Data, January 1, 2017 to March 21, 2018

Date	Mean Air Temperature (°C)	Maximum Air Temperature (°C)	Minimum Air Temperature (°C)	Mean Relative Humidity (%)	Mean Wind Speed (m/s)	Maximum Wind Speed (m/s)	Mean Solar Radiation (W/m^2)	1-Hour Maximum Solar Radiation (W/m^2)	Mean Barometric Pressure at Station Elevation (kPa)	Mean Snow Depth (cm)	Total Precipitation (mm)	Total Rainfall (mm)	Total Snow-Water-Equivalent (mm)
1-May-17	3.8	7.8	-0.2	-	-	-	-	-	-	-	0.0	0.0	0.0
2-May-17	3.6	11.5	-4.3	-	-	-	-	-	-	-	1.0	1.0	0.0
3-May-17	7.1	12.2	2.0	-	-	-	-	-	-	-	2.1	2.1	0.0
4-May-17	1.7	4.1	-0.7	-	-	-	-	-	-	-	12.4	10.5	1.9
5-May-17	4.0	6.6	1.4	-	-	-	-	-	-	-	11.8	11.8	0.0
6-May-17	4.5	7.2	1.7	-	-	-	-	-	-	-	0.0	0.0	0.0
7-May-17	4.6	9.1	0.0	-	-	-	-	-	-	-	1.6	1.6	0.0
8-May-17	6.7	11.5	1.9	-	-	-	-	-	-	-	0.0	0.0	0.0
9-May-17	3.9	10.0	-2.2	-	-	-	-	-	-	-	1.4	1.4	0.0
10-May-17	6.2	13.0	-0.4	-	-	-	-	-	-	-	0.0	0.0	0.0
11-May-17	5.1	6.0	4.2	-	-	-	-	-	-	-	28.7	28.7	0.0
12-May-17	3.3	5.3	1.2	-	-	-	-	-	-	-	27.6	27.6	0.0
13-May-17	3.5	7.5	-0.6	-	-	-	-	-	-	-	2.7	2.7	0.0
14-May-17	5.7	9.4	2.0	-	-	-	-	-	-	-	2.5	2.5	0.0
15-May-17	4.7	7.4	1.9	-	-	-	-	-	-	-	7.8	7.8	0.0
16-May-17	7.1	12.4	1.9	-	-	-	-	-	-	-	0.0	0.0	0.0
17-May-17	8.4	12.6	4.2	-	-	-	-	-	-	-	0.0	0.0	0.0
18-May-17	7.4	13.4	1.4	-	-	-	-	-	-	-	0.0	0.0	0.0
19-May-17	7.3	15.0	-0.4	-	-	-	-	-	-	-	0.0	0.0	0.0
20-May-17	9.0	17.1	0.9	-	-	-	-	-	-	-	0.0	0.0	0.0
21-May-17	11.7	16.8	6.6	-	-	-	-	-	-	-	0.0	0.0	0.0
22-May-17	10.0	14.1	5.9	-	-	-	-	-	-	-	0.0	0.0	0.0
23-May-17	7.8	11.0	4.5	-	-	-	-	-	-	-	2.3	2.3	0.0
24-May-17	8.7	13.7	3.8	-	-	-	-	-	-	-	0.0	0.0	0.0
25-May-17	9.9	17.2	2.6	-	-	-	-	-	-	-	0.0	0.0	0.0
26-May-17	12.1	18.8	5.3	-	-	-	-	-	-	-	0.0	0.0	0.0
27-May-17	11.4	19.4	3.3	-	-	-	-	-	-	-	0.0	0.0	0.0
28-May-17	12.9	22.5	3.3	-	-	-	-	-	-	-	0.0	0.0	0.0
29-May-17	13.7	21.4	5.9	-	-	-	-	-	-	-	0.0	0.0	0.0
30-May-17	12.1	18.9	5.2	-	-	-	-	-	-	-	6.9	6.9	0.0
31-May-17	10.7	14.9	6.4	-	-	-	-	-	-	-	1.0	1.0	0.0

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Appendix 2-A. Tenas Deposit Meteorological Station Daily Data, January 1, 2017 to March 21, 2018

Date	Mean Air Temperature (°C)	Maximum Air Temperature (°C)	Minimum Air Temperature (°C)	Mean Relative Humidity (%)	Mean Wind Speed (m/s)	Maximum Wind Speed (m/s)	Mean Solar Radiation (W/m^2)	1-Hour Maximum Solar Radiation (W/m^2)	Mean Barometric Pressure at Station Elevation (kPa)	Mean Snow Depth (cm)	Total Precipitation (mm)	Total Rainfall (mm)	Total Snow-Water-Equivalent (mm)
1-Jun-17	11.0	15.1	6.9	-	-	-	-	-	-	-	1.2	1.2	0.0
2-Jun-17	9.3	14.1	4.4	-	-	-	-	-	-	-	1.6	1.6	0.0
3-Jun-17	7.1	11.1	3.1	-	-	-	-	-	-	-	1.6	1.6	0.0
4-Jun-17	5.3	13.1	-2.4	-	-	-	-	-	-	-	0.0	0.0	0.0
5-Jun-17	8.3	11.9	4.8	-	-	-	-	-	-	-	1.2	1.2	0.0
6-Jun-17	10.4	17.6	3.1	-	-	-	-	-	-	-	0.0	0.0	0.0
7-Jun-17	14.3	22.7	6.0	-	-	-	-	-	-	-	0.0	0.0	0.0
8-Jun-17	14.2	20.4	8.0	-	-	-	-	-	-	-	26.1	26.1	0.0
9-Jun-17	5.6	8.1	3.1	-	-	-	-	-	-	-	23.9	23.9	0.0
10-Jun-17	7.5	11.1	3.7	-	-	-	-	-	-	-	0.0	0.0	0.0
11-Jun-17	10.8	15.2	6.4	-	-	-	-	-	-	-	0.0	0.0	0.0
12-Jun-17	8.1	12.9	3.2	-	-	-	-	-	-	-	0.0	0.0	0.0
13-Jun-17	7.0	12.6	1.3	-	-	-	-	-	-	-	0.0	0.0	0.0
14-Jun-17	7.5	13.0	1.9	-	-	-	-	-	-	-	0.0	0.0	0.0
15-Jun-17	7.6	10.0	5.0	-	-	-	-	-	-	-	4.5	4.5	0.0
16-Jun-17	8.7	12.3	5.2	-	-	-	-	-	-	-	1.0	1.0	0.0
17-Jun-17	7.0	14.0	-0.1	-	-	-	-	-	-	-	0.0	0.0	0.0
18-Jun-17	8.1	15.7	0.4	-	-	-	-	-	-	-	2.5	2.5	0.0
19-Jun-17	10.8	13.8	7.7	-	-	-	-	-	-	-	4.1	4.1	0.0
20-Jun-17	7.5	11.1	3.8	-	-	-	-	-	-	-	1.0	1.0	0.0
21-Jun-17	7.6	11.7	3.6	-	-	-	-	-	-	-	0.0	0.0	0.0
22-Jun-17	7.7	15.1	0.3	-	-	-	-	-	-	-	0.0	0.0	0.0
23-Jun-17	10.0	17.8	2.1	-	-	-	-	-	-	-	0.0	0.0	0.0
24-Jun-17	9.9	17.1	2.7	-	-	-	-	-	-	-	0.0	0.0	0.0
25-Jun-17	13.6	20.2	6.9	-	-	-	-	-	-	-	0.0	0.0	0.0
26-Jun-17	8.3	12.8	3.7	-	-	-	-	-	-	-	3.4	3.4	0.0
27-Jun-17	10.0	14.3	5.8	-	-	-	-	-	-	-	0.0	0.0	0.0
28-Jun-17	12.1	20.0	4.2	-	-	-	-	-	-	-	0.0	0.0	0.0
29-Jun-17	15.3	20.5	10.1	-	-	-	-	-	-	-	0.0	0.0	0.0
30-Jun-17	12.7	19.9	5.5	-	-	-	-	-	-	-	0.0	0.0	0.0

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Appendix 2-A. Tenas Deposit Meteorological Station Daily Data, January 1, 2017 to March 21, 2018

Date	Mean Air Temperature (°C)	Maximum Air Temperature (°C)	Minimum Air Temperature (°C)	Mean Relative Humidity (%)	Mean Wind Speed (m/s)	Maximum Wind Speed (m/s)	Mean Solar Radiation (W/m^2)	1-Hour Maximum Solar Radiation (W/m^2)	Mean Barometric Pressure at Station Elevation (kPa)	Mean Snow Depth (cm)	Total Precipitation (mm)	Total Rainfall (mm)	Total Snow-Water-Equivalent (mm)
1-Jul-17	10.8	15.8	5.7	-	-	-	-	-	-	-	0.0	0.0	0.0
2-Jul-17	12.0	16.2	7.6	-	-	-	-	-	-	-	2.5	2.5	0.0
3-Jul-17	9.3	13.5	5.2	-	-	-	-	-	-	-	0.0	0.0	0.0
4-Jul-17	8.1	13.4	2.6	-	-	-	-	-	-	-	0.0	0.0	0.0
5-Jul-17	10.2	19.4	1.0	-	-	-	-	-	-	-	0.0	0.0	0.0
6-Jul-17	14.2	23.9	4.4	-	-	-	-	-	-	-	0.0	0.0	0.0
7-Jul-17	14.3	21.6	6.9	-	-	-	-	-	-	-	3.2	3.2	0.0
8-Jul-17	12.2	19.1	5.3	-	-	-	-	-	-	-	1.4	1.4	0.0
9-Jul-17	10.1	13.4	6.8	-	-	-	-	-	-	-	2.5	2.5	0.0
10-Jul-17	8.2	14.6	1.7	-	-	-	-	-	-	-	0.0	0.0	0.0
11-Jul-17	9.2	13.9	4.3	-	-	-	-	-	-	-	2.1	2.1	0.0
12-Jul-17	10.5	14.1	6.9	-	-	-	-	-	-	-	5.4	5.4	0.0
13-Jul-17	9.7	13.2	6.0	-	-	-	-	-	-	-	3.4	3.4	0.0
14-Jul-17	10.5	15.2	5.9	-	-	-	-	-	-	-	0.0	0.0	0.0
15-Jul-17	9.3	13.7	5.0	-	-	-	-	-	-	-	3.8	3.8	0.0
16-Jul-17	9.6	13.9	5.2	-	-	-	-	-	-	-	0.0	0.0	0.0
17-Jul-17	10.5	14.2	6.8	-	-	-	-	-	-	-	0.0	0.0	0.0
18-Jul-17	11.1	19.1	3.1	-	-	-	-	-	-	-	0.0	0.0	0.0
19-Jul-17	12.3	20.5	4.2	-	-	-	-	-	-	-	0.0	0.0	0.0
20-Jul-17	11.6	18.8	4.5	-	-	-	-	-	-	-	0.0	0.0	0.0
21-Jul-17	9.0	14.7	3.3	-	-	-	-	-	-	-	5.2	5.2	0.0
22-Jul-17	11.5	15.2	7.8	-	-	-	-	-	-	-	4.7	4.7	0.0
23-Jul-17	9.5	12.7	6.2	-	-	-	-	-	-	-	0.0	0.0	0.0
24-Jul-17	10.5	18.9	2.0	-	-	-	-	-	-	-	0.0	0.0	0.0
25-Jul-17	13.0	20.8	5.1	-	-	-	-	-	-	-	3.0	3.0	0.0
26-Jul-17	13.3	16.5	10.1	-	-	-	-	-	-	-	0.0	0.0	0.0
27-Jul-17	10.6	15.0	6.2	-	-	-	-	-	-	-	3.4	3.4	0.0
28-Jul-17	10.4	15.3	5.3	-	-	-	-	-	-	-	2.5	2.5	0.0
29-Jul-17	12.9	18.8	6.9	-	-	-	-	-	-	-	1.6	1.6	0.0
30-Jul-17	8.7	14.2	3.1	-	-	-	-	-	-	-	0.0	0.0	0.0
31-Jul-17	10.4	17.0	3.6	-	-	-	-	-	-	-	0.0	0.0	0.0

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Appendix 2-A. Tenas Deposit Meteorological Station Daily Data, January 1, 2017 to March 21, 2018

Date	Mean Air Temperature (°C)	Maximum Air Temperature (°C)	Minimum Air Temperature (°C)	Mean Relative Humidity (%)	Mean Wind Speed (m/s)	Maximum Wind Speed (m/s)	Mean Solar Radiation (W/m^2)	1-Hour Maximum Solar Radiation (W/m^2)	Mean Barometric Pressure at Station Elevation (kPa)	Mean Snow Depth (cm)	Total Precipitation (mm)	Total Rainfall (mm)	Total Snow-Water-Equivalent (mm)
1-Aug-17	12.0	21.4	2.5	-	-	-	-	-	-	-	0.0	0.0	0.0
2-Aug-17	14.1	23.3	4.8	-	-	-	-	-	-	-	0.0	0.0	0.0
3-Aug-17	14.3	22.4	6.0	-	-	-	-	-	-	-	0.0	0.0	0.0
4-Aug-17	15.3	24.3	6.3	-	-	-	-	-	-	-	0.0	0.0	0.0
5-Aug-17	16.2	25.2	7.1	-	-	-	-	-	-	-	0.0	0.0	0.0
6-Aug-17	16.5	25.3	7.6	-	-	-	-	-	-	-	0.0	0.0	0.0
7-Aug-17	16.1	23.8	8.4	-	-	-	-	-	-	-	0.0	0.0	0.0
8-Aug-17	16.4	24.6	8.1	-	-	-	-	-	-	-	0.0	0.0	0.0
9-Aug-17	15.8	22.9	8.6	-	-	-	-	-	-	-	0.0	0.0	0.0
10-Aug-17	17.5	25.4	9.5	-	-	-	-	-	-	-	0.0	0.0	0.0
11-Aug-17	16.2	23.9	8.5	-	-	-	-	-	-	-	0.0	0.0	0.0
12-Aug-17	13.1	19.9	6.2	-	-	-	-	-	-	-	0.0	0.0	0.0
13-Aug-17	11.8	16.6	7.0	-	-	-	-	-	-	-	0.0	0.0	0.0
14-Aug-17	10.2	15.2	5.2	-	-	-	-	-	-	-	0.0	0.0	0.0
15-Aug-17	9.2	13.7	4.6	-	-	-	-	-	-	-	0.0	0.0	0.0
16-Aug-17	12.5	17.2	7.7	-	-	-	-	-	-	-	0.0	0.0	0.0
17-Aug-17	9.8	14.2	5.3	-	-	-	-	-	-	-	3.6	3.6	0.0
18-Aug-17	9.7	13.0	6.4	-	-	-	-	-	-	-	1.2	1.2	0.0
19-Aug-17	7.6	11.2	4.0	-	-	-	-	-	-	-	1.6	1.6	0.0
20-Aug-17	8.2	10.5	5.9	-	-	-	-	-	-	-	5.8	5.8	0.0
21-Aug-17	12.7	16.6	8.6	-	-	-	-	-	-	-	3.6	3.6	0.0
22-Aug-17	11.2	17.7	4.7	-	-	-	-	-	-	-	1.2	1.2	0.0
23-Aug-17	10.4	15.2	5.6	-	-	-	-	-	-	-	0.0	0.0	0.0
24-Aug-17	8.3	13.8	2.8	-	-	-	-	-	-	-	1.0	1.0	0.0
25-Aug-17	8.7	12.7	4.8	-	-	-	-	-	-	-	0.0	0.0	0.0
26-Aug-17	12.8	17.2	8.4	-	-	-	-	-	-	-	2.7	2.7	0.0
27-Aug-17	8.7	10.6	6.6	-	-	-	-	-	-	-	4.3	4.3	0.0
28-Aug-17	11.9	16.4	7.4	-	-	-	-	-	-	-	0.0	0.0	0.0
29-Aug-17	12.1	19.5	4.6	-	-	-	-	-	-	-	0.0	0.0	0.0
30-Aug-17	13.2	18.1	8.2	-	-	-	-	-	-	-	0.0	0.0	0.0
31-Aug-17	10.0	14.0	6.0	-	-	-	-	-	-	-	1.0	1.0	0.0

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Date	Mean Air Temperature (°C)	Maximum Air Temperature (°C)	Minimum Air Temperature (°C)	Mean Relative Humidity (%)	Mean Wind Speed (m/s)	Maximum Wind Speed (m/s)	Mean Solar Radiation (W/m^2)	1-Hour Maximum Solar Radiation (W/m^2)	Mean Barometric Pressure at Station Elevation (kPa)	Mean Snow Depth (cm)	Total Precipitation (mm)	Total Rainfall (mm)	Total Snow-Water-Equivalent (mm)
1-Sep-17	10.4	15.1	5.5	-	-	-	-	-	-	-	5.2	5.2	0.0
2-Sep-17	10.4	14.3	6.5	-	-	-	-	-	-	-	1.6	1.6	0.0
3-Sep-17	10.4	16.9	3.9	-	-	-	-	-	-	-	0.0	0.0	0.0
4-Sep-17	12.3	21.6	3.1	-	-	-	-	-	-	-	0.0	0.0	0.0
5-Sep-17	14.2	23.2	5.2	-	-	-	-	-	-	-	0.0	0.0	0.0
6-Sep-17	13.7	21.7	5.7	-	-	-	-	-	-	-	1.0	1.0	0.0
7-Sep-17	13.1	18.2	8.0	-	-	-	-	-	-	-	0.0	0.0	0.0
8-Sep-17	8.4	15.6	1.2	-	-	-	-	-	-	-	0.0	0.0	0.0
9-Sep-17	9.8	14.6	5.1	-	-	-	-	-	-	-	1.4	1.4	0.0
10-Sep-17	6.8	8.5	5.0	-	-	-	-	-	-	-	52.5	52.5	0.0
11-Sep-17	8.7	11.6	5.6	-	-	-	-	-	-	-	2.5	2.5	0.0
12-Sep-17	6.5	11.1	1.9	-	-	-	-	-	-	-	0.0	0.0	0.0
13-Sep-17	5.3	12.2	-1.6	-	-	-	-	-	-	-	0.0	0.0	0.0
14-Sep-17	6.3	14.6	-2.1	-	-	-	-	-	-	-	0.0	0.0	0.0
15-Sep-17	7.0	14.7	-0.6	-	-	-	-	-	-	-	0.0	0.0	0.0
16-Sep-17	7.0	13.8	0.1	-	-	-	-	-	-	-	0.0	0.0	0.0
17-Sep-17	5.9	9.1	2.8	-	-	-	-	-	-	-	8.5	8.5	0.0
18-Sep-17	4.6	8.8	0.3	-	-	-	-	-	-	-	0.0	0.0	0.0
19-Sep-17	5.5	9.6	1.4	-	-	-	-	-	-	-	2.7	2.7	0.0
20-Sep-17	8.3	12.4	4.2	-	-	-	-	-	-	-	0.0	0.0	0.0
21-Sep-17	7.6	12.4	2.9	-	-	-	-	-	-	-	0.0	0.0	0.0
22-Sep-17	4.3	6.5	2.1	-	-	-	-	-	-	-	2.7	2.7	0.0
23-Sep-17	6.8	8.5	5.1	-	-	-	-	-	-	-	1.2	1.2	0.0
24-Sep-17	8.5	10.3	6.6	-	-	-	-	-	-	-	1.2	1.2	0.0
25-Sep-17	9.9	13.5	6.4	-	-	-	-	-	-	-	3.6	3.6	0.0
26-Sep-17	10.9	14.1	7.6	-	-	-	-	-	-	-	0.0	0.0	0.0
27-Sep-17	11.5	16.7	6.2	-	-	-	-	-	-	-	0.0	0.0	0.0
28-Sep-17	8.8	11.1	6.5	-	-	-	-	-	-	-	9.6	9.6	0.0
29-Sep-17	6.4	9.7	3.0	-	-	-	-	-	-	-	8.0	8.0	0.0
30-Sep-17	4.3	9.0	1.1	75.0	2.2	6.8	76.0	293.6	89.9	0.0	0.0	0.0	0.0

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Appendix 2-A. Tenas Deposit Meteorological Station Daily Data, January 1, 2017 to March 21, 2018

Date	Mean Air Temperature (°C)	Maximum Air Temperature (°C)	Minimum Air Temperature (°C)	Mean Relative Humidity (%)	Mean Wind Speed (m/s)	Maximum Wind Speed (m/s)	Mean Solar Radiation (W/m^2)	1-Hour Maximum Solar Radiation (W/m^2)	Mean Barometric Pressure at Station Elevation (kPa)	Mean Snow Depth (cm)	Total Precipitation (mm)	Total Rainfall (mm)	Total Snow-Water-Equivalent (mm)
1-Oct-17	4.0	9.2	-0.4	72.3	1.1	4.2	109.6	460.8	90.7	0.0	0.0	0.0	0.0
2-Oct-17	2.5	9.0	-2.9	68.5	1.2	5.6	150.3	549.9	91.3	0.0	0.0	0.0	0.0
3-Oct-17	2.3	9.5	-3.5	68.5	0.7	2.8	121.4	488.7	91.0	0.0	0.0	0.0	0.0
4-Oct-17	5.5	13.7	-0.1	67.1	0.6	2.3	145.5	537.3	90.6	0.0	0.0	0.0	0.0
5-Oct-17	6.5	14.2	-0.5	62.7	1.2	8.2	136.8	536.6	90.1	0.0	0.5	0.5	0.0
6-Oct-17	4.4	7.5	1.0	79.0	2.1	11.0	102.4	505.3	88.8	0.0	2.8	2.8	0.0
7-Oct-17	2.6	7.5	0.0	84.6	1.3	5.4	63.4	253.4	89.4	0.0	0.2	0.2	0.0
8-Oct-17	2.5	7.5	-3.0	81.6	1.4	8.9	90.1	370.6	90.3	0.0	0.1	0.1	0.0
9-Oct-17	1.9	5.5	-2.2	89.4	1.4	7.5	51.9	225.8	89.9	0.0	1.9	1.8	0.1
10-Oct-17	0.1	5.0	-2.8	85.3	0.9	4.0	98.5	449.5	89.9	0.0	0.1	0.0	0.1
11-Oct-17	-0.4	4.6	-4.6	82.4	0.8	6.2	95.8	411.0	89.9	0.1	0.9	0.0	0.9
12-Oct-17	-0.6	4.0	-3.9	83.8	1.1	6.6	85.5	612.5	89.9	0.2	0.2	0.0	0.2
13-Oct-17	-0.9	4.2	-5.9	71.1	1.0	5.2	93.6	401.8	90.4	0.0	0.5	0.0	0.5
14-Oct-17	3.3	8.8	-1.1	88.8	1.2	7.1	70.4	371.4	90.0	0.0	1.0	1.0	0.0
15-Oct-17	4.4	6.9	0.6	85.2	3.0	12.2	53.3	314.6	89.4	0.0	5.9	5.9	0.0
16-Oct-17	0.8	3.3	-0.2	94.4	-	6.5	14.6	84.2	89.0	1.6	16.3	6.4	9.9
17-Oct-17	0.2	3.1	-1.5	91.6	-	5.4	59.2	470.2	89.0	8.6	9.0	1.0	8.0
18-Oct-17	-0.4	2.0	-1.5	96.4	1.2	6.9	34.2	204.9	87.9	7.6	2.5	0.0	2.5
19-Oct-17	1.4	5.5	-1.5	84.9	1.3	8.9	86.0	495.0	87.5	7.3	0.0	0.0	0.0
20-Oct-17	-0.8	3.6	-4.4	89.5	0.9	5.6	44.6	245.9	88.4	7.2	1.3	0.0	1.3
21-Oct-17	-2.5	-1.0	-4.4	95.5	0.8	3.1	-	-	88.3	11.8	8.0	0.0	8.0
22-Oct-17	0.4	3.4	-2.9	94.3	0.9	6.0	-	-	89.0	15.9	0.9	0.2	0.7
23-Oct-17	2.3	8.6	-0.7	95.8	1.6	11.0	-	-	90.2	13.5	21.4	21.4	0.0
24-Oct-17	2.7	8.7	-0.5	96.4	-	8.8	-	-	90.0	8.3	72.8	72.8	0.0
25-Oct-17	1.1	4.7	-2.3	93.6	1.5	13.3	53.2	278.5	90.3	9.4	0.6	0.3	0.2
26-Oct-17	-0.5	3.4	-3.7	95.2	0.7	2.6	69.1	486.5	91.0	9.1	0.3	0.0	0.3
27-Oct-17	4.6	10.5	-1.2	87.1	0.6	2.5	81.3	402.6	90.7	8.1	0.0	0.0	0.0
28-Oct-17	4.6	8.8	-1.6	85.1	1.5	5.4	71.0	370.4	90.5	6.4	0.0	0.0	0.0
29-Oct-17	0.4	5.9	-2.9	68.0	0.8	3.2	72.6	370.5	91.3	5.6	0.0	0.0	0.0
30-Oct-17	0.8	9.3	-4.0	71.0	1.0	6.2	62.6	333.2	90.9	5.6	0.0	0.0	0.0
31-Oct-17	6.4	10.1	1.8	68.9	2.6	10.3	36.4	163.1	89.6	1.7	0.0	0.0	0.0

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Appendix 2-A. Tenas Deposit Meteorological Station Daily Data, January 1, 2017 to March 21, 2018

Date	Mean Air Temperature (°C)	Maximum Air Temperature (°C)	Minimum Air Temperature (°C)	Mean Relative Humidity (%)	Mean Wind Speed (m/s)	Maximum Wind Speed (m/s)	Mean Solar Radiation (W/m^2)	1-Hour Maximum Solar Radiation (W/m^2)	Mean Barometric Pressure at Station Elevation (kPa)	Mean Snow Depth (cm)	Total Precipitation (mm)	Total Rainfall (mm)	Total Snow-Water-Equivalent (mm)
1-Nov-17	-3.1	2.5	-8.9	84.1	2.8	10.6	13.1	64.6	89.9	3.1	5.5	0.0	5.5
2-Nov-17	-9.6	-6.8	-12.0	53.6	3.5	11.5	48.3	278.2	90.9	5.3	0.0	0.0	0.0
3-Nov-17	-10.3	-7.2	-15.3	63.6	0.7	4.1	48.7	217.1	90.5	4.6	0.8	0.0	0.8
4-Nov-17	-9.0	-7.1	-11.2	89.1	0.8	3.6	12.6	50.8	90.1	6.7	0.9	0.0	0.9
5-Nov-17	-9.8	-5.0	-13.4	82.5	0.9	3.1	28.0	151.6	90.5	5.9	0.0	0.0	0.0
6-Nov-17	-10.6	-7.9	-14.4	87.1	0.6	2.0	-	-	90.4	6.2	2.8	0.0	2.8
7-Nov-17	-6.4	-4.1	-8.3	91.1	1.1	6.6	-	-	90.4	15.2	8.7	0.0	8.7
8-Nov-17	-6.1	-4.6	-8.2	90.6	1.6	9.2	-	-	90.2	14.8	0.2	0.0	0.2
9-Nov-17	-7.2	-4.6	-10.1	92.4	0.6	2.4	-	-	89.4	13.8	0.0	0.0	0.0
10-Nov-17	-7.8	-4.0	-11.0	92.7	0.5	2.2	-	-	89.5	12.8	0.0	0.0	0.0
11-Nov-17	-3.8	-1.5	-7.6	96.8	0.7	3.1	-	-	89.4	15.1	5.4	0.0	5.4
12-Nov-17	-2.4	0.5	-6.8	96.2	0.9	3.8	-	-	89.3	19.6	0.7	0.0	0.7
13-Nov-17	-3.9	-3.1	-6.1	96.3	1.4	6.4	-	-	88.6	21.1	6.4	0.0	6.4
14-Nov-17	-5.0	-4.0	-6.1	96.3	1.2	6.1	-	-	89.1	26.6	5.2	0.0	5.2
15-Nov-17	-8.2	-6.1	-10.6	90.3	2.1	7.0	-	-	88.8	32.8	5.3	0.0	5.3
16-Nov-17	-11.8	-9.4	-15.9	88.6	0.6	2.8	-	-	88.8	30.9	0.0	0.0	0.0
17-Nov-17	-9.6	-4.8	-15.0	89.7	0.5	2.4	-	-	89.3	28.9	0.4	0.0	0.4
18-Nov-17	-2.6	-1.1	-4.8	97.2	-	3.0	-	-	89.0	39.8	33.1	0.0	33.1
19-Nov-17	-3.4	-0.9	-9.2	93.8	-	4.5	-	-	88.2	46.8	2.1	0.0	2.1
20-Nov-17	-8.0	-5.1	-10.5	91.0	0.7	4.0	-	-	89.3	43.8	0.0	0.0	0.0
21-Nov-17	-7.2	-5.4	-10.6	93.0	0.7	4.1	-	-	89.7	42.7	10.1	0.0	10.1
22-Nov-17	-3.5	1.3	-6.4	97.1	-	2.4	-	-	88.7	45.1	16.8	0.0	16.8
23-Nov-17	-0.4	1.9	-3.3	95.5	-	5.8	-	-	88.2	42.8	3.8	0.0	3.8
24-Nov-17	-2.7	0.3	-5.3	93.3	1.4	7.8	-	-	88.5	43.2	4.3	0.0	4.3
25-Nov-17	-3.6	-2.3	-5.2	96.0	0.4	2.6	-	-	89.1	46.5	5.7	0.0	5.7
26-Nov-17	-1.9	1.2	-3.5	95.0	1.3	7.6	-	-	87.6	56.2	10.5	0.0	10.5
27-Nov-17	-3.5	-1.6	-5.5	91.9	1.2	9.9	-	-	88.8	57.8	2.9	0.0	2.9
28-Nov-17	-2.2	-0.5	-3.8	97.1	1.0	5.3	-	-	88.4	60.4	1.2	0.0	1.2
29-Nov-17	-1.4	1.7	-4.1	86.2	1.7	10.5	-	-	89.4	-	0.0	0.0	0.0
30-Nov-17	-3.3	-0.8	-5.9	91.4	0.9	8.1	-	-	89.3	-	1.3	0.0	1.3

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Appendix 2-A. Tenas Deposit Meteorological Station Daily Data, January 1, 2017 to March 21, 2018

Date	Mean Air Temperature (°C)	Maximum Air Temperature (°C)	Minimum Air Temperature (°C)	Mean Relative Humidity (%)	Mean Wind Speed (m/s)	Maximum Wind Speed (m/s)	Mean Solar Radiation (W/m^2)	1-Hour Maximum Solar Radiation (W/m^2)	Mean Barometric Pressure at Station Elevation (kPa)	Mean Snow Depth (cm)	Total Precipitation (mm)	Total Rainfall (mm)	Total Snow-Water-Equivalent (mm)
1-Dec-17	-3.6	-1.3	-6.9	85.8	1.3	5.6	-	-	89.0	-	0.4	0.0	0.4
2-Dec-17	-7.5	-5.1	-10.8	87.8	1.0	3.7	-	-	89.7	-	0.0	0.0	0.0
3-Dec-17	-5.1	-1.7	-10.4	82.4	1.2	6.3	-	-	90.3	-	0.0	0.0	0.0
4-Dec-17	-0.7	1.9	-3.4	86.6	1.4	6.9	-	-	90.9	-	0.1	0.0	0.1
5-Dec-17	-1.3	1.8	-3.2	96.3	0.6	2.3	-	-	91.8	-	0.0	0.0	0.0
6-Dec-17	-4.2	-2.3	-6.4	97.1	0.4	2.1	-	-	92.1	-	0.0	0.0	0.0
7-Dec-17	-9.4	-5.7	-11.5	93.4	0.4	1.8	-	-	91.7	-	0.0	0.0	0.0
8-Dec-17	-10.0	-7.4	-12.2	91.7	0.3	1.4	-	-	91.2	-	0.0	0.0	0.0
9-Dec-17	-6.4	-2.2	-10.6	94.3	0.3	2.7	-	-	90.7	-	0.1	0.0	0.1
10-Dec-17	-1.5	0.2	-4.5	98.9	0.7	2.6	-	-	91.1	-	0.1	0.0	0.1
11-Dec-17	-1.7	0.5	-3.6	98.8	0.6	5.3	26.7	106.7	90.8	45.0	0.0	0.0	0.0
12-Dec-17	-0.3	3.4	-2.7	95.2	0.8	8.3	17.0	103.3	91.0	45.2	0.5	0.0	0.5
13-Dec-17	-1.2	0.7	-3.1	98.9	0.8	4.7	16.4	81.3	91.4	45.2	0.0	0.0	0.0
14-Dec-17	-0.4	2.2	-2.4	96.7	1.2	11.2	9.9	52.9	90.5	44.7	1.3	0.0	1.3
15-Dec-17	-2.4	0.0	-5.5	81.0	1.8	6.3	15.3	113.3	90.2	44.2	0.0	0.0	0.0
16-Dec-17	-2.3	1.5	-5.3	87.3	1.4	4.8	16.1	103.1	89.5	44.0	1.1	0.0	1.1
17-Dec-17	-2.3	0.8	-5.6	77.5	1.9	8.4	18.6	115.0	89.3	45.2	0.3	0.0	0.3
18-Dec-17	-5.0	-1.8	-6.7	80.6	1.0	4.7	12.8	93.2	89.8	44.8	0.1	0.0	0.1
19-Dec-17	-8.6	-5.5	-13.3	92.5	0.8	3.3	12.6	78.0	90.2	44.6	0.2	0.0	0.2
20-Dec-17	-11.0	-2.6	-15.4	87.5	0.7	6.0	12.1	73.7	90.6	44.3	0.0	0.0	0.0
21-Dec-17	-7.3	-2.6	-12.9	90.3	1.4	4.3	-	-	90.9	46.8	2.1	0.0	2.1
22-Dec-17	-14.7	-10.9	-17.3	87.7	0.7	3.4	-	-	91.4	47.4	0.0	0.0	0.0
23-Dec-17	-15.5	-12.1	-17.4	86.4	0.4	1.7	-	-	91.5	46.8	0.0	0.0	0.0
24-Dec-17	-18.2	-15.7	-20.0	85.1	0.9	3.1	-	-	91.0	46.7	0.0	0.0	0.0
25-Dec-17	-19.1	-16.1	-21.2	84.0	0.5	2.3	-	-	91.0	47.3	0.0	0.0	0.0
26-Dec-17	-18.4	-16.0	-22.6	85.4	0.4	2.3	-	-	90.6	48.5	1.3	0.0	1.3
27-Dec-17	-19.0	-16.1	-23.8	83.6	0.8	3.2	-	-	90.9	50.9	0.6	0.0	0.6
28-Dec-17	-20.5	-18.3	-24.9	80.8	1.8	8.2	-	-	90.6	50.8	0.9	0.0	0.9
29-Dec-17	-19.7	-18.8	-20.2	78.1	2.0	8.0	-	-	90.5	50.3	0.0	0.0	0.0
30-Dec-17	-20.9	-18.5	-23.4	79.3	0.6	2.1	-	-	90.5	50.1	0.0	0.0	0.0
31-Dec-17	-18.9	-17.1	-21.3	85.0	0.4	2.0	-	-	91.0	51.4	0.4	0.0	0.4

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Appendix 2-A. Tenas Deposit Meteorological Station Daily Data, January 1, 2017 to March 21, 2018

Date	Mean Air Temperature (°C)	Maximum Air Temperature (°C)	Minimum Air Temperature (°C)	Mean Relative Humidity (%)	Mean Wind Speed (m/s)	Maximum Wind Speed (m/s)	Mean Solar Radiation (W/m^2)	1-Hour Maximum Solar Radiation (W/m^2)	Mean Barometric Pressure at Station Elevation (kPa)	Mean Snow Depth (cm)	Total Precipitation (mm)	Total Rainfall (mm)	Total Snow-Water-Equivalent (mm)
1-Jan-18	-14.9	-9.4	-18.9	87.5	0.6	2.2	-	-	91.0	51.9	0.8	0.0	0.8
2-Jan-18	-9.5	-7.2	-13.2	91.5	0.6	3.1	-	-	91.1	51.5	0.0	0.0	0.0
3-Jan-18	-7.1	-4.8	-10.7	93.5	0.4	2.1	-	-	90.6	51.2	0.0	0.0	0.0
4-Jan-18	-4.1	-2.7	-6.2	95.6	0.7	2.7	-	-	89.8	51.1	2.6	0.0	2.6
5-Jan-18	-2.4	0.1	-4.3	95.0	0.9	5.9	-	-	89.4	51.0	1.6	0.0	1.6
6-Jan-18	-3.6	-1.3	-6.2	85.0	1.2	8.3	-	-	89.8	50.9	0.1	0.0	0.1
7-Jan-18	-2.9	-1.9	-3.7	95.8	0.7	3.9	-	-	89.2	52.6	5.0	0.0	5.0
8-Jan-18	-2.6	-0.1	-5.6	95.8	0.9	5.1	-	-	88.6	56.2	1.2	0.0	1.2
9-Jan-18	-8.2	-4.4	-14.5	91.5	1.0	4.0	-	-	88.8	56.4	0.5	0.0	0.5
10-Jan-18	-17.6	-14.5	-19.7	86.3	0.7	3.9	-	-	90.0	57.1	0.0	0.0	0.0
11-Jan-18	-22.0	-18.4	-24.7	79.9	0.6	2.3	-	-	90.3	57.0	0.0	0.0	0.0
12-Jan-18	-19.7	-16.8	-24.1	82.8	0.5	2.0	-	-	90.6	57.3	1.5	0.0	1.5
13-Jan-18	-13.7	-10.1	-17.1	88.8	0.5	2.3	-	-	90.8	57.7	1.3	0.0	1.3
14-Jan-18	-6.8	-4.2	-10.2	95.1	0.6	3.5	-	-	90.8	57.5	0.1	0.0	0.1
15-Jan-18	-3.6	-2.1	-4.8	96.0	0.7	5.4	-	-	90.1	57.5	0.5	0.0	0.5
16-Jan-18	-2.8	-1.4	-4.7	96.3	0.9	6.4	-	-	89.6	57.5	0.0	0.0	0.0
17-Jan-18	-3.6	-2.4	-5.3	97.3	0.9	4.2	-	-	88.7	60.7	6.5	0.0	6.5
18-Jan-18	-1.3	0.8	-2.9	98.0	0.7	2.7	-	-	88.1	63.4	0.7	0.0	0.7
19-Jan-18	-4.6	-1.1	-8.3	96.8	0.4	1.9	-	-	88.7	63.1	0.0	0.0	0.0
20-Jan-18	-5.7	-3.3	-8.9	95.3	0.4	2.1	-	-	88.7	63.8	3.6	0.0	3.6
21-Jan-18	-4.2	-1.2	-6.6	95.4	0.7	3.8	-	-	88.2	71.4	5.8	0.0	5.8
22-Jan-18	-5.6	-1.9	-8.4	90.6	1.1	8.2	-	-	89.4	71.0	0.0	0.0	0.0
23-Jan-18	-7.4	-6.1	-9.5	93.3	1.0	4.6	-	-	89.2	72.2	7.4	0.0	7.4
24-Jan-18	-6.1	-3.8	-8.3	94.4	0.7	2.8	-	-	88.6	76.8	4.0	0.0	4.0
25-Jan-18	-6.2	-3.4	-9.6	93.9	0.5	3.0	-	-	88.5	78.2	1.4	0.0	1.4
26-Jan-18	-7.5	-5.8	-8.5	93.5	0.6	2.8	-	-	89.6	77.0	0.3	0.0	0.3
27-Jan-18	-9.5	-6.7	-13.3	91.1	0.5	2.3	-	-	90.3	75.0	0.2	0.0	0.2
28-Jan-18	-12.5	-11.2	-15.1	89.1	1.2	5.9	-	-	90.2	76.9	4.3	0.0	4.3
29-Jan-18	-9.2	-4.3	-14.8	90.6	-	5.4	-	-	88.7	78.0	0.6	0.0	0.6
30-Jan-18	-5.0	-1.8	-8.7	92.8	-	6.3	-	-	88.7	76.4	0.2	0.0	0.2
31-Jan-18	-4.5	-2.6	-7.2	83.7	1.2	8.1	-	-	89.7	75.8	0.1	0.0	0.1

Dashes (-) indicate not enough data were not available or were erroneous. Underlined values indicate data that were gap-filled.

Appendix 2-A. Tenas Deposit Meteorological Station Daily Data, January 1, 2017 to March 21, 2018

Date	Mean Air Temperature (°C)	Maximum Air Temperature (°C)	Minimum Air Temperature (°C)	Mean Relative Humidity (%)	Mean Wind Speed (m/s)	Maximum Wind Speed (m/s)	Mean Solar Radiation (W/m^2)	1-Hour Maximum Solar Radiation (W/m^2)	Mean Barometric Pressure at Station Elevation (kPa)	Mean Snow Depth (cm)	Total Precipitation (mm)	Total Rainfall (mm)	Total Snow-Water-Equivalent (mm)
1-Feb-18	-7.4	-5.2	-10.1	92.8	0.6	3.2	-	-	89.9	75.9	7.2	0.0	7.2
2-Feb-18	-7.3	-2.6	-9.7	93.7	1.1	5.1	-	-	89.2	82.6	7.1	0.0	7.1
3-Feb-18	-13.4	-7.8	-16.1	87.8	1.3	6.2	-	-	90.8	86.7	7.5	0.0	7.5
4-Feb-18	-15.7	-14.5	-16.7	87.7	0.5	2.8	-	-	90.2	95.8	31.2	0.0	31.2
5-Feb-18	-14.2	-11.1	-16.4	88.7	0.3	2.2	-	-	90.5	99.0	0.5	0.0	0.5
6-Feb-18	-11.9	-10.3	-13.1	91.0	0.3	2.6	-	-	90.4	97.4	3.3	0.0	3.3
7-Feb-18	-9.5	-8.1	-11.5	91.9	0.4	3.4	-	-	90.0	107.1	65.0	0.0	65.0
8-Feb-18	-11.3	-8.7	-17.7	83.8	1.7	6.7	-	-	90.9	121.7	1.6	0.0	1.6
9-Feb-18	-16.6	-10.1	-20.1	84.1	0.5	2.1	-	-	91.4	117.3	0.0	0.0	0.0
10-Feb-18	-14.5	-7.9	-18.9	85.3	0.7	3.2	-	-	90.6	113.8	0.0	0.0	0.0
11-Feb-18	-15.7	-9.9	-19.9	83.9	1.1	4.1	-	-	90.7	110.7	0.0	0.0	0.0
12-Feb-18	-12.5	-3.1	-19.3	87.1	0.7	4.3	-	-	90.5	108.4	0.0	0.0	0.0
13-Feb-18	-2.1	-0.2	-3.9	90.7	2.2	9.0	-	-	89.2	108.0	4.4	0.0	4.4
14-Feb-18	-6.5	-2.2	-13.1	86.0	1.2	6.8	70.1	410.5	90.3	107.2	0.0	0.0	0.0
15-Feb-18	-9.6	-5.3	-14.5	88.9	0.7	3.2	37.3	188.5	90.4	105.1	0.0	0.0	0.0
16-Feb-18	-7.0	-2.9	-10.9	88.6	1.2	7.3	32.8	141.2	90.1	104.8	1.0	0.0	1.0
17-Feb-18	-10.3	-8.7	-14.9	84.5	2.5	9.9	33.7	172.1	89.9	103.6	0.3	0.0	0.3
18-Feb-18	-15.8	-10.1	-20.3	75.2	1.4	4.3	94.2	451.2	90.8	102.6	0.0	0.0	0.0
19-Feb-18	-16.9	-10.4	-21.0	77.5	0.7	2.4	65.3	301.4	90.4	101.2	0.0	0.0	0.0
20-Feb-18	-14.0	-8.3	-19.6	74.6	0.6	2.7	98.9	460.3	90.6	100.0	0.0	0.0	0.0
21-Feb-18	-8.7	-3.7	-12.7	76.3	1.4	5.5	71.8	429.1	90.5	99.5	0.0	0.0	0.0
22-Feb-18	-8.8	-3.4	-16.2	69.2	1.0	5.0	103.1	453.9	90.6	98.1	0.0	0.0	0.0
23-Feb-18	-3.1	2.2	-6.3	78.7	1.6	8.1	96.2	540.6	89.2	98.3	0.6	0.0	0.6
24-Feb-18	-4.2	-1.0	-6.8	77.5	1.8	7.1	65.2	293.9	88.8	97.9	0.7	0.0	0.7
25-Feb-18	-4.3	0.2	-7.4	71.2	1.8	6.7	84.6	439.2	88.4	97.7	0.0	0.0	0.0
26-Feb-18	-3.7	-0.3	-7.8	71.0	2.2	10.5	71.6	323.6	89.1	97.0	0.3	0.0	0.3
27-Feb-18	-3.2	0.1	-6.3	71.5	2.3	9.3	82.7	333.5	88.9	96.5	0.2	0.0	0.2
28-Feb-18	-6.0	-4.3	-9.8	89.6	2.1	10.1	-	-	88.6	106.5	19.6	0.0	19.6

Dashes (-) indicate not enough data were not available or were erroneous. Underlined values indicate data that were gap-filled.

Appendix 2-A. Tenas Deposit Meteorological Station Daily Data, January 1, 2017 to March 21, 2018

Date	Mean Air Temperature (°C)	Maximum Air Temperature (°C)	Minimum Air Temperature (°C)	Mean Relative Humidity (%)	Mean Wind Speed (m/s)	Maximum Wind Speed (m/s)	Mean Solar Radiation (W/m^2)	1-Hour Maximum Solar Radiation (W/m^2)	Mean Barometric Pressure at Station Elevation (kPa)	Mean Snow Depth (cm)	Total Precipitation (mm)	Total Rainfall (mm)	Total Snow-Water-Equivalent (mm)
1-Mar-18	-7.6	-4.8	-11.0	89.6	3.3	10.6	55.8	288.9	89.1	144.5	16.2	0.0	16.2
2-Mar-18	-10.3	-8.8	-11.8	76.5	2.2	9.5	61.2	262.2	89.9	141.0	0.8	0.0	0.8
3-Mar-18	-11.7	-9.6	-14.9	73.1	1.6	7.2	92.3	496.4	90.4	133.9	0.0	0.0	0.0
4-Mar-18	-13.0	-6.8	-19.7	73.7	1.0	3.5	138.6	534.3	90.5	128.8	0.0	0.0	0.0
5-Mar-18	-9.6	-4.4	-14.5	78.2	0.9	3.5	119.7	494.6	90.7	124.3	0.0	0.0	0.0
6-Mar-18	-8.2	-2.2	-13.8	72.9	1.1	3.2	118.9	457.7	90.8	120.6	0.0	0.0	0.0
7-Mar-18	-9.1	-2.1	-14.5	79.4	1.0	3.2	142.6	541.8	90.2	117.7	0.0	0.0	0.0
8-Mar-18	-7.5	-3.1	-12.1	82.8	1.0	4.1	88.2	378.6	88.8	115.9	0.8	0.0	0.8
9-Mar-18	-4.6	2.4	-11.8	72.0	1.2	5.0	93.0	376.5	89.3	114.7	0.0	0.0	0.0
10-Mar-18	-1.2	4.7	-5.5	71.3	1.3	6.7	112.3	537.7	90.1	112.2	0.0	0.0	0.0
11-Mar-18	-1.2	6.1	-7.9	73.1	0.7	2.5	122.5	437.0	90.5	109.9	0.0	0.0	0.0
12-Mar-18	0.6	7.4	-4.0	69.7	0.9	3.2	128.7	556.0	90.3	108.7	0.0	0.0	0.0
13-Mar-18	1.7	7.7	-3.8	65.1	1.6	9.4	131.5	474.8	89.5	107.2	0.0	0.0	0.0
14-Mar-18	2.1	6.3	-0.7	71.3	1.1	4.7	85.8	381.8	89.1	105.2	0.5	0.5	0.0
15-Mar-18	1.1	5.4	-3.7	67.9	1.5	5.0	142.0	603.7	89.6	103.1	0.0	0.0	0.0
16-Mar-18	0.1	4.1	-4.4	74.8	1.1	4.0	120.0	460.7	89.8	102.2	0.0	0.0	0.0
17-Mar-18	1.7	4.3	-1.4	77.3	1.1	5.2	68.8	226.2	89.8	101.4	0.1	0.1	0.0
18-Mar-18	1.9	8.3	-4.3	60.8	1.5	7.6	171.0	609.0	90.3	100.1	0.0	0.0	0.0
19-Mar-18	2.0	5.6	-0.7	64.9	2.5	10.0	119.6	561.3	90.2	98.9	0.1	0.1	0.0
20-Mar-18	0.2	5.2	-2.4	73.9	1.5	8.2	115.7	410.6	89.5	97.4	0.8	0.1	0.7
21-Mar-18	-0.7	4.3	-4.6	78.5	2.2	8.8	138.9	652.7	89.0	97.3	2.8	0.0	2.8

Dashes (-) indicate not enough data were not available or were erroneous. Underlined values indicate data that were gap-filled.

Appendix 3-A

Dustfall Laboratory Analysis Results

DRAFT

ERM Consultants Canada Ltd.
ATTN: Daniel Casanova
1500-1111 West Hastings Street
Vancouver BC V6E 2J3

Date Received: 20-OCT-17
Report Date: 31-OCT-17 11:41 (MT)
Version: FINAL

Client Phone: 604-689-9460

Certificate of Analysis

Lab Work Order #: L2010563

Project P.O. #: NOT SUBMITTED
Job Reference: 0403488-0007
C of C Numbers: 17-677666
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

Sample ID	L2010563-1	L2010563-2	L2010563-3	L2010563-4	
Description	DUSTFALL	DUSTFALL	DUSTFALL	DUSTFALL	
Sampled Date	18-OCT-17	18-OCT-17	18-OCT-17	16-OCT-17	
Sampled Time	16:15	15:10	10:15	12:26	
Client ID	DF-RAIL	DF-KERR	DF-TELKWA	DF-TENAS DEP	
Grouping / **Analyte**					
DUSTFALL					
Particulates					
Total Dustfall (mg/dm2.day)	<0.21	1.71	0.80	0.47	
Total Insoluble Dustfall (mg/dm2.day)	<0.21	0.24	0.53	<0.18	
Total Soluble Dustfall (mg/dm2.day)	<0.21	1.47	0.26	0.37	
Anions and Nutrients					
Ammonia, Total (as N) (mg/dm2.day)	<0.0020	0.0033	<0.0013	0.0031	
Chloride (Cl) (mg/dm2.day)	<0.35 DLB	<0.26 DLB	<0.22 DLB	<0.25 DLB	
Nitrate (as N) (mg/dm2.day)	<0.0022	<0.00093	<0.0014	<0.00088	
Sulfate (SO4) (mg/dm2.day)	<0.025	0.032	<0.016	<0.018	
Metals					
Aluminum (Al)-Total (mg/dm2.day)	0.00172	<0.00096 DLB	0.00203	<0.00082 DLB	
Antimony (Sb)-Total (mg/dm2.day)	<0.0000046	<0.0000036	<0.0000029	<0.0000031	
Arsenic (As)-Total (mg/dm2.day)	<0.0000046	<0.0000036	<0.0000029	<0.0000031	
Barium (Ba)-Total (mg/dm2.day)	0.0000399	0.0000255	0.0000687	0.0000196	
Beryllium (Be)-Total (mg/dm2.day)	<0.000023	<0.000018	<0.000014	<0.000015	
Bismuth (Bi)-Total (mg/dm2.day)	<0.000023	<0.000018	<0.000014	<0.000015	
Boron (B)-Total (mg/dm2.day)	<0.00046	<0.00036	<0.00029	<0.00031	
Cadmium (Cd)-Total (mg/dm2.day)	<0.0000023	<0.0000018	<0.0000014	<0.0000015	
Calcium (Ca)-Total (mg/dm2.day)	<0.0092 DLB	<0.0085 DLB	0.0140	<0.0098 DLB	
Chromium (Cr)-Total (mg/dm2.day)	<0.000023	<0.000018	<0.000014	<0.000015	
Cobalt (Co)-Total (mg/dm2.day)	<0.0000046	<0.0000036	<0.0000029	<0.0000031	
Copper (Cu)-Total (mg/dm2.day)	0.0017 DLB	0.00221	<0.00060 DLB	0.00272	
Iron (Fe)-Total (mg/dm2.day)	0.0021	<0.0011	0.00183	<0.00092	
Lead (Pb)-Total (mg/dm2.day)	0.0000057	0.0000064	0.0000029	0.0000078	
Lithium (Li)-Total (mg/dm2.day)	<0.00023	<0.00018	<0.00014	<0.00015	
Magnesium (Mg)-Total (mg/dm2.day)	0.00191	0.00220	0.00274	0.00105	
Manganese (Mn)-Total (mg/dm2.day)	0.000132	0.0000987	0.000208	0.0000929	
Mercury (Hg)-Total (mg/dm2.day)	<0.0000023	<0.0000018	<0.0000014	<0.0000015	
Molybdenum (Mo)-Total (mg/dm2.day)	<0.0000023	<0.0000018	<0.0000014	<0.0000015	
Nickel (Ni)-Total (mg/dm2.day)	<0.000023	<0.000018	<0.000014	0.000023	
Phosphorus (P)-Total (mg/dm2.day)	0.0032	0.0118	0.0081	0.0040	
Potassium (K)-Total (mg/dm2.day)	0.0043	0.0208	0.0187	0.0107	
Selenium (Se)-Total (mg/dm2.day)	<0.000046	<0.000036	<0.000029	<0.000031	
Silicon (Si)-Total (mg/dm2.day)	0.0029	<0.0018	0.0042	<0.0015	
Silver (Ag)-Total (mg/dm2.day)	<0.00000046	<0.00000036	<0.00000029	<0.00000031	
Sodium (Na)-Total (mg/dm2.day)	<0.0046 DLB	<0.0071 DLB	<0.0086 DLB	<0.0061 DLB	
Strontium (Sr)-Total (mg/dm2.day)	0.0000171	0.0000201	0.0000551	0.0000131	
Thallium (Tl)-Total (mg/dm2.day)	<0.0000046	<0.0000036	<0.0000029	<0.0000031	
Tin (Sn)-Total (mg/dm2.day)	<0.0000046	<0.0000036	<0.0000029	<0.0000031	
Titanium (Ti)-Total (mg/dm2.day)	<0.00046	<0.00036	<0.00029	<0.00031	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L2010563-1	L2010563-2	L2010563-3	L2010563-4	
	Description	DUSTFALL	DUSTFALL	DUSTFALL	DUSTFALL	
	Sampled Date	18-OCT-17	18-OCT-17	18-OCT-17	16-OCT-17	
	Sampled Time	16:15	15:10	10:15	12:26	
	Client ID	DF-RAIL	DF-KERR	DF-TELKWA	DF-TENAS DEP	
Grouping	**Analyte**					
DUSTFALL						
Metals	Uranium (U)-Total (mg/dm2.day)	<0.00000046	<0.00000036	<0.00000029	0.00000074	
	Vanadium (V)-Total (mg/dm2.day)	<0.000046 DLB	<0.000036 DLB	<0.000029 DLB	<0.000031 DLB	
	Zinc (Zn)-Total (mg/dm2.day)	<0.00028	<0.00032	<0.00026	<0.00037	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Manganese (Mn)-Total	B	L2010563-1, -2, -3, -4
Method Blank	Aluminum (Al)-Total	MB-LOR	L2010563-1, -2, -3, -4
Method Blank	Calcium (Ca)-Total	MB-LOR	L2010563-1, -2, -3, -4
Method Blank	Copper (Cu)-Total	MB-LOR	L2010563-1, -2, -3, -4
Method Blank	Sodium (Na)-Total	MB-LOR	L2010563-1, -2, -3, -4
Method Blank	Zinc (Zn)-Total	MB-LOR	L2010563-1, -2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CL-IC-VA	Dustfall	Dustfall Chloride by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The chloride analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

DUSTFALLS-COM-DM2-VA	Dustfall	Combined Dustfalls-Total, soluble, insol	BCMOE PARTICULATE

This analysis is carried out using procedures modified from British Columbia Environmental Manual "Particulate."
Particulates or Dustfall are determined gravimetrically. Total Insoluble Dustfall is determined by filtering a sample through a 0.45 um membrane filter and drying the filter at 104 degrees celsius. Total Soluble Dustfall is determined by evaporating the filtrate to dryness at 104 degrees celsius. The Total Dustfall is the sum of Insoluble Dustfall and the Soluble Dustfall.

HG-DUST(DM2-CVAFS-VA	Dustfall	Total Mercury in Dustfalls by CVAFS	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-DUST(DM2)-MS-VA	Dustfall	Total Metals in Dustfalls by ICPMS	EPA 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

NH3-F-VA	Dustfall	Dustfall Ammonia by Fluorescence	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The ammonia analysis is specifcially carried out using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

Results are reported in units of nitrogen weight. To convert to units by weight of ammonium, multiply by 1.29.

NO3-IC-VA	Dustfall	Dustfall Nitrate by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The nitrate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

Results are reported in units of nitrogen weight. To convert to units by weight of nitrate, multiply by 4.43.

SO4-IC-VA	Dustfall	Dustfall Sulfate by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The sulfate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Reference Information

VA ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

17-677666

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

DRAFT

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2010563-COFC

COC Number: 17 - 677666

Page | of |

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	ERM	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Daniel Casanova	Quality Control (QC) Report with Report ☑ YES ☐ NO	PRIORITY (Business Days): 4 day [P4-20%] ☐ / 3 day [P3-25%] ☐ / 2 day [P2-50%] ☐ — EMERGENCY: 1 Business day [E-100%] ☐ / Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] ☐
Phone:	250-827-7838	☐ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Street:	3790 Alfred Ave	Email 1 or Fax daniel.casanova@erm.com	[redacted] Date and Time Required for all E&P TATs: [redacted] dd-mmm-yy hh:mm
City/Province:	Smithers BC	Email 2 andres.sousa@erm.com	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	V0J 2N0	Email 3	
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax daniel.casanova@erm.com	
Contact:		Email 2 Fonna_houghton@erm.com	

Project Information		[redacted] Oil and Gas Required Fields (client use) [redacted]	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	0403488-0007	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only): [redacted]		ALS Contact: A. Springer	Sampler: D. Casanova

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	end Date (dd-mmm-yy)	end Time (hh:mm)	Sample Type	Total Particulate	Soluble Particulate	Insoluble Particulate	Sulphate	Nitrate	NH3, NH4	Cl	Total Metals	Mg+	Ca+	K+	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
[redacted]	DF-Rail start: Oct 4 15:30	18-Oct-17	16:15	Dustfall	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			2
[redacted]	DF-Kerr " Sept. 29 9:55	18-Oct-17	15:10	↓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			2
[redacted]	DF-Telkwa " ~~Oct~~ Sept 25 14:40	18-Oct-17	10:15		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			2
[redacted]	DF-Tenas Dep " Sept 29 16:20	16-Oct-17	12:26	↓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			2
[redacted]																		
[redacted]																		
[redacted]																		
[redacted]																		
[redacted]																		
[redacted]																		
[redacted]																		

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human consumption/ use? ☐ YES ☐ NO	

[redacted] SAMPLE CONDITION AS RECEIVED (lab use only) [redacted]

Frozen ☐	SIF Observations	Yes ☐	No ☐
Ice Packs ☐	Ice Cubes ☐	Custody seal intact	Yes ☐ No ☐
Cooling Initiated ☐			

[redacted] INITIAL COOLER TEMPERATURES °C [redacted]				[redacted] FINAL COOLER TEMPERATURES °C [redacted]			
[redacted]	[redacted]	[redacted]	[redacted]	15	17	13	24

SHIPMENT RELEASE (client use)			[redacted] INITIAL SHIPMENT RECEPTION (lab use only) [redacted]			[redacted] FINAL SHIPMENT RECEPTION (lab use only) [redacted]		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
Daniel Casanova	Oct. 18 '17		[redacted]	[redacted]	[redacted]	Christed	OCT 20 2017	10:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JULY 2017 FRONT

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

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

White Paper Co. 604 951-3900

DRAFT

ERM Consultants Canada Ltd.
ATTN: Daniel Casanova
1500-1111 West Hastings Street
Vancouver BC V6E 2J3

Date Received: 29-NOV-17
Report Date: 18-DEC-17 14:17 (MT)
Version: FINAL

Client Phone: 604-689-9460

Certificate of Analysis

Lab Work Order #: L2028727

Project P.O. #: NOT SUBMITTED
Job Reference: 0403488-0007
C of C Numbers: 15-587287
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

	Sample ID	L2028727-1	L2028727-2	L2028727-3		
	Description	DUSTFALL	DUSTFALL	DUSTFALL		
	Sampled Date	22-NOV-17	22-NOV-17	22-NOV-17		
	Sampled Time	12:49	11:47	10:35		
	Client ID	DF-RAIL START: OCT 18 16:15	DF-KERR START: OCT 18 15:10	DF-TELKWA START: OCT 18 10:15		
Grouping	**Analyte**					
DUSTFALL						
Particulates	Total Dustfall (mg/dm2.day)	0.16	0.40	0.28		
	Total Insoluble Dustfall (mg/dm2.day)	<0.10	0.10	0.11		
	Total Soluble Dustfall (mg/dm2.day)	0.13	0.30	0.17		
Anions and Nutrients	Ammonia, Total (as N) (mg/dm2.day)	<0.0018	0.0026	<0.0019		
	Chloride (Cl) (mg/dm2.day)	<0.31	<0.34	<0.34		
	Nitrate (as N) (mg/dm2.day)	<0.0031 DLB	<0.0017 DLB	<0.0019 DLB		
	Sulfate (SO4) (mg/dm2.day)	<0.022	<0.024	<0.024		
Metals	Aluminum (Al)-Total (mg/dm2.day)	0.00363	0.00144	0.00342		
	Antimony (Sb)-Total (mg/dm2.day)	<0.0000096 DLB	<0.0000048	<0.0000048		
	Arsenic (As)-Total (mg/dm2.day)	<0.0000048	<0.0000048	<0.0000048		
	Barium (Ba)-Total (mg/dm2.day)	0.0000905	0.000231	0.0000673		
	Beryllium (Be)-Total (mg/dm2.day)	<0.000024	<0.000024	<0.000024		
	Bismuth (Bi)-Total (mg/dm2.day)	<0.000024	<0.000024	<0.000024		
	Boron (B)-Total (mg/dm2.day)	<0.00048	<0.00048	<0.00048		
	Cadmium (Cd)-Total (mg/dm2.day)	<0.0000024	<0.0000024	<0.0000024		
	Calcium (Ca)-Total (mg/dm2.day)	<0.0067 DLB	0.0141	<0.0058 DLB		
	Chromium (Cr)-Total (mg/dm2.day)	<0.000024	<0.000024	<0.000024		
	Cobalt (Co)-Total (mg/dm2.day)	<0.0000048	<0.0000048	<0.0000048		
	Copper (Cu)-Total (mg/dm2.day)	0.00119	0.000298	0.00111		
	Iron (Fe)-Total (mg/dm2.day)	0.0047	<0.0014	0.0031		
	Lead (Pb)-Total (mg/dm2.day)	0.0000144	0.0000031	0.0000039		
	Lithium (Li)-Total (mg/dm2.day)	<0.00024	<0.00024	<0.00024		
	Magnesium (Mg)-Total (mg/dm2.day)	0.00173	0.00195	0.00179		
	Manganese (Mn)-Total (mg/dm2.day)	0.000213	0.00102	0.000199		
	Mercury (Hg)-Total (mg/dm2.day)	<0.0000024	<0.0000024	<0.0000024		
	Molybdenum (Mo)-Total (mg/dm2.day)	<0.0000024	<0.0000024	<0.0000024		
	Nickel (Ni)-Total (mg/dm2.day)	<0.000024	<0.000024	<0.000024		
	Phosphorus (P)-Total (mg/dm2.day)	<0.0024	<0.0024	0.0055		
	Potassium (K)-Total (mg/dm2.day)	<0.0024	0.0043	0.0075		
	Selenium (Se)-Total (mg/dm2.day)	<0.000048	<0.000048	<0.000048		
	Silicon (Si)-Total (mg/dm2.day)	0.0060	0.0027	0.0062		
	Silver (Ag)-Total (mg/dm2.day)	<0.00000048	<0.00000048	<0.00000048		
	Sodium (Na)-Total (mg/dm2.day)	0.0036	<0.0024	0.0040		
	Strontium (Sr)-Total (mg/dm2.day)	0.0000205	0.0000803	0.0000304		
	Thallium (Tl)-Total (mg/dm2.day)	<0.0000048	<0.0000048	<0.0000048		
	Tin (Sn)-Total (mg/dm2.day)	<0.0000048	<0.0000048	<0.0000048		
	Titanium (Ti)-Total (mg/dm2.day)	<0.00048	<0.00048	<0.00048		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L2028727-1	L2028727-2	L2028727-3		
	Description	DUSTFALL	DUSTFALL	DUSTFALL		
	Sampled Date	22-NOV-17	22-NOV-17	22-NOV-17		
	Sampled Time	12:49	11:47	10:35		
	Client ID	DF-RAIL START: OCT 18 16:15	DF-KERR START: OCT 18 15:10	DF-TELKWA START: OCT 18 10:15		
Grouping	**Analyte**					
DUSTFALL						
Metals	Uranium (U)-Total (mg/dm2.day)	<0.00000048	<0.00000048	<0.00000048		
	Vanadium (V)-Total (mg/dm2.day)	<0.000048	<0.000048	<0.000048		
	Zinc (Zn)-Total (mg/dm2.day)	0.00040	0.00027	0.00022		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Antimony (Sb)-Total	MB-LOR	L2028727-1, -2, -3
Method Blank	Calcium (Ca)-Total	MB-LOR	L2028727-1, -2, -3

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CL-IC-VA	Dustfall	Dustfall Chloride by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The chloride analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

DUSTFALLS-COM-DM2-VA	Dustfall	Combined Dustfalls-Total, soluble, insol	BCMOE PARTICULATE

This analysis is carried out using procedures modified from British Columbia Environmental Manual "Particulate."
Particulates or Dustfall are determined gravimetrically. Total Insoluble Dustfall is determined by filtering a sample through a 0.45 um membrane filter and drying the filter at 104 degrees celsius. Total Soluble Dustfall is determined by evaporating the filtrate to dryness at 104 degrees celsius. The Total Dustfall is the sum of Insoluble Dustfall and the Soluble Dustfall.

HG-DUST(DM2-CVAFS-VA	Dustfall	Total Mercury in Dustfalls by CVAFS	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-DUST(DM2)-MS-VA	Dustfall	Total Metals in Dustfalls by ICPMS	EPA 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

NH3-F-VA	Dustfall	Dustfall Ammonia by Fluorescence	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The ammonia analysis is specifcially carried out using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

Results are reported in units of nitrogen weight. To convert to units by weight of ammonium, multiply by 1.29.

NO3-IC-VA	Dustfall	Dustfall Nitrate by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The nitrate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

Results are reported in units of nitrogen weight. To convert to units by weight of nitrate, multiply by 4.43.

SO4-IC-VA	Dustfall	Dustfall Sulfate by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The sulfate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

15-587287

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

DRAFT

L2028727-COFC

Canada Toll Free: 1 800 668 9878

COC Number: 15 - 587287

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	ERM
Contact:	Dan Casciano
Phone:	250-877-7838
	Company address below will appear on the final report
Street:	3790 Alfred Ave
City/Province:	Smithers BC
Postal Code:	V0J 2N0

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	daniel.cascianova@erm.com
Email 2	~~andres~~ andres.sant@erm.com
Email 3	

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To		
	Same as Report To	☑ YES ☐ NO
	Copy of Invoice with Report	☑ YES ☐ NO
Company:		
Contact:		

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	daniel.cascianova@erm.com
Email 2	katrina.houghton@erm.com

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	0403488-0007	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Springer	Sampler: Dan Casciano

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	end Date (dd-mmm-yy)	end Time (hh:mm)	Sample Type	Total Particulates	Soluble Particulate	Insoluble Particulates	Sulphate	Nitrate	NH_3, NH_4	Cl	Total Metals	Mg^+	Ca^+	K^+	Number of Containers
	DF-Rail Start: Oct 18 16:15	22-Nov-17	12:49	Dustfall	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
	DF-Kerr " Oct 18 15:10	22-Nov-17	11:47	"	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
	DF-Telkwa " Oct 18 10:15	22-Nov-17	10:35	"	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	-Bottles had Alcohol or Algaecide from ALS
Are samples for human drinking water use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			5		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: C Hall	Date: Nov 26/17	Time:	Received by:	Date:	Time:	Received by: A JC	Date: 11/29/17	Time: 11:15

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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OCTOBER 2015 FRONT

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

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

DRAFT

ERM Consultants Canada Ltd.
ATTN: Daniel Casanova
1500-1111 West Hastings Street
Vancouver BC V6E 2J3

Date Received: 30-NOV-17
Report Date: 13-DEC-17 11:03 (MT)
Version: FINAL

Client Phone: 604-689-9460

Certificate of Analysis

Lab Work Order #: L2029324

Project P.O. #: NOT SUBMITTED
Job Reference: 0403488-0007
C of C Numbers: 10-385511
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

	Sample ID	L2029324-1				
	Description	Dustfall				
	Sampled Date	28-NOV-17				
	Sampled Time	12:45				
	Client ID	DF-TENAS DEP/START OCT 16 12:25				
Grouping	**Analyte**					
DUSTFALL						
Particulates	Total Dustfall (mg/dm2.day)	0.32				
	Total Insoluble Dustfall (mg/dm2.day)	<0.10				
	Total Soluble Dustfall (mg/dm2.day)	0.32				
Anions and Nutrients	Ammonia, Total (as N) (mg/dm2.day)	<0.0020				
	Chloride (Cl) (mg/dm2.day)	<0.36				
	Nitrate (as N) (mg/dm2.day)	0.00187				
	Sulfate (SO4) (mg/dm2.day)	<0.025				
Metals	Aluminum (Al)-Total (mg/dm2.day)	0.00063				
	Antimony (Sb)-Total (mg/dm2.day)	<0.0000051				
	Arsenic (As)-Total (mg/dm2.day)	<0.0000051				
	Barium (Ba)-Total (mg/dm2.day)	0.0000145				
	Beryllium (Be)-Total (mg/dm2.day)	<0.000025				
	Bismuth (Bi)-Total (mg/dm2.day)	<0.000025				
	Boron (B)-Total (mg/dm2.day)	<0.00051				
	Cadmium (Cd)-Total (mg/dm2.day)	<0.0000025				
	Calcium (Ca)-Total (mg/dm2.day)	<0.0030 DLB				
	Chromium (Cr)-Total (mg/dm2.day)	<0.000025				
	Cobalt (Co)-Total (mg/dm2.day)	<0.0000051				
	Copper (Cu)-Total (mg/dm2.day)	0.000119				
	Iron (Fe)-Total (mg/dm2.day)	<0.0015				
	Lead (Pb)-Total (mg/dm2.day)	<0.0000025				
	Lithium (Li)-Total (mg/dm2.day)	<0.00025				
	Magnesium (Mg)-Total (mg/dm2.day)	0.00034				
	Manganese (Mn)-Total (mg/dm2.day)	0.0000508				
	Mercury (Hg)-Total (mg/dm2.day)	<0.0000025				
	Molybdenum (Mo)-Total (mg/dm2.day)	<0.0000025				
	Nickel (Ni)-Total (mg/dm2.day)	<0.000025				
	Phosphorus (P)-Total (mg/dm2.day)	<0.0025				
	Potassium (K)-Total (mg/dm2.day)	<0.0025				
	Selenium (Se)-Total (mg/dm2.day)	<0.000051				
	Silicon (Si)-Total (mg/dm2.day)	<0.0025				
	Silver (Ag)-Total (mg/dm2.day)	<0.00000051				
	Sodium (Na)-Total (mg/dm2.day)	<0.0025				
	Strontium (Sr)-Total (mg/dm2.day)	0.0000066				
	Thallium (Tl)-Total (mg/dm2.day)	<0.0000051				
	Tin (Sn)-Total (mg/dm2.day)	<0.0000051				
	Titanium (Ti)-Total (mg/dm2.day)	<0.00051				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L2029324-1				
	Description	Dustfall				
	Sampled Date	28-NOV-17				
	Sampled Time	12:45				
	Client ID	DF-TENAS DEP/START OCT 16 12:25				
Grouping	**Analyte**					
DUSTFALL						
Metals	Uranium (U)-Total (mg/dm2.day)	<0.00000051				
	Vanadium (V)-Total (mg/dm2.day)	<0.000051				
	Zinc (Zn)-Total (mg/dm2.day)	<0.00015				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

DRAFT

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Calcium (Ca)-Total	MB-LOR	L2029324-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CL-IC-VA	Dustfall	Dustfall Chloride by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The chloride analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

DUSTFALLS-COM-DM2-VA	Dustfall	Combined Dustfalls-Total, soluble, insol	BCMOE PARTICULATE

This analysis is carried out using procedures modified from British Columbia Environmental Manual "Particulate."
Particulates or Dustfall are determined gravimetrically. Total Insoluble Dustfall is determined by filtering a sample through a 0.45 um membrane filter and drying the filter at 104 degrees celsius. Total Soluble Dustfall is determined by evaporating the filtrate to dryness at 104 degrees celsius. The Total Dustfall is the sum of Insoluble Dustfall and the Soluble Dustfall.

HG-DUST(DM2-CVAFS-VA	Dustfall	Total Mercury in Dustfalls by CVAFS	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-DUST(DM2)-MS-VA	Dustfall	Total Metals in Dustfalls by ICPMS	EPA 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

NH3-F-VA	Dustfall	Dustfall Ammonia by Fluorescence	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The ammonia analysis is specifcially carried out using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

Results are reported in units of nitrogen weight. To convert to units by weight of ammonium, multiply by 1.29.

NO3-IC-VA	Dustfall	Dustfall Nitrate by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The nitrate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

Results are reported in units of nitrogen weight. To convert to units by weight of nitrate, multiply by 4.43.

SO4-IC-VA	Dustfall	Dustfall Sulfate by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The sulfate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

10-385511

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

L2029324-COFC

DRAFT

10- 385511

ALS Enuil

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

Page 1 of 1

Report To	Report Format / Distribution	Service Request: (Rush subject to availability - Contact ALS to confirm TAT)
Company: ERM	Standard: ✓ Other (specify):	✓ Regular (Standard Turnaround Times - Business Days)
Contact: Dan Casanova	Select: PDF ✓ Excel ✓ Digital Fax	Priority(2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT
Address: 3790 Alfred Ave. Smithers BC, V0J 2N0	Email 1: daniel.casanova@erm.com	Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT
Phone: Fax:	Email 2: andres.soux@erm.com	Same Day or Weekend Emergency - Contact ALS to confirm TAT
	korina.houghton@erm.com	
Invoice To Same as Report ? (circle) Yes or No (if No, provide details)	**Client / Project Information**	**Analysis Request**
Copy of Invoice with Report? (circle) Yes or No	Job #: 0403488-0007	(Indicate Filtered or Preserved, F/P)
Company:	PO / AFE:	
Contact:	LSD:	
Address:		
Phone: Fax:	Quote #:	
Lab Work Order # (lab use only)	**ALS Contact:** A. Springer **Sampler:** C. Hall	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Particulates	Soluble Particulates	Insoluble Particulates	Sulphate	Nitrate	NH_3, NH_4	Cl	Total Metals	Mg^+	Ca^+	K^+		Number of Containers
	DF-Tenas Dep Start Oct 16 12:25	28-11-17	12:45	Dustfall	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		2

Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details

Bottles had alcohol or algaecide from ALS

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date:	Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
C. Hall	Nov 29/17		Cade	Nov 30	1130	-1.6 °C				

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION | WHITE - LABORATORY COPY | YELLOW - CLIENT COPY | GENF 18.01 Front

DRAFT

ERM Consultants Canada Ltd.
ATTN: Daniel Casanova
1500-1111 West Hastings Street
Vancouver BC V6E 2J3

Date Received: 18-DEC-17
Report Date: 08-JAN-18 13:56 (MT)
Version: FINAL

Client Phone: 604-689-9460

Certificate of Analysis

Lab Work Order #: L2036519

Project P.O. #: NOT SUBMITTED
Job Reference: 0403488-0007
C of C Numbers: 15-603878
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

Sample ID	L2036519-1	L2036519-2	L2036519-3	L2036519-4	
Description	Dustfall	Dustfall	Dustfall	Dustfall	
Sampled Date	15-DEC-17	15-DEC-17	15-DEC-17	14-DEC-17	
Sampled Time	09:43	11:22	11:44	09:50	
Client ID	DF-RAIL	DF-KERR	DF-TELKWA	DF-TENAS DEP'	
Grouping / **Analyte**					
DUSTFALL					
Particulates					
Total Dustfall (mg/dm2.day)	<0.13	0.19	0.27	<0.13	
Total Insoluble Dustfall (mg/dm2.day)	<0.13	<0.13	<0.13	<0.13	
Total Soluble Dustfall (mg/dm2.day)	<0.13	0.15	0.24	<0.13	
Anions and Nutrients					
Ammonia, Total (as N) (mg/dm2.day)	<0.0013	<0.0015	0.0014	<0.00090	
Chloride (Cl) (mg/dm2.day)	<0.23	<0.26	<0.21	<0.16	
Nitrate (as N) (mg/dm2.day)	<0.0010 DLB	<0.00075 DLB	<0.0012 DLB	<0.00045 DLB	
Sulfate (SO4) (mg/dm2.day)	<0.017	<0.019	<0.015	<0.011	
Metals					
Aluminum (Al)-Total (mg/dm2.day)	0.000692	0.00391	<0.00092 DLB	<0.00094 DLB	
Antimony (Sb)-Total (mg/dm2.day)	<0.0000032	<0.0000038	<0.0000031	<0.0000031	
Arsenic (As)-Total (mg/dm2.day)	<0.0000032	<0.0000076 DLB	<0.0000031	<0.0000063 DLB	
Barium (Ba)-Total (mg/dm2.day)	0.0000107	0.0000226	0.0000176	0.0000104	
Beryllium (Be)-Total (mg/dm2.day)	<0.000016	<0.000019	<0.000015	<0.000016	
Bismuth (Bi)-Total (mg/dm2.day)	<0.000016	<0.000019	<0.000015	<0.000016	
Boron (B)-Total (mg/dm2.day)	<0.00032	<0.00038	<0.00031	<0.00031	
Cadmium (Cd)-Total (mg/dm2.day)	<0.0000016	<0.0000019	<0.0000015	<0.0000016	
Calcium (Ca)-Total (mg/dm2.day)	<0.0064 DLB	<0.0076 DLB	<0.0031 DLB	<0.0016 DLB	
Chromium (Cr)-Total (mg/dm2.day)	<0.000016	<0.000019	<0.000015	<0.000016	
Cobalt (Co)-Total (mg/dm2.day)	<0.0000032	<0.0000038	<0.0000031	<0.0000031	
Copper (Cu)-Total (mg/dm2.day)	<0.00022 DLB	<0.0015 DLB	<0.000062 DLB	<0.00063 DLB	
Iron (Fe)-Total (mg/dm2.day)	<0.00096	0.0045	<0.00092	0.00221	
Lead (Pb)-Total (mg/dm2.day)	<0.0000022 DLB	<0.0000030 DLB	<0.0000015	<0.0000028 DLB	
Lithium (Li)-Total (mg/dm2.day)	<0.00016	<0.00019	<0.00015	<0.00016	
Magnesium (Mg)-Total (mg/dm2.day)	0.00070	0.00341	0.00023	0.00037	
Manganese (Mn)-Total (mg/dm2.day)	<0.000064 DLB	0.0000716	0.0000395	0.0000493	
Mercury (Hg)-Total (mg/dm2.day)	<0.0000016	<0.0000019	<0.0000015	<0.0000016	
Molybdenum (Mo)-Total (mg/dm2.day)	<0.0000016	<0.0000019	<0.0000015	<0.0000016	
Nickel (Ni)-Total (mg/dm2.day)	<0.000016	<0.000019	<0.000015	<0.000016	
Phosphorus (P)-Total (mg/dm2.day)	<0.0016	<0.0019	<0.0015	<0.0016	
Potassium (K)-Total (mg/dm2.day)	<0.0016	<0.0019	<0.0015	<0.0016	
Selenium (Se)-Total (mg/dm2.day)	<0.000032	<0.000038	<0.000031	<0.000031	
Silicon (Si)-Total (mg/dm2.day)	<0.0016	0.0074	<0.0015	<0.0016	
Silver (Ag)-Total (mg/dm2.day)	<0.00000032	<0.00000038	<0.00000031	<0.00000031	
Sodium (Na)-Total (mg/dm2.day)	<0.0064 DLB	<0.0038 DLB	<0.0092 DLB	<0.0063 DLB	
Strontium (Sr)-Total (mg/dm2.day)	0.0000067	0.0000140	0.0000039	0.0000045	
Thallium (Tl)-Total (mg/dm2.day)	<0.0000032	<0.0000038	<0.0000031	<0.0000031	
Tin (Sn)-Total (mg/dm2.day)	<0.0000032	<0.0000038	<0.0000031	<0.0000031	
Titanium (Ti)-Total (mg/dm2.day)	<0.00032	<0.00038	<0.00031	<0.00031	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L2036519-1	L2036519-2	L2036519-3	L2036519-4	
	Description	Dustfall	Dustfall	Dustfall	Dustfall	
	Sampled Date	15-DEC-17	15-DEC-17	15-DEC-17	14-DEC-17	
	Sampled Time	09:43	11:22	11:44	09:50	
	Client ID	DF-RAIL	DF-KERR	DF-TELKWA	DF-TENAS DEP'	
Grouping	**Analyte**					
DUSTFALL						
Metals	Uranium (U)-Total (mg/dm2.day)	<0.00000032	<0.00000038	<0.00000031	0.00000033	
	Vanadium (V)-Total (mg/dm2.day)	<0.000032 DLB	<0.000038 DLB	<0.000031 DLB	<0.000031 DLB	
	Zinc (Zn)-Total (mg/dm2.day)	<0.00019	<0.00023	<0.00018	<0.00019	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Barium (Ba)-Total	B	L2036519-1, -2, -3, -4
Duplicate	Barium (Ba)-Total	DUP-H	L2036519-1, -2, -3, -4
Method Blank	Aluminum (Al)-Total	MB-LOR	L2036519-1, -2, -3, -4
Method Blank	Arsenic (As)-Total	MB-LOR	L2036519-1, -2, -3, -4
Method Blank	Calcium (Ca)-Total	MB-LOR	L2036519-1, -2, -3, -4
Method Blank	Copper (Cu)-Total	MB-LOR	L2036519-1, -2, -3, -4
Method Blank	Lead (Pb)-Total	MB-LOR	L2036519-1, -2, -3, -4
Method Blank	Manganese (Mn)-Total	MB-LOR	L2036519-1, -2, -3, -4
Method Blank	Sodium (Na)-Total	MB-LOR	L2036519-1, -2, -3, -4
Method Blank	Zinc (Zn)-Total	MB-LOR	L2036519-1, -2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CL-IC-VA	Dustfall	Dustfall Chloride by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The chloride analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

DUSTFALLS-COM-DM2-VA	Dustfall	Combined Dustfalls-Total, soluble, insol	BCMOE PARTICULATE

This analysis is carried out using procedures modified from British Columbia Environmental Manual "Particulate."
Particulates or Dustfall are determined gravimetrically. Total Insoluble Dustfall is determined by filtering a sample through a 0.45 um membrane filter and drying the filter at 104 degrees celsius. Total Soluble Dustfall is determined by evaporating the filtrate to dryness at 104 degrees celsius. The Total Dustfall is the sum of Insoluble Dustfall and the Soluble Dustfall.

HG-DUST(DM2-CVAFS-VA	Dustfall	Total Mercury in Dustfalls by CVAFS	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-DUST(DM2)-MS-VA	Dustfall	Total Metals in Dustfalls by ICPMS	EPA 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

NH3-F-VA	Dustfall	Dustfall Ammonia by Fluorescence	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The ammonia analysis is specifcially carried out using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

Results are reported in units of nitrogen weight. To convert to units by weight of ammonium, multiply by 1.29.

NO3-IC-VA	Dustfall	Dustfall Nitrate by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The nitrate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

Results are reported in units of nitrogen weight. To convert to units by weight of nitrate, multiply by 4.43.

SO4-IC-VA	Dustfall	Dustfall Sulfate by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The sulfate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

Reference Information

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

15-603878

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

DRAFT

Canada Toll Free: 1 800 668 9878

L2036519-COFC

COC Number: 15 - 603878

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	ERM
Contact:	Dan Casanova
Phone:	250-877-8998
	Company address below will appear on the final report
Street:	3790 Alfred Ave
City/Province:	Smithers BC
Postal Code:	V0J 2N0
Invoice To	Same as Report To: YES NO
	Copy of Invoice with Report: YES NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: PDF EXCEL EDD (DIGITAL)
Quality Control (QC) Report with Report: YES NO
Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: EMAIL MAIL FAX
Email 1 or Fax: daniel.casanova@erm.com
Email 2: ~~koring.houghton@erm.com~~
Email 3: andres.soux@erm.com

Invoice Distribution

Select Invoice Distribution: EMAIL MAIL FAX
Email 1 or Fax: daniel.casanova@erm.com
Email 2: Koring.houghton@erm.com

Project Information

ALS Account # / Quote #:
Job #: 0403488-0007
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only):
ALS Contact: A. Springer
Sampler: Dan Casanova

all E&P TATs with your AM - surcharges will apply

Regular [R]: Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] 3 day [P3] 2 day [P2]
EMERGENCY: 1 Business day [E1] Same Day, Weekend or Statutory holiday [E0]

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	End Date (dd-mmm-yy)	End Time (hh:mm)	Sample Type	Total Particulates	Soluble Part.	Insoluble Part.	Sulphate	Nitrate	NH_3, NH_4	Cl	Total Metals	Mg^+	Ca^+	K^+	Number of Containers
	DF-Rail Start: Nov 22 16:15	15-Dec-17	9:43	Outfall	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
	DF-Kerr " Nov 22 17:02	15-Dec-17	11:22	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	2
	DF-Telkwa " Nov 22 17:25	15-Dec-17	11:44													2
	DF-Tenas Dep " Nov 28 12:45	14-Dec-17	9:50													2

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? YES NO

Are samples for human drinking water use? N/A YES NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Preserved with 500 mL 50% Alcohol

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen SIF Observations Yes No
Ice Packs Ice Cubes Custody seal intact Yes No
Cooling Initiated

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			5.2		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Daniel Casanova	Date: Dec 15 '17	Time: 13:00	Received by:	Date:	Time:	Received by:	Date: DEC 18	Time: 11:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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

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

DRAFT

ERM Consultants Canada Ltd.
ATTN: Daniel Casanova
1500-1111 West Hastings Street
Vancouver BC V6E 2J3

Date Received: 19-JAN-18
Report Date: 01-FEB-18 12:34 (MT)
Version: FINAL

Client Phone: 604-689-9460

Certificate of Analysis

Lab Work Order #: L2047191

Project P.O. #: NOT SUBMITTED
Job Reference: 0403488-0007
C of C Numbers: 15-604375
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

Sample ID	L2047191-1	L2047191-2	L2047191-3	L2047191-4	
Description	Dustfall	Dustfall	Dustfall	Dustfall	
Sampled Date	17-JAN-18	17-JAN-18	17-JAN-18	17-JAN-18	
Sampled Time	12:06	12:58	13:18	10:11	
Client ID	DF-RAIL	DF-KERR	DF-TELKWA	DF-TENAS DEP	
Grouping / **Analyte**					
DUSTFALL					
Particulates					
Total Dustfall (mg/dm2.day)	<0.10	0.11	<0.10	<0.10	
Total Insoluble Dustfall (mg/dm2.day)	<0.10	<0.10	<0.10	<0.10	
Total Soluble Dustfall (mg/dm2.day)	<0.10	<0.10	<0.10	<0.10	
Anions and Nutrients					
Ammonia, Total (as N) (mg/dm2.day)	0.00361	0.00405	0.00593	0.00432	
Chloride (Cl) (mg/dm2.day)	<0.12	<0.15	<0.12	<0.13	
Nitrate (as N) (mg/dm2.day)	0.00073	0.00051 DLB	0.00104	0.00038 DLB	
Sulfate (SO4) (mg/dm2.day)	<0.0086	<0.010	<0.0086	<0.0093	
Metals					
Aluminum (Al)-Total (mg/dm2.day)	<0.00027 DLB	<0.00026 DLB	0.000390	<0.00010 DLB	
Antimony (Sb)-Total (mg/dm2.day)	<0.0000036	<0.0000022	<0.0000035 DLB	<0.0000017	
Arsenic (As)-Total (mg/dm2.day)	<0.0000018	<0.0000022	<0.0000017	<0.0000017	
Barium (Ba)-Total (mg/dm2.day)	0.00000789	0.0000048	0.0000139	0.00000178	
Beryllium (Be)-Total (mg/dm2.day)	<0.0000090	<0.000011	<0.0000087	<0.0000083	
Bismuth (Bi)-Total (mg/dm2.day)	<0.0000090	<0.000011	<0.0000087	<0.0000083	
Boron (B)-Total (mg/dm2.day)	<0.00018	<0.00022	<0.00017	<0.00017	
Cadmium (Cd)-Total (mg/dm2.day)	<0.00000090	<0.0000011	<0.00000087	<0.00000083	
Calcium (Ca)-Total (mg/dm2.day)	<0.0032 DLB	<0.0026 DLB	0.00361	<0.0023 DLB	
Chromium (Cr)-Total (mg/dm2.day)	<0.0000090	<0.000011	<0.0000087	<0.0000083	
Cobalt (Co)-Total (mg/dm2.day)	<0.0000018	<0.0000022	<0.0000017	<0.0000017	
Copper (Cu)-Total (mg/dm2.day)	<0.0000090	<0.000011	<0.000017 DLB	<0.0000083	
Iron (Fe)-Total (mg/dm2.day)	<0.00054	<0.00065	0.00084	<0.00050	
Lead (Pb)-Total (mg/dm2.day)	0.00000123	<0.0000011	0.00000201	<0.00000083	
Lithium (Li)-Total (mg/dm2.day)	<0.000090	<0.00011	<0.000087	<0.000083	
Magnesium (Mg)-Total (mg/dm2.day)	0.000178	0.00018	0.000266	0.000093	
Manganese (Mn)-Total (mg/dm2.day)	<0.000020 DLB	<0.000017 DLB	0.000043 DLB	<0.0000083 DLB	
Mercury (Hg)-Total (mg/dm2.day)	<0.00000090	<0.0000011	<0.00000087	<0.00000083	
Molybdenum (Mo)-Total (mg/dm2.day)	0.00000229	<0.0000011	<0.00000087	<0.00000083	
Nickel (Ni)-Total (mg/dm2.day)	<0.0000090	<0.000011	0.0000116	<0.0000083	
Phosphorus (P)-Total (mg/dm2.day)	<0.00090	<0.0011	<0.00087	<0.00083	
Potassium (K)-Total (mg/dm2.day)	<0.00090	<0.0011	<0.00087	<0.00083	
Selenium (Se)-Total (mg/dm2.day)	<0.000018	<0.000022	<0.000017	<0.000017	
Silicon (Si)-Total (mg/dm2.day)	<0.00090	<0.0011	<0.00087	<0.00083	
Silver (Ag)-Total (mg/dm2.day)	<0.00000018	<0.00000022	<0.00000017	<0.00000017	
Sodium (Na)-Total (mg/dm2.day)	0.00148	0.0013	0.00329	0.00137	
Strontium (Sr)-Total (mg/dm2.day)	0.0000052	0.0000050	0.0000080	0.0000024	
Thallium (Tl)-Total (mg/dm2.day)	<0.0000018	<0.0000022	<0.0000017	<0.0000017	
Tin (Sn)-Total (mg/dm2.day)	<0.0000018	<0.0000022	<0.0000017	<0.0000017	
Titanium (Ti)-Total (mg/dm2.day)	<0.00018	<0.00022	<0.00017	<0.00017	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L2047191-1	L2047191-2	L2047191-3	L2047191-4	
	Description	Dustfall	Dustfall	Dustfall	Dustfall	
	Sampled Date	17-JAN-18	17-JAN-18	17-JAN-18	17-JAN-18	
	Sampled Time	12:06	12:58	13:18	10:11	
	Client ID	DF-RAIL	DF-KERR	DF-TELKWA	DF-TENAS DEP	
Grouping	**Analyte**					
DUSTFALL						
Metals	Uranium (U)-Total (mg/dm2.day)	<0.00000018	<0.00000022	<0.00000017	<0.00000017	
	Vanadium (V)-Total (mg/dm2.day)	<0.000018	<0.000022	<0.000017	<0.000017	
	Zinc (Zn)-Total (mg/dm2.day)	<0.000054	<0.000065	0.000073	<0.000050	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Aluminum (Al)-Total	MB-LOR	L2047191-1, -2, -3, -4
Method Blank	Antimony (Sb)-Total	MB-LOR	L2047191-1, -2, -3, -4
Method Blank	Calcium (Ca)-Total	MB-LOR	L2047191-1, -2, -3, -4
Method Blank	Copper (Cu)-Total	MB-LOR	L2047191-1, -2, -3, -4
Method Blank	Manganese (Mn)-Total	MB-LOR	L2047191-1, -2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CL-IC-VA	Dustfall	Dustfall Chloride by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The chloride analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

DUSTFALLS-COM-DM2-VA	Dustfall	Combined Dustfalls-Total, soluble, insol	BCMOE PARTICULATE

This analysis is carried out using procedures modified from British Columbia Environmental Manual "Particulate."
Particulates or Dustfall are determined gravimetrically. Total Insoluble Dustfall is determined by filtering a sample through a 0.45 um membrane filter and drying the filter at 104 degrees celsius. Total Soluble Dustfall is determined by evaporating the filtrate to dryness at 104 degrees celsius. The Total Dustfall is the sum of Insoluble Dustfall and the Soluble Dustfall.

HG-DUST(DM2-CVAFS-VA	Dustfall	Total Mercury in Dustfalls by CVAFS	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-DUST(DM2)-MS-VA	Dustfall	Total Metals in Dustfalls by ICPMS	EPA 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

NH3-F-VA	Dustfall	Dustfall Ammonia by Fluorescence	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The ammonia analysis is specifcially carried out using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

Results are reported in units of nitrogen weight. To convert to units by weight of ammonium, multiply by 1.29.

NO3-IC-VA	Dustfall	Dustfall Nitrate by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The nitrate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

Results are reported in units of nitrogen weight. To convert to units by weight of nitrate, multiply by 4.43.

SO4-IC-VA	Dustfall	Dustfall Sulfate by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The sulfate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

Reference Information

15-604375

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

DRAFT

L2047191-COFC

Canada Toll Free: 1 800 668 9878

COC Number: 15 - 604375

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	ERM
Contact:	Daniel Casanovas
Phone:	250-877-5948
Company address below will appear on the final report	
Street:	3790 Alfred Ave
City/Province:	Smithers, BC
Postal Code:	V0J 2N0
Invoice To	Same as Report To: YES NO
	Copy of Invoice with Report: YES NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	PDF EXCEL EDD (DIGITAL)
Quality Control (QC) Report with Report	YES NO
Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	EMAIL MAIL FAX
Email 1 or Fax	daniel.casanovas@erm.com
Email 2	andres.sosa@erm.com
Email 3	

Invoice Distribution	
Select Invoice Distribution:	EMAIL MAIL FAX
Email 1 or Fax	daniel.casanovas@erm.com
Email 2	Kirina.houghton@erm.com

Project Information	
ALS Account # / Quote #:	
Job #:	0403488-0007
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: A. Springer

Sampler: D. Casanovas

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R]: ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)		end Date (dd-mmm-yy)	end Time (hh:mm)	Sample Type	Total Particulate (P)	Soluble Particulate (P)	Insoluble Particulate (P)	Sulphate (P)	Nitrate (P)	NH_3, NH_4 (P)	Cl (P)	Total Metals (P)	Mg^{++} (P)	Ca^{++} (P)	K^{+} (P)	Number of Containers
	DF-Rail	start: Dec 15 9:43	17-Jan-18	12:06	Dustfall												2
	DF-Kerr	" : Dec 15 11:22	17-Jan-18	12:58													2
	DF-Telkwa	" : Dec 15 11:44	17-Jan-18	13:18													2
	DF-Texas Dep	" : Dec 14 9:50	17-Jan-18	10:11													2

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? YES NO

Are samples for human drinking water use? YES NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			4.8 °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
Daniel Casanovas	Jan 17 '18						Jan 19	11:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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

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

DRAFT

ERM Consultants Canada Ltd.
ATTN: Daniel Casanova
1500-1111 West Hastings Street
Vancouver BC V6E 2J3

Date Received: 22-FEB-18
Report Date: 08-MAR-18 11:27 (MT)
Version: FINAL

Client Phone: 604-689-9460

Certificate of Analysis

Lab Work Order #: L2059708

Project P.O. #: NOT SUBMITTED
Job Reference: 0403488-0007
C of C Numbers: 17-677145
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

Sample ID	L2059708-1	L2059708-2	L2059708-3	L2059708-4	
Description	Dustfall	Dustfall	Dustfall	Dustfall	
Sampled Date	19-FEB-18	19-FEB-18	19-FEB-18	19-FEB-18	
Sampled Time	12:58	14:00	14:24	21:52	
Client ID	DF-RAIL	DF-KERR	DF-TELKWA	DF-TENAS DEP	
Grouping / **Analyte**					
DUSTFALL					
Particulates					
Total Dustfall (mg/dm2.day)	<0.10	0.19	0.20	<0.10	
Total Insoluble Dustfall (mg/dm2.day)	<0.10	<0.10	0.12	<0.10	
Total Soluble Dustfall (mg/dm2.day)	<0.10	0.16	<0.10	<0.10	
Anions and Nutrients					
Ammonia, Total (as N) (mg/dm2.day)	<0.0016	<0.0016	0.0029	<0.0016	
Chloride (Cl) (mg/dm2.day)	<0.28	<0.27	<0.26	<0.27	
Nitrate (as N) (mg/dm2.day)	0.00128	0.00116	0.00180	0.00078	
Sulfate (SO4) (mg/dm2.day)	<0.020	<0.020	<0.018	<0.020	
Metals					
Aluminum (Al)-Total (mg/dm2.day)	0.00089	<0.00069 DLB	0.00126	<0.00061 DLB	
Antimony (Sb)-Total (mg/dm2.day)	<0.0000038	<0.000011 DLB	<0.000010 DLB	<0.000012 DLB	
Arsenic (As)-Total (mg/dm2.day)	0.0000152	<0.0000076 DLM	<0.000014 DLM	<0.0000041	
Barium (Ba)-Total (mg/dm2.day)	<0.000015 DLB	<0.0000095 DLB	<0.000019 DLB	<0.000012 DLB	
Beryllium (Be)-Total (mg/dm2.day)	<0.000019	<0.000019	<0.000017	<0.000020	
Bismuth (Bi)-Total (mg/dm2.day)	<0.000019	<0.000019	<0.000017	<0.000020	
Boron (B)-Total (mg/dm2.day)	<0.00038	<0.00038	<0.00034	<0.00041	
Cadmium (Cd)-Total (mg/dm2.day)	<0.0000019	<0.0000019	<0.0000017	<0.0000020	
Calcium (Ca)-Total (mg/dm2.day)	<0.0030 DLB	<0.0069 DLB	0.0183	<0.0033 DLB	
Chromium (Cr)-Total (mg/dm2.day)	<0.000019	<0.000019	<0.000017	<0.000020	
Cobalt (Co)-Total (mg/dm2.day)	<0.0000038	<0.0000038	<0.0000034	<0.0000041	
Copper (Cu)-Total (mg/dm2.day)	0.00274	0.00225	0.00075 DLB	<0.0011 DLB	
Iron (Fe)-Total (mg/dm2.day)	<0.0011	<0.0011	0.0017	<0.0012	
Lead (Pb)-Total (mg/dm2.day)	<0.0000038 DLB	0.0000028	0.0000024	<0.0000020	
Lithium (Li)-Total (mg/dm2.day)	<0.00019	<0.00019	<0.00017	<0.00020	
Magnesium (Mg)-Total (mg/dm2.day)	0.00097	0.00182	0.00428	0.00058	
Manganese (Mn)-Total (mg/dm2.day)	0.0000330	0.0000339	0.0000745	<0.000025 DLB	
Mercury (Hg)-Total (mg/dm2.day)	<0.0000019	<0.0000019	<0.0000017	<0.0000020	
Molybdenum (Mo)-Total (mg/dm2.day)	<0.0000019	<0.0000019	<0.0000017	<0.0000020	
Nickel (Ni)-Total (mg/dm2.day)	<0.000019	<0.000019	<0.000017	<0.000020	
Phosphorus (P)-Total (mg/dm2.day)	<0.0019	<0.0019	<0.0017	<0.0020	
Potassium (K)-Total (mg/dm2.day)	<0.0019	<0.0019	0.0020	<0.0020	
Selenium (Se)-Total (mg/dm2.day)	<0.000038	<0.000038	<0.000034	<0.000041	
Silicon (Si)-Total (mg/dm2.day)	<0.0019	0.0020	0.0055	<0.0020	
Silver (Ag)-Total (mg/dm2.day)	<0.00000038	<0.00000038	<0.00000034	<0.00000041	
Sodium (Na)-Total (mg/dm2.day)	<0.0019	0.0027	0.0215	<0.0020	
Strontium (Sr)-Total (mg/dm2.day)	0.0000193	0.0000743	0.000259	0.0000188	
Thallium (Tl)-Total (mg/dm2.day)	<0.0000038	<0.0000038	<0.0000034	<0.0000041	
Tin (Sn)-Total (mg/dm2.day)	<0.0000038	<0.0000038	<0.0000034	<0.0000041	
Titanium (Ti)-Total (mg/dm2.day)	<0.00038	<0.00038	<0.00034	<0.00041	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L2059708-1	L2059708-2	L2059708-3	L2059708-4	
	Description	Dustfall	Dustfall	Dustfall	Dustfall	
	Sampled Date	19-FEB-18	19-FEB-18	19-FEB-18	19-FEB-18	
	Sampled Time	12:58	14:00	14:24	21:52	
	Client ID	DF-RAIL	DF-KERR	DF-TELKWA	DF-TENAS DEP	
Grouping	**Analyte**					
DUSTFALL						
Metals	Uranium (U)-Total (mg/dm2.day)	0.00000054	0.00000126	0.00000160	0.00000056	
	Vanadium (V)-Total (mg/dm2.day)	<0.000038 DLB	<0.000038 DLB	<0.000034 DLB	<0.000041 DLB	
	Zinc (Zn)-Total (mg/dm2.day)	<0.00023	<0.00034	<0.00021	<0.00025	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Sodium (Na)-Total	DUP-H	L2059708-1
Duplicate	Strontium (Sr)-Total	DUP-H	L2059708-1
Duplicate	Calcium (Ca)-Total	DUP-H,J	L2059708-1
Duplicate	Magnesium (Mg)-Total	DUP-H,J	L2059708-1
Method Blank	Aluminum (Al)-Total	MB-LOR	L2059708-2, -3, -4
Method Blank	Antimony (Sb)-Total	MB-LOR	L2059708-2, -3, -4
Method Blank	Barium (Ba)-Total	MB-LOR	L2059708-2, -3, -4
Method Blank	Calcium (Ca)-Total	MB-LOR	L2059708-2, -3, -4
Method Blank	Copper (Cu)-Total	MB-LOR	L2059708-2, -3, -4
Method Blank	Manganese (Mn)-Total	MB-LOR	L2059708-2, -3, -4
Method Blank	Zinc (Zn)-Total	MB-LOR	L2059708-2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
DUP-H,J	Duplicate results outside ALS DQO, due to sample heterogeneity. Duplicate results and limits are expressed in terms of absolute difference.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CL-IC-VA	Dustfall	Dustfall Chloride by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The chloride analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

DUSTFALLS-COM-DM2-VA	Dustfall	Combined Dustfalls-Total, soluble, insol	BCMOE PARTICULATE

This analysis is carried out using procedures modified from British Columbia Environmental Manual "Particulate."
Particulates or Dustfall are determined gravimetrically. Total Insoluble Dustfall is determined by filtering a sample through a 0.45 um membrane filter and drying the filter at 104 degrees celsius. Total Soluble Dustfall is determined by evaporating the filtrate to dryness at 104 degrees celsius. The Total Dustfall is the sum of Insoluble Dustfall and the Soluble Dustfall.

HG-DUST(DM2-CVAFS-VA	Dustfall	Total Mercury in Dustfalls by CVAFS	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-DUST(DM2)-MS-VA	Dustfall	Total Metals in Dustfalls by ICPMS	EPA 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

NH3-F-VA	Dustfall	Dustfall Ammonia by Fluorescence	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The ammonia analysis is specifcially carried out using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

Results are reported in units of nitrogen weight. To convert to units by weight of ammonium, multiply by 1.29.

NO3-IC-VA	Dustfall	Dustfall Nitrate by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The nitrate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

Results are reported in units of nitrogen weight. To convert to units by weight of nitrate, multiply by 4.43.

SO4-IC-VA	Dustfall	Dustfall Sulfate by Ion Chromatography	BC LAB MAN. - PART. - SOLUBLE - ANIONS

Reference Information

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The sulfate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

17-677145

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Chain of Custody (COC) / Analytical Request Form

DRAFT

L2059708-COFC

COC Number: 17 - 677145

Page 1 of 1

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Report To	Contact and company name below will appear on the final report
Company:	ERM
Contact:	Daniel Casanova
Phone:	250-877-8496
	Company address below will appear on the final report
Street:	3790 Alfred Ave
City/Province:	Smithers BC
Postal Code:	V0J 2N0

Report Format / Distribution	
Select Report Format:	☐ PDF ☑ EXCEL | EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL | MAIL ☐ FAX
Email 1 or Fax	daniel.casanova@ermcan
Email 2	centres.sowr@ermcan
Email 3	

Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E-100%] ☐ | Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To		
	Same as Report To	☑ YES ☐ NO
	Copy of Invoice with Report	☑ YES ☐ NO
Company:		
Contact:		

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	daniel.casanova@ermcan
Email 2	kristina.haggstrom@erm.com

Project Information	
ALS Account # / Quote #:	
Job #:	0405488-0007
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: A. Springer

Sampler: D. Casanova

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	End Date (dd-mmm-yy)	End Time (hh:mm)	Sample Type	Total Particulate P	Soluble Particulate F/P	Insoluble Particulate F/P	Sulphate P	Nitrate P	NH_3, NH_4 P	Cl P	Total Metals F/P	Mg^{++} F/P	Ca^{++} F/P	K^+ F/P	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	DF-Rail start: Jan 17 12:06	19-Feb-18	12:58	Dustfall	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓			2
	DF-Kerr " 12:58		14:00															2
	DF-Telkwa " 13:18 ~~10:11 11:24~~		11:24															2
	DF-Tenas Dep " 10:11		9:52															2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human consumption/ use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☑

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
	6.4

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
Daniel Casanova	Feb 20						Feb 22 2018	1225

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JULY 2017 FRONT

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

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

Chain of Custody (COC) / Analytical Request Form

DRAFT

L2059708-COFC

COC Number: 17 - 677145

Page 1 of 1

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Report To	Contact and company name below will appear on the final report
Company:	ERM
Contact:	Daniel Casanova
Phone:	250-877-8490
	Company address below will appear on the final report
Street:	3790 Alfred Ave
City/Province:	Smithers BC
Postal Code:	V0J 2N0

Report Format / Distribution	
Select Report Format:	PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
Compare Results to Criteria on Report - provide details below if box checked	☐
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	daniel.casanova@ermcon
Email 2	andrea.sousa@ermcon
Email 3	

Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E-100%] ☐ | Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To		
	Same as Report To	☑ YES ☐ NO
	Copy of Invoice with Report	☐ YES ☐ NO
Company:		
Contact:		

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	daniel.casanova@ermcon
Email 2	kristina.haggstrom@erm.com

Project Information	
ALS Account # / Quote #:	
Job #:	0405488-0007
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)		
AFE/Cost Center:		PO#
Major/Minor Code:		Routing Code:
Requisitioner:		
Location:		

ALS Lab Work Order # (lab use only):

ALS Contact: A. Springer

Sampler: D. Casanova

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	End Date (dd-mmm-yy)	End Time (hh:mm)	Sample Type	Total Particulate	Soluble Particulate	Insoluble Particulate	Sulphate	Nitrate	NH3, NH4	Cl	Total Metals	Mg++	Ca++	K+	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	DF-Rail Start: Jan 17 12:06	19-Feb-18	12:58	Distfill	P	P	P	P	P	P	P	P	P	P	P			2
	DF-Kerr " 12:58		14:00															2
	DF-Telkwa " 13:18 ~~14:24~~		14:24															2
	DF-Tenas Dep " 10:11		9:52															2

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☑

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				6.4			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
Daniel Casanova	Feb 20						Feb 22 2018	1225

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JULY 2017 FRONT

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

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

Appendix 4-A

Baseline Noise Monitoring Field Notes

DRAFT

Noise Baseline Study - Field Data Sheet

Sampler Location:

Project Name: Telkwa Coal — Project #: 0403488-7

ID (*e.g.* S1): ~~S-Mill~~ S-Plant

UTM Coordinates: 618794 E 6053543 N — UTM Datum: WGS-84

Ground Cover (*e.g.* soil/vegetation type): cutblock, dead trees, small regen trees — Start Date/Time: Oct. 16 '17 11:56 48

Terrain (*e.g.* flat, hills, mountains): generally flat, genital with slope — Finish Date/Time: Oct. 17 '17 12:~~46~~ 48

Weather: at setup

Temperature (°C): ~1°C — Cloud Cover (%): 100

Precipitation: ☐ Heavy ☑ Moderate ☐ Mild ☐ None

☑ Snow ☐ Rain ☐ Other _____

Wind: Speed ☐ Strong ☐ Moderate ☐ Light ☑ None — Direction _____

Instrument:

Type: Bak 225D — Serial #: 3023697

Calibration: ☑ Before ☐ After

Method: 4231 Calibrator

Weighting (*i.e.* A): A and C — Other Settings: 50.17 mV/Pa

Response (*i.e.* fast/slow): slow, 1-minute log — dev. from initial 0.20 dB

Observations: ***Include directions and estimated distances to the instrument in this section***

Audible noise observed at setup: falling snow on ground

Potential noise sources: - aircraft, gunshots, wind, train, animals

Obstacles (*e.g.* trees, buildings): 1-2m high trees in surrounding area

Notes:

station picked-up at 4:45pm on Oct. 17

- station location chosen by Ardea Bio Consulting instructions

Please be sure to take a few photos of the instrument and the surrounding area (*i.e.* one in each direction) and put them in the project folder with appropriate labels upon return to the office!

DRAFT

Noise Baseline Study - Field Data Sheet

Sampler Location:

Project Name: Telkwa Coal | Project #: 0403488-7

ID (*e.g.* S1): S-Texas Dep

UTM Coordinates: 616490 E 6051477 N | UTM Datum: WGS-84

Ground Cover (*e.g.* soil/vegetation type): full grown forest | Start Date/Time: Oct. 17 '17, 17:27 (18)

Terrain (*e.g.* flat, hills, mountains): gentle mountain slope | Finish Date/Time: Oct 18 '17, 18:18

Weather: at setup

Temperature (°C): ~ 4°C | Cloud Cover (%): 50

Precipitation: ☐ Heavy ☐ Moderate ☐ Mild ☑ None

☐ Snow ☐ Rain ☐ Other _____

Wind: Speed ☐ Strong ☐ Moderate ☐ Light ☑ None | Direction _____

Instrument:

Type: B&K 2250 | Serial #: 3023697

Calibration: ☑ Before ☐ After

Method: 4231 calibrator

Weighting (*i.e.* A): A and C | Other Settings: 49.99 mV/Pa

Response (*i.e.* fast/slow): slow, 1-minute log | dev. from initial: 0.17dB

Observations: ***Include directions and estimated distances to the instrument in this section***

Audible noise observed at setup: - water dripping from trees / melting snow

- gunshots, aircraft

Potential noise sources: - wind, train horn, animals

Obstacles (*e.g.* trees, buildings): - full grown trees

Notes:

- location is inside a fully grown forest, as per Ardea Bio Consulting instructions

- station picked-up ~~at~~ on Oct 19

Please be sure to take a few photos of the instrument and the surrounding area (*i.e.* one in each direction) and put them in the project folder with appropriate labels upon return to the office!

Noise Baseline Study - Field Data Sheet

Sampler Location:

Project Name: Tenas Project Project #: 0403488-7

ID (*e.g.* S1): S-Tenas Dep

(Same as last)

UTM Coordinates: E N UTM Datum

Ground Cover (*e.g.* soil/vegetation type): snow Start Date/Time: Dec 11 '17, ~10:40 (18)

Terrain (*e.g.* flat, hills, mountains): gentle hills local and regional Finish Date/Time: Dec 12 '17, ~10:40

Weather:

Temperature (°C): ~ 1°C Cloud Cover (%): 100

Precipitation: ☐ Heavy ☐ Moderate ☐ Mild ☑ None

☐ Snow ☐ Rain ☐ Other

Wind: Speed ☐ Strong ☐ Moderate ☐ Light ☑ None Direction

Instrument:

Type: B&K 2250 Serial #: 3023697

Calibration: ☑ Before ☐ After Sensitivity: 50.73 mV/Pa

Method: 4231 calibrator Dev. from last: 0.18 dB

Weighting (*i.e.* A): Broadband: A, C Other Settings: broadband peak: C

Response (*i.e.* fast/slow): 1 minute log, fast response Spectrum Z, Full stats

Observations: ***Include directions and estimated distances to the instrument in this section***

Audible noise observed: - Birds, ~~-~~ snow melting, squirrles, train, aircraft

Potential noise sources: - other animals, wind, falling snow from trees

Obstacles (*e.g.* trees, buildings): - in forest as per wildlife monitoring instructions

Notes: File name: Unit 9 001

Please be sure to take a few photos of the instrument and the surrounding area (*i.e.* one in each direction) and put them in the project folder with appropriate labels upon return to the office!

DRAFT

Noise Baseline Study - Field Data Sheet

Sampler Location:

Project Name: Texas Project

Project #: 0403488-7

ID (*e.g.* S1): S-Plant

(Same as last) UTM Coordinates: E N

UTM Datum:

Ground Cover (*e.g.* soil/vegetation type): Snow, small new trees

Start Date/Time: Dec 12, '17 11:55

Terrain (*e.g.* flat, hills, mountains): - gental slope

Finish Date/Time: Dec 13 12:56

Weather:

Temperature (°C): ~5°C

Cloud Cover (%): 100 (thin)

Precipitation: ☐ Heavy ☐ Moderate ☑ Mild ☐ None

☐ Snow ☑ Rain ☐ Other

Wind: Speed ☐ Strong ☐ Moderate ☐ Light ☑ None

Direction

Instrument:

Type: B&K 2250

Serial #: 3023697

Calibration: ☑ Before ☐ After

Method: Type 4231, sensi 50.44 mV/Pa, dev. from last: 0.25 dB

Weighting (*i.e.* A): Broadband A, C

Other Settings: Broadband Peak: C 1/3 octave

Response (*i.e.* fast/slow): 1-min logging, fast response

Spectrum: Z

Observations: ***Include directions and estimated distances to the Instrument in this section***

Audible noise observed: - melting snow, birds

Potential noise sources: - animals, aircraft, gunshots, train, snowmobiles

Obstacles (*e.g.* trees, buildings): - small trees in catblock

Notes: File: Unit 9 003

Please be sure to take a few photos of the instrument and the surrounding area (*i.e.* one in each direction) and put them in the project folder with appropriate labels upon return to the office!

Noise Baseline Study - Field Data Sheet

Sampler Location:

Project Name: Texas Project — Project #: 0403488-7

New station — ID (e.g. S1): S-Rail

UTM Coordinates: 630146 E 6058143 N — UTM Datum: WGS-84

Ground Cover (e.g. soil/vegetation type): snow, nearby small trees — Start Date/Time: Dec 15 2017 ~10:15

Terrain (e.g. flat, hills, mountains): locally flat, small hill to S. — Finish Date/Time: Dec 18 ~10:15

Weather:

Temperature (°C): -5°C — Cloud Cover (%): 10

Precipitation: ☐ Heavy ☐ Moderate ☐ Mild ☑ None ☐ Snow ☐ Rain ☐ Other _____

Wind: Speed ☐ Strong ☐ Moderate ☑ Light ☐ None — Direction: from E

Instrument:

Type: B&K 2250 — Serial #: ~~4231 calibrator~~ 3023697

Calibration: ☑ Before ☑ After ★ — Method: 4231 calibrator | sensitivity: 51.10 mV/Pa | dev from last: 0.11 dB

Weighting (i.e. A): Broadband: A, C — Other Settings: broadband peak: C

Response (i.e. fast/slow): 1 min log, fast response — spectrum: Z, Full stats

Observations: ***Include directions and estimated distances to the instrument in this section***

Audible noise observed: - Birds, highway traffic, snow melting

Potential noise sources: - train, animals, wind, snowmobiles, livestock

Obstacles (e.g. trees, buildings): - in forest clearing, small 10m high hill to south

Notes:

- File name: Unit 9 008 ← ~~I think first file~~
- 2250 set up on timer to measure 3 consecutive days
  - deployed Friday, pick up on Monday
  - → need to check calibration at end of monitoring to determine if all 3 days are OK.

★ End Calibration — Date: Dec 18 — sensitivity: 48.72 mV/Pa — Deviation from last: -0.41 dB

Please be sure to take a few photos of the instrument and the surrounding area (i.e. one in each direction) and put them in the project folder with appropriate labels upon return to the office!

Files 008, 009, 010 ← cut short, only 21 hours

Noise Baseline Study - Field Data Sheet

Sampler Location:

Project Name: Tenas — Project #: 0403488-7

ID (*e.g.* S1): S-Tenas Dep

UTM Coordinates: 616490 E 6051477 N — UTM Datum: 9U

Ground Cover (*e.g.* soil/vegetation type): snow w/some veg exposed in grown forest — Start Date/Time: 3/21/2018 10:48AM

Terrain (*e.g.* flat, hills, mountains): gentle slope — Finish Date/Time: 3/22/2018 9:35AM

Weather:

Temperature (°C): -1 — Cloud Cover (%): 100

Precipitation: ☐ Heavy ☐ Moderate ☐ Mild ☑ None

☐ Snow ☐ Rain ☐ Other _____

Wind: Speed ☐ Strong ☑ Moderate ☑ Light ☐ None — Direction _____

Instrument:

Type: B&K 2250 — Serial #: 3007892

Calibration: ☑ Before ☐ After — 45.53 mV/Pa

Method: 4231 Calibrator — -0.55 dB dev. from last

Weighting (*i.e.* A): Broadband AC — Other Settings: broadband peak A

Response (*i.e.* fast/slow): 2-min leq — spectrum 2

Observations: ***Include directions and estimated distances to the instrument in this section***

Audible noise observed: -wind, trees moving, snow melting

Potential noise sources: -wind, trees, animals, train horn, hunters, aircraft

Obstacles (*e.g.* trees, buildings): -located in dense mature forest

Notes:

Lynx spotted at helicopter transit landing spot

-windier than normal on deployment, compared to Oct. and Dec. sampling

Files: Unit 2003 files spit/saved at 7:00 AM

Unit 2004

-combine w/ Evaluator software

Please be sure to take a few photos of the instrument and the surrounding area (*i.e.* one in each direction) and put them in the project folder with appropriate labels upon return to the office!

Noise Baseline Study - Field Data Sheet

Sampler Location:

Project Name: Tenas — Project #: 0403488-7

ID (*e.g.* S1): S-Plant

UTM Coordinates: 618827 E 6053599 N — UTM Datum: NAD

Ground Cover (*e.g.* soil/vegetation type): snow covered — Start Date/Time: 3/20/2018 9:32 AM

Terrain (*e.g.* flat, hills, mountains): locally flat, regional gental slope — Finish Date/Time: 3/21/2018 9:43 AM

Weather:

Temperature (°C): 1°C — Cloud Cover (%): 50%

Precipitation: ☐ Heavy ☐ Moderate ☐ Mild ☑ None

☐ Snow ☐ Rain ☐ Other

Wind: Speed ☐ Strong ☐ Moderate ☑ Light ☐ None — Direction

Instrument:

Type: B&K 2250 — Serial #: 3007892

Calibration: ☑ Before ☐ After — 48 mV/Pa

Method: 4231 Calibrator — 1.23 dB dev. from last

Weighting (*i.e.* A): Broadband A, C — Other Settings: broadband peak A

Response (*i.e.* fast/slow): spectrum Z — spectrum Z

1-min log

Observations: ***Include directions and estimated distances to the instrument in this section***

Audible noise observed: - wolves howling

- aircraft

Potential noise sources: - wind, trees, animals, train horn, hunters, aircraft

Obstacles (*e.g.* trees, buildings): - trees (new cutblock)

Notes:

Fieldcrew install: CH, GK (DC was sick)

~~A~~ - installed at different location than usual → error

- approx 70 m northeast of the usual spot

- noise difference should be negligible

Files ~~2005~~ Unit 2005 — Files split/saved at 7:00 AM

2006 Unit 2006

- combine w/ Evaluator software

Please be sure to take a few photos of the instrument and the surrounding area (*i.e.* one in each direction) and put them in the project folder with appropriate labels upon return to the office!

Noise Baseline Study - Field Data Sheet

Sampler Location:

Project Name: Texas — Project #: 0403488-7

ID (*e.g.* S1): S-Rail

UTM Coordinates: 63946 E 6058143 N — UTM Datum: 9U

Ground Cover (*e.g.* soil/vegetation type): snow cover, open cutblock — Start Date/Time: 3/22/2018 1:04 PM

Terrain (*e.g.* flat, hills, mountains): local flat, hill to south — Finish Date/Time: 3/23/2018 2:04 PM

Weather:

Temperature (°C): -1 C — Cloud Cover (%): 100

Precipitation: ☐ Heavy ☐ Moderate ☐ Mild ☑ None

☐ Snow ☐ Rain ☐ Other _____

Wind: Speed ☐ Strong ☐ Moderate ☐ Light ☑ None — Direction _____

Instrument:

Type: B&K 2250 — Serial #: 3007892

Calibration: ☑ Before ☐ After — 45.49 mV/Pa

Method: 4231 Calibrator -0.01 dB dev. from last

Weighting (*i.e.* A): Broadband A/C — Other Settings: Broadband peak A

Response (*i.e.* fast/slow): 1-min leq — spectrum 2

Observations: ***Include directions and estimated distances to the instrument in this section***

Audible noise observed: -highway, train, birds

Potential noise sources: -highway, train moving + horn, animals, wind, trees swaying

Obstacles (*e.g.* trees, buildings): -some scattered small trees in cutblock -hill to south, 40m away

Notes:

Files: Unit 2007 file split/saved at 00:00

Unit 2008

-combine w/ Evaluator software

Please be sure to take a few photos of the instrument and the surrounding area (*i.e.* one in each direction) and put them in the project folder with appropriate labels upon return to the office!

Appendix 4-B

Baseline Noise Monitoring One-minute Data Graphs

Figure 4-B1

One-minute LAeq Noise Levels, S-Plant, October 16 - 17, 2017

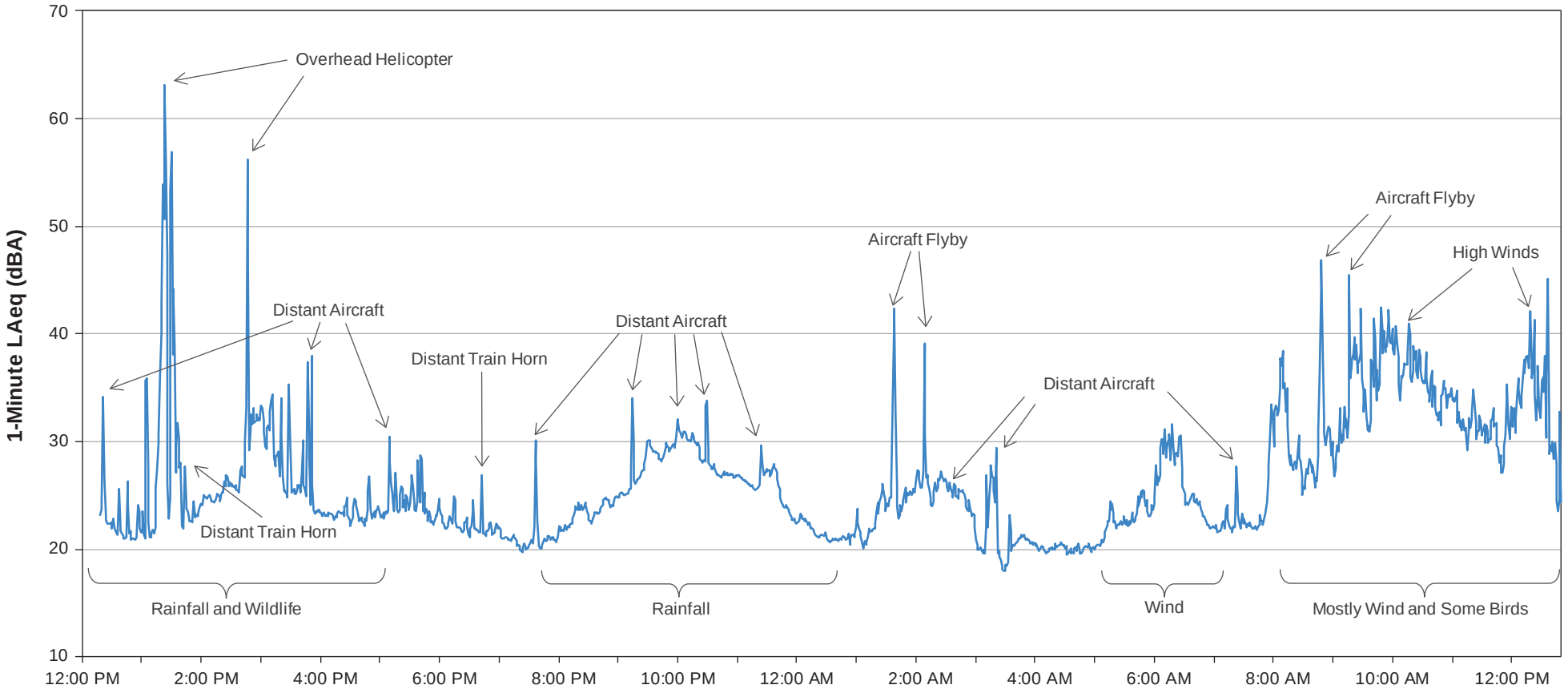
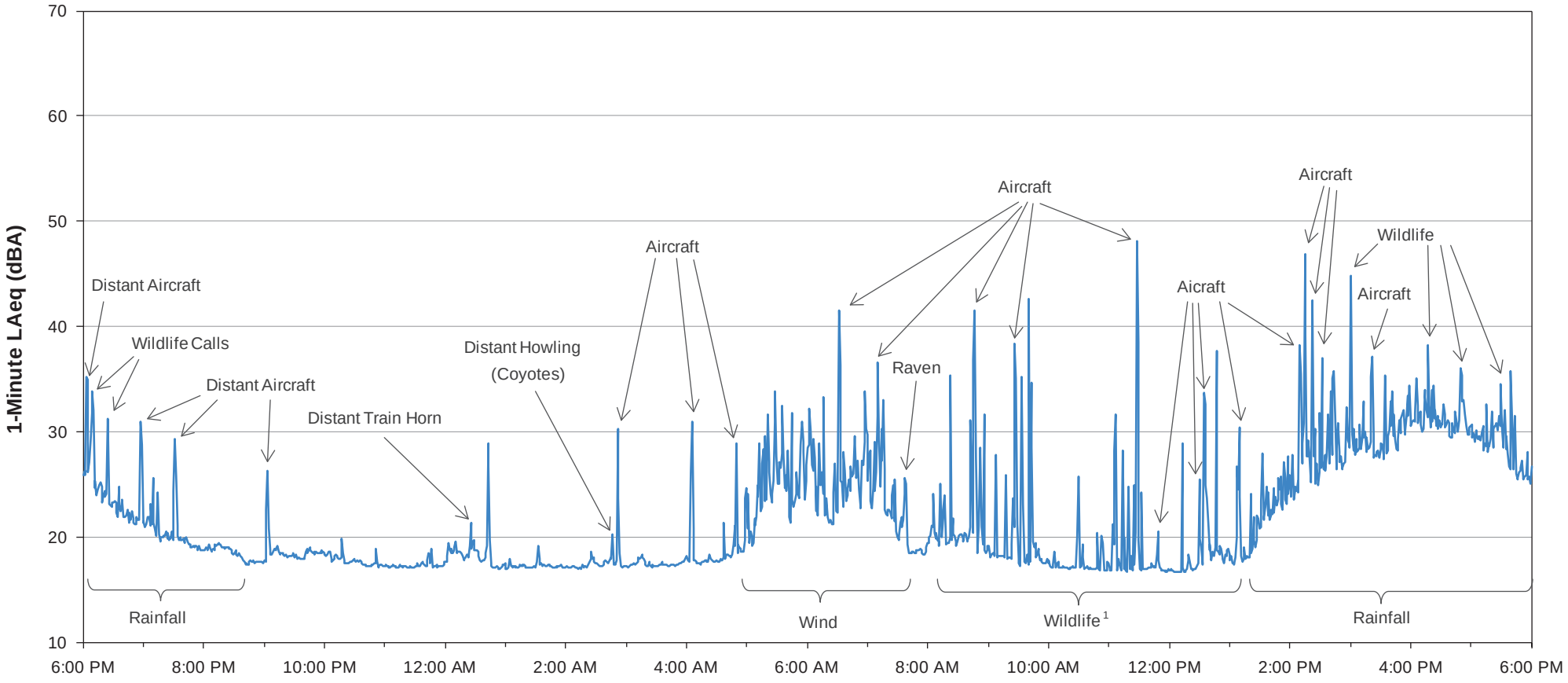


Figure 4-B2

One-minute LAeq Noise Levels, S-TenasDep, October 17 - 18, 2017



Note: 1. Noise spikes were caused by wildlife unless noted otherwise in graph.

Figure 4-B3

One-minute LAeq Noise Levels, S-Plant, December 12 - 13, 2017

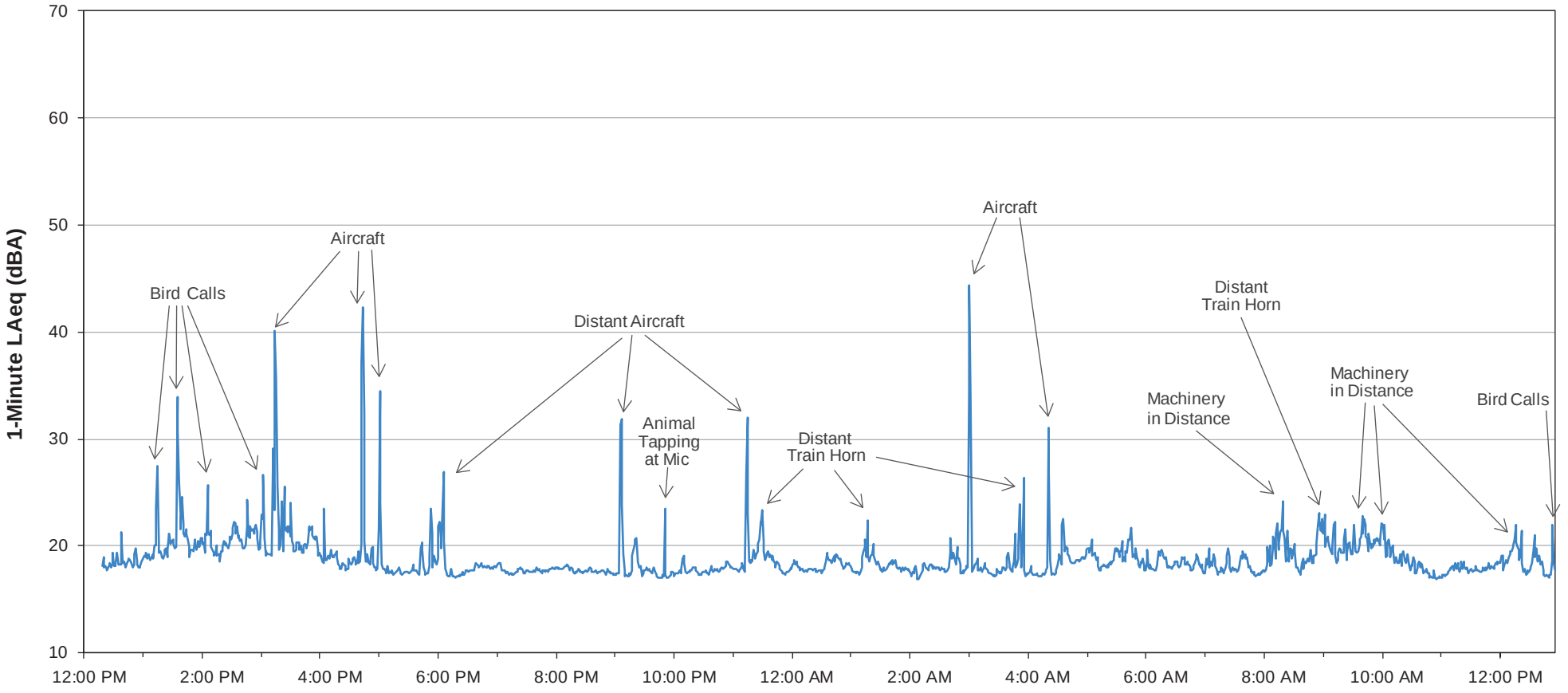


Figure 4-B4

One-minute LAeq Noise Levels, S-TenasDep, December 11 - 12, 2017

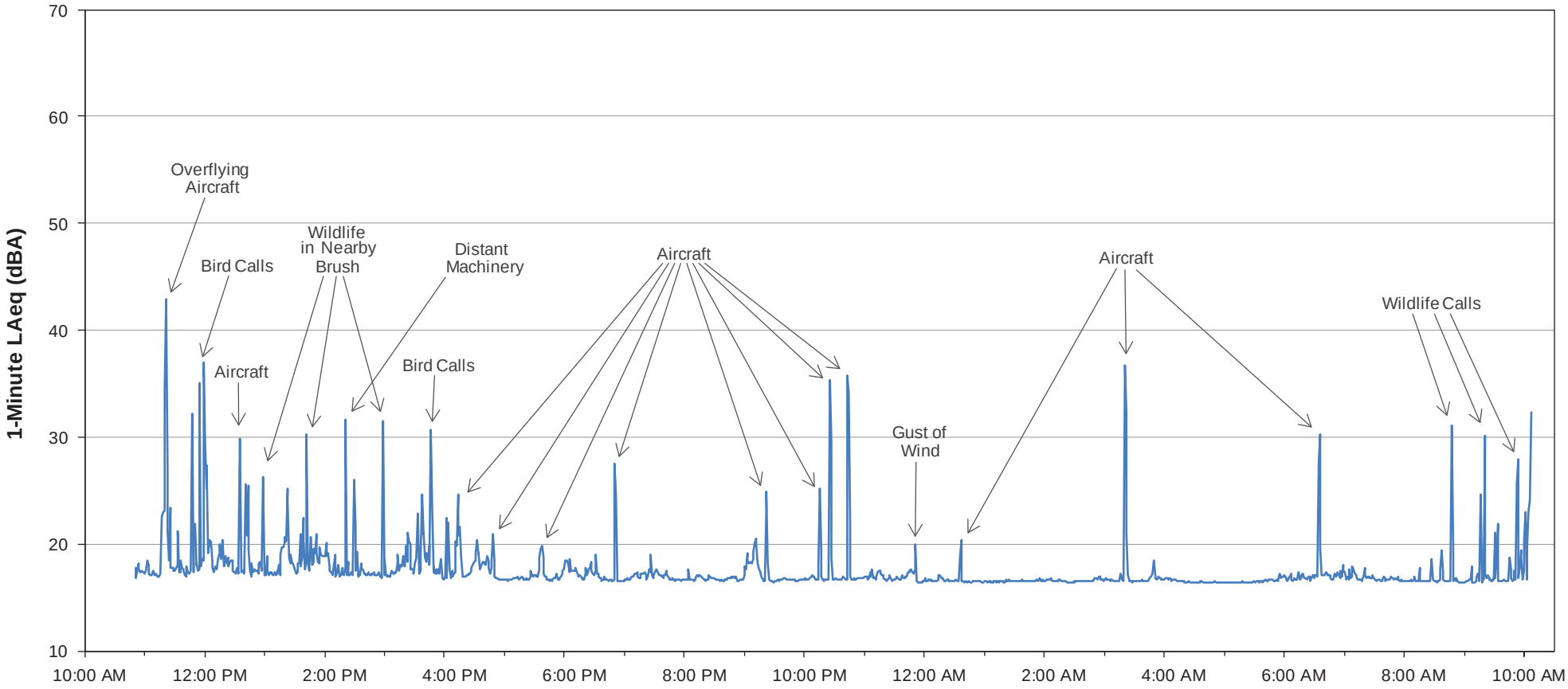


Figure 4-B5

One-minute LAeq Noise Levels, S-Rail, December 15 - 16, 2017

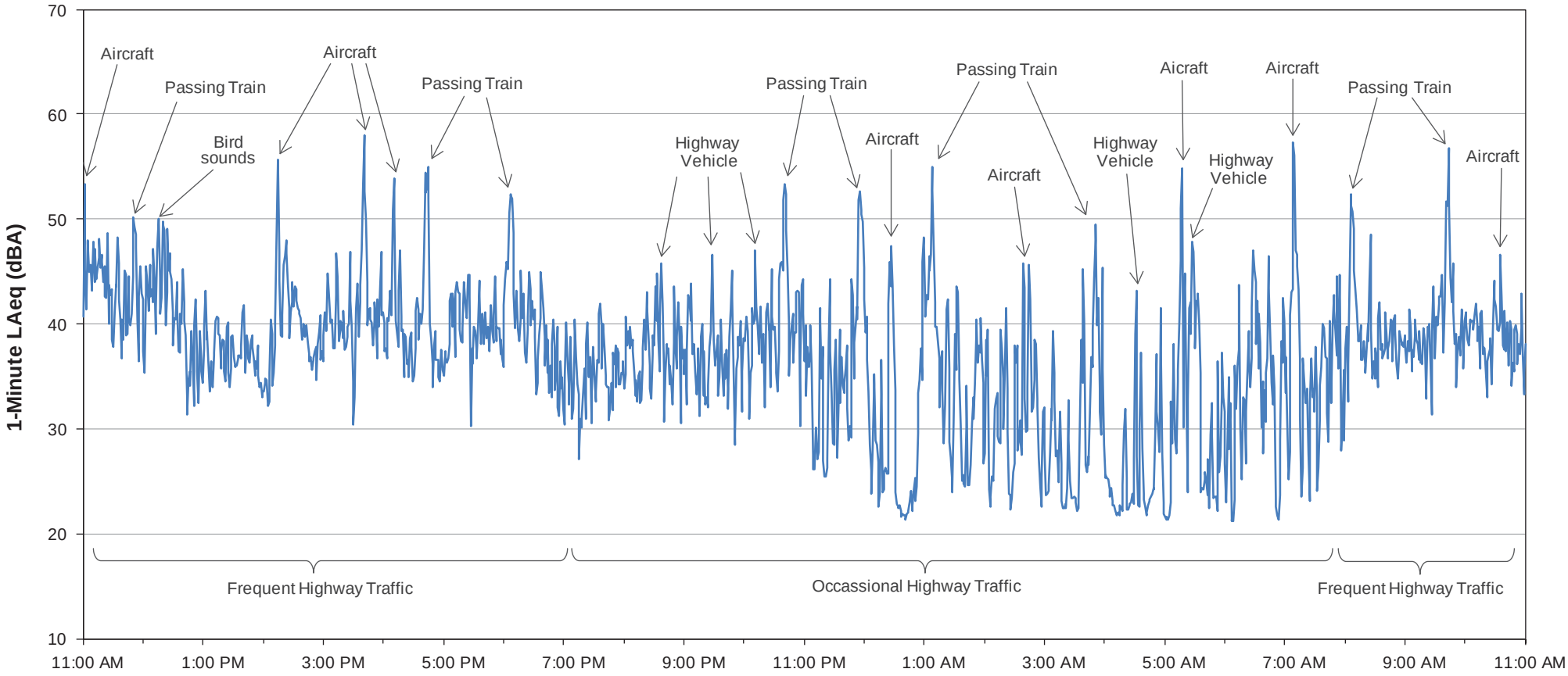


Figure 4-B6

One-minute LAeq Noise Levels, S-Plant, March 20 - 21, 2018

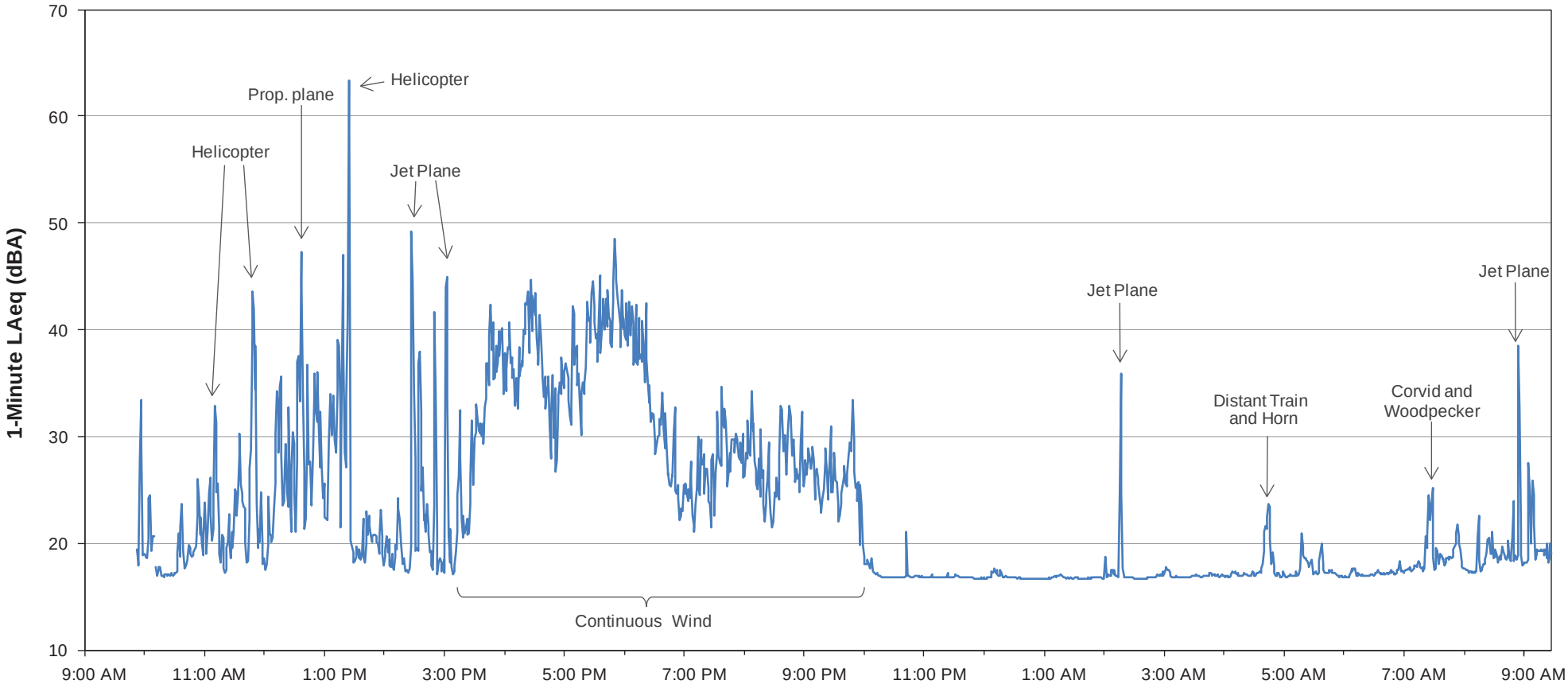


Figure 4-B7

One-minute LAeq Noise Levels, S-TenasDep, March 21 - 22, 2018

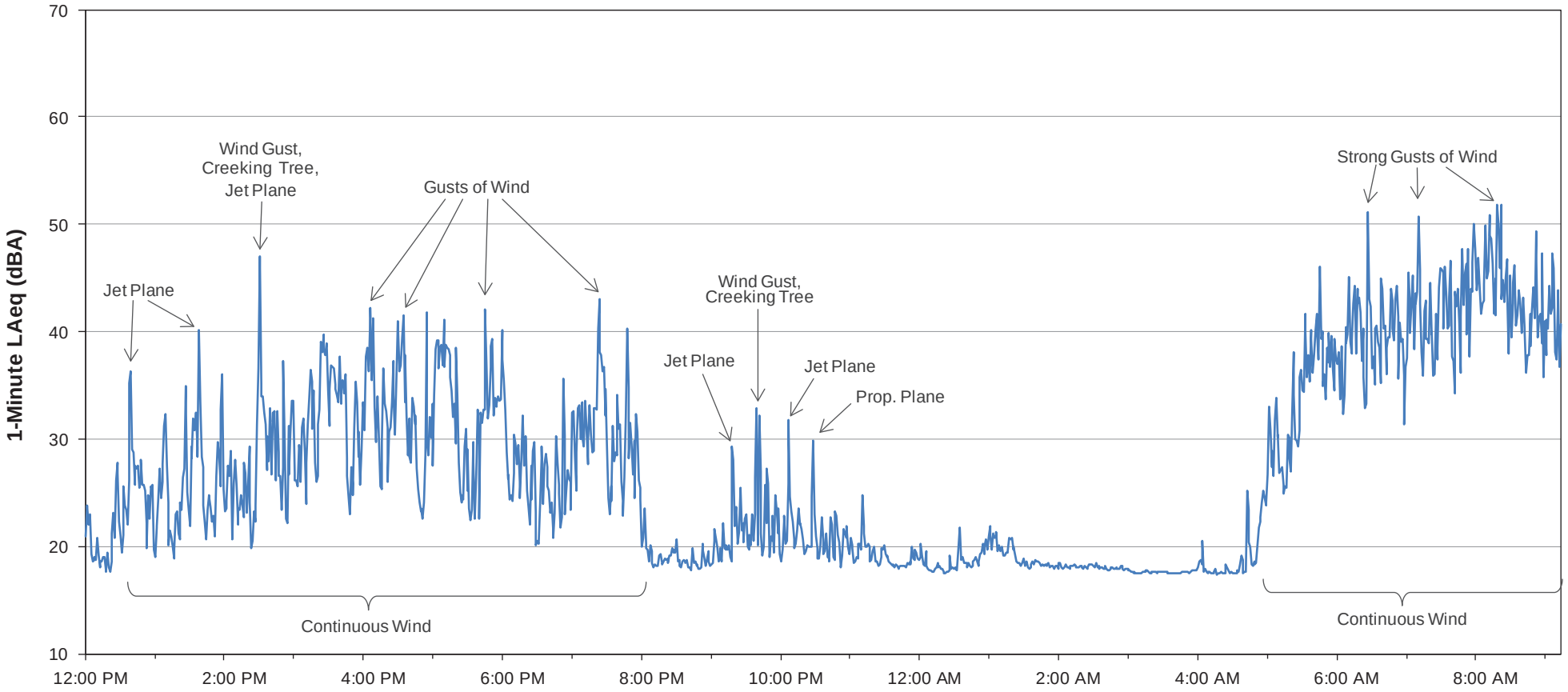
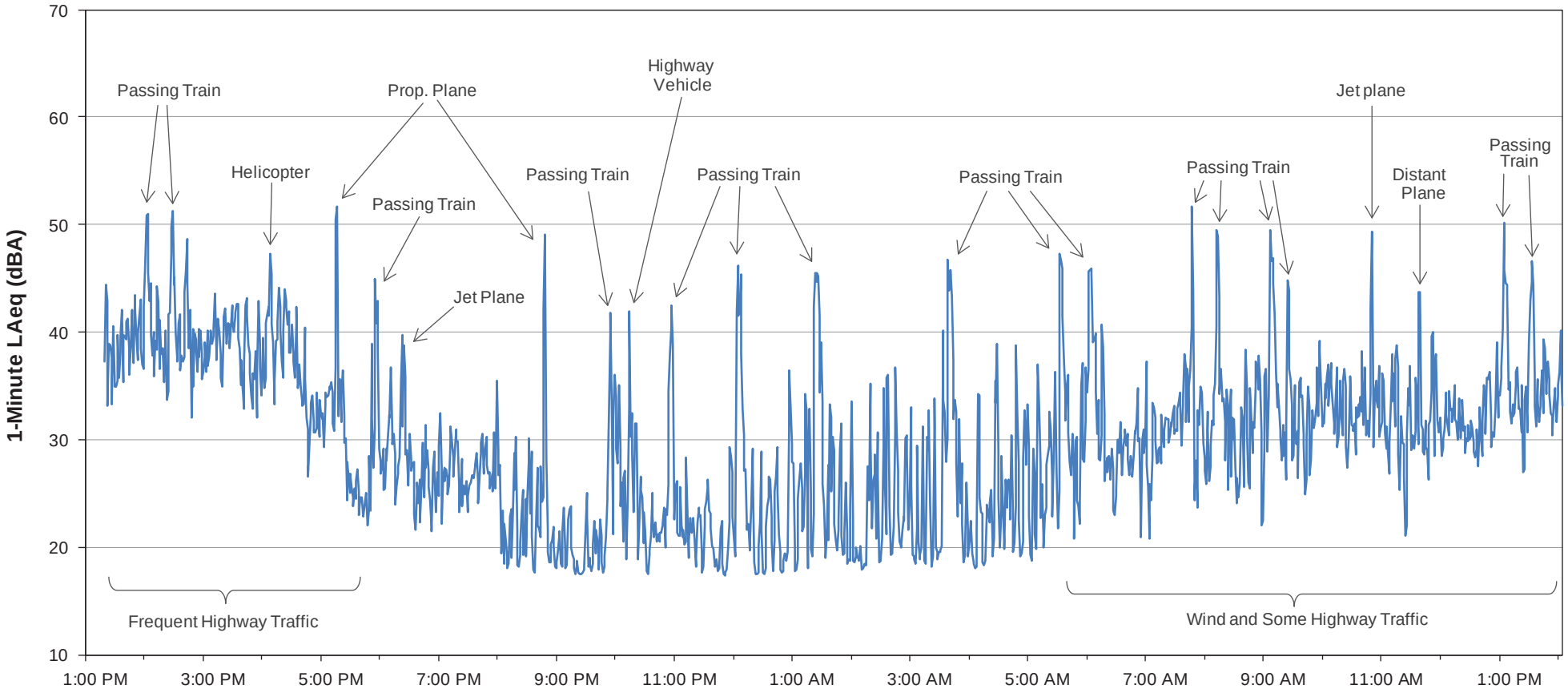


Figure 4-B8

One-minute LAeq Noise Levels, S-Rail, March 22 - 23, 2018



Appendix 4-C

Baseline Noise Monitoring Hourly Data Tables

Appendix 4-C1. Noise Monitoring Summary for S-Plant, October 16 to 17, 2017

									Weather Conditions Measured at Tenas Deposit Met. Stn.		
Period	**Start Time**	**End time**	**Duration (hh:mm)**	**LAeq**	**LAmax**	**LA10**	**LA90**	**LAmin**	**Mean Wind Speed (m/s)**	**Mean Air Temp. (°C)**	**Total Precipitation (mm)**
Time Block 1	12:18, Oct. 16	13:00, Oct. 16	0:42	24.6	44.5	25.3	20.6	19.8	n/a. sensor frozen	0.4	1.0
Time Block 2	13:00, Oct. 16	14:00, Oct. 16	1:00	47.9	71.1	44.0	21.4	20.1	n/a. sensor frozen	0.8	1.0
Time Block 3	14:00, Oct. 16	15:00, Oct. 16	1:00	39.5	61.9	32.1	24.2	22.9	1.1	0.8	0.5
Time Block 4	15:00, Oct. 16	16:00, Oct. 16	1:00	29.9	54.9	32.4	23.5	22.6	0.6	0.9	0.0
Time Block 5	16:00, Oct. 16	17:00, Oct. 16	1:00	23.4	34.7	24.4	22.4	21.4	1.1	0.3	0.0
Time Block 6	17:00, Oct. 16	18:00, Oct. 16	1:00	24.9	45.9	25.9	22.6	21.1	1.2	0.4	0.0
Time Block 7	18:00, Oct. 16	19:00, Oct. 16	1:00	22.4	35.0	23.2	21.3	20.5	1.1	0.7	0.0
Time Block 8	19:00, Oct. 16	20:00, Oct. 16	1:00	21.7	38.9	21.5	20.1	19.2	0.8	0.6	0.6
Time Block 9	20:00, Oct. 16	21:00, Oct. 16	1:00	23.6	36.3	24.7	22.0	20.8	0.2	0.4	1.4
Time Block 10	21:00, Oct. 16	22:00, Oct. 16	1:00	28.7	45.3	30.3	25.1	24.1	0.4	0.1	2.0
Time Block 11	22:00, Oct. 16	23:00, Oct. 16	1:00	29.0	40.4	30.8	26.5	25.6	n/a. sensor frozen	0.0	1.5
Time Block 12	23:00, Oct. 16	00:00, Oct. 17	1:00	26.0	40.2	27.5	22.9	21.5	n/a. sensor frozen	0.0	2.1
Time Block 13	00:00, Oct. 17	01:00, Oct. 17	1:00	21.6	34.1	22.7	20.6	19.8	n/a. sensor frozen	-0.4	3.0
Time Block 14	01:00, Oct. 17	02:00, Oct. 17	1:00	29.0	47.6	26.9	20.9	19.5	n/a. sensor frozen	-0.2	1.9
Time Block 15	02:00, Oct. 17	03:00, Oct. 17	1:00	27.0	46.2	27.4	23.3	19.9	n/a. sensor frozen	0.1	0.8
Time Block 16	03:00, Oct. 17	04:00, Oct. 17	1:00	22.3	37.8	25.4	18.7	17.5	n/a. sensor frozen	0.1	0.3
Time Block 17	04:00, Oct. 17	05:00, Oct. 17	1:00	20.1	35.3	20.7	19.5	18.7	n/a. sensor frozen	0.2	0.1
Time Block 18	05:00, Oct. 17	06:00, Oct. 17	1:00	23.1	37.1	24.8	20.7	19.3	n/a. sensor frozen	-0.1	0.2
Time Block 19	06:00, Oct. 17	07:00, Oct. 17	1:00	27.2	43.4	30.2	22.2	20.8	n/a. sensor frozen	-0.4	0.0
Time Block 20	07:00, Oct. 17	08:00, Oct. 17	1:00	25.0	37.9	27.7	21.6	20.6	n/a. sensor frozen	-0.4	0.0
Time Block 21	08:00, Oct. 17	09:00, Oct. 17	1:00	34.3	62.6	36.2	26.1	23.9	n/a. sensor frozen	-0.1	0.0
Time Block 22	09:00, Oct. 17	10:00, Oct. 17	1:00	37.6	55.0	40.2	29.7	25.8	n/a. sensor frozen	0.2	0.2
Time Block 23	10:00, Oct. 17	11:00, Oct. 17	1:00	36.5	50.4	39.1	32.7	30.0	1.9	1.1	2.6
Time Block 24	11:00, Oct. 17	12:00, Oct. 17	1:00	31.7	44.9	33.8	29.0	25.7	1.7	1.7	0.0
Time Block 25	12:00, Oct. 17	12:48, Oct. 17	0:48	35.8	54.4	38.3	26.9	22.3	1.8	2.2	0.0
Overall											
Total (Day and Night)	12:18, Oct. 16	12:48, Oct. 17	24:30	35.9	71.1	33.9	20.7	17.5			
Daytime Period[1]	12:18, Oct. 16	12:48, Oct. 17	15:30	37.7	71.1	35.8	21.5	19.2			
Nighttime Period[1]	22:00, Oct. 16	07:00, Oct. 17	9:00	26.1	47.6	28.4	20.0	17.5			
Excluded Period[2]	11:48, Oct. 16	12:18, Oct. 16	0:29	55.0	76.2	51.5	21.7	20.8			

Notes:

[1] *Daytime noise occurs between 7:00 and 22:00; Nighttime noise occurs between 22:00 and 7:00.*

[2] *Excluded periods were times when the noise monitor recorded sounds from the noise field crew such as during instrument setup and travel to/from the station.*

Appendix 4-C2. Noise Monitoring Summary for S-TenasDep, October 17 to 18, 2017

									Weather Conditions Measured at Tenas Deposit Met. Stn.		
Period	**Start time**	**End time**	**Duration (hh:mm)**	**LAeq**	**LAmax**	**LA10**	**LA90**	**LAmin**	**Mean Wind Speed (m/s)**	**Mean Air Temp. (°C)**	**Total Precipitation (mm)**
Time Block 1	17:40, Oct. 17	18:00, Oct. 17	0:20	32.4	64.3	35.3	24.2	21.3	1.0	-0.1	0.0
Time Block 2	18:00, Oct. 17	19:00, Oct. 17	1:00	26.6	60.0	28.3	20.2	19.0	1.3	-0.1	0.0
Time Block 3	19:00, Oct. 17	20:00, Oct. 17	1:00	21.1	42.9	22.1	18.6	17.9	1.0	-0.8	0.0
Time Block 4	20:00, Oct. 17	21:00, Oct. 17	1:00	18.4	33.3	19.1	17.4	16.9	0.8	-0.8	0.0
Time Block 5	21:00, Oct. 17	22:00, Oct. 17	1:00	18.9	35.6	18.9	17.9	17.2	0.7	-1.1	0.0
Time Block 6	22:00, Oct. 17	23:00, Oct. 17	1:00	17.7	27.7	18.3	17.2	16.8	1.0	-1.3	0.0
Time Block 7	23:00, Oct. 17	00:00, Oct. 18	1:00	17.3	41.0	17.6	17.0	16.7	0.8	-1.5	0.0
Time Block 8	00:00, Oct. 18	01:00, Oct. 18	1:00	19.3	39.0	19.5	17.1	16.6	1.1	-0.8	0.0
Time Block 9	01:00, Oct. 18	02:00, Oct. 18	1:00	17.3	34.6	17.4	17.0	16.7	1.4	-1.2	0.0
Time Block 10	02:00, Oct. 18	03:00, Oct. 18	1:00	18.8	39.6	18.0	17.0	16.6	0.8	-1.4	0.0
Time Block 11	03:00, Oct. 18	04:00, Oct. 18	1:00	17.5	31.8	17.9	17.1	16.7	1.3	-1.2	0.1
Time Block 12	04:00, Oct. 18	05:00, Oct. 18	1:00	20.5	40.5	20.4	17.5	17.0	2.5	-0.9	0.2
Time Block 13	05:00, Oct. 18	06:00, Oct. 18	1:00	26.8	42.3	29.3	20.7	18.6	2.9	-1.1	0.4
Time Block 14	06:00, Oct. 18	07:00, Oct. 18	1:00	28.9	48.0	30.5	21.6	19.9	1.7	-1.0	0.4
Time Block 15	07:00, Oct. 18	08:00, Oct. 18	1:00	25.3	46.1	27.4	18.4	17.8	1.4	-0.8	0.2
Time Block 16	08:00, Oct. 18	09:00, Oct. 18	1:00	27.5	48.4	25.5	18.8	17.8	0.8	-0.6	0.3
Time Block 17	09:00, Oct. 18	10:00, Oct. 18	1:00	28.5	57.6	24.1	17.4	16.9	1.3	-0.5	0.2
Time Block 18	10:00, Oct. 18	11:00, Oct. 18	1:00	17.8	39.6	17.4	16.8	16.5	1.3	-0.2	0.0
Time Block 19	11:00, Oct. 18	12:00, Oct. 18	1:00	31.1	60.0	19.1	16.7	16.4	0.9	0.3	0.0
Time Block 20	12:00, Oct. 18	13:00, Oct. 18	1:00	24.0	57.2	21.4	16.6	16.3	0.5	1.4	0.0
Time Block 21	13:00, Oct. 18	14:00, Oct. 18	1:00	23.2	52.6	24.4	17.3	16.6	0.6	1.1	0.0
Time Block 22	14:00, Oct. 18	15:00, Oct. 18	1:00	34.7	62.6	32.7	22.0	18.8	1.0	0.8	0.8
Time Block 23	15:00, Oct. 18	16:00, Oct. 18	1:00	30.6	59.0	32.1	24.4	21.3	1.0	0.7	0.0
Time Block 24	16:00, Oct. 18	17:00, Oct. 18	1:00	31.9	61.1	33.5	26.8	23.6	0.8	0.1	0.0
Time Block 25	17:00, Oct. 18	18:00, Oct. 18	1:00	29.4	58.9	31.8	23.3	19.7	0.9	-0.4	0.0
Time Block 26	18:00, Oct. 18	18:18, Oct. 18	0:18	27.0	47.3	29.9	21.4	19.3	0.9	-0.7	0.0
Overall											
Total (Day and Night)	17:40, Oct. 17	18:18, Oct. 18	24:38	27.3	64.3	28.4	17.1	16.3			
Daytime Period[1]	17:40, Oct. 17	18:18, Oct. 18	15:38	28.6	64.3	29.5	17.0	16.3			
Nighttime Period[1]	22:00, Oct. 17	07:00, Oct. 18	9:00	22.9	48.0	25.3	17.1	16.6			
Excluded Period[2]	17:18, Oct. 17	17:40, Oct. 17	0:21	46.6	80.4	46.7	25.5	22.8			

Notes:

[1] *Daytime noise occurs between 7:00 and 22:00; Nighttime noise occurs between 22:00 and 7:00.*

[2] *Excluded periods were times when the noise monitor recorded sounds from the noise field crew such as during instrument setup and travel to/from the station.*

Appendix 4-C3. Noise Monitoring Summary for S-Plant, December 12 to 13, 2017

									Weather Conditions Measured at Tenas Deposit Met. Stn.		
Period	**Start time**	**End time**	**Duration (hh:mm)**	**LAeq**	**LAmax**	**LA10**	**LA90**	**LAmin**	**Mean Wind Speed (m/s)**	**Mean Air Temp. (°C)**	**Total Precipitation (mm)**
Time Block 1	12:18, Dec. 12	13:00, Dec. 12	0:42	18.5	44.3	19.0	17.5	17.0	1.1	2.4	0.0
Time Block 2	13:00, Dec. 12	14:00, Dec. 12	1:00	22.4	50.3	21.3	18.4	17.5	1.3	2.7	0.0
Time Block 3	14:00, Dec. 12	15:00, Dec. 12	1:00	20.8	48.4	22.1	18.9	17.8	0.8	2.0	0.0
Time Block 4	15:00, Dec. 12	16:00, Dec. 12	1:00	25.7	50.3	22.8	19.0	18.0	0.4	0.9	0.0
Time Block 5	16:00, Dec. 12	17:00, Dec. 12	1:00	26.8	49.0	20.2	17.8	17.2	0.6	0.8	0.0
Time Block 6	17:00, Dec. 12	18:00, Dec. 12	1:00	20.6	44.3	19.2	17.3	16.8	0.3	0.5	0.0
Time Block 7	18:00, Dec. 12	19:00, Dec. 12	1:00	18.8	35.4	19.0	17.1	16.7	0.3	0.2	0.1
Time Block 8	19:00, Dec. 12	20:00, Dec. 12	1:00	17.7	25.8	18.1	17.3	16.9	0.9	0.1	0.0
Time Block 9	20:00, Dec. 12	21:00, Dec. 12	1:00	17.7	24.6	18.1	17.4	17.0	0.4	0.1	0.0
Time Block 10	21:00, Dec. 12	22:00, Dec. 12	1:00	20.5	46.9	19.7	17.0	16.6	0.3	-0.1	0.0
Time Block 11	22:00, Dec. 12	23:00, Dec. 12	1:00	17.8	26.6	18.2	17.3	16.9	0.5	-0.1	0.0
Time Block 12	23:00, Dec. 12	00:00, Dec. 13	1:00	20.4	39.7	20.7	17.5	16.9	1.0	0.2	0.0
Time Block 13	00:00, Dec. 13	01:00, Dec. 13	1:00	18.2	36.5	18.9	17.6	17.1	1.2	-0.5	0.0
Time Block 14	01:00, Dec. 13	02:00, Dec. 13	1:00	18.4	31.0	19.3	17.5	17.0	0.8	-1.1	0.0
Time Block 15	02:00, Dec. 13	03:00, Dec. 13	1:00	20.5	50.0	18.9	17.3	16.5	1.5	-1.1	0.0
Time Block 16	03:00, Dec. 13	04:00, Dec. 13	1:00	27.6	53.0	19.6	17.3	16.7	0.5	-1.3	0.0
Time Block 17	04:00, Dec. 13	05:00, Dec. 13	1:00	20.0	41.6	19.8	17.2	16.7	0.8	-1.4	0.0
Time Block 18	05:00, Dec. 13	06:00, Dec. 13	1:00	19.1	40.8	20.2	17.9	17.1	0.9	-1.3	0.0
Time Block 19	06:00, Dec. 13	07:00, Dec. 13	1:00	18.4	24.6	19.2	17.7	16.9	0.8	-1.8	0.0
Time Block 20	07:00, Dec. 13	08:00, Dec. 13	1:00	18.2	41.6	19.0	17.3	16.7	0.7	-2.2	0.0
Time Block 21	08:00, Dec. 13	09:00, Dec. 13	1:00	19.9	44.6	21.7	17.7	16.8	0.5	-2.6	0.0
Time Block 22	09:00, Dec. 13	10:00, Dec. 13	1:00	20.5	33.9	22.1	18.6	17.3	0.7	-2.2	0.0
Time Block 23	10:00, Dec. 13	11:00, Dec. 13	1:00	18.6	28.8	19.9	17.0	16.6	0.3	-1.5	0.0
Time Block 24	11:00, Dec. 13	12:00, Dec. 13	1:00	17.9	26.8	18.5	17.3	16.6	0.6	-1.7	0.0
Time Block 25	12:00, Dec. 13	12:55, Dec. 13	0:55	18.9	39.0	20.2	17.2	16.7	0.5	0.1	0.0
Overall											
Total (Day and Night)	12:18, Dec. 12	12:55, Dec. 13	24:37	21.3	53.0	20.4	17.4	16.5			
Daytime Period[1]	12:18, Dec. 12	12:55, Dec. 13	15:37	21.3	50.3	20.8	17.3	16.6			
Nighttime Period[1]	22:00, Dec. 12	07:00, Dec. 13	9:00	21.4	53.0	19.5	17.4	16.5			
Excluded Period[2]	11:55, Dec. 12	12:18, Dec. 12	0:22	68.9	90.2	71.7	19.1	17.4			

Notes:

[1] *Daytime noise occurs between 7:00 and 22:00; Nighttime noise occurs between 22:00 and 7:00.*

[2] *Excluded periods were times when the noise monitor recorded sounds from the noise field crew such as during instrument setup and travel to/from the station.*

Appendix 4-C4. Noise Monitoring Summary for S-TenasDep, December 11 to 12, 2017

									Weather Conditions Measured at Tenas Deposit Met. Stn.		
Period	**Start time**	**End time**	**Duration (hh:mm)**	**LAeq**	**LAmax**	**LA10**	**LA90**	**LAmin**	**Mean Wind Speed (m/s)**	**Mean Air Temp. (°C)**	**Total Precipitation (mm)**
Time Block 1	10:54, Dec. 11	11:00, Dec. 11	0:06	17.4	20.9	17.9	17.0	16.7	0.1	-1.0	0.0
Time Block 2	11:00, Dec. 11	12:00, Dec. 11	1:00	27.9	54.1	23.0	16.9	16.5	0.3	-0.1	0.0
Time Block 3	12:00, Dec. 11	13:00, Dec. 11	1:00	21.0	49.4	20.6	17.0	16.5	0.5	-0.5	0.0
Time Block 4	13:00, Dec. 11	14:00, Dec. 11	1:00	19.9	48.1	20.2	16.9	16.5	0.4	0.2	0.0
Time Block 5	14:00, Dec. 11	15:00, Dec. 11	1:00	20.4	55.4	18.5	16.8	16.4	0.1	-0.5	0.0
Time Block 6	15:00, Dec. 11	16:00, Dec. 11	1:00	19.7	54.3	19.0	16.9	16.3	0.2	-1.6	0.0
Time Block 7	16:00, Dec. 11	17:00, Dec. 11	1:00	18.5	43.8	19.6	16.7	16.3	0.6	-2.5	0.0
Time Block 8	17:00, Dec. 11	18:00, Dec. 11	1:00	17.1	24.0	17.4	16.6	16.3	0.7	-3.1	0.0
Time Block 9	18:00, Dec. 11	19:00, Dec. 11	1:00	18.2	36.1	18.1	16.5	16.2	0.3	-2.9	0.0
Time Block 10	19:00, Dec. 11	20:00, Dec. 11	1:00	17.0	23.1	17.5	16.6	16.3	0.8	-3.2	0.0
Time Block 11	20:00, Dec. 11	21:00, Dec. 11	1:00	16.8	20.9	17.0	16.5	16.2	0.6	-2.9	0.0
Time Block 12	21:00, Dec. 11	22:00, Dec. 11	1:00	17.9	31.5	19.1	16.5	16.1	1.0	-2.3	0.0
Time Block 13	22:00, Dec. 11	23:00, Dec. 11	1:00	23.6	45.0	19.3	16.6	16.3	1.1	-2.7	0.0
Time Block 14	23:00, Dec. 11	00:00, Dec. 12	1:00	17.0	34.6	17.5	16.5	16.1	1.3	-2.1	0.0
Time Block 15	00:00, Dec. 12	01:00, Dec. 12	1:00	16.7	30.5	16.8	16.4	16.1	1.1	-2.1	0.0
Time Block 16	01:00, Dec. 12	02:00, Dec. 12	1:00	16.5	22.4	16.7	16.4	16.1	0.6	-2.2	0.0
Time Block 17	02:00, Dec. 12	03:00, Dec. 12	1:00	16.6	25.1	16.8	16.4	16.1	0.8	-2.2	0.0
Time Block 18	03:00, Dec. 12	04:00, Dec. 12	1:00	21.8	49.9	17.2	16.4	16.1	1.1	-2.3	0.0
Time Block 19	04:00, Dec. 12	05:00, Dec. 12	1:00	16.5	22.2	16.7	16.3	16.1	0.7	-2.3	0.0
Time Block 20	05:00, Dec. 12	06:00, Dec. 12	1:00	16.5	18.2	16.8	16.3	16.1	0.3	-1.9	0.0
Time Block 21	06:00, Dec. 12	07:00, Dec. 12	1:00	18.8	40.9	17.6	16.6	16.2	0.5	-2.6	0.0
Time Block 22	07:00, Dec. 12	08:00, Dec. 12	1:00	16.8	21.9	17.3	16.5	16.1	0.7	-1.7	0.0
Time Block 23	08:00, Dec. 12	09:00, Dec. 12	1:00	18.3	43.7	16.9	16.4	16.1	0.7	-1.3	0.0
Time Block 24	09:00, Dec. 12	10:00, Dec. 12	1:00	19.5	43.1	17.6	16.4	16.1	0.5	-0.3	0.0
Time Block 25	10:00, Dec:12	10:03, Dec:12	0:03	20.7	37.2	23.3	16.4	16.2	1.1	0.7	0.4
Overall											
Total (Day and Night)	10:54, Dec. 11	10:03, Dec. 12	23:09	20.0	55.4	18.1	16.4	16.1			
Daytime Period[1]	10:54, Dec. 11	10:03, Dec. 12	14:09	20.5	55.4	18.7	16.5	16.1			
Nighttime Period[1]	21:59, Dec. 11	07:00, Dec. 12	9:00	19.1	49.9	17.1	16.4	16.1			
Excluded Period[2]	10:17, Dec. 11	10:54, Dec. 11	0:36	49.4	78.0	48.1	16.8	16.4			
Excluded Period[2]	10:03, Dec. 12	10:39, Dec. 12	0:36	50.3	80.4	45.3	16.4	16.2			

Notes:

[1] *Daytime noise occurs between 7:00 and 22:00; Nighttime noise occurs between 22:00 and 7:00.*

[2] *Excluded periods were times when the noise monitor recorded sounds from the noise field crew such as during instrument setup and travel to/from the station.*

Appendix 4-C5. Noise Monitoring Summary for S-Rail, December 15 to 16, 2017

									Weather Conditions Measured at Tenas Deposit Met. Stn.		
Period	**Start time**	**End time**	**Duration (hh:mm)**	**LAeq**	**LAmax**	**LA10**	**LA90**	**LAmin**	**Mean Wind Speed (m/s)**	**Mean Air Temp. (°C)**	**Total Precipitation (mm)**
Time Block 1	10:37, Dec. 15	11:00, Dec. 15	0:23	44.0	55.7	47.9	36.2	26.4	1.0	-2.6	0.0
Time Block 2	11:00, Dec. 15	12:00, Dec. 15	1:00	45.2	70.9	48.5	37.1	32.0	0.8	-1.9	0.0
Time Block 3	12:00, Dec. 15	13:00, Dec. 15	1:00	43.3	62.9	47.2	33.2	26.1	2.4	-1.0	0.0
Time Block 4	13:00, Dec. 15	14:00, Dec. 15	1:00	37.8	49.6	40.6	33.2	28.0	1.8	-0.5	0.0
Time Block 5	14:00, Dec. 15	15:00, Dec. 15	1:00	42.9	60.8	44.2	33.5	28.6	1.1	-1.3	0.0
Time Block 6	15:00, Dec. 15	16:00, Dec. 15	1:00	45.1	66.0	47.0	36.3	26.6	1.2	-2.1	0.0
Time Block 7	16:00, Dec. 15	17:00, Dec. 15	1:00	45.5	61.9	51.7	34.7	30.4	1.9	-2.4	0.0
Time Block 8	17:00, Dec. 15	18:00, Dec. 15	1:00	40.5	50.8	43.7	35.0	26.7	1.4	-3.1	0.0
Time Block 9	18:00, Dec. 15	19:00, Dec. 15	1:00	43.5	55.6	47.0	32.7	28.4	2.0	-3.3	0.0
Time Block 10	19:00, Dec. 15	20:00, Dec. 15	1:00	36.2	47.9	39.5	29.9	25.0	2.2	-3.2	0.0
Time Block 11	20:00, Dec. 15	21:00, Dec. 15	1:00	38.8	53.9	42.2	31.5	25.3	2.2	-3.1	0.0
Time Block 12	21:00, Dec. 15	22:00, Dec. 15	1:00	38.5	52.5	42.1	30.3	23.5	2.3	-3.4	0.0
Time Block 13	22:00, Dec. 15	23:00, Dec. 15	1:00	43.4	56.1	46.6	32.2	25.2	2.4	-3.7	0.0
Time Block 14	23:00, Dec. 15	00:00, Dec. 16	1:00	42.1	57.3	45.2	25.6	22.6	2.2	-4.0	0.0
Time Block 15	00:00, Dec. 16	01:00, Dec. 16	1:00	37.7	55.8	41.0	21.8	20.4	2.4	-4.1	0.0
Time Block 16	01:00, Dec. 16	02:00, Dec. 16	1:00	42.2	60.3	44.1	24.9	22.1	2.2	-3.7	0.0
Time Block 17	02:00, Dec. 16	03:00, Dec. 16	1:00	36.0	53.8	39.2	23.5	20.6	1.7	-3.5	0.0
Time Block 18	03:00, Dec. 16	04:00, Dec. 16	1:00	37.7	56.0	41.0	22.7	21.0	1.2	-3.2	0.0
Time Block 19	04:00, Dec. 16	05:00, Dec. 16	1:00	31.2	51.1	32.7	21.9	20.5	0.9	-3.4	0.0
Time Block 20	05:00, Dec. 16	06:00, Dec. 16	1:00	41.3	63.8	43.1	21.9	20.2	1.3	-3.9	0.0
Time Block 21	06:00, Dec. 16	07:00, Dec. 16	1:00	38.1	55.4	42.5	22.0	19.9	1.0	-3.9	0.0
Time Block 22	07:00, Dec. 16	08:00, Dec. 16	1:00	43.6	70.6	44.8	25.9	21.6	0.9	-4.3	0.0
Time Block 23	08:00, Dec. 16	09:00, Dec. 16	1:00	42.4	55.3	45.3	33.5	27.5	0.8	-4.2	0.0
Time Block 24	09:00, Dec. 16	10:00, Dec. 16	1:00	44.2	64.8	46.1	33.8	26.9	1.2	-3.6	0.0
Time Block 25	10:00, Dec. 16	11:00, Dec. 16	1:00	39.7	56.5	42.1	34.0	28.4	0.7	-3.3	0.0
Time Block 26	11:00, Dec. 16	11:17, Dec. 16	0:17	44.4	53.1	48.8	35.3	30.4	1.7	-2.9	0.0
Overall											
Total (Day and Night)	10:37, Dec. 15	11:17, Dec. 16	24:40	41.9	70.9	44.7	24.9	19.9			
Daytime Period[1]	10:37, Dec. 15	11:17, Dec. 16	15:40	42.7	70.9	45.3	32.4	21.6			
Nighttime Period[1]	22:00, Dec. 15	07:00, Dec. 16	9:00	40.1	63.8	43.0	22.5	19.9			
Excluded Period[2]	10:18, Dec. 15	10:37, Dec. 15	0:19	53.2	78.4	54.7	38.0	29.4			

Notes:

[1] *Daytime noise occurs between 7:00 and 22:00; Nighttime noise occurs between 22:00 and 7:00.*

[2] *Excluded periods were times when the noise monitor recorded sounds from the noise field crew such as during instrument setup and travel to/from the station.*

Appendix 4-C6. Noise Monitoring Summary for S-Rail, December 16 to 17, 2017

									Weather Conditions Measured at Tenas Deposit Met. Stn.		
Period	**Start time**	**End time**	**Duration (hh:mm)**	**LAeq**	**LAmax**	**LA10**	**LA90**	**LAmin**	**Mean Wind Speed (m/s)**	**Mean Air Temp. (°C)**	**Total Precipitation (mm)**
Time Block 1	11:46, Dec. 16	12:00, Dec. 16	0:14	40.4	65.0	43.1	33.7	30.4	1.7	-2.9	0.0
Time Block 2	12:00, Dec. 16	13:00, Dec. 16	1:00	42.3	62.5	41.6	34.6	26.8	1.8	-2.5	0.0
Time Block 3	13:00, Dec. 16	14:00, Dec. 16	1:00	40.6	62.9	42.9	32.3	25.5	1.8	-2.4	0.0
Time Block 4	14:00, Dec. 16	15:00, Dec. 16	1:00	44.6	61.9	45.0	32.1	23.6	1.6	-1.9	0.0
Time Block 5	15:00, Dec. 16	16:00, Dec. 16	1:00	39.0	50.6	42.5	32.3	26.0	1.0	-2.0	0.0
Time Block 6	16:00, Dec. 16	17:00, Dec. 16	1:00	41.7	58.3	42.9	31.5	25.9	1.0	-2.1	0.3
Time Block 7	17:00, Dec. 16	18:00, Dec. 16	1:00	39.8	53.4	43.1	32.9	26.5	1.2	-1.7	0.1
Time Block 8	18:00, Dec. 16	19:00, Dec. 16	1:00	37.7	50.4	40.9	31.9	27.4	1.4	-1.7	0.1
Time Block 9	19:00, Dec. 16	20:00, Dec. 16	1:00	37.6	50.8	41.2	27.8	22.4	1.0	-0.8	0.1
Time Block 10	20:00, Dec. 16	21:00, Dec. 16	1:00	42.3	55.5	47.5	26.2	23.6	1.6	1.1	0.0
Time Block 11	21:00, Dec. 16	22:00, Dec. 16	1:00	43.4	58.5	46.4	29.8	25.9	1.8	1.1	0.2
Time Block 12	22:00, Dec. 16	23:00, Dec. 16	1:00	36.2	53.4	39.4	27.1	24.2	1.7	0.7	0.2
Time Block 13	23:00, Dec. 16	00:00, Dec. 17	1:00	41.2	58.3	44.4	24.4	21.7	1.2	0.6	0.2
Time Block 14	00:00, Dec. 17	01:00, Dec. 17	1:00	40.9	56.1	41.7	24.2	21.1	1.3	0.6	0.1
Time Block 15	01:00, Dec. 17	02:00, Dec. 17	1:00	30.2	48.0	33.5	22.9	20.3	2.0	0.3	0.1
Time Block 16	02:00, Dec. 17	03:00, Dec. 17	1:00	44.3	62.2	43.7	27.0	25.0	3.4	0.0	0.2
Time Block 17	03:00, Dec. 17	04:00, Dec. 17	1:00	30.1	49.9	31.4	26.9	24.7	2.6	-0.7	0.0
Time Block 18	04:00, Dec. 17	05:00, Dec. 17	1:00	31.5	47.5	33.8	27.3	25.5	3.1	-1.1	0.0
Time Block 19	05:00, Dec. 17	06:00, Dec. 17	1:00	44.1	60.9	40.2	26.0	24.0	2.4	-1.7	0.0
Time Block 20	06:00, Dec. 17	07:00, Dec. 17	1:00	41.7	55.0	45.5	26.7	24.1	2.5	-2.1	0.0
Time Block 21	07:00, Dec. 17	08:00, Dec. 17	1:00	34.4	49.6	37.3	29.6	26.1	2.7	-2.3	0.0
Time Block 22	08:00, Dec. 17	09:00, Dec. 17	1:00	43.1	61.4	39.8	28.5	25.3	1.9	-2.6	0.0
Time Block 23	09:00, Dec. 17	10:00, Dec. 17	1:00	44.0	59.1	49.4	31.6	25.4	1.6	-2.5	0.0
Time Block 24	10:00, Dec. 17	11:00, Dec. 17	1:00	37.3	55.3	40.6	28.9	24.9	1.4	-2.1	0.0
Time Block 25	11:00, Dec. 17	12:00, Dec. 17	1:00	43.1	58.0	47.9	32.6	25.1	1.0	-1.8	0.0
Time Block 26	12:00, Dec. 17	12:45, Dec. 17	0:45	38.1	54.7	42.0	28.8	23.4	0.6	-1.1	0.0
Overall											
Total (Day and Night)	11:46, Dec. 16	12:45, Dec. 17	24:59	41.1	65.0	42.3	27.2	20.3			
Daytime Period[1]	11:46, Dec. 16	12:45, Dec. 17	15:59	41.4	65.0	43.0	30.4	22.4			
Nighttime Period[1]	22:00, Dec. 16	07:00, Dec. 17	9:00	40.5	62.2	39.6	25.7	20.3			
Excluded Period[2]	-	-	-	-	-	-	-	-			

Notes:

[1] *Daytime noise occurs between 7:00 and 22:00; Nighttime noise occurs between 22:00 and 7:00.*

[2] *Excluded periods were times when the noise monitor recorded sounds from the noise field crew such as during instrument setup and travel to/from the station.*

Appendix 4-C7. Noise Monitoring Summary for S-Rail, December 17 to 18, 2017

									Weather Conditions Measured at Tenas Deposit Met. Stn.		
Period	**Start time**	**End time**	**Duration (hh:mm)**	**LAeq**	**LAmax**	**LA10**	**LA90**	**LAmin**	**Mean Wind Speed (m/s)**	**Mean Air Temp. (°C)**	**Total Precipitation (mm)**
Time Block 1	13:00, Dec. 17	14:00, Dec. 17	1:00	36.9	53.0	39.8	29.5	22.9	1.2	-0.9	0.0
Time Block 2	14:00, Dec. 17	15:00, Dec. 17	1:00	34.8	49.1	37.7	29.3	25.2	1.9	-1.2	0.0
Time Block 3	15:00, Dec. 17	16:00, Dec. 17	1:00	40.6	52.2	42.9	31.5	26.2	1.8	-2.3	0.0
Time Block 4	16:00, Dec. 17	17:00, Dec. 17	1:00	38.1	52.5	41.6	31.7	26.5	0.8	-3.9	0.0
Time Block 5	17:00, Dec. 17	18:00, Dec. 17	1:00	41.0	56.0	42.5	30.8	26.3	1.3	-4.3	0.0
Time Block 6	18:00, Dec. 17	19:00, Dec. 17	1:00	39.1	53.2	42.5	30.2	23.4	1.8	-4.5	0.0
Time Block 7	19:00, Dec. 17	20:00, Dec. 17	1:00	36.9	58.0	40.1	29.1	22.3	1.9	-4.1	0.0
Time Block 8	20:00, Dec. 17	21:00, Dec. 17	1:00	44.0	57.4	46.9	28.6	21.9	2.0	-4.2	0.0
Time Block 9	21:00, Dec. 17	22:00, Dec. 17	1:00	39.5	55.4	43.2	27.7	22.2	2.0	-4.0	0.0
Time Block 10	22:00, Dec. 17	23:00, Dec. 17	1:00	39.6	56.3	42.5	27.0	22.0	2.2	-4.1	0.0
Time Block 11	23:00, Dec. 17	00:00, Dec. 18	1:00	37.0	52.9	39.2	22.0	20.3	1.1	-5.0	0.0
Time Block 12	00:00, Dec. 18	01:00, Dec. 18	1:00	32.8	50.1	36.9	21.9	20.1	1.6	-5.5	0.0
Time Block 13	01:00, Dec. 18	02:00, Dec. 18	1:00	41.5	52.8	46.6	23.4	20.9	1.5	-5.5	0.0
Time Block 14	02:00, Dec. 18	03:00, Dec. 18	1:00	37.5	50.9	40.8	24.1	20.2	1.6	-6.2	0.0
Time Block 15	03:00, Dec. 18	04:00, Dec. 18	1:00	34.2	50.2	38.1	21.2	19.4	1.1	-5.9	0.0
Time Block 16	04:00, Dec. 18	05:00, Dec. 18	1:00	41.7	56.9	44.4	22.0	18.8	0.9	-6.3	0.0
Time Block 17	05:00, Dec. 18	06:00, Dec. 18	1:00	42.4	58.4	45.2	21.4	19.2	1.1	-5.5	0.0
Time Block 18	06:00, Dec. 18	07:00, Dec. 18	1:00	42.4	55.8	46.5	25.7	19.8	1.0	-5.0	0.0
Time Block 19	07:00, Dec. 18	08:00, Dec. 18	1:00	39.0	55.1	42.6	31.3	23.9	1.8	-4.7	0.0
Time Block 20	08:00, Dec. 18	09:00, Dec. 18	1:00	43.9	57.4	47.5	36.2	29.9	1.4	-4.8	0.0
Time Block 21	09:00, Dec. 18	10:00, Dec. 18	1:00	42.4	67.3	44.6	32.4	27.1	2.0	-4.7	0.0
Time Block 22	10:00, Dec. 18	10:02, Dec. 18	0:02	40.3	48.7	43.5	36.5	34.6	1.1	-4.4	0.0
Overall											
Total (Day and Night)	13:00, Dec. 17	10:02, Dec. 18	21:01	40.3	67.3	43.2	25.1	18.8			
Daytime Period[1]	14:00, Dec. 17	10:02, Dec. 18	11:02	40.8	67.3	43.3	30.3	21.9			
Nighttime Period[1]	22:00, Dec. 17	07:00, Dec. 18	9:00	39.9	58.4	43.3	22.2	18.8			
Excluded Period[2]	10:02, Dec. 18	10:09, Dec. 18	0:07	56.7	76.5	60.3	32.7	29.1			

Notes:

[1] *Daytime noise occurs between 7:00 and 22:00; Nighttime noise occurs between 22:00 and 7:00.*

[2] *Excluded periods were times when the noise monitor recorded sounds from the noise field crew such as during instrument setup and travel to/from the station.*

Table 4-C-8. Noise Monitoring Summary for S-Plant, Mar. 20 to 21, 2018

									Weather Conditions Measured at Tenas Deposit Met. Stn.		
Period	**Start time**	**End time**	**Duration (hh:mm)**	**LAeq**	**LAmax**	**LA10**	**LA90**	**LAmin**	**Mean Wind Speed (m/s)**	**Mean Air Temp. (°C)**	**Total Precipitation (mm)**
Time Block 1	10:13, Mar. 20	11:00, Mar. 20	0:47	19.5	35.7	21.5	16.9	16.5	2.0	3.3	0.0
Time Block 2	11:00, Mar. 20	12:00, Mar. 20	1:00	30.8	54.0	31.6	18.0	17.0	2.4	3.9	0.0
Time Block 3	12:00, Mar. 20	13:00, Mar. 20	1:00	33.9	57.1	35.7	20.3	17.0	1.5	2.2	0.6
Time Block 4	13:00, Mar. 20	14:00, Mar. 20	1:00	45.8	73.3	35.5	18.4	17.4	1.2	2.7	0.2
Time Block 5	14:00, Mar. 20	15:00, Mar. 20	1:00	34.1	61.1	32.0	17.3	16.7	2.3	3.6	0.0
Time Block 6	15:00, Mar. 20	16:00, Mar. 20	1:00	35.3	57.5	38.6	18.2	16.7	2.9	2.8	0.0
Time Block 7	16:00, Mar. 20	17:00, Mar. 20	1:00	38.2	51.1	41.6	30.9	25.0	2.9	2.2	0.0
Time Block 8	17:00, Mar. 20	18:00, Mar. 20	1:00	41.0	60.4	44.0	33.0	27.6	3.1	0.3	0.0
Time Block 9	18:00, Mar. 20	19:00, Mar. 20	1:00	36.4	53.0	40.3	24.1	21.0	2.1	-0.5	0.0
Time Block 10	19:00, Mar. 20	20:00, Mar. 20	1:00	28.1	49.8	30.7	22.5	19.5	2.6	-1.0	0.0
Time Block 11	20:00, Mar. 20	21:00, Mar. 20	1:00	28.6	39.6	32.1	22.8	19.8	1.9	-1.5	0.0
Time Block 12	21:00, Mar. 20	22:00, Mar. 20	1:00	26.8	40.2	29.4	22.3	17.9	2.0	-1.7	0.0
Time Block 13	22:00, Mar. 20	23:00, Mar. 20	1:00	17.2	37.7	17.7	16.7	16.5	1.1	-2.1	0.0
Time Block 14	23:00, Mar. 20	00:00, Mar. 21	1:00	16.8	32.8	17.0	16.6	16.4	1.3	-2.0	0.0
Time Block 15	00:00, Mar. 21	01:00, Mar. 21	1:00	16.9	25.3	17.2	16.6	16.4	0.7	-2.0	0.0
Time Block 16	01:00, Mar. 21	02:00, Mar. 21	1:00	16.8	21.4	17.0	16.6	16.4	0.8	-2.6	0.0
Time Block 17	02:00, Mar. 21	03:00, Mar. 21	1:00	20.8	45.9	17.3	16.6	16.4	1.0	-3.0	0.0
Time Block 18	03:00, Mar. 21	04:00, Mar. 21	1:00	17.0	20.2	17.3	16.7	16.5	1.2	-3.4	0.0
Time Block 19	04:00, Mar. 21	05:00, Mar. 21	1:00	18.2	31.3	20.1	16.8	16.5	1.2	-3.6	0.0
Time Block 20	05:00, Mar. 21	06:00, Mar. 21	1:00	17.6	25.0	18.7	16.8	16.5	1.1	-3.9	0.0
Time Block 21	06:00, Mar. 21	07:00, Mar. 21	1:00	17.2	27.0	17.5	16.9	16.5	1.2	-4.4	0.0
Time Block 22	07:00, Mar. 21	08:00, Mar. 21	1:00	19.4	38.6	20.0	17.4	17.0	1.4	-4.1	0.0
Time Block 23	08:00, Mar. 21	09:00, Mar. 21	1:00	23.5	47.3	20.3	17.2	16.8	2.2	-3.3	0.0
Time Block 24	09:00, Mar. 21	09:28, Mar. 21	0:28	21.1	39.7	23.4	18.1	17.4	2.4	-2.3	0.0
Overall											
Total (Day and Night)	10:13, Mar. 20	09:28, Mar. 21	23:15	35.0	73.3	35.5	16.8	16.4			
Daytime Period[1]	10:13, Mar. 20	09:28, Mar. 21	14:15	37.1	73.3	38.2	17.7	16.5			
Nighttime Period[1]	22:00, Mar. 20	07:00, Mar. 21	9:00	17.8	45.9	17.5	16.7	16.4			
Excluded Period[2]	09:32, Mar. 20	10:13, Mar. 20	0:40	71.1	111.9	54.7	18.2	-3.5			
Excluded Period[2]	09:28, Mar. 21	09:43, Mar. 21	0:15	70.5	89.2	72.8	19.7	18.3			

Notes:

[1] *Daytime noise occurs between 7:00 and 22:00; Nighttime noise occurs between 22:00 and 7:00.*

[2] *Excluded periods were times when the noise monitor recorded sounds from the noise field crew such as during instrument setup and travel to/from the station.*

Appendix 4-C9. Noise Monitoring Summary for S-TenasDep, March 21 to 22, 2018

									Weather Conditions Measured at Tenas Deposit Met. Stn.		
Period	**Start time**	**End time**	**Duration (hh:mm)**	**LAeq**	**LAmax**	**LA10**	**LA90**	**LAmin**	**Mean Wind Speed (m/s)**	**Mean Air Temp. (°C)**	**Total Precipitation (mm)**
Time Block 1	11:42, Mar. 21	12:00, Mar. 21	0:18	19.6	34.2	21.4	18.0	17.5	2.2	0.2	0.0
Time Block 2	12:00, Mar. 21	13:00, Mar. 21	1:00	25.6	49.0	27.8	18.1	17.2	2.9	0.9	0.0
Time Block 3	13:00, Mar. 21	14:00, Mar. 21	1:00	29.0	50.7	32.0	20.1	18.0	2.8	2.9	0.0
Time Block 4	14:00, Mar. 21	15:00, Mar. 21	1:00	32.4	56.9	34.2	21.1	18.9	3.7	3.1	0.0
Time Block 5	15:00, Mar. 21	16:00, Mar. 21	1:00	33.7	48.9	37.7	24.7	21.1	3.6	2.5	0.0
Time Block 6	16:00, Mar. 21	17:00, Mar. 21	1:00	35.2	48.6	38.9	24.4	20.1	3.4	2.3	0.0
Time Block 7	17:00, Mar. 21	18:00, Mar. 21	1:00	35.4	49.4	39.4	23.5	20.6	2.9	2.4	0.0
Time Block 8	18:00, Mar. 21	19:00, Mar. 21	1:00	28.4	45.4	31.1	21.2	19.1	4.0	1.3	0.0
Time Block 9	19:00, Mar. 21	20:00, Mar. 21	1:00	33.1	53.1	36.5	23.7	19.7	2.2	-0.1	0.5
Time Block 10	20:00, Mar. 21	21:00, Mar. 21	1:00	19.0	41.7	20.0	17.9	17.4	3.1	0.2	0.2
Time Block 11	21:00, Mar. 21	22:00, Mar. 21	1:00	23.7	44.3	25.7	18.6	17.8	2.8	0.1	0.4
Time Block 12	22:00, Mar. 21	23:00, Mar. 21	1:00	22.3	46.0	23.8	18.6	17.7	2.2	0.0	0.8
Time Block 13	23:00, Mar. 21	00:00, Mar. 22	1:00	19.3	39.1	20.4	18.0	17.5	2.1	0.1	0.9
Time Block 14	00:00, Mar. 22	01:00, Mar. 22	1:00	18.7	35.9	19.7	17.6	17.2	1.3	-0.4	2.5
Time Block 15	01:00, Mar. 22	02:00, Mar. 22	1:00	19.2	30.3	20.7	17.9	17.5	1.3	-0.6	1.9
Time Block 16	02:00, Mar. 22	03:00, Mar. 22	1:00	18.1	24.5	18.4	17.7	17.3	1.3	-0.7	0.2
Time Block 17	03:00, Mar. 22	04:00, Mar. 22	1:00	17.6	25.8	17.8	17.4	17.2	1.9	-1.1	0.1
Time Block 18	04:00, Mar. 22	05:00, Mar. 22	1:00	19.7	44.3	21.8	17.4	17.1	4.4	-2.0	0.6
Time Block 19	05:00, Mar. 22	06:00, Mar. 22	1:00	36.7	57.9	40.0	24.3	19.9	5.3	-2.9	0.4
Time Block 20	06:00, Mar. 22	07:00, Mar. 22	1:00	41.1	68.0	44.4	32.1	26.5	7.0	-3.3	1.0
Time Block 21	07:00, Mar. 22	08:00, Mar. 22	1:00	43.7	68.8	47.4	34.8	30.1	7.4	-3.8	1.2
Time Block 22	08:00, Mar. 22	09:00, Mar. 22	1:00	45.2	63.4	48.8	36.5	31.3	6.6	-4.0	1.4
Time Block 23	09:00, Mar. 22	09:14, Mar. 22	0:14	42.6	59.3	46.2	34.7	30.9	5.9	-3.9	1.2
Overall											
Total (Day and Night)	11:42, Mar. 21	09:14, Mar. 22	21:32	36.4	68.8	39.5	17.8	17.1			
Daytime Period[1]	11:42, Mar. 21	09:14, Mar. 22	12:32	37.8	68.8	40.9	18.9	17.2			
Nighttime Period[1]	22:00, Mar. 21	07:00, Mar. 22	9:00	33.1	68.0	36.6	17.6	17.1			
Excluded Period[2]	10:48, Mar. 21	11:42, Mar. 21	0:53	51.1	80.6	40.8	19.1	17.6			
Excluded Period[2]	09:14, Mar. 22	09:35, Mar. 22	0:21	56.7	82.5	52.9	33.0	27.8			

Notes:

[1] *Daytime noise occurs between 7:00 and 22:00; Nighttime noise occurs between 22:00 and 7:00.*

[2] *Excluded periods were times when the noise monitor recorded sounds from the noise field crew such as during instrument setup and travel to/from the station.*

Appendix 4-C10. Noise Monitoring Summary for S-Rail, March 22 to 23, 2018

									Weather Conditions Measured at Tenas Deposit Met. Stn.		
Period	**Start time**	**End time**	**Duration (hh:mm)**	**LAeq**	**LAmax**	**LA10**	**LA90**	**LAmin**	**Mean Wind Speed (m/s)**	**Mean Air Temp. (°C)**	**Total Precipitation (mm)**
Time Block 1	13:10, Mar. 22	14:00, Mar. 22	0:50	51.3	80.4	44.1	33.7	26.5	2.9	-4.2	0.2
Time Block 2	14:00, Mar. 22	15:00, Mar. 22	1:00	43.3	54.4	47.6	34.1	25.9	2.4	-4.0	1.1
Time Block 3	15:00, Mar. 22	16:00, Mar. 22	1:00	39.5	50.6	42.4	33.7	26.0	1.2	-4.0	1.4
Time Block 4	16:00, Mar. 22	17:00, Mar. 22	1:00	39.3	51.7	43.0	30.2	24.2	1.4	-4.0	1.8
Time Block 5	17:00, Mar. 22	18:00, Mar. 22	1:00	38.3	61.6	37.7	23.3	20.8	1.8	-4.2	1.3
Time Block 6	18:00, Mar. 22	19:00, Mar. 22	1:00	30.2	51.4	31.6	22.0	19.3	1.7	-4.4	1.0
Time Block 7	19:00, Mar. 22	20:00, Mar. 22	1:00	28.0	38.8	30.8	23.0	19.4	1.4	-4.5	0.8
Time Block 8	20:00, Mar. 22	21:00, Mar. 22	1:00	32.7	57.3	28.6	18.1	17.3	1.4	-4.7	0.4
Time Block 9	21:00, Mar. 22	22:00, Mar. 22	1:00	28.2	45.6	25.8	17.6	17.1	1.1	-4.9	0.2
Time Block 10	22:00, Mar. 22	23:00, Mar. 22	1:00	31.6	51.9	34.6	18.5	17.2	1.5	-5.1	0.4
Time Block 11	23:00, Mar. 22	00:00, Mar. 23	1:00	22.7	38.0	25.9	17.7	17.1	1.4	-5.5	0.4
Time Block 12	00:00, Mar. 23	01:00, Mar. 23	1:00	33.9	51.0	36.3	17.5	17.1	0.8	-5.7	0.3
Time Block 13	01:00, Mar. 23	02:00, Mar. 23	1:00	35.2	48.2	38.6	18.6	17.3	0.4	-5.8	0.2
Time Block 14	02:00, Mar. 23	03:00, Mar. 23	1:00	28.0	49.8	31.7	18.3	17.5	0.5	-6.0	0.2
Time Block 15	03:00, Mar. 23	04:00, Mar. 23	1:00	35.5	52.2	38.5	18.5	17.7	0.6	-6.3	0.2
Time Block 16	04:00, Mar. 23	05:00, Mar. 23	1:00	28.7	50.1	32.0	18.6	17.5	0.2	-6.8	0.1
Time Block 17	05:00, Mar. 23	06:00, Mar. 23	1:00	35.8	51.7	37.8	20.1	17.9	0.3	-6.6	0.0
Time Block 18	06:00, Mar. 23	07:00, Mar. 23	1:00	36.1	49.4	39.8	22.8	19.4	0.4	-6.7	0.1
Time Block 19	07:00, Mar. 23	08:00, Mar. 23	1:00	36.7	57.1	36.6	24.0	19.2	0.3	-6.4	0.0
Time Block 20	08:00, Mar. 23	09:00, Mar. 23	1:00	37.0	52.1	38.0	23.4	19.4	0.6	-5.5	0.0
Time Block 21	09:00, Mar. 23	10:00, Mar. 23	1:00	38.9	55.4	43.6	26.2	21.1	0.9	-4.9	0.0
Time Block 22	10:00, Mar. 23	11:00, Mar. 23	1:00	36.0	62.1	37.0	28.1	22.3	1.1	-4.7	0.0
Time Block 23	11:00, Mar. 23	12:00, Mar. 23	1:00	34.6	57.5	36.8	25.8	19.3	1.4	-4.0	0.1
Time Block 24	12:00, Mar. 23	13:00, Mar. 23	1:00	32.4	47.1	35.4	27.6	23.0	1.1	-2.5	0.0
Time Block 25	13:00, Mar. 23	14:00, Mar. 23	1:00	39.2	56.0	43.9	29.4	21.4	1.1	-2.0	0.0
Time Block 26	14:00, Mar. 23	14:04, Mar. 23	0:04	37.1	54.7	38.8	31.5	29.1	1.1	-1.4	0.0
Overall											
Total (Day and Night)	13:10, Mar. 22	14:04, Mar. 23	24:54	39.4	80.4	40.0	19.1	17.1			
Daytime Period[1]	13:10, Mar. 22	14:04, Mar. 23	15:54	40.9	80.4	41.0	21.9	17.1			
Nighttime Period[1]	22:00, Mar. 22	07:00, Mar. 23	9:00	33.5	52.2	35.3	18.4	17.1			
Excluded Period[2]	13:04, Mar. 22	13:10, Mar. 22	0:05	63.4	80.9	67.6	42.3	34.6			
Excluded Period[2]	10:10, Mar. 23	10:11, Mar. 23	0:01	86.6	112.6	83.0	29.2	-3.6			

Notes:

[1] *Daytime noise occurs between 7:00 and 22:00; Nighttime noise occurs between 22:00 and 7:00.*

[2] *Excluded periods were times when the noise monitor recorded sounds from the noise field crew such as during instrument setup and travel to/from the station.*

Appendix 5-A

Existing Monitoring Well Data Tables

Appendix 5-A, Table 1 - Existing Monitoring Well Inspection Results, July 2017

Well ID	Geology Type	UTM Coordinates (zone 9N)		Ground Elevation (masl)[1]	Groundwater Surface Elevation (masl)	Depth to Water (mbtoc)	Stick-up (mags)	Diameter (in)	Screen Top (mbgs)	Screen Bottom (mbgs)	Depth to bottom (mbtoc)	Date Inspection (2017)	Damaged (y/n)	Dry (y/n)	July 2017 note:
T95R-15C	BDR	6051998	617062	886	886.63	0.45	1.08	2	48.0	63.0	62.17	July 26th	No	No	There is a crack in the upper part of the well but it is functional. There is no cap and no protective steel lid. Water level is above the ground surface.
T95R-39C	BDR	6050869	617336	993	n/a	n/a	n/a	2	51.2	58.4	n/a	July 25th	Yes	n/a	Upper part of the well and casing are destroyed. Fragments of the 2" PVC found along with the dedicated bailer lying in the mud.
T95R-40	BDR	6051461	618188	906	898.32	7.95	0.26	2	42.0	53.0	52.24	July 25th	No	No	The dedicated bailer fell down into the well.
T95R-64	BDR	6050597	618278	947	940.69	7.54	1.23	2	85.0	94.0	>90	July 25th	No	No	Dedicated bailer.
T96R-16-19	BDR	6050613	616954	1022	1020.06	2.69	0.75	2	13.1	19.1	18.61	July 25th	No	No	No dedicated bailer, well is in good shape.
T96R-16-28	BDR	6050613	616954	1022	1020.13	2.69	0.82	2	24.5	27.5	28.58	July 25th	No	No	Dedicated bailer.
T96R-34-67[2]	BDR	6051180	617691	940	***940.41***	***0.53***	0.94	2	66.2	67.5	68.67	July 25th	Yes	No	No cap on the well.
T96R-34-87	BDR	6051180	617691	940	940.13	0.85	0.97	2	80.6	86.6	86.83	July 25th	No	No	No cap on the well.
T96R-56C-83	BDR	6050370	618588	947	***947.43***	***0.75***	1.18	2	74.9	82.6	31.37	July 25th	Yes	No	Suspected damage. Depth to bottom is much shallower than the provided well details. The well casing looks disturbed and tilted. Moose tracks beside the well. No cap as well.
T97R-108C-70	BDR	6052532	617380	839	***839.15***	***0.27***	0.42	2	61.0	70.0	1.25	July 26th	Yes	No	Well is damaged. Casing is bent and the ground around the well is depressed. Depth to bottom is very shallow.
TOB96-01-05	OVB	6050602	619014	926	924.05	2.70	0.75	2	1.6	4.6	5.17	July 25th	No	No	Well looks to be in good condition. Dedicated bailer.
TOB96-02-06	OVB	6051947	618466	853	850.45	2.93	0.38	2	3.0	6.0	6.79	July 26th	No	No	Well is in good condition and has a dedicated bailer.
TOB96-02-20	OVB	6051947	618466	853	n/a	n/a	0.34	2	17.0	20.0	n/a	July 26th	No	n/a	Could not get the cap off. Well has a dedicated bailer and is in good condition.
TOB96-11-04	OVB	6052818	617724	833	831.39	2.48	0.87	2	1.5	4.5	4.43	July 26th	No	No	Well looks to be in good condition. Had dedicated Waterra tubing with a foot valve. Screened section may be partially filled with fines.
TOB96-11-19	OVB	6052818	617724	833	n/a	dry	0.31	2	18.7	20.2	19.80	July 26th	No	Yes	Upper part of the PVC casing is cracked and broken (cap on the ground). Well is still useable. Steel protective casing looks good. Water level tape easily can get down the well. Dedicated Waterra tubing with a foot valve. Well is dry. Screened section may be partially filled with fines.
TOB96-12-04	OVB	6051377	616082	934	n/a	n/a	0.42	2	1.0	4.0	1.47	July 26th	Yes	n/a	Well is damaged. Casing is bent over and the depth to bottom is shallower than the original depth. There is a dedicated bailer.
TOB97-06-21	OVB	6052496	616652	861	n/a	dry	0.74	2	18.0	21.0	20.38	July 26th	No	Yes	Well is in good condition. No dedicated bailer or tubing.
TOB97-07-24	OVB	6053579	617887	816	n/a	dry	0.90	2	21.0	24.0	23.54	July 26th	No	Yes	Well is in good condition. There is a cap. The screened section may be partially filled with fines.
T96TP-01-10	BDR	6050718	617276	1007	***1006.10***	***2.14***	1.24	3	8.5	10.0	6.13	July 25th	Yes	No	The coordinates were off by about 26 meters. Could not find another well in the area. 3" well in some type of testing area. Well is surrounded by a fence. Depth to bottom off by 5 meters from the original depth (screened section is filled with fines?).
T96TP-02-07[3]	BDR	6050655	617201	1015	1012.89	3.42	1.31	3	2.0	7.0	7.65	July 25th	No	No	3" diameter well surrounded by a fence. Soft bottom and shallower than original depth.
T93R-17	na	6052178	617435	852	n/a	n/a	n/a	n/a	na	na	n/a	July 25th	n/a	n/a	Could not find the well. No evidence of the well.
T93R-18	na	6052193	617968	852	n/a	n/a	n/a	n/a	na	na	n/a	July 25th	n/a	n/a	Could not find the well. No evidence of the well.

Notes:

[1] - Ground surface elevations from Google Earth

[2] - The inside casing of T96R-34-67 was found to be damaged during the August 2017 sampling event

[3] - This monitoring well is not being used in the baseline program.

	Damaged or well not being used in baseline program.
	Information from SRK 2017 memo
xxxx	Depth to water may not be true due to the well being damaged
masl	meters above sea level
mbtoc	meters below top of casing
mags	meters above ground surface
mbgs	meters below ground surface

Well ID	Date	Time	Water Level Measurement (m btoc)[1]	Ground Elevation (m asl)	Stick up (m)	Groundwater Elevation (m asl)
Existing Bedrock Wells						
T95R-15C	7/26/2017	-	0.45	888.36	1.08	888.99
	nm	-	-			-
	9/26/2017	9:00 AM	0.24			889.20
	1/15/2018	11:15 AM	0			889.44
	4/20/2018	1:00 PM	0.24			889.20
T95R-40	7/25/2017	-	7.945	900.18	0.26	892.50
	8/17/2017	9:30 AM	8.155			892.29
	9/29/2017	10:59 AM	8.03			892.41
	1/18/2018	1:01 PM	7.95			892.49
	4/3/2018	10:06 AM	7.91			892.53
T95R-64	7/25/2017	-	7.535	949.5	1.23	943.20
	8/17/2017	1:10 PM	7.525			943.21
	9/26/2017	12:54 PM	7.345			943.39
	1/15/2018	12:10 PM	7.275			943.46
	3/31/2018	10:15 AM	7.2			943.53
T96R-16-19	7/25/2017	-	2.69	1012.9	0.75	1010.96
	nm	-	-			-
	9/27/2017	4:41 PM	2.735			1010.92
	1/16/2018	10:10 AM	2.43			1011.22
	3/30/2018	4:25 PM	2.47			1011.18
T96R-16-28	7/25/2017	-	2.69	1012.9	0.82	1011.03
	nm	-	-			-
	9/27/2017	4:40 PM	2.76			1010.96
	1/16/2018	10:10 AM	2.445			1011.28
	3/30/2018	4:25 PM	2.5			1011.22
T96R-34-87	7/25/2017	-	0.845	934	0.97	934.13
	8/16/2017	9:30 AM	0.884			934.09
	9/27/2017	9:21 AM	0.825			934.15
	1/17/2018	11:00 AM	0.68			934.29
	3/28/2018	3:40 PM	0.86			934.11
New Bedrock Wells						
W1 Deep	4/27/2018	9:58 AM	0.24	938.09	1.73	939.58
W3 Deep	4/23/2018	10:31 AM	41.85	803.52	1	762.67
ARD 2	3/24/2018	9:23 AM	11	956.5	0.99	946.49
Existing Overburden Wells						
TOB97-07-24	7/26/2017	12:30 PM	dry	811.05	0.9	<788.41
	nm	-	-			-
	nm	-	-			-
	3/26/2018	2:50 PM	dry			<788.41
TOB96-02-06	7/26/2017	2:15 PM	2.93	853.41	0.38	850.86
	9/28/2017	9:50 AM	3.61			850.18
	1/16/2018	1:37 PM	2.625			851.17
	3/26/2018	12:00 PM	2.73			851.06
TOB96-02-20	7/26/2017	2:17 PM	*nm*	853.41	0.34	-
	9/28/2017	9:52 AM	dry			<832.79
	1/16/2018	1:40 PM	dry			<832.79
	3/26/2018	12:02 PM	dry			<832.79
TOB96-11-04	7/26/2017	10:30 AM	2.48	827.36	0.87	825.75
	9/27/2017	2:35 PM	2.54			825.69
	1/15/2018	10:30 AM	3.2			825.03
	3/26/2018	1:30 PM	3.87			824.36
TOB96-11-19	7/26/2017	10:30 AM	dry	827.36	0.31	<807.85
	9/27/2017	2:32 PM	dry			<807.85
	1/15/2018	10:32 AM	dry			<807.85
	3/26/2018	1:40 PM	dry			<807.85
TOB97-06-21	7/26/2017	3:24 PM	dry	854.58	0.74	<834.94
	nm	-	-			-
	1/19/2018	2:00 PM	dry			<834.94
	nm	-	-			-
TOB96-01-05	7/25/2017	1:24 PM	2.7	922.87	0.75	920.92
	9/28/2017	2:56 PM	3.675			919.95
	1/18/2018	10:20 AM	1.92			921.70
	3/29/2018	9:40 AM	1.37			922.25
New Overburden Wells						
W1 Shallow	4/28/2018	2:09 PM	0.2	938.18	1.47	939.45
W3 Shallow	4/28/2018	3:37 PM	34.38	803.52	1	770.14
W2	4/24/2018	11:30 AM	51.3	851.6	0.8	801.10
GEO 11	3/26/2018	10:12 AM	14.46			821.26
GEO 13	4/2/2018	4:30 PM	dry			<797.32
GEO 22	4/3/2018	3:20 PM	dry			<779.71

Notes:
[1] - m btoc = meters below top of casing
nm - not measured
Ground elevations for existing wells derived from Piteau 1998 report (Table 1 - Page 89 in the pdf)
Ground elevations for the new wells derived from survey information provided by the project geologist Ron Parent.

Appendix 6-A

Groundwater Quality Tables

Table 6A-1 - Groundwater Quality Results, August and September 2017 and January 2018

DRAFT

				Well ID	T95R-64	T95R-64	T95R-64	T95R-40	T95R-40	T95R-40	T96R-34-87	T96R-34-87	T95R-15C	T0B96-02-06	T0B96-02-06	T0B96-11-04	T0B96-11-04	T0B96-01-05
				Sample ID	T95R-64-0817	T95R-64	T9SR-64	T95R-40-0817	T95R-40	T95R-40	T96R-34-87-0817	T96R-34-87	T95R-15C	T0B96-02-06	T0B96-02-06	T0B96-11-04	T0B96-11-04	T0B96-01-05
			BCWQG FAL		BDR	BDR	BDR	BDR	BDR	BDR	BDR	BDR	BDR	OVB	OVB	OVB	OVB	OVB
Date Sampled	Units	Detection Limits[1]	Approved Guidelines	*Working Guidelines*	17-Aug-2017	26-Sep-2017	15-Jan-2018	17-Aug-2017	29-Sep-2017	18-Jan-2018	16-Aug-2017	27-Sep-2017	26-Sep-2017	28-Sep-2017	16-Jan-2018	27-Sep-2017	18-Jan-2018	19-Jan-2018
ALS Sample ID					L1977808-4	L2000339-2	L2047836-7	L1977808-3	L2000339-9	L2047836-2	L1977808-2	L2000339-3	L2000339-1	L2000339-4	L2047836-5	L2000339-5	L2047836-6	L2047836-8
Physical Tests																		
Colour	CU	5	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	6.2
Conductivity (lab)	uS/cm	2.0	n.g.	n.g.	1330	1220	1270	2790	2600	2680	1320	1280	1260	535	553	695	650	392
Specific Conductivity (field)	uS/cm	1.0	n.g.	n.g.	1303	1322	1279	2840	2560	2687	1312	1414	1370	557	555	781	709	472
Hardness (as $CaCO_3$)- total	mg/L	0.5	n.g.	n.g.	56.8	57.2	55.5	113	102	103	44	42	18.3	314	297	405	339	154
pH (lab)	pH	0.10	6.5-9	n.g.	8.19	8.17	8.09	8.08	7.81	7.67	8.15	7.98	8.48	7.79	8.04	7.85	8.18	7.66
pH (field)	pH	0.10	6.5-9	n.g.	7.35	7.50	7.12	7.18	7.30	7.11	7.33	7.50	8.20	7.50	7.20	7.70	7.68	7.2
Total Suspended Solids	mg/L	3.0	n.g.	n.g.	5.0	<3.0	<3.0	11.6	5.3	688.0	10.4	4.7	5.3	35.5	6.1	21.9	14.1	43.5
Total Dissolved Solids*	mg/L	10.0	n.g.	n.g.	845	823	838	1750	1680	1810	834	862	867	329	327	390	367	261
Turbidity (lab)	NTU	0.10	50	n.g.	4.82	4.22	1.79	4.21	3.81	489	1.55	2.45	3.11	19.9	4.8	20.2	7.74	47.1
Alkalinity and Acidity																		
Acidity (as CaCO3)	mg/L	1.0	n.g.	n.g.	2.9	3.1	-	11.3	21.5	-	3.7	8.8	<1.0	10.2	-	10.8	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	739	716	756	1660	1630	1690	753	759	698	301	321	407	380	220
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	39.4	44.6	<1.0	<1.0	67.4	<1.0	<1.0	44.8	63.8	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Phenolphthalein (as	mg/L	2.0	n.g.	n.g.	-	22.3	-	-	33.7	-	-	22.4	31.9	<2.0	-	<2.0	-	-
Alkalinity, Total (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	778	761	756	1660	1700	1690	753	804	762	301	321	407	380	220
Anions and Nitrogen																		
Ammonia, Total (as N)	mg/L	0.0050	0.681-28.7 [pH, T]	n.g.	0.347	0.336	0.366	0.673	0.639	0.695	0.373	0.367	0.246	<0.0050	<0.0050	0.0209	0.0088	0.0151
Bromide (Br)	mg/L	0.050	n.g.	n.g.	<0.25	<0.25	<0.25	<1.0	<1.0	<1.0	<0.25	<0.25	<0.25	<0.050	<0.050	<0.25	<0.050	<0.050
Chloride (Cl)	mg/L	0.50	600	n.g.	<2.5	<2.5	<2.5	<10	<10	<10	<2.5	<2.5	<2.5	<0.50	<0.50	<2.5	<0.50	<0.50
Fluoride (F)	mg/L	0.020	0.4-2.0 [T]	n.g.	**1.49**	**1.48**	**1.58**	0.43	0.49	0.59	**1.53**	**1.51**	**2.24**	0.103	0.110	<0.10	0.111	0.137
Nitrate (as N)	mg/L	0.0050	32.8	n.g.	<0.025	<0.025	<0.025	<0.10	<0.10	<0.10	<0.025	<0.025	<0.025	0.0143	0.0137	0.130	0.153	<0.0050
Nitrite (as N)	mg/L	0.0010	0.06 [W]	n.g.	<0.0050	<0.0050	<0.0050	<0.020	<0.020	<0.020	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
Total Nitrogen	mg/L	0.050	n.g.	n.g.	0.366	0.370	0.365	0.801	0.756	1.04	0.377	0.418	0.276	0.043	<0.030	0.739	0.321	0.677
Phosphorus (P)-Total Dissolved	mg/L	0.0020	n.g.	n.g.	0.0028	<0.0010	-	0.0065	0.0044	-	0.0044	0.0016	0.0345	0.0017	-	<0.0010	-	-
Phosphorus (P)-Total	mg/L	0.0020	n.g.	n.g.	0.0104	0.0067	0.0094	0.0393	0.0278	0.202	0.0082	0.0177	0.0409	0.0155	0.0035	0.0591	0.0646	0.11
Sulfate (SO_4)	mg/L	0.50	100	n.g.	<1.5	<1.5	<1.5	<6.0	<6.0	<6.0	<1.5	<1.5	<1.5	9.77	10.4	20.8	22.4	4.27
Inorganic/Organic Carbon																		
Dissolved Organic Carbon	mg/L	0.5	n.g.	n.g.	<0.50	<0.50	<0.50	<0.50	<0.50	1.11	<0.50	<0.50	0.50	1.88	1.36	3.25	1.71	10.4
Total Organic Carbon	mg/L	0.50	n.g.	n.g.	<0.50	<0.50	<0.50	1.06	<0.50	64.8	<0.50	<0.50	0.80	1.25	1.18	4.63	2.87	11.6
Total Metals																		
Aluminum (Al)-Total	mg/L	0.0050	n.g.	n.g.	<0.010	<0.010	<0.0050	0.062	0.034	9.42	0.088	0.020	0.110	1.19	0.193	2.81	1.31	0.844
Antimony (Sb)-Total	mg/L	0.00050	n.g.	n.g.	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00071
Arsenic (As)-Total	mg/L	0.00050	0.005	n.g.	<0.0010	<0.0010	<0.00050	<0.0010	<0.0010	**0.0060**	<0.0010	<0.0010	<0.0010	<0.0010	<0.00050	<0.0010	0.00055	0.00135
Barium (Ba)-Total	mg/L	0.020	n.g.	5	0.449	0.406	0.429	4.19	3.17	***5.01***	0.959	0.849	0.294	0.140	0.125	0.138	0.099	0.263
Beryllium (Be)-Total	mg/L	0.0010	n.g.	0.0053	<0.0050	<0.0050	<0.00010	<0.0050	<0.0050	0.00111	<0.0050	<0.0050	<0.0050	<0.0050	<0.00010	<0.0050	<0.00010	<0.00010
Boron (B)-Total	mg/L	0.10	1.2	n.g.	0.15	0.13	0.15	0.34	0.32	0.38	0.18	0.17	0.15	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium (Cd)-Total	mg/L	0.000010	n.g.	n.g.	<0.000050	<0.000050	<0.0000050	<0.000050	<0.000050	0.000217	<0.000050	<0.000050	<0.000050	0.000068	0.0000211	0.000119	0.0000836	0.0000433
Calcium (Ca)-Total	mg/L	0.10	n.g.	n.g.	20.7	19.5	20.6	35.6	31.3	40.7	19.6	14.5	5.59	85.4	92.7	69.8	66.5	45.3
Chromium (Cr)-Total	mg/L	0.0010	n.g.	0.001 or 0.089 [3]	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	***0.0062***	<0.00050	<0.00050	<0.00050	0.00057	<0.0010	0.00142	<0.0010	<0.0010
Cobalt (Co)-Total	mg/L	0.00030	0.11	n.g.	<0.00050	<0.00050	<0.00030	<0.00050	<0.00050	0.00325	<0.00050	<0.00050	<0.00050	0.00103	<0.00030	0.00136	0.00067	0.00129
Copper (Cu)-Total	mg/L	0.0010	0.002 - 0.026 [H]	n.g.	<0.0010	<0.0010	<0.0010	<0.0010	0.0014	**0.0349**	<0.0010	0.0012	<0.0010	0.0013	<0.0010	0.0054	0.0029	0.0029
Iron (Fe)-Total	mg/L	0.030	1	n.g.	0.652	0.470	0.420	0.760	0.414	**8.39**	0.530	0.594	0.169	0.852	0.144	**2.39**	**1.00**	0.618
Lead (Pb)-Total	mg/L	0.00050	0.003 - 0.33 [H]	n.g.	<0.0010	<0.0010	<0.00050	<0.0010	<0.0010	0.0231	<0.0010	<0.0010	<0.0010	0.0018	<0.00050	0.0035	0.00156	0.00097
Lithium (Li)-Total	mg/L	0.0050	n.g.	0.87	0.064	0.059	0.0698	0.112	0.096	0.124	<0.050	<0.050	0.052	<0.050	0.0033	<0.050	0.0059	0.0058
Magnesium (Mg)-Total	mg/L	0.10	n.g.	n.g.	1.98	1.85	1.94	6.70	5.96	9.75	2.15	2.05	1.07	24.9	25.3	55.5	49.7	11.1
Manganese (Mn)-Total	mg/L	0.00030	0.80-3.80 [H]	n.g.	0.022	0.018	0.0182	0.036	0.033	0.154	0.015	0.014	<0.010	0.484	0.111	0.070	0.0383	1.07
Mercury (Hg)-Total	mg/L	0.000010	n.g.	n.g.	<0.00020	<0.00020	<0.0000050	<0.00020	<0.00020	<0.000050	<0.00020	<0.00020	<0.00020	<0.00020	<0.0000050	<0.00020	0.0000082	0.000038
Molybdenum (Mo)-Total	mg/L	0.0010	2	n.g.	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	0.0021	0.0014
Nickel (Ni)-Total	mg/L	0.0010	n.g.	0.025 - 0.180 [H]	<0.0050	<0.0050	<0.0010	<0.0050	<0.0050	0.0068	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010	<0.0050	0.0012	0.0025
Potassium (K)-Total	mg/L	2.0	n.g.	373-432	<2.0	<2.0	<2.0	3.4	2.9	4.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.8	<2.0	<2.0
Selenium (Se)-Total	mg/L	0.00010	0.002	n.g.	<0.0010	<0.0010	<0.000050	<0.0010	<0.0010	0.00020	<0.0010	<0.0010	<0.0010	<0.0010	0.000533	<0.0010	0.000564	0.000116
Silver (Ag)-Total	mg/L	0.000020	0.0001-0.003 [H]	n.g.	<0.000050	<0.000050	<0.000020	<0.000050	0.000081	0.000071	<0.000050	<0.000050	<0.000050	<0.000050	<0.000020	<0.000050	<0.000020	0.000024
Sodium (Na)-Total	mg/L	2.0	n.g.	n.g.	327	325	302	776	746	698	331	353	372	7.9	7.8	19.4	16.6	32.7
Thallium (Tl)-Total	mg/L	0.00020	n.g.	0.0017 - 0.0063 [4]	<0.00020	<0.00020	<0.000010	<0.00020	<0.00020	0.000083	<0.00020	<0.00020	<0.00020	<0.00020	<0.000010	<0.00020	0.000025	0.000010
Tin (Sn)-Total	mg/L	0.00050	n.g.	n.g.	-	-	<0.00050	-	-	<0.00050					<0.00050	-	<0.00050	<0.00050
Titanium (Ti)-Total	mg/L	0.010	n.g.	2	<0.050	<0.050	<0.010	<0.050	<0.050	0.038	<0.050	<0.050	<0.050	<0.050	<0.010	0.063	0.023	<0.010
Uranium (U)-Total	mg/L	0.00020	n.g.	0.3	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00241	<0.00020	<0.00020	<0.00020	0.00136	0.00103	0.00344	0.00303	0.00243
Vanadium (V)-Total	mg/L	0.0010	n.g.	0.020 [5]	<0.030	<0.030	<0.00050	<0.030	<0.030	0.0128	<0.030	<0.030	<0.030	<0.030	0.00060	<0.030	0.00328	0.00286
Zinc (Zn)-Total	mg/L	0.0050	0.033-0.265 [H]	n.g.	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0378	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0164	0.0104	<0.0050

				Well ID	T95R-64	T95R-64	T95R-64	T95R-40	T95R-40	T95R-40	T96R-34-87	T96R-34-87	T95R-15C	T0B96-02-06	T0B96-02-06	T0B96-11-04	T0B96-11-04	T0B96-01-05
				Sample ID	T95R-64-0817	T95R-64	T9SR-64	T95R-40-0817	T95R-40	T95R-40	T96R-34-87-0817	T96R-34-87	T95R-15C	T0B96-02-06	T0B96-02-06	T0B96-11-04	T0B96-11-04	T0B96-01-05
			BCWQG FAL		BDR	BDR	BDR	BDR	BDR	BDR	BDR	BDR	BDR	OVB	OVB	OVB	OVB	OVB
Date Sampled					17-Aug-2017	26-Sep-2017	15-Jan-2018	17-Aug-2017	29-Sep-2017	18-Jan-2018	16-Aug-2017	27-Sep-2017	26-Sep-2017	28-Sep-2017	16-Jan-2018	27-Sep-2017	18-Jan-2018	19-Jan-2018
ALS Sample ID	**Units**	**Detection Limits[1]**	**Approved Guidelines**	***Working Guidelines***	L1977808-4	L2000339-2	L2047836-7	L1977808-3	L2000339-9	L2047836-2	L1977808-2	L2000339-3	L2000339-1	L2000339-4	L2047836-5	L2000339-5	L2047836-6	L2047836-8
Dissolved Metals																		
Aluminum (Al)-Dissolved	mg/L	0.0050	0.10 (pH)(2)	n.g.	<0.010	<0.010	<0.0050	<0.010	<0.010	<0.0050	<0.010	<0.010	<0.010	0.035	<0.0050	<0.010	<0.0050	0.0206
Antimony (Sb)-Dissolved	mg/L	0.00050	n.g.	n.g.	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00069
Arsenic (As)-Dissolved	mg/L	0.00050	n.g.	n.g.	<0.0010	<0.0010	<0.00050	<0.0010	<0.0010	<0.00050	<0.0010	<0.0010	<0.0010	<0.0010	<0.00050	<0.0010	<0.00050	0.00092
Barium (Ba)-Dissolved	mg/L	0.020	n.g.	n.g.	0.433	0.436	0.433	4.06	3.02	3.69	0.905	0.893	0.297	0.120	0.121	0.097	0.078	0.248
Beryllium (Be)-Dissolved	mg/L	0.0010	n.g.	n.g.	<0.0050	<0.0050	<0.00010	<0.0050	<0.0050	<0.00020	<0.0050	<0.0050	<0.0050	<0.0050	<0.00010	<0.0050	<0.00010	<0.00010
Boron (B)-Dissolved	mg/L	0.10	n.g.	n.g.	0.13	0.14	0.14	0.31	0.33	0.36	0.16	0.17	0.14	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium (Cd)-Dissolved	mg/L	0.000010	0.00001-	n.g.	<0.000050	<0.000050	<0.0000050	<0.000050	<0.000050	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050	0.0000064	0.000059	0.0000486	0.000155
Calcium (Ca)-Dissolved	mg/L	0.10	n.g.	n.g.	19.6	19.8	18.3	35.1	30.9	30.8	14.2	13.4	5.62	84.9	80.9	69.8	58.8	43.5
Chromium (Cr)-Dissolved	mg/L	0.0010	n.g.	n.g.	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.0010	<0.0010
Cobalt (Co)-Dissolved	mg/L	0.00030	n.g.	n.g.	<0.00050	<0.00050	<0.00030	<0.00050	<0.00050	<0.00030	<0.00050	<0.00050	<0.00050	<0.00050	<0.00030	<0.00050	<0.00030	0.00089
Copper (Cu)-Dissolved	mg/L	0.0010	n.g.	n.g.	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0241	<0.0010	<0.0010	0.0013	0.0011	<0.0010	0.0022
Iron (Fe)-Dissolved	mg/L	0.030	0.35	n.g.	**0.557**	**0.413**	**0.386**	**0.681**	0.323	<0.030	**0.458**	**0.422**	0.058	0.050	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	mg/L	0.00050	n.g.	n.g.	<0.0010	<0.0010	<0.00050	<0.0010	<0.0010	<0.00050	<0.0010	<0.0010	<0.0010	<0.0010	<0.00050	<0.0010	<0.00050	<0.00050
Lithium (Li)-Dissolved	mg/L	0.0050	n.g.	n.g.	0.062	0.062	0.0576	0.107	0.104	0.102	<0.050	<0.050	0.050	<0.050	0.0026	<0.050	0.0046	0.0053
Magnesium (Mg)-Dissolved	mg/L	0.10	n.g.	n.g.	1.92	1.91	1.89	6.29	5.99	6.33	2.09	2.07	1.04	24.8	23.2	56.1	46.7	11.0
Manganese (Mn)-Dissolved	mg/L	0.00030	n.g.	n.g.	0.022	0.019	0.0168	0.034	0.031	0.0331	0.013	0.014	<0.010	0.029	0.00170	0.014	0.00207	0.922
Mercury (Hg)-Dissolved	mg/L	0.0000010	n.g.	n.g.	<0.00020	<0.00020	<0.0000050	<0.00020	<0.00020	<0.0000050	<0.00020	<0.00020	<0.00020	<0.00020	<0.0000050	<0.00020	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved	mg/L	0.0010	n.g.	n.g.	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0044	<0.0010	<0.0010	<0.0010	0.0014	0.0038	<0.0010
Nickel (Ni)-Dissolved	mg/L	0.0010	n.g.	n.g.	<0.0050	<0.0050	<0.0010	<0.0050	<0.0050	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010	<0.0050	<0.0010	0.0018
Potassium (K)-Dissolved	mg/L	2.0	n.g.	n.g.	<2.0	<2.0	<2.0	3.2	3.1	3.3	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Selenium (Se)-Dissolved	mg/L	0.00010	n.g.	n.g.	<0.0010	<0.0010	<0.000050	<0.0010	<0.0010	<0.00010	<0.0010	<0.0010	<0.0010	<0.0010	0.000526	<0.0010	0.000433	0.000065
Silver (Ag)-Dissolved	mg/L	0.000020	n.g.	n.g.	<0.000050	<0.000050	<0.000020	<0.000050	<0.000050	<0.000020	<0.000050	<0.000050	<0.000050	<0.000050	<0.000020	<0.000050	<0.000020	<0.000020
Sodium (Na)-Dissolved	mg/L	2.0	n.g.	n.g.	367	334	303	795	731	703	371	358	357	7.7	8.2	19.2	17.1	33.9
Thallium (Tl)-Dissolved	mg/L	0.00020	n.g.	n.g.	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Tin (Sn)-Dissolved	mg/L	0.00050	n.g.	n.g.	-	-	<0.00050			<0.00050				-	<0.00050	-	<0.00050	<0.00050
Titanium (Ti)-Dissolved	mg/L	0.010	n.g.	n.g.	<0.050	<0.050	<0.010	<0.050	<0.050	<0.010	<0.050	<0.050	<0.050	<0.050	<0.010	<0.050	<0.010	<0.010
Uranium (U)-Dissolved	mg/L	0.00020	n.g.	n.g.	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00108	0.00096	0.00307	0.00283	0.00228
Vanadium (V)-Dissolved	mg/L	0.0010	n.g.	n.g.	<0.030	<0.030	<0.00050	<0.030	<0.030	<0.0010	<0.030	<0.030	<0.030	<0.030	<0.00050	<0.030	0.00125	0.00140
Zinc (Zn)-Dissolved	mg/L	0.0050	n.g.	n.g.	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0497	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0062

Notes:

BCWQG *BC Water Quality Guidelines*

Maximum concentrations for Freshwater Aquatic Life

('-) *Not applicable*

[1] *Lowest reported detection limit listed*

[2] *Dissolved Aluminum is pH dependent. 100 ug/L for a pH greater than or equal to 6.5 and* $e^{(1.209 - 2.426\,(pH) + 0.286K)}$ *where K = (pH)2 for a pH less than 6.5*

[3] *Chromium (VI) maximum is 1.0 ug/l and Chromium (III) maximum is 8.9 ug/L*

[4] *Thallium - 1.7 ug/L human health, consumption of water + organism and 6.3 ug/L human health, consumption of organism only*

[5] *Vanadium - 20 ug/L for secondary chronic value*

(Cl) *Chloride dependent guideline*

(H) *Hardness dependent guideline*

(pH) *pH dependent guideline*

(T) *Temperature dependent guideline*

n.g. *No guideline*

Bold *Concentration exceeds BCWQG Working Water Quality Guidelines*

Bold and Shaded *Concentration exceeds BCWQG Approved Water Quality Guidelines*

				Well ID	T95R-64	T95R-64	T95R-64	T95R-64	T95R-64	T95R-64
				Sample ID	-	-	-	T95R-64-0817	T95R-64	T95R-64
			BCWQG FAL		BDR	BDR	BDR	BDR	BDR	BDR
Date Sampled		**Detection**	**Approved**	***Working***	26-Oct-1995[a]	28-Oct-1996	22-Aug-1997	17-Aug-2017	26-Sep-2017	15-Jan-2018
ALS Sample ID	**Units**	**Limits[1]**	**Guidelines**	***Guidelines***	-	-	-	L1977808-4	L2000339-2	L2047836-7
Physical Tests										
Colour	CU	5	-	-	-	-	-	<5.0	<5.0	<5.0
Conductivity (lab)	µS/cm	2.0	n.g.	n.g.	-	1310	1342	1330	1220	1270
Specific Conductivity (field)	µS/cm	1.0	n.g.	n.g.	-	-	-	1303	1322	1279
Hardness (as $CaCO_3$)- total	mg/L	0.5	n.g.	n.g.	-	56.4	61.8	56.8	57.2	53.5
pH (lab)	pH	0.10	6.5-9	n.g.	-	7.48	7.49	8.19	8.17	8.09
pH (field)	pH	0.10	6.5-9	n.g.	-	-	-	7.35	7.50	7.12
Total Suspended Solids	mg/L	3.0	n.g.	n.g.	-	1.0	8.0	5.0	<3.0	<3.0
Total Dissolved Solids[2]	mg/L	10.0	n.g.	n.g.	879	782	827	845	823	838
Turbidity (lab)	NTU	0.10	50	n.g.	-	-	-	4.82	4.22	1.79
Alkalinity and Acidity										
Acidity (as CaCO3)	mg/L	1.0	n.g.	n.g.	-	-	-	2.9	3.1	-
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	-	920 [c]	973 [c]	739	716	756
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	-	< 0.5	< 0.5	39.4	44.6	<1.0
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	-	< 0.5	< 0.5	<1.0	<1.0	<1.0
Alkalinity, Phenolphthalein (as CaCO3)	mg/L	2.0	n.g.	n.g.	-	-	-	-	22.3	-
Alkalinity, Total (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	-	755	798	778	761	756
Anions and Nitrogen										
Ammonia, Total (as N)	mg/L	0.0050	0.681-28.7 [pH, T]	n.g.	-	0.32	0.24	0.347	0.336	0.366
Bromide (Br)	mg/L	0.050	n.g.	n.g.	-	-	-	<0.25	<0.25	<0.25
Chloride (Cl)	mg/L	0.50	600	n.g.	3.0 [b]	1.1 [b]	0.6 [b]	<2.5	<2.5	<2.5
Fluoride (F)	mg/L	0.020	0.4-2.0 [H]	n.g.	-	-	-	**1.49**	**1.48**	**1.58**
Nitrate (as N)	mg/L	0.0050	32.8	n.g.	-	-	-	<0.025	<0.025	<0.025
Nitrite (as N)	mg/L	0.0010	0.06 -0.60 [cl]	n.g.	-	-	-	<0.0050	<0.0050	<0.0050
Total Nitrogen	mg/L	0.050	n.g.	n.g.	0.151	< 0.01	0.191	0.366	0.370	0.365
Phosphorus (P)-Total Dissolved	mg/L	0.0020	n.g.	n.g.	0.046	< 0.1	< 0.1	0.0028	<0.0010	-
Phosphorus (P)-Total	mg/L	0.0020	n.g.	n.g.	-	-	< 0.1	0.0104	0.0067	0.0094
Sulfate (SO_4)	mg/L	0.50	100	n.g.	12.4 [b]	0.4 [b]	0.5 [b]	<1.5	<1.5	<1.5
Inorganic/Organic Carbon										
Dissolved Organic Carbon	mg/L	0.5	n.g.	n.g.	-	-	-	<0.50	<0.50	<0.50
Total Organic Carbon	mg/L	0.50	n.g.	n.g.	-	-	-	<0.50	<0.50	<0.50
Total Metals										
Aluminum (Al)-Total	mg/L	0.0050	n.g.	n.g.	1.86	0.226	0.183	<0.010	<0.010	<0.0050
Antimony (Sb)-Total	mg/L	0.00050	n.g.	n.g.	< 0.00001	-	-	<0.00050	<0.00050	<0.00050
Arsenic (As)-Total	mg/L	0.00050	0.005	n.g.	0.0023	0.0005	0.0004	<0.0010	<0.0010	<0.00050
Barium (Ba)-Total	mg/L	0.020	n.g.	5	0.24	0.397	0.383	0.449	0.406	0.429
Beryllium (Be)-Total	mg/L	0.0010	n.g.	0.0053	0.001	< 0.0002	< 0.0002	<0.0050	<0.0050	<0.00010
Boron (B)-Total	mg/L	0.10	1.2	n.g.	0.14	0.23	0.11	0.15	0.13	0.15
Cadmium (Cd)-Total	mg/L	0.000010	n.g.	n.g.	< 0.003	0.0015	0.0010	<0.000050	<0.000050	<0.0000050
Calcium (Ca)-Total	mg/L	0.10	n.g.	n.g.	-	21.0	21.9	20.7	19.5	20.6
Chromium (Cr)-Total	mg/L	0.0010	n.g.	0.001 or 0.0089 [3]	0.065	0.006	0.008	<0.00050	<0.00050	<0.0010
Cobalt (Co)-Total	mg/L	0.00030	0.11	n.g.	< 0.003	0.0022	0.0046	<0.00050	<0.00050	<0.00030
Copper (Cu)-Total	mg/L	0.0010	0.002 - 0.026 [H]	n.g.	0.005	0.0009	0.0102	<0.0010	<0.0010	<0.0010
Iron (Fe)-Total	mg/L	0.030	1	n.g.	2.43	0.73	1.01	0.652	0.470	0.420
Lead (Pb)-Total	mg/L	0.00050	0.003 - 0.33 [H]	n.g.	0.02	0.0012	0.0053	<0.0010	<0.0010	<0.00050
Lithium (Li)-Total	mg/L	0.0050	n.g.	0.87	-	0.058	0.063	0.064	0.059	0.0698
Magnesium (Mg)-Total	mg/L	0.10	n.g.	n.g.	-	2.11	2.22	1.98	1.85	1.94
Manganese (Mn)-Total	mg/L	0.00030	0.80-3.80 [H]	n.g.	0.243	0.099	0.054	0.022	0.018	0.0182
Mercury (Hg)-Total	mg/L	0.000010	n.g.	n.g.	< 0.00005	< 0.00005	< 0.05	<0.00020	<0.00020	<0.0000050
Molybdenum (Mo)-Total	mg/L	0.0010	2	n.g.	< 0.003	< 0.0002	0.0021	<0.0010	<0.0010	<0.0010
Nickel (Ni)-Total	mg/L	0.0010	n.g.	0.025 - 0.180 [H]	0.007	< 0.0005	0.0299	<0.0050	<0.0050	<0.0010
Potassium (K)-Total	mg/L	2.0	n.g.	373-432	-	1.59	1.55	<2.0	<2.0	<2.0
Selenium (Se)-Total	mg/L	0.00010	0.002	n.g.	< 0.0002	< 0.0002	< 0.0002	<0.0010	<0.0010	<0.000050
Silver (Ag)-Total	mg/L	0.000020	0.0001-0.003 [H]	n.g.	< 0.002	< 0.0001	0.0006	<0.000050	<0.000050	<0.000020
Sodium (Na)-Total	mg/L	2.0	n.g.	n.g.	-	317	338	327	325	302
Thallium (Tl)-Total	mg/L	0.00020	n.g.	0.0017 - 0.0063 [4]	-	-	-	<0.00020	<0.00020	<0.000010
Tin (Sn)-Total	mg/L	0.00050	n.g.	n.g.	-	-	-	-	-	<0.00050
Titanium (Ti)-Total	mg/L	0.010	n.g.	2	-	0.012	0.014	<0.050	<0.050	<0.010
Uranium (U)-Total	mg/L	0.00020	n.g.	0.3	< 0.5	< 0.0004	< 0.0004	<0.00020	<0.00020	<0.00020
Vanadium (V)-Total	mg/L	0.0010	n.g.	0.020 [5]	< 0.002	< 0.001	0.002	<0.030	<0.030	<0.00050
Zinc (Zn)-Total	mg/L	0.0050	0.033-0.265 [H]	n.g.	0.027	0.0197	0.0795	<0.0050	<0.0050	<0.0050
Dissolved Metals										
Aluminum (Al)-Dissolved	mg/L	0.0050	0.10 [pH](2)	n.g.	0.04	0.054	0.012	<0.010	<0.010	<0.0050
Antimony (Sb)-Dissolved	mg/L	0.00050	n.g.	n.g.	0.400	-	-	<0.00050	<0.00050	<0.00050
Arsenic (As)-Dissolved	mg/L	0.00050	n.g.	n.g.	0.0005	0.0005	0.0002	<0.0010	<0.0010	<0.00050
Barium (Ba)-Dissolved	mg/L	0.020	n.g.	n.g.	0.2	0.367	0.436	0.433	0.436	0.433
Beryllium (Be)-Dissolved	mg/L	0.0010	n.g.	n.g.	0.001	< 0.0002	< 0.0002	<0.0050	<0.0050	<0.00010
Boron (B)-Dissolved	mg/L	0.10	n.g.	n.g.	0.12	0.08	0.03	0.13	0.14	0.14
Cadmium (Cd)-Dissolved	mg/L	0.000010	0.00001-0.00006 [H]	n.g.	< 0.003	0.0008	0.0010	<0.000050	<0.000050	<0.0000050
Calcium (Ca)-Dissolved	mg/L	0.10	n.g.	n.g.	-	19.5	21.2	19.6	19.8	18.3
Chromium (Cr)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.002	< 0.001	0.006	<0.00050	<0.00050	<0.0010
Cobalt (Co)-Dissolved	mg/L	0.00030	n.g.	n.g.	< 0.003	0.0017	0.0037	<0.00050	<0.00050	<0.00030
Copper (Cu)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.001	< 0.0002	0.0032	<0.0010	<0.0010	<0.0010
Iron (Fe)-Dissolved	mg/L	0.030	0.35	n.g.	0.11	< 0.01	< 0.01	**0.557**	**0.413**	**0.386**
Lead (Pb)-Dissolved	mg/L	0.00050	n.g.	n.g.	0.02	< 0.0003	< 0.0003	<0.0010	<0.0010	<0.00050
Lithium (Li)-Dissolved	mg/L	0.0050	n.g.	n.g.	-	0.055	0.059	0.062	0.062	0.0576
Magnesium (Mg)-Dissolved	mg/L	0.10	n.g.	n.g.	-	1.86	2.14	1.92	1.91	1.89
Manganese (Mn)-Dissolved	mg/L	0.00030	n.g.	n.g.	0.192	0.070	0.037	0.022	0.019	0.0168
Mercury (Hg)-Dissolved	mg/L	0.000010	n.g.	n.g.	< 0.00005	< 0.00005	< 0.05	<0.00020	<0.00020	<0.0000050
Molybdenum (Mo)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.003	< 0.0002	0.0030	<0.0010	<0.0010	<0.0010
Nickel (Ni)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.005	< 0.0005	0.0165	<0.0050	<0.0050	<0.0010
Potassium (K)-Dissolved	mg/L	2.0	n.g.	n.g.	-	1.41	1.52	<2.0	<2.0	<2.0
Selenium (Se)-Dissolved	mg/L	0.00010	n.g.	n.g.	< 0.0002	< 0.0002	< 0.0002	<0.0010	<0.0010	<0.000050
Silver (Ag)-Dissolved	mg/L	0.000020	n.g.	n.g.	< 0.002	4.01	< 0.0001	<0.000050	<0.000050	<0.000020
Sodium (Na)-Dissolved	mg/L	2.0	n.g.	n.g.	-	< 0.0001	314	367	334	303
Thallium (Tl)-Dissolved	mg/L	0.00020	n.g.	n.g.	-	-	-	<0.00020	<0.00020	<0.00020
Tin (Sn)-Dissolved	mg/L	0.00050	n.g.	n.g.	-	-	-	-	-	<0.00050
Titanium (Ti)-Dissolved	mg/L	0.010	n.g.	n.g.	-	-	< 0.001	<0.050	<0.050	<0.010
Uranium (U)-Dissolved	mg/L	0.00020	n.g.	n.g.	< 0.5	< 0.0004	< 0.0004	<0.00020	<0.00020	<0.00020
Vanadium (V)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.002	< 0.001	0.002	<0.030	<0.030	<0.00050
Zinc (Zn)-Dissolved	mg/L	0.0050	n.g.	n.g.	0.006	0.0055	0.0066	<0.0050	<0.0050	<0.0050

				Well ID	T95R-40	T95R-40	T95R-40	T95R-40	T95R-40	T95R-40
				Sample ID	-	-	-	T95R-40-0817	T95R-40	T95R-40
			BCWQG FAL		BDR	BDR	BDR	BDR	BDR	BDR
Date Sampled		**Detection**	**Approved**	***Working***	25-Oct-1995	28-Oct-1996	23-Aug-1997	17-Aug-2017	29-Sep-2017	18-Jan-2018
ALS Sample ID	**Units**	**Limits**[1]	**Guidelines**	***Guidelines***	-	-	-	L1977808-3	L2000339-9	L2047836-2
Physical Tests										
Colour	CU	5	-	-	-			<5.0	<5.0	<5.0
Conductivity (lab)	µS/cm	2.0	n.g.	n.g.	-	2840	2883	2790	2600	2680
Specific Conductivity (field)	µS/cm	1.0	n.g.	n.g.	-	-	-	2840	2560	2687
Hardness (as $CaCO_3$)- total	mg/L	0.5	n.g.	n.g.	-	110	116	113	102	103
pH (lab)	pH	0.10	6.5-9	n.g.	-	7.37	7.48	8.08	7.81	7.67
pH (field)	pH	0.10	6.5-9	n.g.	-	-	-	7.18	7.30	7.11
Total Suspended Solids	mg/L	3.0	n.g.	n.g.		7.0	7.0	11.6	5.3	688.0
Total Dissolved Solids[2]	mg/L	10.0	n.g.	n.g.	1850	1770	1910	1750	1680	1810
Turbidity (lab)	NTU	0.10	50	n.g.	-	-	-	4.21	3.81	**489**
Alkalinity and Acidity										
Acidity (as CaCO3)	mg/L	1.0	n.g.	n.g.	-	-	-	11.3	21.5	-
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	-	2100 [c]	2155 [c]	1660	1630	1690
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	-	< 0.5	< 0.5	<1.0	67.4	<1.0
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	-	< 0.5	< 0.5	<1.0	<1.0	<1.0
Alkalinity, Phenolphthalein (as CaCO3)	mg/L	2.0	n.g.	n.g.	-	< 0.1	< 0.1	-	33.7	-
Alkalinity, Total (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	-	1730	1768	1660	1700	1690
Anions and Nitrogen										
Ammonia, Total (as N)	mg/L	0.0050	0.681-28.7 [pH, T]	n.g.	-	0.68	0.50	0.673	0.639	0.695
Bromide (Br)	mg/L	0.050	n.g.	n.g.	-	-	-	<1.0	<1.0	<1.0
Chloride (Cl)	mg/L	0.50	600	n.g.	9.80 [b]	9.2 [b]	9.4 [b]	<10	<10	<10
Fluoride (F)	mg/L	0.020	0.4-2.0 [H]	n.g.	-	-	-	0.43	0.49	0.59
Nitrate (as N)	mg/L	0.0050	32.8	n.g.	-	-	-	<0.10	<0.10	<0.10
Nitrite (as N)	mg/L	0.0010	0.06 -0.60 [cl]	n.g.	-	-	-	<0.020	<0.020	<0.020
Total Nitrogen	mg/L	0.050	n.g.	n.g.	0.0100	< 0.01	0.003	0.801	0.756	1.04
Phosphorus (P)-Total Dissolved	mg/L	0.0020	n.g.	n.g.	-	0.026	0.027	0.0065	0.0044	-
Phosphorus (P)-Total	mg/L	0.0020	n.g.	n.g.	-	-	0.1	0.0393	0.0278	0.202
Sulfate (SO_4)	mg/L	0.50	100	n.g.	-	-	-	<6.0	<6.0	<6.0
Inorganic/Organic Carbon										
Dissolved Organic Carbon	mg/L	0.5	n.g.	n.g.	-	-	-	<0.50	<0.50	1.11
Total Organic Carbon	mg/L	0.50	n.g.	n.g.	-	-	-	1.06	<0.50	64.8
Total Metals										
Aluminum (Al)-Total	mg/L	0.0050	n.g.	n.g.	0.97	0.187	0.079	0.062	0.034	9.42
Antimony (Sb)-Total	mg/L	0.00050	n.g.	n.g.	< 0.00001	-	-	<0.00050	<0.00050	<0.00050
Arsenic (As)-Total	mg/L	0.00050	0.005	n.g.	0.0038	0.0008	0.0017	<0.0010	<0.0010	**0.0060**
Barium (Ba)-Total	mg/L	0.020	n.g.	5	2.05	3.57	3.77	4.19	3.17	***5.01***
Beryllium (Be)-Total	mg/L	0.0010	n.g.	0.0053	0.001	< 0.0002	0.0005	<0.0050	<0.0050	0.00111
Boron (B)-Total	mg/L	0.10	1.2	n.g.	0.39	0.37	0.34	0.34	0.32	0.38
Cadmium (Cd)-Total	mg/L	0.000010	n.g.	n.g.	< 0.003	0.0020	< 0.0002	<0.000050	<0.000050	0.000217
Calcium (Ca)-Total	mg/L	0.10	n.g.	n.g.	-	35.0	35.2	35.6	31.3	40.7
Chromium (Cr)-Total	mg/L	0.0010	n.g.	0.001 or 0.0089 [3]	0.008	0.004	< 0.001	<0.00050	<0.00050	***0.0062***
Cobalt (Co)-Total	mg/L	0.00030	0.11	n.g.	< 0.003	0.0025	0.0071	<0.00050	<0.00050	0.00325
Copper (Cu)-Total	mg/L	0.0010	0.002 - 0.026 [H]	n.g.	< 0.001	0.0016	0.0098	<0.0010	0.0014	**0.0349**
Iron (Fe)-Total	mg/L	0.030	1	n.g.	**1.31**	0.26	**1.00**	0.760	0.414	**8.39**
Lead (Pb)-Total	mg/L	0.00050	0.003 - 0.33 [H]	n.g.	< 0.02	0.0009	0.0017	<0.0010	<0.0010	0.0231
Lithium (Li)-Total	mg/L	0.0050	n.g.	0.87	-	0.107	0.107	0.112	0.096	0.124
Magnesium (Mg)-Total	mg/L	0.10	n.g.	n.g.	-	6.84	6.69	6.70	5.96	9.75
Manganese (Mn)-Total	mg/L	0.00030	0.80-3.80 [H]	n.g.	0.294	0.154	0.058	0.036	0.033	0.154
Mercury (Hg)-Total	mg/L	0.000010	n.g.	n.g.	< 0.00005	< 0.00005	< 0.05	<0.00020	<0.00020	<0.000050
Molybdenum (Mo)-Total	mg/L	0.0010	2	n.g.	0.01	0.0014	< 0.0002	<0.0010	<0.0010	<0.0010
Nickel (Ni)-Total	mg/L	0.0010	n.g.	0.025 - 0.180 [H]	< 0.005	< 0.0005	0.0213	<0.0050	<0.0050	0.0068
Potassium (K)-Total	mg/L	2.0	n.g.	373-432	-	3.70	3.39	3.4	2.9	4.0
Selenium (Se)-Total	mg/L	0.00010	0.002	n.g.	< 0.0002	< 0.0002	< 0.0002	<0.0010	<0.0010	0.00020
Silver (Ag)-Total	mg/L	0.000020	0.0001-0.003 [H]	n.g.	< 0.002	< 0.0001	0.0003	<0.000050	0.000081	0.000071
Sodium (Na)-Total	mg/L	2.0	n.g.	n.g.	-	701	778	776	746	698
Thallium (Tl)-Total	mg/L	0.00020	n.g.	0.0017 - 0.0063 [4]	-	-	-	<0.00020	<0.00020	0.000083
Tin (Sn)-Total	mg/L	0.00050	n.g.	n.g.	-	-	-	-	-	<0.00050
Titanium (Ti)-Total	mg/L	0.010	n.g.	2	-	0.023	0.007	<0.050	<0.050	0.038
Uranium (U)-Total	mg/L	0.00020	n.g.	0.3	< 0.5	< 0.0004	< 0.0004	<0.00020	<0.00020	0.00241
Vanadium (V)-Total	mg/L	0.0010	n.g.	0.020 [5]	0.004	< 0.001	< 0.001	<0.030	<0.030	0.0128
Zinc (Zn)-Total	mg/L	0.0050	0.033-0.265 [H]	n.g.	0.016	0.0355	0.0545	<0.0050	<0.0050	0.0378
Dissolved Metals										
Aluminum (Al)-Dissolved	mg/L	0.0050	0.10 [pH](2)	n.g.	0.06	0.023	< 0.001	<0.010	<0.010	<0.0050
Antimony (Sb)-Dissolved	mg/L	0.00050	n.g.	n.g.	0.600	-	-	<0.00050	<0.00050	<0.00050
Arsenic (As)-Dissolved	mg/L	0.00050	n.g.	n.g.	0.0033	0.0004	0.0006	<0.0010	<0.0010	<0.00050
Barium (Ba)-Dissolved	mg/L	0.020	n.g.	n.g.	2.02	3.50	3.63	4.06	3.02	3.69
Beryllium (Be)-Dissolved	mg/L	0.0010	n.g.	n.g.	0.001	< 0.0002	< 0.0002	<0.0050	<0.0050	<0.00020
Boron (B)-Dissolved	mg/L	0.10	n.g.	n.g.	0.36	0.24	0.32	0.31	0.33	0.36
Cadmium (Cd)-Dissolved	mg/L	0.000010	0.00001-0.00006 [H]	n.g.	< 0.003	0.0020	< 0.0002	<0.000050	<0.000050	<0.000010
Calcium (Ca)-Dissolved	mg/L	0.10	n.g.	n.g.	-	32.9	35.2	35.1	30.9	30.8
Chromium (Cr)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.002	< 0.001	0.001	<0.00050	<0.00050	<0.0010
Cobalt (Co)-Dissolved	mg/L	0.00030	n.g.	n.g.	< 0.003	0.0020	0.0010	<0.00050	<0.00050	<0.00030
Copper (Cu)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.001	< 0.0002	0.0006	<0.0010	<0.0010	<0.0010
Iron (Fe)-Dissolved	mg/L	0.030	0.35	n.g.	< 0.01	< 0.01	0.01	**0.681**	0.323	<0.030
Lead (Pb)-Dissolved	mg/L	0.00050	n.g.	n.g.	< 0.02	< 0.0003	< 0.0003	<0.0010	<0.0010	<0.00050
Lithium (Li)-Dissolved	mg/L	0.0050	n.g.	n.g.	-	0.099	0.107	0.107	0.104	0.102
Magnesium (Mg)-Dissolved	mg/L	0.10	n.g.	n.g.	-	6.75	6.69	6.29	5.99	6.33
Manganese (Mn)-Dissolved	mg/L	0.00030	n.g.	n.g.	0.272	0.078	0.005	0.034	0.031	0.0331
Mercury (Hg)-Dissolved	mg/L	0.000010	n.g.	n.g.	< 0.00005	< 0.00005	< 0.05	<0.00020	<0.00020	<0.0000050
Molybdenum (Mo)-Dissolved	mg/L	0.0010	n.g.	n.g.	0.006	< 0.0002	< 0.0002	<0.0010	<0.0010	<0.0010
Nickel (Ni)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.005	< 0.0005	< 0.0005	<0.0050	<0.0050	<0.0010
Potassium (K)-Dissolved	mg/L	2.0	n.g.	n.g.	< 0.0002	3.70	3.39	3.2	3.1	3.3
Selenium (Se)-Dissolved	mg/L	0.00010	n.g.	n.g.	< 0.002	< 0.0002	< 0.0002	<0.0010	<0.0010	<0.00010
Silver (Ag)-Dissolved	mg/L	0.000020	n.g.	n.g.	-	< 0.0001	< 0.0001	<0.000050	<0.000050	<0.000020
Sodium (Na)-Dissolved	mg/L	2.0	n.g.	n.g.	-	665	778	795	731	703
Thallium (Tl)-Dissolved	mg/L	0.00020	n.g.	n.g.	-	-	-	<0.00020	<0.00020	<0.00020
Tin (Sn)-Dissolved	mg/L	0.00050	n.g.	n.g.	-	-	-			<0.00050
Titanium (Ti)-Dissolved	mg/L	0.010	n.g.	n.g.	-	0.004	< 0.001	<0.050	<0.050	<0.010
Uranium (U)-Dissolved	mg/L	0.00020	n.g.	n.g.	< 0.5	< 0.0004	< 0.0004	<0.00020	<0.00020	<0.00020
Vanadium (V)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.002	< 0.001	< 0.001	<0.030	<0.030	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.0050	n.g.	n.g.	0.004	0.0046	0.0134	<0.0050	<0.0050	<0.0050

				Well ID	T96R-34-87	T96R-34-87	T96R-34-87	T96R-34-87
				Sample ID	-	-	T96R-34-87-0817	T96R-34-87
			BCWQG FAL		BDR	BDR	BDR	BDR
Date Sampled		**Detection**	**Approved**	***Working***	18-Sep-1996	22-Aug-1997	16-Aug-2017	27-Sep-2017
ALS Sample ID	**Units**	**Limits**[1]	**Guidelines**	***Guidelines***	-	-	L1977808-2	L2000339-3
Physical Tests								
Colour	CU	5	-	-	-	-	<5.0	<5.0
Conductivity (lab)	µS/cm	2.0	n.g.	n.g.	1310	1400	1320	1280
Specific Conductivity (field)	µS/cm	1.0	n.g.	n.g.	-	-	1312	1414
Hardness (as $CaCO_3$)- total	mg/L	0.5	n.g.	n.g.	46.3	43.6	44	42
pH (lab)	pH	0.10	6.5-9	n.g.	7.55	7.39	8.15	7.98
pH (field)	pH	0.10	6.5-9	n.g.	-	-	7.33	7.50
Total Suspended Solids	mg/L	3.0	n.g.	n.g.	31.0	3	10.4	4.7
Total Dissolved Solids[2]	mg/L	10.0	n.g.	n.g.	818	838	834	862
Turbidity (lab)	NTU	0.10	50	n.g.	-	-	1.55	2.45
Alkalinity and Acidity								
Acidity (as CaCO3)	mg/L	1.0	n.g.	n.g.	-	-	3.7	8.8
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	928 [c]	995 [c]	753	759
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	< 0.5	< 0.5	<1.0	44.8
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	< 0.5	< 0.5	<1.0	<1.0
Alkalinity, Phenolphthalein (as CaCO3)	mg/L	2.0	n.g.	n.g.	< 0.1	< 0.1	-	22.4
Alkalinity, Total (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	761	816	753	804
Anions and Nitrogen								
Ammonia, Total (as N)	mg/L	0.0050	0.681-28.7 [pH, T]	n.g.	0.41	0.32	0.373	0.367
Bromide (Br)	mg/L	0.050	n.g.	n.g.	-	-	<0.25	<0.25
Chloride (Cl)	mg/L	0.50	600	n.g.	2.1 [b]	<0.5 [b]	<2.5	<2.5
Fluoride (F)	mg/L	0.020	0.4-2.0 [H]	n.g.	-	-	**1.53**	**1.51**
Nitrate (as N)	mg/L	0.0050	32.8	n.g.	-	-	<0.025	<0.025
Nitrite (as N)	mg/L	0.0010	0.06 -0.60 [cl]	n.g.	-	-	<0.0050	<0.0050
Total Nitrogen	mg/L	0.050	n.g.	n.g.	0.115	0.017	0.377	0.418
Phosphorus (P)-Total Dissolved	mg/L	0.0020	n.g.	n.g.	0.019	0.013	0.0044	0.0016
Phosphorus (P)-Total	mg/L	0.0020	n.g.	n.g.	< 0.1	< 0.1	0.0082	0.0177
Sulfate (SO_4)	mg/L	0.50	100	n.g.	6.8 [b]	< 0.1 [b]	<1.5	<1.5
Inorganic/Organic Carbon								
Dissolved Organic Carbon	mg/L	0.5	n.g.	n.g.	-	-	<0.50	<0.50
Total Organic Carbon	mg/L	0.50	n.g.	n.g.	-	-	<0.50	<0.50
Total Metals								
Aluminum (Al)-Total	mg/L	0.0050	n.g.	n.g.	0.785	0.074	0.088	0.020
Antimony (Sb)-Total	mg/L	0.00050	n.g.	n.g.	-	-	<0.00050	<0.00050
Arsenic (As)-Total	mg/L	0.00050	0.005	n.g.	0.0120	0.0098	<0.0010	<0.0010
Barium (Ba)-Total	mg/L	0.020	n.g.	5	0.816	0.886	0.959	0.849
Beryllium (Be)-Total	mg/L	0.0010	n.g.	0.0053	0.0035	< 0.0002	<0.0050	<0.0050
Boron (B)-Total	mg/L	0.10	1.2	n.g.	0.45	0.17	0.18	0.17
Cadmium (Cd)-Total	mg/L	0.000010	n.g.	n.g.	< 0.0002	< 0.0002	<0.000050	<0.000050
Calcium (Ca)-Total	mg/L	0.10	n.g.	n.g.	15.9	14.0	19.6	14.5
Chromium (Cr)-Total	mg/L	0.0010	n.g.	0.001 or 0.0089 [3]	0.011	< 0.001	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	0.00030	0.11	n.g.	0.0050	0.0024	<0.00050	<0.00050
Copper (Cu)-Total	mg/L	0.0010	0.002 - 0.026 [H]	n.g.	< 0.0002	0.0084	<0.0010	0.0012
Iron (Fe)-Total	mg/L	0.030	1	n.g.	1.28	0.66	0.530	0.594
Lead (Pb)-Total	mg/L	0.00050	0.003 - 0.33 [H]	n.g.	0.0023	0.0014	<0.0010	<0.0010
Lithium (Li)-Total	mg/L	0.0050	n.g.	0.87	0.048	0.047	<0.050	<0.050
Magnesium (Mg)-Total	mg/L	0.10	n.g.	n.g.	2.45	2.08	2.15	2.05
Manganese (Mn)-Total	mg/L	0.00030	0.80-3.80 [H]	n.g.	0.056	0.011	0.015	0.014
Mercury (Hg)-Total	mg/L	0.000010	n.g.	n.g.	< 0.00005	< 0.05	<0.00020	<0.00020
Molybdenum (Mo)-Total	mg/L	0.0010	2	n.g.	< 0.0002	< 0.0002	<0.0010	<0.0010
Nickel (Ni)-Total	mg/L	0.0010	n.g.	0.025 - 0.180 [H]	< 0.0005	< 0.0005	<0.0050	<0.0050
Potassium (K)-Total	mg/L	2.0	n.g.	373-432	1.98	1.68	<2.0	<2.0
Selenium (Se)-Total	mg/L	0.00010	0.002	n.g.	< 0.0002	< 0.0002	<0.0010	<0.0010
Silver (Ag)-Total	mg/L	0.000020	0.0001-0.003 [H]	n.g.	< 0.0001	< 0.0001	<0.000050	<0.000050
Sodium (Na)-Total	mg/L	2.0	n.g.	n.g.	326	342	331	353
Thallium (Tl)-Total	mg/L	0.00020	n.g.	0.0017 - 0.0063 [4]	-	-	<0.00020	<0.00020
Tin (Sn)-Total	mg/L	0.00050	n.g.	n.g.	-	-		
Titanium (Ti)-Total	mg/L	0.010	n.g.	2	0.030	0.010	<0.050	<0.050
Uranium (U)-Total	mg/L	0.00020	n.g.	0.3	0.0078	0.0006	<0.00020	<0.00020
Vanadium (V)-Total	mg/L	0.0010	n.g.	0.020 [5]	< 0.001	< 0.001	<0.030	<0.030
Zinc (Zn)-Total	mg/L	0.0050	0.033-0.265 [H]	n.g.	0.0276	0.0647	<0.0050	<0.0050
Dissolved Metals								
Aluminum (Al)-Dissolved	mg/L	0.0050	0.10 [pH](2)	n.g.	< 0.001	0.002	<0.010	<0.010
Antimony (Sb)-Dissolved	mg/L	0.00050	n.g.	n.g.	-	-	<0.00050	<0.00050
Arsenic (As)-Dissolved	mg/L	0.00050	n.g.	n.g.	0.0100	0.0057	<0.0010	<0.0010
Barium (Ba)-Dissolved	mg/L	0.020	n.g.	n.g.	0.800	0.880	0.905	0.893
Beryllium (Be)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.0002	< 0.0002	<0.0050	<0.0050
Boron (B)-Dissolved	mg/L	0.10	n.g.	n.g.	0.36	0.06	0.16	0.17
Cadmium (Cd)-Dissolved	mg/L	0.000010	0.00001-0.00006 [H]	n.g.	< 0.0002	< 0.0002	<0.000050	<0.000050
Calcium (Ca)-Dissolved	mg/L	0.10	n.g.	n.g.	15.0	14.0	14.2	13.4
Chromium (Cr)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.001	< 0.001	<0.00050	<0.00050
Cobalt (Co)-Dissolved	mg/L	0.00030	n.g.	n.g.	< 0.0003	0.0009	<0.00050	<0.00050
Copper (Cu)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.0002	0.0006	<0.0010	0.0241
Iron (Fe)-Dissolved	mg/L	0.030	0.35	n.g.	0.13	0.30	**0.458**	**0.422**
Lead (Pb)-Dissolved	mg/L	0.00050	n.g.	n.g.	< 0.0003	< 0.0003	<0.0010	<0.0010
Lithium (Li)-Dissolved	mg/L	0.0050	n.g.	n.g.	0.048	0.044	<0.050	<0.050
Magnesium (Mg)-Dissolved	mg/L	0.10	n.g.	n.g.	2.15	2.08	2.09	2.07
Manganese (Mn)-Dissolved	mg/L	0.00030	n.g.	n.g.	0.037	0.002	0.013	0.014
Mercury (Hg)-Dissolved	mg/L	0.000010	n.g.	n.g.	< 0.00005	< 0.05	<0.00020	<0.00020
Molybdenum (Mo)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.0002	< 0.0002	<0.0010	0.0044
Nickel (Ni)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.0005	< 0.0005	<0.0050	<0.0050
Potassium (K)-Dissolved	mg/L	2.0	n.g.	n.g.	1.96	1.63	<2.0	<2.0
Selenium (Se)-Dissolved	mg/L	0.00010	n.g.	n.g.	< 0.0002	< 0.0002	<0.0010	<0.0010
Silver (Ag)-Dissolved	mg/L	0.000020	n.g.	n.g.	< 0.0001	< 0.0001	<0.000050	<0.000050
Sodium (Na)-Dissolved	mg/L	2.0	n.g.	n.g.	326	323	371	358
Thallium (Tl)-Dissolved	mg/L	0.00020	n.g.	n.g.	-	-	<0.00020	<0.00020
Tin (Sn)-Dissolved	mg/L	0.00050	n.g.	n.g.	-	-		
Titanium (Ti)-Dissolved	mg/L	0.010	n.g.	n.g.	0.004	< 0.001	<0.050	<0.050
Uranium (U)-Dissolved	mg/L	0.00020	n.g.	n.g.	0.0077	< 0.0004	<0.00020	<0.00020
Vanadium (V)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.001	< 0.001	<0.030	<0.030
Zinc (Zn)-Dissolved	mg/L	0.0050	n.g.	n.g.	< 0.0006	0.0114	<0.0050	0.0497

				Well ID	T95R-15C	T95R-15C	T95R-15C	T95R-15C	T95R-15C
				Sample ID	-	-	-		T95R-15C
			BCWQG FAL		BDR	BDR	BDR	BDR	BDR
Date Sampled		**Detection**	**Approved**	***Working***	26-Oct-1995	28-Oct-1996	23-Aug-1997	9-Nov-2016	26-Sep-2017
ALS Sample ID	**Units**	**Limits[1]**	**Guidelines**	***Guidelines***	-	-	-	-	L2000339-1
Physical Tests									
Colour	CU	5	-	-	-	-	-	<5.0	<5.0
Conductivity (lab)	µS/cm	2.0	n.g.	n.g.	-	1380	1414	1340	1260
Specific Conductivity (field)	µS/cm	1.0	n.g.	n.g.	-	-	-	-	1370
Hardness (as $CaCO_3$)- total	mg/L	0.5	n.g.	n.g.	-	20.6	21.2	22.8	18.3
pH (lab)	pH	0.10	6.5-9	n.g.	-	8.14	8.12	8.60	8.48
pH (field)	pH	0.10	6.5-9	n.g.	-	-	-	-	8.20
Total Suspended Solids	mg/L	3.0	n.g.	n.g.	-	< 0.4	2.0	120	5.3
Total Dissolved Solids[2]	mg/L	10.0	n.g.	n.g.	853	821	858	820	867
Turbidity (lab)	NTU	0.10	50	n.g.	-	-	-	**120**	3.11
Alkalinity and Acidity									
Acidity (as CaCO3)	mg/L	1.0	n.g.	n.g.	-	-	-	<0.50	<1.0
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	-	954 [c]	1009 [c]	872 [c]	698
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	-	< 0.5	< 0.5	26.6	63.8
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	-	< 0.5	< 0.5	<0.50	<1.0
Alkalinity, Phenolphthalein (as CaCO3)	mg/L	2.0	n.g.	n.g.	-	< 0.1	< 0.1	-	31.9
Alkalinity, Total (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	-	783	828	759	762
Anions and Nitrogen									
Ammonia, Total (as N)	mg/L	0.0050	0.681-28.7 [pH, T]	n.g.	-	0.28	0.22	0.33	0.246
Bromide (Br)	mg/L	0.050	n.g.	n.g.	-	-	-	-	<0.25
Chloride (Cl)	mg/L	0.50	600	n.g.	1.90 [b]	2.2 [b]	2.2 [b]	3	<2.5
Fluoride (F)	mg/L	0.020	0.4-2.0 [H]	n.g.	-	-	-	**2.20**	**2.24**
Nitrate (as N)	mg/L	0.0050	32.8	n.g.	-	-	-	<0.020	<0.025
Nitrite (as N)	mg/L	0.0010	0.06 -0.60 [d]	n.g.	-	-	-	<0.0050	<0.0050
Total Nitrogen	mg/L	0.050	n.g.	n.g.	0.00300	< 0.01	0.030	0.449	0.276
Phosphorus (P)-Total Dissolved	mg/L	0.0020	n.g.	n.g.	-	0.040	0.041	0.0332	0.0345
Phosphorus (P)-Total	mg/L	0.0020	n.g.	n.g.	-		< 0.1	0.128	0.0409
Sulfate (SO_4)	mg/L	0.50	100	n.g.	2.40 [b]	0.3 [b]	0.4 [b]	1.01 [b]	<1.5
Inorganic/Organic Carbon									
Dissolved Organic Carbon	mg/L	0.5	n.g.	n.g.	-	-	-	0.84	0.50
Total Organic Carbon	mg/L	0.50	n.g.	n.g.	-	-	-	<0.50	0.80
Total Metals									
Aluminum (Al)-Total	mg/L	0.0050	n.g.	n.g.	9.48	0.050	0.051	1.57	0.110
Antimony (Sb)-Total	mg/L	0.00050	n.g.	n.g.	< 0.00001	-	-	<0.00050	<0.00050
Arsenic (As)-Total	mg/L	0.00050	0.005	n.g.	**0.0055**	< 0.0002	< 0.0002	0.00026	<0.0010
Barium (Ba)-Total	mg/L	0.020	n.g.	5	0.53	0.330	0.304	0.381	0.294
Beryllium (Be)-Total	mg/L	0.0010	n.g.	0.0053	0.01	< 0.0002	0.0003	0.00023	<0.0050
Boron (B)-Total	mg/L	0.10	1.2	n.g.	0.19	0.24	0.16	0.136	0.15
Cadmium (Cd)-Total	mg/L	0.000010	n.g.	n.g.	< 0.003	0.0006	< 0.0002	0.000037	<0.000050
Calcium (Ca)-Total	mg/L	0.10	n.g.	n.g.	-	6.99	6.54	6.63	5.59
Chromium (Cr)-Total	mg/L	0.0010	n.g.	0.001 or 0.0089 [3]	0.022	0.007	< 0.001	0.0015	<0.00050
Cobalt (Co)-Total	mg/L	0.00030	0.11	n.g.	0.008	0.0025	0.0012	0.00176	<0.00050
Copper (Cu)-Total	mg/L	0.0010	0.002 - 0.026 [H]	n.g.	0.01	< 0.0002	0.0030	0.00399	<0.0010
Iron (Fe)-Total	mg/L	0.030	1	n.g.	24.7	0.05	0.09	**3.01**	0.169
Lead (Pb)-Total	mg/L	0.00050	0.003 - 0.33 [H]	n.g.	0.03	0.0007	< 0.0003	0.0198	<0.0010
Lithium (Li)-Total	mg/L	0.0050	n.g.	0.87	-	0.050	0.052	0.0497	0.052
Magnesium (Mg)-Total	mg/L	0.10	n.g.	n.g.	-	1.20	1.18	1.53	1.07
Manganese (Mn)-Total	mg/L	0.00030	0.80-3.80 [H]	n.g.	0.793	< 0.001	0.002	0.079	<0.010
Mercury (Hg)-Total	mg/L	0.000010	n.g.	n.g.	< 0.00005	< 0.00005	< 0.05	<0.000010	<0.00020
Molybdenum (Mo)-Total	mg/L	0.0010	2	n.g.	0.011	< 0.0002	< 0.0002	<0.0010	<0.0010
Nickel (Ni)-Total	mg/L	0.0010	n.g.	0.025 - 0.180 [H]	0.009	< 0.0005	< 0.0005	0.0026	<0.0050
Potassium (K)-Total	mg/L	2.0	n.g.	373-432	-	1.26	1.29	1.2	<2.0
Selenium (Se)-Total	mg/L	0.00010	0.002	n.g.	< 0.0002	0.0003	< 0.0002	<0.00010	<0.0010
Silver (Ag)-Total	mg/L	0.000020	0.0001-0.003 [H]	n.g.	< 0.002	< 0.0001	0.0009	0.000023	<0.000050
Sodium (Na)-Total	mg/L	2.0	n.g.	n.g.	-	361	372	356	372
Thallium (Tl)-Total	mg/L	0.00020	n.g.	0.0017 - 0.0063 [4]	-	-	-	<0.000050	<0.00020
Tin (Sn)-Total	mg/L	0.00050	n.g.	n.g.	-	-	-	<0.005.0	-
Titanium (Ti)-Total	mg/L	0.010	n.g.	2	-	0.008	0.015	0.0129	<0.050
Uranium (U)-Total	mg/L	0.00020	n.g.	0.3	< 0.5	< 0.0004	< 0.0004	0.00016	<0.00020
Vanadium (V)-Total	mg/L	0.0010	n.g.	0.020 [5]	0.025	0.004	< 0.001	<0.0050	<0.030
Zinc (Zn)-Total	mg/L	0.0050	0.033-0.265 [H]	n.g.	0.108	0.0177	0.0240	0.0121	<0.0050
Dissolved Metals									
Aluminum (Al)-Dissolved	mg/L	0.0050	0.10 [pH](2)	n.g.	0.7	0.028	0.001	0.0114	<0.010
Antimony (Sb)-Dissolved	mg/L	0.00050	n.g.	n.g.	0.300	-	-	<0.00050	<0.00050
Arsenic (As)-Dissolved	mg/L	0.00050	n.g.	n.g.	0.0006	< 0.0002	< 0.0002	<0.00010	<0.0010
Barium (Ba)-Dissolved	mg/L	0.020	n.g.	n.g.	0.23	0.330	0.307	0.289	0.297
Beryllium (Be)-Dissolved	mg/L	0.0010	n.g.	n.g.	0.009	< 0.0002	< 0.0002	<0.00010	<0.0050
Boron (B)-Dissolved	mg/L	0.10	n.g.	n.g.	0.13	0.15	0.03	0.139	0.14
Cadmium (Cd)-Dissolved	mg/L	0.000010	0.00001-0.00006 [H]	n.g.	< 0.003	< 0.0002	< 0.0002	<0.000010	<0.000050
Calcium (Ca)-Dissolved	mg/L	0.10	n.g.	n.g.	-	6.41	6.54	5.43	5.62
Chromium (Cr)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.002	< 0.001	< 0.001	<0.0010	<0.00050
Cobalt (Co)-Dissolved	mg/L	0.00030	n.g.	n.g.	< 0.003	< 0.0003	0.0003	<0.00050	<0.00050
Copper (Cu)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.001	< 0.0002	< 0.0002	<0.0002	<0.0010
Iron (Fe)-Dissolved	mg/L	0.030	0.35	n.g.	**1.03**	< 0.01	< 0.01	0.0815	0.058
Lead (Pb)-Dissolved	mg/L	0.00050	n.g.	n.g.	< 0.02	0.0003	< 0.0003	<0.00020	<0.0010
Lithium (Li)-Dissolved	mg/L	0.0050	n.g.	n.g.	-	0.047	0.046	0.051	0.050
Magnesium (Mg)-Dissolved	mg/L	0.10	n.g.	n.g.	-	1.12	1.18	1.05	1.04
Manganese (Mn)-Dissolved	mg/L	0.00030	n.g.	n.g.	0.106	< 0.001	< 0.001	0.0037	<0.010
Mercury (Hg)-Dissolved	mg/L	0.000010	n.g.	n.g.	< 0.00005	< 0.00005	< 0.05	<0.00001	<0.00020
Molybdenum (Mo)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.003	< 0.0002	< 0.0002	<0.001	<0.0010
Nickel (Ni)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.005	< 0.0005	< 0.0005	<0.001	<0.0050
Potassium (K)-Dissolved	mg/L	2.0	n.g.	n.g.	-	1.19	1.15	1.02	<2.0
Selenium (Se)-Dissolved	mg/L	0.00010	n.g.	n.g.	< 0.0002	0.0002	< 0.0002	<0.00010	<0.0010
Silver (Ag)-Dissolved	mg/L	0.000020	n.g.	n.g.	< 0.002	< 0.0001	< 0.0001	<0.000020	<0.000050
Sodium (Na)-Dissolved	mg/L	2.0	n.g.	n.g.	-	332.	342.	333	357
Thallium (Tl)-Dissolved	mg/L	0.00020	n.g.	n.g.	-	-	-	<0.000050	<0.00020
Tin (Sn)-Dissolved	mg/L	0.00050	n.g.	n.g.	-	-	-	<0.005	
Titanium (Ti)-Dissolved	mg/L	0.010	n.g.	n.g.	-	< 0.001	< 0.001	<0.005	<0.050
Uranium (U)-Dissolved	mg/L	0.00020	n.g.	n.g.	< 0.5	< 0.0004	< 0.0004	<0.00010	<0.00020
Vanadium (V)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.002	< 0.001	< 0.001	<0.005	<0.030
Zinc (Zn)-Dissolved	mg/L	0.0050	n.g.	n.g.	0.01	0.0024	0.0038	<0.005	<0.0050

				Well ID	T0B96-02-06	T0B96-02-06	T0B96-02-06	T0B96-02-06	T0B96-02-06
				Sample ID	-	-	-	T0B96-02-06	T0B96-02-06
			BCWQG FAL		OVB	OVB	OVB	OVB	OVB
Date Sampled		**Detection**	**Approved**	***Working***	20-Sep-1996	23-Aug-1997	10-Nov-2016	28-Sep-2017	16-Jan-2018
ALS Sample ID	**Units**	**Limits[1]**	**Guidelines**	***Guidelines***	-	-	-	L2000339-4	L2047836-5
Physical Tests									
Colour	CU	5	-	-	-	-	<5.0	<5.0	<5.0
Conductivity (lab)	µS/cm	2.0	n.g.	n.g.	630	568	484	535	553
Specific Conductivity (field)	µS/cm	1.0	n.g.	n.g.	-	-	-	557	555
Hardness (as $CaCO_3$)- total	mg/L	0.5	n.g.	n.g.	338	289	389	314	297
pH (lab)	pH	0.10	6.5-9	n.g.	7.87	7.12	8.05	7.79	8.04
pH (field)	pH	0.10	6.5-9	n.g.	-	-	-	7.50	7.20
Total Suspended Solids	mg/L	3.0	n.g.	n.g.	63.0	37.0	2670	35.5	6.1
Total Dissolved Solids[2]	mg/L	10.0	n.g.	n.g.	340	311	314	329	327
Turbidity (lab)	NTU	0.10	50	n.g.	-	-	**1950**	19.9	4.8
Alkalinity and Acidity									
Acidity (as CaCO3)	mg/L	1.0	n.g.	n.g.	-	-	<0.5	10.2	-
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	386 [c]	380 [c]	320 [c]	301	321
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	<0.5	< 0.5	<0.5	<1.0	<1.0
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	<0.5	<0.5	<0.5	<1.0	<1.0
Alkalinity, Phenolphthalein (as CaCO3)	mg/L	2.0	n.g.	n.g.	<0.1	<0.1	<0.5	<2.0	-
Alkalinity, Total (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	317	312	263	301	321
Anions and Nitrogen									
Ammonia, Total (as N)	mg/L	0.0050	0.681-28.7 [pH, T]	n.g.	0.050	< 0.01	0.19	<0.0050	<0.0050
Bromide (Br)	mg/L	0.050	n.g.	n.g.	-	-	-	<0.050	<0.050
Chloride (Cl)	mg/L	0.50	600	n.g.	2.5 [b]	< 0.5 [b]	1.1 [b]	<0.50	<0.50
Fluoride (F)	mg/L	0.020	0.4-2.0 [H]	n.g.	-	-	0.14	0.103	0.110
Nitrate (as N)	mg/L	0.0050	32.8	n.g.	-	-	<0.020	0.0143	0.0137
Nitrite (as N)	mg/L	0.0010	0.06 -0.60 [d]	n.g.	-	-	<0.0050	<0.0010	<0.0010
Total Nitrogen	mg/L	0.050	n.g.	n.g.	0.218	0.353	0.481	0.043	<0.030
Phosphorus (P)-Total Dissolved	mg/L	0.0020	n.g.	n.g.	0.0100	0.0040	0.0058	0.0017	-
Phosphorus (P)-Total	mg/L	0.0020	n.g.	n.g.	< 0.1	< 0.1	0.854	0.0155	0.0035
Sulfate (SO_4)	mg/L	0.50	100	n.g.	13.4 [b]	9.1 [b]	10.8 [b]	9.77	10.4
Inorganic/Organic Carbon									
Dissolved Organic Carbon	mg/L	0.5	n.g.	n.g.	-	-	1.95	1.88	1.36
Total Organic Carbon	mg/L	0.50	n.g.	n.g.	-	-	1.92	1.25	1.18
Total Metals									
Aluminum (Al)-Total	mg/L	0.0050	n.g.	n.g.	1.30	0.179	16.7	1.19	0.193
Antimony (Sb)-Total	mg/L	0.00050	n.g.	n.g.	-	-	<0.0005	<0.00050	<0.00050
Arsenic (As)-Total	mg/L	0.00050	0.005	n.g.	0.0012	0.0002	**0.00899**	<0.0010	<0.00050
Barium (Ba)-Total	mg/L	0.020	n.g.	5	0.156	0.144	1.01	0.140	0.125
Beryllium (Be)-Total	mg/L	0.0010	n.g.	0.0053	0.0022	< 0.0002	0.00375	<0.0050	<0.00010
Boron (B)-Total	mg/L	0.10	1.2	n.g.	0.09	0.01	<0.05	<0.10	<0.10
Cadmium (Cd)-Total	mg/L	0.000010	n.g.	n.g.	0.0008	< 0.0002	0.000643	0.000068	0.0000211
Calcium (Ca)-Total	mg/L	0.10	n.g.	n.g.	90.6	86.0	106	85.4	92.7
Chromium (Cr)-Total	mg/L	0.0010	n.g.	0.001 or 0.0089 [3]	0.042	< 0.001	0.0081	0.00057	<0.0010
Cobalt (Co)-Total	mg/L	0.00030	0.11	n.g.	0.0020	0.0133	0.0158	0.00103	<0.00030
Copper (Cu)-Total	mg/L	0.0010	0.002 - 0.026 [H]	n.g.	< 0.0002	0.0114	0.0233	0.0013	<0.0010
Iron (Fe)-Total	mg/L	0.030	1	n.g.	1.77	0.27	**20**	0.852	0.144
Lead (Pb)-Total	mg/L	0.00050	0.003 - 0.33 [H]	n.g.	0.0026	0.0012	0.0584	0.0018	<0.00050
Lithium (Li)-Total	mg/L	0.0050	n.g.	0.87	0.004	0.003	0.0151	<0.050	0.0033
Magnesium (Mg)-Total	mg/L	0.10	n.g.	n.g.	27.2	23.9	30.4	24.9	25.3
Manganese (Mn)-Total	mg/L	0.00030	0.80-3.80 [H]	n.g.	0.117	0.051	4.46	0.484	0.111
Mercury (Hg)-Total	mg/L	0.000010	n.g.	n.g.	< 0.00005	< 0.05	0.00001	<0.00020	<0.0000050
Molybdenum (Mo)-Total	mg/L	0.0010	2	n.g.	< 0.0002	< 0.0002	<0.001	<0.0010	<0.0010
Nickel (Ni)-Total	mg/L	0.0010	n.g.	0.025 - 0.180 [H]	< 0.0005	0.0878	0.0234	<0.0050	<0.0010
Potassium (K)-Total	mg/L	2.0	n.g.	373-432	1.03	0.75	3.96	<2.0	<2.0
Selenium (Se)-Total	mg/L	0.00010	0.002	n.g.	< 0.0002	< 0.0002	0.00058	<0.0010	0.000533
Silver (Ag)-Total	mg/L	0.000020	0.0001-0.003 [H]	n.g.	< 0.0001	0.0008	0.000244	<0.000050	<0.000020
Sodium (Na)-Total	mg/L	2.0	n.g.	n.g.	11.4	8.11	13.6	7.9	7.8
Thallium (Tl)-Total	mg/L	0.00020	n.g.	0.0017 - 0.0063 [4]	-	-	0.000266	<0.00020	<0.000010
Tin (Sn)-Total	mg/L	0.00050	n.g.	n.g.	-	-	<0.005	-	<0.00050
Titanium (Ti)-Total	mg/L	0.010	n.g.	2	0.031	0.007	0.0378	<0.050	<0.010
Uranium (U)-Total	mg/L	0.00020	n.g.	0.3	0.0085	< 0.0004	0.0126	0.00136	0.00103
Vanadium (V)-Total	mg/L	0.0010	n.g.	0.020 [5]	0.018	< 0.001	0.0152	<0.030	0.00060
Zinc (Zn)-Total	mg/L	0.0050	0.033-0.265 [H]	n.g.	0.0050	0.0439	0.111	<0.0050	<0.0050
Dissolved Metals									
Aluminum (Al)-Dissolved	mg/L	0.0050	0.10 [pH](2)	n.g.	< 0.001	< 0.001	<0.003	0.035	<0.0050
Antimony (Sb)-Dissolved	mg/L	0.00050	n.g.	n.g.	-	-	<0.0005	<0.00050	<0.00050
Arsenic (As)-Dissolved	mg/L	0.00050	n.g.	n.g.	< 0.0002	< 0.0002	0.00026	<0.0010	<0.00050
Barium (Ba)-Dissolved	mg/L	0.020	n.g.	n.g.	0.142	0.138	0.11	0.120	0.121
Beryllium (Be)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.0002	< 0.0002	<0.0001	<0.0050	<0.00010
Boron (B)-Dissolved	mg/L	0.10	n.g.	n.g.	0.04	< 0.01	<0.05	<0.10	<0.10
Cadmium (Cd)-Dissolved	mg/L	0.000010	0.00001-0.00006 [H]	n.g.	< 0.0002	< 0.0002	<0.00001	<0.000050	0.0000064
Calcium (Ca)-Dissolved	mg/L	0.10	n.g.	n.g.	90.6	79.2	78.2	84.9	80.9
Chromium (Cr)-Dissolved	mg/L	0.0010	n.g.	n.g.	0.019	< 0.001	<0.001	<0.00050	<0.0010
Cobalt (Co)-Dissolved	mg/L	0.00030	n.g.	n.g.	0.0020	0.0045	<0.0005	<0.00050	<0.00030
Copper (Cu)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.0002	0.0033	0.00043	<0.0010	0.0013
Iron (Fe)-Dissolved	mg/L	0.030	0.35	n.g.	< 0.01	< 0.01	<0.005	0.050	<0.030
Lead (Pb)-Dissolved	mg/L	0.00050	n.g.	n.g.	< 0.0003	< 0.0003	<0.0002	<0.0010	<0.00050
Lithium (Li)-Dissolved	mg/L	0.0050	n.g.	n.g.	0.003	0.001	<0.005	<0.050	0.0026
Magnesium (Mg)-Dissolved	mg/L	0.10	n.g.	n.g.	27.2	22.1	22.4	24.8	23.2
Manganese (Mn)-Dissolved	mg/L	0.00030	n.g.	n.g.	0.035	< 0.001	0.0262	0.029	0.00170
Mercury (Hg)-Dissolved	mg/L	0.000010	n.g.	n.g.	< 0.00005	< 0.05	<0.00001	<0.00020	<0.0000050
Molybdenum (Mo)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.0002	< 0.0002	<0.001	<0.0010	<0.0010
Nickel (Ni)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.0005	0.0273	<0.001	<0.0050	<0.0010
Potassium (K)-Dissolved	mg/L	2.0	n.g.	n.g.	0.86	0.65	0.794	<2.0	<2.0
Selenium (Se)-Dissolved	mg/L	0.00010	n.g.	n.g.	< 0.0002	< 0.0002	0.00043	<0.0010	0.000526
Silver (Ag)-Dissolved	mg/L	0.000020	n.g.	n.g.	< 0.0001	0.0003	<0.00002	<0.000050	<0.000020
Sodium (Na)-Dissolved	mg/L	2.0	n.g.	n.g.	11.4	7.81	12.1	7.7	8.2
Thallium (Tl)-Dissolved	mg/L	0.00020	n.g.	n.g.	-	-	<0.00005	<0.00020	<0.00020
Tin (Sn)-Dissolved	mg/L	0.00050	n.g.	n.g.	-	-	<0.005	-	<0.00050
Titanium (Ti)-Dissolved	mg/L	0.010	n.g.	n.g.	0.017	< 0.001	<0.005	<0.050	<0.010
Uranium (U)-Dissolved	mg/L	0.00020	n.g.	n.g.	0.0082	< 0.0004	0.00121	0.00108	0.00096
Vanadium (V)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.001	< 0.001	<0.005	<0.030	<0.00050
Zinc (Zn)-Dissolved	mg/L	0.0050	n.g.	n.g.	< 0.0006	0.0054	<0.005	<0.0050	<0.0050

				Well ID	T0B96-11-04	T0B96-11-04	T0B96-11-04
				Sample ID	-	T0B96-11-04	T0B96-11-04
			BCWQG FAL		OVB	OVB	OVB
Date Sampled		**Detection**	**Approved**	***Working***	10-Nov-2016	27-Sep-2017	18-Jan-2018
ALS Sample ID	**Units**	**Limits[1]**	**Guidelines**	***Guidelines***	-	L2000339-5	L2047836-6
Physical Tests							
Colour	CU	5	-	-	<5.0	<5.0	<5.0
Conductivity (lab)	µS/cm	2.0	n.g.	n.g.	729	695	650
Specific Conductivity (field)	µS/cm	1.0	n.g.	n.g.	-	781	709
Hardness (as $CaCO_3$)- total	mg/L	0.5	n.g.	n.g.	423	405	339
pH (lab)	pH	0.10	6.5-9	n.g.	8.16	7.85	8.18
pH (field)	pH	0.10	6.5-9	n.g.	-	7.70	7.68
Total Suspended Solids	mg/L	3.0	n.g.	n.g.	385	21.9	14.1
Total Dissolved Solids[2]	mg/L	10.0	n.g.	n.g.	420	390	367
Turbidity (lab)	NTU	0.10	50	n.g.	**288.0**	20.2	7.74
Alkalinity and Acidity							
Acidity (as CaCO3)	mg/L	1.0	n.g.	n.g.	7.9	10.8	-
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	492 [c]	407	380
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	<0.5	<1.0	<1.0
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	<0.5	<1.0	<1.0
Alkalinity, Phenolphthalein (as CaCO3)	mg/L	2.0	n.g.	n.g.	0.5	<2.0	-
Alkalinity, Total (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	403	407	380
Anions and Nitrogen							
Ammonia, Total (as N)	mg/L	0.0050	0.681-28.7 [pH, T]	n.g.	0.093	0.0209	0.0088
Bromide (Br)	mg/L	0.050	n.g.	n.g.	-	<0.25	<0.050
Chloride (Cl)	mg/L	0.50	600	n.g.	1.1 [b]	<2.5	<0.50
Fluoride (F)	mg/L	0.020	0.4-2.0 [H]	n.g.	0.1	<0.10	0.111
Nitrate (as N)	mg/L	0.0050	32.8	n.g.	<0.02	0.130	0.153
Nitrite (as N)	mg/L	0.0010	0.06 -0.60 [cl]	n.g.	<0.005	<0.0050	<0.0010
Total Nitrogen	mg/L	0.050	n.g.	n.g.	0.28	0.739	0.321
Phosphorus (P)-Total Dissolved	mg/L	0.0020	n.g.	n.g.	<0.005	<0.0010	-
Phosphorus (P)-Total	mg/L	0.0020	n.g.	n.g.	0.221	0.0591	0.0646
Sulfate (SO_4)	mg/L	0.50	100	n.g.	21.7 [b]	20.8	22.4
Inorganic/Organic Carbon							
Dissolved Organic Carbon	mg/L	0.5	n.g.	n.g.	2.42	3.25	1.71
Total Organic Carbon	mg/L	0.50	n.g.	n.g.	2.16	4.63	2.87
Total Metals							
Aluminum (Al)-Total	mg/L	0.0050	n.g.	n.g.	5.27	2.81	1.31
Antimony (Sb)-Total	mg/L	0.00050	n.g.	n.g.	<0.0005	<0.00050	<0.00050
Arsenic (As)-Total	mg/L	0.00050	0.005	n.g.	0.00197	<0.0010	0.00055
Barium (Ba)-Total	mg/L	0.020	n.g.	5	0.192	0.138	0.099
Beryllium (Be)-Total	mg/L	0.0010	n.g.	0.0053	0.00046	<0.0050	<0.00010
Boron (B)-Total	mg/L	0.10	1.2	n.g.	<0.05	<0.10	<0.10
Cadmium (Cd)-Total	mg/L	0.000010	n.g.	n.g.	0.000321	0.000119	0.0000836
Calcium (Ca)-Total	mg/L	0.10	n.g.	n.g.	75.1	69.8	66.5
Chromium (Cr)-Total	mg/L	0.0010	n.g.	0.001 or 0.0089 [3]	0.004	0.00142	<0.0010
Cobalt (Co)-Total	mg/L	0.00030	0.11	n.g.	0.00375	0.00136	0.00067
Copper (Cu)-Total	mg/L	0.0010	0.002 - 0.026 [H]	n.g.	0.0169	0.0054	0.0029
Iron (Fe)-Total	mg/L	0.030	1	n.g.	**5.89**	**2.39**	**1.00**
Lead (Pb)-Total	mg/L	0.00050	0.003 - 0.33 [H]	n.g.	0.00877	0.0035	0.00156
Lithium (Li)-Total	mg/L	0.0050	n.g.	0.87	0.0071	<0.050	0.0059
Magnesium (Mg)-Total	mg/L	0.10	n.g.	n.g.	57.3	55.5	49.7
Manganese (Mn)-Total	mg/L	0.00030	0.80-3.80 [H]	n.g.	0.244	0.070	0.0383
Mercury (Hg)-Total	mg/L	0.000010	n.g.	n.g.	<0.00001	<0.00020	0.0000082
Molybdenum (Mo)-Total	mg/L	0.0010	2	n.g.	<0.001	0.0013	0.0021
Nickel (Ni)-Total	mg/L	0.0010	n.g.	0.025 - 0.180 [H]	0.0052	<0.0050	0.0012
Potassium (K)-Total	mg/L	2.0	n.g.	373-432	2.04	2.8	<2.0
Selenium (Se)-Total	mg/L	0.00010	0.002	n.g.	0.0001	<0.0010	0.000564
Silver (Ag)-Total	mg/L	0.000020	0.0001-0.003 [H]	n.g.	0.000054	<0.000050	<0.000020
Sodium (Na)-Total	mg/L	2.0	n.g.	n.g.	19.8	19.4	16.6
Thallium (Tl)-Total	mg/L	0.00020	n.g.	0.0017 - 0.0063 [4]	0.000072	<0.00020	0.000025
Tin (Sn)-Total	mg/L	0.00050	n.g.	n.g.	<0.005	-	<0.00050
Titanium (Ti)-Total	mg/L	0.010	n.g.	2	0.0702	0.063	0.023
Uranium (U)-Total	mg/L	0.00020	n.g.	0.3	0.0034	0.00344	0.00303
Vanadium (V)-Total	mg/L	0.0010	n.g.	0.020 [5]	0.0117	<0.030	0.00328
Zinc (Zn)-Total	mg/L	0.0050	0.033-0.265 [H]	n.g.	0.0266	0.0164	0.0104
Dissolved Metals							
Aluminum (Al)-Dissolved	mg/L	0.0050	0.10 [pH](2)	n.g.	<0.003	<0.010	<0.0050
Antimony (Sb)-Dissolved	mg/L	0.00050	n.g.	n.g.	<0.0005	<0.00050	<0.00050
Arsenic (As)-Dissolved	mg/L	0.00050	n.g.	n.g.	0.00026	<0.0010	<0.00050
Barium (Ba)-Dissolved	mg/L	0.020	n.g.	n.g.	0.0925	0.097	0.078
Beryllium (Be)-Dissolved	mg/L	0.0010	n.g.	n.g.	<0.0001	<0.0050	<0.00010
Boron (B)-Dissolved	mg/L	0.10	n.g.	n.g.	<0.05	<0.10	<0.10
Cadmium (Cd)-Dissolved	mg/L	0.000010	0.00001-0.00006[H]	n.g.	<0.00001	0.000059	0.0000486
Calcium (Ca)-Dissolved	mg/L	0.10	n.g.	n.g.	69.4	69.8	58.8
Chromium (Cr)-Dissolved	mg/L	0.0010	n.g.	n.g.	<0.001	<0.00050	<0.0010
Cobalt (Co)-Dissolved	mg/L	0.00030	n.g.	n.g.	<0.0005	<0.00050	<0.00030
Copper (Cu)-Dissolved	mg/L	0.0010	n.g.	n.g.	<0.0002	0.0011	<0.0010
Iron (Fe)-Dissolved	mg/L	0.030	0.35	n.g.	0.0201	<0.030	<0.030
Lead (Pb)-Dissolved	mg/L	0.00050	n.g.	n.g.	<0.0002	<0.0010	<0.00050
Lithium (Li)-Dissolved	mg/L	0.0050	n.g.	n.g.	<0.005	<0.050	0.0046
Magnesium (Mg)-Dissolved	mg/L	0.10	n.g.	n.g.	54.7	56.1	46.7
Manganese (Mn)-Dissolved	mg/L	0.00030	n.g.	n.g.	0.122	0.014	0.00207
Mercury (Hg)-Dissolved	mg/L	0.000010	n.g.	n.g.	<0.00001	<0.00020	<0.0000050
Molybdenum (Mo)-Dissolved	mg/L	0.0010	n.g.	n.g.	0.0015	0.0014	0.0038
Nickel (Ni)-Dissolved	mg/L	0.0010	n.g.	n.g.	<0.001	<0.0050	<0.0010
Potassium (K)-Dissolved	mg/L	2.0	n.g.	n.g.	1.03	<2.0	<2.0
Selenium (Se)-Dissolved	mg/L	0.00010	n.g.	n.g.	<0.0001	<0.0010	0.000433
Silver (Ag)-Dissolved	mg/L	0.000020	n.g.	n.g.	<0.00002	<0.000050	<0.000020
Sodium (Na)-Dissolved	mg/L	2.0	n.g.	n.g.	19.4	19.2	17.1
Thallium (Tl)-Dissolved	mg/L	0.00020	n.g.	n.g.	<0.00005	<0.00020	<0.00020
Tin (Sn)-Dissolved	mg/L	0.00050	n.g.	n.g.	<0.005	-	<0.00050
Titanium (Ti)-Dissolved	mg/L	0.010	n.g.	n.g.	<0.005	<0.050	<0.010
Uranium (U)-Dissolved	mg/L	0.00020	n.g.	n.g.	0.00306	0.00307	0.00283
Vanadium (V)-Dissolved	mg/L	0.0010	n.g.	n.g.	<0.005	<0.030	0.00125
Zinc (Zn)-Dissolved	mg/L	0.0050	n.g.	n.g.	<0.005	<0.0050	<0.0050

				Well ID	T0B96-01-05	T0B96-01-05	T0B96-01-05
				Sample ID	-	-	T0B96-01-05
			BCWQG FAL		OVB	OVB	OVB
Date Sampled		**Detection**	**Approved**	***Working***	20-Sep-1996	22-Aug-1997	19-Jan-2018
ALS Sample ID	**Units**	**Limits[1]**	**Guidelines**	***Guidelines***	-	-	L2047836-8
Physical Tests							
Colour	CU	5	-	-	-	-	6.2
Conductivity (lab)	µS/cm	2.0	n.g.	n.g.	373	403	392
Specific Conductivity (field)	µS/cm	1.0	n.g.	n.g.	-	-	472
Hardness (as $CaCO_3$)- total	mg/L	0.5	n.g.	n.g.	181	189	154
pH (lab)	pH	0.10	6.5-9	n.g.	7.18	6.7	7.66
pH (field)	pH	0.10	6.5-9	n.g.	-	-	7.2
Total Suspended Solids	mg/L	3.0	n.g.	n.g.	170	418	43.5
Total Dissolved Solids[2]	mg/L	10.0	n.g.	n.g.	199	220	261
Turbidity (lab)	NTU	0.10	50	n.g.	-	-	47.1
Alkalinity and Acidity							
Acidity (as CaCO3)	mg/L	1.0	n.g.	n.g.	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	232 [c]	263 [c]	220
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	< 0.5	< 0.5	<1.0
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	< 0.5	< 0.5	<1.0
Alkalinity, Phenolphthalein (as CaCO3)	mg/L	2.0	n.g.	n.g.	<0.1	<0.1	-
Alkalinity, Total (as $CaCO_3$)	mg/L	1.0	n.g.	n.g.	190	216	220
Anions and Nitrogen							
Ammonia, Total (as N)	mg/L	0.0050	0.681-28.7 [pH, T]	n.g.	0.03	< 0.01	0.0151
Bromide (Br)	mg/L	0.050	n.g.	n.g.	-	-	<0.050
Chloride (Cl)	mg/L	0.50	600	n.g.	< 0.5 [b]	< 0.5 [b]	<0.50
Fluoride (F)	mg/L	0.020	0.4-2.0 [H]	n.g.	-	-	0.137
Nitrate (as N)	mg/L	0.0050	32.8	n.g.	-	-	<0.0050
Nitrite (as N)	mg/L	0.0010	0.06 -0.60 [c]	n.g.	-	-	<0.0010
Total Nitrogen	mg/L	0.050	n.g.	n.g.	0.124	0.077	0.677
Phosphorus (P)-Total Dissolved	mg/L	0.0020	n.g.	n.g.	0.005	0.012	-
Phosphorus (P)-Total	mg/L	0.0020	n.g.	n.g.	0.1	0.2	0.11
Sulfate (SO_4)	mg/L	0.50	100	n.g.	5.8 [b]	9.3 [b]	4.27
Inorganic/Organic Carbon							
Dissolved Organic Carbon	mg/L	0.5	n.g.	n.g.	-	-	10.4
Total Organic Carbon	mg/L	0.50	n.g.	n.g.	-	-	11.6
Total Metals							
Aluminum (Al)-Total	mg/L	0.0050	n.g.	n.g.	3.82	4.41	0.844
Antimony (Sb)-Total	mg/L	0.00050	n.g.	n.g.	-	-	0.00071
Arsenic (As)-Total	mg/L	0.00050	0.005	n.g.	0.0034	**0.006**	0.00135
Barium (Ba)-Total	mg/L	0.020	n.g.	5	0.341	0.496	0.263
Beryllium (Be)-Total	mg/L	0.0010	n.g.	0.0053	0.0025	< 0.0002	<0.00010
Boron (B)-Total	mg/L	0.10	1.2	n.g.	0.09	< 0.01	<0.10
Cadmium (Cd)-Total	mg/L	0.000010	n.g.	n.g.	< 0.0002	< 0.0002	0.0000433
Calcium (Ca)-Total	mg/L	0.10	n.g.	n.g.	52.5	60.5	45.3
Chromium (Cr)-Total	mg/L	0.0010	n.g.	0.001 or 0.0089 [3]	0.006	0.005	<0.0010
Cobalt (Co)-Total	mg/L	0.00030	0.11	n.g.	0.0072	0.0072	0.00129
Copper (Cu)-Total	mg/L	0.0010	0.002 - 0.026 [H]	n.g.	< 0.0002	0.0161	0.0029
Iron (Fe)-Total	mg/L	0.030	1	n.g.	**5.05**	**19.1**	0.618
Lead (Pb)-Total	mg/L	0.00050	0.003 - 0.33 [H]	n.g.	0.0037	0.0118	0.00097
Lithium (Li)-Total	mg/L	0.0050	n.g.	0.87	0.005	0.014	0.0058
Magnesium (Mg)-Total	mg/L	0.10	n.g.	n.g.	14.7	19	11.1
Manganese (Mn)-Total	mg/L	0.00030	0.80-3.80 [H]	n.g.	0.345	0.243	1.07
Mercury (Hg)-Total	mg/L	0.000010	n.g.	n.g.	< 0.00005	< 0.05	0.000038
Molybdenum (Mo)-Total	mg/L	0.0010	2	n.g.	< 0.0002	0.0004	0.0014
Nickel (Ni)-Total	mg/L	0.0010	n.g.	0.025 - 0.180 [H]	< 0.0005	< 0.0005	0.0025
Potassium (K)-Total	mg/L	2.0	n.g.	373-432	0.97	1.98	<2.0
Selenium (Se)-Total	mg/L	0.00010	0.002	n.g.	< 0.0002	< 0.0002	0.000116
Silver (Ag)-Total	mg/L	0.000020	0.0001-0.003 [H]	n.g.	< 0.0001	0.0005	0.000024
Sodium (Na)-Total	mg/L	2.0	n.g.	n.g.	18.3	14	32.7
Thallium (Tl)-Total	mg/L	0.00020	n.g.	0.0017 - 0.0063 [4]	-	-	0.000010
Tin (Sn)-Total	mg/L	0.00050	n.g.	n.g.	-	-	<0.00050
Titanium (Ti)-Total	mg/L	0.010	n.g.	2	0.067	0.043	<0.010
Uranium (U)-Total	mg/L	0.00020	n.g.	0.3	0.0077	< 0.0004	0.00243
Vanadium (V)-Total	mg/L	0.0010	n.g.	0.020 [5]	< 0.001	0.012	0.00286
Zinc (Zn)-Total	mg/L	0.0050	0.033-0.265 [H]	n.g.	0.0205	0.032	<0.0050
Dissolved Metals							
Aluminum (Al)-Dissolved	mg/L	0.0050	0.10 [pH)(2)]	n.g.	< 0.001	0.005	0.0206
Antimony (Sb)-Dissolved	mg/L	0.00050	n.g.	n.g.	-	-	0.00069
Arsenic (As)-Dissolved	mg/L	0.00050	n.g.	n.g.	0.0003	0.0002	0.00092
Barium (Ba)-Dissolved	mg/L	0.020	n.g.	n.g.	0.281	0.196	0.248
Beryllium (Be)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.0002	< 0.0002	<0.00010
Boron (B)-Dissolved	mg/L	0.10	n.g.	n.g.	< 0.01	< 0.01	<0.10
Cadmium (Cd)-Dissolved	mg/L	0.000010	0.00001-0.00006 [H]	n.g.	< 0.0002	< 0.0002	0.000155
Calcium (Ca)-Dissolved	mg/L	0.10	n.g.	n.g.	50.5	52.4	43.5
Chromium (Cr)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.001	< 0.001	<0.0010
Cobalt (Co)-Dissolved	mg/L	0.00030	n.g.	n.g.	0.0037	0.0025	0.00089
Copper (Cu)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.0002	0.0021	0.0022
Iron (Fe)-Dissolved	mg/L	0.030	0.35	n.g.	< 0.01	< 0.01	<0.030
Lead (Pb)-Dissolved	mg/L	0.00050	n.g.	n.g.	< 0.0003	< 0.0003	<0.00050
Lithium (Li)-Dissolved	mg/L	0.0050	n.g.	n.g.	0.003	0.003	0.0053
Magnesium (Mg)-Dissolved	mg/L	0.10	n.g.	n.g.	13.2	14	11.0
Manganese (Mn)-Dissolved	mg/L	0.00030	n.g.	n.g.	0.207	0.039	0.922
Mercury (Hg)-Dissolved	mg/L	0.000010	n.g.	n.g.	< 0.00005	< 0.05	<0.0000050
Molybdenum (Mo)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.0002	< 0.0002	<0.0010
Nickel (Ni)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.0005	< 0.0005	0.0018
Potassium (K)-Dissolved	mg/L	2.0	n.g.	n.g.	0.37	0.27	<2.0
Selenium (Se)-Dissolved	mg/L	0.00010	n.g.	n.g.	< 0.0002	< 0.0002	0.000065
Silver (Ag)-Dissolved	mg/L	0.000020	n.g.	n.g.	< 0.0001	< 0.0001	<0.000020
Sodium (Na)-Dissolved	mg/L	2.0	n.g.	n.g.	12.5	12.4	33.9
Thallium (Tl)-Dissolved	mg/L	0.00020	n.g.	n.g.	-	-	<0.00020
Tin (Sn)-Dissolved	mg/L	0.00050	n.g.	n.g.	-	-	<0.00050
Titanium (Ti)-Dissolved	mg/L	0.010	n.g.	n.g.	0.02	< 0.001	<0.010
Uranium (U)-Dissolved	mg/L	0.00020	n.g.	n.g.	< 0.0004	< 0.0004	0.00228
Vanadium (V)-Dissolved	mg/L	0.0010	n.g.	n.g.	< 0.001	< 0.001	0.00140
Zinc (Zn)-Dissolved	mg/L	0.0050	n.g.	n.g.	< 0.0006	0.0318	0.0062

Table 6A-2 - Groundwater Quality Analytical Results, 2017-2018 and Historical Data

Notes:

BCWQG	BC Water Quality Guidelines
	Maximum concentrations for Freshwater Aquatic Life
(-)	Not applicable
[1]	Lowest reported detection limit listed
[2]	Dissolved Aluminum is pH dependent. 100 ug/L for a pH greater than or equal to 6.5 and $e^{(1.209 - 2.426\,(pH) + 0.286K)}$ where K = (pH)2 for a pH less than 6.5
[3]	Chromium (VI) maximum is 1.0 ug/l and Chromium (III) maximum is 8.9 ug/L
[4]	Thallium - 1.7 ug/L human health, consumption of water + organism and 6.3 ug/L human health, consumption of organism only
[5]	Vanadium - 20 ug/L for secondary chronic value
(Cl)	Chloride dependent guideline
(H)	Hardness dependent guideline
(pH)	pH dependent guideline
(T)	Temperature dependent guideline
n.g.	No guideline
underlined	Concentration exceeds BCWQG Working Water Quality Guidelines
and Shaded	Concentration exceeds BCWQG Approved Water Quality Guidelines
[a]	Historical data shows samples collected over two days - Oct 26 and Oct 27, 1995
[b]	Reported as dissolved
[cl]	The approved guideline for nitrite is chloride dependent.
[c]	Values may not be accurate.

			T96R-34-87	Duplicate	RPD %	T95R-15C	Duplicate	RPD %	T95R-40	Duplicate	RPD %
			T96R-34-87-0817	T95R-0817		T95R-15C	DUP 1		T95R-40	DUP 1	
Date Sampled		**Detection**	16-Aug-2017	16-Aug-2017		26-Sep-2017	26-Sep-2017		18-Jan-2018	18-Jan-2018	
ALS Sample ID	**Units**	**Limits[1]**	L1977808-2	L1977808-1		L2000339-1	L2000339-6		L2047836-2	L2047836-1	
Physical Tests											
Colour	CU	5	<5.0	<5.0	-	<5.0	<5.0	-	<5.0	<5.0	-
Conductivity (lab)	uS/cm	2.0	1320	1310	0.8	1260	1260	0.0	2680	2700	0.7
Hardness (as $CaCO_3$)- total	mg/L	0.5	44	42.1	4.4	18.3	19.9	8.4	103	104	1.0
pH (lab)	pH	0.10	8.15	8.15	0.0	8.48	8.45	0.4	7.67	7.62	0.7
Total Suspended Solids	mg/L	3.0	10.4	8.4	-	5.3	5.5	-	688.0	666	3.2
Total Dissolved Solids[c]	mg/L	10.0	834	827	0.8	867	864	0.3	1810	1830	1.1
Turbidity (lab)	NTU	0.10	1.55	1.49	3.9	3.11	2.98	4.3	489	476	2.7
Alkalinity and Acidity											
Acidity (as CaCO3)	mg/L	1.0	3.7	3.9	-	<1.0	<1.0	-	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	1.0	753	757	0.5	698	706	1.1	1690	1670	1.2
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	1.0	<1.0	<1.0	-	63.8	67	4.9	<1.0	<1.0	-
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	1.0	<1.0	<1.0	-	<1.0	<1.0	-	<1.0	<1.0	-
Alkalinity, Phenolphthalein (as CaCO3)	mg/L	2.0	-	-	-	31.9	33.5	4.9	-	-	-
Alkalinity, Total (as $CaCO_3$)	mg/L	1.0	753	757	0.5	762	773	1.4	1690	1670	1.2
Anions and Nitrogen											
Ammonia, Total (as N)	mg/L	0.0050	0.373	0.373	0.0	0.246	0.242	1.6	0.695	0.700	0.7
Bromide (Br)	mg/L	0.050	<0.25	<0.25	-	<0.25	<0.25	-	<1.0	<1.0	-
Chloride (Cl)	mg/L	0.50	<2.5	<2.5	-	<2.5	<2.5	-	<10	<10	-
Fluoride (F)	mg/L	0.020	**1.53**	1.57	2.6	2.24	2.23	0.4	0.59	0.55	7.0
Nitrate (as N)	mg/L	0.0050	<0.025	<0.025	-	<0.025	<0.025	-	<0.10	<0.10	-
Nitrite (as N)	mg/L	0.0010	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.020	<0.020	-
Total Nitrogen	mg/L	0.050	0.377	0.380	0.8	0.276	0.275	0.4	1.04	1.03	1.0
Phosphorus (P)-Total Dissolved	mg/L	0.0020	0.0044	0.0041	-	0.0345	0.0336	2.6	-	-	-
Phosphorus (P)-Total	mg/L	0.0020	0.0082	0.0085	-	0.0409	0.0385	6.0	0.202	0.233	14.3
Sulfate (SO_4)	mg/L	0.50	<1.5	<1.5	-	<1.5	<1.5	-	<6.0	<6.0	-
Inorganic/Organic Carbon											
Dissolved Organic Carbon	mg/L	0.5	<0.50	<0.50	-	0.50	0.54	-	1.11	0.59	-
Total Organic Carbon	mg/L	0.50	<0.50	0.50	-	0.80	0.73	-	64.8	69.3	6.7
Total Metals											
Aluminum (Al)-Total	mg/L	0.0050	0.088	0.078	12.0	0.110	0.115	4.4	9.42	8.76	7.3
Antimony (Sb)-Total	mg/L	0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
Arsenic (As)-Total	mg/L	0.00050	<0.0010	<0.0010	-	<0.0010	<0.0010	-	0.0060	0.00572	4.8
Barium (Ba)-Total	mg/L	0.020	0.959	0.973	-	0.294	0.281	4.5	*5.01*	4.78	4.7
Beryllium (Be)-Total	mg/L	0.0010	<0.0050	<0.0050	-	<0.0050	<0.0050	-	0.00111	0.00106	-
Boron (B)-Total	mg/L	0.10	0.18	0.19	-	0.15	0.14	-	0.38	0.37	-
Cadmium (Cd)-Total	mg/L	0.000010	<0.000050	<0.000050	-	<0.000050	<0.000050	-	0.000217	0.000240	10.1
Calcium (Ca)-Total	mg/L	0.10	19.6	19.7	0.5	5.59	5.46	2.4	40.7	40.5	0.5
Chromium (Cr)-Total	mg/L	0.0010	<0.00050	<0.00050	-	<0.00050	<0.00050	-	*0.0062*	0.0061	1.6
Cobalt (Co)-Total	mg/L	0.00030	<0.00050	<0.00050	-	<0.00050	<0.00050	-	0.00325	0.00333	2.4
Copper (Cu)-Total	mg/L	0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	-	0.0349	0.0333	4.7
Iron (Fe)-Total	mg/L	0.030	0.530	0.532	0.4	0.169	0.170	0.6	8.39	8.52	1.5
Lead (Pb)-Total	mg/L	0.00050	<0.0010	<0.0010	-	<0.0010	<0.0010	-	0.0231	0.0226	2.2
Lithium (Li)-Total	mg/L	0.0050	<0.050	<0.050	-	0.052	<0.050	-	0.124	0.126	1.6
Magnesium (Mg)-Total	mg/L	0.10	2.15	2.19	1.8	1.07	1.04	2.8	9.75	9.53	2.3
Manganese (Mn)-Total	mg/L	0.00030	0.015	0.015	0.0	<0.010	<0.010	-	0.154	0.156	1.3
Mercury (Hg)-Total	mg/L	0.000010	<0.00020	<0.00020	-	<0.00020	<0.00020	-	<0.000050	<0.000050	-
Molybdenum (Mo)-Total	mg/L	0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-
Nickel (Ni)-Total	mg/L	0.0010	<0.0050	<0.0050	-	<0.0050	<0.0050	-	0.0068	0.0068	0.0
Potassium (K)-Total	mg/L	2.0	<2.0	<2.0	-	<2.0	<2.0	-	4.0	3.9	-
Selenium (Se)-Total	mg/L	0.00010	<0.0010	<0.0010	-	<0.0010	<0.0010	-	0.00020	0.00018	-
Silver (Ag)-Total	mg/L	0.000020	<0.000050	<0.000050	-	<0.000050	<0.000050	-	0.000071	0.000075	-
Sodium (Na)-Total	mg/L	2.0	331	336	1.5	372	353	5.2	698	682	2.3
Thallium (Tl)-Total	mg/L	0.00020	<0.00020	<0.00020	-	<0.00020	<0.00020	-	0.000083	0.000085	-
Tin (Sn)-Total	mg/L	0.00050			-			-	<0.00050	0.00050	-
Titanium (Ti)-Total	mg/L	0.010	<0.050	<0.050	-	<0.050	<0.050	-	0.038	0.038	0.0
Uranium (U)-Total	mg/L	0.00020	<0.00020	<0.00020	-	<0.00020	<0.00020	-	0.00241	0.00250	3.7
Vanadium (V)-Total	mg/L	0.0010	<0.030	<0.030	-	<0.030	<0.030	-	0.0128	0.0125	2.4
Zinc (Zn)-Total	mg/L	0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	-	0.0378	0.0455	18.5
Dissolved Metals											
Aluminum (Al)-Dissolved	mg/L	0.0050	<0.010	<0.010	-	<0.010	<0.010	-	<0.0050	<0.0050	-
Antimony (Sb)-Dissolved	mg/L	0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
Arsenic (As)-Dissolved	mg/L	0.00050	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.00050	<0.00050	-
Barium (Ba)-Dissolved	mg/L	0.020	0.905	0.850	6.3	0.297	0.285	4.1	3.69	3.67	0.5
Beryllium (Be)-Dissolved	mg/L	0.0010	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.00020	<0.00020	-
Boron (B)-Dissolved	mg/L	0.10	0.16	0.15	-	0.14	0.14	-	0.36	0.32	-
Cadmium (Cd)-Dissolved	mg/L	0.000010	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000010	<0.000010	-
Calcium (Ca)-Dissolved	mg/L	0.10	14.2	13.6	4.3	5.62	6.27	10.9	30.8	31.5	2.2
Chromium (Cr)-Dissolved	mg/L	0.0010	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.0010	<0.0010	-
Cobalt (Co)-Dissolved	mg/L	0.00030	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00030	<0.00030	-
Copper (Cu)-Dissolved	mg/L	0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-
Iron (Fe)-Dissolved	mg/L	0.030	**0.458**	0.434	5.4	0.058	0.057	-	<0.030	<0.030	-
Lead (Pb)-Dissolved	mg/L	0.00050	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.00050	<0.00050	-
Lithium (Li)-Dissolved	mg/L	0.0050	<0.050	<0.050	-	0.050	<0.050	-	0.102	0.101	1.0
Magnesium (Mg)-Dissolved	mg/L	0.10	2.09	1.99	4.9	1.04	1.04	0.0	6.33	6.23	1.6
Manganese (Mn)-Dissolved	mg/L	0.00030	0.013	0.013	0.0	<0.010	<0.010	-	0.0331	0.0316	4.6
Mercury (Hg)-Dissolved	mg/L	0.000010	<0.00020	<0.00020	-	<0.00020	<0.00020	-	<0.0000050	<0.0000050	-
Molybdenum (Mo)-Dissolved	mg/L	0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-
Nickel (Ni)-Dissolved	mg/L	0.0010	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0010	<0.0010	-
Potassium (K)-Dissolved	mg/L	2.0	<2.0	<2.0	-	<2.0	<2.0	-	3.3	3.2	-
Selenium (Se)-Dissolved	mg/L	0.00010	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.00010	<0.00010	-
Silver (Ag)-Dissolved	mg/L	0.000020	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000020	<0.000020	-
Sodium (Na)-Dissolved	mg/L	2.0	371	349	6.1	357	344	3.7	703	674	4.2
Thallium (Tl)-Dissolved	mg/L	0.00020	<0.00020	<0.00020	-	<0.00020	<0.00020	-	<0.00020	<0.00020	-
Tin (Sn)-Dissolved	mg/L	0.00050			-			-	<0.00050	<0.00050	-
Titanium (Ti)-Dissolved	mg/L	0.010	<0.050	<0.050	-	<0.050	<0.050	-	<0.010	<0.010	-
Uranium (U)-Dissolved	mg/L	0.00020	<0.00020	<0.00020	-	<0.00020	<0.00020	-	<0.00020	<0.00020	-
Vanadium (V)-Dissolved	mg/L	0.0010	<0.030	<0.030	-	<0.030	<0.030	-	<0.0010	<0.0010	-
Zinc (Zn)-Dissolved	mg/L	0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0050	<0.0050	-

Notes:

('-) Not calculated

Table 6A-4, Field Parameter Measurements, July 2017 - April 2018

		Field Parameters					
Monitoring Well ID	**Date**	**Temperature (°C)**	**Specific Conductivity (µS/cm)**	**Turbidity (qualitative)**	**pH**	**DO (mg/L)**	**ORP (mV)**
T95R-40	17-Aug-17	5.7	2840	clear	7.18	1.13	-20.6
	29-Sep-17	6.1	2560	clear	7.3	nm	-15
	18-Jan-18	4.06	2687	turbid	7.11	1.91	-26.3
	3-Apr-18	3.5	2726	clear	7.67	0.73	+66
T95R-64	17-Aug-17	5.85	1303	clear	7.35	0.09	-72.8
	26-Sep-17	5.9	1322	clear	7.5	nm	-33
	15-Jan-18	4.61	1279	clear	7.12	0.67	-8.9
	31-Mar-18	4.3	1293	clear	7.68	0.69	+16
T96R-34-87	16-Aug-17	4.94	1312	low	7.33	0.91	-43.6
	27-Sep-17	6.0	1414	nm	7.5	nm	-40
	2-Apr-18	4.2	1379	clear	7.68	0.84	-7
T95R-15C	26-Sep-17	5.8	1370	clear	8.2	nm	-23
	20-Apr-18	5.8	1602	clear	8.4	nm	-85
TOB96-01-05	28-Sep-17	7.5	663	nm	7.8	nm	+47
	19-Jan-18	3.3	472	turbid	7.2	nm	+8
	29-Mar-18	2.9	518	semi-turbid	7.02	2.39	+59
TOB96-02-06	28-Sep-17	7.9	557	clear	7.5	nm	+68
	16-Jan-18	4.13	558	clear	7.2	4.06	+238
	29-Mar-18	2.7	559	clear	7.73	6.24	+79.4
TOB96-11-04 shallow	27-Sep-17	7.6	781	nm	7.7	nm	+105
	15-Jan-18	4.03	709	semi-turbid	7.68	6.71	+149
	26-Mar-18	3.3	638	clear	7.88	11.45	+136.3
W1 Deep	28-Apr-18	6.2	1212	semi-turbid	9.3	nm	-88
W1 Shallow	27-Apr-18	5.0	789	semi-turbid	9.1	nm	+65
W2	5-Apr-18	3.3	523	semi-turbid	8.78	3.09	+75
W3 Deep	25-Apr-18	13.4	722	clear	8.2	nm	+71
W3 Shallow	6-Apr-18	4.8	535	clear	8.71	1.79	+32
ARD2	24-Mar-18	4.9	1986	semi-turbid	7.68	1.34	+89

Notes
nm = not measured

Appendix 6-B

Field Notes and Field Data Sheets

July 25, 2017 Telkwa Coal

Sunny + 18°C 10am

Well ID	Damaged	Depth to bottom mbtc	Depth to Water mbtc	Checked already
T95R-15C	no	62.17	0.45	Y
T97R-108C-70	Yes	1.245	0.27	Y
TOB96-02-06	no	6.79	2.93	Y
TOB 96-02-20	no	n/a	n/a	Y
TOB 96-11-04	no	4.43	2.48	Y
TOB 96-11-19	yes	1.46 (1.5.8)	dry	Y
TOB 96-12-04	Yes	1.47	dry	Y
TOB 97-06-21	no	20.88		Y
TOB 97-07-24	no	23.54	dry	Y
T95R-39C	Yes			
T95R-40 1030	no	52.24	7.945	
T95R-64 1130a	no	>90m	7.535	
T96R-16-19	no	18.61	2.69	
T96R-16-28	no	28.58	2.69	
T96R-34-87 930am	no cap	68.67	0.530 mbtc	
T96R-34-87 930am	no cap	86.83	0.845	
T96R-56C-83 1215p	Potential	31.37	0.75	
TOB96-01-05	no	5.165	2.70	
T96TP-01-10	no is this the well?	6.125	2.14	
T96TP-02-07	no	7.65	3.42	
T93R-17	no well			
T93R-18	could not find - no evidence of the well			
~~T95R-40~~				

July 25, 2017 Telkwa Coal

	Stick up (mags)	
T96R-34-67	0.94m	pretty tough access - heli landing ≈250m away
T96R-34-87	0,97m	
T95R-40	0,26m	tough walk in ≈300m from heli. landing - there is a cap - some of the cap fell into the well. Not a problem though
T95R-64	Stick-up 1.225 mags	≈100m from heli spot - There is a cut road - ~~duplicate~~ remarked the waypoint as TR95-64 - this well has a dedicated bailer that is attached to the cap. - we dropped the bailer in T95R-40
T96R-56C-83	1.18m	≈500m walk fairly tough - depth to bottom is much shallower than the provided info. - well casing looks disturbed and tilted - no cap - moose prints beside the well - seems damaged

July 28, 2017 Telkwa Coal

	Stick-up (mags)	
TOB96-01-05	0,745	not bad access ≈350m from the road - well looks good - dedicated bailer attached to the cap
T96TP-01-10	1.24m	- is this the well? - bottom needs cleaning - 3" ID surrounded by a fence - Looks to be a testing ~~for~~ area. - we are not exactly on the coordinates ≈ 26m off - helicopter can land right here - has a threaded coupler on top of it. We measured from the top of the coupler. - remarked the waypoint - not sure if this is the well. We walked around and could not find another well.
T96TP-02-07	1.305m	- soft bottom - needs to be cleaned - easy to walk to from the helicopter - 3" diameter - surrounded by a fence

4/ July 25th, 2017 Telkwa Coal
Stick-up (mags)

T95R-39C
- well could not be found. The dedicated bailer was found buried in the mud. Fragments of the 2" PVC found.
- 1.5m x 1.5m depressing filled with 2" of water. Most likely the old well location.

T96R-16-19 — 0,745m
- no dedicated bailer
- fairly good access
- wells are in good shape
- Liddon in the trees

T96R-16-28 — 0,815m
- dedicated bailer in the well

T93R-18 - no evidence of a well

Done at 415pm - leaving for the helibase.

1/ July 26th, 2017 Telkwa Coal
- arrived at Silverking at 830am
- did safety plan with Dallas.
- T93R-17 - arrived at 935am
- no evidence of a well - tough walk in
- wet in the forest +15°C

1030am — Stick-up (mags)

TOB 96-11-04 shallow — 0.87
- well looks fine
- has dedicated waterra tubing
- easy access - helicopter landed close
- steel casing looks good

TOB 96-11-19 Deep
- rebar measuring tape could not get past 1.46m btoc.
- PVC is cracked and broken - cap on the ground. Steel casing looks good.
- water level tape is getting down with ease
- dedicated waterra tubing was in the well. Dallas pulled this out easily
- 19.80 mbtoc (broken casing) for depth to bottom used the water level tape - some mud at the bottom
- well is dry
- 0.31m stick up

2 July 26, 2017 Telkwa Coal

1230pm

	Stick-up
TOB97-07-24	0,90m

- well looks good
- no damage
- there is a cap
- nice walking access - helicopter probably could land

TOB 96-02-06	0,38m

- has a dedicated bailer
- good condition
- tough access

TOB 96-02-20	0,34m

- could not get the cap off
- has a dedicated bailer
- good condition
- tough access

T95R-15C	1.08 m

- well is cracked but functional
- dedicated waterra tubing
- no cap
- PVC extends above the steel casing
- no protective steel lid
- easy access

3 July 26, 2017 Stick-up

TOB 97-06-21	0,74m

- no damage
- easy access
- no dedicated tubing or bailer

T97R-108C-70	0.42m	4:02pm

- could not get past 1.25 mbtoc
- damaged
- casing is bent and the ground around it is depressed
- still has a well cap
- no dedicated tubing
- fairly difficult access

TOB96-12-04	0.42m	435pm

- well is damaged
- casing is bent over
- dedicated bailer
- dry

August 16, 2017 Telkwa Coal

- arrived at Silverking at 810am - met Mike Stead.
- ~~mobbed~~ to T96R-34-67187 - arrived at 915am - slung the material into the site

T96R-34-67
0.525 mbtoc
T96R-34-87
0.884 mbtoc

---

checking the YSI 556
pH 7.0 reads 6.98 ORP reads 242 mV
Spec. cond. reads 1405 µs/cm

T96R-34-67

- pipe must be slightly kinked at ≈ 14 meters as the mini-monsoon pump cannot get beyond that depth. A standard bailer can get past it, We will have to purge with a bailer. The bailer can only get to a certain depth ≈ 145 m btoc, therefore can only pull a certain amount of water, Best option is ~~Water~~ HDPE tubing with a hydrolift. We 1207pm will improvise with the LDPE tubing and a foot valve

August 17, 2017 Telkwa Coal 1

- arrived at Silver King at 810 am
- mobbed to T95R-40 - at the well at 925am

- T95R-40

water level → 8.155 mbtoc

checking the YSI

pH 7.00 reads 7.02 ✓

Spec. Cond. reads 1423 µs/cm ✓

ORP reads 239.2 mV ✓

2 August 16, 2017 Telkwa Coal

- T96R-34-67

- we believe the well to be cracked at ≈ 14-15 m. When the water level is dropped below 14.5 mbtoc you can hear water gurgling in the well. This tells me that possibly there is a crack in the casing somewhere in this area. The fact that the pump and bailer cannot get below this point also implies a bend or crack in the pipe. The 3/8" Waterra tubing also produced a rough feeling along the side of the casing at this depth (≈ 14.5 mbtoc)

T 96R-34-87

- using the mini-monsoon which seems to be working. Has trouble pumping when water goes below ≈ 45'.

Left the site @ 415 - back at the base around 430pm

T96R-34-87 Dup. T95R-0817 PAGE ___ of ___

Date	August 16, 2017
Project	Telkwa Coal - Tenas
Client	Telkwa Coal
WELL ID	T96R-34-87

Weather	Partly Cloudy +20°C
Personnel	Mike Stadd ; Cody Cameron

Time

Arrival on site	915am
Departure	415pm

Well Completion

Stick up	[illegible]	(1)
PVC depth	86.83 mbtoc	(2)
Top sand pack	80.6 mbgs (screen)	(3)
Bottom sand pack	86.6 mbgs (screen)	(4)
Inner diameter	2"	(5)
Borehole Radius		(6)

K = 1.2 x 10⁻⁷ m/s

Water column height (metres)

Time	Water level	End of hole	Water column	
930am	0.884 mbtoc	86.83 mbtc		(7)

Calculated Well Volume

Standpipe Volume: A_P = [(5) / 2]² x π x 1000 L/m³

86m x 2 ⇒ 172L / 1 well volume

A_P = ____ L/m

V_P = (7) x A_P = ____ L

Borehole Volume: A_B = {[(5) + (6)]² − (5)²} x π x 1000 L/m³

A_B = ____ L/m

V_B = (7) x A_B = ____ L

Well Volume: WV = V_P + V_B = ____ L

Volume of ideal purge		Volume of water Purged	
516	L	728	L

Reason for discrepancy: stable readings

Bottles	preservation	X	filtered	X
Anions/Routine	None	✓	No	
Total Metals	HNO3	✓	No	
Total Hg	HCl	✓	No	
Dissolved Metals	HNO3	✓	Yes	✓
Dissolved Hg	HCl	✓	Yes	✓
Nutrients/TOC	H2SO4	✓	No	
Cyanides	NAOH		No	
TOC - Phos.	H2SO4	✓	Yes	✓

Notes (purging method, colour, odour, etc.)

- turned pump on at 1245pm (mini-monsoon)
- pump is sitting at ≈19m btoc

Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity (qualitative)	pH	DO (mg/L)	ORP (mv)
1246	5	5.10	1419	low	7.43	7.07↓	-37.1↓
1249	36	4.91	1416	"	7.30	1.83↓	-53.4
1257	63	5.34	1414	"	7.27	1.31↓	-54.1
1301	84	5.49	1413	"	7.28	1.38↓	-54.7
1324	96	5.69	1424	"	7.29	2.94↓	-25.1
1342	125	5.98	1425	"	7.31	1.34↓	-40.8
1410	150	5.99	1393	"	7.32	2.41↓	-44.7
1445	190	5.80	1354	"	7.31	1.16↓	-46.3
1510	214	5.38	1346	"	7.30	2.84↓	-47.2
1516	218	5.19	1317	"	7.29		-48.4
1523	221	~~4.95~~ 5.04	1306	"	7.34	0.75↓	-38.3
1527	229	4.94	1315		7.31	0.67↓	-44.6
1531	238	4.94	1312		7.33	0.91↓	-43.6

Done purging at 1533 - done sampling at 1600

Time	water level (mbsu)	Δ time	Δ volume (L)	rate
1255	14.98		60	
1348	12.56		125	
1502	15.18		204	1.5 L/min
← flow through cell readings				

T96R-34-67

PAGE ___ of ___

Date	August 16, 2017
Project	Telkwa Coal - Tenas
Client	Telkwa Coal
WELL ID	T96R-34-67

Weather	Cloudy + 18°C
Personnel	Mike Stead & CORY CAMERON

Time

Arrival on site	915 am
Departure	415 pm

Well Completion

Stick up	0.94 m	(1)
PVC depth	68.67 mbtoc	(2)
Top sand pack	66.2 mbgs (top screen)	(3)
Bottom sand pack	67.5 mbgs (bottom screen)	(4)
Inner diameter	2"	(5)
Borehole Radius		(6)

K = 2.1 x 10^{-8} m/s

Water column height (metres)

Time	Water level	End of hole	Water column	
930am	0.525 mbtoc	68.67 mbtoc		(7)

Calculated Well Volume

Standpipe Volume A_P = [(5) / 2]^2 x π x 1000 L/m^3 = ____ L/m

68m x 2 = 136L / well volume

V_P = (7) x A_P = ____ L

Borehole Volume A_B = {[(5) + (6)]^2 − (5)^2} x π x 1000 L/m^3 = ____ L/m

V_B = (7) x A_B = ____ L

Well Volume WV = V_P + V_B = ____ L

Volume of ideal purge		Volume of water Purged	
400	L		L

Reason for discrepancy:

Bottles	preservation	X	filtered	X
Anions/Routine	None		No	
Total Metals	HNO3		No	
Total Hg	HCl		No	
Dissolved Metals	HNO3		Yes	
Dissolved Hg	HCl		Yes	
Nutrients/TOC	H2SO4		No	
Cyanides	NAOH		No	

Notes (purging method, colour, odour, etc.)

- pump set at ≈14.5 mbtoc
- turned pump on at 10:00am
- took out 44L in 5 minutes - below level of pump
- used a bailer for 5 litres then put the pump back in. Pump gets stuck at ≈14m. Bailer will be used for purging

Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity (qualitative)	pH	DO (mg/L)	ORP (mv)
1002	12	5.68	1677	turbid	9.34	1.67	-132
1010	45	5.86	1682	" black	9.35	1.38	-132
1047	~~47~~ 51	6.79	1717	"	9.24	10.44	-135
1134	58	5.69	1940	"	8.29	1.99	-183
1157	63	6.70	2129	slightly	7.66	9.80	-254
	- Done with this well at 1215 pm. We believe the casing						
	is cracked somewhere between 14 and 15 m bbc.						
	- The pump is all scratched up and we saw very small						
	pieces of potential PVC.						
	- More noted in the field book						

Time	water level (mbsu)	Δ time	Δ volume (L)
1011 am	14.12		45

T95R-64

Date	August 17, 2017
Project	Telkwa Coal - Teros
Client	Telkwa Coal
WELL ID	T95R-64

Weather	Cloudy + 18°C
Personnel	Mike Stedl ; CODY CAMERON

Time

Arrival on site	1300
Departure	1630

Well Completion

Stick up	1.23 m	(1)
PVC depth		(2)
Top sand pack	85.0 mbgs (top screen)	(3)
Bottom sand pack	94.0 mbgs (bottom screen)	(4)
Inner diameter	2"	(5)
Borehole Radius		(6)

Water column height (metres)

Time	Water level	End of hole	Water column	
1310	7.525	94.0 mbgs		(7)

Calculated Well Volume

Standpipe Volume	A_P	= [(5) / 2]^2 x π x 1000 L/m^3		L/m
94.00 − 7.53 = 86.47 x 2 ⇒ 170 L	V_P	= (7) x A_P =		L
Borehole Volume	A_B	= {[(5) + (6)]^2 − (5)^2} x π x 1000 L/m^3		L/m
	V_B	= (7) x A_B =		L
Well Volume	WV	= V_P + V_B =		L

Volume of ideal purge		Volume of water Purged	
510	L	312	L

Reason for discrepancy: stable readings

Bottles	preservation	X	filtered	X
Anions/Routine	None	✓	No	
Total Metals	HNO3	✓	No	
Total Hg	HCl	✓	No	
Dissolved Metals	HNO3	✓	Yes	✓
Dissolved Hg	HCl	✓	Yes	✓
Nutrients/TOC	H2SO4	✓	No	
Cyanides	NAOH		No	
Dissolved TOC	H2SO4	✓	Yes	✓

Notes (purging method, colour, odour, etc.)

- pump turned on at 1314
- mini-monsoon

K = 5.5x10^{-7} m/s

Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity (qualitative)	pH	DO (mg/L)	ORP (mv)
1315	5	5.14	1342	clear	7.51	4.02	-27.1
1320	~~#~~30	4.91	1324	"	7.43	1.89	-63.3
1330	65	5.04	1327	"	7.43	1.15	-67.2
1350	120	5.52	1331	"	7.44	1.23	-72.6
1417	200	5.71	1311	"	7.43	1.72	-66.1
1440	228	6.50	1325	"	7.40	1.09	-66.1
1509	264	6.28	1310	"	7.40	0.38	-64.9
1515	276	5.71	1297	"	7.32	0.09	-69.5
1522	288	5.90	1304	"	7.35	0.10	-70.1
1532	312	5.85	1303	"	7.35	0.09	-72.8
		Done purging at	1532				
		Done sampling at	1556				

Time	water level (mbsu)	Δ time	Δ volume (L)
1326	716.5 mbbc		48
1339	"		96
1440	"		228
flow cell attached			

rate 3 L/min ⇒ 2 litres/min

T95R-40

PAGE ___ of ___

Date	August 17, 2017
Project	Telkwa Coal - Tenas
Client	Telkwa Coal
WELL ID	T95R-40

Weather	Cloudy +12°C
Personnel	Mike Stead ; Cody Cameron

Time

Arrival on site	945am
Departure	1230 pm

Well Completion

Stick up	0.26 m	(1)
PVC depth	52.24 mbtoc	(2)
Top sand pack	42.0 mbgs (top screen)	(3)
Bottom sand pack	53.0 m bgs (bottom screen)	(4)
Inner diameter	2"	(5)
Borehole Radius		(6)

Water column height (metres)

Time	Water level	End of hole	Water column	
930am	8.155 mbtoc	52.24 mbtoc		(7)

Calculated Well Volume

Standpipe Volume	A_P	= [(5) / 2]^2 x π x 1000 L/m^3		
52.24 − 8.15 = 44.09m x 2 = 88L		=		L/m
	V_P	= (7) x A_P =		L
Borehole Volume ~~A_B~~	A_B	= {[(5) + (6)]^2 − (5)^2} x π x 1000 L/m^3		
		=		L/m
	V_B	= (7) x A_B =		L
Well Volume	WV	= V_P + V_B =		L

Volume of ideal purge		Volume of water Purged	
264	L	89	L

Reason for discrepancy: stable readings

Bottles	preservation	X	filtered	X
Anions/Routine	None	✓	No	
Total Metals	HNO3	✓	No	
Total Hg	HCl	✓	No	
Dissolved Metals	HNO3	✓	Yes	✓
Dissolved Hg	HCl	✓	Yes	✓
Nutrients/TOC	H2SO4	✓	No	
Cyanides	NAOH		No	
Dissolved TOC	H_2SO_4	✓	Yes	✓

Notes (purging method, colour, odour, etc.)

- will use the mini-monsoon pump
- pump turned on at 945am
- A flow controller would be ideal.

K= 1.4×10^{-6} m/s

Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity (qualitative)	pH	DO (mg/L)	ORP (mv)
946 am	4	5.16	2967	clear	7.21	2.05	90.8
950 am	24	4.99	2841	"	7.15	1.20	1.26
1001 am	30	5.07	2848	"	7.16	0.21	-29.3
1030 am	52	5.64	2845	"	7.16	1.29	-30.9
1038 am	58	4.93	2842	"	7.16	1.00	-34.1
1052	67	5.36	2832	"	7.15	1.24	-33.5
1128	82	5.7	2840	"	7.18	1.13	-20.6
	Done purging at 89L		- purged for 1hr 50 min				
	Done sampling at 1152 pm						

Time	water level (mbsu)	Δ time	Δ volume (L)
949	17.16		22
1110	17.90		76

Sept. 25, 2017 T&K Co. 1

Transducer programming 9am

~~Well ID~~	Serial #	
T95R-15C	0032065041	M10
T95R-64	0032065044	M10
T96R-16-19	0032060396	M10
~~Barologger (T95R-64)~~ ~~T0B96-02-06~~	0012077834	
T0B96-02-06	0032065063	M10
T0B96-02-20	2077546	M10

checking Oakton multi-parameter probes temp. 13°C

pH 7.00 reads 7.~~01~~ ~~calibrated to 7.01~~

ORP reads 25~~9~~ mV - calibrated to 240mV

pH 4.00 reads 3.7 - calibrated to 4.0

Spec. Cond. reads 1398 µs/cm - calibrated to 1413 µs/cm

1 Srpt. 26, 2017 Telkwa Coal

- arrived at Canadian at 745am
- dropped off at an access road near T95R-15C

- water level is 0.24 mbtoc - there is a crack in the casing at this depth.

Done sampling at T95R-15C at 1058
Installing transducer at 1115 ≈ 5 meters below the top of casing
Serial # 3206 5041
- Installed a j-plug
- offsite at 1130am

Done sampling at T95R-64 at 335pm
- Serial # 0032065044
transducer placed ≈ 11.10 meters below the top of casing.
- installed the barologger here as well. Placed inside the 2" PVC ≈ 3' feet down
Barologger serial # 0012077834
- picked up at 430pm - back in town at 445pm
- picked up supplies when in town

Srpt. 27, 2017 Telkwa Coal 1

- at Canadian Heli at 815am
- mobed out to T96R-34-87 at 9am

- water elevation at T96R-34-67 (broken well) 0.74 mbtoc
- water elevation at T96R-34-67 has dropped to 2.01 mbtoc after purging 146 litres from T96R-34-87. Are they hydraulically connected?

Left T96R-34-87 at 2pm
- arrived at TOB96-11 nest at 232pm
- TOB96-11-19Deep - dry
Depth to bottom - 19.82 mbtoc

TOB96-11-04 shallow
Depth to water 2.54 mbtoc
" to bottom 4.45 mbtoc
- very low recharge at TOB96-11-04 so we bailed the water out nearly dry. We will return tomorrow to retrieve a sample.

Well ID	water level mbtoc	Time
T96-TP-02-07	3.225	430pm
T96-TP-01-10	1.845	425pm
T96R-16-28	2.76	440pm
T96R-16-19	2.735	441pm

TOB 96-11-04 shallow

Date	Sept. 27, 2017
Project	Telkwa Coal
Client	allegiance Coal
WELL ID	TOB 96-11-04

Weather	Sunny + 20°C
Personnel	Jesse Meidl ! Cody Cameron

Time

	Purge	Sample
Arrival on site	230 09/27	830am 09/28
Departure	350 09/27	930am 09/28

Well Completion

Stick up	0.88m	(1)
PVC depth	4.45 mbtc	(2)
Top sand pack	1.5 mbgs screen	(3)
Bottom sand pack	4.5 mbgs screen	(4)
Inner diameter	2"	(5)
Borehole Radius		(6)

Water column height (metres)

Time	Water level	End of hole	Water column	
235	2.54 mbtc	4.45 mbtc		(7)

Calculated Well Volume

Standpipe Volume / well volume

$A_P = [(5)/2]^2 \times \pi \times 1000$ L/m³ = ____ L/m

$V_P = (7) \times A_P =$ ____ L

4.45 − 2.54 = 1.91 × 2 = 3.8 L

Borehole Volume

$A_B = \{[(5)+(6)]^2 - (5)^2\} \times \pi \times 1000$ L/m³ = ____ L/m

$V_B = (7) \times A_B =$ ____ L

Well Volume $WV = V_P + V_B =$ ____ L

Volume of ideal purge		Volume of water Purged	
11.4	L	12	L

Reason for discrepancy:

Bottles	preservation	X	filtered	X
Anions/Routine	None	✓	No	
Total Metals	HNO3	✓	No	
Total Hg	HCl	✓	No	
Dissolved Metals	HNO3	✓	Yes	✓
Dissolved Hg	HCl	✓	Yes	✓
Nutrients/TOC	H2SO4	✓	No	✓
Cyanides	NAOH		No	
Dissolved TOC	H_2SO_4	✓	Yes	✓

Notes (purging method, colour, odour, etc.)

- peristaltic pump (low flow)
- turned pump on at 249pm
- peristaltic died at 256 pm (purged 1.5 liters)
- used a bailer to purge 8 liters - we bailed the well nearly dry. We will collect a sample tomorrow after it recharges
- very slow recharge

	Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity (qualitative)	pH	DO (mg/L)	ORP (mv)
09/27	250	1	9.5	835		7.5		+83
	321	5.5	9.1	710		7.8		188
	326	8.5	9.0	754		7.3		
	335	9.5	8.6	772		7.5		+29
09/28	900am	12	7.6	781		7.7		105
			bailed well dry	collecting a sample			on 09/28/ 9am	

Time	water level (mbsu)	Δ time	Δ volume (L)
250			
329	4.00		8.5
340	4.11		
857am 09/28	4.03		

TOB 96-02-06

4 this
PAGE ___ of ___

Date	September 28, 2017
Project	Telkwa Coal
Client	Allegiance Coal
WELL ID	TOB 96-02-06

Weather	Cloudy + 10°C
Personnel	Jessel Meidl & Cody Cameron

Time

Arrival on site	940 am
Departure	200 pm

Well Completion

Stick up	0.35 meters	(1)
PVC depth	6.80 mbtoc	(2)
Top sand pack	3.0 mbgs screen	(3)
Bottom sand pack	6.0 mbgs screen	(4)
Inner diameter	2"	(5)
Borehole Radius		(6)

Water column height (metres)

Time	Water level	End of hole	Water column	
950	3.61	6.0 mbgs		(7)

← according to the provided note

Calculated Well Volume

Standpipe Volume / well volume

A_P = [(5) / 2]^2 x π x 1000 L/m^3

6.80
3.61
3.19 x 2 = 6.4 L

= ____ L/m

V_P = (7) x A_P = ____ L

Borehole Volume

A_B = {[(5) + (6)]^2 – (5)^2} x π x 1000 L/m^3

= ____ L/m

V_B = (7) x A_B = ____ L

Well Volume WV = V_P + V_B = ____ L

Volume of ideal purge		Volume of water Purged	
19	L	19+	L

Reason for discrepancy:

Bottles	preservation	X	filtered	X
Anions/Routine	None	✓	No	
Total Metals	HNO3	✓	No	
Total Hg	HCl	✓	No	
Dissolved Metals	HNO3	✓	Yes	
Dissolved Hg	HCl	✓	Yes	
Nutrients/TOC	H2SO4	✓	No	
Cyanides	NAOH		No	
Dissolved TOC	H2SO4	✓	Yes	✓

Notes (purging method, colour, odour, etc.)

- peristaltic pump
- turned pump on at 959am
- field blank at this location

Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity (qualitative)	pH	DO (mg/L)	ORP (mv)
1004	1	7.0	610	clear	7.7		+125
1020	3.5	7.3	552	"	7.4		+57
1050	8	7.8	551		7.4		+90
1106	11	7.7	553		7.4		+100
1116	14	7.8	549		7.5		
1131	16	8.5	554		7.3		+22
1146	19	7.9	557		7.5		+68
		Done purging at	1150 am				
		Done sampling at	1235 pm				

Time	water level (mbsu)	Δ time	Δ volume (L)
1003	3.79		
1015	4.02		2.5
1027	4.15		
1105	4.40		

0.16 litres / min

TOB96-01-05

PAGE ___ of ___

Date	September 28, 2017
Project	Telkwa Coal
Client	Allegiance Coal
WELL ID	TOB96-01-05

Weather	Cloudy, +14C
Personnel	Jesse Merdl & Cody Cameron

Time

Arrival on site	245pm 09/28	345 09/29
Departure	400 pm 09/28	401 09/29

Well Completion

Stick up		(1)
PVC depth	5.15 ~~mbgl~~ mbtoc	(2)
Top sand pack	1.6 mbgl screen	(3)
Bottom sand pack	4.6 mbgl screen	(4)
Inner diameter	2"	(5)
Borehole Radius		(6)

Water column height (metres)

Time	Water level	End of hole	Water column
256	3.675 mbtoc	~~mbtoc~~ 5.15	(7)

Calculated Well Volume

Standpipe Volume / well volume: $A_P = [(5)/2]^2 \times \pi \times 1000$ L/m³ = ____ L/m; $V_P = (7) \times A_P$ = ____ L

~~5.150 − 3.675 = 1.475 × 2 = 2.95 L~~

Borehole Volume: $A_B = \{[(5)+(6)]^2 - (5)^2\} \times \pi \times 1000$ L/m³ = ____ L/m; $V_B = (7) \times A_B$ = ____ L

5.150 − 3.675 = 1.475 × 2 = 2.95 L

Well Volume: $WV = V_P + V_B$ = ____ L

Volume of ideal purge		Volume of water Purged	
~~12~~ 9	L		L

Reason for discrepancy:

Bottles	preservation	X	filtered	X
Anions/Routine	None		No	
Total Metals	HNO3		No	
Total Hg	HCl		No	
Dissolved Metals	HNO3		Yes	
Dissolved Hg	HCl		Yes	
Nutrients/TOC	H2SO4		No	
Cyanides	NAOH		No	

Notes (purging method, colour, odour, etc.)

09/28
- using a bailer to purge
- water is very turbid (brown)
- basically cleaning out the bottom of the well
- we are getting less amount of water in each bailer as we purge. Purging the well dry. Bailed 7.5 litres out
- Sample tomorrow

	Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity (qualitative)	pH	DO (mg/L)	ORP (mv)
09/28	320	0.5	8.4	319	turbid	7.1		-86
	333	7	7.8	662	"	7.5		-76
09/29	347	returned to collect a sample.	Water level = 4.86 mbtoc so					
		there is 31cm of standing	water. We may not be able					
		to collect a sample.						
09/29	358	7.2	7.5	663		7.8		+47
		- only could pull out ≤200ml of water and it is highly turbid						
		- not enough water to collect a sample - nearly dry.						

Time	water level (mbsu)	Δ time	Δ volume (L)
328	4.64		5
345	4.86		
358	4.915		7.2

T96R-34-87

5 shrt

PAGE 1 of 1

Date	Sept. 27, 2017
Project	Telkwa Coal
Client	Allegiance Coal
WELL ID	T96R-34-87

Weather	Partly Cloudy +8°C
Personnel	Jesse Meidl ; Cody Cameron

Time

Arrival on site	910 am
Departure	115 pm

Well Completion

Stick up		(1)
PVC depth	87.6 mbtoc	(2)
Top sand pack	80.6 mbgs screen	(3)
Bottom sand pack	86.6 mbgs screen	(4)
Inner diameter	2"	(5)
Borehole Radius		(6)

Water column height (metres)

Time	Water level	End of hole	Water column	
921am	0.825 mbtoc	87.6 mbtoc		(7)

Calculated Well Volume

Standpipe Volume / well volume: $A_P = [(5)/2]^2 \times \pi \times 1000$ L/m³

87.600 − 0.825 = 86.775 × 2 ⇒ 172 L

$V_P = (7) \times A_P =$ ____ L/m ____ L

Borehole Volume: $A_B = \{[(5) + (6)]^2 - (5)^2\} \times \pi \times 1000$ L/m³

$V_B = (7) \times A_B =$ ____ L/m ____ L

Well Volume: $WV = V_P + V_B =$ ____ L

Volume of ideal purge		Volume of water Purged	
516	L	227	L

Reason for discrepancy: stable readings

Bottles	preservation	X	filtered	X
Anions/Routine	None	✓	No	
Total Metals	HNO3	✓	No	
Total Hg	HCl	✓	No	
Dissolved Metals	HNO3	✓	Yes	✓
Dissolved Hg	HCl	✓	Yes	✓
Nutrients/TOC	H2SO4	✓	No	
Cyanides	NAOH		No	
Dissolved TOC	H2SO4	✓	Yes	✓

Notes (purging method, colour, odour, etc.)

- using a mini-monsoon pump
- pump on at 9:50 am
- pump set at ≈ 20 metres below casing
- water level drops quickly
- pump off at 1022 (72 L total)
- " on at 1006 - off at 1010 (88 L total)
- turning pump on and off - collected 125 L in 4 minutes allowing well to recover
- from 1107 - 1114 (7 min 44 sec) pumped 24 L total

Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity (qualitative)	pH	DO (mg/L)	ORP (mv)
957		5.3	1418		8.0		-20
1020	102	4.8	1438		7.5		-17
1106	124	5.1	1386		7.6		-41
1204	180	5.9	1405		7.4		-47
1217	192	6.0	1418		7.5		-45
1235	212	6.0	1414		7.5		-40
		Done purging at 1243 pm					
		Done sampling at 1256 pm					

122
146
167
177
191
214
217

Time	water level (mbsu)	Δ time	Δ volume (L)	
951				8 litres/min
953	7.31			6 litres/min
955	12.21			
1007	13.4			4 litres/min
1110	17.30	- while pump is on.		≈ 3 litres/min
		- Pump cannot push water than ≈ 17 - 18 metres		

T95R-64

4hrs

PAGE ___ of ___

Date	September 26, 2017
Project	TelKwa Coal
Client	allegiance Coal
WELL ID	T95R-64

Weather	Partly Cloudy +15°C
Personnel	Jesse Maidl ; Cody Cameron

Time

Arrival on site	1245 pm
Departure	430 pm

Well Completion

Stick up		(1)
PVC depth	94.0 mbtoc	(2)
Top sand pack	85.0 mbgs screen	(3)
Bottom sand pack	94.0 mbgs screen	(4)
Inner diameter	2"	(5)
Borehole Radius		(6)

Water column height (metres)

Time	Water level	End of hole	Water column
1254	7.345 mbtoc	94.00 mbtoc	(7)

Calculated Well Volume

Standpipe Volume	A_P	= [(5) / 2]^2 x π x 1000 L/m^3		
1 well volume		=		L/m
94.00 − 7.345 = 86.655 x 2 ⇒ 173 L	V_P	= (7) x A_P =		L
Borehole Volume	A_B	= {[(5) + (6)]^2 − (5)^2} x π x 1000 L/m^3		
		=		L/m
	V_B	= (7) x A_B =		L
Well Volume	WV	= V_P + V_B =		L

Volume of ideal purge		Volume of water Purged	
519	L	538	L

Reason for discrepancy:

Bottles	preservation	X	filtered	X
Anions/Routine	None	✓	No	
Total Metals	HNO3	✓	No	
Total Hg	HCl	✓	No	
Dissolved Metals	HNO3	✓	Yes	✓
Dissolved Hg	HCl	✓	Yes	✓
Nutrients/TOC	H2SO4	✓	No	✓
Cyanides	NAOH		No	
Dissolved TOC	H_2SO_4	✓	Yes	✓

Notes (purging method, colour, odour, etc.)

- using the mini-monsoon pump
- pump on at 1:09
- pump set at ≈ 20 metres below top of casing

Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity (qualitative)	pH	DO (mg/L)	ORP (mv)
1:15	36	5.0	1337	clear	7.7		66
1:25	50	5.8	1389	"	7.5		-21
1:30		5.1	1361	"	7.4		-51
1:44	114	5.9	1391	"	7.5		-23
2:05	198	6.0	1340	"	7.6		-37
2:35	318	6.1	1309		7.5		-35
3:00	418	6.0	1300		7.5		-45
3:18	490	5.9	1322		7.5		-33
		Done purging at 330					
		Done sampling at 335					

Time	water level (mbsu)	Δ time	Δ volume (L)
1:10			
1:13	11.90		
1:50			
1:21	16.54		
1:25			
1:39	17.08		
1:48	16.41		
3:14	16.43		

Flow 6 litres/min

" 11

4 litres/min

" 11

" 11

" 11

pH strips 0 hardness, 7.8 pH, 7240 alkalinity

T95R-40

Date	September 29, 2017
Project	Telkwa Coal
Client	Allegiance Coal
WELL ID	T95R-40

Weather	Rain +12°C
Personnel	Jesse Meidl ; Cody Cameron

Time

Arrival on site	1045 am
Departure	3 pm

Well Completion

Stick up	0.30 m	(1)
PVC depth	53.0 mbgs (53.30 mbtoc)	(2)
Top sand pack	42.0 mbgs screen	(3)
Bottom sand pack	57.0 mbgs screen	(4)
Inner diameter	2"	(5)
Borehole Radius		(6)

Water column height (metres)

Time	Water level	End of hole	Water column	
1059	8.03	53.0 mbgs		(7)

Calculated Well Volume

Standpipe Volume / well volume: $A_P = [(5)/2]^2 \times \pi \times 1000$ L/m³ = ____ L/m

$V_P = (7) \times A_P$ = ____ L

53.30 − 8.03 = 45.27 × 2 ≈ 90 L

Borehole Volume: $A_B = \{[(5)+(6)]^2 - (5)^2\} \times \pi \times 1000$ L/m³ = ____ L/m

$V_B = (7) \times A_B$ = ____ L

Well Volume $WV = V_P + V_B$ = ____ L

Volume of ideal purge		Volume of water Purged	
270	L	91	L

Reason for discrepancy: stable readings

Bottles	preservation	X	filtered	X
Anions/Routine	None	✓	No	
Total Metals	HNO3	✓	No	
Total Hg	HCl	✓	No	
Dissolved Metals	HNO3	✓	Yes	
Dissolved Hg	HCl	✓	Yes	
Nutrients/TOC	H2SO4	✓	No	
Cyanides	NAOH		No	
Dissolved TOC	H2SO4	✓	Yes	✓

Notes (purging method, colour, odour, etc.)

- using a mini-monsoon pump
- pump on at 1110am - pump off at 1119 (32 litres)
- purged from 32-46 in 4min 50sec @ 4L/min to 1140
- pump sitting at 20.57 mbtoc
- pump cannot push water lower than ≈ 18.28 mbtoc

Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity (qualitative)	pH	DO (mg/L)	ORP (mV)
1113	15	6.3	2660	clear	7.3		+79
1135	32	6.3	1662		7.5		-3
1201	47	5.8	2670		7.3		+25
1228	58	5.8	2120		7.5		+10
1249	63	6.1	890		7.1		+94
108	73	6.1	2390		7.2		+33
134	79	6.1	2610		7.3		+7
152	82	5.8	2530		7.3		-3
204	86	6.1	2600		7.4		-17
218	89	6.1	2560		7.3		-15
			Done purging at		223 pm		
			Done sampling at		235 pm		

Time	water level (mbsu)	Δ time	Δ volume (L)
1116			24
1118	19.50		30

Flowrate 3 litre/min ≈ 0.5L/min

3hrs

T95R-15C

Date	September 26, 2017
Project	Tenas Pit
Client	Teck Coal
WELL ID	T95R-15C

Weather	Cloudy + 10°C
Personnel	Jesse Meidl & Cody Cameron

Time

Arrival on site	845 am
Departure	1230 pm

Well Completion

Stick up		(1)
PVC depth	63.0 m	(2)
Top sand pack	48.0 mbgs screen	(3)
Bottom sand pack	63.0 mbgs screen	(4)
Inner diameter	2"	(5)
Borehole Radius		(6)

Water column height (metres)

Time	Water level	End of hole	Water column	
9am	0.24 mbtoc	63.0		(7)

Calculated Well Volume

Standpipe Volume: $A_P = [(5)/2]^2 \times \pi \times 1000$ L/m³ = ____ L/m

$V_P = (7) \times A_P =$ ____ L

~126 Litres / well volume

Borehole Volume: $A_B = \{[(5)+(6)]^2 - (5)^2\} \times \pi \times 1000$ L/m³ = ____ L/m

$V_B = (7) \times A_B =$ ____ L

Well Volume: $WV = V_P + V_B =$ ____ L

Volume of Ideal purge		Volume of water Purged	
378	L	472	L

Reason for discrepancy:

Bottles	preservation	X	filtered	X
Anions/Routine	None	✓	No	
Total Metals	HNO3	✓	No	
Total Hg	HCl	✓	No	
Dissolved Metals	HNO3	✓	Yes	✓
Dissolved Hg	HCl	✓	Yes	✓
Nutrients/TOC	H2SO4	✓	No	
Cyanides	NAOH		No	
Dissolved TOC	H2SO4	✓	Yes	✓

Notes (purging method, colour, odour, etc.)

- using a mini-monsoon pump
- turned pump on at 926 am
- collected a duplicate sample DUP1
- pump set at 65' below top of casing

Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity (qualitative)	pH	DO (mg/L)	ORP (mv)
928	16	5.1	1374	clear	8.3		208
937	88	5.4	1384	"	8.4		144
949	184	5.4	1357	"	8.6		142
1002	288	6.0	1372		8.3		-24
1009		5.4	1363		8.2		-23
1025	472	5.8	1370		8.2		-23
		Done purging at 1030 am					
		Done sampling at 1058 am					

Time	water level (mbsu)	Δ time	Δ volume (L)
930 am			
936 am	4.12		
942 am	4.50		
953 am	4.90		
1007	5.30		
1024	5.50		

Rate
8 Litre/min
"
"
"
7.5 litres/min

Sept. 27, 2017 Telkwa Coal 2

T96R-16-19
transducer installed ≈ 7 meters below the top of casing - Serial #0032060396

---

1 Sept. 28, 2017 Telkwa Coal
- at Canadian at 725am
- mobed into TOB96-11-04 at 830am
water level → 4.03 mbtoc

- mobed to TOB96-02-06 at 915am
- sampling from TOB96-02-06
- TOB96-02-20 is dry - mud at the bottom - checked twice.
→ Depth to bottom is 20.96 mbtoc
The well is screened in a sand/gravel with a K value of 10^{-6} m/s (SRK report) therefore water was expected. We will put a transducer at 20.70 mbtoc (not right at the bottom because of the mud). Put in well at 1205pm
Serial # 2077546
- transducer placed in TOB96-02-06 at 5.30 mbtoc (1220pm) Serial # 32065063

- went to sample TOB96-01-05 but we bailed it dry. We are hoping the water level will recover by tomorrow in order to collect a sample. Waiting for a heli. pickup from 4-5 - organizing gear and field notes. Back at the base by 520pm

1 Sept. 29, 2017 Telkwa Coal

DRAFT

- arrived at the Canadian Base at 730am
- foggy conditions so we could not fly. Dropped the peristaltic pump off at bandstra.

- sampled at TQ15R-40 in the morning until 3pm
- came to TOB 96-01-05 - only 30cm of water in the well - not enough for a sample

Water levels

TOB97-07-24 — no landing spots within
TOB97-05-21 a reasonable distance.

Back at the base by 4pm. Organized gear and then dropped water samples off at Dr Lonsdale by 6pm.

checking probes temp. of fluid 21.5°C

pH 7.00 reads 7.0
pH 4.00 " 3.5
Spec. Cond " 1448 µS/cm
ORP " 243 mV

Rite in the Rain

No. 392

Jan. 14th, 2018 Tolkum Col
DRAFT
- prep. today (3.5hrs) before 4pm
- organized sample bottles and field gear

---

1 Jan. 15, 2018

- met Gary (OW) at Canadian at 930am
- Left Canadian at 10am
- arrived at TOB96-11-04/19 at 1020am

Well	Water Level mbtoc	Depth to Bottom
TOB96-11-04	3.20	4.44
TOB96-11-19	dry	19.76 mbtoc

- arrived at 1115 at T9SR-15C. Water is frozen in the PVC right up to the top of casing. Cap came off fine and transducer looks to be still in place. Pulled off steel casing and there was ice around the PVC down to the ground (took photos)

- arrived at T9SR-64 at 1145am pulled the transducer and barologger at 1221pm.
- transducer 2065044 m10 - changed the time due to time change
- 9/26/2017 12am (every 12 hrs) - reprogrammed to start at 12am on Jan. 16, 2018
- 1/15/2018 12pm
- battery is 100%

TOB 96-11-04

PAGE ___ of ___

Date	Jan. 15, 2018
Project	Telkwa Coal
Client	Allegiance Coal
WELL ID	TOB 96-11-04

Weather	Cloudy - 2°C
Personnel	Gary Michelle ; Cody Cameron

Time

Arrival on site	1020 am (01/15) 1130 (01/18)
Departure	1115 am (01/15) 1210 (01/18)

Well Completion

Stick up		(1)
PVC depth	4.44 mbtoc	(2)
Top sand pack		(3)
Bottom sand pack		(4)
Inner diameter	2"	(5)
Borehole Radius		(6)

Water column height (metres)

Time	Water level	End of hole	Water column	
1030am	3.20 mbtoc	4.44 mbtoc		(7)

Calculated Well Volume

Standpipe Volume (1 well volume)	A_P	$= [(5) / 2]^2 \times \pi \times 1000$ L/m³	
4.44 − 3.20 ⇒ 1.24m		=	L/m
	V_P	$= (7) \times A_P =$	L
×2 ⇒ 2.5L			
Borehole Volume	A_B	$= \{[(5) + (6)]^2 - (5)^2\} \times \pi \times 1000$ L/m³	
		=	L/m
	V_B	$= (7) \times A_B =$	L
Well Volume	WV	$= V_P + V_B =$	L

Volume of ideal purge		Volume of water Purged	
7.5	L	6.25	L

Reason for discrepancy: bailed dry - will collect a sample tomorrow

Bottles	preservation	X	filtered	X
Anions/Routine	None	✓	No	✓
Total Metals	HNO3	✓	No	✓
Total Hg	HCl	✓	No	✓
Dissolved Metals	HNO3	✓	Yes	✓
Dissolved Hg	HCl	✓	Yes	✓
Nutrients/TOC	H2SO4	✓	No	✓
Cyanides	NAOH		No	
Dissolved TOC	H2SO4	✓	Yes	✓
Dissolved Chromium VI	NaOH		Yes	

Notes (purging method, colour, odour, etc.)

- used a bailer to purge out 6 1/4 liters
- used a bailer to sample

Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity (qualitative)	pH	DO (mg/L)	ORP (mv)
01/18 1149	8	4.03	709	Semi-turbid	7.68	6.71	149 01/18
		collected a sample at 1145 am on 01/18					

Time	water level (mbsu)	Δ time	Δ volume (L)
01/18 1052am	4.24		6.25
1130am	4.14		

TOB96-02-06

Date	01/16/2018
Project	Telkwa Coal
Client	Allegiance
WELL ID	TOB96-02-06

Weather	Cloudy + 1°C
Personnel	Gary Michele & Cody Cameron

Time

Arrival on site	115 pm
Departure	4pm

Well Completion

Stick up		(1)
PVC depth	6.80 mbtoc	(2)
Top sand pack	3.0 mbgl	(3)
Bottom sand pack	6.0 mbgl	(4)
Inner diameter	2"	(5)
Borehole Radius		(6)

Water column height (metres)

Time	Water level	End of hole	Water column	
137pm	2.625 mbtoc	6.80 mbtoc		(7)

Calculated Well Volume

Standpipe Volume: $A_P = [(5)/2]^2 \times \pi \times 1000$ L/m³ = ____ L/m

6.80 − 2.63 = 4.17 × 2 = 8.3 L

$V_P = (7) \times A_P =$ ____ L

Borehole Volume: $A_B = \{[(5)+(6)]^2 - (5)^2\} \times \pi \times 1000$ L/m³ = ____ L/m

$V_B = (7) \times A_B =$ ____ L

Well Volume: $WV = V_P + V_B =$ ____ L

Volume of ideal purge		Volume of water Purged	
25	L	21	L

Reason for discrepancy: stable parameters

Bottles	preservation	X	filtered	X
Anions/Routine	None	✓	No	✓
Total Metals	HNO3	✓	No	✓
Total Hg	HCl	✓	No	✓
Dissolved Metals	HNO3	✓	Yes	✓
Dissolved Hg	HCl	✓	Yes	✓
Nutrients/TOC	H2SO4	✓	No	✓
Cyanides	NAOH		No	
Dissolved TOC	H2SO4	✓	Yes	✓
Chromium	NaOH	✓	Yes	✓

Notes (purging method, colour, odour, etc.)

peristaltic pump turned on at 156 pm

Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity NTU (qualitative)	pH	DO (mg/L)	ORP (mv)
200	2	4.04	579	clear	7.18	4.52	170
223	10	4.00	551	" 5.9	7.20	3.54	249
246	19	4.10	558	" 27	7.21	4.37	239
256	21	4.13	555	" 30?	7.20	4.04	238
		Done	purging	at 3pm			
		Done	sampling	at 320 pm			

Time	water level (mbsu)	Δ time	Δ volume (L)
204	3.46		3
251	4.92		20

TOB96-01-05

Date	01/18/2018
Project	Telkwa Coal
Client	Allogiance
WELL ID	TOB96-01-05

Weather	Partly Cloudy 0°C
Personnel	Gary Michole ; Cody Cormier

Time

Arrival on site	1015 am (01/18) 1215 (01/19)
Departure	1055 am (01/18) 1230 pm (01/19)

Well Completion

Stick up		(1)
PVC depth	5.15 mbtoc	(2)
Top sand pack	1.6 mbgs (screen)	(3)
Bottom sand pack	4.6 mbg (screen)	(4)
Inner diameter	2"	(5)
Borehole Radius		(6)

Water column height (metres)

Time	Water level	End of hole	Water column	
1020	1.92 mbtoc	5.15 mbtoc		(7)

Calculated Well Volume

Standpipe Volume (1 well volume)

$A_P = [(5)/2]^2 \times \pi \times 1000$ L/m³ = ____ L/m

5.15 − 1.92 = 3.23 × 2 = 6.5 L

$V_P = (7) \times A_P$ = ____ L

Borehole Volume

$A_B = \{[(5) + (6)]^2 - (5)^2\} \times \pi \times 1000$ L/m³ = ____ L/m

$V_B = (7) \times A_B$ = ____ L

Well Volume $WV = V_P + V_B$ = ____ L

Volume of Ideal purge		Volume of water Purged	
19.5	L	21	L

Reason for discrepancy:

Bottles	preservation	X	filtered	X
Anions/Routine	None	✓	No	✓
Total Metals	HNO3	✓	No	✓
Total Hg	HCl	✓	No	✓
Dissolved Metals	HNO3	✓	Yes	✓
Dissolved Hg	HCl	✓	Yes	✓
Nutrients/TOC	H2SO4	✓	No	✓
Cyanides	NAOH	✓	No	✓
dissolved TOC	H2SO4	✓	Yes	✓

chromium NaOH Yes

Notes (purging method, colour, odour, etc.)

- used a bailer to purge
- Handheld probes for water quality
- tough walk in
- water was clear in the beginning and then became more turbid and orange/brown
- purged out 21 litres and almost purged dry.

	Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity (qualitative)	pH	DO (mg/L)	ORP (mv)
01/18	1030	1	2.2	246	clear	8.0	—	-61
	1035	4 3/4	2.4	349	turbid	7.9		-43
01/19	1250	23	3.3	472	turbid	7.8		+8
				- collecting a sample at 1250 pm				
				- using 0.45 µ Filters				
				- used the bailer to sample				

	Time	water level (mbsu)	Δ time	Δ volume (L)
01/18	1045	4.82		21
	we will allow the well to recover before sampling.			
01/19	1235 pm	2.825		

T95R-64

PAGE ___ of ___

Date	01/15/2018
Project	Telkwa Coal
Client	Altagience Coal
WELL ID	T95R-64

Weather	Cloudy -2°C
Personnel	Gary Michelle & Cody Cameron

Time

Arrival on site	1145am
Departure	350pm

Well Completion

Stick up		(1)
PVC depth	94.00 mbgs	(2)
Top sand pack	85.00 mbgs (screen)	(3)
Bottom sand pack	94.00 mbgs (screen)	(4)
Inner diameter	2"	(5)
Borehole Radius		(6)

Water column height (metres)

Time	Water level	End of hole	Water column
1210	7.275 mbTOC	94.00	(7)

Calculated Well Volume

Standpipe Volume / well volume: $A_P = [(5)/2]^2 \times \pi \times 1000$ L/m³ = ____ L/m

$V_P = (7) \times A_P$ = ____ L

94.00 − 7.28 = 86.72 × 2 ⇒ 174 L

Borehole Volume: $A_B = \{[(5)+(6)]^2 - (5)^2\} \times \pi \times 1000$ L/m³ = ____ L/m

$V_B = (7) \times A_B$ = ____ L

Well Volume: $WV = V_P + V_B$ = ____ L

Volume of ideal purge		Volume of water Purged	
522	L	705	L

Reason for discrepancy: stable parameters

Bottles	preservation	X	filtered	X
Anions/Routine	None	✓	No	✓
Total Metals	HNO3	✓	No	✓
Total Hg	HCl	✓	No	✓
Dissolved Metals	HNO3	✓	Yes	✓
Dissolved Hg	HCl	✓	Yes	✓
Nutrients/TOC	H2SO4	✓	No	✓
Cyanides	NAOH		No	
Dissolved nutrients (Chromium)	H_2SO_4 (NaOH)	✓	Yes	✓

Notes (purging method, colour, odour, etc.)

- using a mini-monsoon pump
- pump turned on at 1243 pm

Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity (qualitative)	pH	DO (mg/L)	ORP (mv)	Turbidity (NTU)	
1247	20	4.02	1309	clear	7.72	6.41 ↓	52.1 ↓		
1254	42	4.06	1293	"	6.43	1.80 ↓	44.1 ↓		
107	75	4.04	1291	"	6.46	1.19 ↓	19.1 ↓		
149	150	4.50	1276	"	7.14	0.68	-8.3 ↓		
212	190	4.52	1275	"	7.20	0.81	-11.2 ↓	0.18	
238	240	4.63	1273	"	7.11	0.65	-4.5	1.5	
250	265	4.56	1277		7.09	0.82	-4.4		
305	300	4.61	1279		7.12	0.67	-8.9		
			Done	purging at	310 pm				
			Done	sampling at	320 pm				

Time	water level (mbsu)	Δ time	Δ volume (L)	
1252	16.30		38	
106 pm	17.57	stable		
				≈2L/min

T95R-40 DUP 1

PAGE ___ of ___

Date	01/15/2018
Project	Telkwa Coal
Client	allegiance
WELL ID	T95R-40

Weather	Partly Cloudy +1°C
Personnel	Gary Michelle ; Cody Cameron

Time

Arrival on site	1255pm
Departure	4/6 pm

Well Completion

Stick up		(1)
PVC depth	53.30 mbtoc	(2)
Top sand pack	42.0 mbgs (screen)	(3)
Bottom sand pack	53.0 mbgs (screen	(4)
Inner diameter		(5)
Borehole Radius		(6)

Water column height (metres)

Time	Water level	End of hole	Water column	
10/pm	7.95 mbtoc	53.30 mbtoc		(7)

Calculated Well Volume

Standpipe Volume: $A_P = [(5)/2]^2 \times \pi \times 1000$ L/m³

53.30 − 7.95 = 45.35 ×2 ⇒ 90L

$V_P = (7) \times A_P =$ ____ L/m ____ L

Borehole Volume: $A_B = \{[(5)+(6)]^2 - (5)^2\} \times \pi \times 1000$ L/m³

$V_B = (7) \times A_B =$ ____ L/m ____ L

Well Volume $WV = V_P + V_B =$ ____ L

Volume of ideal purge		Volume of water Purged	
270	L	82	L

Reason for discrepancy: stable parameters

Bottles	preservation	X	filtered	X
Anions/Routine	None	✓	No	✓
Total Metals	HNO3	✓	No	✓
Total Hg	HCl	✓	No	✓
Dissolved Metals	HNO3	✓	Yes	✓
Dissolved Hg	HCl	✓	Yes	✓
Nutrients/TOC	H2SO4	✓	No	✓
Cyanides	NAOH	✓	No	✓
Dissolved TOC	H2SO4	✓	Yes	✓

(Chromium VI)

Notes (purging method, colour, odour, etc.)

- inertial pump turned on 130pm
- Gary is clearing trees for landing purposes
- tubing set at ± 40 mbtoc (foot valve)
- field blank at this site
- Duplicate collected here

Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity (qualitative)	pH	DO (mg/L)	ORP (mv)
141 pm	11	3.73	2730	14 NTU	7.19	4.01↓	70.1↓
221 pm	40	4.02	2700	1258 AU	7.17	3.03↓	-11.1↓
250 pm	61	4.05	2690	991 AU	7.13	1.62↓	-19.8
313 pm	71	4.10	2697	1628 AU	7.10	1.41↓	-23.2
320 pm	76	4.09	2684	1718 AU	7.14	1.78↓	-26.3
328 pm	80	4.06	2687	grey, turbid	7.11	1.91↓	-26.3
			None	purging at 328 pm			
			11	sampling at 345 pm			

Rate

Time	water level (mbsu)	Δ time	Δ volume (L)
149 pm	11.55		14
226 pm	16.50		43
304 pm	17.10	≈0.75L/min	68

~~25~~ 48 60 68 +309pm

T95L45C

Date	01/15/2018
Project	Tc Kwo Coal
Client	Allegiance Coal
WELL ID	T95L-15C

Weather	Cloudy -2°C
Personnel	Gary Michelle ; Cody Cameron

Time

Arrival on site	1115 am (01/15)	1030 (01/16)
Departure	1135 am (01/15)	1230 (01/16)

Well Completion

Stick up		(1)
PVC depth		(2)
Top sand pack		(3)
Bottom sand pack		(4)
Inner diameter		(5)
Borehole Radius		(6)

Water column height (metres)

Time	Water level	End of hole	Water column
1115	artesian at the top of casing		(7)

Calculated Well Volume

Standpipe Volume

$A_P = [(5) / 2]^2 \times \pi \times 1000$ L/m³

= ____ L/m

$V_P = (7) \times A_P =$ ____ L

Borehole Volume

$A_B = \{[(5) + (6)]^2 - (5)^2\} \times \pi \times 1000$ L/m³

= ____ L/m

$V_B = (7) \times A_B =$ ____ L

Well Volume $WV = V_P + V_B =$ ____ L

Volume of ideal purge ____ L

Volume of water Purged ____ L

Reason for discrepancy:

Bottles	preservation	X	filtered	X
Anions/Routine	None		No	
Total Metals	HNO3		No	
Total Hg	HCl		No	
Dissolved Metals	HNO3		Yes	
Dissolved Hg	HCl		Yes	
Nutrients/TOC	H2SO4		No	
Cyanides	NAOH		No	

Notes (purging method, colour, odour, etc.)

- well is frozen right up to the top of casing
- went back on the 16th to attempt to thaw out the well. We melted 22 feet but were limited on time so we left without completely melting the rest. No idea how much ice there was.

Time	Volume out (L)	Temp (°C)	Sp. Cond. (µS/cm)	Turbidity (qualitative)	pH	DO (mg/L)	ORP (mv)

Time	water level (mbsu)	Δ time	Δ volume (L)

2 Jan. 15, 2018 Telkwa (cont)

downloaded the barologger - 2077834 at 130pm
9/26/2017 12am - reprogrammed to start
01/15/2018 12pm at 12am on Jan. 16, 2018
100% battery - adjusted the time by 1hr due to the time change

Water Level

Well	Water Level (mbtoc)	Time
96TP-01-10	1.77	4pm

- back at Canadian Helicopters by 420pm
- went to North Country Rentals and grabbed an Auger Blaster
- home at 530pm - unloading gear

Evening - LaMotte 2020
- Calibrated the 10NTU standard from 11.2NTU to 10NTU
- 1NTU standard reads 1.96 NTU

YSI 556
pH 7.00 reads 7.01
Spec. Cond. " 1438 µs/cm - calibrated to 1413 µs/cm
ORP " 266mV - calibrated to 240mV

Jan. 16, 2018 1

- left Canadian Heli. at 910am Cloudy +2°C

Water Levels

Well ID	Water level mbtoc	
T96R-16-19	2.43	≈10:10am
T96R-16-28	2.445	≈10:10am

Downloading transducer from T96R-16-19
2060396 100% M10
9/26/2017 12am → 01/16/2018 12am
Downloaded the data at 1005am - reprogrammed to start at 12pm today. Every 12 hrs.

Well ID	Water Level mbtoc	Time
T96TD-02-07	3.17	1020am

Went to T95R-15C to try and throw it out from 10 30 - 1230pm. Hose for the Auger Blaster ~~that~~ was damaged, therefore did not work. We used the tiger torch and melted 1-2 feet of ice in the well but decided to abandon the task. It was working but slow

Well ID	Water Level	Time
TUB96-02-06	2.625 mbtoc	137pm
TDB96-02-20	perhaps 2055? dry (tough to tell)	140pm

→ 20.95 mbtoc - depth to bottom - mud at the bottom not enough water to sample

2 Jun. 16, 2018 Telkwa Coal 2

TOB96-02-06 Transducer 2065063 100% battery

TOB96-02-20 " 2077546 100% battery

Data downloaded from 9/26/2017 12pm - 1/16/2018 12pm.

Reprogrammed to start 01/17/2018 12am

Purged and collected a sample at TOB96-02-06.

- offsite @ TOB96-02-06/20 at 4pm
- back at Cana. Heli. by 4:15pm
- Loading up gear at Cana. Heli until 4:40pm

checking YSI in the evening

pH 7.00 reads		7.01
Spec. Cond.	"	1404 µS/cm
ORP	"	238.1 mV

1 Jun. 17, 2018 Telkwa Coal

- at Canadian at 830am
- ERM crew flew out first so we flew out at 9:45am
- arrived at T96R-34-67/87 at 10:15am
- tough walk in to the wells
- Wells are both frozen. T96R-34-67 at 0.5m btoc and T96R-34-87 at 0.68m btoc
- picked up at 11:45am due to poor visibility back in town by 12:15pm. Stopped by Driftwood Drilling.

Jun. 18, 2018 1

- At Canadian at 830am
- Did not fly until 9:30am due to incoming plane
- Dropped off at TOB96-01-05 9:45am - purged the well close to dry. Sample tomorrow hopefully.
- Collected a sample at TOB96-11-04
- Spent the afternoon at T95R-40. Brutal walk in - helicopter slinged gear to us. Cory cleared the area for a heli pick up. Picked up at 4:00pm
- Back at the base by 4:20pm.

1

Jan. 19, 2018 Telkwa Coal

- fogged out in the morning +1°C
- left the base at 1145 am
- arrived at the landing spot for TOB96-01-05 at 1215.

- checked TOB97-06-21 — well is dry 2pm Depth to bottom → 20.37 m btoc

- headed out to TOB97-03-34 but Gary got a cut on his forehead. He was not in danger but we headed back to the chopper. This happened around 3pm.
- Helicopter could not fly out so we grabbed a ride with Charles. He drove us out and transported me to Smithers. Gary grabbed a ride with a Vihar contractor.

Rite in the Rain

No. 392

Appendix 6-C

Certificates of Analysis

DRAFT

ERM Consultants Canada Ltd.
ATTN: Wade Brunham
1500-1111 West Hastings Street
Vancouver BC V6E 2J3

Date Received: 19-AUG-17
Report Date: 30-AUG-17 15:02 (MT)
Version: FINAL

Client Phone: 604-689-9460

Certificate of Analysis

Lab Work Order #: L1977808

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 15-605071
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

	Sample ID	L1977808-1	L1977808-2	L1977808-3	L1977808-4	L1977808-5
	Description	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
	Sampled Date	16-AUG-17	16-AUG-17	17-AUG-17	17-AUG-17	16-AUG-17
	Sampled Time					
	Client ID	T95R-0817	T96R-34-87-0817	T95R-40-0817	T95R-64-0817	TRAVEL BLANK
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	1310	1320	2790	1330	<2.0
	Hardness (as CaCO3) (mg/L)	42.1	44.0	113	56.8	
	pH (pH)	8.15	8.15	8.08	8.19	5.23
	Total Suspended Solids (mg/L)	8.4	10.4	11.6	5.0	<3.0
	Total Dissolved Solids (mg/L)	827	834	1750	845	<10
	Turbidity (NTU)	1.49	1.55	4.21	4.82	<0.10
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	3.9	3.7	11.3	2.9	1.9
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	757	753	1660	739	<1.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	39.4	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	757	753	1660	778	<1.0
	Ammonia, Total (as N) (mg/L)	0.373	0.373	0.673	0.347	<0.0050
	Bromide (Br) (mg/L)	<0.25 DLDS	<0.25 DLDS	<1.0 DLDS	<0.25 DLDS	<0.050
	Chloride (Cl) (mg/L)	<2.5 DLDS	<2.5 DLDS	<10 DLDS	<2.5 DLDS	<0.50
	Fluoride (F) (mg/L)	1.57	1.53	0.43	1.49	<0.020
	Nitrate (as N) (mg/L)	<0.025 DLDS	<0.025 DLDS	<0.10 DLDS	<0.025 DLDS	<0.0050
	Nitrite (as N) (mg/L)	<0.0050 DLDS	<0.0050 DLDS	<0.020 DLDS	<0.0050 DLDS	<0.0010
	Total Nitrogen (mg/L)	0.380	0.377	0.801	0.366	<0.030
	Phosphorus (P)-Total Dissolved (mg/L)	0.0041	0.0044	0.0065	0.0028	<0.0020
	Phosphorus (P)-Total (mg/L)	0.0085	0.0082	0.0393	0.0104	<0.0020
	Sulfate (SO4) (mg/L)	<1.5 DLDS	<1.5 DLDS	<6.0 DLDS	<1.5 DLDS	<0.30
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Total Organic Carbon (mg/L)	0.50	<0.50	1.06	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.078	0.088	0.062	<0.010	<0.010
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Barium (Ba)-Total (mg/L)	0.973	0.959	4.19	0.449	<0.020
	Beryllium (Be)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Boron (B)-Total (mg/L)	0.19	0.18	0.34	0.15	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Calcium (Ca)-Total (mg/L)	19.7	19.6	35.6	20.7	<0.10
	Chromium (Cr)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Cobalt (Co)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Copper (Cu)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Iron (Fe)-Total (mg/L)	0.532	0.530	0.760	0.652	<0.030

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L1977808-6				
	Description	Groundwater				
	Sampled Date	16-AUG-17				
	Sampled Time					
	Client ID	FIELD BLANK				
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0				
	Conductivity (uS/cm)	<2.0				
	Hardness (as CaCO3) (mg/L)					
	pH (pH)	5.20				
	Total Suspended Solids (mg/L)	<3.0				
	Total Dissolved Solids (mg/L)	<10				
	Turbidity (NTU)	<0.10				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	2.0				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	<0.50				
	Fluoride (F) (mg/L)	<0.020				
	Nitrate (as N) (mg/L)	<0.0050				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Nitrogen (mg/L)	<0.030				
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020				
	Phosphorus (P)-Total (mg/L)	<0.0020				
	Sulfate (SO4) (mg/L)	<0.30				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50 SP				
	Total Organic Carbon (mg/L)	<0.50 SP				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.010				
	Antimony (Sb)-Total (mg/L)	<0.00050				
	Arsenic (As)-Total (mg/L)	<0.0010				
	Barium (Ba)-Total (mg/L)	<0.020				
	Beryllium (Be)-Total (mg/L)	<0.0050				
	Boron (B)-Total (mg/L)	<0.10				
	Cadmium (Cd)-Total (mg/L)	<0.000050				
	Calcium (Ca)-Total (mg/L)	<0.10				
	Chromium (Cr)-Total (mg/L)	<0.00050				
	Cobalt (Co)-Total (mg/L)	<0.00050				
	Copper (Cu)-Total (mg/L)	<0.0010				
	Iron (Fe)-Total (mg/L)	<0.030				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L1977808-1	L1977808-2	L1977808-3	L1977808-4	L1977808-5
	Description	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
	Sampled Date	16-AUG-17	16-AUG-17	17-AUG-17	17-AUG-17	16-AUG-17
	Sampled Time					
	Client ID	T95R-0817	T96R-34-87-0817	T95R-40-0817	T95R-64-0817	TRAVEL BLANK
Grouping	**Analyte**					
WATER						
Total Metals	Lead (Pb)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Lithium (Li)-Total (mg/L)	<0.050	<0.050	0.112	0.064	<0.050
	Magnesium (Mg)-Total (mg/L)	2.19	2.15	6.70	1.98	<0.10
	Manganese (Mn)-Total (mg/L)	0.015	0.015	0.036	0.022	<0.010
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Potassium (K)-Total (mg/L)	<2.0	<2.0	3.4	<2.0	<2.0
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Silver (Ag)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Sodium (Na)-Total (mg/L)	336	331	776	327	<2.0
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Titanium (Ti)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Uranium (U)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Vanadium (V)-Total (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Arsenic (As)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Barium (Ba)-Dissolved (mg/L)	0.850	0.905	4.06	0.433	
	Beryllium (Be)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
	Boron (B)-Dissolved (mg/L)	0.15	0.16	0.31	0.13	
	Cadmium (Cd)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Calcium (Ca)-Dissolved (mg/L)	13.6	14.2	35.1	19.6	
	Chromium (Cr)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Cobalt (Co)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Iron (Fe)-Dissolved (mg/L)	0.434	0.458	0.681	0.557	
	Lead (Pb)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Lithium (Li)-Dissolved (mg/L)	<0.050	<0.050	0.107	0.062	
	Magnesium (Mg)-Dissolved (mg/L)	1.99	2.09	6.29	1.92	
	Manganese (Mn)-Dissolved (mg/L)	0.013	0.013	0.034	0.022	
	Mercury (Hg)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Nickel (Ni)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L1977808-6				
	Description	Groundwater				
	Sampled Date	16-AUG-17				
	Sampled Time					
	Client ID	FIELD BLANK				
Grouping	**Analyte**					
WATER						
Total Metals	Lead (Pb)-Total (mg/L)	<0.0010				
	Lithium (Li)-Total (mg/L)	<0.050				
	Magnesium (Mg)-Total (mg/L)	<0.10				
	Manganese (Mn)-Total (mg/L)	<0.010				
	Mercury (Hg)-Total (mg/L)	<0.00020				
	Molybdenum (Mo)-Total (mg/L)	<0.0010				
	Nickel (Ni)-Total (mg/L)	<0.0050				
	Potassium (K)-Total (mg/L)	<2.0				
	Selenium (Se)-Total (mg/L)	<0.0010				
	Silver (Ag)-Total (mg/L)	<0.000050				
	Sodium (Na)-Total (mg/L)	<2.0				
	Thallium (Tl)-Total (mg/L)	<0.00020				
	Titanium (Ti)-Total (mg/L)	<0.050				
	Uranium (U)-Total (mg/L)	<0.00020				
	Vanadium (V)-Total (mg/L)	<0.030				
	Zinc (Zn)-Total (mg/L)	<0.0050				
Dissolved Metals	Dissolved Mercury Filtration Location					
	Dissolved Metals Filtration Location					
	Aluminum (Al)-Dissolved (mg/L)					
	Antimony (Sb)-Dissolved (mg/L)					
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)					
	Beryllium (Be)-Dissolved (mg/L)					
	Boron (B)-Dissolved (mg/L)					
	Cadmium (Cd)-Dissolved (mg/L)					
	Calcium (Ca)-Dissolved (mg/L)					
	Chromium (Cr)-Dissolved (mg/L)					
	Cobalt (Co)-Dissolved (mg/L)					
	Copper (Cu)-Dissolved (mg/L)					
	Iron (Fe)-Dissolved (mg/L)					
	Lead (Pb)-Dissolved (mg/L)					
	Lithium (Li)-Dissolved (mg/L)					
	Magnesium (Mg)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
	Mercury (Hg)-Dissolved (mg/L)					
	Molybdenum (Mo)-Dissolved (mg/L)					
	Nickel (Ni)-Dissolved (mg/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L1977808-1	L1977808-2	L1977808-3	L1977808-4	L1977808-5
	Description	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
	Sampled Date	16-AUG-17	16-AUG-17	17-AUG-17	17-AUG-17	16-AUG-17
	Sampled Time					
	Client ID	T95R-0817	T96R-34-87-0817	T95R-40-0817	T95R-64-0817	TRAVEL BLANK
Grouping	**Analyte**					
WATER						
Dissolved Metals	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	3.2	<2.0	
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Silver (Ag)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Sodium (Na)-Dissolved (mg/L)	349	371	795	367	
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Titanium (Ti)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Vanadium (V)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	

	Sample ID	L1977808-6				
	Description	Groundwater				
	Sampled Date	16-AUG-17				
	Sampled Time					
	Client ID	FIELD BLANK				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Potassium (K)-Dissolved (mg/L)					
	Selenium (Se)-Dissolved (mg/L)					
	Silver (Ag)-Dissolved (mg/L)					
	Sodium (Na)-Dissolved (mg/L)					
	Thallium (Tl)-Dissolved (mg/L)					
	Titanium (Ti)-Dissolved (mg/L)					
	Uranium (U)-Dissolved (mg/L)					
	Vanadium (V)-Dissolved (mg/L)					
	Zinc (Zn)-Dissolved (mg/L)					

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Dissolved Organic Carbon	MS-B	L1977808-1
Matrix Spike	Dissolved Organic Carbon	MS-B	L1977808-5, -6
Matrix Spike	Total Organic Carbon	MS-B	L1977808-1
Matrix Spike	Total Organic Carbon	MS-B	L1977808-5, -6
Matrix Spike	Aluminum (Al)-Total	MS-B	L1977808-5, -6
Matrix Spike	Calcium (Ca)-Total	MS-B	L1977808-1, -2, -3, -4
Matrix Spike	Total Nitrogen	MS-B	L1977808-1, -2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
SP	Sample was Preserved at the laboratory

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-IC-N-VA	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-VA	Water	Colour (True) by Spectrometer	BCMOE Colour Single Wavelength

This analysis is carried out using procedures adapted from British Columbia Environmental Manual "Colour- Single Wavelength." Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method.
Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-DIS-CVAFS-VA	Water	Dissolved Hg in Water by CVAFS LOR=50ppt	APHA 3030B/EPA 1631E (mod)

Reference Information

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

HG-TOT-CVAFS-VA Water Total Hg in Water by CVAFS LOR=50ppt EPA 1631E (mod)

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-DIS-ICP-VA Water Dissolved Metals in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA Water Total Metals in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

N-T-COL-VA Water Total Nitrogen in water by Colour APHA4500-P(J)/NEMI9171/USGS03-4174

This analysis is carried out using procedures adapted from APHA Method 4500-P (J) "Persulphate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus" and National Environmental Methods Index - Nemi method 5735.

NH3-F-VA Water Ammonia in Water by Fluorescence APHA 4500 NH3-NITROGEN (AMMONIA)

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TSS-VA	Water	Total Suspended Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

15-605071

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

DRAFT

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L1977808-COFC

COC Number: 15 - 605071

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	ERM
Contact:	Wade Brunham
Phone:	(250)877 7838
	Company address below will appear on the final report
Street:	15th Floor, 1111 West Hastings
City/Province:	Vancouver, BC
Postal Code:	V6E 2J3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report ☐ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: wade.brunham@erm.com
Email 2: cody@cassiargeo.com
Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: wade.brunham@erm.com
Email 2:

Project Information

ALS Account # / Quote #:
Job #:
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#:
Major/Minor Code: | Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only):

ALS Contact: Amber Sprayer | Sampler: Cody Cameron

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	pH, Conductivity, TSS, TDS (P)	Hardness, Total Alkalinity (F/P)	Color, Turbidity (P)	Total Metals (F/P)	Dissolved Metals (P)	Total Organic Carbon (F/P)	Dissolved Organic Carbon (P)	Total Mercury (F/P)	Dissolved Mercury (P)	Nitrate, nitrate, Total Nitrogen (F/P)	Major Anions, Acidity (P)	Ammonia, Total Phosphorus (P)	Dissolved Phosphorus (F/P)	Number of Containers
	T95R-0817	16-08-17	am	groundwater	X	X	X	X	X	X	X	X	X	X	X	X	X	7
	T96R-34-87-0817	16-08-17	am	"														7
	T95R-40-0817	17-08-17	am	"														7
	T95R-64-0817	17-08-17	pm	"														7
	Travel Blank																	
	Field Blank																	

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO
Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

- Please analyze all alkalinities (HCO_3, CO_3 etc)
- Detection limits for BC mining baseline guidelines

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐
Ice Packs ☐ | Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			4	5	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: M Stead	Date: Aug 18 2017	Time: 2:30	Received by: Shayan	Date: Aug 19	Time: 1230	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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

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

DRAFT

CASSIAR GEOSCIENCE CONSULTING LTD
ATTN: Cody Cameron
9199 Bluff Road
Telkwa BC V0J 2X1

Date Received: 30-SEP-17
Report Date: 13-OCT-17 18:11 (MT)
Version: FINAL

Client Phone: 778-378-1716

Certificate of Analysis

Lab Work Order #: L2000339

Project P.O. #: NOT SUBMITTED
Job Reference: 0403488-0010
C of C Numbers: 15-603959
Legal Site Desc:

Carla Fuginski
Account Manager

	Sample ID	L2000339-1	L2000339-2	L2000339-3	L2000339-4	L2000339-5
	Description	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER
	Sampled Date	26-SEP-17	26-SEP-17	27-SEP-17	28-SEP-17	27-SEP-17
	Sampled Time					
	Client ID	T95R-15C	T95R-64	T96R-34-87	T0B96-02-06	T0B96-11-04
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	1260	1220	1280	535	695
	Hardness (as CaCO3) (mg/L)	18.3	57.2	42.0	314	405
	pH (pH)	8.48	8.17	7.98	7.79	7.85
	Total Suspended Solids (mg/L)	5.3	<3.0	4.7	35.5	21.9
	Total Dissolved Solids (mg/L)	867	823	862	329	390
	Turbidity (NTU)	3.11	4.22	2.45	19.9	20.2
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0	3.1	8.8	10.2	10.8
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	698	716	759	301	407
	Alkalinity, Carbonate (as CaCO3) (mg/L)	63.8	44.6	44.8	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Phenolphthalein (as CaCO3) (mg/L)	31.9	22.3	22.4	<2.0	<2.0
	Alkalinity, Total (as CaCO3) (mg/L)	762	761	804	301	407
	Ammonia, Total (as N) (mg/L)	0.246	0.336	0.367	<0.0050	0.0209
	Bromide (Br) (mg/L)	<0.25 DLDS	<0.25 DLDS	<0.25 DLDS	<0.050	<0.25 DLDS
	Chloride (Cl) (mg/L)	<2.5 DLDS	<2.5 DLDS	<2.5 DLDS	<0.50	<2.5 DLDS
	Fluoride (F) (mg/L)	2.24	1.48	1.51	0.103	<0.10 DLDS
	Nitrate (as N) (mg/L)	<0.025 DLDS	<0.025 DLDS	<0.025 DLDS	0.0143	0.130
	Nitrite (as N) (mg/L)	<0.0050 DLDS	<0.0050 DLDS	<0.0050 DLDS	<0.0010	<0.0050 DLDS
	Total Nitrogen (mg/L)	0.276	0.370	0.418	0.043	0.739
	Orthophosphate-Dissolved (as P) (mg/L)	0.0345	<0.0010	0.0016	0.0017	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0409	0.0067	0.0177	0.0155	0.0591
	Sulfate (SO4) (mg/L)	<1.5 DLDS	<1.5 DLDS	<1.5 DLDS	9.77	20.8
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.50	<0.50	<0.50	1.88 RRV	3.25
	Total Organic Carbon (mg/L)	0.80	<0.50	<0.50	1.25 RRV	4.63
Total Metals	Aluminum (Al)-Total (mg/L)	0.110	<0.010	0.020	1.19	2.81
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Barium (Ba)-Total (mg/L)	0.294	0.406	0.849	0.140	0.138
	Beryllium (Be)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Boron (B)-Total (mg/L)	0.15	0.13	0.17	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.000050	<0.000050	<0.000050	0.000068	0.000119
	Calcium (Ca)-Total (mg/L)	5.59	19.5	14.5	85.4	69.8
	Chromium (Cr)-Total (mg/L)	<0.00050	<0.00050	<0.00050	0.00057	0.00142
	Cobalt (Co)-Total (mg/L)	<0.00050	<0.00050	<0.00050	0.00103	0.00136
	Copper (Cu)-Total (mg/L)	<0.0010	<0.0010	0.0012	0.0013	0.0054

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Sample ID	L2000339-6	L2000339-7	L2000339-8	L2000339-9	
Description	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER	
Sampled Date	26-SEP-17			29-SEP-17	
Sampled Time					
Client ID	DUP 1	TRAVEL BLANK	TRIP BLANK	T95R-40	
Grouping / **Analyte**					
WATER					
Physical Tests					
Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	
Conductivity (uS/cm)	1260	<2.0	<2.0	2600	
Hardness (as CaCO3) (mg/L)	19.9	<0.50 HTC	<0.50	102	
pH (pH)	8.45	6.63	6.27	7.81	
Total Suspended Solids (mg/L)	5.5	<3.0	<3.0	5.3	
Total Dissolved Solids (mg/L)	864	<10	<10	1680	
Turbidity (NTU)	2.98	<0.10	<0.10	3.81	
Anions and Nutrients					
Acidity (as CaCO3) (mg/L)	<1.0	2.1	2.0	21.5	
Alkalinity, Bicarbonate (as CaCO3) (mg/L)	706	<1.0	<1.0	1630	
Alkalinity, Carbonate (as CaCO3) (mg/L)	67.0	<1.0	<1.0	67.4	
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	
Alkalinity, Phenolphthalein (as CaCO3) (mg/L)	33.5	<2.0	<2.0	33.7	
Alkalinity, Total (as CaCO3) (mg/L)	773	<1.0	<1.0	1700	
Ammonia, Total (as N) (mg/L)	0.242	0.0136 RRV	<0.0050	0.639	
Bromide (Br) (mg/L)	<0.25 DLDS	<0.050	<0.050	<1.0 DLDS	
Chloride (Cl) (mg/L)	<2.5 DLDS	<0.50	<0.50	<10 DLDS	
Fluoride (F) (mg/L)	2.23	<0.020	<0.020	0.49	
Nitrate (as N) (mg/L)	<0.025 DLDS	<0.0050	<0.0050	<0.10 DLDS	
Nitrite (as N) (mg/L)	<0.0050 DLDS	<0.0010	<0.0010	<0.020 DLDS	
Total Nitrogen (mg/L)	0.275	<0.030	<0.030	0.756	
Orthophosphate-Dissolved (as P) (mg/L)	0.0336	<0.0010	<0.0010	0.0044	
Phosphorus (P)-Total (mg/L)	0.0385	<0.0020	<0.0020	0.0278	
Sulfate (SO4) (mg/L)	<1.5 DLDS	<0.30	<0.30	<6.0 DLDS	
Organic / Inorganic Carbon					
Dissolved Organic Carbon (mg/L)	0.54		<0.50	<0.50	
Total Organic Carbon (mg/L)	0.73	<0.50	0.87	<0.50	
Total Metals					
Aluminum (Al)-Total (mg/L)	0.115	<0.010	<0.010	0.034	
Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Arsenic (As)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Barium (Ba)-Total (mg/L)	0.281	<0.020	<0.020	3.17	
Beryllium (Be)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
Boron (B)-Total (mg/L)	0.14	<0.10	<0.10	0.32	
Cadmium (Cd)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Calcium (Ca)-Total (mg/L)	5.46	<0.10	<0.10	31.3	
Chromium (Cr)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Cobalt (Co)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Copper (Cu)-Total (mg/L)	<0.0010	<0.0010	<0.0010	0.0014	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Grouping	Analyte	L2000339-1 GROUNDWATER 26-SEP-17 T95R-15C	L2000339-2 GROUNDWATER 26-SEP-17 T95R-64	L2000339-3 GROUNDWATER 27-SEP-17 T96R-34-87	L2000339-4 GROUNDWATER 28-SEP-17 T0B96-02-06	L2000339-5 GROUNDWATER 27-SEP-17 T0B96-11-04
WATER						
Total Metals	Iron (Fe)-Total (mg/L)	0.169	0.470	0.594	0.852	2.39
	Lead (Pb)-Total (mg/L)	<0.0010	<0.0010	<0.0010	0.0018	0.0035
	Lithium (Li)-Total (mg/L)	0.052	0.059	<0.050	<0.050	<0.050
	Magnesium (Mg)-Total (mg/L)	1.07	1.85	2.05	24.9	55.5
	Manganese (Mn)-Total (mg/L)	<0.010	0.018	0.014	0.484	0.070
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0013
	Nickel (Ni)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	2.8
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Silver (Ag)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Sodium (Na)-Total (mg/L)	372	325	353	7.9	19.4
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Titanium (Ti)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	0.063
	Uranium (U)-Total (mg/L)	<0.00020	<0.00020	<0.00020	0.00136	0.00344
	Vanadium (V)-Total (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	0.0164
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	<0.010	<0.010	<0.010	0.035	<0.010
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Barium (Ba)-Dissolved (mg/L)	0.297	0.436	0.893	0.120	0.097
	Beryllium (Be)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Boron (B)-Dissolved (mg/L)	0.14	0.14	0.17	<0.10	<0.10
	Cadmium (Cd)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	0.000059
	Calcium (Ca)-Dissolved (mg/L)	5.62	19.8	13.4	84.9	69.8
	Chromium (Cr)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Cobalt (Co)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	0.0241 DTC	<0.0010	0.0011
	Iron (Fe)-Dissolved (mg/L)	0.058	0.413	0.422	0.050	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Lithium (Li)-Dissolved (mg/L)	0.050	0.062	<0.050	<0.050	<0.050
	Magnesium (Mg)-Dissolved (mg/L)	1.04	1.91	2.07	24.8	56.1
	Manganese (Mn)-Dissolved (mg/L)	<0.010	0.019	0.014	0.029	0.014
	Mercury (Hg)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010	0.0044 DTC	<0.0010	0.0014

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Sample ID	L2000339-6	L2000339-7	L2000339-8	L2000339-9	
Description	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER	
Sampled Date	26-SEP-17			29-SEP-17	
Sampled Time					
Client ID	DUP 1	TRAVEL BLANK	TRIP BLANK	T95R-40	
Grouping	**Analyte**				
WATER					
Total Metals	Iron (Fe)-Total (mg/L)	0.170	<0.030	<0.030	0.414
	Lead (Pb)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Lithium (Li)-Total (mg/L)	<0.050	<0.050	<0.050	0.096
	Magnesium (Mg)-Total (mg/L)	1.04	<0.10	<0.10	5.96
	Manganese (Mn)-Total (mg/L)	<0.010	<0.010	<0.010	0.033
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020
	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	2.9
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Silver (Ag)-Total (mg/L)	<0.000050	<0.000050	<0.000050	0.000081
	Sodium (Na)-Total (mg/L)	353	<2.0	<2.0	746
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020
	Titanium (Ti)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050
	Uranium (U)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020
	Vanadium (V)-Total (mg/L)	<0.030	<0.030	<0.030	<0.030
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD		FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD		FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	<0.010		<0.010	<0.010
	Antimony (Sb)-Dissolved (mg/L)	<0.00050		<0.00050	<0.00050
	Arsenic (As)-Dissolved (mg/L)	<0.0010		<0.0010	<0.0010
	Barium (Ba)-Dissolved (mg/L)	0.285		<0.020	3.02
	Beryllium (Be)-Dissolved (mg/L)	<0.0050		<0.0050	<0.0050
	Boron (B)-Dissolved (mg/L)	0.14		<0.10	0.33
	Cadmium (Cd)-Dissolved (mg/L)	<0.000050		<0.000050	<0.000050
	Calcium (Ca)-Dissolved (mg/L)	6.27		<0.10	30.9
	Chromium (Cr)-Dissolved (mg/L)	<0.00050		<0.00050	<0.00050
	Cobalt (Co)-Dissolved (mg/L)	<0.00050		<0.00050	<0.00050
	Copper (Cu)-Dissolved (mg/L)	<0.0010		<0.0010	<0.0010
	Iron (Fe)-Dissolved (mg/L)	0.057		<0.030	0.323
	Lead (Pb)-Dissolved (mg/L)	<0.0010		<0.0010	<0.0010
	Lithium (Li)-Dissolved (mg/L)	<0.050		<0.050	0.104
	Magnesium (Mg)-Dissolved (mg/L)	1.04		<0.10	5.99
	Manganese (Mn)-Dissolved (mg/L)	<0.010		<0.010	0.031
	Mercury (Hg)-Dissolved (mg/L)	<0.00020		<0.00020	<0.00020
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010		<0.0010	<0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L2000339-1	L2000339-2	L2000339-3	L2000339-4	L2000339-5
	Description	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER
	Sampled Date	26-SEP-17	26-SEP-17	27-SEP-17	28-SEP-17	27-SEP-17
	Sampled Time					
	Client ID	T95R-15C	T95R-64	T96R-34-87	T0B96-02-06	T0B96-11-04
Grouping	**Analyte**					
WATER						
Dissolved Metals	Nickel (Ni)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Silver (Ag)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Sodium (Na)-Dissolved (mg/L)	357	334	358	7.7	19.2
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Titanium (Ti)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	0.00108	0.00307
	Vanadium (V)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050	0.0497	<0.0050	<0.0050

Sample ID	L2000339-6	L2000339-7	L2000339-8	L2000339-9	
Description	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER	
Sampled Date	26-SEP-17			29-SEP-17	
Sampled Time					
Client ID	DUP 1	TRAVEL BLANK	TRIP BLANK	T95R-40	
Grouping **Analyte**					
WATER					
Dissolved Metals Nickel (Ni)-Dissolved (mg/L)	<0.0050		<0.0050	<0.0050	
Potassium (K)-Dissolved (mg/L)	<2.0		<2.0	3.1	
Selenium (Se)-Dissolved (mg/L)	<0.0010		<0.0010	<0.0010	
Silver (Ag)-Dissolved (mg/L)	<0.000050		<0.000050	<0.000050	
Sodium (Na)-Dissolved (mg/L)	344		<2.0	731	
Thallium (Tl)-Dissolved (mg/L)	<0.00020		<0.00020	<0.00020	
Titanium (Ti)-Dissolved (mg/L)	<0.050		<0.050	<0.050	
Uranium (U)-Dissolved (mg/L)	<0.00020		<0.00020	<0.00020	
Vanadium (V)-Dissolved (mg/L)	<0.030		<0.030	<0.030	
Zinc (Zn)-Dissolved (mg/L)	<0.0050		<0.0050	<0.0050	

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Aluminum (Al)-Total	MB-LOR	L2000339-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Dissolved Organic Carbon	MS-B	L2000339-4
Matrix Spike	Dissolved Organic Carbon	MS-B	L2000339-4
Matrix Spike	Total Organic Carbon	MS-B	L2000339-4, -9
Matrix Spike	Total Organic Carbon	MS-B	L2000339-4, -9
Matrix Spike	Total Nitrogen	MS-B	L2000339-1, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-IC-N-VA	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-VA	Water	Colour (True) by Spectrometer	BCMOE Colour Single Wavelength

This analysis is carried out using procedures adapted from British Columbia Environmental Manual "Colour- Single Wavelength." Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method.
Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Reference Information

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-DIS-CVAFS-VA Water Dissolved Hg in Water by CVAFS LOR=50ppt APHA 3030B/EPA 1631E (mod)

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

HG-TOT-CVAFS-VA Water Total Hg in Water by CVAFS LOR=50ppt EPA 1631E (mod)

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-DIS-ICP-VA Water Dissolved Metals in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA Water Total Metals in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

N-T-COL-VA Water Total Nitrogen in water by Colour APHA4500-P(J)/NEMI9171/USGS03-4174

This analysis is carried out using procedures adapted from APHA Method 4500-P (J) "Persulphate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus" and National Environmental Methods Index - Nemi method 5735.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TSS-VA	Water	Total Suspended Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

15-603959

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

DRAFT

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2000339-COFC

COC Number: 15 - 603959

Page of

Report To	Contact and company name below will appear on the final report
Company:	Cassiar Geoscience Consulting
Contact:	CODY CAMERON
Phone:	(778) 378 1716
	Company address below will appear on the final report
Street:	
City/Province:	
Postal Code:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	cody@cassiargeo.com
Email 2	Wade.Brunham@erm.com
Email 3	

Invoice To		Invoice Distribution	
	Same as Report To ☐ YES ☑ NO	Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
	Copy of Invoice with Report ☐ YES ☑ NO	Email 1 or Fax	Wade.brunham@erm.com
Company:	ERM Consultants	Email 2	
Contact:	Wade Brunham		

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q63959	AFE/Cost Center:	PO#
Job #:	0403488-0010	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Amber Springer

Sampler: CODY CAMERON

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	pH, Conductivity, TSS, TDS	P	F/P	P	F/P				P	P	F/P	F/P	P	Number of Containers
						Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Total Hardness, Turbidity	Colour, Acidity	Major Anions	Nitrate, nitrite, total nitrogen	TOC, Total Phosphorus	Dissolved phosphorus	Dissolved Organic Carbon	Ammonia	
	T95R-15C	26-09-17		groundwater	X	X	X	X	X	X	X	X	X	X	X	X	X	7
	T95R-64	26-09-17																
	T96R-34-87	27-09-17																
	TOB96-02-06	28-09-17																
	TOB96-11-04	27-09-17																
	DUP 1	26-09-17																
	Travel Blank																	
	Trip Blank																	
	T95R-40	29-09-17																

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Please analyze all species of alkalinity.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			2	-1	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
CODY Cameron	Sept. 29/2017	6pm	Shayon	Sep. 30	1045			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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

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

DRAFT

CASSIAR GEOSCIENCE CONSULTING LTD
ATTN: Cody Cameron
9199 Bluff Road
Telkwa BC V0J 2X1

Date Received: 22-JAN-18
Report Date: 01-FEB-18 13:00 (MT)
Version: FINAL

Client Phone: 778-378-1716

Certificate of Analysis

Lab Work Order #: L2047836

Project P.O. #: NOT SUBMITTED
Job Reference: CGC17-01-01
C of C Numbers: 17-676058
Legal Site Desc:

Carla Fuginski
Account Manager

	Sample ID	L2047836-1	L2047836-2	L2047836-3	L2047836-4	L2047836-5
	Description	water	water	water	water	water
	Sampled Date	18-JAN-18	18-JAN-18	18-JAN-18	18-JAN-18	16-JAN-18
	Sampled Time	12:00	12:00	12:00	12:00	12:00
	Client ID	DUP 1	T95R-40	FIELD BLANK	TRIP BLANK	TOB96-02-06
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	2700	2680	<2.0	<2.0	553
	Hardness (as CaCO3) (mg/L)	104	103	<0.50 HTC	<0.50 HTC	297
	pH (pH)	7.62	7.67	5.58	5.60	8.04
	Total Suspended Solids (mg/L)	666	688	<3.0	<3.0	6.1
	Total Dissolved Solids (mg/L)	1830	1810	<10	<10	327
	Turbidity (NTU)	476	489	<0.10	<0.10	4.83
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	1670	1690	<1.0	<1.0	321
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	1670	1690	<1.0	<1.0	321
	Ammonia, Total (as N) (mg/L)	0.700	0.695	<0.0050	<0.0050	<0.0050
	Bromide (Br) (mg/L)	<1.0 DLDS	<1.0 DLDS	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<10 DLDS	<10 DLDS	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.55	0.59	<0.020	<0.020	0.110
	Nitrate (as N) (mg/L)	<0.10 DLDS	<0.10 DLDS	<0.0050	<0.0050	0.0137
	Nitrite (as N) (mg/L)	<0.020 DLDS	<0.020 DLDS	<0.0010	<0.0010	<0.0010
	Total Nitrogen (mg/L)	1.03 DLM	1.04 DLM	<0.030	<0.030	<0.030
	Phosphorus (P)-Total (mg/L)	0.233	0.202	<0.0020	<0.0020	0.0035
	Sulfate (SO4) (mg/L)	<6.0 DLDS	<6.0 DLDS	<0.30	<0.30	10.4
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.59	1.11			1.36
	Total Organic Carbon (mg/L)	69.3	64.8	<0.50	<0.50	1.18
Total Metals	Aluminum (Al)-Total (mg/L)	8.76	9.42	<0.0050	<0.0050	0.193
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	0.00572	0.00600	<0.00050	<0.00050	<0.00050
	Barium (Ba)-Total (mg/L)	4.78	5.01	<0.020	<0.020	0.125
	Beryllium (Be)-Total (mg/L)	0.00106	0.00111	<0.00010	<0.00010	<0.00010
	Boron (B)-Total (mg/L)	0.37	0.38	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	0.000240	0.000217	<0.0000050	<0.0000050	0.0000211
	Calcium (Ca)-Total (mg/L)	40.5	40.7	<0.10	<0.10	92.7
	Chromium (Cr)-Total (mg/L)	0.0061	0.0062	<0.0010	<0.0010	<0.0010
	Cobalt (Co)-Total (mg/L)	0.00333	0.00325	<0.00030	<0.00030	<0.00030
	Copper (Cu)-Total (mg/L)	0.0333	0.0349	<0.0010	<0.0010	<0.0010
	Iron (Fe)-Total (mg/L)	8.52	8.39	<0.030	<0.030	0.144
	Lead (Pb)-Total (mg/L)	0.0226	0.0231	<0.00050	<0.00050	<0.00050
	Lithium (Li)-Total (mg/L)	0.126	0.124	<0.0010	<0.0010	0.0033

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L2047836-6	L2047836-7	L2047836-8		
	Description	water	water	water		
	Sampled Date	18-JAN-18	15-JAN-18	19-JAN-18		
	Sampled Time		12:00	12:00		
	Client ID	TOB96-11-04	T9SR-64	TOB96-01-05		
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0	6.2		
	Conductivity (uS/cm)	650	1270	392		
	Hardness (as CaCO3) (mg/L)	339	53.5	154		
	pH (pH)	8.18	8.09	7.66		
	Total Suspended Solids (mg/L)	14.1	<3.0	43.5		
	Total Dissolved Solids (mg/L)	367	838	261		
	Turbidity (NTU)	7.74	1.79	47.1		
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	380	756	220		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)	380	756	220		
	Ammonia, Total (as N) (mg/L)	0.0088	0.366	0.0151		
	Bromide (Br) (mg/L)	<0.050	<0.25 DLDS	<0.050		
	Chloride (Cl) (mg/L)	<0.50	<2.5 DLDS	<0.50		
	Fluoride (F) (mg/L)	0.111	1.58	0.137		
	Nitrate (as N) (mg/L)	0.153	<0.025 DLDS	<0.0050		
	Nitrite (as N) (mg/L)	<0.0010	<0.0050 DLDS	<0.0010		
	Total Nitrogen (mg/L)	0.321	0.365	0.677		
	Phosphorus (P)-Total (mg/L)	0.0646	0.0094	0.110		
	Sulfate (SO4) (mg/L)	22.4	<1.5 DLDS	4.27		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.71	<0.50	10.4		
	Total Organic Carbon (mg/L)	2.87	<0.50	11.6		
Total Metals	Aluminum (Al)-Total (mg/L)	1.31	<0.0050	0.844		
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	0.00071		
	Arsenic (As)-Total (mg/L)	0.00055	<0.00050	0.00135		
	Barium (Ba)-Total (mg/L)	0.099	0.429	0.263		
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010		
	Boron (B)-Total (mg/L)	<0.10	0.15	<0.10		
	Cadmium (Cd)-Total (mg/L)	0.0000836	<0.0000050	0.0000433		
	Calcium (Ca)-Total (mg/L)	66.5	20.6	45.3		
	Chromium (Cr)-Total (mg/L)	<0.0010	<0.0010	<0.0010		
	Cobalt (Co)-Total (mg/L)	0.00067	<0.00030	0.00129		
	Copper (Cu)-Total (mg/L)	0.0029	<0.0010	0.0029		
	Iron (Fe)-Total (mg/L)	1.00	0.420	0.618		
	Lead (Pb)-Total (mg/L)	0.00156	<0.00050	0.00097		
	Lithium (Li)-Total (mg/L)	0.0059	0.0698	0.0058		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L2047836-1	L2047836-2	L2047836-3	L2047836-4	L2047836-5
	Description	water	water	water	water	water
	Sampled Date	18-JAN-18	18-JAN-18	18-JAN-18	18-JAN-18	16-JAN-18
	Sampled Time	12:00	12:00	12:00	12:00	12:00
	Client ID	DUP 1	T95R-40	FIELD BLANK	TRIP BLANK	TOB96-02-06
Grouping	**Analyte**					
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)	9.53	9.75	<0.10	<0.10	25.3
	Manganese (Mn)-Total (mg/L)	0.156	0.154	<0.00030	<0.00030	0.111
	Mercury (Hg)-Total (mg/L)	<0.000050 DLM	<0.000050 DLM	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Total (mg/L)	0.0068	0.0068	<0.0010	<0.0010	<0.0010
	Potassium (K)-Total (mg/L)	3.9	4.0	<2.0	<2.0	<2.0
	Selenium (Se)-Total (mg/L)	0.00018	0.00020	<0.000050	<0.000050	0.000533
	Silver (Ag)-Total (mg/L)	0.000075	0.000071	<0.000020	<0.000020	<0.000020
	Sodium (Na)-Total (mg/L)	682	698	<2.0	<2.0	7.8
	Thallium (Tl)-Total (mg/L)	0.000085	0.000083	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Titanium (Ti)-Total (mg/L)	0.038	0.038	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)	0.00250	0.00241	<0.00020	<0.00020	0.00103
	Vanadium (V)-Total (mg/L)	0.0125	0.0128	<0.00050	<0.00050	0.00060
	Zinc (Zn)-Total (mg/L)	0.0455	0.0378	<0.0050	<0.0050	<0.0050
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD			FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD			FIELD
	Aluminum (Al)-Dissolved (mg/L)	<0.0050	<0.0050			<0.0050
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050			<0.00050
	Arsenic (As)-Dissolved (mg/L)	<0.00050	<0.00050			<0.00050
	Barium (Ba)-Dissolved (mg/L)	3.67	3.69			0.121
	Beryllium (Be)-Dissolved (mg/L)	<0.00020 DLA	<0.00020 DLA			<0.00010
	Boron (B)-Dissolved (mg/L)	0.32	0.36			<0.10
	Cadmium (Cd)-Dissolved (mg/L)	<0.000010 DLA	<0.000010 DLA			0.0000064
	Calcium (Ca)-Dissolved (mg/L)	31.5	30.8			80.9
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010			<0.0010
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030			<0.00030
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010			0.0013
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030			<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050			<0.00050
	Lithium (Li)-Dissolved (mg/L)	0.101	0.102			0.0026
	Magnesium (Mg)-Dissolved (mg/L)	6.23	6.33			23.2
	Manganese (Mn)-Dissolved (mg/L)	0.0316	0.0331			0.00170
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050			<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010			<0.0010
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010			<0.0010
	Potassium (K)-Dissolved (mg/L)	3.2	3.3			<2.0

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L2047836-6	L2047836-7	L2047836-8		
	Description	water	water	water		
	Sampled Date	18-JAN-18	15-JAN-18	19-JAN-18		
	Sampled Time		12:00	12:00		
	Client ID	TOB96-11-04	T9SR-64	TOB96-01-05		
Grouping	**Analyte**					
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)	49.7	1.94	11.1		
	Manganese (Mn)-Total (mg/L)	0.0383	0.0182	1.07		
	Mercury (Hg)-Total (mg/L)	0.0000082	<0.0000050	0.000038		
	Molybdenum (Mo)-Total (mg/L)	0.0021	<0.0010	0.0014		
	Nickel (Ni)-Total (mg/L)	0.0012	<0.0010	0.0025		
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0		
	Selenium (Se)-Total (mg/L)	0.000564	<0.000050	0.000116		
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	0.000024		
	Sodium (Na)-Total (mg/L)	16.6	302	32.7		
	Thallium (Tl)-Total (mg/L)	0.000025	<0.000010	0.000010		
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050		
	Titanium (Ti)-Total (mg/L)	0.023	<0.010	<0.010		
	Uranium (U)-Total (mg/L)	0.00303	<0.00020	0.00243		
	Vanadium (V)-Total (mg/L)	0.00328	<0.00050	0.00286		
	Zinc (Zn)-Total (mg/L)	0.0104	<0.0050	<0.0050		
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD		
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		
	Aluminum (Al)-Dissolved (mg/L)	<0.0050	<0.0050	0.0206		
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	0.00069		
	Arsenic (As)-Dissolved (mg/L)	<0.00050	<0.00050	0.00092		
	Barium (Ba)-Dissolved (mg/L)	0.078	0.433	0.248		
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
	Boron (B)-Dissolved (mg/L)	<0.10	0.14	<0.10		
	Cadmium (Cd)-Dissolved (mg/L)	0.0000486	<0.0000050	0.000155		
	Calcium (Ca)-Dissolved (mg/L)	58.8	18.3	43.5		
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010		
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030	0.00089		
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	0.0022		
	Iron (Fe)-Dissolved (mg/L)	<0.030	0.386	<0.030		
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		
	Lithium (Li)-Dissolved (mg/L)	0.0046	0.0576	0.0053		
	Magnesium (Mg)-Dissolved (mg/L)	46.7	1.89	11.0		
	Manganese (Mn)-Dissolved (mg/L)	0.00207	0.0168	0.922		
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050		
	Molybdenum (Mo)-Dissolved (mg/L)	0.0038	<0.0010	<0.0010		
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010	0.0018		
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L2047836-1	L2047836-2	L2047836-3	L2047836-4	L2047836-5
	Description	water	water	water	water	water
	Sampled Date	18-JAN-18	18-JAN-18	18-JAN-18	18-JAN-18	16-JAN-18
	Sampled Time	12:00	12:00	12:00	12:00	12:00
	Client ID	DUP 1	T95R-40	FIELD BLANK	TRIP BLANK	TOB96-02-06
Grouping	**Analyte**					
WATER						
Dissolved Metals	Selenium (Se)-Dissolved (mg/L)	<0.00010 DLA	<0.00010 DLA			0.000526
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020			<0.000020
	Sodium (Na)-Dissolved (mg/L)	674	703			8.2
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020			<0.00020
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050			<0.00050
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010			<0.010
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020			0.00096
	Vanadium (V)-Dissolved (mg/L)	<0.0010 DLA	<0.0010 DLA			<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050			<0.0050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L2047836-6	L2047836-7	L2047836-8		
	Description	water	water	water		
	Sampled Date	18-JAN-18	15-JAN-18	19-JAN-18		
	Sampled Time		12:00	12:00		
	Client ID	TOB96-11-04	T9SR-64	TOB96-01-05		
Grouping	**Analyte**					
WATER						
Dissolved Metals	Selenium (Se)-Dissolved (mg/L)	0.000433	<0.000050	0.000065		
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020		
	Sodium (Na)-Dissolved (mg/L)	17.1	303	33.9		
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020		
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
	Uranium (U)-Dissolved (mg/L)	0.00283	<0.00020	0.00228		
	Vanadium (V)-Dissolved (mg/L)	0.00125	<0.00050	0.00140		
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050	0.0062		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Magnesium (Mg)-Dissolved	MB-LOR	L2047836-1, -2, -5, -6, -7, -8
Matrix Spike	Total Organic Carbon	MS-B	L2047836-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2047836-1, -2, -5, -6, -7, -8
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2047836-1, -2, -5, -6, -7, -8
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2047836-1, -2, -5, -6, -7, -8
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2047836-1, -2, -5, -6, -7, -8
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2047836-1, -2, -5, -6, -7, -8
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2047836-1, -2, -5, -6, -7, -8
Matrix Spike	Aluminum (Al)-Total	MS-B	L2047836-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Barium (Ba)-Total	MS-B	L2047836-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Calcium (Ca)-Total	MS-B	L2047836-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2047836-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Manganese (Mn)-Total	MS-B	L2047836-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Sodium (Na)-Total	MS-B	L2047836-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Total Nitrogen	MS-B	L2047836-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Total Nitrogen	MS-B	L2047836-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Phosphorus (P)-Total	MS-B	L2047836-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Phosphorus (P)-Total	MS-B	L2047836-1, -2, -3, -4, -5, -6, -7, -8

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-IC-N-VA	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-VA	Water	Colour (True) by Spectrometer	BCMOE Colour Single Wavelength

This analysis is carried out using procedures adapted from British Columbia Environmental Manual "Colour- Single Wavelength." Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method.
Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Reference Information

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-COL-VA	Water	Total Nitrogen in water by Colour	APHA4500-P(J)/NEMI9171/USGS03-4174

This analysis is carried out using procedures adapted from APHA Method 4500-P (J) "Persulphate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus" and National Environmental Methods Index - Nemi method 5735.

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TSS-VA	Water	Total Suspended Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

Reference Information

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

17-676058

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Chain of Custody (COC) / Analytical Request Form

DRAFT

L2047836-COFC

COC Number: 17 - 676058

Page of

ALS Environmental

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Report To	Contact and company name below will appear on the final report
Company:	Cassiar Geoscience
Contact:	Cody Cameron
Phone:	(778) 378 1716
	Company address below will appear on the final report
Street:	10628 Hislop Road
City/Province:	Telkwa / BC
Postal Code:	V0J 2X1

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	cody@cassiargeo.com
Email 2	
Email 3	

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	Same as Report To ☑ YES ☐ NO to be determined	Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
	Copy of Invoice with Report ☑ YES ☐ NO	Email 1 or Fax	
Company:		Email 2	
Contact:			

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62006	AFE/Cost Center:	PO#:
Job #:	CGC17-01-01	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Amber Springer Sampler: Cody Cameron

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐; 3 day [P3-25%] ☐; 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E-100%] ☐; Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	pH, Conductivity, hardness	TSS, TDS, turbidity, Color	Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Nutrients	Dissolved Organic Carbon	Total Organic Carbon	Dissolved Chromium	Major Anions	Alkalinity (all species)	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
					P	F/P	P	F/P	P	F/P	P	F/P	P	F/P					
	DUP 1	18-01-2018	pm	water	X	X	X	X	X	X	X	X	X	X	X	X			8
	TQSR-40	18-01-2018	pm		X	X	X	X	X	X	X	X	X		X	X			8
	Field Blank	18-01-2018	"		X	X	X		X		X		X		X	X			4
	Trip Blank	18-01-2018	"		X	X	X		X		X		X		X	X			4
	TOB 96-02-06	16-01-2018	"		X	X	X	X	X	X	X	X	X		X	X			8
	TOB 96-11-04	18-01-2018	4M																8
	TQSR-64	15-01-2018	pm																8
	TOB96-01-05	19-01-2018	pm																8

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

- Hold Dissolved Chromium for now
- Field Blank bottles were not filtered for dissolved samples
- will email with invoice information

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				7.9	8.1		

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
CODY CAMERON	01/22 2018	8pm cc

INITIAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:
	Jan 22	7:20

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JULY 2017 FRONT

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

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

Appendix 7-A

Mean Daily Discharge Tables

Appendix 7-A1. Summary of Daily Discharge [Q, m^3/s] at Hydrometric Station Tenas-Hydro, 2017

Drainage Area = 47.4 km^2

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	*0.121*	*0.118*	*0.108*	*0.110*	*0.232*	4.473	0.882	0.272	*0.280*	*0.389*	*1.672*	*0.165*
2	*0.121*	*0.110*	*0.110*	*0.112*	*0.243*	4.027	0.951	0.275	*0.255*	*0.326*	*1.391*	*0.164*
3	*0.119*	*0.118*	*0.109*	*0.113*	*0.238*	3.333	0.829	0.282	*0.261*	*0.278*	*0.580*	*0.150*
4	*0.120*	*0.119*	*0.109*	*0.111*	*0.269*	2.623	0.663	0.278	*0.275*	*0.255*	*0.467*	*0.147*
5	*0.121*	*0.119*	*0.107*	*0.111*	*0.310*	2.285	0.611	0.275	*0.254*	*0.252*	*0.446*	*0.164*
6	*0.121*	*0.117*	*0.107*	*0.116*	*0.398*	2.242	0.629	0.261	*0.450*	*0.228*	*0.381*	*0.155*
7	*0.121*	*0.114*	*0.106*	*0.118*	*0.465*	2.666	0.699	0.255	*0.254*	*0.248*	*0.320*	*0.151*
8	*0.120*	*0.114*	*0.105*	*0.119*	*0.393*	4.344	0.699	0.249	*0.259*	*0.246*	*0.336*	*0.146*
9	*0.120*	*0.112*	*0.106*	*0.125*	*0.366*	5.085	0.672	0.256	*0.267*	*0.222*	*0.313*	*0.132*
10	*0.118*	*0.113*	*0.105*	*0.131*	*0.376*	3.681	0.578	0.246	*0.339*	*0.231*	*0.293*	*0.136*
11	*0.113*	*0.114*	*0.105*	*0.130*	*0.366*	3.287	0.502	0.236	*0.299*	*0.222*	*0.273*	*0.152*
12	*0.116*	*0.113*	*0.104*	*0.134*	*0.471*	2.853	0.513	0.222	*4.672*	*0.205*	*0.262*	*0.146*
13	*0.119*	*0.113*	*0.105*	*0.149*	*0.811*	2.292	0.542	0.221	*2.440*	*0.197*	*0.255*	*0.143*
14	*0.119*	*0.112*	*0.107*	*0.155*	*0.728*	1.977	0.502	0.196	*1.140*	*0.187*	*0.242*	*0.140*
15	*0.118*	*0.111*	*0.107*	*0.148*	*0.587*	1.825	0.490	0.174	*0.529*	*0.190*	*0.232*	*0.140*
16	*0.118*	*0.114*	*0.107*	*0.149*	*0.528*	1.802	0.458	0.175	*0.428*	*0.329*	*0.223*	*0.142*
17	*0.117*	*0.118*	*0.105*	*0.155*	*0.499*	1.586	0.420	0.175	*0.367*	*0.253*	*0.210*	*0.140*
18	*0.118*	*0.117*	*0.105*	*0.155*	*2.554*	1.421	0.410	*0.257*	*0.352*	*0.253*	*0.195*	*0.142*
19	*0.117*	*0.115*	*0.105*	*0.155*	2.556	1.756	0.399	*0.268*	*0.348*	*0.252*	*0.193*	*0.139*
20	*0.119*	*0.113*	*0.104*	*0.152*	2.649	1.893	0.401	*0.267*	*0.323*	*0.295*	*0.201*	*0.132*
21	*0.117*	*0.112*	*0.102*	*0.162*	3.360	1.343	0.390	*0.254*	*0.308*	*0.287*	*0.193*	*0.116*
22	*0.115*	*0.111*	*0.104*	*0.180*	4.691	1.167	0.446	*0.255*	*0.287*	*0.265*	*0.195*	*0.131*
23	*0.114*	*0.111*	*0.104*	*0.194*	4.874	1.080	0.423	*0.304*	*0.269*	*0.254*	*0.192*	*0.126*
24	*0.111*	*0.107*	*0.104*	*0.205*	4.021	1.098	0.343	*0.284*	*0.262*	*0.290*	*0.198*	*0.115*
25	*0.112*	*0.112*	*0.105*	*0.208*	3.772	1.528	0.342	*0.261*	*0.263*	*4.886*	*0.193*	*0.127*
26	*0.111*	*0.108*	*0.105*	*0.213*	3.989	1.305	0.440	*0.376*	*0.284*	*24.376*	*0.185*	*0.129*
27	*0.111*	*0.110*	*0.104*	*0.229*	4.075	0.965	0.407	*0.498*	*0.295*	*3.611*	*0.183*	*0.131*
28	*0.112*	*0.109*	*0.104*	*0.258*	4.307	0.908	0.344	*0.270*	*0.290*	*2.043*	*0.176*	*0.133*
29	*0.118*		*0.106*	*0.247*	5.540	0.930	0.356	*0.307*	*0.275*	*2.509*	*0.174*	*0.128*
30	*0.126*		*0.109*	*0.232*	5.502	0.938	0.349	*0.279*	*0.323*	*1.841*	*0.170*	*0.129*
31	*0.126*		*0.108*		4.849		0.288	*0.277*		*1.210*		*0.127*
Mean	0.118	0.113	0.106	0.159	2.065	2.224	0.515	0.265	0.555	1.504	0.345	0.139
Max	0.126	0.119	0.110	0.258	5.540	5.085	0.951	0.498	4.672	24.376	1.672	0.165
Min	0.111	0.107	0.102	0.110	0.232	0.908	0.288	0.174	0.254	0.187	0.170	0.115
Total	3.650	3.176	3.279	4.774	64.017	66.714	15.980	8.208	16.644	46.630	10.343	4.317

Notes: Estimated and modelled values are italicized.

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

Appendix 7-A2. Summary of Daily Discharge [Q, m^3/s] at Hydrometric Station Goathorn-Hydro, 2017

Drainage Area = 121.6 km^2

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	*0.243*	*0.227*	*0.181*	*0.190*	*0.752*	7.485	3.426	1.186	0.855	1.179	*3.894*	*0.444*
2	*0.243*	*0.191*	*0.191*	*0.200*	*0.801*	6.544	3.445	1.147	0.881	0.962	*3.411*	*0.438*
3	*0.234*	*0.230*	*0.189*	*0.204*	*0.777*	5.668	3.311	1.295	0.945	0.855	*2.341*	*0.373*
4	*0.239*	*0.234*	*0.186*	*0.197*	*0.918*	4.695	2.384	1.400	0.853	0.841	*1.827*	*0.362*
5	*0.244*	*0.233*	*0.178*	*0.196*	*1.108*	4.024	1.891	1.408	0.853	0.841	*1.728*	*0.439*
6	*0.244*	*0.224*	*0.178*	*0.219*	*1.507*	3.762	1.934	1.407	*0.849*	*0.732*	*1.430*	*0.397*
7	*0.243*	*0.213*	*0.174*	*0.229*	*1.814*	4.474	2.623	1.387	0.875	*0.825*	*1.151*	*0.378*
8	*0.236*	*0.212*	*0.169*	*0.232*	*1.486*	7.778	3.277	1.400	0.908	*0.815*	*1.226*	*0.358*
9	*0.237*	*0.203*	*0.172*	*0.261*	*1.365*	12.928	2.953	1.400	0.908	*0.705*	*1.120*	*0.291*
10	*0.230*	*0.207*	*0.168*	*0.289*	*1.410*	7.572	2.604	1.452	*1.059*	*0.746*	*1.030*	*0.313*
11	*0.207*	*0.211*	*0.169*	*0.285*	*1.364*	7.332	1.877	1.495	9.054	*0.706*	*0.939*	*0.382*
12	*0.222*	*0.207*	*0.166*	*0.302*	*1.844*	6.761	1.641	1.326	5.215	*0.629*	*0.886*	*0.357*
13	*0.232*	*0.206*	*0.171*	*0.370*	*3.401*	5.363	1.935	1.215	2.980	*0.589*	*0.856*	*0.343*
14	*0.232*	*0.199*	*0.176*	*0.399*	*3.017*	4.421	1.910	1.099	2.107	*0.543*	*0.798*	*0.328*
15	*0.228*	*0.199*	*0.178*	*0.366*	*2.373*	4.276	1.792	0.910	1.647	*0.559*	*0.749*	*0.328*
16	*0.227*	*0.213*	*0.177*	*0.369*	*2.102*	5.043	1.689	0.846	1.367	*0.846*	*0.710*	*0.337*
17	*0.225*	*0.228*	*0.171*	*0.398*	*5.714*	4.369	1.535	0.865	1.297	0.844	*0.649*	*0.332*
18	*0.228*	*0.226*	*0.171*	*0.397*	5.566	3.655	1.434	0.915	1.280	0.843	*0.583*	*0.339*
19	*0.225*	*0.215*	*0.168*	*0.399*	5.519	4.166	1.432	0.909	1.166	0.843	*0.571*	*0.323*
20	*0.233*	*0.206*	*0.164*	*0.384*	5.500	5.852	1.494	0.851	1.096	*1.039*	*0.607*	*0.294*
21	*0.224*	*0.200*	*0.157*	*0.429*	6.230	4.227	1.510	0.857	1.004	*1.004*	*0.570*	*0.218*
22	*0.215*	*0.194*	*0.164*	*0.510*	7.986	3.215	1.555	1.082	0.917	*0.902*	*0.582*	*0.289*
23	*0.211*	*0.196*	*0.164*	*0.574*	9.100	2.929	1.894	0.988	0.890	*1.016*	*0.567*	*0.264*
24	*0.196*	*0.181*	*0.164*	*0.627*	7.841	2.999	1.502	0.884	0.890	9.422	*0.596*	*0.217*
25	*0.200*	*0.199*	*0.168*	*0.639*	7.219	4.425	1.334	0.884	0.986	42.937	*0.572*	*0.270*
26	*0.198*	*0.183*	*0.169*	*0.665*	7.211	5.133	1.730	*1.409*	1.036	42.937	*0.536*	*0.279*
27	*0.199*	*0.194*	*0.165*	*0.738*	7.424	3.518	2.135	*0.925*	1.015	*7.229*	*0.527*	*0.289*
28	*0.201*	*0.189*	*0.167*	*0.870*	7.529	3.200	1.685	1.096	0.945	*4.532*	*0.495*	*0.295*
29	*0.228*		*0.172*	*0.817*	8.603	3.396	1.475	0.965	1.168	*5.334*	*0.486*	*0.274*
30	*0.265*		*0.186*	*0.750*	9.437	3.720	1.549	0.957	1.467	*4.185*	*0.464*	*0.281*
31	*0.265*		*0.182*		8.388		1.354	0.971		*3.099*		*0.270*
Mean	0.228	0.208	0.173	0.417	4.365	5.098	2.010	1.127	1.550	4.469	1.063	0.326
Max	0.265	0.234	0.191	0.870	9.437	12.928	3.445	1.495	9.054	42.937	3.894	0.444
Min	0.196	0.181	0.157	0.190	0.752	2.929	1.334	0.846	0.849	0.543	0.464	0.217
Total	7.056	5.821	5.355	12.505	135.308	152.929	62.310	34.932	46.512	138.539	31.900	10.104

Notes: Estimated and modelled values are italicized.

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

Appendix 7-A3. Summary of Daily Discharge [Q, m^3/s] at Hydrometric Station Telkwa-Hydro, 2017

Drainage Area = 966.9 km^2

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	*5.311*	*5.125*	*4.575*	*4.685*	*11.359*	150.366	59.561	22.940	21.975	21.521	68.220	*7.701*
2	*5.311*	*4.696*	*4.691*	*4.805*	*11.936*	129.282	57.862	23.923	23.869	17.345	48.387	*7.626*
3	*5.207*	*5.154*	*4.674*	*4.854*	*11.648*	113.928	60.703	27.759	22.223	15.457	35.897	*6.861*
4	*5.268*	*5.210*	*4.631*	*4.763*	*13.334*	87.969	49.118	29.790	19.199	15.457	34.579	*6.729*
5	*5.328*	*5.193*	*4.538*	*4.756*	*15.586*	72.897	41.402	29.863	20.428	*11.804*	28.064	*7.645*
6	*5.320*	*5.086*	*4.539*	*5.026*	*20.329*	70.078	40.289	30.721	22.074	*11.114*	21.787	*7.135*
7	*5.316*	*4.951*	*4.497*	*5.143*	*23.969*	91.030	49.220	32.341	22.919	*12.222*	24.168	*6.916*
8	*5.227*	*4.943*	*4.430*	*5.180*	*20.076*	147.186	54.687	32.610	20.323	*12.109*	22.246	*6.677*
9	*5.237*	*4.833*	*4.468*	*5.524*	*18.638*	221.949	48.862	33.921	16.205	*10.796*	19.769	*5.880*
10	*5.152*	*4.881*	*4.420*	*5.860*	*19.175*	146.541	45.959	35.171	16.680	*11.289*	17.621	*6.144*
11	*4.884*	*4.937*	*4.432*	*5.815*	*18.626*	127.832	35.861	34.474	141.931	*16.524*	16.470	*6.966*
12	*5.059*	*4.888*	*4.397*	*6.016*	*24.321*	123.295	31.356	30.087	126.845	16.524	15.932	*6.667*
13	*5.186*	*4.878*	*4.455*	*6.820*	*42.815*	95.392	34.332	25.743	51.880	*16.458*	15.245	*6.502*
14	*5.182*	*4.790*	*4.519*	*7.163*	*38.258*	79.242	33.627	23.751	34.891	16.458	15.245	*6.320*
15	*5.138*	*4.788*	*4.537*	*6.771*	*30.606*	73.683	31.980	19.069	26.957	*21.318*	*15.558*	*6.325*
16	*5.125*	*4.952*	*4.533*	*6.805*	*63.491*	90.136	32.249	20.044	22.407	25.815	15.391	*6.431*
17	*5.097*	*5.135*	*4.458*	*7.152*	65.105	77.972	33.493	21.619	20.447	22.591	15.151	*6.363*
18	*5.130*	*5.104*	*4.459*	*7.142*	70.099	67.115	29.652	32.495	21.069	19.815	15.151	*6.458*
19	*5.099*	*4.980*	*4.418*	*7.162*	73.072	74.004	28.649	28.237	17.405	18.294	*9.205*	*6.260*
20	*5.195*	*4.876*	*4.378*	*6.981*	78.038	97.154	30.006	20.197	16.015	17.927	*9.629*	*5.914*
21	*5.090*	*4.803*	*4.292*	*7.522*	91.539	75.705	30.367	31.365	15.085	16.396	*9.195*	*5.021*
22	*4.985*	*4.736*	*4.371*	*8.484*	121.830	63.852	28.819	36.191	15.085	15.575	*9.337*	*5.863*
23	*4.931*	*4.755*	*4.377*	*9.247*	149.197	60.612	36.067	30.098	*15.200*	16.062	*9.160*	*5.559*
24	*4.760*	*4.570*	*4.373*	*9.874*	135.760	59.501	28.899	22.387	24.980	142.707	*9.505*	*4.998*
25	*4.801*	*4.792*	*4.417*	*10.016*	125.284	71.574	28.294	17.938	33.580	385.512	*9.223*	*5.631*
26	*4.778*	*4.595*	*4.431*	*10.318*	131.186	84.339	33.740	20.893	34.964	178.073	*8.791*	*5.741*
27	*4.787*	*4.730*	*4.386*	*11.190*	146.571	66.979	38.797	32.620	33.845	94.937	*8.690*	*5.858*
28	*4.818*	*4.675*	*4.404*	*12.761*	153.798	63.951	31.935	44.237	27.624	101.478	*8.310*	*5.931*
29	*5.130*		*4.473*	*12.125*	171.041	65.351	28.428	29.959	32.102	87.637	*8.203*	*5.685*
30	*5.577*		*4.639*	*11.330*	180.867	67.466	28.511	28.593	32.079	65.012	*7.940*	*5.762*
31	*5.497*		*4.590*		180.221		24.303	28.051		68.302		*5.633*
Mean	5.127	4.895	4.478	7.376	72.831	93.879	37.646	28.293	31.676	48.469	18.402	6.297
Max	5.577	5.210	4.691	12.761	180.867	221.949	60.703	44.237	141.931	385.512	68.220	7.701
Min	4.760	4.570	4.292	4.685	11.359	59.501	24.303	17.938	15.085	10.796	7.940	4.998
Total	158.924	137.055	138.805	221.290	2257.776	2816.378	1167.026	877.084	950.286	1502.530	552.067	195.205

Notes: Estimated and modelled values are italicized.

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

Appendix 8-A

Water Quality Analytical Results, Tenas Project, 2017 to 2018

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS01	WQS01	WQS02	WQS04	WQS03	WQS06	WQS05	WQS08	WQS09	WQS10	WQS10	WQS11	WQS12	WQS01	WQS02	WQS04	WQS03
Date	**4-May-2017**	**4-May-2017**	**4-May-2017**	**4-May-2017**	**4-May-2017**	**4-May-2017**	**4-May-2017**	**4-May-2017**	**4-May-2017**	**3-May-2017**	**3-May-2017**	**3-May-2017**	**3-May-2017**	**21-Jun-2017**	**20-Jun-2017**	**20-Jun-2017**	**21-Jun-2017**
Time	**10:25**	**-**	**9:53**	**14:50**	**11:05**	**13:15**	**1:23**	**13:55**	**0:52**	**16:00**	**-**	**15:30**	**14:50**	**8:50**	**13:00**	**14:30**	**9:20**
QAQC	**Regular**	**Duplicate**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Duplicate**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**
ALS Sample ID	**L1922134-9**	**L1922134-15**	**L1922134-7**	**L1922134-11**	**L1922134-8**	**L1922134-14**	**L1922134-13**	**L1922134-10**	**L1922134-12**	**L1922134-3**	**L1922134-4**	**L1922134-1**	**L1922134-2**	**L1947234-7**	**L1947234-1**	**L1947234-2**	**L1947234-8**
In Situ																	
Temperature (°C)	0.10	0.10	0.60	1.80	0.10	2.40	2.10	3.10	3.10	-	-	7.70	7.40	3.90	6.60	8.40	4.90
pH	7.64	7.64	8.56	8.03	7.96	7.96	8.07	7.90	8.05	8.07	8.07	7.40	7.52	7.39	7.08	7.17	7.75
Conductivity (µS/cm)	57.6	57.6	57.0	60.0	46.2	64.7	63.2	41.3	46.0	55.4	55.4	53.4	50.9	60.1	59.5	65.5	85.9
Physical Tests																	
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hardness (as $CaCO_3$)	57.4	57.1	55.5	56.1	48.3	57.4	56.8	34.6	38.5	40.2	39.4	37.4	36.0	51.0	45.9	46.4	74.6
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity (NTU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions																	
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.780	0.540	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.0250	0.0260	0.0270	0.0270	0.0270	0.0270	0.0280	0.0230	0.0230	0.0260	0.0260	0.0330	0.0330	0.0230	0.0220	0.0230	0.0360
Sulphate (SO_4)	0.930	0.930	1.02	1.24	<0.30	6.35	4.17	1.91	2.45	2.60	2.60	3.88	3.85	1.90	1.73	1.80	0.490
Nutrients																	
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	0.368	0.339	0.382	0.415	0.545	0.305	0.373	0.228	0.255	0.199	0.213	0.315	0.300	0.103	0.0980	0.110	0.289
Ammonia as N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00530	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	0.0864	0.0860	0.0772	0.0710	0.0213	0.0479	0.0581	0.0451	0.0477	0.0321	0.0322	0.0104	0.0123	0.0118	0.00970	0.00630	0.00510
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Phosphorus (as P)	0.0502	0.0580	0.0450	0.0390	0.0240	0.0126	0.0220	0.0145	0.0161	0.00630	0.00630	0.0210	0.0238	0.0106	0.0242	0.0318	0.00390
Dissolved Orthophosphate (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon																	
Total Organic Carbon	15.5	14.9	14.4	17.2	22.4	12.6	14.3	9.21	10.2	8.28	7.86	10.1	10.3	2.97	3.14	3.74	13.6
Dissolved Organic Carbon	13.4	13.3	13.1	15.5	20.5	11.8	13.2	8.07	9.01	7.19	7.57	9.71	9.75	2.83	2.63	2.59	11.8
Total Inorganic Carbon	12.9	12.8	9.27	12.4	8.86	11.3	12.0	8.01	8.90	8.19	8.56	7.92	7.38	11.8	10.7	11.1	16.6
Dissolved Inorganic Carbon	12.3	11.8	10.6	11.5	9.55	10.2	10.3	7.19	7.93	5.23	6.23	7.67	6.93	11.7	10.7	11.0	16.4
Cyanide																	
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Weak Acid Dissociable	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Free	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Metals																	
Aluminum (Al)	2.23	1.59	2.30	1.86	1.28	0.565	1.67	0.676	0.809	0.422	0.437	0.800	0.899	0.465	1.000	1.18	0.171
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000160	0.000190	0.000180	<0.00010
Arsenic (As)	0.000920	0.000880	0.000880	0.000770	0.000810	0.000580	0.000770	0.000460	0.000520	0.000400	0.000370	0.000660	0.000690	0.000720	0.000860	0.000900	0.000720
Barium (Ba)	0.0519	0.0472	0.0463	0.0409	0.0573	0.0653	0.0595	0.0335	0.0393	0.0331	0.0328	0.0292	0.0312	0.0225	0.0268	0.0282	0.0667
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.0170	0.0160	0.0140	0.0130	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000210	0.0000185	0.0000185	0.0000137	0.0000180	0.0000160	0.0000195	0.0000168	0.0000206	0.0000150	0.0000109	0.0000115	0.0000153	0.0000059	0.0000105	0.0000081	0.0000054
Calcium (Ca)	17.2	17.2	16.6	16.8	10.4	16.0	16.9	10.5	11.9	12.0	11.9	10.6	10.4	15.3	14.0	14.6	15.5
Chromium (Cr)	0.00226	0.00172	0.00222	0.00183	0.00163	0.000740	0.00160	0.000630	0.000770	0.000530	0.000490	0.000950	0.00103	0.000730	0.00113	0.00126	0.000290
Cobalt (Co)	0.000990	0.000920	0.000780	0.000620	0.000220	0.000400	0.000620	0.000330	0.000400	0.000190	0.000190	0.000360	0.000400	0.000280	0.000610	0.000640	<0.00010
Copper (Cu)	0.00491	0.00463	0.00501	0.00527	0.00317	0.00461	0.00527	0.00238	0.00291	0.00224	0.00212	0.00217	0.00242	0.00177	0.00279	0.00328	0.00187
Iron (Fe)	1.79	1.51	1.54	1.23	0.683	0.865	1.30	0.973	1.06	0.639	0.639	0.926	0.987	0.301	0.671	0.776	0.119
Lead (Pb)	0.000427	0.000388	0.000346	0.000280	0.000120	0.000234	0.000337	0.000341	0.000366	0.000162	0.000155	0.000238	0.000276	0.0000740	0.000202	0.000193	<0.000050
Lithium (Li)	0.00130	0.00110	0.00130	0.00120	0.00150	<0.0010	0.00130	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	4.24	4.05	4.02	3.95	5.76	4.05	4.12	2.32	2.61	2.54	2.51	2.95	2.91	2.65	2.65	2.83	8.41

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS06	WQS05	WQS08	WQS09	WQS09	WQS10	WQS11	WQS12	WQS01	WQS02	WQS04	WQS03	WQS06	WQS05	WQS08	WQS08	WQS09
Date	20-Jun-2017	20-Jun-2017	20-Jun-2017	20-Jun-2017	20-Jun-2017	21-Jun-2017	21-Jun-2017	21-Jun-2017	26-Jul-2017	27-Jul-2017	27-Jul-2017	26-Jul-2017	27-Jul-2017	27-Jul-2017	27-Jul-2017	27-Jul-2017	27-Jul-2017
Time	17:00	15:40	15:15	16:10	-	12:10	11:30	11:00	12:15	10:09	11:13	12:59	13:45	12:42	13:12	-	14:38
QAQC	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Duplicate	Regular
ALS Sample ID	L1947234-6	L1947234-4	L1947234-3	L1947234-5	L1947234-13	L1947234-11	L1947234-10	L1947234-9	L1966679-1	L1966679-2	L1966679-4	L1966679-3	L1966679-6	L1966679-5	L1966679-8	L1966679-12	L1966679-9
In Situ																	
Temperature (°C)	7.00	7.80	7.80	8.20	8.20	7.00	8.60	8.60	9.20	8.80	10.50	9.50	10.30	10.50	9.60	9.60	10.20
pH	7.08	7.34	6.81	7.52	7.52	7.05	7.45	7.44	7.24	7.36	7.58	7.85	7.48	7.54	7.42	7.42	7.16
Conductivity (µS/cm)	73.2	70.4	34.3	42.7	42.7	40.5	37.8	37.5	83.4	86.3	97.2	205	101	101	38.3	38.3	50.4
Physical Tests																	
Colour, True	-	-	-	-	-	-	-	-	5.20	5.70	6.70	19.0	5.10	5.20	8.00	8.50	8.20
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	120	124	134	288	139	140	54.5	54.4	70.2
Hardness (as $CaCO_3$)	50.6	50.2	24.0	28.8	27.5	28.9	26.2	25.6	57.5	57.3	63.8	143	61.4	61.6	25.6	24.2	32.1
pH	-	-	-	-	-	-	-	-	8.02	8.08	8.10	8.31	7.76	7.86	7.69	7.70	7.73
Total Suspended Solids	-	-	-	-	-	-	-	-	<3.0	<3.0	<3.0	<3.0	3.70	4.70	19.9	11.3	8.90
Total Dissolved Solids	-	-	-	-	-	-	-	-	87.0	80.0	87.0	179	95.0	94.0	41.0	44.0	53.0
Turbidity (NTU)	-	-	-	-	-	-	-	-	2.82	1.88	2.58	0.420	3.84	3.33	14.5	15.0	13.8
Acidity (as $CaCO_3$)	-	-	-	-	-	-	-	-	1.50	1.50	1.50	<1.0	2.00	2.00	1.90	1.90	1.80
Alkalinity, Total (as $CaCO_3$)	-	-	-	-	-	-	-	-	68.0	73.0	68.0	184	30.5	38.6	23.4	22.6	25.4
Anions																	
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.0300	0.0270	0.0200	0.0220	0.0220	0.0220	0.0210	0.0210	0.0230	0.0250	0.0270	0.0640	0.0320	0.0320	<0.020	<0.020	0.0220
Sulphate (SO_4)	22.5	12.9	3.36	6.10	6.08	4.66	3.78	3.78	2.28	2.23	2.60	1.79	36.2	29.8	4.36	4.34	8.94
Nutrients																	
Total Nitrogen	-	-	-	-	-	-	-	-	<0.030	<0.030	<0.030	0.107	0.0400	0.0410	<0.030	0.0380	0.0300
Total Kjeldahl Nitrogen	0.0890	0.103	0.0960	0.0960	0.0950	0.0920	0.128	0.128	<0.050	<0.050	<0.050	0.0840	<0.050	<0.050	<0.050	<0.050	<0.050
Ammonia as N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	0.0447	0.0263	0.00990	0.0143	0.0142	0.0118	0.0198	0.0205	<0.0050	<0.0050	<0.0050	0.0217	0.0305	0.0247	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Phosphorus (as P)	0.0328	0.0175	0.0411	0.0368	0.0364	0.0172	0.0321	0.0381	0.00310	0.00220	0.00320	0.00290	0.00600	0.00470	0.0241	0.0325	0.0205
Dissolved Orthophosphate (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon																	
Total Organic Carbon	2.62	2.99	2.29	2.30	2.43	2.33	2.69	3.37	1.10	1.13	1.28	4.60	0.710	0.940	0.610	0.920	0.710
Dissolved Organic Carbon	1.94	2.28	1.77	1.91	1.90	1.76	2.57	2.70	1.29	1.08	1.39	4.50	0.670	0.810	0.630	<0.50	<0.50
Total Inorganic Carbon	7.36	9.05	5.48	5.86	5.88	6.30	5.54	5.78	14.4	15.2	16.8	38.2	7.00	8.94	5.57	5.59	6.11
Dissolved Inorganic Carbon	6.86	8.75	5.14	5.70	5.66	6.07	5.30	5.37	14.8	15.5	17.1	37.9	7.61	9.60	6.12	5.87	6.61
Cyanide																	
Cyanide, Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	-	-	-	-	-	-	-	-	-
Cyanide, Weak Acid Dissociable	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	-	-	-	-	-	-	-	-	-
Cyanide, Free	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	-	-	-	-	-	-	-	-
Total Metals																	
Aluminum (Al)	0.647	0.849	1.19	1.10	1.17	0.585	1.22	1.24	0.0967	0.0619	0.108	0.0751	0.250	0.191	0.563	0.565	0.519
Antimony (Sb)	0.000110	0.000150	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000270	0.000260	0.000240	<0.00010	0.000110	0.000130	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.000520	0.000720	0.000420	0.000460	0.000470	0.000320	0.000600	0.000610	0.000650	0.000550	0.000480	0.000790	0.000220	0.000270	0.000190	0.000210	0.000210
Barium (Ba)	0.0544	0.0398	0.0361	0.0397	0.0401	0.0313	0.0325	0.0333	0.0257	0.0254	0.0288	0.121	0.0494	0.0453	0.0384	0.0379	0.0387
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.0000790	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0120	0.0110	0.0160	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000521	0.0000293	0.0000298	0.0000345	0.0000295	0.0000188	0.0000154	0.0000172	<0.0000050	<0.0000050	<0.0000050	0.0000087	0.0000483	0.0000322	0.0000224	0.0000247	0.0000255
Calcium (Ca)	15.8	15.3	7.89	9.66	9.46	9.12	8.26	8.44	17.9	19.3	19.3	28.9	19.5	19.0	8.03	8.23	10.5
Chromium (Cr)	0.000660	0.000940	0.000720	0.000720	0.000730	0.000490	0.001000	0.00101	0.000320	0.000300	0.000320	<0.00010	0.000230	0.000160	0.000290	0.000370	0.000270
Cobalt (Co)	0.000570	0.000590	0.000550	0.000550	0.000590	0.000290	0.000600	0.000630	<0.00010	<0.00010	<0.00010	<0.00010	0.000190	0.000160	0.000270	0.000280	0.000260
Copper (Cu)	0.00610	0.00450	0.00346	0.00382	0.00390	0.00212	0.00255	0.00260	0.000800	0.000850	0.000870	0.000700	0.00345	0.00281	0.00170	0.00183	0.00191
Iron (Fe)	0.787	0.779	1.05	1.01	1.06	0.521	1.25	1.26	0.0600	0.0470	0.0790	0.0480	0.248	0.187	0.584	0.608	0.555
Lead (Pb)	0.000250	0.000232	0.00111	0.000942	0.000973	0.000410	0.000341	0.000356	<0.000050	<0.000050	<0.000050	<0.000050	0.0000870	0.0000770	0.000824	0.000867	0.000706
Lithium (Li)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00200	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	2.66	2.75	1.52	1.80	1.80	1.55	1.51	1.53	3.01	3.56	3.53	15.7	3.00	3.10	1.26	1.30	1.60

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS10	WQS11	WQS12	WQS01	WQS02	WQS04	WQS03	WQS06	WQS05	WQS08	WQS08	WQS09	WQS10	WQS11	WQS12	WQS01
Date	**27-Jul-2017**	**27-Jul-2017**	**27-Jul-2017**	**17-Aug-2017**	**16-Aug-2017**	**16-Aug-2017**	**17-Aug-2017**	**16-Aug-2017**	**16-Aug-2017**	**16-Aug-2017**	**16-Aug-2017**	**16-Aug-2017**	**17-Aug-2017**	**17-Aug-2017**	**17-Aug-2017**	**27-Sep-2017**
Time	**15:11**	**-**	**15:57**	**9:15**	**12:00**	**13:29**	**8:44**	**16:06**	**14:54**	**14:18**	**-**	**15:24**	**12:15**	**10:00**	**11:48**	**10:40**
QAQC	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Duplicate**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**
ALS Sample ID	**L1966679-10**	**L1966679-15**	**L1966679-11**	**L1977457-1**	**L1977457-2**	**L1977457-4**	**L1977457-3**	**L1977457-6**	**L1977457-5**	**L1977457-7**	**L1977457-12**	**L1977457-8**	**L1977457-9**	**L1977457-10**	**L1977457-11**	**L1998999-1**
In Situ																
Temperature (°C)	10.90	15.60	15.20	8.70	10.20	12.50	8.90	12.90	12.60	9.80	9.80	11.00	9.60	15.00	14.70	6.70
pH	7.15	7.69	7.32	8.05	7.71	7.95	7.92	7.66	7.75	7.36	7.36	7.81	7.10	7.82	7.52	8.00
Conductivity (µS/cm)	45.9	43.5	43.7	97.8	113	130	229	123	124	45.2	45.2	55.0	44.9	41.1	42.1	85.8
Physical Tests																
Colour, True	6.70	5.60	<5.0	<5.0	<5.0	<5.0	13.7	<5.0	<5.0	<5.0	11.4	<5.0	11.3	<5.0	<5.0	8.20
Conductivity (µS/cm)	62.6	51.8	53.5	146	162	172	332	161	163	64.9	62.5	77.3	64.8	50.8	52.4	140
Hardness (as $CaCO_3$)	27.8	22.9	23.8	71.8	77.6	88.2	174	76.5	80.4	31.5	29.3	36.4	30.2	23.1	23.9	66.5
pH	7.74	7.62	7.69	8.03	8.08	8.09	8.36	7.71	7.83	7.63	7.58	7.68	7.62	7.53	7.53	8.09
Total Suspended Solids	3.90	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	5.20	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	48.0	43.0	43.0	88.0	96.0	106	193	103	102	44.0	45.0	54.0	47.0	32.0	35.0	79.0
Turbidity (NTU)	13.3	3.91	4.50	0.830	0.690	0.870	0.450	2.75	2.01	7.95	7.32	7.48	8.23	2.68	2.28	1.20
Acidity (as $CaCO_3$)	1.80	2.00	1.80	<1.0	<1.0	<1.0	<1.0	5.30	1.40	2.30	2.50	2.40	2.20	2.10	2.10	1.60
Alkalinity, Total (as $CaCO_3$)	25.2	22.2	22.9	71.9	83.6	88.7	186	35.9	48.5	27.3	28.2	30.5	26.6	22.1	22.2	74.1
Anions																
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.0210	<0.020	<0.020	0.0270	0.0300	0.0310	0.0670	0.0310	0.0310	0.0200	0.0210	0.0200	<0.020	<0.020	<0.020	0.0360
Sulphate (SO_4)	6.34	3.90	4.06	2.54	2.88	3.63	2.27	39.9	30.6	4.78	4.62	7.73	5.66	3.82	3.95	3.25
Nutrients																
Total Nitrogen	<0.030	0.0460	0.0450	<0.030	<0.030	<0.030	0.107	0.0390	0.0350	<0.030	<0.030	<0.030	<0.030	0.0420	0.0350	0.0400
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.0520	<0.050	<0.050
Ammonia as N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	<0.0050	0.0124	0.0128	<0.0050	<0.0050	<0.0050	0.0469	0.0301	0.0213	<0.0050	<0.0050	<0.0050	<0.0050	0.0103	0.0122	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Phosphorus (as P)	0.0182	0.00480	0.00670	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.00260	0.00990	0.00930	0.00830	0.0111	0.00470	0.00260	<0.0020
Dissolved Orthophosphate (as P)	-	-	-	0.00110	0.001000	<0.0010	0.00140	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001000	<0.0010	<0.0010	<0.0010
Carbon																
Total Organic Carbon	0.750	1.38	1.35	0.840	0.990	1.22	3.24	0.810	0.890	<0.50	0.510	0.510	<0.50	0.820	0.840	1.78
Dissolved Organic Carbon	<0.50	1.16	1.000	0.800	0.910	1.27	3.03	0.730	0.760	<0.50	<0.50	<0.50	<0.50	0.860	0.810	1.74
Total Inorganic Carbon	5.88	5.15	5.40	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Inorganic Carbon	6.45	5.58	5.60	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide																
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Weak Acid Dissociable	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Cyanide, Free	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Total Metals																
Aluminum (Al)	0.405	0.148	0.183	0.0362	0.0293	0.0375	0.0555	0.162	0.129	0.267	0.258	0.222	0.250	0.140	0.1000	0.0298
Antimony (Sb)	<0.00010	<0.00010	<0.00010	0.000240	0.000250	0.000210	<0.00010	0.000110	0.000140	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000200
Arsenic (As)	0.000260	0.000200	0.000210	0.000570	0.000520	0.000410	0.000790	0.000190	0.000250	0.000150	0.000140	0.000170	0.000150	0.000210	0.000170	0.000540
Barium (Ba)	0.0338	0.0217	0.0224	0.0296	0.0335	0.0372	0.141	0.0616	0.0548	0.0390	0.0397	0.0410	0.0374	0.0216	0.0218	0.0313
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	<0.010	<0.010	<0.010	0.0130	0.0160	0.0140	0.0190	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0120
Cadmium (Cd)	0.0000193	<0.0000050	0.0000063	<0.0000050	<0.0000050	<0.0000050	0.0000058	0.0000222	0.0000174	0.0000220	0.0000210	0.0000186	0.0000196	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	9.13	7.91	8.08	22.2	26.1	25.3	35.7	22.4	22.2	9.76	9.87	11.3	9.51	7.85	8.08	20.3
Chromium (Cr)	0.000220	0.000170	0.000160	0.000350	0.000300	0.000260	<0.00010	0.000210	0.000200	0.000180	0.000150	0.000140	0.000130	0.000410	0.000140	0.000310
Cobalt (Co)	0.000180	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000110	<0.00010	0.000120	0.000130	0.000110	0.000120	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00145	0.000910	0.00102	0.000680	0.000740	0.000860	0.000570	0.00196	0.00159	0.00110	0.00112	0.00115	0.00119	0.000860	0.000770	0.000910
Iron (Fe)	0.421	0.154	0.187	<0.030	<0.030	<0.030	<0.030	0.188	0.139	0.381	0.368	0.327	0.329	0.175	0.114	<0.030
Lead (Pb)	0.000656	0.0000610	0.000115	<0.000050	<0.000050	<0.000050	<0.000050	0.0000890	0.0000520	0.000478	0.000490	0.000411	0.000492	0.0000640	0.0000730	<0.000050
Lithium (Li)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00150	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	1.30	0.921	0.958	3.67	4.13	4.73	19.4	3.63	4.01	1.31	1.32	1.56	1.35	0.795	0.829	3.82

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS02	WQS04	WQS03	WQS06	WQS05	WQS08	WQS09	WQS09	WQS10	WQS11	WQS11	WQS12	WQS01	WQS02	WQS02	WQS04B
Date	**26-Sep-2017**	**26-Sep-2017**	**27-Sep-2017**	**26-Sep-2017**	**26-Sep-2017**	**26-Sep-2017**	**26-Sep-2017**	**26-Sep-2017**	**26-Sep-2017**	**27-Sep-2017**	**27-Sep-2017**	**26-Sep-2017**	**16-Oct-2017**	**18-Oct-2017**	**18-Oct-2017**	**18-Oct-2017**
Time	**10:13**	**11:34**	**11:10**	**14:16**	**12:20**	**12:45**	**13:21**	**-**	**14:48**	**10:03**	**-**	**15:35**	**10:20**	**12:35**	**-**	**13:30**
QAQC	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Duplicate**	**Regular**	**Regular**	**Duplicate**	**Regular**	**Regular**	**Regular**	**Duplicate**	**Regular**
ALS Sample ID	**L1998999-2**	**L1998999-4**	**L1998999-3**	**L1998999-6**	**L1998999-5**	**L1998999-7**	**L1998999-8**	**L1998999-15**	**L1998999-9**	**L1998999-10**	**L1998999-12**	**L1998999-11**	**L2008179-1**	**L2010562-5**	**L2010562-3**	**L2010562-6**
In Situ																
Temperature (°C)	7.30	8.90	7.00	9.20	8.90	7.70	8.10	8.10	9.10	12.10	12.10	12.70	1.70	2.40	2.40	2.80
pH	7.89	7.98	8.12	7.83	7.97	7.97	7.74	7.74	7.79	7.83	7.83	7.74	7.88	5.91	5.91	6.98
Conductivity (µS/cm)	93.8	105	130	102	102	36.9	44.0	44.0	45.3	36.6	36.6	40.2	79.6	84.2	84.2	92.6
Physical Tests																
Colour, True	11.7	13.1	41.9	7.80	9.50	29.2	23.0	22.9	25.4	6.10	5.90	8.80	12.3	25.3	14.3	22.6
Conductivity (µS/cm)	153	166	213	157	162	59.6	69.6	69.0	65.3	51.7	52.1	55.8	141	144	162	167
Hardness (as $CaCO_3$)	74.8	80.1	111	65.8	74.5	26.4	32.1	30.0	31.4	22.8	25.0	26.2	68.2	69.5	78.1	76.3
pH	8.12	8.16	8.22	7.87	7.99	7.70	7.72	7.73	7.75	7.70	7.68	7.70	8.09	8.08	7.85	8.14
Total Suspended Solids	<3.0	<3.0	<3.0	6.10	4.70	31.1	29.5	31.1	27.9	<3.0	<3.0	6.10	26.5	4.30	3.10	5.10
Total Dissolved Solids	88.0	109	146	102	106	67.0	72.0	69.0	66.0	39.0	37.0	43.0	71.0	95.0	105	103
Turbidity (NTU)	1.02	1.57	0.850	3.36	3.01	65.5	59.9	56.4	51.4	1.90	1.98	8.06	32.4	6.67	5.67	7.61
Acidity (as $CaCO_3$)	1.60	1.20	<1.0	1.80	1.80	1.80	1.80	1.80	1.70	1.70	1.70	1.70	1.10	1.70	1.50	1.40
Alkalinity, Total (as $CaCO_3$)	81.0	87.2	120	40.6	54.2	26.8	28.8	29.1	28.8	22.8	23.1	24.7	75.9	78.2	61.4	83.4
Anions																
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.0360	0.0360	0.0640	0.0360	0.0340	0.0270	0.0330	0.0340	0.0290	0.0250	0.0300	0.0250	0.0370	0.0300	0.0320	0.0330
Sulphate (SO_4)	3.35	3.83	1.33	35.2	25.6	4.50	6.90	6.91	5.65	4.09	4.10	4.41	3.26	2.69	23.3	3.85
Nutrients																
Total Nitrogen	0.0550	0.0600	0.212	0.0880	0.0830	0.0630	0.103	0.0610	0.0570	0.0650	0.0700	0.0480	0.0870	0.129	0.101	0.111
Total Kjeldahl Nitrogen	0.0550	0.0700	0.237	<0.050	0.0520	0.0520	0.0860	0.0930	0.0540	0.0840	0.0640	0.0510	0.0880	0.124	0.0620	0.111
Ammonia as N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0313	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	<0.0050	<0.0050	<0.0050	0.0520	0.0379	0.0135	0.0153	0.0148	0.0106	<0.0050	<0.0050	0.00610	<0.0050	<0.0050	0.0266	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Phosphorus (as P)	<0.0020	0.00220	0.00220	0.00470	0.00340	0.0654	0.0442	0.0281	0.0518	0.00430	0.00450	0.00970	0.0257	0.00520	0.00520	0.00670
Dissolved Orthophosphate (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00250	0.00200	0.00190	0.00280	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Carbon																
Total Organic Carbon	2.67	2.94	9.91	1.78	2.06	1.56	1.06	1.30	0.980	1.12	1.23	1.17	3.63	6.05	3.77	5.69
Dissolved Organic Carbon	2.76	2.51	9.19	1.68	1.91	0.950	0.770	0.890	0.800	0.880	0.990	0.930	3.22	5.51	3.37	4.99
Total Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide																
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Weak Acid Dissociable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Free	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals																
Aluminum (Al)	0.0403	0.0525	0.0515	0.161	0.113	2.31	2.70	2.57	2.10	0.0745	0.0814	0.247	1.24	0.270	0.231	0.307
Antimony (Sb)	0.000180	0.000170	<0.00010	<0.00010	0.000120	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000140	0.000160	0.000140	0.000140
Arsenic (As)	0.000460	<0.00050	0.000860	<0.00030	<0.00030	<0.00040	0.000340	<0.00040	<0.00040	<0.00020	<0.00020	<0.00020	0.000860	0.000530	0.000340	0.000500
Barium (Ba)	0.0345	0.0376	0.0991	0.0659	0.0573	0.0767	0.0763	0.0802	0.0719	0.0218	0.0225	0.0295	0.0616	0.0332	0.0535	0.0353
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.0140	0.0140	0.0170	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0130	0.0130	<0.010	0.0130
Cadmium (Cd)	<0.0000050	<0.0000050	0.0000061	0.0000156	0.0000094	0.0000899	0.0000802	0.0000867	0.0000800	<0.0000050	<0.0000050	0.0000150	0.0000115	<0.0000050	0.0000070	0.0000052
Calcium (Ca)	22.0	23.9	22.1	21.0	22.6	9.30	11.5	10.8	9.84	7.90	7.75	8.28	21.4	21.6	23.8	23.2
Chromium (Cr)	0.000520	0.000290	0.000200	0.000250	0.000250	0.00101	0.00105	0.00104	0.000900	<0.00010	0.000170	0.000180	0.00138	0.000580	0.000390	0.000580
Cobalt (Co)	<0.00010	<0.00010	<0.00010	0.000120	<0.00010	0.00108	0.00104	0.00107	0.000970	<0.00010	<0.00010	0.000130	0.000700	0.000150	0.000160	0.000230
Copper (Cu)	0.00109	0.00133	0.00136	0.00246	0.00161	0.00641	0.00622	0.00589	0.00556	0.000760	0.000800	0.00141	0.00310	0.00211	0.00181	0.00218
Iron (Fe)	<0.030	0.0520	0.0380	0.213	0.143	2.47	2.55	2.48	2.20	0.0800	0.0930	0.277	1.19	0.254	0.266	0.332
Lead (Pb)	<0.000050	0.000380	<0.000050	0.000104	0.000141	0.00297	0.00269	0.00270	0.00256	<0.000050	0.0000530	0.000413	0.000283	0.0000590	0.0000640	0.0000750
Lithium (Li)	<0.0010	<0.0010	0.00180	<0.0010	<0.0010	0.001000	0.00160	0.00110	<0.0010	<0.0010	<0.0010	<0.0010	0.00110	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	4.46	4.96	13.4	3.97	4.23	2.11	2.39	2.53	2.15	0.880	0.885	1.09	4.25	3.87	4.26	4.31

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS03	WQS06	WQS05	WQS05	WQS08	WQS09	WQS10	WQS11	WQS12	WQS01	WQS02	WQS02	WQS04B	WQS03	WQS06	WQS05
Date	**16-Oct-2017**	**18-Oct-2017**	**18-Oct-2017**	**18-Oct-2017**	**18-Oct-2017**	**18-Oct-2017**	**18-Oct-2017**	**16-Oct-2017**	**18-Oct-2017**	**28-Nov-2017**	**28-Nov-2017**	**28-Nov-2017**	**21-Nov-2017**	**28-Nov-2017**	**21-Nov-2017**	**21-Nov-2017**
Time	**14:00**	**15:25**	**13:45**	**-**	**14:15**	**14:50**	**16:50**	**10:53**	**17:15**	**9:45**	**-**	**11:00**	**11:30**	**-**	**13:30**	**10:50**
QAQC	**Regular**	**Regular**	**Regular**	**Duplicate**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Duplicate**	**Duplicate**	**Regular**	**Regular**	**Regular**	**Regular**
ALS Sample ID	**L2008179-2**	**L2010562-8**	**L2010562-9**	**L2010562-4**	**L2010562-10**	**L2010562-7**	**L2010562-11**	**L2008179-3**	**L2010562-12**	**L2029323-1**	**L2029323-4**	**L2029323-2**	**L2027227-1**	**L2029323-6**	**L2027227-3**	**L2027227-2**
In Situ																
Temperature (°C)	1.40	4.30	3.50	3.50	3.50	3.70	4.10	6.60	6.20	0.50	0.50	0.50	0.00	0.70	0.00	0.00
pH	8.22	7.51	7.28	7.28	7.37	7.39	7.53	8.44	7.62	7.57	7.57	7.57	7.09	7.81	7.56	6.66
Conductivity (µS/cm)	109	105	99.5	99.5	47.9	53.9	53.0	36.8	38.6	76.8	78.3	78.3	21.5	79.8	79.2	79.2
Physical Tests																
Colour, True	38.3	6.50	13.9	20.9	22.4	19.8	18.1	<5.0	6.70	15.8	20.7	21.0	26.6	59.9	21.3	23.0
Conductivity (µS/cm)	199	171	165	77.5	79.7	90.5	85.9	57.9	61.2	140	142	143	141	139	145	147
Hardness (as $CaCO_3$)	93.3	76.4	75.8	36.2	36.8	42.1	39.9	24.4	26.8	66.4	72.5	68.9	72.6	76.3	72.2	74.1
pH	8.23	7.88	8.04	7.77	7.84	7.87	7.88	7.68	7.73	8.16	8.14	8.16	8.02	8.08	7.84	7.93
Total Suspended Solids	4.30	7.90	6.90	3.50	<3.0	4.50	3.90	3.50	6.10	4.50	3.70	<3.0	<3.0	<3.0	7.30	<3.0
Total Dissolved Solids	101	109	108	55.0	60.0	66.0	66.0	23.0	44.0	90.0	98.0	88.0	101	111	114	106
Turbidity (NTU)	2.89	5.76	5.83	3.50	3.89	3.80	3.51	1.60	3.18	4.21	3.36	2.56	5.35	3.36	8.95	4.59
Acidity (as $CaCO_3$)	<1.0	2.10	1.80	1.40	1.90	2.00	1.90	2.00	1.80	1.000	<1.0	<1.0	1.40	<1.0	2.40	2.20
Alkalinity, Total (as $CaCO_3$)	113	48.4	62.8	37.2	37.6	40.6	40.1	25.8	28.3	78.3	79.6	79.8	79.0	80.0	53.7	60.8
Anions																
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.0660	0.0310	0.0320	0.0270	0.0270	0.0280	0.0290	0.0230	0.0200	0.0270	0.0280	0.0290	0.0380	0.0350	0.0390	0.0390
Sulphate (SO_4)	1.16	36.2	23.5	4.78	4.79	7.05	6.06	3.86	3.91	1.69	1.78	1.80	2.84	0.660	23.3	17.3
Nutrients																
Total Nitrogen	0.204	0.0990	0.0980	0.0990	0.0910	0.0900	0.0840	0.0480	0.0690	0.1000	0.120	0.119	0.149	0.249	0.156	0.157
Total Kjeldahl Nitrogen	0.218	<0.050	0.0650	0.0640	0.0770	0.0670	0.0960	<0.050	0.0550	0.0950	0.0950	0.101	0.150	0.241	0.132	0.134
Ammonia as N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	<0.0050	0.0464	0.0266	0.00820	0.00850	0.00770	<0.0050	<0.0050	0.00810	0.0195	0.0170	0.0174	0.0112	0.00780	0.0396	0.0309
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Phosphorus (as P)	0.00440	0.00590	0.00510	0.00560	0.00600	0.00540	0.00460	0.00280	0.00470	0.00620	0.00390	0.00350	0.00540	0.00420	0.00840	0.00450
Dissolved Orthophosphate (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001000	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Carbon																
Total Organic Carbon	8.72	2.37	3.74	3.86	4.06	3.73	3.86	1.11	2.01	4.55	5.51	5.78	6.48	13.1	5.54	5.83
Dissolved Organic Carbon	8.22	2.13	3.19	3.55	3.70	3.45	3.75	1.16	2.49	4.62	5.29	5.48	5.94	12.4	5.37	5.82
Total Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide																
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Weak Acid Dissociable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Free	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals																
Aluminum (Al)	0.147	0.263	0.234	0.140	0.146	0.153	0.108	0.0581	0.132	0.196	0.184	0.125	0.244	0.194	0.400	0.207
Antimony (Sb)	<0.00010	0.000110	0.000110	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	0.0001	0.000120	<0.00010	<0.00010	0.0001
Arsenic (As)	0.000900	0.000290	0.000340	0.000230	0.000230	0.000240	0.000220	0.000160	0.000210	0.000500	0.000480	0.000460	0.000470	0.000710	0.000350	0.000340
Barium (Ba)	0.122	0.0693	0.0541	0.0358	0.0365	0.0379	0.0370	0.0335	0.0242	0.0303	0.0305	0.0307	0.0316	0.0613	0.0558	0.0474
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.0130	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0140	0.0140	0.0150	0.0120	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000053	0.0000125	0.0000083	0.0000121	0.0000102	0.0000130	0.0000104	<0.0000050	0.0000052	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000084	0.0000080	0.0000061
Calcium (Ca)	19.9	24.2	23.8	11.9	11.9	13.4	13.1	7.97	9.29	21.7	21.9	22.9	23.8	15.8	22.6	23.1
Chromium (Cr)	0.000290	0.000320	0.000380	0.000190	0.000200	0.000220	0.000160	<0.00010	0.000160	0.000480	0.000510	0.000450	0.000600	0.000370	0.000510	0.000390
Cobalt (Co)	<0.00010	0.000170	0.000160	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000110	<0.00010	<0.00010	0.000150	<0.00010	0.000240	0.000130
Copper (Cu)	0.00151	0.00183	0.00180	0.00135	0.00137	0.00139	0.00134	0.000670	0.001000	0.00161	0.00203	0.00201	0.00290	0.00193	0.00301	0.00276
Iron (Fe)	0.137	0.308	0.269	0.317	0.324	0.308	0.261	0.0720	0.182	0.146	0.136	0.0960	0.263	0.151	0.488	0.255
Lead (Pb)	<0.000050	0.0000960	0.0000710	0.000144	0.000152	0.000142	0.000132	<0.000050	0.0000900	<0.000050	<0.000050	<0.000050	0.0000650	<0.000050	0.000148	0.0000720
Lithium (Li)	0.00160	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00140	<0.0010	<0.0010
Magnesium (Mg)	12.5	4.15	4.18	1.81	1.80	2.12	2.06	1.05	1.22	3.85	3.91	4.02	4.94	8.56	4.81	4.90

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS05	WQS08	WQS09	WQS10	WQS11-US	WQS11	WQS12	WQS01	WQS01	WQS02	WQS04B	WQS03	WQS06	WQS06	WQS05	WQS08
Date	21-Nov-2017	21-Nov-2017	21-Nov-2017	21-Nov-2017	21-Nov-2017	28-Nov-2017	21-Nov-2017	14-Dec-2017	14-Dec-2017	14-Dec-2017	12-Dec-2017	14-Dec-2017	12-Dec-2017	12-Dec-2017	12-Dec-2017	12-Dec-2017
Time	-	10:13	12:30	14:20	16:30	14:30	17:00	10:30	-	13:30	14:00	9:30	13:00	-	13:45	15:00
QAQC	Duplicate	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular
ALS Sample ID	L2027227-8	L2027227-4	L2027227-5	L2027227-6	L2027227-10	L2029323-3	L2027227-7	L2036162-1	L2036162-14	L2036162-2	L2036162-4	L2036162-3	L2036162-6	L2036162-13	L2036162-5	L2036162-7
In Situ																
Temperature (°C)	0.00	0.00	0.00	0.00	1.30	2.00	1.30	0.60	0.60	0.30	0.00	0.60	0.00	0.00	0.00	0.00
pH	6.66	6.07	7.51	7.56	7.41	7.92	7.47	8.20	8.20	8.17	7.49	8.68	7.48	7.48	7.55	7.57
Conductivity (µS/cm)	79.2	50.3	54.4	54.7	34.9	36.1	36.3	83.9	83.9	84.7	87.9	89.6	89.0	89.0	89.0	54.7
Physical Tests																
Colour, True	23.2	12.2	13.3	12.1	11.5	12.8	10.5	11.7	11.6	16.2	20.8	46.3	14.9	14.6	16.2	11.8
Conductivity (µS/cm)	149	88.5	97.3	99.1	59.4	62.8	63.3	156	157	160	161	182	167	168	167	105
Hardness (as $CaCO_3$)	74.4	40.1	46.4	47.3	27.5	27.6	29.4	76.0	89.9	77.2	81.5	90.0	75.8	95.5	78.7	48.6
pH	7.96	7.84	7.85	7.89	7.63	7.79	7.69	8.12	8.12	8.11	8.03	8.14	7.95	7.95	7.99	7.94
Total Suspended Solids	4.70	<3.0	<3.0	5.10	3.90	3.30	4.10	<3.0	<3.0	<3.0	19.9	<3.0	3.30	3.70	6.70	<3.0
Total Dissolved Solids	107	65.0	73.0	74.0	51.0	48.0	51.0	99.0	97.0	99.0	108	113	111	109	113	69.0
Turbidity (NTU)	4.98	1.84	2.21	3.42	6.01	5.44	5.84	1.58	1.75	1.65	17.8	2.19	6.74	6.75	8.39	1.52
Acidity (as $CaCO_3$)	2.10	2.00	2.00	2.00	2.10	1.80	2.00	1.60	1.60	1.30	2.10	1.50	2.10	2.00	2.00	1.80
Alkalinity, Total (as $CaCO_3$)	61.9	42.6	46.2	46.6	27.8	28.7	28.9	83.3	84.6	86.3	89.3	99.5	60.8	60.4	67.1	48.8
Anions																
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.0390	0.0300	0.0320	0.0320	0.0270	0.0210	0.0250	0.0340	0.0330	0.0360	0.0370	0.0470	0.0380	0.0390	0.0390	0.0350
Sulphate (SO_4)	17.3	4.90	6.27	6.28	4.21	4.11	4.48	2.00	2.02	2.18	3.39	0.990	25.4	25.5	19.8	5.35
Nutrients																
Total Nitrogen	0.159	0.0910	0.105	0.116	0.111	0.116	0.112	0.0990	0.0860	0.102	0.130	0.204	0.139	0.130	0.128	0.0910
Total Kjeldahl Nitrogen	0.123	0.0770	0.0870	0.0830	0.0760	0.0780	0.0730	0.0630	0.0770	0.0910	0.117	0.207	0.116	0.142	0.124	0.0660
Ammonia as N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00890	0.00510	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	0.0298	0.0399	0.0397	0.0397	0.0382	0.0356	0.0408	0.0228	0.0225	0.0170	0.0126	0.0131	0.0412	0.0414	0.0333	0.0398
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Phosphorus (as P)	0.00400	0.00230	0.00320	0.00700	0.00770	0.00830	0.00800	0.00480	0.00420	0.00330	0.0230	0.00410	0.00630	0.00730	0.0105	0.00340
Dissolved Orthophosphate (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00140	0.001000	0.001000	0.00130	0.001000	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Carbon																
Total Organic Carbon	6.13	2.91	3.42	3.29	3.49	3.88	3.18	3.46	4.49	4.64	5.93	10.4	4.55	4.66	4.92	2.37
Dissolved Organic Carbon	5.89	2.80	2.88	2.93	3.00	3.70	2.77	3.37	3.15	4.29	5.76	10.2	4.53	4.30	5.36	2.13
Total Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide																
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Weak Acid Dissociable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Free	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals																
Aluminum (Al)	0.273	0.0668	0.0918	0.174	0.289	0.275	0.257	0.0959	0.102	0.0877	1.28	0.156	0.345	0.373	0.570	0.0376
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000110	0.000120	<0.00020	<0.00020	<0.00020	0.000130	<0.00010	0.000110	<0.00010
Arsenic (As)	0.000340	0.000230	0.000250	0.000300	0.000300	0.000280	0.000290	0.000510	0.000520	0.000490	0.000880	0.000870	0.000320	0.000350	0.000440	0.000230
Barium (Ba)	0.0491	0.0337	0.0349	0.0369	0.0245	0.0220	0.0231	0.0370	0.0390	0.0394	0.0552	0.0931	0.0681	0.0727	0.0663	0.0413
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00020	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00010	<0.00010	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0160	0.0170	<0.020	<0.020	<0.020	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000063	0.0000099	0.0000100	0.0000092	0.0000092	0.0000078	0.0000088	<0.0000050	<0.0000050	<0.000010	0.0000110	0.0000100	0.0000104	0.0000080	0.0000085	0.0000119
Calcium (Ca)	23.5	14.7	16.4	16.6	9.85	9.06	10.4	25.4	27.7	28.3	32.7	24.2	27.1	28.7	27.9	17.1
Chromium (Cr)	0.000430	0.000170	0.000230	0.000280	0.000320	0.000330	0.000280	0.000430	0.000420	0.000450	0.00150	0.000330	0.000440	0.000470	0.000700	0.000160
Cobalt (Co)	0.000130	<0.00010	<0.00010	0.000110	0.000150	0.000140	0.000140	<0.00010	<0.00010	<0.00020	0.000680	<0.00020	0.000220	0.000240	0.000330	<0.00010
Copper (Cu)	0.00271	0.00103	0.00122	0.00142	0.00137	0.00131	0.00134	0.00137	0.00150	0.00200	0.00470	0.00200	0.00263	0.00287	0.00309	0.000960
Iron (Fe)	0.262	0.261	0.257	0.335	0.339	0.330	0.315	0.0790	0.0730	0.0740	1.21	0.134	0.404	0.426	0.606	0.246
Lead (Pb)	0.0000710	0.0000680	0.0000680	0.000103	0.000153	0.000125	0.000146	<0.000050	<0.000050	<0.00010	0.000410	<0.00010	0.000117	0.000154	0.000182	<0.000050
Lithium (Li)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020	<0.0020	0.00110	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	4.92	2.33	2.81	2.87	1.50	1.42	1.51	4.56	4.87	5.60	6.99	14.1	5.46	5.93	5.81	2.83

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS09	WQS10	WQS11-US	WQS11	WQS12	WQS01	WQS02	WQS02	WQS04B	WQS03	WQS06	WQS05	WQS05	WQS08	WQS09	WQS10
Date	12-Dec-2017	12-Dec-2017	12-Dec-2017	14-Dec-2017	12-Dec-2017	18-Jan-2018	17-Jan-2018	17-Jan-2018	18-Jan-2018	18-Jan-2018	18-Jan-2018	18-Jan-2018	18-Jan-2018	18-Jan-2018	18-Jan-2018	18-Jan-2018
Time	12:00	11:00	10:00	14:15	15:45	11:20	10:30	-	13:25	10:30	15:25	13:45	-	13:00	14:30	16:12
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular
ALS Sample ID	L2036162-8	L2036162-9	L2036162-11	L2036162-10	L2036162-12	L2047188-4	L2047188-1	L2047188-11	L2047188-6	L2047188-3	L2047188-9	L2047188-7	L2047188-12	L2047188-5	L2047188-8	L2047188-10
In Situ																
Temperature (°C)	0.00	0.20	0.60	1.80	1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
pH	7.48	7.68	7.68	7.99	7.52	8.72	8.36	8.36	8.04	8.72	8.43	8.60	8.60	8.36	8.10	8.02
Conductivity (µS/cm)	58.8	64.1	36.3	39.2	41.6	210	224	224	239	315	243	242	242	143	152	157
Physical Tests																
Colour, True	12.4	11.0	12.4	11.1	10.9	6.20	7.30	8.20	8.80	20.9	7.50	7.00	8.50	6.40	6.50	7.00
Conductivity (µS/cm)	114	117	69.4	68.7	76.1	168	176	177	191	250	191	195	194	114	122	125
Hardness (as $CaCO_3$)	52.7	54.7	35.3	31.5	38.5	82.6	86.6	86.2	94.4	130	92.6	91.6	92.5	52.7	57.0	58.3
pH	7.94	7.92	7.75	7.77	7.78	8.14	8.13	8.18	8.16	8.27	8.00	8.05	8.04	7.82	7.90	7.93
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.50	<3.0	<3.0	3.50	4.70	32.3	<3.0	<3.0
Total Dissolved Solids	79.0	75.0	56.0	53.0	51.0	115	102	121	115	148	118	119	122	72.0	82.0	91.0
Turbidity (NTU)	1.58	2.22	3.38	3.43	3.37	1.66	0.940	1.000	2.31	0.720	2.56	2.61	2.58	9.10	0.890	1.03
Acidity (as $CaCO_3$)	1.90	2.10	2.00	1.90	1.90	<1.0	1.000	<1.0	<1.0	<1.0	1.20	1.10	<1.0	1.80	1.40	1.30
Alkalinity, Total (as $CaCO_3$)	52.1	54.4	31.6	31.0	34.3	90.1	94.6	95.3	99.2	144	68.4	76.4	76.1	53.3	57.6	58.2
Anions																
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	0.730	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.0350	0.0370	0.0260	0.0260	0.0270	0.0340	0.0360	0.0360	0.0380	0.0590	0.0370	0.0370	0.0370	0.0330	0.0330	0.0330
Sulphate (SO_4)	6.77	6.76	4.26	4.34	4.71	2.41	2.75	2.74	4.89	1.65	31.3	23.4	23.3	5.53	6.89	6.94
Nutrients																
Total Nitrogen	0.0860	0.0970	0.113	0.0990	0.110	0.0710	0.0800	0.0760	0.0780	0.127	0.106	0.101	0.1000	0.0750	0.0750	0.0780
Total Kjeldahl Nitrogen	0.0620	<0.050	0.0990	0.0720	0.0800	0.0610	0.0630	0.0770	0.0840	0.130	0.0650	0.0610	0.0800	<0.050	0.0560	0.0500
Ammonia as N	<0.0050	0.00940	<0.0050	0.00620	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	0.0427	0.0459	0.0408	0.0352	0.0476	0.0466	0.0417	0.0415	0.0287	0.0362	0.0699	0.0561	0.0560	0.0672	0.0575	0.0563
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Phosphorus (as P)	0.00320	0.00370	0.00570	0.00510	0.00580	0.00410	0.00280	0.00260	0.00400	0.00270	0.00380	0.00450	0.00480	0.00420	0.00350	0.00360
Dissolved Orthophosphate (as P)	<0.0010	<0.0010	0.00120	0.00140	0.00140	0.00180	0.00130	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Carbon																
Total Organic Carbon	2.54	2.54	3.00	2.96	2.56	2.09	2.52	2.55	3.05	5.35	2.67	2.78	2.82	1.50	1.57	1.52
Dissolved Organic Carbon	2.61	2.47	2.97	2.78	2.73	2.23	2.63	2.47	3.11	5.63	2.50	2.75	2.58	1.50	1.80	1.50
Total Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide																
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Weak Acid Dissociable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Free	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals																
Aluminum (Al)	0.0567	0.112	0.171	0.123	0.160	0.0604	0.0374	0.0616	0.104	0.0448	0.124	0.131	0.139	0.152	0.0290	0.0474
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	0.000110	0.000130	0.000110	0.000160	<0.00010	<0.00010	0.000120	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.000240	0.000260	0.000280	0.000250	0.000320	0.000470	0.000370	0.000480	0.000320	0.000640	0.000150	0.000230	0.000230	0.000220	0.000180	0.000190
Barium (Ba)	0.0416	0.0441	0.0303	0.0246	0.0345	0.0353	0.0350	0.0433	0.0383	0.0956	0.0671	0.0567	0.0568	0.0416	0.0404	0.0408
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.020	0.0170	0.0170	0.0170	0.0150	0.0130	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000081	0.0000087	0.0000113	0.0000079	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000054	<0.0000050	0.0000057	0.0000061	0.0000069	0.0000051	<0.0000050
Calcium (Ca)	17.0	17.8	12.0	10.6	14.1	25.5	26.4	27.5	29.4	26.9	27.6	28.1	28.7	17.5	18.8	19.1
Chromium (Cr)	0.000260	0.000200	0.000220	0.000270	0.000240	0.000400	0.000410	0.000480	0.000400	0.000190	0.000180	0.000340	0.000320	0.000360	0.000190	0.000170
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000110	0.000110	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00111	0.00122	0.00124	0.00110	0.00130	0.000910	0.00110	0.00142	0.00151	0.000850	0.00139	0.00159	0.00152	0.000800	0.000840	0.000710
Iron (Fe)	0.240	0.268	0.235	0.185	0.241	0.0430	0.0390	0.0420	0.120	0.0310	0.131	0.159	0.158	0.287	0.177	0.153
Lead (Pb)	0.0000500	0.0000690	0.0000840	0.0000800	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.0000740	<0.000050	<0.000050
Lithium (Li)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	3.01	3.16	2.05	1.64	2.30	4.64	5.40	6.60	5.73	15.4	5.53	5.54	5.79	2.83	3.06	3.21

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS11B	WQS01	WQS01	WQS02	WQS04B	WQS04B	WQS03	WQS06	WQS05	WQS08	WQS09	WQS10	WQS01	WQS02	WQS04B	WQS03
Date	**17-Jan-2018**	**19-Feb-2018**	**19-Feb-2018**	**19-Feb-2018**	**20-Feb-2018**	**20-Feb-2018**	**19-Feb-2018**	**19-Feb-2018**	**20-Feb-2018**	**20-Feb-2018**	**20-Feb-2018**	**19-Feb-2018**	**20-Mar-2018**	**20-Mar-2018**	**20-Mar-2018**	**20-Mar-2018**
Time	**12:50**	**12:00**	**-**	**11:10**	**9:50**	**-**	**13:25**	**16:00**	**10:25**	**9:10**	**11:20**	**15:00**	**11:25**	**12:57**	**16:35**	**10:30**
QAQC	**Regular**	**Regular**	**Duplicate**	**Regular**	**Regular**	**Duplicate**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**
ALS Sample ID	**L2047188-2**	**L2059721-2**	**L2059721-6**	**L2059721-1**	**L2059721-8**	**L2059721-11**	**L2059721-3**	**L2059721-5**	**L2059721-9**	**L2059721-7**	**L2059721-10**	**L2059721-4**	**L2071214-2**	**L2071214-3**	**L2071214-7**	**L2071214-1**
In Situ																
Temperature (°C)	0.00	0.00	0.00	0.00	-0.10	-0.10	-0.10	0.00	-0.20	0.00	0.00	0.00	0.20	0.50	0.10	0.20
pH	8.40	8.41	8.41	8.91	8.19	8.19	8.17	7.70	8.06	8.28	7.85	7.86	8.01	8.11	7.96	8.63
Conductivity (µS/cm)	94.4	94.0	94.0	55.8	94.8	94.8	104	36.5	107	53.6	69.2	23.5	101	107	116	98.3
Physical Tests																
Colour, True	7.90	<5.0	<5.0	6.20	5.80	6.20	14.4	5.50	5.30	5.90	5.80	5.10	5.20	7.10	7.80	14.5
Conductivity (µS/cm)	75.5	175	175	186	208	204	280	213	211	125	131	135	202	202	217	321
Hardness (as $CaCO_3$)	33.6	88.2	89.0	94.5	102	106	142	97.7	99.3	57.2	62.0	63.8	108	119	123	174
pH	7.67	8.29	8.29	8.31	8.39	8.19	8.48	8.23	8.30	8.14	8.25	8.18	8.21	8.29	8.32	8.26
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	9.40	<3.0	<3.0	<3.0	<3.0	3.70	<3.0
Total Dissolved Solids	44.0	108	107	111	130	129	164	127	124	82.0	87.0	84.0	117	122	135	189
Turbidity (NTU)	1.95	0.910	0.860	0.380	0.910	0.900	0.470	1.56	1.20	5.08	0.900	0.750	0.560	0.390	5.15	0.370
Acidity (as $CaCO_3$)	1.50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.10	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as $CaCO_3$)	34.4	94.7	94.4	104	112	111	155	67.3	82.6	57.9	61.5	60.9	100.0	108	113	174
Anions																
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	0.510	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.0250	0.0360	0.0340	0.0380	0.0390	0.0410	0.0620	0.0330	0.0380	0.0340	0.0330	0.0320	0.0350	0.0410	0.0410	0.0630
Sulphate (SO_4)	4.32	2.60	2.60	3.03	5.72	5.92	1.95	32.2	25.1	5.69	6.93	6.87	2.90	3.35	7.71	2.18
Nutrients																
Total Nitrogen	0.0890	0.0900	0.123	0.0900	0.108	0.0950	0.142	0.133	0.121	0.135	0.0950	0.0920	0.0910	0.0740	0.0880	0.148
Total Kjeldahl Nitrogen	0.0790	<0.050	<0.050	<0.050	0.0540	<0.050	0.0860	<0.050	<0.050	0.0520	<0.050	<0.050	<0.050	0.0640	<0.050	0.0900
Ammonia as N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0107	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	0.0407	0.0551	0.0546	0.0472	0.0386	0.0390	0.0538	0.0837	0.0705	0.0617	0.0613	0.0602	0.0593	0.0319	0.0328	0.0603
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Phosphorus (as P)	0.00470	0.00360	0.00250	<0.0020	0.00280	0.00300	<0.0020	0.00280	0.00260	0.0102	0.00280	0.00230	0.00270	0.00250	0.00770	0.00340
Dissolved Orthophosphate (as P)	0.00120	0.00150	0.00170	0.00120	0.00120	0.001000	0.00110	<0.0010	<0.0010	0.00140	0.00130	0.00120	0.00130	<0.0010	<0.0010	<0.0010
Carbon																
Total Organic Carbon	2.33	1.82	1.78	2.21	3.07	2.50	4.91	2.28	2.30	1.61	1.36	1.38	1.59	1.98	2.52	4.37
Dissolved Organic Carbon	2.45	1.93	1.76	2.45	2.60	2.62	4.47	2.18	2.38	1.32	1.35	1.43	1.50	1.97	2.36	4.01
Total Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide																
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Weak Acid Dissociable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Free	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals																
Aluminum (Al)	0.0680	0.0469	0.0313	0.0223	0.0345	0.0364	0.0272	0.0549	0.137	0.135	0.0141	0.0216	0.0153	0.0192	0.231	0.0187
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000120	0.000130	0.000120	<0.00010
Arsenic (As)	0.000200	0.000440	0.000360	0.000380	0.000290	0.000320	0.000680	0.000130	0.000160	0.000240	0.000150	0.000170	0.000370	0.000330	0.000380	0.000540
Barium (Ba)	0.0254	0.0348	0.0332	0.0358	0.0368	0.0377	0.1000	0.0621	0.0573	0.0431	0.0423	0.0419	0.0396	0.0378	0.0433	0.108
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	<0.010	0.0190	0.0190	0.0200	0.0160	0.0160	0.0160	<0.010	<0.010	<0.010	<0.010	<0.010	0.0220	0.0220	0.0180	0.0210
Cadmium (Cd)	0.0000077	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000059	0.0000070	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000064
Calcium (Ca)	10.8	26.3	26.5	28.4	29.3	30.7	26.8	27.4	29.5	17.6	19.2	18.9	30.0	30.8	32.2	34.6
Chromium (Cr)	0.000140	0.000330	0.000340	0.000360	0.000690	0.000260	0.000170	0.0001	0.000130	0.000240	<0.00010	0.000140	0.000300	0.000340	0.000380	0.000110
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000110	<0.00010	<0.00010	<0.00010	<0.00010	0.000260	<0.00010
Copper (Cu)	0.000890	0.000820	0.000760	0.000930	0.00111	0.00113	0.000690	0.00107	0.00111	0.000820	<0.00050	0.000600	0.000750	0.000860	0.00150	0.000640
Iron (Fe)	0.115	0.0330	<0.030	<0.030	0.0450	0.0470	0.0300	0.0610	0.0530	0.405	0.136	0.157	<0.030	<0.030	0.246	<0.030
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000105	<0.000050	<0.000050	<0.000050	<0.000050	0.0000640	<0.000050
Lithium (Li)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00130	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00110	0.001000	0.00110	0.00190
Magnesium (Mg)	1.76	4.71	4.62	5.71	5.91	6.35	16.5	5.97	6.11	3.09	3.25	3.33	5.23	5.94	6.70	17.9

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS06	WQS05	WQS08	WQS08	WQS09	WQS10	WQS10	WQS12	WQS01	WQS02	WQS02	WQS04B	WQS03	WQS06	WQS05	WQS05
Date	**21-Mar-2018**	**20-Mar-2018**	**21-Mar-2018**	**21-Mar-2018**	**21-Mar-2018**	**20-Mar-2018**	**20-Mar-2018**	**20-Mar-2018**	**18-Apr-2018**	**18-Apr-2018**	**18-Apr-2018**	**17-Apr-2018**	**18-Apr-2018**	**17-Apr-2018**	**17-Apr-2018**	**17-Apr-2018**
Time	**9:48**	**16:35**	**7:50**	**-**	**8:50**	**15:35**	**-**	**14:37**	**10:05**	**9:22**	**-**	**10:23**	**10:53**	**11:50**	**10:47**	**-**
QAQC	**Regular**	**Regular**	**Regular**	**Duplicate**	**Regular**	**Regular**	**Duplicate**	**Regular**	**Regular**	**Regular**	**Duplicate**	**Regular**	**Regular**	**Regular**	**Regular**	**Duplicate**
ALS Sample ID	**L2071214-11**	**L2071214-6**	**L2071214-9**	**L2071214-12**	**L2071214-10**	**L2071214-5**	**L2071214-8**	**L2071214-4**	**L2082789-1**	**L2082789-2**	**L2082789-4**	**L2082790-2**	**L2082789-3**	**L2082790-4**	**L2082790-3**	**L2082790-10**
In Situ																
Temperature (°C)	0.20	0.30	0.00	0.00	0.00	0.10	0.10	0.80	0.20	0.50	0.50	0.10	0.20	0.20	0.30	0.30
pH	7.84	7.89	7.96	7.96	7.94	7.96	7.96	7.92	8.01	8.11	8.11	7.96	8.63	7.84	7.89	7.89
Conductivity (µS/cm)	118	117	63.4	63.4	69.2	69.5	69.5	51.7	101	107	107	116	98.3	118	117	117
Physical Tests																
Colour, True	<5.0	5.20	9.40	9.20	8.50	8.10	6.70	9.30	11.2	21.1	21.2	30.4	26.7	16.8	22.7	22.8
Conductivity (µS/cm)	228	217	128	120	137	132	131	93.1	182	182	181	172	247	214	201	241
Hardness (as $CaCO_3$)	120	115	65.9	67.5	72.3	72.3	72.1	48.1	82.9	83.8	82.0	97.6	111	119	113	110
pH	8.13	8.22	8.03	8.03	8.04	8.07	8.04	7.81	8.02	8.02	8.03	8.05	8.27	7.93	7.98	7.99
Total Suspended Solids	<3.0	3.90	<3.0	3.50	<3.0	<3.0	<3.0	<3.0	3.40	<3.0	<3.0	7.00	<3.0	5.80	7.80	8.60
Total Dissolved Solids	144	140	84.0	80.0	92.0	84.0	83.0	67.0	113	116	120	129	143	159	163	156
Turbidity (NTU)	1.13	3.31	6.11	4.86	5.05	1.77	1.76	1.51	4.74	1.67	1.50	8.25	0.840	7.32	10.5	9.35
Acidity (as $CaCO_3$)	1.10	<1.0	1.30	1.30	1.30	1.50	<1.0	1.80	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as $CaCO_3$)	78.6	87.4	57.6	58.1	62.5	62.5	61.8	41.2	98.1	96.5	96.6	102	138	87.2	92.0	91.3
Anions																
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.31	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.0390	0.0410	0.0350	0.0370	0.0350	0.0350	0.0360	0.0290	0.0340	0.0360	0.0360	0.0410	0.0600	0.0380	0.0390	0.0390
Sulphate (SO_4)	34.5	26.3	5.63	5.64	7.08	6.90	6.90	4.92	2.53	2.73	2.71	9.44	1.38	42.0	31.3	31.2
Nutrients																
Total Nitrogen	0.122	0.116	0.0910	0.0910	0.0970	0.0860	0.0840	0.112	0.140	0.241	0.192	0.231	0.278	0.199	0.209	0.211
Total Kjeldahl Nitrogen	<0.050	0.0660	<0.050	<0.050	<0.050	<0.050	<0.050	0.0620	0.0910	0.125	0.150	0.186	0.167	0.111	0.163	0.120
Ammonia as N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	0.0849	0.0646	0.0524	0.0527	0.0555	0.0506	0.0491	0.0460	0.0551	0.0591	0.0604	0.0576	0.0492	0.0754	0.0685	0.0685
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Phosphorus (as P)	0.00240	0.00480	0.00880	0.00740	0.00650	0.00750	0.00540	0.00660	0.00630	0.00430	0.00370	0.0155	0.00830	0.0112	0.0120	0.0133
Dissolved Orthophosphate (as P)	<0.0010	<0.0010	0.00130	0.001000	0.00120	<0.0010	<0.0010	0.00170	0.00120	<0.0010	<0.0010	0.00170	<0.0010	<0.0010	<0.0010	<0.0010
Carbon																
Total Organic Carbon	1.94	2.24	1.45	1.65	1.40	1.34	1.38	2.21	3.70	6.39	6.31	7.84	7.53	5.75	6.43	6.37
Dissolved Organic Carbon	1.98	2.16	1.62	1.61	1.51	1.25	1.58	2.28	3.94	6.28	6.40	7.56	7.08	5.63	6.39	6.24
Total Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide																
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Weak Acid Dissociable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Free	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals																
Aluminum (Al)	0.0314	0.128	0.0935	0.116	0.0850	0.0556	0.0557	0.0528	0.185	0.0818	0.0752	0.510	0.0432	0.309	0.449	0.721
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.000120	0.000230	0.000240	0.000250	0.000240	0.000180	0.000170	0.000200	0.000460	0.000410	0.000410	0.000620	0.000630	0.000340	0.000430	0.000430
Barium (Ba)	0.0725	0.0618	0.0412	0.0435	0.0417	0.0417	0.0419	0.0277	0.0399	0.0374	0.0361	0.0427	0.0924	0.0817	0.0703	0.0637
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0220	0.0210	0.0210	0.0170	0.0190	<0.010	<0.010	<0.010
Cadmium (Cd)	<0.0000050	<0.0000050	0.0000062	0.0000069	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000118	0.0000050	0.0000088	0.0000106	0.0000077
Calcium (Ca)	32.0	32.2	19.6	18.8	20.0	20.2	20.7	13.5	28.0	25.9	25.8	29.6	24.2	35.3	32.0	28.8
Chromium (Cr)	<0.00010	0.000200	0.000150	0.000180	0.000250	0.000150	0.000130	<0.00010	0.000460	0.000390	0.000420	0.000750	0.000210	0.000470	0.000890	0.000700
Cobalt (Co)	<0.00010	0.000120	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000110	<0.00010	<0.00010	0.00110	<0.00010	0.000230	0.000540	0.000510
Copper (Cu)	0.000980	0.00120	0.000740	0.000790	0.000690	0.000660	0.000630	0.000720	0.00154	0.00199	0.00196	0.00441	0.00106	0.00223	0.00306	0.00300
Iron (Fe)	0.0390	0.143	0.365	0.385	0.308	0.223	0.227	0.116	0.170	0.0760	0.0690	0.824	0.0390	0.407	0.598	0.629
Lead (Pb)	<0.000050	<0.000050	0.0000760	0.0000770	0.0000580	<0.000050	0.0000550	<0.000050	<0.000050	<0.000050	<0.000050	0.0000990	<0.000050	0.000126	0.000125	0.000137
Lithium (Li)	0.001000	0.00110	0.00110	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00120	0.00170	0.00110	0.00110	0.00150
Magnesium (Mg)	6.56	6.37	3.02	3.25	3.36	3.46	3.50	2.25	5.31	5.35	5.42	6.30	14.1	8.15	7.67	6.96

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS08	WQS09	WQS10	WQS12
Date	**17-Apr-2018**	**17-Apr-2018**	**17-Apr-2018**	**17-Apr-2018**
Time	**9:45**	**12:54**	**13:49**	**14:47**
QAQC	**Regular**	**Regular**	**Regular**	**Regular**
ALS Sample ID	**L2082790-1**	**L2082790-5**	**L2082790-6**	**L2082790-9**
In Situ				
Temperature (°C)	0.00	0.00	0.10	0.80
pH	7.96	7.94	7.96	7.92
Conductivity (µS/cm)	63.4	69.2	69.5	51.7
Physical Tests				
Colour, True	30.3	26.3	24.1	37.3
Conductivity (µS/cm)	101	114	119	112
Hardness (as $CaCO_3$)	54.4	61.6	62.8	56.8
pH	7.65	7.73	7.76	7.57
Total Suspended Solids	19.4	10.6	7.00	10.4
Total Dissolved Solids	81.0	90.0	94.0	97.0
Turbidity (NTU)	11.4	10.9	7.40	12.6
Acidity (as $CaCO_3$)	1.40	<1.0	<1.0	1.60
Alkalinity, Total (as $CaCO_3$)	57.6	63.6	65.5	56.6
Anions				
Bromide (Br)	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	3.92
Fluoride (F)	0.0340	0.0340	0.0350	0.0350
Sulphate (SO_4)	4.50	6.98	7.29	5.48
Nutrients				
Total Nitrogen	0.172	0.158	0.237	0.446
Total Kjeldahl Nitrogen	0.136	0.126	0.114	0.304
Ammonia as N	<0.0050	<0.0050	<0.0050	0.0177
Nitrate (as N)	0.0403	0.0422	0.126	0.152
Nitrite (as N)	<0.0010	<0.0010	<0.0010	0.00160
Total Phosphorus (as P)	0.0245	0.0172	0.0121	0.0272
Dissolved Orthophosphate (as P)	0.00150	0.001000	0.00130	0.00560
Carbon				
Total Organic Carbon	5.12	4.72	4.57	7.67
Dissolved Organic Carbon	4.60	4.59	4.45	7.78
Total Inorganic Carbon	-	-	-	-
Dissolved Inorganic Carbon	-	-	-	-
Cyanide				
Cyanide, Total	-	-	-	-
Cyanide, Weak Acid Dissociable	-	-	-	-
Cyanide, Free	-	-	-	-
Total Metals				
Aluminum (Al)	0.645	0.493	0.339	0.539
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.000620	0.000550	0.000420	0.000560
Barium (Ba)	0.0465	0.0483	0.0462	0.0397
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000158	0.0000114	0.0000092	0.0000141
Calcium (Ca)	16.6	19.0	20.0	16.3
Chromium (Cr)	0.000750	0.000550	0.000480	0.000650
Cobalt (Co)	0.000380	0.000310	0.000200	0.000300
Copper (Cu)	0.00202	0.00189	0.00166	0.00218
Iron (Fe)	1.11	0.938	0.726	0.752
Lead (Pb)	0.000247	0.000182	0.000136	0.000190
Lithium (Li)	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	3.39	3.72	4.01	4.05

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS01	WQS01	WQS02	WQS04	WQS03	WQS06	WQS05	WQS08	WQS09	WQS10	WQS10	WQS11	WQS12	WQS01	WQS02	WQS04	WQS03
Date	**4-May-2017**	**4-May-2017**	**4-May-2017**	**4-May-2017**	**4-May-2017**	**4-May-2017**	**4-May-2017**	**4-May-2017**	**4-May-2017**	**3-May-2017**	**3-May-2017**	**3-May-2017**	**3-May-2017**	**21-Jun-2017**	**20-Jun-2017**	**20-Jun-2017**	**21-Jun-2017**
Time	**10:25**	**-**	**9:53**	**14:50**	**11:05**	**13:15**	**1:23**	**13:55**	**0:52**	**16:00**	**-**	**15:30**	**14:50**	**8:50**	**13:00**	**14:30**	**9:20**
QAQC	**Regular**	**Duplicate**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Duplicate**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**
ALS Sample ID	**L1922134-9**	**L1922134-15**	**L1922134-7**	**L1922134-11**	**L1922134-8**	**L1922134-14**	**L1922134-13**	**L1922134-10**	**L1922134-12**	**L1922134-3**	**L1922134-4**	**L1922134-1**	**L1922134-2**	**L1947234-7**	**L1947234-1**	**L1947234-2**	**L1947234-8**
Total Metals *(cont'd)*																	
Manganese (Mn)	0.0581	0.0584	0.0435	0.0381	0.00946	0.0275	0.0397	0.0596	0.0640	0.0294	0.0294	0.0470	0.0502	0.0160	0.0407	0.0414	0.00195
Mercury (Hg)	0.0000084	0.0000088	0.0000083	0.0000078	0.0000112	0.0000054	0.0000077	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.0000880	0.0000820	0.0000940	0.0001	0.0000780	0.000308	0.000233	0.000297	0.000298	0.000299	0.000311	0.000255	0.000252	0.0000700	0.0000740	0.0000780	0.000109
Nickel (Ni)	0.00204	0.00198	0.00187	0.00162	0.000900	0.00109	0.00156	0.000510	0.000730	0.000700	<0.00050	0.00121	0.00134	<0.00050	0.00101	0.00113	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.513	0.400	0.573	0.516	0.387	0.406	0.544	0.334	0.368	0.326	0.336	0.687	0.674	0.198	0.262	0.292	0.276
Selenium (Se)	0.0000640	<0.000050	<0.000050	<0.000050	<0.000050	0.0000730	0.0000580	0.0000690	0.0000730	0.0000590	0.0000570	<0.000050	0.0000500	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)	7.82	6.12	8.51	7.80	5.26	3.73	6.82	4.51	4.71	4.13	4.01	5.20	4.97	3.79	4.46	4.80	3.45
Silver (Ag)	0.0000160	0.0000130	0.0000160	0.0000170	0.0000240	0.0000120	0.0000160	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	2.80	2.60	2.80	2.80	2.30	2.30	2.60	<2.0	<2.0	2.10	2.00	2.50	2.50	2.10	<2.0	2.00	3.70
Strontium (Sr)	0.0864	0.0834	0.0820	0.0802	0.0721	0.0627	0.0738	0.0553	0.0585	0.0588	0.0585	0.0601	0.0600	0.0709	0.0654	0.0684	0.107
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	0.0000120	<0.000010	0.0000120	0.0000120	<0.000010	<0.000010	0.0000130	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	0.0690	0.0400	0.0790	0.0660	0.0400	0.0130	0.0880	0.0200	0.0220	<0.015	0.0120	<0.028	<0.028	0.0110	0.0220	0.0260	<0.010
Uranium (U)	0.000145	0.000130	0.000137	0.000130	0.0000310	0.0000560	0.0001	0.0000560	0.0000630	0.0000510	0.0000490	0.0000620	0.0000660	0.0000410	0.0000390	0.0000410	0.0000260
Vanadium (V)	0.00488	0.00367	0.00504	0.00401	0.00232	0.00163	0.00355	0.00184	0.00218	0.00134	0.00137	0.00247	0.00267	0.00179	0.00270	0.00292	0.000760
Zinc (Zn)	0.00630	0.00610	0.00450	0.00370	0.00380	0.00400	0.00500	0.00300	0.00340	<0.0030	<0.0030	0.00380	0.00440	<0.0030	0.00310	0.00330	<0.0030
Dissolved Metals																	
Aluminum (Al)	0.140	0.144	0.147	0.144	0.254	0.0782	0.106	0.0777	0.0772	0.0757	0.0759	0.0828	0.0817	0.0126	0.0158	0.0166	0.0648
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000130	0.000160	0.000140	<0.00010
Arsenic (As)	0.000300	0.000300	0.000320	0.000350	0.000560	0.000260	0.000300	0.000180	0.000200	0.000210	0.000200	0.000290	0.000280	0.000530	0.000500	0.000450	0.000660
Barium (Ba)	0.0308	0.0306	0.0278	0.0266	0.0523	0.0571	0.0427	0.0238	0.0275	0.0275	0.0274	0.0200	0.0198	0.0214	0.0201	0.0207	0.0716
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.0140	0.0140	0.0130	0.0120	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000127	0.0000065	0.0000054	<0.0000050	<0.0000050	0.0000051	0.0000064	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000052
Calcium (Ca)	17.1	16.9	16.5	16.6	10.2	16.6	16.7	10.5	11.6	12.1	11.8	10.6	10.2	16.0	14.3	14.5	15.6
Chromium (Cr)	0.000310	0.000350	0.000300	0.000390	0.000330	0.000180	0.000260	0.000210	0.000180	0.000210	0.000200	0.000190	<0.00010	0.000240	0.000200	0.000190	0.000200
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00237	0.00236	0.00281	0.00333	0.00252	0.00343	0.00339	0.00137	0.00162	0.00153	0.00150	0.00127	0.00124	0.00105	0.00119	0.00132	0.00178
Iron (Fe)	0.134	0.132	0.144	0.139	0.190	0.111	0.125	0.237	0.220	0.256	0.251	0.152	0.147	<0.030	<0.030	<0.030	0.0410
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	0.0000650	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00130
Magnesium (Mg)	3.58	3.59	3.44	3.59	5.53	3.91	3.66	2.01	2.32	2.39	2.38	2.68	2.55	2.67	2.45	2.48	8.66
Manganese (Mn)	0.00327	0.00294	0.00248	0.00223	0.00612	0.00255	0.00253	0.00385	0.00345	0.00635	0.00572	0.00547	0.00340	0.00225	0.00625	0.00533	0.000680
Mercury (Hg)	0.0000055	0.0000058	0.0000074	0.0000069	0.0000099	<0.0000050	0.0000068	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.0000610	0.0000600	0.0000630	0.0000690	<0.000050	0.000289	0.000197	0.000265	0.000255	0.000276	0.000276	0.000237	0.000233	0.0000700	0.0000660	0.0000720	0.000107
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.219	0.224	0.226	0.248	0.263	0.334	0.292	0.251	0.256	0.270	0.270	0.565	0.517	0.149	0.191	0.167	0.286
Selenium (Se)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.0000530	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)	4.02	3.97	3.92	3.94	3.48	3.11	3.41	3.59	3.52	3.54	3.49	3.70	3.79	3.02	2.85	2.87	3.17
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	2.50	2.50	2.60	2.70	2.20	2.30	2.50	<2.0	<2.0	2.00	<2.0	2.40	2.30	2.30	2.10	2.00	3.90
Strontium (Sr)	0.0762	0.0732	0.0718	0.0719	0.0672	0.0573	0.0652	0.0491	0.0528	0.0536	0.0547	0.0579	0.0538	0.0733	0.0646	0.0662	0.105
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	0.000113	0.000110	0.0000990	0.0000940	0.0000180	0.0000480	0.0000660	0.0000400	0.0000430	0.0000430	0.0000440	0.0000520	0.0000450	0.0000390	0.0000320	0.0000330	0.0000240
Vanadium (V)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000920	0.000910	0.000850	<0.00050
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	0.00540	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS06	WQS05	WQS08	WQS09	WQS09	WQS10	WQS11	WQS12	WQS01	WQS02	WQS04	WQS03	WQS06	WQS05	WQS08	WQS08	WQS09
Date	20-Jun-2017	20-Jun-2017	20-Jun-2017	20-Jun-2017	20-Jun-2017	21-Jun-2017	21-Jun-2017	21-Jun-2017	26-Jul-2017	27-Jul-2017	27-Jul-2017	26-Jul-2017	27-Jul-2017	27-Jul-2017	27-Jul-2017	27-Jul-2017	27-Jul-2017
Time	17:00	15:40	15:15	16:10	-	12:10	11:30	11:00	12:15	10:09	11:13	12:59	13:45	12:42	13:12	-	14:38
QAQC	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Duplicate	Regular
ALS Sample ID	L1947234-6	L1947234-4	L1947234-3	L1947234-5	L1947234-13	L1947234-11	L1947234-10	L1947234-9	L1966679-1	L1966679-2	L1966679-4	L1966679-3	L1966679-6	L1966679-5	L1966679-8	L1966679-12	L1966679-9
Total Metals *(cont'd)*																	
Manganese (Mn)	0.0329	0.0353	0.0494	0.0480	0.0621	0.0242	0.0493	0.0527	0.00326	0.00336	0.00663	0.00241	0.0117	0.0103	0.0292	0.0305	0.0262
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000536	0.000320	0.000485	0.000490	0.000453	0.000586	0.000352	0.000335	0.0000780	0.0000830	0.0000980	0.000324	0.000625	0.000533	0.000985	0.000638	0.000620
Nickel (Ni)	0.00102	0.00101	0.000660	0.000710	0.000710	<0.00050	0.00113	0.00116	<0.00050	<0.00050	<0.00050	<0.00050	0.000510	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.418	0.366	0.390	0.396	0.394	0.283	0.441	0.447	0.134	0.172	0.182	0.409	0.372	0.326	0.300	0.294	0.310
Selenium (Se)	0.0000760	0.0000740	0.0000820	0.0000660	0.0000780	0.0000550	<0.000050	<0.000050	0.0000550	<0.000050	<0.000050	<0.000050	0.000115	0.0000790	0.000101	0.0000670	0.0000630
Silicon (Si)	3.28	3.91	3.87	3.88	3.94	3.19	4.03	4.15	2.95	2.97	3.06	3.16	2.91	2.86	2.25	2.25	2.44
Silver (Ag)	<0.000010	<0.000010	0.0000170	<0.000010	0.0000150	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000120	<0.000010	<0.000010
Sodium (Na)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.70	2.80	2.80	8.90	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)	0.0542	0.0615	0.0425	0.0471	0.0468	0.0459	0.0386	0.0384	0.0869	0.0896	0.0904	0.206	0.0654	0.0703	0.0443	0.0441	0.0491
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	0.0130	0.0200	0.0340	0.0340	0.0310	0.0180	0.0380	0.0410	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0220	0.0200	0.0190
Uranium (U)	0.0000720	0.0000560	0.0000560	0.0000570	0.0000560	0.0000430	0.0000410	0.0000430	0.0000470	0.0000540	0.0000540	0.000122	0.0000510	0.0000510	0.0000630	0.0000570	0.0000540
Vanadium (V)	0.00164	0.00227	0.00266	0.00261	0.00258	0.00156	0.00320	0.00318	0.00122	0.00113	0.000990	0.000580	0.000650	0.000620	0.00145	0.00135	0.00128
Zinc (Zn)	0.00680	0.00470	0.00730	0.00560	0.00550	0.00330	0.00500	0.00460	<0.0030	<0.0030	<0.0030	<0.0030	0.00420	0.00320	0.00380	0.00390	0.00330
Dissolved Metals																	
Aluminum (Al)	0.0406	0.0335	0.0272	0.0272	0.0248	0.0257	0.0213	0.0216	0.00620	0.00670	0.00900	0.0307	0.0306	0.0243	0.0436	0.0420	0.0403
Antimony (Sb)	<0.00010	0.000110	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000250	0.000240	0.000220	<0.00010	<0.00010	0.000110	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.000200	0.000310	0.000140	0.000170	0.000170	0.000150	0.000200	0.000220	0.000630	0.000490	0.000420	0.000750	0.000130	0.000200	<0.00010	<0.00010	0.0001
Barium (Ba)	0.0467	0.0345	0.0234	0.0259	0.0245	0.0260	0.0210	0.0206	0.0253	0.0259	0.0287	0.133	0.0480	0.0451	0.0288	0.0279	0.0321
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01000	0.0160	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000322	0.0000144	0.0000087	0.0000075	0.0000090	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000374	0.0000296	0.0000062	<0.0000050	0.0000073
Calcium (Ca)	16.0	15.8	7.74	9.21	8.82	9.26	8.51	8.32	18.0	17.7	19.8	29.9	19.6	19.4	8.46	7.97	10.4
Chromium (Cr)	<0.00010	0.000120	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000190	0.000200	0.000180	<0.00010	<0.00010	0.000150	<0.00010	<0.00010	<0.00010
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00322	0.00249	0.00110	0.00135	0.00122	0.00103	0.000950	0.000940	0.000500	0.000510	0.000580	0.000620	0.00180	0.00166	<0.00050	<0.00050	0.000540
Iron (Fe)	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.0330	0.0330	<0.030
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.0000610	0.0000550	<0.000050
Lithium (Li)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00190	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	2.56	2.59	1.14	1.40	1.34	1.40	1.20	1.17	3.07	3.16	3.51	16.5	3.01	3.17	1.09	1.04	1.48
Manganese (Mn)	0.00764	0.00649	0.00573	0.00550	0.00336	0.00427	0.00645	0.00553	0.000270	0.000460	0.00112	0.000330	0.00470	0.00419	0.00181	0.000740	0.00132
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000542	0.000312	0.000486	0.000473	0.000431	0.000454	0.000331	0.000331	0.0000730	0.0000800	0.0001	0.000346	0.000589	0.000508	0.000688	0.000658	0.000630
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.333	0.256	0.194	0.212	0.205	0.205	0.312	0.301	0.125	0.127	0.167	0.450	0.347	0.319	0.226	0.214	0.242
Selenium (Se)	0.0000910	0.0000590	0.0000570	0.0000590	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000102	0.0000660	<0.000050	<0.000050	0.0000580
Silicon (Si)	2.31	2.51	2.01	2.09	1.90	2.22	2.05	2.03	2.60	2.66	2.84	3.06	2.40	2.52	1.51	1.44	1.69
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.70	2.70	2.80	9.40	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)	0.0531	0.0618	0.0396	0.0430	0.0405	0.0448	0.0369	0.0364	0.0877	0.0851	0.0922	0.213	0.0654	0.0709	0.0430	0.0415	0.0483
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	0.0000570	0.0000510	0.0000270	0.0000310	0.0000310	0.0000290	0.0000200	0.0000190	0.0000460	0.0000450	0.0000550	0.000119	0.0000480	0.0000500	0.0000250	0.0000220	0.0000320
Vanadium (V)	<0.00050	0.000510	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00108	0.000880	0.000770	0.000510	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS10	WQS11	WQS12	WQS01	WQS02	WQS04	WQS03	WQS06	WQS05	WQS08	WQS08	WQS09	WQS10	WQS11	WQS12	WQS01
Date	27-Jul-2017	27-Jul-2017	27-Jul-2017	17-Aug-2017	16-Aug-2017	16-Aug-2017	17-Aug-2017	16-Aug-2017	16-Aug-2017	16-Aug-2017	16-Aug-2017	16-Aug-2017	17-Aug-2017	17-Aug-2017	17-Aug-2017	27-Sep-2017
Time	15:11	-	15:57	9:15	12:00	13:29	8:44	16:06	14:54	14:18	-	15:24	12:15	10:00	11:48	10:40
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	L1966679-10	L1966679-15	L1966679-11	L1977457-1	L1977457-2	L1977457-4	L1977457-3	L1977457-6	L1977457-5	L1977457-7	L1977457-12	L1977457-8	L1977457-9	L1977457-10	L1977457-11	L1998999-1
Total Metals *(cont'd)*																
Manganese (Mn)	0.0214	0.0113	0.0116	0.00140	0.00229	0.00440	0.000970	0.00867	0.00790	0.0239	0.0243	0.0208	0.0170	0.00934	0.00755	0.00122
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000616	0.000372	0.000407	0.000111	0.000155	0.000127	0.000423	0.000563	0.000421	0.000572	0.000570	0.000559	0.000508	0.000417	0.000402	0.000189
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.254	0.269	0.265	0.149	0.191	0.250	0.455	0.433	0.392	0.284	0.287	0.295	0.272	0.282	0.272	0.175
Selenium (Se)	<0.000050	<0.000050	<0.000050	0.0000670	<0.000050	<0.000050	<0.000050	0.0000840	0.0000760	0.000101	0.0000820	0.0000800	0.0000880	<0.000050	<0.000050	0.0000520
Silicon (Si)	2.10	1.82	1.92	2.90	3.03	3.44	3.16	2.97	3.13	2.17	2.17	2.19	2.00	1.81	1.73	3.19
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	<2.0	<2.0	<2.0	3.10	3.20	3.60	10.9	<2.0	2.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.40
Strontium (Sr)	0.0453	0.0333	0.0345	0.110	0.126	0.120	0.258	0.0763	0.0855	0.0506	0.0526	0.0549	0.0475	0.0328	0.0332	0.104
Sulphur (S)	-	-	-	0.830	1.05	1.37	0.790	13.9	10.7	1.60	1.67	2.77	1.98	1.29	1.28	0.980
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	0.0130	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01000	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	0.0000440	0.0000240	0.0000250	0.0000680	0.0000920	0.0000980	0.000175	0.0000330	0.0000500	0.0000450	0.0000460	0.0000450	0.0000370	0.0000230	0.0000230	0.0000870
Vanadium (V)	0.00101	0.000560	0.000630	0.00107	0.000990	0.000900	0.000580	0.000520	0.000620	0.000770	0.000740	0.000690	0.000710	0.000580	<0.00050	0.00105
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	0.00370	<0.0030	<0.0030	0.00610	<0.0030	0.00360	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																
Aluminum (Al)	0.0423	0.0136	0.0161	0.00470	0.00550	0.00610	0.0234	0.0112	0.0115	0.0304	0.0303	0.0321	0.0399	0.0106	0.0120	0.00750
Antimony (Sb)	<0.00010	<0.00010	<0.00010	0.000240	0.000200	0.000180	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000180
Arsenic (As)	<0.00010	0.000160	0.000110	0.000590	0.000420	0.000420	0.000850	0.000110	0.000180	<0.00010	<0.00010	0.000110	0.0001	0.000140	0.000130	0.000520
Barium (Ba)	0.0297	0.0203	0.0211	0.0305	0.0330	0.0401	0.145	0.0646	0.0589	0.0362	0.0342	0.0383	0.0323	0.0204	0.0212	0.0318
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	<0.010	<0.010	<0.010	0.0130	0.0140	0.0140	0.0190	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0110
Cadmium (Cd)	0.0000060	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000215	0.0000135	0.0000079	0.0000074	0.0000085	0.0000080	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	9.05	7.71	8.01	22.4	24.0	26.9	36.8	24.2	25.1	10.4	9.66	11.9	9.87	7.91	8.15	20.3
Chromium (Cr)	<0.00010	<0.00010	<0.00010	0.000260	0.000220	0.000200	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000210
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	<0.00050	<0.00050	<0.00050	0.000900	0.00133	0.000670	0.000500	0.00108	0.000980	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000860
Iron (Fe)	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.0440	0.0420	0.0400	0.0370	<0.030	<0.030	<0.030
Lead (Pb)	0.0000500	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.0000510	<0.000050	<0.000050	0.0000520	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00160	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	1.26	0.886	0.936	3.84	4.30	5.07	19.9	3.89	4.28	1.36	1.26	1.64	1.34	0.823	0.872	3.87
Manganese (Mn)	0.00135	0.000620	0.000630	<0.00010	0.000160	0.000910	0.000220	0.00262	0.00262	0.0108	0.0103	0.00863	0.00413	0.000460	0.000340	0.000410
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000600	0.000360	0.000398	0.0000660	0.000104	0.000135	0.000362	0.000561	0.000454	0.000612	0.000601	0.000594	0.000578	0.000418	0.000442	<0.000050
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.229	0.258	0.268	0.153	0.173	0.272	0.477	0.467	0.424	0.269	0.246	0.287	0.248	0.270	0.272	0.185
Selenium (Se)	0.0000520	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.0000770	0.0000530	0.0000840	0.0000920	<0.000050	0.0000780	<0.000050	<0.000050	<0.000050
Silicon (Si)	1.54	1.58	1.60	2.87	3.07	3.26	3.18	2.67	2.85	1.75	1.64	1.83	1.54	1.47	1.49	3.20
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	<2.0	<2.0	<2.0	3.20	3.40	3.80	11.3	2.10	2.60	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.50
Strontium (Sr)	0.0444	0.0322	0.0332	0.110	0.114	0.117	0.257	0.0788	0.0900	0.0512	0.0489	0.0550	0.0472	0.0313	0.0331	0.0975
Sulphur (S)	-	-	-	0.780	0.780	1.09	0.760	12.3	9.56	1.62	1.20	2.22	1.79	1.05	1.20	0.990
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	0.0000250	0.0000170	0.0000180	0.0000670	0.0000870	0.0000940	0.000171	0.0000330	0.0000460	0.0000340	0.0000310	0.0000360	0.0000250	0.0000150	0.0000160	0.0000720
Vanadium (V)	<0.00050	<0.00050	<0.00050	0.00101	0.000850	0.000820	0.000510	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000990
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS02	WQS04	WQS03	WQS06	WQS05	WQS08	WQS09	WQS09	WQS10	WQS11	WQS11	WQS12	WQS01	WQS02	WQS02	WQS04B
Date	**26-Sep-2017**	**26-Sep-2017**	**27-Sep-2017**	**26-Sep-2017**	**26-Sep-2017**	**26-Sep-2017**	**26-Sep-2017**	**26-Sep-2017**	**26-Sep-2017**	**27-Sep-2017**	**27-Sep-2017**	**26-Sep-2017**	**16-Oct-2017**	**18-Oct-2017**	**18-Oct-2017**	**18-Oct-2017**
Time	**10:13**	**11:34**	**11:10**	**14:16**	**12:20**	**12:45**	**13:21**	**-**	**14:48**	**10:03**	**-**	**15:35**	**10:20**	**12:35**	**-**	**13:30**
QAQC	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Duplicate**	**Regular**	**Regular**	**Duplicate**	**Regular**	**Regular**	**Regular**	**Duplicate**	**Regular**
ALS Sample ID	**L1998999-2**	**L1998999-4**	**L1998999-3**	**L1998999-6**	**L1998999-5**	**L1998999-7**	**L1998999-8**	**L1998999-15**	**L1998999-9**	**L1998999-10**	**L1998999-12**	**L1998999-11**	**L2008179-1**	**L2010562-5**	**L2010562-3**	**L2010562-6**
Total Metals *(cont'd)*																
Manganese (Mn)	0.00210	0.00550	0.000970	0.00822	0.00678	0.0949	0.0932	0.0917	0.0821	0.00484	0.00558	0.0145	0.0363	0.00770	0.0112	0.0144
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000025	<0.000025	<0.000025	<0.000025	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000210	<0.00030	<0.00040	0.000554	<0.00050	0.000727	0.000716	0.000750	0.000733	<0.00050	<0.00050	<0.00050	0.000253	0.000107	0.000305	0.000127
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000890	0.000990	0.000950	0.000830	<0.00050	<0.00050	<0.00050	0.00144	<0.00050	<0.00050	0.000530
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.199	0.256	0.367	0.420	0.366	0.743	0.816	0.840	0.705	0.268	0.276	0.319	0.369	0.248	0.410	0.302
Selenium (Se)	<0.000050	<0.000050	0.0000700	0.000101	0.0000770	0.0000910	0.000108	0.0000950	0.0000820	<0.000050	<0.000050	<0.000050	0.0000580	<0.000050	0.0000580	<0.000050
Silicon (Si)	3.39	3.42	3.42	2.90	3.03	5.44	6.37	6.49	5.17	1.28	1.30	1.83	5.56	3.93	3.47	3.94
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000190	0.000111	0.0000200	0.0000220	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	3.70	3.80	6.80	2.30	2.70	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.60	3.40	3.00	3.50
Strontium (Sr)	0.110	0.115	0.162	0.0768	0.0886	0.0528	0.0586	0.0571	0.0538	0.0334	0.0323	0.0365	0.104	0.103	0.0947	0.109
Sulphur (S)	1.01	1.13	<0.50	11.6	8.56	1.30	2.33	2.12	1.82	1.24	1.18	1.45	1.04	1.06	8.48	1.36
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	0.000110	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	0.0750	0.0940	0.0840	0.0660	<0.010	<0.010	<0.010	0.0300	<0.010	<0.010	<0.010
Uranium (U)	0.0000980	0.000101	0.0000570	0.0000390	0.0000610	0.000106	0.0000980	0.000102	0.0000920	0.0000230	0.0000230	0.0000320	0.000123	0.000115	0.0000780	0.000109
Vanadium (V)	0.000990	0.000860	0.000590	0.000530	0.000600	0.00437	0.00474	0.00460	0.00398	<0.00050	<0.00050	0.000650	0.00327	0.00133	0.000860	0.00128
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0127	0.0141	0.0119	0.0113	<0.0030	<0.0030	<0.0030	0.00670	<0.0030	<0.0030	<0.0030
Dissolved Metals																
Aluminum (Al)	0.0116	0.00980	0.0415	0.0102	0.00880	0.0373	0.0160	0.0166	0.0395	0.0168	0.0180	0.0190	0.0105	0.0250	0.0130	0.0225
Antimony (Sb)	0.000160	0.000150	<0.00010	<0.00010	0.000110	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.000430	0.000400	0.000820	0.000130	0.000170	<0.00010	<0.00010	<0.00010	<0.00010	0.000110	0.000120	0.0001	0.000440	0.000360	0.000210	0.000330
Barium (Ba)	0.0347	0.0383	0.1000	0.0616	0.0510	0.0296	0.0310	0.0325	0.0310	0.0211	0.0209	0.0234	0.0443	0.0309	0.0513	0.0331
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.0130	0.0130	0.0160	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0120	0.0130	<0.010	0.0120
Cadmium (Cd)	<0.0000050	<0.0000050	0.0000073	0.0000121	0.0000062	0.0000099	0.0000079	0.0000078	0.0000082	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000060	<0.0000050
Calcium (Ca)	22.8	23.8	22.5	20.3	23.3	8.67	10.6	9.63	10.4	7.58	8.45	8.80	21.0	21.7	24.5	23.5
Chromium (Cr)	0.000250	0.000230	0.000150	<0.00010	<0.00010	<0.00010	0.000140	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000220	0.000290	0.000210	0.000240
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00102	0.00112	0.00135	0.00150	0.00122	0.000760	0.000700	0.000720	0.000770	0.000580	0.000600	0.000600	0.00129	0.00146	0.00124	0.00153
Iron (Fe)	<0.030	<0.030	<0.030	<0.030	<0.030	0.0370	<0.030	<0.030	0.0350	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.0000630	<0.000050	<0.000050	0.0000740	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.0010	<0.0010	0.00190	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	4.36	5.01	13.4	3.67	3.96	1.16	1.35	1.46	1.35	0.939	0.946	1.04	3.85	3.73	4.10	4.31
Manganese (Mn)	0.000990	0.00328	0.000620	0.00260	0.00272	0.00990	0.00785	0.00796	0.00735	0.00189	0.00191	0.00315	0.00450	0.00119	0.00376	0.00448
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	<0.000050	0.0000610	0.000131	0.000430	0.000323	0.000572	0.000659	0.000534	0.000617	0.000305	0.000350	0.000374	0.000101	0.0000930	0.000288	0.000112
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.203	0.276	0.386	0.420	0.356	0.354	0.321	0.351	0.351	0.297	0.285	0.317	0.171	0.201	0.357	0.244
Selenium (Se)	<0.000050	<0.000050	<0.000050	0.000116	0.0000510	0.0000700	0.0000780	<0.000050	0.0000960	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.0000590	<0.000050
Silicon (Si)	3.54	3.62	3.48	2.72	2.98	1.85	1.81	1.88	1.94	1.21	1.24	1.48	3.34	3.53	2.95	3.41
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	3.60	3.90	6.80	2.10	2.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.50	3.30	2.90	3.40
Strontium (Sr)	0.108	0.110	0.160	0.0701	0.0879	0.0431	0.0510	0.0446	0.0499	0.0298	0.0331	0.0363	0.0979	0.0994	0.0906	0.108
Sulphur (S)	1.18	1.38	<0.50	11.5	8.50	1.59	2.09	1.92	1.53	1.07	1.11	1.29	0.930	0.870	7.64	1.26
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	0.0000910	0.0000910	0.0000530	0.0000340	0.0000520	0.0000310	0.0000360	0.0000310	0.0000390	0.0000180	0.0000220	0.0000220	0.000104	0.000103	0.0000680	0.000109
Vanadium (V)	0.000870	0.000740	0.000500	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000820	0.000760	<0.00050	0.000590
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS03	WQS06	WQS05	WQS05	WQS08	WQS09	WQS10	WQS11	WQS12	WQS01	WQS02	WQS02	WQS04B	WQS03	WQS06	WQS05
Date	16-Oct-2017	18-Oct-2017	18-Oct-2017	18-Oct-2017	18-Oct-2017	18-Oct-2017	18-Oct-2017	16-Oct-2017	18-Oct-2017	28-Nov-2017	28-Nov-2017	28-Nov-2017	21-Nov-2017	28-Nov-2017	21-Nov-2017	21-Nov-2017
Time	14:00	15:25	13:45	-	14:15	14:50	16:50	10:53	17:15	9:45	-	11:00	11:30	-	13:30	10:50
QAQC	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Regular	Regular	Duplicate	Duplicate	Regular	Regular	Regular	Regular
ALS Sample ID	L2008179-2	L2010562-8	L2010562-9	L2010562-4	L2010562-10	L2010562-7	L2010562-11	L2008179-3	L2010562-12	L2029323-1	L2029323-4	L2029323-2	L2027227-1	L2029323-6	L2027227-3	L2027227-2
Total Metals *(cont'd)*																
Manganese (Mn)	0.00262	0.0120	0.0117	0.0203	0.0209	0.0185	0.0154	0.00604	0.0117	0.00560	0.00674	0.00423	0.00841	0.00273	0.0146	0.00770
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000300	0.000408	0.000304	0.000542	0.000542	0.000540	0.000519	0.000460	0.000390	0.000109	0.000102	0.0000990	0.000117	0.000142	0.000429	0.000332
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000500	<0.00050	0.000850	0.000560
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.324	0.442	0.371	0.360	0.336	0.362	0.335	0.284	0.314	0.176	0.182	0.183	0.242	0.253	0.450	0.366
Selenium (Se)	<0.000050	0.0000760	0.0000680	0.0000820	0.0000830	0.0000820	0.0000680	<0.000050	<0.000050	0.0000940	0.0000730	<0.000050	0.0000620	<0.000050	0.000127	0.0000930
Silicon (Si)	3.38	3.11	3.41	3.10	3.27	3.19	3.13	1.52	2.23	3.77	3.76	3.72	4.06	3.30	3.38	3.33
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	6.40	2.50	2.90	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.00	2.90	3.00	3.30	3.70	2.60	2.80
Strontium (Sr)	0.144	0.0866	0.0947	0.0607	0.0632	0.0660	0.0656	0.0338	0.0411	0.102	0.0963	0.0986	0.0989	0.103	0.0769	0.0843
Sulphur (S)	0.510	12.8	8.16	1.72	1.73	2.41	2.20	1.25	1.38	<0.50	0.530	0.570	1.04	<0.50	7.80	5.70
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	0.0000550	0.0000490	0.0000740	0.0000540	0.0000540	0.0000540	0.0000540	0.0000230	0.0000360	0.000115	0.000113	0.000114	0.0000990	0.0000360	0.0000590	0.0000730
Vanadium (V)	0.000750	0.000750	0.000860	0.000740	0.000690	0.000700	0.000610	<0.00050	0.000530	0.00115	0.00102	0.000930	0.00110	0.000700	0.00110	0.000820
Zinc (Zn)	0.00330	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.00340	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.00320	<0.0030	<0.0030
Dissolved Metals																
Aluminum (Al)	0.0291	0.00610	0.0127	0.0234	0.0239	0.0210	0.0196	0.00300	0.00690	0.0241	0.0291	0.0284	0.0342	0.112	0.0256	0.0284
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.000120	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.000770	0.000140	0.000200	0.000160	0.000160	0.000140	0.000150	0.000110	0.000130	0.000420	0.000390	0.000380	0.000380	0.000620	0.000210	0.000250
Barium (Ba)	0.119	0.0651	0.0501	0.0341	0.0343	0.0370	0.0353	0.0320	0.0218	0.0311	0.0328	0.0309	0.0295	0.0685	0.0531	0.0465
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.0110	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0120	0.0120	0.0120	0.0110	<0.010	<0.010	<0.010
Cadmium (Cd)	<0.0000050	0.0000081	0.0000060	0.0000066	0.0000063	0.0000062	0.0000054	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	17.4	23.8	23.5	11.6	11.7	13.5	12.7	8.13	8.80	20.5	22.0	21.0	21.3	16.4	21.2	22.3
Chromium (Cr)	0.000150	<0.00010	0.000120	<0.00010	<0.00010	0.0001	0.0001	<0.00010	<0.00010	0.000220	0.000230	0.000290	0.000310	0.000250	0.000110	0.000180
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00121	0.00107	0.00128	0.000960	0.000960	0.000980	0.00102	<0.00050	0.000520	0.00110	0.00160	0.00154	0.00246	0.00167	0.00238	0.00232
Iron (Fe)	0.0310	<0.030	<0.030	0.112	0.122	0.101	0.0930	<0.030	<0.030	<0.030	<0.030	<0.030	0.0400	0.0910	0.0340	0.0370
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	0.00140	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00120	<0.0010	<0.0010
Magnesium (Mg)	12.1	4.13	4.18	1.75	1.82	2.03	1.97	1.01	1.17	3.67	4.29	4.01	4.74	8.57	4.69	4.49
Manganese (Mn)	0.000660	0.00402	0.00366	0.00958	0.00998	0.00893	0.00661	0.000180	0.000290	0.000450	0.000680	0.000700	0.000930	0.00119	0.00337	0.00237
Mercury (Hg)	<0.0000050	<0.00010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000082	0.0000069	0.0000063	<0.0000050	0.0000071	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000157	0.000427	0.000288	0.000517	0.000518	0.000530	0.000523	0.000368	0.000362	0.0000950	0.000101	0.000103	0.000130	0.000112	0.000475	0.000369
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.294	0.398	0.322	0.336	0.319	0.332	0.317	0.266	0.288	0.148	0.185	0.173	0.234	0.267	0.444	0.373
Selenium (Se)	<0.000050	0.0000660	<0.000050	0.0000700	0.0000950	0.0000760	0.0000780	<0.000050	<0.000050	0.0000530	0.0000680	0.0000990	0.0000690	0.0000530	0.000123	0.0000930
Silicon (Si)	3.04	2.71	2.99	2.92	2.93	2.88	2.93	1.45	1.93	3.50	3.63	3.51	3.72	3.31	2.83	3.03
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	6.10	2.50	2.90	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.20	3.50	3.30	3.30	4.30	2.70	2.90
Strontium (Sr)	0.124	0.0851	0.0947	0.0583	0.0604	0.0629	0.0638	0.0342	0.0391	0.102	0.102	0.102	0.104	0.111	0.0837	0.0918
Sulphur (S)	<0.50	12.6	8.04	1.56	1.60	2.31	2.02	1.29	1.29	<0.50	<0.50	0.580	1.15	<0.50	7.60	5.48
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	0.0000490	0.0000480	0.0000760	0.0000410	0.0000430	0.0000460	0.0000480	0.0000180	0.0000220	0.000108	0.000113	0.000111	0.000105	0.0000350	0.0000620	0.0000740
Vanadium (V)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000720	0.000730	0.000740	0.000640	0.000560	<0.00050	<0.00050
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS05	WQS08	WQS09	WQS10	WQS11-US	WQS11	WQS12	WQS01	WQS01	WQS02	WQS04B	WQS03	WQS06	WQS06	WQS05	WQS08
Date	21-Nov-2017	21-Nov-2017	21-Nov-2017	21-Nov-2017	21-Nov-2017	28-Nov-2017	21-Nov-2017	14-Dec-2017	14-Dec-2017	14-Dec-2017	12-Dec-2017	14-Dec-2017	12-Dec-2017	12-Dec-2017	12-Dec-2017	12-Dec-2017
Time	-	10:13	12:30	14:20	16:30	14:30	17:00	10:30	-	13:30	14:00	9:30	13:00	-	13:45	15:00
QAQC	Duplicate	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular
ALS Sample ID	L2027227-8	L2027227-4	L2027227-5	L2027227-6	L2027227-10	L2029323-3	L2027227-7	L2036162-1	L2036162-14	L2036162-2	L2036162-4	L2036162-3	L2036162-6	L2036162-13	L2036162-5	L2036162-7
Total Metals *(cont'd)*																
Manganese (Mn)	0.00797	0.0243	0.0219	0.0214	0.0178	0.0187	0.0197	0.00289	0.00276	0.00384	0.0406	0.00253	0.0121	0.0128	0.0196	0.0262
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000335	0.000464	0.000474	0.000469	0.000347	0.000361	0.000373	0.000118	0.000115	0.000130	0.000190	0.000220	0.000542	0.000595	0.000457	0.000575
Nickel (Ni)	0.000550	<0.00050	<0.00050	0.00159	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	0.00160	<0.0010	0.000760	0.000820	0.000930	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.373	0.251	0.270	0.290	0.339	0.351	0.332	0.176	0.184	0.210	0.450	0.340	0.494	0.539	0.489	0.287
Selenium (Se)	0.0000900	0.0000750	0.0000840	0.0000920	<0.000050	0.0000550	<0.000050	0.0000660	0.0000860	<0.00010	<0.00010	<0.00010	0.000125	0.000116	0.000110	0.000106
Silicon (Si)	3.58	3.63	3.69	3.87	2.82	2.76	2.78	4.15	4.52	4.69	7.05	4.66	3.83	4.02	4.52	4.12
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020	<0.000020	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	2.80	<2.0	<2.0	2.00	<2.0	<2.0	<2.0	3.60	3.90	4.30	4.70	6.30	3.20	3.30	3.50	2.10
Strontium (Sr)	0.0839	0.0651	0.0709	0.0702	0.0404	0.0419	0.0431	0.122	0.131	0.132	0.150	0.173	0.0984	0.104	0.114	0.0811
Sulphur (S)	5.95	1.71	2.13	2.16	1.44	1.37	1.47	0.760	0.880	<1.0	1.50	<1.0	10.2	10.3	8.16	1.93
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020	<0.000020	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00020	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0350	<0.010	<0.010	0.01000	0.0150	<0.010
Uranium (U)	0.0000720	0.0000480	0.0000490	0.0000540	0.0000350	0.0000360	0.0000340	0.000142	0.000155	0.000163	0.000178	0.0000640	0.0000840	0.0000810	0.000106	0.0000640
Vanadium (V)	0.000870	0.000580	0.000640	0.000800	0.000860	0.000830	0.000830	0.000990	0.00107	0.001000	0.00330	<0.0010	0.000870	0.000970	0.00145	<0.00050
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0060	<0.0060	<0.0060	<0.0030	0.00330	<0.0030	<0.0030
Dissolved Metals																
Aluminum (Al)	0.0276	0.0227	0.0235	0.0225	0.0289	0.0302	0.0258	0.0189	0.0137	0.0226	0.0248	0.0671	0.0147	0.0147	0.0164	0.0258
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000110	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.000230	0.000190	0.000200	0.000190	0.000180	0.000170	0.000160	0.000420	0.000430	0.000370	0.000360	0.000630	0.000160	0.000170	0.000190	0.000180
Barium (Ba)	0.0471	0.0316	0.0346	0.0339	0.0203	0.0212	0.0204	0.0351	0.0366	0.0330	0.0350	0.0773	0.0603	0.0649	0.0542	0.0418
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0130	0.0150	0.0130	0.0120	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	<0.0000050	0.0000056	0.0000062	0.0000061	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000058	<0.0000050	<0.0000050	0.0000064
Calcium (Ca)	22.3	12.4	14.3	14.7	8.62	8.78	9.24	23.2	28.1	23.6	24.8	18.7	22.5	29.2	23.5	15.0
Chromium (Cr)	0.000150	<0.00010	0.000110	0.000110	<0.00010	<0.00010	<0.00010	0.000250	0.000340	0.000250	0.000200	0.000180	<0.00010	0.000110	<0.00010	<0.00010
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00229	0.000820	0.000990	0.00101	0.000800	0.000740	0.000780	0.00121	0.00112	0.00159	0.00231	0.00158	0.00199	0.00199	0.00205	0.000840
Iron (Fe)	0.0370	0.118	0.109	0.1000	0.0450	0.0550	0.0450	<0.030	<0.030	<0.030	<0.030	0.0530	<0.030	<0.030	<0.030	0.140
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00120	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	4.52	2.24	2.60	2.59	1.44	1.37	1.53	4.42	4.83	4.46	4.74	10.5	4.78	5.50	4.85	2.68
Manganese (Mn)	0.00213	0.0206	0.0169	0.0120	0.00355	0.00525	0.00338	<0.00015	0.000190	0.000750	<0.00070	0.000800	0.00219	0.00219	0.000980	0.0228
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000393	0.000494	0.000500	0.000523	0.000364	0.000364	0.000398	0.0000920	0.0000920	0.000115	0.000157	0.000164	0.000479	0.000471	0.000405	0.000501
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000610	<0.00050	<0.00050	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.362	0.257	0.274	0.287	0.314	0.319	0.327	0.174	0.173	0.181	0.225	0.292	0.430	0.445	0.381	0.287
Selenium (Se)	0.0000660	0.0000860	0.0000800	0.0000690	<0.000050	0.0000720	<0.000050	0.0000600	0.0000570	<0.000050	<0.000050	<0.000050	0.000102	0.0000760	0.0000660	0.0000740
Silicon (Si)	3.08	3.43	3.48	3.48	2.35	2.45	2.37	3.33	3.66	3.47	3.53	3.24	2.66	2.68	2.81	3.59
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	2.80	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.70	3.80	3.50	3.60	5.20	3.00	3.20	3.10	<2.0
Strontium (Sr)	0.0885	0.0695	0.0740	0.0762	0.0448	0.0421	0.0450	0.118	0.126	0.116	0.119	0.137	0.0906	0.101	0.1000	0.0750
Sulphur (S)	5.57	1.72	2.04	1.96	1.40	1.26	1.36	<0.50	0.690	0.570	1.07	<0.50	8.11	8.03	6.42	1.49
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000170	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	0.0000720	0.0000460	0.0000540	0.0000550	0.0000270	0.0000290	0.0000280	0.000157	0.000144	0.000157	0.000148	0.0000560	0.0000760	0.0000740	0.0000990	0.0000630
Vanadium (V)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000770	0.000790	0.000690	0.000600	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.00320	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS09	WQS10	WQS11-US	WQS11	WQS12	WQS01	WQS02	WQS02	WQS04B	WQS03	WQS06	WQS05	WQS05	WQS08	WQS09	WQS10
Date	**12-Dec-2017**	**12-Dec-2017**	**12-Dec-2017**	**14-Dec-2017**	**12-Dec-2017**	**18-Jan-2018**	**17-Jan-2018**	**17-Jan-2018**	**18-Jan-2018**	**18-Jan-2018**	**18-Jan-2018**	**18-Jan-2018**	**18-Jan-2018**	**18-Jan-2018**	**18-Jan-2018**	**18-Jan-2018**
Time	**12:00**	**11:00**	**10:00**	**14:15**	**15:45**	**11:20**	**10:30**	**-**	**13:25**	**10:30**	**15:25**	**13:45**	**-**	**13:00**	**14:30**	**16:12**
QAQC	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Duplicate**	**Regular**	**Regular**	**Regular**	**Regular**	**Duplicate**	**Regular**	**Regular**	**Regular**
ALS Sample ID	**L2036162-8**	**L2036162-9**	**L2036162-11**	**L2036162-10**	**L2036162-12**	**L2047188-4**	**L2047188-1**	**L2047188-11**	**L2047188-6**	**L2047188-3**	**L2047188-9**	**L2047188-7**	**L2047188-12**	**L2047188-5**	**L2047188-8**	**L2047188-10**
Total Metals *(cont'd)*																
Manganese (Mn)	0.0215	0.0220	0.0182	0.0151	0.0198	0.00190	0.00348	0.00414	0.00675	0.00105	0.00613	0.00694	0.00724	0.0190	0.00587	0.00611
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000569	0.000528	0.000408	0.000374	0.000480	0.000129	0.000166	0.000144	0.000179	0.000297	0.000479	0.000415	0.000395	0.000524	0.000508	0.000525
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000610	0.000540	<0.00050	<0.00050	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.292	0.305	0.396	0.343	0.440	0.164	0.179	0.250	0.230	0.307	0.442	0.377	0.381	0.282	0.261	0.277
Selenium (Se)	0.0000990	0.0000840	<0.000050	<0.000050	<0.00010	0.0000540	0.0000640	0.0000580	0.0000650	<0.000050	0.000118	0.0000760	0.0000640	0.0001	0.0000910	0.0000720
Silicon (Si)	4.05	4.19	3.37	2.84	3.85	3.64	3.67	3.69	3.74	3.41	2.83	3.13	3.10	3.89	3.61	3.64
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	2.20	2.20	<2.0	<2.0	2.20	4.20	4.20	5.10	4.30	8.10	3.60	3.70	3.70	2.10	2.30	2.30
Strontium (Sr)	0.0827	0.0858	0.0547	0.0471	0.0682	0.124	0.127	0.129	0.130	0.185	0.0995	0.111	0.116	0.0816	0.0809	0.0867
Sulphur (S)	2.57	2.45	1.75	1.53	2.30	0.880	1.02	0.950	1.76	0.680	10.1	7.78	7.61	1.80	2.08	2.21
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	0.0001	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	0.0000640	0.0000680	0.0000400	0.0000360	0.0000490	0.000183	0.000176	0.000177	0.000179	0.000112	0.0000860	0.000114	0.000114	0.0000610	0.0000620	0.0000670
Vanadium (V)	0.000500	0.000590	0.000620	0.000510	<0.0010	0.000840	0.000750	0.000920	0.000690	<0.00050	<0.00050	<0.00050	0.000510	0.000580	<0.00050	<0.00050
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0060	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																
Aluminum (Al)	0.0153	0.0171	0.0186	0.0181	0.0160	0.00530	0.00670	0.00730	0.00980	0.0205	0.00500	0.00660	0.00650	0.00410	0.00490	0.00460
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	0.000110	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.000170	0.000160	0.000180	0.000180	0.000190	0.000440	0.000350	0.000330	0.000270	0.000600	<0.00010	0.000160	0.000160	0.000150	0.000150	0.000140
Barium (Ba)	0.0433	0.0420	0.0262	0.0226	0.0258	0.0354	0.0335	0.0353	0.0384	0.0972	0.0638	0.0565	0.0556	0.0382	0.0390	0.0411
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.010	0.0150	0.0160	0.0150	0.0130	0.0120	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000073	0.0000063	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	16.0	16.8	11.3	9.85	12.3	25.1	26.0	25.7	27.7	26.1	27.9	27.2	27.7	16.3	17.6	17.9
Chromium (Cr)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000300	0.000240	0.000270	0.000160	<0.00010	<0.00010	<0.00010	0.000110	<0.00010	<0.00010	<0.00010
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.000880	0.000950	0.000790	0.000740	0.000780	0.000700	0.000870	0.000860	0.00118	0.000740	0.00103	0.00108	0.00107	<0.00050	<0.00050	0.000540
Iron (Fe)	0.124	0.114	0.0450	0.0470	0.0460	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.0740	0.0680	0.0500
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00110	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	3.13	3.09	1.75	1.69	1.87	4.81	5.26	5.36	6.14	15.6	5.60	5.75	5.69	2.89	3.19	3.29
Manganese (Mn)	0.0147	0.0119	0.00564	0.00520	0.00586	<0.00010	0.000690	0.00108	0.00132	0.000290	0.000870	0.000830	0.00107	0.00252	0.00198	0.00119
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000477	0.000497	0.000378	0.000339	0.000391	0.000133	0.000135	0.000137	0.000172	0.000278	0.000500	0.000382	0.000385	0.000527	0.000495	0.000500
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.299	0.306	0.348	0.340	0.354	0.157	0.173	0.174	0.233	0.314	0.435	0.375	0.367	0.266	0.277	0.286
Selenium (Se)	0.0000790	0.0000830	<0.000050	<0.000050	<0.000050	0.0000510	0.0000760	0.0000570	0.0000560	<0.000050	0.000115	0.0000650	0.0000760	0.0000540	0.0000700	0.0000850
Silicon (Si)	3.55	3.61	2.50	2.50	2.55	3.56	3.50	3.55	3.62	3.27	2.67	2.95	2.95	3.70	3.67	3.64
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	2.10	2.20	<2.0	<2.0	<2.0	4.10	4.20	4.10	4.70	8.50	3.60	3.90	3.80	2.20	2.30	2.40
Strontium (Sr)	0.0769	0.0803	0.0527	0.0425	0.0553	0.122	0.126	0.124	0.128	0.186	0.1000	0.110	0.107	0.0814	0.0809	0.0829
Sulphur (S)	1.99	2.07	1.46	1.21	1.36	<0.50	<0.50	0.540	1.36	<0.50	9.96	7.51	7.42	1.40	1.79	1.95
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	0.0000630	0.0000670	0.0000320	0.0000310	0.0000340	0.000179	0.000180	0.000181	0.000173	0.000119	0.0000860	0.000112	0.000112	0.0000570	0.0000640	0.0000690
Vanadium (V)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000690	0.000620	0.000600	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS11B	WQS01	WQS01	WQS02	WQS04B	WQS04B	WQS03	WQS06	WQS05	WQS08	WQS09	WQS10	WQS01	WQS02	WQS04B	WQS03
Date	17-Jan-2018	19-Feb-2018	19-Feb-2018	19-Feb-2018	20-Feb-2018	20-Feb-2018	19-Feb-2018	19-Feb-2018	20-Feb-2018	20-Feb-2018	20-Feb-2018	19-Feb-2018	20-Mar-2018	20-Mar-2018	20-Mar-2018	20-Mar-2018
Time	12:50	12:00	-	11:10	9:50	-	13:25	16:00	10:25	9:10	11:20	15:00	11:25	12:57	16:35	10:30
QAQC	Regular	Regular	Duplicate	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	L2047188-2	L2059721-2	L2059721-6	L2059721-1	L2059721-8	L2059721-11	L2059721-3	L2059721-5	L2059721-9	L2059721-7	L2059721-10	L2059721-4	L2071214-2	L2071214-3	L2071214-7	L2071214-1
Total Metals *(cont'd)*																
Manganese (Mn)	0.0126	0.00174	0.000860	0.00277	0.00463	0.00459	0.000690	0.00351	0.00496	0.0325	0.00394	0.00449	0.000420	0.00339	0.0134	0.000290
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000379	0.000140	0.000127	0.000168	0.000194	0.000180	0.000349	0.000531	0.000387	0.000464	0.000491	0.000488	0.000148	0.000206	0.000230	0.000368
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000500	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.330	0.176	0.163	0.195	0.228	0.240	0.349	0.442	0.395	0.335	0.287	0.302	0.180	0.202	0.291	0.364
Selenium (Se)	<0.000050	<0.000050	0.0000530	<0.000050	<0.000050	<0.000050	<0.000050	0.0000980	0.0000680	0.0000930	0.0000510	0.0000540	0.0000960	0.0000710	<0.000050	<0.000050
Silicon (Si)	2.69	3.64	3.58	3.67	3.51	3.62	3.45	2.75	3.13	4.19	3.84	3.88	3.58	3.68	3.86	3.47
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	<2.0	4.40	4.20	4.60	4.50	4.60	9.30	4.00	4.20	2.30	2.50	2.60	4.80	5.10	5.30	9.90
Strontium (Sr)	0.0491	0.126	0.124	0.128	0.129	0.136	0.194	0.105	0.113	0.0848	0.0883	0.0896	0.135	0.132	0.140	0.211
Sulphur (S)	1.55	1.02	0.950	1.04	1.88	1.95	0.750	11.0	8.18	1.94	2.29	2.44	1.15	1.40	2.73	0.830
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	0.0000290	0.000232	0.000227	0.000220	0.000229	0.000226	0.000153	0.000106	0.000137	0.0000760	0.0000750	0.0000780	0.000269	0.000254	0.000278	0.000169
Vanadium (V)	<0.00050	0.000810	0.000750	0.000720	0.000520	<0.00050	<0.00050	<0.00050	<0.00050	0.000640	<0.00050	<0.00050	0.000740	0.000750	0.000880	<0.00050
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																
Aluminum (Al)	0.0102	0.00490	0.00460	0.00650	0.00700	0.00770	0.0155	0.00350	0.00520	0.00620	0.00930	0.00400	0.00450	0.00630	0.0370	0.0131
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000120	0.000110	<0.00010
Arsenic (As)	0.000150	0.000420	0.000370	0.000370	0.000310	0.000290	0.000680	0.000110	0.000180	0.000150	0.000200	0.000160	0.000410	0.000360	0.000300	0.000590
Barium (Ba)	0.0244	0.0342	0.0355	0.0358	0.0394	0.0396	0.102	0.0631	0.0607	0.0412	0.0426	0.0428	0.0424	0.0440	0.0459	0.131
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	<0.010	0.0190	0.0190	0.0190	0.0150	0.0150	0.0160	<0.010	<0.010	<0.010	<0.010	<0.010	0.0220	0.0220	0.0170	0.0190
Cadmium (Cd)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000051
Calcium (Ca)	10.4	27.3	27.6	28.2	30.5	32.0	29.5	29.3	29.2	18.2	19.6	20.1	33.5	35.5	36.4	35.3
Chromium (Cr)	<0.00010	0.000170	0.000240	0.000240	0.000180	0.000170	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000320	0.000310	0.000170	0.0001
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000130	<0.00010
Copper (Cu)	0.000570	0.000620	0.000630	0.000800	0.000910	0.000920	0.000600	0.000850	0.000930	<0.00050	0.000560	<0.00050	0.000640	0.000820	0.00112	0.000630
Iron (Fe)	0.0330	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.0910	0.166	0.0720	<0.030	<0.030	<0.030	<0.030
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00120	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00150
Magnesium (Mg)	1.85	4.83	4.88	5.84	6.30	6.29	16.7	5.93	6.43	2.85	3.16	3.32	5.91	7.31	7.71	20.9
Manganese (Mn)	0.00348	0.000150	0.000170	0.00206	0.00335	0.00324	0.000370	0.00170	0.00234	0.000850	0.00516	0.00265	<0.00010	0.00200	0.00637	0.000150
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000358	0.000138	0.000135	0.000158	0.000186	0.000183	0.000316	0.000471	0.000392	0.000449	0.000424	0.000479	0.000166	0.000220	0.000234	0.000365
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.335	0.174	0.180	0.213	0.262	0.262	0.361	0.456	0.427	0.313	0.306	0.311	0.203	0.241	0.283	0.404
Selenium (Se)	<0.000050	0.0000690	0.0000510	<0.000050	<0.000050	<0.000050	<0.000050	0.0000830	0.0000710	0.000106	0.0000870	0.0000930	0.0000560	<0.000050	0.0000730	<0.000050
Silicon (Si)	2.61	3.35	3.31	3.39	3.41	3.28	3.14	2.46	2.71	3.54	3.50	3.54	3.45	3.56	3.43	3.46
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	<2.0	4.20	4.30	4.50	4.70	4.80	9.00	4.10	4.20	2.10	2.40	2.50	5.00	5.40	5.50	10.7
Strontium (Sr)	0.0485	0.124	0.123	0.131	0.139	0.133	0.201	0.103	0.114	0.0832	0.0881	0.0881	0.143	0.152	0.155	0.237
Sulphur (S)	1.08	0.700	0.650	0.790	1.47	1.59	<0.50	9.66	7.58	1.53	1.88	1.95	0.960	1.03	2.59	0.770
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	0.0000270	0.000213	0.000213	0.000205	0.000218	0.000216	0.000141	0.0000960	0.000129	0.0000630	0.0000740	0.0000750	0.000266	0.000255	0.000268	0.000164
Vanadium (V)	<0.00050	0.000640	0.000650	0.000620	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000720	0.000730	<0.00050	<0.00050
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS06	WQS05	WQS08	WQS08	WQS09	WQS10	WQS10	WQS12	WQS01	WQS02	WQS02	WQS04B	WQS03	WQS06	WQS05	WQS05
Date	21-Mar-2018	20-Mar-2018	21-Mar-2018	21-Mar-2018	21-Mar-2018	20-Mar-2018	20-Mar-2018	20-Mar-2018	18-Apr-2018	18-Apr-2018	18-Apr-2018	17-Apr-2018	18-Apr-2018	17-Apr-2018	17-Apr-2018	17-Apr-2018
Time	9:48	16:35	7:50	-	8:50	15:35	-	14:37	10:05	9:22	-	10:23	10:53	11:50	10:47	-
QAQC	Regular	Regular	Regular	Duplicate	Regular	Regular	Duplicate	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Duplicate
ALS Sample ID	L2071214-11	L2071214-6	L2071214-9	L2071214-12	L2071214-10	L2071214-5	L2071214-8	L2071214-4	L2082789-1	L2082789-2	L2082789-4	L2082790-2	L2082789-3	L2082790-4	L2082790-3	L2082790-10
Total Metals *(cont'd)*																
Manganese (Mn)	0.00357	0.00811	0.0238	0.0252	0.0142	0.0102	0.00999	0.00915	0.00562	0.00499	0.00493	0.0297	0.000720	0.0150	0.0217	0.0208
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000058	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000531	0.000433	0.000451	0.000489	0.000450	0.000484	0.000526	0.000368	0.000130	0.000137	0.000132	0.000169	0.000236	0.000518	0.000393	0.000374
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00171	<0.00050	0.000820	0.00121	0.00110
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.475	0.428	0.295	0.309	0.300	0.303	0.303	0.377	0.224	0.216	0.217	0.334	0.345	0.555	0.504	0.482
Selenium (Se)	0.0000990	0.000105	0.000103	0.0000760	0.0000690	0.0000840	0.0000610	<0.000050	0.0000760	0.0000610	0.0000670	0.0000680	<0.000050	0.0000990	0.000125	0.0000870
Silicon (Si)	2.79	3.10	3.81	3.96	3.64	3.62	3.66	2.74	3.89	3.69	3.71	4.16	3.50	3.23	3.59	4.12
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	4.80	4.90	2.80	2.90	2.70	3.00	2.70	2.50	4.20	4.20	4.40	4.60	7.90	5.50	5.30	5.00
Strontium (Sr)	0.109	0.116	0.0793	0.0817	0.0826	0.0833	0.0883	0.0583	0.124	0.113	0.112	0.131	0.168	0.128	0.128	0.135
Sulphur (S)	12.5	9.24	1.80	1.90	2.32	2.28	2.40	1.79	0.840	0.930	0.860	3.27	0.590	14.8	10.7	10.8
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	0.000129	0.000177	0.0000810	0.0000860	0.0000910	0.0000900	0.0000930	0.0000480	0.000229	0.000193	0.000197	0.000216	0.0000880	0.000151	0.000163	0.000171
Vanadium (V)	<0.00050	<0.00050	0.000550	0.000630	0.000520	<0.00050	<0.00050	<0.00050	0.00124	0.000960	0.000940	0.00142	0.000600	0.001000	0.00124	0.00160
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.00420	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																
Aluminum (Al)	0.00310	0.0131	0.00760	0.00790	0.00730	0.00560	0.00490	0.00780	0.0169	0.0308	0.0294	0.132	0.0248	0.0230	0.0585	0.0587
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.000130	0.000190	0.000230	0.000200	0.000200	0.000170	0.000170	0.000170	0.000360	0.000330	0.000330	0.000330	0.000560	0.000160	0.000240	0.000220
Barium (Ba)	0.0794	0.0671	0.0453	0.0452	0.0461	0.0478	0.0448	0.0301	0.0350	0.0323	0.0312	0.0394	0.0878	0.0804	0.0701	0.0653
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0190	0.0180	0.0180	0.0140	0.0160	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000055	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000064	<0.0000050	<0.0000050	0.0000061	<0.0000050
Calcium (Ca)	36.1	33.5	20.3	20.7	22.4	22.4	22.1	14.7	25.7	25.5	25.1	28.7	23.1	33.6	32.4	31.2
Chromium (Cr)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000280	0.000330	0.000320	0.000280	0.000150	<0.00010	0.000110	0.000140
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000420	<0.00010	<0.00010	0.000110	0.000140
Copper (Cu)	0.000900	0.000980	0.000550	0.000520	0.000520	0.000500	<0.00050	0.000600	0.00104	0.00161	0.00161	0.00339	0.000880	0.00162	0.00218	0.00216
Iron (Fe)	<0.030	<0.030	0.188	0.186	0.157	0.103	0.102	0.0490	<0.030	0.0310	0.0300	0.279	<0.030	0.0340	0.0920	0.0960
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00170	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	7.34	7.51	3.70	3.86	3.96	3.99	4.11	2.74	4.52	4.85	4.72	6.32	13.0	8.48	7.79	7.68
Manganese (Mn)	0.00102	0.00264	0.0114	0.0111	0.00654	0.00437	0.00435	0.00323	0.000450	0.00121	0.00151	0.00994	0.000340	0.001000	0.00202	0.00334
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000593	0.000459	0.000532	0.000539	0.000496	0.000505	0.000527	0.000364	0.000121	0.000128	0.000141	0.000157	0.000232	0.000501	0.000413	0.000378
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00106	<0.00050	<0.00050	0.000590	0.000610
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.530	0.447	0.329	0.331	0.332	0.335	0.336	0.413	0.156	0.172	0.166	0.304	0.305	0.540	0.471	0.449
Selenium (Se)	0.0000820	0.000101	0.0000870	0.0000890	0.0000690	0.0000700	0.0000940	<0.000050	<0.000050	<0.000050	<0.000050	0.0000690	<0.000050	0.0000890	0.0000700	0.000107
Silicon (Si)	2.61	2.78	3.63	3.71	3.66	3.42	3.54	2.64	3.45	3.47	3.41	3.63	3.26	2.76	2.97	3.05
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	5.10	5.30	2.80	2.80	2.90	3.00	2.90	2.50	4.10	4.00	4.00	4.60	7.40	5.40	5.10	4.80
Strontium (Sr)	0.124	0.129	0.0939	0.0925	0.0896	0.0937	0.0944	0.0609	0.133	0.122	0.127	0.134	0.173	0.131	0.137	0.132
Sulphur (S)	11.2	8.45	1.66	1.74	2.34	2.18	2.05	1.57	0.670	0.820	0.930	2.93	0.530	13.8	10.5	10.4
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	0.000125	0.000165	0.0000800	0.0000810	0.0000870	0.0000850	0.0000880	0.0000390	0.000242	0.000204	0.000210	0.000208	0.0001	0.000144	0.000151	0.000164
Vanadium (V)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000730	0.000730	0.000710	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS08	WQS09	WQS10	WQS12
Date	17-Apr-2018	17-Apr-2018	17-Apr-2018	17-Apr-2018
Time	9:45	12:54	13:49	14:47
QAQC	Regular	Regular	Regular	Regular
ALS Sample ID	L2082790-1	L2082790-5	L2082790-6	L2082790-9
Total Metals *(cont'd)*				
Manganese (Mn)	0.0746	0.0505	0.0315	0.0441
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000483	0.000403	0.000404	0.000259
Nickel (Ni)	0.000630	0.000580	0.000560	0.00106
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.410	0.403	0.420	1.19
Selenium (Se)	0.0000850	0.0000800	0.0000770	<0.000050
Silicon (Si)	4.74	4.47	4.18	3.78
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	2.80	2.90	3.20	4.00
Strontium (Sr)	0.0796	0.0838	0.0853	0.0798
Sulphur (S)	1.34	2.25	2.46	1.68
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	0.0160	0.0110	<0.010	0.0110
Uranium (U)	0.0000740	0.0000860	0.0000920	0.0000660
Vanadium (V)	0.00195	0.00158	0.00118	0.00153
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals				
Aluminum (Al)	0.0403	0.0359	0.0304	0.0906
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.000300	0.000280	0.000230	0.000320
Barium (Ba)	0.0381	0.0397	0.0378	0.0346
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000054	0.0000051	0.0000058	<0.0000050
Calcium (Ca)	16.4	18.7	19.5	16.1
Chromium (Cr)	0.000190	0.000170	0.000140	0.000170
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00106	0.00106	0.000980	0.00150
Iron (Fe)	0.417	0.363	0.285	0.193
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	3.28	3.61	3.46	4.05
Manganese (Mn)	0.00168	0.00211	0.00228	0.00182
Mercury (Hg)	<0.0000050	0.0000087	<0.0000050	<0.0000050
Molybdenum (Mo)	0.000422	0.000406	0.000428	0.000301
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30
Potassium (K)	0.338	0.346	0.348	1.25
Selenium (Se)	<0.000050	0.0000630	0.0000740	<0.000050
Silicon (Si)	3.87	3.62	3.65	3.28
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	2.70	2.80	2.80	4.00
Strontium (Sr)	0.0810	0.0887	0.0870	0.0823
Sulphur (S)	1.36	2.03	2.28	1.77
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010
Uranium (U)	0.0000670	0.0000770	0.0000820	0.0000590
Vanadium (V)	0.000510	<0.00050	<0.00050	<0.00050
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS01	WQS01	WQS02	WQS04	WQS03	WQS06	WQS05	WQS08	WQS09	WQS10	WQS10	WQS11	WQS12	WQS01	WQS02	WQS04	WQS03
Date	4-May-2017	4-May-2017	4-May-2017	4-May-2017	4-May-2017	4-May-2017	4-May-2017	4-May-2017	4-May-2017	3-May-2017	3-May-2017	3-May-2017	3-May-2017	21-Jun-2017	20-Jun-2017	20-Jun-2017	21-Jun-2017
Time	10:25	-	9:53	14:50	11:05	13:15	1:23	13:55	0:52	16:00	-	15:30	14:50	8:50	13:00	14:30	9:20
QAQC	Regular	Duplicate	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	L1922134-9	L1922134-15	L1922134-7	L1922134-11	L1922134-8	L1922134-14	L1922134-13	L1922134-10	L1922134-12	L1922134-3	L1922134-4	L1922134-1	L1922134-2	L1947234-7	L1947234-1	L1947234-2	L1947234-8
Polycyclic Aromatic Hydrocarbons																	
Acenaphthene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acenaphthylene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Anthracene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Benz[a]anthracene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Benzo[a]pyrene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo[g,h,i]perylene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Benzo[b]fluoranthene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Benzo[b,j]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b,j,k]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[k]fluoranthene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Chrysene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Fluorene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Indeno[1,2,3-c,d]pyrene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Naphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
1-Methylnaphthalene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Pyrene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Quinoline	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	101	87.3	91.7	91.1	77.9	99.6	98.6	102	84.3	85.4	80.9	105	83.0	66.5	65.0	71.7	69.0
Chrysene d12	90.6	76.6	77.9	82.6	62.0	88.3	88.3	89.4	76.9	87.9	84.9	96.2	86.9	65.5	61.1	65.9	69.6
Naphthalene d8	90.2	75.2	84.4	82.4	69.9	89.3	90.6	91.3	74.5	84.9	83.2	96.6	82.2	70.4	67.1	74.9	75.1
Phenanthrene d10	102	88.6	91.8	92.9	75.3	102	102	100	84.5	97.2	94.2	106	95.3	74.1	71.8	77.8	79.9
Aggregate Organics																	
BOD	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
COD	41.0	41.0	46.0	45.0	69.0	35.0	37.0	25.0	33.0	26.0	23.0	27.0	32.0	<20	21.0	<20	59.0
Phenols (4AAP)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	-
Volatile Organic Compounds																	
Benzene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Methyl t-butyl ether (MTBE)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Styrene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045
ortho-Xylene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
meta- & para-Xylene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylene	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075
4-Bromofluorobenzene (SS)	103	102	101	103	103	105	103	103	103	101	99.9	101	101	89.7	85.2	82.9	92.9
1,4-Difluorobenzene (SS)	101	101	101	101	101	101	101	101	101	101	101	102	101	94.5	92.9	92.2	93.5
Hydrocarbons																	
Volatile Hydrocarbons (VH6-10)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
VPH (C6-C10)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
3,4-Dichlorotoluene (SS)	101	98.6	92.3	96.1	99.4	95.4	104	100	95.9	101	91.4	97.4	102	89.2	94.1	91.7	102
Radiological																	
Ra-226	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS06	WQS05	WQS08	WQS09	WQS09	WQS10	WQS11	WQS12	WQS01	WQS02	WQS04	WQS03	WQS06	WQS05	WQS08	WQS08	WQS09
Date	20-Jun-2017	20-Jun-2017	20-Jun-2017	20-Jun-2017	20-Jun-2017	21-Jun-2017	21-Jun-2017	21-Jun-2017	26-Jul-2017	27-Jul-2017	27-Jul-2017	26-Jul-2017	27-Jul-2017	27-Jul-2017	27-Jul-2017	27-Jul-2017	27-Jul-2017
Time	17:00	15:40	15:15	16:10	-	12:10	11:30	11:00	12:15	10:09	11:13	12:59	13:45	12:42	13:12	-	14:38
QAQC	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Duplicate	Regular
ALS Sample ID	L1947234-6	L1947234-4	L1947234-3	L1947234-5	L1947234-13	L1947234-11	L1947234-10	L1947234-9	L1966679-1	L1966679-2	L1966679-4	L1966679-3	L1966679-6	L1966679-5	L1966679-8	L1966679-12	L1966679-9
Polycyclic Aromatic Hydrocarbons																	
Acenaphthene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acenaphthylene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Anthracene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Benz[a]anthracene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Benzo[a]pyrene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo[g,h,i]perylene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Benzo[b]fluoranthene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	-	-	-	-	-	-
Benzo[b,j]fluoranthene	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Benzo[b,j,k]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[k]fluoranthene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Chrysene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Fluorene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Indeno[1,2,3-c,d]pyrene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Naphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
1-Methylnaphthalene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Pyrene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Quinoline	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	69.8	73.1	71.3	62.6	73.6	75.7	79.0	66.1	95.4	86.4	96.6	95.9	87.3	92.0	91.3	94.6	95.3
Chrysene d12	68.7	71.1	67.8	63.6	65.3	71.6	69.5	65.5	112	106	114	113	104	109	105	111	106
Naphthalene d8	75.6	76.4	73.7	70.1	75.0	79.6	80.0	73.5	85.3	84.3	95.7	91.1	86.3	91.6	87.1	91.4	93.7
Phenanthrene d10	79.7	79.0	77.9	73.8	74.7	74.9	75.1	77.6	98.4	89.8	101	98.2	90.3	95.6	92.6	97.7	99.0
Aggregate Organics																	
BOD	<2.0	2.20	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
COD	<20	<20	<20	<20	21.0	25.0	29.0	49.0	<20	<20	<20	21.0	<20	<20	<20	<20	<20
Phenols (4AAP)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds																	
Benzene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	<0.00050	-	-	-	-
Ethylbenzene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	<0.00050	-	-	-	-
Methyl t-butyl ether (MTBE)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	<0.00050	-	-	-	-
Styrene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	<0.00050	-	-	-	-
Toluene	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	-	-	-	<0.00045	-	-	-	-
ortho-Xylene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	<0.00050	-	-	-	-
meta- & para-Xylene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	<0.00050	-	-	-	-
Xylene	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	-	-	-	<0.00075	-	-	-	-
4-Bromofluorobenzene (SS)	91.9	95.4	90.2	92.2	89.0	89.7	91.4	88.9	93.7	-	-	-	95.1	-	-	-	-
1,4-Difluorobenzene (SS)	94.2	89.5	92.5	93.8	94.3	93.7	94.9	95.1	104	-	-	-	102	-	-	-	-
Hydrocarbons																	
Volatile Hydrocarbons (VH6-10)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	-	-	<0.10	-	-	-	-
VPH (C6-C10)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	-	-	<0.10	-	-	-	-
3,4-Dichlorotoluene (SS)	77.7	98.4	86.3	103	99.7	96.2	101	90.2	59.1	-	-	-	95.4	-	-	-	-
Radiological																	
Ra-226	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS10	WQS11	WQS12	WQS01	WQS02	WQS04	WQS03	WQS06	WQS05	WQS08	WQS08	WQS09	WQS10	WQS11	WQS12	WQS01
Date	27-Jul-2017	27-Jul-2017	27-Jul-2017	17-Aug-2017	16-Aug-2017	16-Aug-2017	17-Aug-2017	16-Aug-2017	16-Aug-2017	16-Aug-2017	16-Aug-2017	16-Aug-2017	17-Aug-2017	17-Aug-2017	17-Aug-2017	27-Sep-2017
Time	15:11	-	15:57	9:15	12:00	13:29	8:44	16:06	14:54	14:18	-	15:24	12:15	10:00	11:48	10:40
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	L1966679-10	L1966679-15	L1966679-11	L1977457-1	L1977457-2	L1977457-4	L1977457-3	L1977457-6	L1977457-5	L1977457-7	L1977457-12	L1977457-8	L1977457-9	L1977457-10	L1977457-11	L1998999-1
Polycyclic Aromatic Hydrocarbons																
Acenaphthene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010
Acenaphthylene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010
Acridine	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010
Anthracene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010
Benz[a]anthracene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010
Benzo[a]pyrene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo[g,h,i]perylene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010
Benzo[b]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b,j]fluoranthene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010
Benzo[b,j,k]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[k]fluoranthene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010
Chrysene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010
Fluorene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010
Indeno[1,2,3-c,d]pyrene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010
Naphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
1-Methylnaphthalene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000020
Pyrene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010
Quinoline	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	86.0	88.5	88.8	85.9	89.6	82.0	84.9	85.4	83.1	89.3	81.4	82.6	79.6	107	103	90.3
Chrysene d12	103	111	111	104	107	112	118	110	111	109	80.2	116	62.8	72.7	74.9	101
Naphthalene d8	85.2	90.0	90.7	96.8	97.5	104	107	101	101	100	90.3	103	75.7	103	103	89.0
Phenanthrene d10	89.5	93.5	93.6	88.1	93.0	96.1	98.5	91.9	93.5	92.5	91.4	97.3	86.4	109	113	95.6
Aggregate Organics																
BOD	<2.0	<2.0	<2.0	-	-	-	-	-	-	-	-	-	-	-	-	-
COD	<20	<20	<20	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (4AAP)	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Volatile Organic Compounds																
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl t-butyl ether (MTBE)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ortho-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
meta- & para-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Difluorobenzene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbons																
Volatile Hydrocarbons (VH6-10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VPH (C6-C10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3,4-Dichlorotoluene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radiological																
Ra-226	-	-	-	0.00590	<0.0078	<0.0078	<0.0060	0.00590	<0.0071	<0.0073	<0.0054	0.0120	<0.0071	<0.0063	<0.0055	-

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS02	WQS04	WQS03	WQS06	WQS05	WQS08	WQS09	WQS09	WQS10	WQS11	WQS11	WQS12	WQS01	WQS02	WQS02	WQS04B
Date	26-Sep-2017	26-Sep-2017	27-Sep-2017	26-Sep-2017	26-Sep-2017	26-Sep-2017	26-Sep-2017	26-Sep-2017	26-Sep-2017	27-Sep-2017	27-Sep-2017	26-Sep-2017	16-Oct-2017	18-Oct-2017	18-Oct-2017	18-Oct-2017
Time	10:13	11:34	11:10	14:16	12:20	12:45	13:21	-	14:48	10:03	-	15:35	10:20	12:35	-	13:30
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular	Duplicate	Regular	Regular	Regular	Duplicate	Regular
ALS Sample ID	L1998999-2	L1998999-4	L1998999-3	L1998999-6	L1998999-5	L1998999-7	L1998999-8	L1998999-15	L1998999-9	L1998999-10	L1998999-12	L1998999-11	L2008179-1	L2010562-5	L2010562-3	L2010562-6
Polycyclic Aromatic Hydrocarbons																
Acenaphthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz[a]anthracene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[a]pyrene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo[g,h,i]perylene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[b]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b,j]fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[b,j,k]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[k]fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno[1,2,3-c,d]pyrene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
1-Methylnaphthalene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	84.5	105	88.6	86.9	92.2	92.2	83.3	93.7	92.2	91.3	94.7	92.4	66.9	87.3	81.6	89.7
Chrysene d12	95.8	119	109	102	105	108	97.6	105	96.7	112	115	103	55.0	100.0	102	103
Naphthalene d8	86.0	108	93.0	85.6	83.7	88.7	84.7	89.4	85.3	88.7	90.1	87.6	70.8	81.0	77.3	82.0
Phenanthrene d10	91.1	111	97.0	92.6	94.6	98.5	91.4	94.6	91.9	97.2	96.6	95.8	75.8	96.5	94.7	102
Aggregate Organics																
BOD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (4AAP)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00250	0.00110	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Volatile Organic Compounds																
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl t-butyl ether (MTBE)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ortho-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
meta- & para-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Difluorobenzene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbons																
Volatile Hydrocarbons (VH6-10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VPH (C6-C10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3,4-Dichlorotoluene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radiological																
Ra-226	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS03	WQS06	WQS05	WQS05	WQS08	WQS09	WQS10	WQS11	WQS12	WQS01	WQS02	WQS02	WQS04B	WQS03	WQS06	WQS05
Date	16-Oct-2017	18-Oct-2017	18-Oct-2017	18-Oct-2017	18-Oct-2017	18-Oct-2017	18-Oct-2017	16-Oct-2017	18-Oct-2017	28-Nov-2017	28-Nov-2017	28-Nov-2017	21-Nov-2017	28-Nov-2017	21-Nov-2017	21-Nov-2017
Time	14:00	15:25	13:45	-	14:15	14:50	16:50	10:53	17:15	9:45	-	11:00	11:30	-	13:30	10:50
QAQC	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Regular	Regular	Duplicate	Duplicate	Regular	Regular	Regular	Regular
ALS Sample ID	L2008179-2	L2010562-8	L2010562-9	L2010562-4	L2010562-10	L2010562-7	L2010562-11	L2008179-3	L2010562-12	L2029323-1	L2029323-4	L2029323-2	L2027227-1	L2029323-6	L2027227-3	L2027227-2
Polycyclic Aromatic Hydrocarbons																
Acenaphthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz[a]anthracene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[a]pyrene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo[g,h,i]perylene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[b]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b,j]fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[b,j,k]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[k]fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno[1,2,3-c,d]pyrene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
1-Methylnaphthalene	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
2-Methylnaphthalene	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	72.9	77.4	88.6	80.9	87.0	89.5	92.4	76.0	97.5	76.4	78.7	81.5	84.6	74.2	92.2	95.3
Chrysene d12	61.4	95.3	97.3	103	107	123	104	63.3	114	106	105	109	121	102	130	126
Naphthalene d8	73.3	83.2	88.5	83.0	91.6	86.4	92.6	76.4	91.1	93.5	96.5	102	94.7	95.3	104	107
Phenanthrene d10	77.7	89.1	96.0	98.1	97.4	102	105	81.6	110	94.7	96.6	102	88.0	92.5	94.2	98.3
Aggregate Organics																
BOD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (4AAP)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	-	-	-	-
Volatile Organic Compounds																
Benzene	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Methyl t-butyl ether (MTBE)	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Styrene	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	-	-	-	-	-	-	-	-	-	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045
ortho-Xylene	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
meta- & para-Xylene	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylene	-	-	-	-	-	-	-	-	-	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075
4-Bromofluorobenzene (SS)	-	-	-	-	-	-	-	-	-	96.4	96.3	97.6	75.4	97.9	72.7	72.2
1,4-Difluorobenzene (SS)	-	-	-	-	-	-	-	-	-	98.4	104	102	94.9	107	92.1	103
Hydrocarbons																
Volatile Hydrocarbons (VH6-10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VPH (C6-C10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3,4-Dichlorotoluene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radiological																
Ra-226	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS05	WQS08	WQS09	WQS10	WQS11-US	WQS11	WQS12	WQS01	WQS01	WQS02	WQS04B	WQS03	WQS06	WQS06	WQS05	WQS08
Date	21-Nov-2017	21-Nov-2017	21-Nov-2017	21-Nov-2017	21-Nov-2017	28-Nov-2017	21-Nov-2017	14-Dec-2017	14-Dec-2017	14-Dec-2017	12-Dec-2017	14-Dec-2017	12-Dec-2017	12-Dec-2017	12-Dec-2017	12-Dec-2017
Time	-	10:13	12:30	14:20	16:30	14:30	17:00	10:30	-	13:30	14:00	9:30	13:00	-	13:45	15:00
QAQC	Duplicate	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular
ALS Sample ID	L2027227-8	L2027227-4	L2027227-5	L2027227-6	L2027227-10	L2029323-3	L2027227-7	L2036162-1	L2036162-14	L2036162-2	L2036162-4	L2036162-3	L2036162-6	L2036162-13	L2036162-5	L2036162-7
Polycyclic Aromatic Hydrocarbons																
Acenaphthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz[a]anthracene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[a]pyrene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo[g,h,i]perylene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[b]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b,j]fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[b,j,k]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[k]fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno[1,2,3-c,d]pyrene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
1-Methylnaphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
2-Methylnaphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	81.0	116	84.6	75.7	76.1	83.0	87.8	101	98.5	117	103	95.9	96.9	109	100.0	99.3
Chrysene d12	117	111	121	117	110	103	124	104	119	124	104	119	115	116	117	116
Naphthalene d8	95.9	129	101	96.9	92.8	94.9	103	104	124	108	108	103	105	102	101	105
Phenanthrene d10	85.8	116	89.5	87.7	81.2	96.0	91.8	116	115	122	123	116	115	123	107	116
Aggregate Organics																
BOD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (4AAP)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds																
Benzene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	-	-
Ethylbenzene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	-	-
Methyl t-butyl ether (MTBE)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	-	-
Styrene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	-	-
Toluene	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	-	-	-	-	-	-	-	-	-
ortho-Xylene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	-	-
meta- & para-Xylene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	-	-
Xylene	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene (SS)	70.7	71.1	72.5	70.8	67.2	96.5	70.5	-	-	-	-	-	-	-	-	-
1,4-Difluorobenzene (SS)	98.3	93.6	101	100	99.5	102	93.1	-	-	-	-	-	-	-	-	-
Hydrocarbons																
Volatile Hydrocarbons (VH6-10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VPH (C6-C10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3,4-Dichlorotoluene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radiological																
Ra-226	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS09	WQS10	WQS11-US	WQS11	WQS12	WQS01	WQS02	WQS02	WQS04B	WQS03	WQS06	WQS05	WQS05	WQS08	WQS09	WQS10
Date	12-Dec-2017	12-Dec-2017	12-Dec-2017	14-Dec-2017	12-Dec-2017	18-Jan-2018	17-Jan-2018	17-Jan-2018	18-Jan-2018	18-Jan-2018	18-Jan-2018	18-Jan-2018	18-Jan-2018	18-Jan-2018	18-Jan-2018	18-Jan-2018
Time	12:00	11:00	10:00	14:15	15:45	11:20	10:30	-	13:25	10:30	15:25	13:45	-	13:00	14:30	16:12
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular
ALS Sample ID	L2036162-8	L2036162-9	L2036162-11	L2036162-10	L2036162-12	L2047188-4	L2047188-1	L2047188-11	L2047188-6	L2047188-3	L2047188-9	L2047188-7	L2047188-12	L2047188-5	L2047188-8	L2047188-10
Polycyclic Aromatic Hydrocarbons																
Acenaphthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz[a]anthracene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[a]pyrene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo[g,h,i]perylene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[b]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b,j]fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[b,j,k]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[k]fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno[1,2,3-c,d]pyrene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
1-Methylnaphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
2-Methylnaphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	107	91.4	97.4	100	105	99.3	104	96.5	86.5	93.5	89.8	109	82.8	89.3	97.5	89.4
Chrysene d12	107	126	120	102	97.9	97.7	113	102	111	96.7	106	102	89.4	119	100	97.3
Naphthalene d8	104	101	116	119	118	98.8	107	116	107	117	98.9	112	112	109	95.1	89.1
Phenanthrene d10	113	113	114	120	123	124	113	108	116	114	107	123	102	119	120	114
Aggregate Organics																
BOD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (4AAP)	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Volatile Organic Compounds																
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl t-butyl ether (MTBE)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ortho-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
meta- & para-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Difluorobenzene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbons																
Volatile Hydrocarbons (VH6-10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VPH (C6-C10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3,4-Dichlorotoluene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radiological																
Ra-226	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS11B	WQS01	WQS01	WQS02	WQS04B	WQS04B	WQS03	WQS06	WQS05	WQS08	WQS09	WQS10	WQS01	WQS02	WQS04B	WQS03
Date	17-Jan-2018	19-Feb-2018	19-Feb-2018	19-Feb-2018	20-Feb-2018	20-Feb-2018	19-Feb-2018	19-Feb-2018	20-Feb-2018	20-Feb-2018	20-Feb-2018	19-Feb-2018	20-Mar-2018	20-Mar-2018	20-Mar-2018	20-Mar-2018
Time	12:50	12:00	-	11:10	9:50	-	13:25	16:00	10:25	9:10	11:20	15:00	11:25	12:57	16:35	10:30
QAQC	Regular	Regular	Duplicate	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	L2047188-2	L2059721-2	L2059721-6	L2059721-1	L2059721-8	L2059721-11	L2059721-3	L2059721-5	L2059721-9	L2059721-7	L2059721-10	L2059721-4	L2071214-2	L2071214-3	L2071214-7	L2071214-1
Polycyclic Aromatic Hydrocarbons																
Acenaphthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz[a]anthracene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[a]pyrene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo[g,h,i]perylene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[b]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b,j]fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[b,j,k]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[k]fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno[1,2,3-c,d]pyrene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
1-Methylnaphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
2-Methylnaphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	83.3	106	110	101	64.8	76.3	98.2	83.0	96.5	99.3	70.4	104	82.8	95.9	87.2	86.0
Chrysene d12	110	86.1	86.4	80.5	72.3	77.2	79.4	69.6	76.8	83.4	76.8	82.2	82.2	93.2	93.8	87.9
Naphthalene d8	107	113	109	104	116	113	105	87.8	101	108	119	113	111	90.9	88.9	89.0
Phenanthrene d10	103	113	115	105	88.8	94.1	103	81.4	101	109	94.4	111	93.3	104	103	97.1
Aggregate Organics																
BOD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (4AAP)	<0.0010	<0.0010	<0.0010	0.00150	<0.0010	<0.0010	<0.0010	0.00130	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Volatile Organic Compounds																
Benzene	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-
Ethylbenzene	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-
Methyl t-butyl ether (MTBE)	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-
Styrene	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-
Toluene	-	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	-	-	-	-
ortho-Xylene	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-
meta- & para-Xylene	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-
Xylene	-	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	-	-	-	-
4-Bromofluorobenzene (SS)	-	92.5	88.2	95.5	95.5	91.3	88.2	94.6	93.1	93.9	95.1	90.2	-	-	-	-
1,4-Difluorobenzene (SS)	-	97.5	98.1	97.0	96.4	98.6	97.8	96.6	96.9	96.7	96.6	97.7	-	-	-	-
Hydrocarbons																
Volatile Hydrocarbons (VH6-10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VPH (C6-C10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3,4-Dichlorotoluene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radiological																
Ra-226	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS06	WQS05	WQS08	WQS08	WQS09	WQS10	WQS10	WQS12	WQS01	WQS02	WQS02	WQS04B	WQS03	WQS06	WQS05	WQS05
Date	21-Mar-2018	20-Mar-2018	21-Mar-2018	21-Mar-2018	21-Mar-2018	20-Mar-2018	20-Mar-2018	20-Mar-2018	18-Apr-2018	18-Apr-2018	18-Apr-2018	17-Apr-2018	18-Apr-2018	17-Apr-2018	17-Apr-2018	17-Apr-2018
Time	9:48	16:35	7:50	-	8:50	15:35	-	14:37	10:05	9:22	-	10:23	10:53	11:50	10:47	-
QAQC	Regular	Regular	Regular	Duplicate	Regular	Regular	Duplicate	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Duplicate
ALS Sample ID	L2071214-11	L2071214-6	L2071214-9	L2071214-12	L2071214-10	L2071214-5	L2071214-8	L2071214-4	L2082789-1	L2082789-2	L2082789-4	L2082790-2	L2082789-3	L2082790-4	L2082790-3	L2082790-10
Polycyclic Aromatic Hydrocarbons																
Acenaphthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz[a]anthracene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[a]pyrene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo[g,h,i]perylene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[b]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b,j]fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[b,j,k]fluoranthene	-	-	-	-	-	-	-	-	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015
Benzo[k]fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno[1,2,3-c,d]pyrene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
1-Methylnaphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
2-Methylnaphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	81.8	93.1	93.9	97.2	83.1	79.9	89.0	87.9	90.0	86.0	88.9	71.1	90.1	89.9	87.4	87.7
Chrysene d12	83.7	90.7	90.4	88.2	83.9	83.6	86.3	90.6	79.3	78.2	82.9	70.1	85.4	86.6	74.1	79.0
Naphthalene d8	86.9	89.1	102	85.5	85.9	95.1	82.5	114	101	102	107	86.6	109	96.1	98.6	97.0
Phenanthrene d10	89.9	98.5	102	106	94.4	97.3	101	104	89.8	87.5	91.1	74.8	92.8	93.5	100	91.6
Aggregate Organics																
BOD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (4AAP)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Volatile Organic Compounds																
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl t-butyl ether (MTBE)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ortho-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
meta- & para-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Difluorobenzene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbons																
Volatile Hydrocarbons (VH6-10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VPH (C6-C10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3,4-Dichlorotoluene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radiological																
Ra-226	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-A. Water Quality Analytical Results, Tenas Project, 2017 to 2018

Site	WQS08	WQS09	WQS10	WQS12
Date	17-Apr-2018	17-Apr-2018	17-Apr-2018	17-Apr-2018
Time	9:45	12:54	13:49	14:47
QAQC	Regular	Regular	Regular	Regular
ALS Sample ID	L2082790-1	L2082790-5	L2082790-6	L2082790-9
Polycyclic Aromatic Hydrocarbons				
Acenaphthene	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	<0.000010	<0.000010	<0.000010	<0.000010
Benz[a]anthracene	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[a]pyrene	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo[g,h,i]perylene	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[b]fluoranthene	-	-	-	-
Benzo[b,j]fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[b,j,k]fluoranthene	<0.000015	<0.000015	<0.000015	<0.000015
Benzo[k]fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	<0.000010	<0.000010	<0.000010	<0.000010
Indeno[1,2,3-c,d]pyrene	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	<0.000050	<0.000050	<0.000050	<0.000050
1-Methylnaphthalene	<0.000050	<0.000050	<0.000050	<0.000050
2-Methylnaphthalene	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	88.2	86.0	86.1	82.4
Chrysene d12	82.9	83.3	80.8	75.2
Naphthalene d8	112	98.5	101	92.8
Phenanthrene d10	93.6	93.5	92.6	85.4
Aggregate Organics				
BOD	-	-	-	-
COD	-	-	-	-
Phenols (4AAP)	<0.0010	<0.0010	<0.0010	<0.0010
Volatile Organic Compounds				
Benzene	-	-	-	-
Ethylbenzene	-	-	-	-
Methyl t-butyl ether (MTBE)	-	-	-	-
Styrene	-	-	-	-
Toluene	-	-	-	-
ortho-Xylene	-	-	-	-
meta- & para-Xylene	-	-	-	-
Xylene	-	-	-	-
4-Bromofluorobenzene (SS)	-	-	-	-
1,4-Difluorobenzene (SS)	-	-	-	-
Hydrocarbons				
Volatile Hydrocarbons (VH6-10)	-	-	-	-
VPH (C6-C10)	-	-	-	-
3,4-Dichlorotoluene (SS)	-	-	-	-
Radiological				
Ra-226	-	-	-	-

All units in mg/L unless otherwise noted.

Appendix 8-B

Water Quality Blank Results, Tenas Project, 2017 to 2018

Appendix 8-B. Water Quality Blank Results, Tenas Project, 2017 to 2018

Site	Field Blank												Travel Blank			
Date	3-May-2017	20-Jun-2017	27-Jul-2017	17-Aug-2017	26-Sep-2017	18-Oct-2017	21-Nov-2017	14-Dec-2017	17-Jan-2018	20-Feb-2018	21-Mar-2018	17-Apr-2018	3-May-2017	21-Jun-2017	27-Jul-2017	17-Aug-2017
Time	-	-	-	12:00	10:40	-	-	-	-	-	9:50	13:49	-	-	-	-
ALS Sample ID	L1922134-5	L1947234-14	L1966679-14	L1977457-13	L1998999-13	L2010562-1	L2027227-9	L2036162-16	L2047188-14	L2059721-12	L2071214-13	L2082790-7	L1922134-6	L1947234-12	L1966679-13	L1977457-14
Physical Tests																
Colour, True	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	-	-	<5.0	<5.0
Conductivity (µS/cm)	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	-	<2.0	<2.0
Hardness (as $CaCO_3$)	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	-	-
pH	-	-	5.87	5.23	5.77	5.35	5.76	5.96	5.42	5.44	6.87	5.19	-	-	5.93	5.25
Total Suspended Solids	-	-	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	-	-	<3.0	<3.0
Total Dissolved Solids	-	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	-	-	<10	<10
Turbidity (NTU)	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	-	<0.10	<0.10
Acidity (as $CaCO_3$)	-	-	1.90	1.80	2.00	2.30	2.10	2.00	1.80	1.30	1.60	1.90	-	-	1.90	1.80
Alkalinity, Total (as $CaCO_3$)	-	-	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	<2.0	<1.0
Anions																
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Sulphate (SO_4)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Nutrients																
Total Nitrogen	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	-	-	<0.030	<0.030
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ammonia as N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Phosphorus (as P)	0.00360	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Dissolved Orthophosphate (as P)	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	<0.0010
Carbon																
Total Organic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Organic Carbon	0.520	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	-
Total Inorganic Carbon	<0.50	<0.50	<0.50	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	-
Dissolved Inorganic Carbon	<0.50	<0.50	-	-	-	-	-	-	-	-	-	-	<0.50	-	-	-
Cyanide																
Cyanide, Total	<0.0010	<0.0020	-	-	-	-	-	-	-	-	-	-	<0.0010	<0.0020	-	-
Cyanide, Weak Acid Dissociable	<0.0050	<0.0020	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0020	-	<0.0050
Cyanide, Free	<0.0050	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	<0.0050
Total Metals																
Aluminum (Al)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.0000710	0.0000750	<0.000050	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chromium (Cr)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00650	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Manganese (Mn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000140	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Appendix 8-B. Water Quality Blank Results, Tenas Project, 2017 to 2018

Site	Travel Blank							
Date	**26-Sep-2017**	**18-Oct-2017**	**28-Nov-2017**	**14-Dec-2017**	**17-Jan-2018**	**20-Feb-2018**	**21-Mar-2018**	**17-Apr-2018**
Time	**10:40**	**-**	**-**	**-**	**-**	**-**	**-**	**13:49**
ALS Sample ID	**L1998999-14**	**L2010562-2**	**L2029323-5**	**L2036162-15**	**L2047188-13**	**L2059721-13**	**L2071214-14**	**L2082790-8**
Physical Tests								
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (µS/cm)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (as $CaCO_3$)	<0.50	-	-	<0.50	<0.50	<0.50	-	<0.50
pH	5.71	5.22	5.91	6.31	5.45	5.41	6.10	5.18
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	<10	<10	<10	<10	<10	<10	<10	<10
Turbidity (NTU)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acidity (as $CaCO_3$)	2.00	2.40	1.90	2.00	1.60	1.30	1.50	2.10
Alkalinity, Total (as $CaCO_3$)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.30	<1.0
Anions								
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Sulphate (SO_4)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Nutrients								
Total Nitrogen	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ammonia as N	0.0192	0.00510	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Phosphorus (as P)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Dissolved Orthophosphate (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Carbon								
Total Organic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Organic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Inorganic Carbon	-	-	-	-	-	-	-	-
Dissolved Inorganic Carbon	-	-	-	-	-	-	-	-
Cyanide								
Cyanide, Total	-	-	-	-	-	-	-	-
Cyanide, Weak Acid Dissociable	-	-	-	-	-	-	-	-
Cyanide, Free	-	-	-	-	-	-	-	-
Total Metals								
Aluminum (Al)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)	<0.000050	<0.000050	<0.000050	<0.00010	<0.000050	0.0000550	<0.000050	<0.00010
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chromium (Cr)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Manganese (Mn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Mercury (Hg)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Appendix 8-B. Water Quality Blank Results, Tenas Project, 2017 to 2018

Site	Field Blank												Travel Blank			
Date	**3-May-2017**	**20-Jun-2017**	**27-Jul-2017**	**17-Aug-2017**	**26-Sep-2017**	**18-Oct-2017**	**21-Nov-2017**	**14-Dec-2017**	**17-Jan-2018**	**20-Feb-2018**	**21-Mar-2018**	**17-Apr-2018**	**3-May-2017**	**21-Jun-2017**	**27-Jul-2017**	**17-Aug-2017**
Time	**-**	**-**	**-**	**12:00**	**10:40**	**-**	**-**	**-**	**-**	**-**	**9:50**	**13:49**	**-**	**-**	**-**	**-**
ALS Sample ID	**L1922134-5**	**L1947234-14**	**L1966679-14**	**L1977457-13**	**L1998999-13**	**L2010562-1**	**L2027227-9**	**L2036162-16**	**L2047188-14**	**L2059721-12**	**L2071214-13**	**L2082790-7**	**L1922134-6**	**L1947234-12**	**L1966679-13**	**L1977457-14**
Total Metals *(cont'd)*																
Potassium (K)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Selenium (Se)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Sulphur (S)	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	-	<0.50
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																
Aluminum (Al)	<0.0030	<0.0030	-	<0.0030	<0.0030	-	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	-	-	-	-
Antimony (Sb)	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-
Arsenic (As)	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-
Barium (Ba)	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.00010	-	-	-	-
Beryllium (Be)	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-
Bismuth (Bi)	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	-
Boron (B)	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	-	-	-
Cadmium (Cd)	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	-	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	-	-
Calcium (Ca)	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	<0.050	<0.050	<0.050	<0.050	-	-	-	-
Chromium (Cr)	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-
Cobalt (Co)	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-
Copper (Cu)	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-
Iron (Fe)	<0.030	<0.030	-	<0.030	<0.030	-	<0.030	-	<0.030	<0.030	<0.030	<0.030	-	-	-	-
Lead (Pb)	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	-
Lithium (Li)	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	-
Magnesium (Mg)	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	-	-	-	-
Manganese (Mn)	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-
Mercury (Hg)	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	-	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	-	-
Molybdenum (Mo)	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	-
Nickel (Ni)	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-
Phosphorus (P)	<0.30	<0.30	-	<0.30	<0.30	-	<0.30	-	<0.30	<0.30	<0.30	<0.30	-	-	-	-
Potassium (K)	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	<0.050	<0.050	<0.050	<0.050	-	-	-	-
Selenium (Se)	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	-
Silicon (Si)	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	<0.050	<0.050	<0.050	<0.050	-	-	-	-
Silver (Ag)	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	-
Sodium (Na)	<2.0	<2.0	-	<2.0	<2.0	-	<2.0	-	<2.0	<2.0	<2.0	<2.0	-	-	-	-
Strontium (Sr)	<0.00020	<0.00020	-	<0.00020	<0.00020	-	<0.00020	-	<0.00020	<0.00020	<0.00020	<0.00020	-	-	-	-
Sulphur (S)	-	-	-	<0.50	<0.50	-	<0.50	-	<0.50	<0.50	<0.50	<0.50	-	-	-	-
Thallium (Tl)	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	-
Tin (Sn)	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-
Titanium (Ti)	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	-	-	-
Uranium (U)	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	-
Vanadium (V)	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-
Zinc (Zn)	<0.0030	<0.0030	-	<0.0030	<0.0030	-	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	-	-	-	-
Polycyclic Aromatic Hydrocarbons																
Acenaphthene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050
Acenaphthylene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050
Acridine	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050
Anthracene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050
Benz[a]anthracene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050

Appendix 8-B. Water Quality Blank Results, Tenas Project, 2017 to 2018

Site	Travel Blank							
Date	**26-Sep-2017**	**18-Oct-2017**	**28-Nov-2017**	**14-Dec-2017**	**17-Jan-2018**	**20-Feb-2018**	**21-Mar-2018**	**17-Apr-2018**
Time	**10:40**	**-**	**-**	**-**	**-**	**-**	**-**	**13:49**
ALS Sample ID	**L1998999-14**	**L2010562-2**	**L2029323-5**	**L2036162-15**	**L2047188-13**	**L2059721-13**	**L2071214-14**	**L2082790-8**
Total Metals *(cont'd)*								
Potassium (K)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Selenium (Se)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Sulphur (S)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals								
Aluminum (Al)	<0.0030	-	-	-	-	-	-	<0.0030
Antimony (Sb)	<0.00010	-	-	-	-	-	-	<0.00010
Arsenic (As)	<0.00010	-	-	-	-	-	-	<0.00010
Barium (Ba)	0.0000860	-	-	-	-	-	-	<0.00010
Beryllium (Be)	<0.00010	-	-	-	-	-	-	<0.00010
Bismuth (Bi)	<0.000050	-	-	-	-	-	-	<0.000050
Boron (B)	<0.010	-	-	-	-	-	-	<0.010
Cadmium (Cd)	<0.0000050	-	-	-	-	-	-	<0.0000050
Calcium (Ca)	<0.050	-	-	-	-	-	-	<0.050
Chromium (Cr)	<0.00010	-	-	-	-	-	-	<0.00010
Cobalt (Co)	<0.00010	-	-	-	-	-	-	<0.00010
Copper (Cu)	<0.00050	-	-	-	-	-	-	<0.00050
Iron (Fe)	<0.030	-	-	-	-	-	-	<0.030
Lead (Pb)	<0.000050	-	-	-	-	-	-	<0.000050
Lithium (Li)	<0.0010	-	-	-	-	-	-	<0.0010
Magnesium (Mg)	<0.0050	-	-	-	-	-	-	<0.0050
Manganese (Mn)	<0.00010	-	-	-	-	-	-	<0.00010
Mercury (Hg)	<0.0000050	-	-	-	-	-	-	<0.0000050
Molybdenum (Mo)	<0.000050	-	-	-	-	-	-	<0.000050
Nickel (Ni)	<0.00050	-	-	-	-	-	-	<0.00050
Phosphorus (P)	<0.30	-	-	-	-	-	-	<0.30
Potassium (K)	<0.050	-	-	-	-	-	-	<0.050
Selenium (Se)	<0.000050	-	-	-	-	-	-	<0.000050
Silicon (Si)	<0.050	-	-	-	-	-	-	<0.050
Silver (Ag)	<0.000010	-	-	-	-	-	-	<0.000010
Sodium (Na)	<2.0	-	-	-	-	-	-	<2.0
Strontium (Sr)	<0.00020	-	-	-	-	-	-	<0.00020
Sulphur (S)	<0.50	-	-	-	-	-	-	<0.50
Thallium (Tl)	<0.000010	-	-	-	-	-	-	<0.000010
Tin (Sn)	<0.00010	-	-	-	-	-	-	<0.00010
Titanium (Ti)	<0.010	-	-	-	-	-	-	<0.010
Uranium (U)	<0.000010	-	-	-	-	-	-	<0.000010
Vanadium (V)	<0.00050	-	-	-	-	-	-	<0.00050
Zinc (Zn)	<0.0030	-	-	-	-	-	-	<0.0030
Polycyclic Aromatic Hydrocarbons								
Acenaphthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz[a]anthracene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

Appendix 8-B. Water Quality Blank Results, Tenas Project, 2017 to 2018

Site	Field Blank												Travel Blank			
Date	**3-May-2017**	**20-Jun-2017**	**27-Jul-2017**	**17-Aug-2017**	**26-Sep-2017**	**18-Oct-2017**	**21-Nov-2017**	**14-Dec-2017**	**17-Jan-2018**	**20-Feb-2018**	**21-Mar-2018**	**17-Apr-2018**	**3-May-2017**	**21-Jun-2017**	**27-Jul-2017**	**17-Aug-2017**
Time	**-**	**-**	**-**	**12:00**	**10:40**	**-**	**-**	**-**	**-**	**-**	**9:50**	**13:49**	**-**	**-**	**-**	**-**
ALS Sample ID	**L1922134-5**	**L1947234-14**	**L1966679-14**	**L1977457-13**	**L1998999-13**	**L2010562-1**	**L2027227-9**	**L2036162-16**	**L2047188-14**	**L2059721-12**	**L2071214-13**	**L2082790-7**	**L1922134-6**	**L1947234-12**	**L1966679-13**	**L1977457-14**
Polycyclic Aromatic Hydrocarbons *(cont'd)*																
Benzo[a]pyrene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo[g,h,i]perylene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050
Benzo[b]fluoranthene	<0.000050	<0.000050	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	-	-
Benzo[b,j]fluoranthene	-	-	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	<0.000050	<0.000050
Benzo[b,j,k]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	<0.000015	-	-	-	-
Benzo[k]fluoranthene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050
Chrysene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050
Fluorene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050
Indeno[1,2,3-c,d]pyrene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050
Naphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
1-Methylnaphthalene	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	-
2-Methylnaphthalene	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	-
Phenanthrene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000050	<0.000050	<0.000050	<0.000050
Pyrene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050
Quinoline	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	112	72.0	93.2	87.1	94.7	83.1	76.7	102	98.8	97.0	102	74.5	115	65.8	91.4	78.9
Chrysene d12	110	76.7	123	80.0	113	91.2	121	118	88.8	83.0	93.2	70.8	122	69.7	121	81.6
Naphthalene d8	102	83.8	92.0	92.4	93.5	79.0	98.3	106	118	98.6	95.2	86.9	115	73.9	90.4	83.2
Phenanthrene d10	118	76.8	96.4	97.5	98.7	86.2	86.4	118	121	108	112	79.1	122	71.2	95.5	91.8
Aggregate Organics																
BOD	<2.0	<2.0	<2.0	-	-	-	-	-	-	-	-	-	<2.0	<2.0	<2.0	-
COD	<20	<20	<20	-	-	-	-	-	-	-	-	-	<20	<20	<20	-
Phenols (4AAP)	<0.0010	-	-	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	<0.0010
Volatile Organic Compounds																
Benzene	<0.00050	<0.00050	-	-	-	-	<0.00050	-	-	<0.00050	-	-	<0.00050	<0.00050	-	-
Ethylbenzene	<0.00050	<0.00050	-	-	-	-	<0.00050	-	-	<0.00050	-	-	<0.00050	<0.00050	-	-
Methyl t-butyl ether (MTBE)	<0.00050	<0.00050	-	-	-	-	<0.00050	-	-	<0.00050	-	-	<0.00050	<0.00050	-	-
Styrene	<0.00050	<0.00050	-	-	-	-	<0.00050	-	-	<0.00050	-	-	<0.00050	<0.00050	-	-
Toluene	<0.00045	<0.00045	-	-	-	-	<0.00045	-	-	<0.00045	-	-	<0.00045	<0.00045	-	-
ortho-Xylene	<0.00050	<0.00050	-	-	-	-	<0.00050	-	-	<0.00050	-	-	<0.00050	<0.00050	-	-
meta- & para-Xylene	<0.00050	<0.00050	-	-	-	-	<0.00050	-	-	<0.00050	-	-	<0.00050	<0.00050	-	-
Xylene	<0.00075	<0.00075	-	-	-	-	<0.00075	-	-	<0.00075	-	-	<0.00075	<0.00075	-	-
4-Bromofluorobenzene (SS)	100	86.6	-	-	-	-	70.2	-	-	92.1	-	-	102	88.4	-	-
1,4-Difluorobenzene (SS)	101	94.8	-	-	-	-	99.7	-	-	97.9	-	-	101	93.7	-	-
Hydrocarbons																
Volatile Hydrocarbons (VH6-10)	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	<0.10	<0.10	-	-
VPH (C6-C10)	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	<0.10	<0.10	-	-
3,4-Dichlorotoluene (SS)	99.6	93.2	-	-	-	-	-	-	-	-	-	-	98.9	103	-	-
Radiological																
Ra-226	-	-	-	<0.0040	-	-	-	-	-	-	-	-	-	-	-	0.00580

Appendix 8-B. Water Quality Blank Results, Tenas Project, 2017 to 2018

Site	Travel Blank							
Date	**26-Sep-2017**	**18-Oct-2017**	**28-Nov-2017**	**14-Dec-2017**	**17-Jan-2018**	**20-Feb-2018**	**21-Mar-2018**	**17-Apr-2018**
Time	**10:40**	**-**	**-**	**-**	**-**	**-**	**-**	**13:49**
ALS Sample ID	**L1998999-14**	**L2010562-2**	**L2029323-5**	**L2036162-15**	**L2047188-13**	**L2059721-13**	**L2071214-14**	**L2082790-8**
Polycyclic Aromatic Hydrocarbons *(cont'd)*								
Benzo[a]pyrene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo[g,h,i]perylene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[b]fluoranthene	-	-	-	-	-	-	-	-
Benzo[b,j]fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo[b,j,k]fluoranthene	-	-	-	-	-	-	-	<0.000015
Benzo[k]fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000060
Fluoranthene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno[1,2,3-c,d]pyrene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
1-Methylnaphthalene	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
2-Methylnaphthalene	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	86.9	85.0	78.8	112	103	106	89.4	80.9
Chrysene d12	110	108	109	108	126	89.7	88.8	78.8
Naphthalene d8	86.5	91.9	97.7	113	126	108	94.5	91.7
Phenanthrene d10	92.5	99.2	97.1	124	127	113	109	84.8
Aggregate Organics								
BOD	-	-	-	-	-	-	-	-
COD	-	-	-	-	-	-	-	-
Phenols (4AAP)	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010
Volatile Organic Compounds								
Benzene	-	-	<0.00050	-	-	<0.00050	-	-
Ethylbenzene	-	-	<0.00050	-	-	<0.00050	-	-
Methyl t-butyl ether (MTBE)	-	-	<0.00050	-	-	<0.00050	-	-
Styrene	-	-	<0.00050	-	-	<0.00050	-	-
Toluene	-	-	<0.00045	-	-	<0.00045	-	-
ortho-Xylene	-	-	<0.00050	-	-	<0.00050	-	-
meta- & para-Xylene	-	-	<0.00050	-	-	<0.00050	-	-
Xylene	-	-	<0.00075	-	-	<0.00075	-	-
4-Bromofluorobenzene (SS)	-	-	97.5	-	-	93.6	-	-
1,4-Difluorobenzene (SS)	-	-	99.3	-	-	97.7	-	-
Hydrocarbons								
Volatile Hydrocarbons (VH6-10)	-	-	-	-	-	-	-	-
VPH (C6-C10)	-	-	-	-	-	-	-	-
3,4-Dichlorotoluene (SS)	-	-	-	-	-	-	-	-
Radiological								
Ra-226	-	-	-	-	-	-	-	-

Notes:
All units are in mg/L unless otherwise noted.
Shaded cells indicate detected concentrations.

Appendix 8-C

Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS01			WQS10			WQS09			WQS08			WQS08		
Date	4-May-2017			3-May-2017			20-Jun-2017			27-Jul-2017			16-Aug-2017		
ALS Sample ID	L1922134-9	L1922134-15	RPD (%)	L1922134-3	L1922134-4	RPD (%)	L1947234-5	L1947234-13	RPD (%)	L1966679-8	L1966679-12	RPD (%)	L1977457-7	L1977457-12	RPD (%)
Physical Tests															
Colour, True	-	-	-	-	-	-	-	-	-	8.00	8.50	n/a	<5.0	11.4	n/a
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	54.5	54.4	0.2	64.9	62.5	3.8
Hardness (as $CaCO_3$)	57.4	57.1	0.5	40.2	39.4	2.0	28.8	27.5	4.6	25.6	24.2	5.6	31.5	29.3	7.2
pH	-	-	-	-	-	-	-	-	-	7.69	7.70	0.1	7.63	7.58	0.7
Total Suspended Solids	-	-	-	-	-	-	-	-	-	19.9	11.3	n/a	5.20	<3.0	n/a
Total Dissolved Solids	-	-	-	-	-	-	-	-	-	41.0	44.0	n/a	44.0	45.0	n/a
Turbidity (NTU)	-	-	-	-	-	-	-	-	-	14.5	15.0	3.4	7.95	7.32	8.3
Acidity (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	1.90	1.90	n/a	2.30	2.50	n/a
Alkalinity, Total (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	23.4	22.6	3.5	27.3	28.2	3.2
Anions															
Bromide (Br)	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Chloride (Cl)	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Fluoride (F)	0.0250	0.0260	n/a	0.0260	0.0260	n/a	0.0220	0.0220	n/a	<0.020	<0.020	n/a	0.0200	0.0210	n/a
Sulphate (SO_4)	0.930	0.930	n/a	2.60	2.60	0.0	6.10	6.08	0.3	4.36	4.34	0.5	4.78	4.62	3.4
Nutrients															
Total Nitrogen	-	-	-	-	-	-	-	-	-	<0.030	0.0380	n/a	<0.030	<0.030	n/a
Total Kjeldahl Nitrogen	0.368	0.339	8.2	0.199	0.213	n/a	0.0960	0.0950	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Ammonia as N	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Nitrate (as N)	0.0864	0.0860	0.5	0.0321	0.0322	0.3	0.0143	0.0142	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Nitrite (as N)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Total Phosphorus (as P)	0.0502	0.0580	14.4	0.00630	0.00630	n/a	0.0368	0.0364	1.1	0.0241	0.0325	*29.7*	0.00990	0.00930	n/a
Dissolved Orthophosphate (as P)	-	-	-	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010	n/a
Carbon															
Total Organic Carbon	15.5	14.9	3.9	8.28	7.86	5.2	2.30	2.43	n/a	0.610	0.920	n/a	<0.50	0.510	n/a
Dissolved Organic Carbon	13.4	13.3	0.7	7.19	7.57	5.1	1.91	1.90	n/a	0.630	<0.50	n/a	<0.50	<0.50	n/a
Total Inorganic Carbon	12.9	12.8	0.8	8.19	8.56	4.4	5.86	5.88	0.3	5.57	5.59	0.4	-	-	-
Dissolved Inorganic Carbon	12.3	11.8	4.1	5.23	6.23	17.5	5.70	5.66	0.7	6.12	5.87	4.2	-	-	-
Cyanide															
Cyanide, Total	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0020	<0.0020	n/a	-	-	-	-	-	-
Cyanide, Weak Acid Dissociable	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0020	<0.0020	n/a	-	-	-	<0.0050	<0.0050	n/a
Cyanide, Free	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	-	-	-	<0.0050	<0.0050	n/a
Total Metals															
Aluminum (Al)	2.23	1.59	*33.5*	0.422	0.437	3.5	1.10	1.17	6.2	0.563	0.565	0.4	0.267	0.258	3.4
Antimony (Sb)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Arsenic (As)	0.000920	0.000880	4.4	0.000400	0.000370	n/a	0.000460	0.000470	n/a	0.000190	0.000210	n/a	0.000150	0.000140	n/a
Barium (Ba)	0.0519	0.0472	9.5	0.0331	0.0328	0.9	0.0397	0.0401	1.0	0.0384	0.0379	1.3	0.0390	0.0397	1.8
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Boron (B)	0.0170	0.0160	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	0.0000210	0.0000185	n/a	0.0000150	0.0000109	n/a	0.0000345	0.0000295	15.6	0.0000224	0.0000247	n/a	0.0000220	0.0000210	n/a
Calcium (Ca)	17.2	17.2	0.0	12.0	11.9	0.8	9.66	9.46	2.1	8.03	8.23	2.5	9.76	9.87	1.1
Chromium (Cr)	0.00226	0.00172	*27.1*	0.000530	0.000490	n/a	0.000720	0.000730	1.4	0.000290	0.000370	n/a	0.000180	0.000150	n/a
Cobalt (Co)	0.000990	0.000920	7.3	0.000190	0.000190	n/a	0.000550	0.000590	7.0	0.000270	0.000280	n/a	0.000120	0.000130	n/a
Copper (Cu)	0.00491	0.00463	5.9	0.00224	0.00212	n/a	0.00382	0.00390	2.1	0.00170	0.00183	n/a	0.00110	0.00112	n/a
Iron (Fe)	1.79	1.51	17.0	0.639	0.639	0.0	1.01	1.06	4.8	0.584	0.608	4.0	0.381	0.368	3.5

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS09			WQS11			WQS02			WQS05			WQS02		
Date	26-Sep-2017			27-Sep-2017			18-Oct-2017			18-Oct-2017			28-Nov-2017		
ALS Sample ID	L1998999-8	L1998999-15	RPD (%)	L1998999-10	L1998999-12	RPD (%)	L2010562-3	L2010562-5	RPD (%)	L2010562-4	L2010562-9	RPD (%)	L2029323-2	L2029323-4	RPD (%)
Physical Tests															
Colour, True	23.0	22.9	n/a	6.10	5.90	n/a	14.3	25.3	n/a	20.9	13.9	n/a	21.0	20.7	n/a
Conductivity (µS/cm)	69.6	69.0	0.9	51.7	52.1	0.8	162	144	11.8	77.5	165	**72.2**	143	142	0.7
Hardness (as $CaCO_3$)	32.1	30.0	6.8	22.8	25.0	9.2	78.1	69.5	11.7	36.2	75.8	**70.7**	68.9	72.5	5.1
pH	7.72	7.73	0.1	7.70	7.68	0.3	7.85	8.08	2.9	7.77	8.04	3.4	8.16	8.14	0.2
Total Suspended Solids	29.5	31.1	5.3	<3.0	<3.0	n/a	3.10	4.30	n/a	3.50	6.90	n/a	<3.0	3.70	n/a
Total Dissolved Solids	72.0	69.0	4.3	39.0	37.0	n/a	105	95.0	10.0	55.0	108	n/a	88.0	98.0	10.8
Turbidity (NTU)	59.9	56.4	6.0	1.90	1.98	4.1	5.67	6.67	16.2	3.50	5.83	*49.9*	2.56	3.36	*27.0*
Acidity (as $CaCO_3$)	1.80	1.80	n/a	1.70	1.70	n/a	1.50	1.70	n/a	1.40	1.80	n/a	<1.0	<1.0	n/a
Alkalinity, Total (as $CaCO_3$)	28.8	29.1	1.0	22.8	23.1	1.3	61.4	78.2	*24.1*	37.2	62.8	**51.2**	79.8	79.6	0.3
Anions															
Bromide (Br)	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Chloride (Cl)	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Fluoride (F)	0.0330	0.0340	n/a	0.0250	0.0300	n/a	0.0320	0.0300	n/a	0.0270	0.0320	n/a	0.0290	0.0280	n/a
Sulphate (SO_4)	6.90	6.91	0.1	4.09	4.10	0.2	23.3	2.69	**158.6**	4.78	23.5	**132.4**	1.80	1.78	1.1
Nutrients															
Total Nitrogen	0.103	0.0610	n/a	0.0650	0.0700	n/a	0.101	0.129	n/a	0.0990	0.0980	n/a	0.119	0.120	n/a
Total Kjeldahl Nitrogen	0.0860	0.0930	n/a	0.0840	0.0640	n/a	0.0620	0.124	n/a	0.0640	0.0650	n/a	0.101	0.0950	n/a
Ammonia as N	0.0313	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Nitrate (as N)	0.0153	0.0148	n/a	<0.0050	<0.0050	n/a	0.0266	<0.0050	n/a	0.00820	0.0266	n/a	0.0174	0.0170	n/a
Nitrite (as N)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Total Phosphorus (as P)	0.0442	0.0281	*44.5*	0.00430	0.00450	n/a	0.00520	0.00520	n/a	0.00560	0.00510	n/a	0.00350	0.00390	n/a
Dissolved Orthophosphate (as P)	0.00200	0.00190	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Carbon															
Total Organic Carbon	1.06	1.30	n/a	1.12	1.23	n/a	3.77	6.05	*46.4*	3.86	3.74	3.2	5.78	5.51	4.8
Dissolved Organic Carbon	0.770	0.890	n/a	0.880	0.990	n/a	3.37	5.51	*48.2*	3.55	3.19	10.7	5.48	5.29	3.5
Total Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide															
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Weak Acid Dissociable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Free	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals															
Aluminum (Al)	2.70	2.57	4.9	0.0745	0.0814	8.9	0.231	0.270	15.6	0.140	0.234	**50.3**	0.125	0.184	*38.2*
Antimony (Sb)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.000140	0.000160	n/a	<0.00010	0.000110	n/a	0.0001	<0.00010	n/a
Arsenic (As)	0.000340	<0.00040	n/a	<0.00020	<0.00020	n/a	0.000340	0.000530	n/a	0.000230	0.000340	n/a	0.000460	0.000480	n/a
Barium (Ba)	0.0763	0.0802	5.0	0.0218	0.0225	3.2	0.0535	0.0332	*46.8*	0.0358	0.0541	*40.7*	0.0307	0.0305	0.7
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	0.0130	n/a	<0.010	<0.010	n/a	0.0150	0.0140	n/a
Cadmium (Cd)	0.0000802	0.0000867	7.8	<0.0000050	<0.0000050	n/a	0.0000070	<0.0000050	n/a	0.0000121	0.0000083	n/a	<0.0000050	<0.0000050	n/a
Calcium (Ca)	11.5	10.8	6.3	7.90	7.75	1.9	23.8	21.6	9.7	11.9	23.8	**66.7**	22.9	21.9	4.5
Chromium (Cr)	0.00105	0.00104	1.0	<0.00010	0.000170	n/a	0.000390	0.000580	n/a	0.000190	0.000380	n/a	0.000450	0.000510	n/a
Cobalt (Co)	0.00104	0.00107	2.8	<0.00010	<0.00010	n/a	0.000160	0.000150	n/a	<0.00010	0.000160	n/a	<0.00010	<0.00010	n/a
Copper (Cu)	0.00622	0.00589	5.5	0.000760	0.000800	n/a	0.00181	0.00211	n/a	0.00135	0.00180	n/a	0.00201	0.00203	n/a
Iron (Fe)	2.55	2.48	2.8	0.0800	0.0930	n/a	0.266	0.254	4.6	0.317	0.269	16.4	0.0960	0.136	n/a

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS05			WQS01			WQS06			WQS02			WQS05		
Date	21-Nov-2017			14-Dec-2017			12-Dec-2017			17-Jan-2018			18-Jan-2018		
ALS Sample ID	L2027227-2	L2027227-8	RPD (%)	L2036162-1	L2036162-14	RPD (%)	L2036162-6	L2036162-13	RPD (%)	L2047188-1	L2047188-11	RPD (%)	L2047188-7	L2047188-12	RPD (%)
Physical Tests															
Colour, True	23.0	23.2	n/a	11.7	11.6	n/a	14.9	14.6	n/a	7.30	8.20	n/a	7.00	8.50	n/a
Conductivity (µS/cm)	147	149	1.4	156	157	0.6	167	168	0.6	176	177	0.6	195	194	0.5
Hardness (as $CaCO_3$)	74.1	74.4	0.4	76.0	89.9	16.8	75.8	95.5	*23.0*	86.6	86.2	0.5	91.6	92.5	1.0
pH	7.93	7.96	0.4	8.12	8.12	0.0	7.95	7.95	0.0	8.13	8.18	0.6	8.05	8.04	0.1
Total Suspended Solids	<3.0	4.70	n/a	<3.0	<3.0	n/a	3.30	3.70	n/a	<3.0	<3.0	n/a	3.50	4.70	n/a
Total Dissolved Solids	106	107	0.9	99.0	97.0	2.0	111	109	1.8	102	121	17.0	119	122	2.5
Turbidity (NTU)	4.59	4.98	8.2	1.58	1.75	10.2	6.74	6.75	0.1	0.940	1.000	6.2	2.61	2.58	1.2
Acidity (as $CaCO_3$)	2.20	2.10	n/a	1.60	1.60	n/a	2.10	2.00	n/a	1.000	<1.0	n/a	1.10	<1.0	n/a
Alkalinity, Total (as $CaCO_3$)	60.8	61.9	1.8	83.3	84.6	1.5	60.8	60.4	0.7	94.6	95.3	0.7	76.4	76.1	0.4
Anions															
Bromide (Br)	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Chloride (Cl)	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Fluoride (F)	0.0390	0.0390	n/a	0.0340	0.0330	n/a	0.0380	0.0390	n/a	0.0360	0.0360	n/a	0.0370	0.0370	n/a
Sulphate (SO_4)	17.3	17.3	0.0	2.00	2.02	1.0	25.4	25.5	0.4	2.75	2.74	0.4	23.4	23.3	0.4
Nutrients															
Total Nitrogen	0.157	0.159	1.3	0.0990	0.0860	n/a	0.139	0.130	n/a	0.0800	0.0760	n/a	0.101	0.1000	n/a
Total Kjeldahl Nitrogen	0.134	0.123	n/a	0.0630	0.0770	n/a	0.116	0.142	n/a	0.0630	0.0770	n/a	0.0610	0.0800	n/a
Ammonia as N	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Nitrate (as N)	0.0309	0.0298	3.6	0.0228	0.0225	n/a	0.0412	0.0414	0.5	0.0417	0.0415	0.5	0.0561	0.0560	0.2
Nitrite (as N)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Total Phosphorus (as P)	0.00450	0.00400	n/a	0.00480	0.00420	n/a	0.00630	0.00730	n/a	0.00280	0.00260	n/a	0.00450	0.00480	n/a
Dissolved Orthophosphate (as P)	<0.0010	<0.0010	n/a	0.001000	0.00130	n/a	<0.0010	<0.0010	n/a	0.00130	<0.0010	n/a	<0.0010	<0.0010	n/a
Carbon															
Total Organic Carbon	5.83	6.13	5.0	3.46	4.49	*25.9*	4.55	4.66	2.4	2.52	2.55	1.2	2.78	2.82	1.4
Dissolved Organic Carbon	5.82	5.89	1.2	3.37	3.15	6.7	4.53	4.30	5.2	2.63	2.47	n/a	2.75	2.58	6.4
Total Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide															
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Weak Acid Dissociable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Free	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals															
Aluminum (Al)	0.207	0.273	*27.5*	0.0959	0.102	6.2	0.345	0.373	7.8	0.0374	0.0616	*48.9*	0.131	0.139	5.9
Antimony (Sb)	0.0001	<0.00010	n/a	0.000110	0.000120	n/a	0.000130	<0.00010	n/a	0.000130	0.000110	n/a	0.000120	<0.00010	n/a
Arsenic (As)	0.000340	0.000340	n/a	0.000510	0.000520	1.9	0.000320	0.000350	n/a	0.000370	0.000480	n/a	0.000230	0.000230	n/a
Barium (Ba)	0.0474	0.0491	3.5	0.0370	0.0390	5.3	0.0681	0.0727	6.5	0.0350	0.0433	*21.2*	0.0567	0.0568	0.2
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Boron (B)	<0.010	<0.010	n/a	0.0160	0.0170	n/a	<0.010	<0.010	n/a	0.0170	0.0170	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	0.0000061	0.0000063	n/a	<0.0000050	<0.0000050	n/a	0.0000104	0.0000080	n/a	<0.0000050	<0.0000050	n/a	0.0000057	0.0000061	n/a
Calcium (Ca)	23.1	23.5	1.7	25.4	27.7	8.7	27.1	28.7	5.7	26.4	27.5	4.1	28.1	28.7	2.1
Chromium (Cr)	0.000390	0.000430	n/a	0.000430	0.000420	n/a	0.000440	0.000470	n/a	0.000410	0.000480	n/a	0.000340	0.000320	n/a
Cobalt (Co)	0.000130	0.000130	n/a	<0.00010	<0.00010	n/a	0.000220	0.000240	n/a	<0.00010	<0.00010	n/a	0.000110	0.000110	n/a
Copper (Cu)	0.00276	0.00271	1.8	0.00137	0.00150	n/a	0.00263	0.00287	8.7	0.00110	0.00142	n/a	0.00159	0.00152	n/a
Iron (Fe)	0.255	0.262	2.7	0.0790	0.0730	n/a	0.404	0.426	5.3	0.0390	0.0420	n/a	0.159	0.158	0.6

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS01			WQS04B			WQS08			WQS10			WQS02		
Date	19-Feb-2018			20-Feb-2018			21-Mar-2018			20-Mar-2018			18-Apr-2018		
ALS Sample ID	L2059721-2	L2059721-6	RPD (%)	L2059721-8	L2059721-11	RPD (%)	L2071214-9	L2071214-12	RPD (%)	L2071214-5	L2071214-8	RPD (%)	L2082789-2	L2082789-4	RPD (%)
Physical Tests															
Colour, True	<5.0	<5.0	n/a	5.80	6.20	n/a	9.40	9.20	n/a	8.10	6.70	n/a	21.1	21.2	n/a
Conductivity (µS/cm)	175	175	0.0	208	204	1.9	128	120	6.5	132	131	0.8	182	181	0.6
Hardness (as $CaCO_3$)	88.2	89.0	0.9	102	106	3.8	65.9	67.5	2.4	72.3	72.1	0.3	83.8	82.0	2.2
pH	8.29	8.29	0.0	8.39	8.19	2.4	8.03	8.03	0.0	8.07	8.04	0.4	8.02	8.03	0.1
Total Suspended Solids	<3.0	<3.0	n/a	<3.0	<3.0	n/a	<3.0	3.50	n/a	<3.0	<3.0	n/a	<3.0	<3.0	n/a
Total Dissolved Solids	108	107	0.9	130	129	0.8	84.0	80.0	4.9	84.0	83.0	1.2	116	120	3.4
Turbidity (NTU)	0.910	0.860	5.6	0.910	0.900	1.1	6.11	4.86	*22.8*	1.77	1.76	0.6	1.67	1.50	10.7
Acidity (as $CaCO_3$)	<1.0	<1.0	n/a	<1.0	<1.0	n/a	1.30	1.30	n/a	1.50	<1.0	n/a	<1.0	<1.0	n/a
Alkalinity, Total (as $CaCO_3$)	94.7	94.4	0.3	112	111	0.9	57.6	58.1	0.9	62.5	61.8	1.1	96.5	96.6	0.1
Anions															
Bromide (Br)	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Chloride (Cl)	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Fluoride (F)	0.0360	0.0340	n/a	0.0390	0.0410	n/a	0.0350	0.0370	n/a	0.0350	0.0360	n/a	0.0360	0.0360	n/a
Sulphate (SO_4)	2.60	2.60	0.0	5.72	5.92	3.4	5.63	5.64	0.2	6.90	6.90	0.0	2.73	2.71	0.7
Nutrients															
Total Nitrogen	0.0900	0.123	n/a	0.108	0.0950	n/a	0.0910	0.0910	n/a	0.0860	0.0840	n/a	0.241	0.192	*22.6*
Total Kjeldahl Nitrogen	<0.050	<0.050	n/a	0.0540	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	0.125	0.150	n/a
Ammonia as N	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Nitrate (as N)	0.0551	0.0546	0.9	0.0386	0.0390	1.0	0.0524	0.0527	0.6	0.0506	0.0491	3.0	0.0591	0.0604	2.2
Nitrite (as N)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Total Phosphorus (as P)	0.00360	0.00250	n/a	0.00280	0.00300	n/a	0.00880	0.00740	n/a	0.00750	0.00540	n/a	0.00430	0.00370	n/a
Dissolved Orthophosphate (as P)	0.00150	0.00170	n/a	0.00120	0.001000	n/a	0.00130	0.001000	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Carbon															
Total Organic Carbon	1.82	1.78	n/a	3.07	2.50	n/a	1.45	1.65	n/a	1.34	1.38	n/a	6.39	6.31	1.3
Dissolved Organic Carbon	1.93	1.76	n/a	2.60	2.62	0.8	1.62	1.61	n/a	1.25	1.58	n/a	6.28	6.40	1.9
Total Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide															
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Weak Acid Dissociable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Free	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals															
Aluminum (Al)	0.0469	0.0313	*39.9*	0.0345	0.0364	5.4	0.0935	0.116	*21.5*	0.0556	0.0557	0.2	0.0818	0.0752	8.4
Antimony (Sb)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Arsenic (As)	0.000440	0.000360	n/a	0.000290	0.000320	n/a	0.000240	0.000250	n/a	0.000180	0.000170	n/a	0.000410	0.000410	n/a
Barium (Ba)	0.0348	0.0332	4.7	0.0368	0.0377	2.4	0.0412	0.0435	5.4	0.0417	0.0419	0.5	0.0374	0.0361	3.5
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Boron (B)	0.0190	0.0190	n/a	0.0160	0.0160	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	0.0210	0.0210	n/a
Cadmium (Cd)	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	0.0000062	0.0000069	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Calcium (Ca)	26.3	26.5	0.8	29.3	30.7	4.7	19.6	18.8	4.2	20.2	20.7	2.4	25.9	25.8	0.4
Chromium (Cr)	0.000330	0.000340	n/a	0.000690	0.000260	n/a	0.000150	0.000180	n/a	0.000150	0.000130	n/a	0.000390	0.000420	n/a
Cobalt (Co)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Copper (Cu)	0.000820	0.000760	n/a	0.00111	0.00113	n/a	0.000740	0.000790	n/a	0.000660	0.000630	n/a	0.00199	0.00196	n/a
Iron (Fe)	0.0330	<0.030	n/a	0.0450	0.0470	n/a	0.365	0.385	5.3	0.223	0.227	1.8	0.0760	0.0690	n/a

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS05		
Date	17-Apr-2018		
ALS Sample ID	L2082790-3	L2082790-10	RPD (%)
Physical Tests			
Colour, True	22.7	22.8	n/a
Conductivity (µS/cm)	201	241	18.1
Hardness (as $CaCO_3$)	113	110	2.7
pH	7.98	7.99	0.1
Total Suspended Solids	7.80	8.60	n/a
Total Dissolved Solids	163	156	4.4
Turbidity (NTU)	10.5	9.35	11.6
Acidity (as $CaCO_3$)	<1.0	<1.0	n/a
Alkalinity, Total (as $CaCO_3$)	92.0	91.3	0.8
Anions			
Bromide (Br)	<0.050	<0.050	n/a
Chloride (Cl)	<0.50	<0.50	n/a
Fluoride (F)	0.0390	0.0390	n/a
Sulphate (SO_4)	31.3	31.2	0.3
Nutrients			
Total Nitrogen	0.209	0.211	1.0
Total Kjeldahl Nitrogen	0.163	0.120	n/a
Ammonia as N	<0.0050	<0.0050	n/a
Nitrate (as N)	0.0685	0.0685	0.0
Nitrite (as N)	<0.0010	<0.0010	n/a
Total Phosphorus (as P)	0.0120	0.0133	10.3
Dissolved Orthophosphate (as P)	<0.0010	<0.0010	n/a
Carbon			
Total Organic Carbon	6.43	6.37	0.9
Dissolved Organic Carbon	6.39	6.24	2.4
Total Inorganic Carbon	-	-	-
Dissolved Inorganic Carbon	-	-	-
Cyanide			
Cyanide, Total	-	-	-
Cyanide, Weak Acid Dissociable	-	-	-
Cyanide, Free	-	-	-
Total Metals			
Aluminum (Al)	0.449	0.721	46.5
Antimony (Sb)	<0.00010	<0.00010	n/a
Arsenic (As)	0.000430	0.000430	n/a
Barium (Ba)	0.0703	0.0637	9.9
Beryllium (Be)	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.000050	<0.000050	n/a
Boron (B)	<0.010	<0.010	n/a
Cadmium (Cd)	0.0000106	0.0000077	n/a
Calcium (Ca)	32.0	28.8	10.5
Chromium (Cr)	0.000890	0.000700	23.9
Cobalt (Co)	0.000540	0.000510	5.7
Copper (Cu)	0.00306	0.00300	2.0
Iron (Fe)	0.598	0.629	5.1

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS01			WQS10			WQS09			WQS08			WQS08		
Date	4-May-2017			3-May-2017			20-Jun-2017			27-Jul-2017			16-Aug-2017		
ALS Sample ID	L1922134-9	L1922134-15	RPD (%)	L1922134-3	L1922134-4	RPD (%)	L1947234-5	L1947234-13	RPD (%)	L1966679-8	L1966679-12	RPD (%)	L1977457-7	L1977457-12	RPD (%)
Total Metals *(cont'd)*															
Lead (Pb)	0.000427	0.000388	9.6	0.000162	0.000155	n/a	0.000942	0.000973	3.2	0.000824	0.000867	5.1	0.000478	0.000490	2.5
Lithium (Li)	0.00130	0.00110	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Magnesium (Mg)	4.24	4.05	4.6	2.54	2.51	1.2	1.80	1.80	0.0	1.26	1.30	3.1	1.31	1.32	0.8
Manganese (Mn)	0.0581	0.0584	0.5	0.0294	0.0294	0.0	0.0480	0.0621	*25.6*	0.0292	0.0305	4.4	0.0239	0.0243	1.7
Mercury (Hg)	0.0000084	0.0000088	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Molybdenum (Mo)	0.0000880	0.0000820	n/a	0.000299	0.000311	3.9	0.000490	0.000453	7.8	0.000985	0.000638	*42.8*	0.000572	0.000570	0.4
Nickel (Ni)	0.00204	0.00198	n/a	0.000700	<0.00050	n/a	0.000710	0.000710	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.513	0.400	*24.8*	0.326	0.336	3.0	0.396	0.394	0.5	0.300	0.294	2.0	0.284	0.287	1.1
Selenium (Se)	0.0000640	<0.000050	n/a	0.0000590	0.0000570	n/a	0.0000660	0.0000780	n/a	0.000101	0.0000670	n/a	0.000101	0.0000820	n/a
Silicon (Si)	7.82	6.12	*24.4*	4.13	4.01	2.9	3.88	3.94	1.5	2.25	2.25	0.0	2.17	2.17	0.0
Silver (Ag)	0.0000160	0.0000130	n/a	<0.000010	<0.000010	n/a	<0.000010	0.0000150	n/a	0.0000120	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	2.80	2.60	n/a	2.10	2.00	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.0864	0.0834	3.5	0.0588	0.0585	0.5	0.0471	0.0468	0.6	0.0443	0.0441	0.5	0.0506	0.0526	3.9
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	1.60	1.67	n/a
Thallium (Tl)	0.0000120	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	0.0690	0.0400	n/a	<0.015	0.0120	n/a	0.0340	0.0310	n/a	0.0220	0.0200	n/a	0.01000	<0.010	n/a
Uranium (U)	0.000145	0.000130	10.9	0.0000510	0.0000490	n/a	0.0000570	0.0000560	1.8	0.0000630	0.0000570	10.0	0.0000450	0.0000460	n/a
Vanadium (V)	0.00488	0.00367	*28.3*	0.00134	0.00137	n/a	0.00261	0.00258	1.2	0.00145	0.00135	n/a	0.000770	0.000740	n/a
Zinc (Zn)	0.00630	0.00610	n/a	<0.0030	<0.0030	n/a	0.00560	0.00550	n/a	0.00380	0.00390	n/a	0.00360	<0.0030	n/a
Dissolved Metals															
Aluminum (Al)	0.140	0.144	2.8	0.0757	0.0759	0.3	0.0272	0.0248	9.2	0.0436	0.0420	3.7	0.0304	0.0303	0.3
Antimony (Sb)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Arsenic (As)	0.000300	0.000300	n/a	0.000210	0.000200	n/a	0.000170	0.000170	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Barium (Ba)	0.0308	0.0306	0.7	0.0275	0.0274	0.4	0.0259	0.0245	5.6	0.0288	0.0279	3.2	0.0362	0.0342	5.7
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Boron (B)	0.0140	0.0140	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	<0.0000050	<0.0000050	n/a	0.0000051	0.0000064	n/a	0.0000075	0.0000090	n/a	0.0000062	<0.0000050	n/a	0.0000079	0.0000074	n/a
Calcium (Ca)	17.1	16.9	1.2	12.1	11.8	2.5	9.21	8.82	4.3	8.46	7.97	6.0	10.4	9.66	7.4
Chromium (Cr)	0.000310	0.000350	n/a	0.000210	0.000200	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Cobalt (Co)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Copper (Cu)	0.00237	0.00236	n/a	0.00153	0.00150	n/a	0.00135	0.00122	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Iron (Fe)	0.134	0.132	n/a	0.256	0.251	2.0	<0.030	<0.030	n/a	0.0330	0.0330	n/a	0.0440	0.0420	n/a
Lead (Pb)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	0.0000610	0.0000550	n/a	0.0000510	<0.000050	n/a
Lithium (Li)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Magnesium (Mg)	3.58	3.59	0.3	2.39	2.38	0.4	1.40	1.34	4.4	1.09	1.04	4.7	1.36	1.26	7.6
Manganese (Mn)	0.00327	0.00294	10.6	0.00635	0.00572	10.4	0.00550	0.00336	*48.3*	0.00181	0.000740	**83.9**	0.0108	0.0103	4.7
Mercury (Hg)	0.0000055	0.0000058	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Molybdenum (Mo)	0.0000610	0.0000600	n/a	0.000276	0.000276	0.0	0.000473	0.000431	9.3	0.000688	0.000658	4.5	0.000612	0.000601	1.8
Nickel (Ni)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.219	0.224	n/a	0.270	0.270	0.0	0.212	0.205	n/a	0.226	0.214	n/a	0.269	0.246	n/a
Selenium (Se)	<0.000050	<0.000050	n/a	0.0000530	<0.000050	n/a	0.0000590	<0.000050	n/a	<0.000050	<0.000050	n/a	0.0000840	0.0000920	n/a

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS09			WQS11			WQS02			WQS05			WQS02		
Date	26-Sep-2017			27-Sep-2017			18-Oct-2017			18-Oct-2017			28-Nov-2017		
ALS Sample ID	L1998999-8	L1998999-15	RPD (%)	L1998999-10	L1998999-12	RPD (%)	L2010562-3	L2010562-5	RPD (%)	L2010562-4	L2010562-9	RPD (%)	L2029323-2	L2029323-4	RPD (%)
Total Metals *(cont'd)*															
Lead (Pb)	0.00269	0.00270	0.4	<0.000050	0.0000530	n/a	0.0000640	0.0000590	n/a	0.000144	0.0000710	n/a	<0.000050	<0.000050	n/a
Lithium (Li)	0.00160	0.00110	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Magnesium (Mg)	2.39	2.53	5.7	0.880	0.885	0.6	4.26	3.87	9.6	1.81	4.18	**79.1**	4.02	3.91	2.8
Manganese (Mn)	0.0932	0.0917	1.6	0.00484	0.00558	14.2	0.0112	0.00770	*37.0*	0.0203	0.0117	**53.8**	0.00423	0.00674	*45.8*
Mercury (Hg)	<0.000025	<0.000025	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Molybdenum (Mo)	0.000716	0.000750	4.6	<0.00050	<0.00050	n/a	0.000305	0.000107	n/a	0.000542	0.000304	**56.3**	0.0000990	0.000102	n/a
Nickel (Ni)	0.000990	0.000950	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.816	0.840	2.9	0.268	0.276	2.9	0.410	0.248	n/a	0.360	0.371	3.0	0.183	0.182	n/a
Selenium (Se)	0.000108	0.0000950	n/a	<0.000050	<0.000050	n/a	0.0000580	<0.000050	n/a	0.0000820	0.0000680	n/a	<0.000050	0.0000730	n/a
Silicon (Si)	6.37	6.49	1.9	1.28	1.30	1.6	3.47	3.93	12.4	3.10	3.41	9.5	3.72	3.76	1.1
Silver (Ag)	0.000111	0.0000200	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	3.00	3.40	n/a	<2.0	2.90	n/a	3.00	2.90	n/a
Strontium (Sr)	0.0586	0.0571	2.6	0.0334	0.0323	3.3	0.0947	0.103	8.4	0.0607	0.0947	*43.8*	0.0986	0.0963	2.4
Sulphur (S)	2.33	2.12	n/a	1.24	1.18	n/a	8.48	1.06	n/a	1.72	8.16	n/a	0.570	0.530	n/a
Thallium (Tl)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	0.0940	0.0840	11.2	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.0000980	0.000102	4.0	0.0000230	0.0000230	n/a	0.0000780	0.000115	*38.3*	0.0000540	0.0000740	*31.3*	0.000114	0.000113	0.9
Vanadium (V)	0.00474	0.00460	3.0	<0.00050	<0.00050	n/a	0.000860	0.00133	n/a	0.000740	0.000860	n/a	0.000930	0.00102	n/a
Zinc (Zn)	0.0141	0.0119	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a
Dissolved Metals															
Aluminum (Al)	0.0160	0.0166	3.7	0.0168	0.0180	6.9	0.0130	0.0250	n/a	0.0234	0.0127	n/a	0.0284	0.0291	2.4
Antimony (Sb)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.0001	<0.00010	n/a
Arsenic (As)	<0.00010	<0.00010	n/a	0.000110	0.000120	n/a	0.000210	0.000360	n/a	0.000160	0.000200	n/a	0.000380	0.000390	n/a
Barium (Ba)	0.0310	0.0325	4.7	0.0211	0.0209	1.0	0.0513	0.0309	*49.6*	0.0341	0.0501	*38.0*	0.0309	0.0328	6.0
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	0.0130	n/a	<0.010	<0.010	n/a	0.0120	0.0120	n/a
Cadmium (Cd)	0.0000079	0.0000078	n/a	<0.0000050	<0.0000050	n/a	0.0000060	<0.0000050	n/a	0.0000066	0.0000060	n/a	<0.0000050	<0.0000050	n/a
Calcium (Ca)	10.6	9.63	9.6	7.58	8.45	10.9	24.5	21.7	12.1	11.6	23.5	**67.8**	21.0	22.0	4.7
Chromium (Cr)	0.000140	<0.00010	n/a	<0.00010	<0.00010	n/a	0.000210	0.000290	n/a	<0.00010	0.000120	n/a	0.000290	0.000230	n/a
Cobalt (Co)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Copper (Cu)	0.000700	0.000720	n/a	0.000580	0.000600	n/a	0.00124	0.00146	n/a	0.000960	0.00128	n/a	0.00154	0.00160	n/a
Iron (Fe)	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	0.112	<0.030	n/a	<0.030	<0.030	n/a
Lead (Pb)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Lithium (Li)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Magnesium (Mg)	1.35	1.46	7.8	0.939	0.946	0.7	4.10	3.73	9.5	1.75	4.18	**82.0**	4.01	4.29	6.7
Manganese (Mn)	0.00785	0.00796	1.4	0.00189	0.00191	1.1	0.00376	0.00119	**103.8**	0.00958	0.00366	**89.4**	0.000700	0.000680	2.9
Mercury (Hg)	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	0.0000063	0.0000069	n/a
Molybdenum (Mo)	0.000659	0.000534	*21.0*	0.000305	0.000350	13.7	0.000288	0.0000930	n/a	0.000517	0.000288	**56.9**	0.000103	0.000101	n/a
Nickel (Ni)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.321	0.351	8.9	0.297	0.285	4.1	0.357	0.201	n/a	0.336	0.322	4.3	0.173	0.185	n/a
Selenium (Se)	0.0000780	<0.000050	n/a	<0.000050	<0.000050	n/a	0.0000590	<0.000050	n/a	0.0000700	<0.000050	n/a	0.0000990	0.0000680	n/a

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS05			WQS01			WQS06			WQS02			WQS05		
Date	21-Nov-2017			14-Dec-2017			12-Dec-2017			17-Jan-2018			18-Jan-2018		
ALS Sample ID	L2027227-2	L2027227-8	RPD (%)	L2036162-1	L2036162-14	RPD (%)	L2036162-6	L2036162-13	RPD (%)	L2047188-1	L2047188-11	RPD (%)	L2047188-7	L2047188-12	RPD (%)
Total Metals *(cont'd)*															
Lead (Pb)	0.0000720	0.0000710	n/a	<0.000050	<0.000050	n/a	0.000117	0.000154	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Lithium (Li)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.00110	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Magnesium (Mg)	4.90	4.92	0.4	4.56	4.87	6.6	5.46	5.93	8.3	5.40	6.60	*20.0*	5.54	5.79	4.4
Manganese (Mn)	0.00770	0.00797	3.4	0.00289	0.00276	4.6	0.0121	0.0128	5.6	0.00348	0.00414	17.3	0.00694	0.00724	4.2
Mercury (Hg)	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Molybdenum (Mo)	0.000332	0.000335	0.9	0.000118	0.000115	n/a	0.000542	0.000595	9.3	0.000166	0.000144	n/a	0.000415	0.000395	4.9
Nickel (Ni)	0.000560	0.000550	n/a	<0.00050	<0.00050	n/a	0.000760	0.000820	n/a	<0.00050	<0.00050	n/a	0.000610	0.000540	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.366	0.373	1.9	0.176	0.184	n/a	0.494	0.539	8.7	0.179	0.250	n/a	0.377	0.381	1.1
Selenium (Se)	0.0000930	0.0000900	n/a	0.0000660	0.0000860	n/a	0.000125	0.000116	n/a	0.0000640	0.0000580	n/a	0.0000760	0.0000640	n/a
Silicon (Si)	3.33	3.58	7.2	4.15	4.52	8.5	3.83	4.02	4.8	3.67	3.69	0.5	3.13	3.10	1.0
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	2.80	2.80	n/a	3.60	3.90	n/a	3.20	3.30	n/a	4.20	5.10	n/a	3.70	3.70	n/a
Strontium (Sr)	0.0843	0.0839	0.5	0.122	0.131	7.1	0.0984	0.104	5.5	0.127	0.129	1.6	0.111	0.116	4.4
Sulphur (S)	5.70	5.95	4.3	0.760	0.880	n/a	10.2	10.3	1.0	1.02	0.950	n/a	7.78	7.61	2.2
Thallium (Tl)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	0.01000	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.0000730	0.0000720	1.4	0.000142	0.000155	8.8	0.0000840	0.0000810	3.6	0.000176	0.000177	0.6	0.000114	0.000114	0.0
Vanadium (V)	0.000820	0.000870	n/a	0.000990	0.00107	n/a	0.000870	0.000970	n/a	0.000750	0.000920	n/a	<0.00050	0.000510	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	0.00330	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a
Dissolved Metals															
Aluminum (Al)	0.0284	0.0276	2.9	0.0189	0.0137	n/a	0.0147	0.0147	n/a	0.00670	0.00730	n/a	0.00660	0.00650	n/a
Antimony (Sb)	<0.00010	<0.00010	n/a	<0.00010	0.000110	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Arsenic (As)	0.000250	0.000230	n/a	0.000420	0.000430	n/a	0.000160	0.000170	n/a	0.000350	0.000330	n/a	0.000160	0.000160	n/a
Barium (Ba)	0.0465	0.0471	1.3	0.0351	0.0366	4.2	0.0603	0.0649	7.3	0.0335	0.0353	5.2	0.0565	0.0556	1.6
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Boron (B)	<0.010	<0.010	n/a	0.0130	0.0150	n/a	<0.010	<0.010	n/a	0.0160	0.0150	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	0.0000058	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Calcium (Ca)	22.3	22.3	0.0	23.2	28.1	19.1	22.5	29.2	*25.9*	26.0	25.7	1.2	27.2	27.7	1.8
Chromium (Cr)	0.000180	0.000150	n/a	0.000250	0.000340	n/a	<0.00010	0.000110	n/a	0.000240	0.000270	n/a	<0.00010	0.000110	n/a
Cobalt (Co)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Copper (Cu)	0.00232	0.00229	n/a	0.00121	0.00112	n/a	0.00199	0.00199	n/a	0.000870	0.000860	n/a	0.00108	0.00107	n/a
Iron (Fe)	0.0370	0.0370	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a
Lead (Pb)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Lithium (Li)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Magnesium (Mg)	4.49	4.52	0.7	4.42	4.83	8.9	4.78	5.50	14.0	5.26	5.36	1.9	5.75	5.69	1.0
Manganese (Mn)	0.00237	0.00213	10.7	<0.00015	0.000190	n/a	0.00219	0.00219	0.0	0.000690	0.00108	*44.1*	0.000830	0.00107	*25.3*
Mercury (Hg)	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Molybdenum (Mo)	0.000369	0.000393	6.3	0.0000920	0.0000920	n/a	0.000479	0.000471	1.7	0.000135	0.000137	n/a	0.000382	0.000385	0.8
Nickel (Ni)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.000610	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.373	0.362	3.0	0.174	0.173	n/a	0.430	0.445	3.4	0.173	0.174	n/a	0.375	0.367	2.2
Selenium (Se)	0.0000930	0.0000660	n/a	0.0000600	0.0000570	n/a	0.000102	0.0000760	n/a	0.0000760	0.0000570	n/a	0.0000650	0.0000760	n/a

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS01			WQS04B			WQS08			WQS10			WQS02		
Date	19-Feb-2018			20-Feb-2018			21-Mar-2018			20-Mar-2018			18-Apr-2018		
ALS Sample ID	L2059721-2	L2059721-6	RPD (%)	L2059721-8	L2059721-11	RPD (%)	L2071214-9	L2071214-12	RPD (%)	L2071214-5	L2071214-8	RPD (%)	L2082789-2	L2082789-4	RPD (%)
Total Metals *(cont'd)*															
Lead (Pb)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	0.0000760	0.0000770	n/a	<0.000050	0.0000550	n/a	<0.000050	<0.000050	n/a
Lithium (Li)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.00110	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Magnesium (Mg)	4.71	4.62	1.9	5.91	6.35	7.2	3.02	3.25	7.3	3.46	3.50	1.1	5.35	5.42	1.3
Manganese (Mn)	0.00174	0.000860	67.7	0.00463	0.00459	0.9	0.0238	0.0252	5.7	0.0102	0.00999	2.1	0.00499	0.00493	1.2
Mercury (Hg)	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Molybdenum (Mo)	0.000140	0.000127	n/a	0.000194	0.000180	n/a	0.000451	0.000489	8.1	0.000484	0.000526	8.3	0.000137	0.000132	n/a
Nickel (Ni)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.176	0.163	n/a	0.228	0.240	n/a	0.295	0.309	4.6	0.303	0.303	0.0	0.216	0.217	n/a
Selenium (Se)	<0.000050	0.0000530	n/a	<0.000050	<0.000050	n/a	0.000103	0.0000760	n/a	0.0000840	0.0000610	n/a	0.0000610	0.0000670	n/a
Silicon (Si)	3.64	3.58	1.7	3.51	3.62	3.1	3.81	3.96	3.9	3.62	3.66	1.1	3.69	3.71	0.5
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	4.40	4.20	n/a	4.50	4.60	n/a	2.80	2.90	n/a	3.00	2.70	n/a	4.20	4.40	n/a
Strontium (Sr)	0.126	0.124	1.6	0.129	0.136	5.3	0.0793	0.0817	3.0	0.0833	0.0883	5.8	0.113	0.112	0.9
Sulphur (S)	1.02	0.950	n/a	1.88	1.95	n/a	1.80	1.90	n/a	2.28	2.40	n/a	0.930	0.860	n/a
Thallium (Tl)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000232	0.000227	2.2	0.000229	0.000226	1.3	0.0000810	0.0000860	6.0	0.0000900	0.0000930	3.3	0.000193	0.000197	2.1
Vanadium (V)	0.000810	0.000750	n/a	0.000520	<0.00050	n/a	0.000550	0.000630	n/a	<0.00050	<0.00050	n/a	0.000960	0.000940	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a
Dissolved Metals															
Aluminum (Al)	0.00490	0.00460	n/a	0.00700	0.00770	n/a	0.00760	0.00790	n/a	0.00560	0.00490	n/a	0.0308	0.0294	4.7
Antimony (Sb)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Arsenic (As)	0.000420	0.000370	n/a	0.000310	0.000290	n/a	0.000230	0.000200	n/a	0.000170	0.000170	n/a	0.000330	0.000330	n/a
Barium (Ba)	0.0342	0.0355	3.7	0.0394	0.0396	0.5	0.0453	0.0452	0.2	0.0478	0.0448	6.5	0.0323	0.0312	3.5
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Boron (B)	0.0190	0.0190	n/a	0.0150	0.0150	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	0.0180	0.0180	n/a
Cadmium (Cd)	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Calcium (Ca)	27.3	27.6	1.1	30.5	32.0	4.8	20.3	20.7	2.0	22.4	22.1	1.3	25.5	25.1	1.6
Chromium (Cr)	0.000170	0.000240	n/a	0.000180	0.000170	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.000330	0.000320	n/a
Cobalt (Co)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Copper (Cu)	0.000620	0.000630	n/a	0.000910	0.000920	n/a	0.000550	0.000520	n/a	0.000500	<0.00050	n/a	0.00161	0.00161	n/a
Iron (Fe)	<0.030	<0.030	n/a	<0.030	<0.030	n/a	0.188	0.186	1.1	0.103	0.102	n/a	0.0310	0.0300	n/a
Lead (Pb)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Lithium (Li)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Magnesium (Mg)	4.83	4.88	1.0	6.30	6.29	0.2	3.70	3.86	4.2	3.99	4.11	3.0	4.85	4.72	2.7
Manganese (Mn)	0.000150	0.000170	n/a	0.00335	0.00324	3.3	0.0114	0.0111	2.7	0.00437	0.00435	0.5	0.00121	0.00151	22.1
Mercury (Hg)	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Molybdenum (Mo)	0.000138	0.000135	n/a	0.000186	0.000183	n/a	0.000532	0.000539	1.3	0.000505	0.000527	4.3	0.000128	0.000141	n/a
Nickel (Ni)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.174	0.180	n/a	0.262	0.262	0.0	0.329	0.331	0.6	0.335	0.336	0.3	0.172	0.166	n/a
Selenium (Se)	0.0000690	0.0000510	n/a	<0.000050	<0.000050	n/a	0.0000870	0.0000890	n/a	0.0000700	0.0000940	n/a	<0.000050	<0.000050	n/a

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS05		
Date	17-Apr-2018		
ALS Sample ID	L2082790-3	L2082790-10	RPD (%)
Total Metals *(cont'd)*			
Lead (Pb)	0.000125	0.000137	n/a
Lithium (Li)	0.00110	0.00150	n/a
Magnesium (Mg)	7.67	6.96	9.7
Manganese (Mn)	0.0217	0.0208	4.2
Mercury (Hg)	<0.0000050	<0.0000050	n/a
Molybdenum (Mo)	0.000393	0.000374	5.0
Nickel (Ni)	0.00121	0.00110	n/a
Phosphorus (P)	<0.30	<0.30	n/a
Potassium (K)	0.504	0.482	4.5
Selenium (Se)	0.000125	0.0000870	n/a
Silicon (Si)	3.59	4.12	13.7
Silver (Ag)	<0.000010	<0.000010	n/a
Sodium (Na)	5.30	5.00	n/a
Strontium (Sr)	0.128	0.135	5.3
Sulphur (S)	10.7	10.8	0.9
Thallium (Tl)	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a
Uranium (U)	0.000163	0.000171	4.8
Vanadium (V)	0.00124	0.00160	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a
Dissolved Metals			
Aluminum (Al)	0.0585	0.0587	0.3
Antimony (Sb)	<0.00010	<0.00010	n/a
Arsenic (As)	0.000240	0.000220	n/a
Barium (Ba)	0.0701	0.0653	7.1
Beryllium (Be)	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.000050	<0.000050	n/a
Boron (B)	<0.010	<0.010	n/a
Cadmium (Cd)	0.0000061	<0.0000050	n/a
Calcium (Ca)	32.4	31.2	3.8
Chromium (Cr)	0.000110	0.000140	n/a
Cobalt (Co)	0.000110	0.000140	n/a
Copper (Cu)	0.00218	0.00216	n/a
Iron (Fe)	0.0920	0.0960	n/a
Lead (Pb)	<0.000050	<0.000050	n/a
Lithium (Li)	<0.0010	<0.0010	n/a
Magnesium (Mg)	7.79	7.68	1.4
Manganese (Mn)	0.00202	0.00334	49.3
Mercury (Hg)	<0.0000050	<0.0000050	n/a
Molybdenum (Mo)	0.000413	0.000378	8.8
Nickel (Ni)	0.000590	0.000610	n/a
Phosphorus (P)	<0.30	<0.30	n/a
Potassium (K)	0.471	0.449	4.8
Selenium (Se)	0.0000700	0.000107	n/a

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS01			WQS10			WQS09			WQS08			WQS08		
Date	4-May-2017			3-May-2017			20-Jun-2017			27-Jul-2017			16-Aug-2017		
ALS Sample ID	L1922134-9	L1922134-15	RPD (%)	L1922134-3	L1922134-4	RPD (%)	L1947234-5	L1947234-13	RPD (%)	L1966679-8	L1966679-12	RPD (%)	L1977457-7	L1977457-12	RPD (%)
Dissolved Metals *(cont'd)*															
Silicon (Si)	4.02	3.97	1.3	3.54	3.49	1.4	2.09	1.90	9.5	1.51	1.44	4.7	1.75	1.64	6.5
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	2.50	2.50	n/a	2.00	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.0762	0.0732	4.0	0.0536	0.0547	2.0	0.0430	0.0405	6.0	0.0430	0.0415	3.6	0.0512	0.0489	4.6
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	1.62	1.20	n/a
Thallium (Tl)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000113	0.000110	2.7	0.0000430	0.0000440	n/a	0.0000310	0.0000310	n/a	0.0000250	0.0000220	n/a	0.0000340	0.0000310	n/a
Vanadium (V)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a
Polycyclic Aromatic Hydrocarbons															
Acenaphthene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Acenaphthylene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Acridine	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Anthracene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Benz[a]anthracene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Benzo[a]pyrene	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Benzo[g,h,i]perylene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Benzo[b]fluoranthene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	-	-	-	-	-	-
Benzo[b,j]fluoranthene	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Benzo[b,j,k]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[k]fluoranthene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Chrysene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Fluoranthene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Fluorene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Indeno[1,2,3-c,d]pyrene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Naphthalene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
1-Methylnaphthalene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Pyrene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Quinoline	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Aggregate Organics															
BOD	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	-	-	-
COD	41.0	41.0	n/a	26.0	23.0	n/a	<20	21.0	n/a	<20	<20	n/a	-	-	-
Phenols (4AAP)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	-	-	-	-	-	-	<0.0010	<0.0010	n/a
Volatile Organic Compounds															
Benzene	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	-	-	-	-	-	-
Ethylbenzene	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	-	-	-	-	-	-
Methyl t-butyl ether (MTBE)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	-	-	-	-	-	-
Styrene	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	-	-	-	-	-	-
Toluene	<0.00045	<0.00045	n/a	<0.00045	<0.00045	n/a	<0.00045	<0.00045	n/a	-	-	-	-	-	-
ortho-Xylene	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	-	-	-	-	-	-

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS09			WQS11			WQS02			WQS05			WQS02		
Date	26-Sep-2017			27-Sep-2017			18-Oct-2017			18-Oct-2017			28-Nov-2017		
ALS Sample ID	L1998999-8	L1998999-15	RPD (%)	L1998999-10	L1998999-12	RPD (%)	L2010562-3	L2010562-5	RPD (%)	L2010562-4	L2010562-9	RPD (%)	L2029323-2	L2029323-4	RPD (%)
Dissolved Metals *(cont'd)*															
Silicon (Si)	1.81	1.88	3.8	1.21	1.24	2.4	2.95	3.53	17.9	2.92	2.99	2.4	3.51	3.63	3.4
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	2.90	3.30	n/a	<2.0	2.90	n/a	3.30	3.50	n/a
Strontium (Sr)	0.0510	0.0446	13.4	0.0298	0.0331	10.5	0.0906	0.0994	9.3	0.0583	0.0947	*47.6*	0.102	0.102	0.0
Sulphur (S)	2.09	1.92	n/a	1.07	1.11	n/a	7.64	0.870	n/a	1.56	8.04	n/a	0.580	<0.50	n/a
Thallium (Tl)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.0000360	0.0000310	n/a	0.0000180	0.0000220	n/a	0.0000680	0.000103	*40.9*	0.0000410	0.0000760	n/a	0.000111	0.000113	1.8
Vanadium (V)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	0.000760	n/a	<0.00050	<0.00050	n/a	0.000740	0.000730	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a
Polycyclic Aromatic Hydrocarbons															
Acenaphthene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Acenaphthylene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Acridine	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Anthracene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Benz[a]anthracene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Benzo[a]pyrene	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Benzo[g,h,i]perylene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Benzo[b]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b,j]fluoranthene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Benzo[b,j,k]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[k]fluoranthene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Chrysene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Fluoranthene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Fluorene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Indeno[1,2,3-c,d]pyrene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Naphthalene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
1-Methylnaphthalene	-	-	-	-	-	n/a	-	-	-	-	-	-	<0.000050	<0.000050	n/a
2-Methylnaphthalene	-	-	-	-	-	n/a	-	-	-	-	-	-	<0.000050	<0.000050	n/a
Phenanthrene	<0.000020	<0.000020	n/a	<0.000020	<0.000020	n/a	<0.000020	<0.000020	n/a	<0.000020	<0.000020	n/a	<0.000020	<0.000020	n/a
Pyrene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Quinoline	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Aggregate Organics															
BOD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (4AAP)	0.00110	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	-	-	-
Volatile Organic Compounds															
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	n/a
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	n/a
Methyl t-butyl ether (MTBE)	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	n/a
Styrene	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	n/a
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	<0.00045	<0.00045	n/a
ortho-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	n/a

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS05			WQS01			WQS06			WQS02			WQS05		
Date	21-Nov-2017			14-Dec-2017			12-Dec-2017			17-Jan-2018			18-Jan-2018		
ALS Sample ID	L2027227-2	L2027227-8	RPD (%)	L2036162-1	L2036162-14	RPD (%)	L2036162-6	L2036162-13	RPD (%)	L2047188-1	L2047188-11	RPD (%)	L2047188-7	L2047188-12	RPD (%)
Dissolved Metals *(cont'd)*															
Silicon (Si)	3.03	3.08	1.6	3.33	3.66	9.4	2.66	2.68	0.7	3.50	3.55	1.4	2.95	2.95	0.0
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	2.90	2.80	n/a	3.70	3.80	n/a	3.00	3.20	n/a	4.20	4.10	n/a	3.90	3.80	n/a
Strontium (Sr)	0.0918	0.0885	3.7	0.118	0.126	6.6	0.0906	0.101	10.9	0.126	0.124	1.6	0.110	0.107	2.8
Sulphur (S)	5.48	5.57	1.6	<0.50	0.690	n/a	8.11	8.03	1.0	<0.50	0.540	n/a	7.51	7.42	1.2
Thallium (Tl)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	0.000170	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.0000740	0.0000720	2.7	0.000157	0.000144	8.6	0.0000760	0.0000740	2.7	0.000180	0.000181	0.6	0.000112	0.000112	0.0
Vanadium (V)	<0.00050	<0.00050	n/a	0.000770	0.000790	n/a	<0.00050	<0.00050	n/a	0.000620	0.000600	n/a	<0.00050	<0.00050	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	0.00320	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a
Polycyclic Aromatic Hydrocarbons															
Acenaphthene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Acenaphthylene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Acridine	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Anthracene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Benz[a]anthracene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Benzo[a]pyrene	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Benzo[g,h,i]perylene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Benzo[b]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b,j]fluoranthene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Benzo[b,j,k]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[k]fluoranthene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Chrysene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Fluoranthene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Fluorene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Indeno[1,2,3-c,d]pyrene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Naphthalene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
1-Methylnaphthalene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
2-Methylnaphthalene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Phenanthrene	<0.000020	<0.000020	n/a	<0.000020	<0.000020	n/a	<0.000020	<0.000020	n/a	<0.000020	<0.000020	n/a	<0.000020	<0.000020	n/a
Pyrene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Quinoline	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Aggregate Organics															
BOD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (4AAP)	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Volatile Organic Compounds															
Benzene	<0.00050	<0.00050	n/a	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	<0.00050	<0.00050	n/a	-	-	-	-	-	-	-	-	-	-	-	-
Methyl t-butyl ether (MTBE)	<0.00050	<0.00050	n/a	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	<0.00050	<0.00050	n/a	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	<0.00045	<0.00045	n/a	-	-	-	-	-	-	-	-	-	-	-	-
ortho-Xylene	<0.00050	<0.00050	n/a	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS01			WQS04B			WQS08			WQS10			WQS02		
Date	19-Feb-2018			20-Feb-2018			21-Mar-2018			20-Mar-2018			18-Apr-2018		
ALS Sample ID	L2059721-2	L2059721-6	RPD (%)	L2059721-8	L2059721-11	RPD (%)	L2071214-9	L2071214-12	RPD (%)	L2071214-5	L2071214-8	RPD (%)	L2082789-2	L2082789-4	RPD (%)
Dissolved Metals *(cont'd)*															
Silicon (Si)	3.35	3.31	1.2	3.41	3.28	3.9	3.63	3.71	2.2	3.42	3.54	3.4	3.47	3.41	1.7
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	4.20	4.30	n/a	4.70	4.80	n/a	2.80	2.80	n/a	3.00	2.90	n/a	4.00	4.00	n/a
Strontium (Sr)	0.124	0.123	0.8	0.139	0.133	4.4	0.0939	0.0925	1.5	0.0937	0.0944	0.7	0.122	0.127	4.0
Sulphur (S)	0.700	0.650	n/a	1.47	1.59	n/a	1.66	1.74	n/a	2.18	2.05	n/a	0.820	0.930	n/a
Thallium (Tl)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000213	0.000213	0.0	0.000218	0.000216	0.9	0.0000800	0.0000810	1.2	0.0000850	0.0000880	3.5	0.000204	0.000210	2.9
Vanadium (V)	0.000640	0.000650	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.000730	0.000710	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a
Polycyclic Aromatic Hydrocarbons															
Acenaphthene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Acenaphthylene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Acridine	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Anthracene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Benz[a]anthracene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Benzo[a]pyrene	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Benzo[g,h,i]perylene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Benzo[b]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b,j]fluoranthene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Benzo[b,j,k]fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	<0.000015	<0.000015	n/a
Benzo[k]fluoranthene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Chrysene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a	<0.0000050	<0.0000050	n/a
Fluoranthene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Fluorene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Indeno[1,2,3-c,d]pyrene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Naphthalene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
1-Methylnaphthalene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
2-Methylnaphthalene	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Phenanthrene	<0.000020	<0.000020	n/a	<0.000020	<0.000020	n/a	<0.000020	<0.000020	n/a	<0.000020	<0.000020	n/a	<0.000020	<0.000020	n/a
Pyrene	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Quinoline	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Aggregate Organics															
BOD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (4AAP)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Volatile Organic Compounds															
Benzene	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	-	-	-	-	-	-	-	-	-
Ethylbenzene	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	-	-	-	-	-	-	-	-	-
Methyl t-butyl ether (MTBE)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	-	-	-	-	-	-	-	-	-
Styrene	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	-	-	-	-	-	-	-	-	-
Toluene	<0.00045	<0.00045	n/a	<0.00045	<0.00045	n/a	-	-	-	-	-	-	-	-	-
ortho-Xylene	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	-	-	-	-	-	-	-	-	-

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS05		
Date	17-Apr-2018		
ALS Sample ID	L2082790-3	L2082790-10	RPD (%)
Dissolved Metals *(cont'd)*			
Silicon (Si)	2.97	3.05	2.7
Silver (Ag)	<0.000010	<0.000010	n/a
Sodium (Na)	5.10	4.80	n/a
Strontium (Sr)	0.137	0.132	3.7
Sulphur (S)	10.5	10.4	1.0
Thallium (Tl)	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a
Uranium (U)	0.000151	0.000164	8.3
Vanadium (V)	<0.00050	<0.00050	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	<0.000010	<0.000010	n/a
Acenaphthylene	<0.000010	<0.000010	n/a
Acridine	<0.000010	<0.000010	n/a
Anthracene	<0.000010	<0.000010	n/a
Benz[a]anthracene	<0.000010	<0.000010	n/a
Benzo[a]pyrene	<0.0000050	<0.0000050	n/a
Benzo[g,h,i]perylene	<0.000010	<0.000010	n/a
Benzo[b]fluoranthene	-	-	-
Benzo[b,j]fluoranthene	<0.000010	<0.000010	n/a
Benzo[b,j,k]fluoranthene	<0.000015	<0.000015	n/a
Benzo[k]fluoranthene	<0.000010	<0.000010	n/a
Chrysene	<0.000010	<0.000010	n/a
Dibenz[a,h]anthracene	<0.0000050	<0.0000050	n/a
Fluoranthene	<0.000010	<0.000010	n/a
Fluorene	<0.000010	<0.000010	n/a
Indeno[1,2,3-c,d]pyrene	<0.000010	<0.000010	n/a
Naphthalene	<0.000050	<0.000050	n/a
1-Methylnaphthalene	<0.000050	<0.000050	n/a
2-Methylnaphthalene	<0.000050	<0.000050	n/a
Phenanthrene	<0.000020	<0.000020	n/a
Pyrene	<0.000010	<0.000010	n/a
Quinoline	<0.000050	<0.000050	n/a
Aggregate Organics			
BOD	-	-	-
COD	-	-	-
Phenols (4AAP)	<0.0010	<0.0010	n/a
Volatile Organic Compounds			
Benzene	-	-	-
Ethylbenzene	-	-	-
Methyl t-butyl ether (MTBE)	-	-	-
Styrene	-	-	-
Toluene	-	-	-
ortho-Xylene	-	-	-

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	**WQS01**			**WQS10**			**WQS09**			**WQS08**			**WQS08**		
Date	**4-May-2017**			**3-May-2017**			**20-Jun-2017**			**27-Jul-2017**			**16-Aug-2017**		
ALS Sample ID	**L1922134-9**	**L1922134-15**	**RPD (%)**	**L1922134-3**	**L1922134-4**	**RPD (%)**	**L1947234-5**	**L1947234-13**	**RPD (%)**	**L1966679-8**	**L1966679-12**	**RPD (%)**	**L1977457-7**	**L1977457-12**	**RPD (%)**
Volatile Organic Compounds *(cont'd)*															
meta- & para-Xylene	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	-	-	-	-	-	-
Xylene	<0.00075	<0.00075	n/a	<0.00075	<0.00075	n/a	<0.00075	<0.00075	n/a	-	-	-	-	-	-
Hydrocarbons															
Volatile Hydrocarbons (VH6-10)	<0.10	<0.10	n/a	<0.10	<0.10	n/a	<0.10	<0.10	n/a	-	-	-	-	-	-
VPH (C6-C10)	<0.10	<0.10	n/a	<0.10	<0.10	n/a	<0.10	<0.10	n/a	-	-	-	-	-	-
Radiological															
Ra-226	-	-	-	-	-	-	-	-	-	-	-	-	<0.0073	<0.0054	n/a

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS09			WQS11			WQS02			WQS05			WQS02		
Date	26-Sep-2017			27-Sep-2017			18-Oct-2017			18-Oct-2017			28-Nov-2017		
ALS Sample ID	L1998999-8	L1998999-15	RPD (%)	L1998999-10	L1998999-12	RPD (%)	L2010562-3	L2010562-5	RPD (%)	L2010562-4	L2010562-9	RPD (%)	L2029323-2	L2029323-4	RPD (%)
Volatile Organic Compounds *(cont'd)*															
meta- & para-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	n/a
Xylene	-	-	-	-	-	-	-	-	-	-	-	-	<0.00075	<0.00075	n/a
Hydrocarbons															
Volatile Hydrocarbons (VH6-10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VPH (C6-C10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radiological															
Ra-226	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	**WQS05**			**WQS01**			**WQS06**			**WQS02**			**WQS05**		
Date	**21-Nov-2017**			**14-Dec-2017**			**12-Dec-2017**			**17-Jan-2018**			**18-Jan-2018**		
ALS Sample ID	**L2027227-2**	**L2027227-8**	**RPD (%)**	**L2036162-1**	**L2036162-14**	**RPD (%)**	**L2036162-6**	**L2036162-13**	**RPD (%)**	**L2047188-1**	**L2047188-11**	**RPD (%)**	**L2047188-7**	**L2047188-12**	**RPD (%)**
Volatile Organic Compounds *(cont'd)*															
meta- & para-Xylene	<0.00050	<0.00050	n/a	-	-	-	-	-	-	-	-	-	-	-	-
Xylene	<0.00075	<0.00075	n/a	-	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbons															
Volatile Hydrocarbons (VH6-10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VPH (C6-C10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radiological															
Ra-226	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	**WQS01**			**WQS04B**			**WQS08**			**WQS10**			**WQS02**		
Date	**19-Feb-2018**			**20-Feb-2018**			**21-Mar-2018**			**20-Mar-2018**			**18-Apr-2018**		
ALS Sample ID	**L2059721-2**	**L2059721-6**	**RPD (%)**	**L2059721-8**	**L2059721-11**	**RPD (%)**	**L2071214-9**	**L2071214-12**	**RPD (%)**	**L2071214-5**	**L2071214-8**	**RPD (%)**	**L2082789-2**	**L2082789-4**	**RPD (%)**
Volatile Organic Compounds *(cont'd)*															
meta- & para-Xylene	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	-	-	-	-	-	-	-	-	-
Xylene	<0.00075	<0.00075	n/a	<0.00075	<0.00075	n/a	-	-	-	-	-	-	-	-	-
Hydrocarbons															
Volatile Hydrocarbons (VH6-10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VPH (C6-C10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radiological															
Ra-226	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-C. Water Quality Relative Percent Difference Results, Tenas Project, 2017 to 2018

Site	WQS05		
Date	17-Apr-2018		
ALS Sample ID	L2082790-3	L2082790-10	RPD (%)
Volatile Organic Compounds *(cont'd)*			
meta- & para-Xylene	-	-	-
Xylene	-	-	-
Hydrocarbons			
Volatile Hydrocarbons (VH6-10)	-	-	-
VPH (C6-C10)	-	-	-
Radiological			
Ra-226	-	-	-

Notes:
All units are in mg/L unless otherwise noted.
n/a = not applicable when values are less than five times the detection limit.
Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.
Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Appendix 8-D

Water Quality Historical Data, Tenas Project, 1974 to 2012

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	400187	400434	400435	400434	400435	400187	400434	400435	400434	400434	400435	400435	400187	400434
Date	20-Mar-1974	4-Jun-1974	25-Jun-1974	25-Jun-1974	10-Jul-1974	10-Jul-1974	17-Sep-1974	24-Sep-1974	24-Sep-1974	21-May-1975	21-May-1975	21-May-1975	21-May-1975	2-Jun-1975	25-Jun-1975
Client Sample ID	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE
Time	8:30	17:05	11:45	11:40	10:10	10:00	22:15	15:30	15:40	9:15	9:20	9:20	9:30	17:45	10:30
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In Situ															
Temperature (°C)	-	-	8.50	9.00	7.50	8.00	-	10.00	10.00	6.00	-	6.00	-	7.00	9.00
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	10.6	10.7	-	-	-	11.0	-	11.2	-	10.2	11.5
Physical Tests															
Colour, True	5.00	30.0	-	-	-	-	5.00	-	-	30.0	-	30.0	-	60.0	15.0
Colour (TAC)	4.00	32.0	-	-	-	-	1.000	-	-	33.0	-	32.0	-	23.0	12.0
Conductivity (µS/cm)	139	64.0	49.0	49.0	50.0	50.0	53.0	65.0	50.0	61.5	-	61.0	-	62.0	54.5
Hardness (as $CaCO_3$)	63.2	31.0	-	-	-	-	23.5	-	-	28.6	-	28.8	-	26.7	78.7
pH	7.90	-	-	-	-	-	7.50	-	-	7.50	-	7.40	-	7.65	7.50
Turbidity (NTU)	2.60	10.00	-	-	-	-	12.0	-	-	17.0	-	16.0	-	180	21.0
Acidity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 4.5)	64.5	-	-	-	-	-	22.4	-	-	28.0	-	27.8	-	28.5	22.5
Alkalinity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions															
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	0.500	-	-	-	-	-	0.500	-	-	-	-	-	-	0.700	-
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (SO_4)	6.10	-	-	-	-	-	5.00	-	-	5.00	-	5.00	-	5.00	-
Nutrients															
Total Nitrogen	0.140	-	-	-	-	-	0.1000	-	-	-	-	-	-	0.320	0.0500
Total Dissolved Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	0.1000	-	-	0.250	-	0.0800	-	0.290	0.0200
Total Kjeldahl Nitrogen, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total	0.0200	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Dissolved	-	-	-	-	-	-	0.00500	-	-	0.0140	-	0.01000	-	0.01000	0.0160
Nitrate+Nitrite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate, Dissolved (as NO_3)	0.0900	-	-	-	-	-	0.0200	-	-	0.0300	-	0.0200	-	0.0300	0.0300
Nitrate+ Nitrite, Dissolved	0.0900	-	-	-	-	-	0.0200	-	-	0.0300	-	0.0200	-	0.0300	0.0300
Nitrite, Dissolved (as N)	0.00500	-	-	-	-	-	0.00500	-	-	0.00500	-	0.00500	-	0.00500	0.00500
Total Organic Nitrogen	0.0300	-	-	-	-	-	0.1000	-	-	0.240	-	0.0700	-	0.280	0.01000
Total Phosphorus (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Orthophosphate (as P)	0.00300	-	-	-	-	-	-	-	-	0.00400	-	0.00400	-	-	0.00400
Silica, Dissolved	8.10	-	-	-	-	-	3.10	-	-	-	-	-	-	5.20	-
Carbon															
Total Organic Carbon	1.000	-	-	-	-	-	1.000	-	-	-	-	-	-	5.00	2.00
Dissolved Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Inorganic Carbon	16.0	-	-	-	-	-	4.00	-	-	-	-	-	-	6.00	-
Total Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals															
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400435	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187
Date	25-Jun-1975	17-Jul-1975	7-Oct-1975	11-Feb-1985	11-Mar-1985	17-Apr-1985	13-May-1985	12-Jun-1985	9-Jul-1985	13-Aug-1985	10-Sep-1985	8-Oct-1985	5-Nov-1985	10-Dec-1985	8-Jan-1986
Client Sample ID	BULKLEY R. IDZ AT SMITHERS	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE
Time	10:45	16:30	12:00	11:00	-	13:45	8:00	14:30	10:30	14:00	11:10	9:00	8:30	7:00	13:00
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In Situ															
Temperature (°C)	9.00	-	7.00	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	11.7	-	7.20	-	-	-	-	-	-	-	-	-	-	-	-
Physical Tests															
Colour, True	20.0	5.00	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour (TAC)	14.0	5.00	3.00	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	52.0	60.0	57.5	131	125	106	89.0	54.0	51.0	55.0	79.0	98.0	109	124	126
Hardness (as $CaCO_3$)	22.6	27.7	24.4	52.3	49.8	50.0	42.2	25.0	22.3	24.9	34.4	41.0	52.3	52.1	60.3
pH	7.40	7.50	7.40	7.80	7.80	7.60	7.70	7.30	7.50	7.30	7.80	7.80	7.60	7.40	7.50
Turbidity (NTU)	19.0	15.0	1.10	1.10	2.60	9.30	25.0	10.00	7.50	4.60	1.90	1.000	1.10	1.000	1.000
Acidity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 4.5)	22.0	26.7	24.3	62.2	59.5	48.1	43.7	25.9	23.8	25.2	36.5	45.0	50.1	57.3	58.5
Alkalinity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions															
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	-	0.500	0.500	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (SO_4)	-	-	5.00	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients															
Total Nitrogen	0.0400	0.0500	0.1000	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	0.0200	0.0300	0.0800	0.0400	0.0300	0.250	0.220	0.0800	0.120	0.0400	0.0200	0.0400	0.0600	0.0500	0.01000
Total Kjeldahl Nitrogen, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Dissolved	0.0110	0.00500	0.00900	0.00500	0.00500	0.00500	0.0170	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500
Nitrate+Nitrite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate, Dissolved (as NO_3)	0.0200	0.0200	0.0200	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate+ Nitrite, Dissolved	0.0200	0.0200	0.0200	0.1000	0.0900	0.120	0.0700	0.0300	0.0200	0.0200	0.0200	0.0300	0.0500	0.0800	0.0900
Nitrite, Dissolved (as N)	0.00500	0.00500	0.00500	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Nitrogen	0.01000	0.0300	0.0700	-	-	-	-	-	-	-	-	-	-	-	-
Total Phosphorus (as P)	-	-	-	0.00400	0.00500	0.01000	0.00500	0.00400	0.00300	0.00300	0.00300	0.00300	0.00400	0.00400	0.00400
Dissolved Orthophosphate (as P)	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300
Silica, Dissolved	-	-	3.40	-	-	-	-	-	-	-	-	-	-	-	-
Carbon															
Total Organic Carbon	2.00	-	2.00	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Inorganic Carbon	-	-	4.00	16.0	16.0	12.0	12.0	6.00	5.00	5.00	9.00	11.0	13.0	15.0	16.0
Total Carbon	-	-	-	16.0	16.0	20.0	18.0	10.00	6.00	6.00	9.00	11.0	13.0	15.0	16.0
Total Metals															
Aluminum (Al)	-	-	-	0.0400	0.0600	0.720	1.57	1.20	0.730	0.240	0.0800	0.0400	0.0800	0.350	0.0400
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187
Date	11-Feb-1986	19-Mar-1986	7-Apr-1986	7-May-1986	2-Jun-1986	8-Jul-1986	5-Aug-1986	4-Sep-1986	4-Oct-1986	9-Oct-1986	12-Nov-1986	10-Dec-1986	12-Jan-1987	18-Feb-1987	26-Mar-1987
Client Sample ID	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE
Time	12:00	9:30	14:00	9:00	9:30	14:00	10:00	9:30	18:00	8:30	10:30	9:30	9:45	9:15	8:15
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In Situ															
Temperature (°C)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Tests															
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	5.00	5.00	5.00
Colour (TAC)	1.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	135	128	125	79.0	55.0	53.0	53.0	46.0	63.0	62.0	95.0	119	126	123	134
Hardness (as $CaCO_3$)	62.3	55.6	57.0	38.3	22.4	25.0	24.2	22.1	-	25.4	38.9	53.9	55.9	57.8	64.4
pH	7.40	7.80	7.80	7.40	7.30	7.40	7.60	7.30	-	7.20	7.70	7.80	7.80	7.80	7.80
Turbidity (NTU)	1.10	10.00	16.0	35.0	23.0	15.0	13.0	180	-	50.0	1.50	1.000	1.30	1.50	6.10
Acidity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 4.5)	62.0	60.3	56.5	36.7	24.4	24.8	23.3	20.2	-	26.6	41.3	54.4	56.5	57.7	60.0
Alkalinity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.500	-
Alkalinity, Bicarbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions															
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (SO_4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients															
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	0.0300	0.0500	0.130	0.320	0.170	0.0500	0.0400	0.170	-	0.0600	0.0500	0.0400	0.0600	0.0500	0.0700
Total Kjeldahl Nitrogen, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Dissolved	0.00800	0.00700	0.00800	0.00500	0.00600	0.00500	0.00500	0.00500	-	0.0110	0.00500	0.00500	0.00500	0.00500	0.00500
Nitrate+Nitrite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate, Dissolved (as NO_3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate+ Nitrite, Dissolved	0.0900	0.1000	0.0800	0.0600	0.0400	0.0200	0.0200	0.0200	-	0.0400	0.0500	0.1000	0.110	0.0900	0.120
Nitrite, Dissolved (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Phosphorus (as P)	0.00400	0.00700	0.00600	0.00700	0.00600	0.00300	0.00600	0.00300	-	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300
Dissolved Orthophosphate (as P)	0.00300	0.00500	0.00300	0.00300	0.00300	0.00200	0.00200	0.00500	-	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200
Silica, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon															
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Inorganic Carbon	16.0	16.0	14.0	9.00	7.00	5.00	6.00	5.00	-	7.00	11.0	14.0	15.0	15.0	16.0
Total Carbon	17.0	16.0	17.0	20.0	12.0	8.00	6.00	5.00	-	7.00	11.0	15.0	15.0	15.0	16.0
Total Metals															
Aluminum (Al)	0.0200	0.350	1.000	2.61	1.69	0.960	1.07	14.7	-	2.67	0.0800	0.0300	0.0700	0.0600	0.270
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.250	-	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	400187	400187	400187	400187	400434	400434	400434	400435	400435	400435	400187	400434	400434	400435
Date	21-Apr-1987	19-May-1987	17-Jun-1987	14-Jul-1987	11-Aug-1987	16-Aug-1987	23-Aug-1987	31-Aug-1987	16-Aug-1987	23-Aug-1987	31-Aug-1987	8-Sep-1987	8-Sep-1987	14-Sep-1987	8-Sep-1987
Client Sample ID	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS
Time	9:30	10:15	13:30	11:50	11:00	15:00	12:40	16:00	15:30	13:30	16:30	11:30	18:30	18:15	18:00
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In Situ															
Temperature (°C)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Tests															
Colour, True	50.0	40.0	10.00	5.00	5.00	-	-	-	-	-	-	5.00	-	-	-
Colour (TAC)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	112	77.0	65.0	58.0	60.0	53.0	58.0	55.0	53.0	59.0	56.0	66.0	53.0	55.0	54.0
Hardness (as $CaCO_3$)	52.6	36.7	31.4	27.5	26.2	-	-	-	-	-	-	28.5	-	-	-
pH	7.70	7.40	7.30	7.30	7.20	7.30	6.90	7.80	7.60	7.20	7.70	6.90	7.70	7.60	7.70
Turbidity (NTU)	14.0	6.90	4.90	5.80	10.00	3.20	-	4.50	3.20	-	4.30	9.30	2.20	2.10	2.00
Acidity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 4.5)	49.5	35.6	29.0	24.8	26.3	-	-	-	-	-	-	27.9	-	-	-
Alkalinity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions															
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride (F)	-	-	0.1000	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (SO_4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients															
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	0.200	0.140	0.0600	0.0400	0.0300	0.0400	-	0.160	0.0400	-	0.0900	0.0300	0.0500	0.0600	0.0600
Total Kjeldahl Nitrogen, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Dissolved	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00800	0.00500	0.00500	0.00800	0.00500	0.00500	0.0310	0.00500
Nitrate+Nitrite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate, Dissolved (as NO_3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate+ Nitrite, Dissolved	0.130	0.0600	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200
Nitrite, Dissolved (as N)	-	-	-	-	-	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	-	0.00500	0.00500	0.00500
Total Organic Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Phosphorus (as P)	0.00600	0.00400	0.00300	0.00300	0.00300	0.00300	0.00400	0.00700	0.00300	0.00500	0.00700	0.00500	0.00500	0.00700	0.00600
Dissolved Orthophosphate (as P)	0.00250	0.00200	0.00200	0.00250	0.00200	0.00200	0.00300	0.00300	0.00450	0.00300	0.00300	0.00200	0.00300	0.00300	0.00300
Silica, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon															
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Inorganic Carbon	12.0	9.00	8.00	6.00	6.00	-	-	-	-	-	-	6.00	-	-	-
Total Carbon	20.0	14.0	9.00	6.00	7.00	-	-	-	-	-	-	6.00	-	-	-
Total Metals															
Aluminum (Al)	0.890	0.560	0.460	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	0.001000	0.001000	0.001000	0.001000	0.001000	-	-	-	-	-	-	0.001000	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400435	400187	400187	400187	400187	400434	400434	400434	400435	400435	400435	400434	400434	400435	400435
Date	14-Sep-1987	7-Oct-1987	16-Nov-1987	8-Feb-1988	8-Mar-1988	16-Aug-1988	22-Aug-1988	29-Aug-1988	16-Aug-1988	22-Aug-1988	29-Aug-1988	6-Sep-1988	12-Sep-1988	6-Sep-1988	12-Sep-1988
Client Sample ID	BULKLEY R. IDZ AT SMITHERS	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS
Time	17:30	11:00	11:30	9:00	9:00	13:00	14:30	12:45	13:30	14:00	12:15	12:45	12:00	12:15	11:30
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In Situ															
Temperature (°C)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Tests															
Colour, True	-	5.00	15.0	5.00	12.0	-	-	-	-	-	-	-	-	-	-
Colour (TAC)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	54.0	81.0	83.0	127	130	-	-	52.0	-	-	52.0	53.0	56.0	55.0	56.0
Hardness (as $CaCO_3$)	-	34.9	40.0	57.1	61.2	-	-	-	-	-	-	-	-	-	-
pH	7.70	7.40	7.50	7.70	7.80	7.10	7.70	7.80	7.60	7.80	7.70	7.60	7.60	7.60	7.60
Turbidity (NTU)	1.20	5.60	1.80	1.000	1.40	2.00	2.50	1.50	2.00	2.00	1.50	2.30	1.000	2.10	1.000
Acidity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 4.5)	-	35.3	38.3	57.3	59.3	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions															
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (SO_4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients															
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	0.0400	0.0800	0.110	0.01000	0.0500	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Dissolved	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00600
Nitrate+Nitrite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate, Dissolved (as NO_3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate+ Nitrite, Dissolved	0.0200	0.0200	0.0400	0.110	0.0900	-	-	-	-	-	-	-	-	-	-
Nitrite, Dissolved (as N)	0.00500	-	-	-	-	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500
Total Organic Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Phosphorus (as P)	0.00500	0.00300	0.00500	0.00300	0.00300	-	-	-	-	-	-	-	-	-	-
Dissolved Orthophosphate (as P)	0.00300	0.00200	0.00250	0.00250	0.00200	-	-	-	-	-	-	-	-	-	-
Silica, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon															
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Inorganic Carbon	-	9.00	9.00	15.0	16.0	-	-	-	-	-	-	-	-	-	-
Total Carbon	-	9.00	13.0	15.0	16.0	-	-	-	-	-	-	-	-	-	-
Total Metals															
Aluminum (Al)	-	-	-	0.0400	0.0700	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	0.001000	0.001000	0.001000	0.001000	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400434	400434	400435	400435	400434	400434	400434	400435	400435	400435	400434	400435	400434	400434	400434
Date	24-Jul-1989	31-Jul-1989	24-Jul-1989	31-Jul-1989	8-Aug-1989	14-Aug-1989	21-Aug-1989	8-Aug-1989	14-Aug-1989	21-Aug-1989	26-Jun-1990	26-Jun-1990	3-Jul-1990	9-Jul-1990	18-Jul-1990
Client Sample ID	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE
Time	12:12	10:00	13:00	9:40	10:38	-	-	11:05	-	11:50	14:28	14:46	14:02	13:12	12:48
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In Situ															
Temperature (°C)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Tests															
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour (TAC)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hardness (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	8.00	7.70	7.80	7.60	8.00	7.50	7.80	7.90	7.10	7.80	7.60	7.70	7.50	7.50	7.70
Turbidity (NTU)	2.60	3.20	2.80	3.00	2.50	3.70	2.70	2.60	3.70	3.00	9.60	9.80	12.0	7.00	3.20
Acidity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions															
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (SO_4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients															
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Dissolved	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00700	0.00500	0.00500	0.00700	0.00500	0.00500	0.00500	0.00600	0.00500
Nitrate+Nitrite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate, Dissolved (as NO_3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate+ Nitrite, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite, Dissolved (as N)	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500
Total Organic Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Phosphorus (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00300
Dissolved Orthophosphate (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silica, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon															
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals															
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400434	400435	400435	400435	400435	400434	400434	400434	400434	400434	400434	400435	400435	400435	400435
Date	23-Jul-1990	3-Jul-1990	9-Jul-1990	18-Jul-1990	23-Jul-1990	16-Jul-1991	16-Jul-1991	22-Jul-1991	22-Jul-1991	31-Jul-1991	31-Jul-1991	16-Jul-1991	16-Jul-1991	22-Jul-1991	22-Jul-1991
Client Sample ID	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS
Time	12:10	14:25	13:28	11:45	12:28	-	15:50	-	15:45	-	12:15	-	15:20	-	15:15
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In Situ															
Temperature (°C)	-	-	-	-	-	10.8	-	11.5	-	10.5	-	10.5	-	12.0	-
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	11.0	-	9.10	-	10.4	-	11.3	-	10.1	-
Physical Tests															
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour (TAC)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hardness (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	7.80	7.60	7.70	7.80	7.60	-	-	-	-	-	-	-	-	-	-
Turbidity (NTU)	3.00	12.0	7.00	3.00	2.50	-	4.00	-	3.00	-	1.60	-	3.70	-	2.80
Acidity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions															
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (SO_4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients															
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Dissolved	0.00500	0.00500	0.00500	0.00500	0.00500	-	0.00500	-	0.00500	-	0.00500	-	0.00500	-	0.00500
Nitrate+Nitrite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate, Dissolved (as NO_3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate+ Nitrite, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite, Dissolved (as N)	0.00500	0.00500	0.00500	0.00500	0.00500	-	0.00500	-	0.00500	-	0.00500	-	0.00500	-	0.00500
Total Organic Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Phosphorus (as P)	0.00300	-	-	0.00300	0.00300	-	-	-	-	-	-	-	-	-	-
Dissolved Orthophosphate (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silica, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon															
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals															
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400435	400435	400434	400434	400434	400435	400435	400435	400435	400434	400434	400435	400435	400434	400434
Date	31-Jul-1991	31-Jul-1991	6-Aug-1991	6-Aug-1991	15-Aug-1991	6-Aug-1991	6-Aug-1991	15-Aug-1991	15-Aug-1991	20-Jul-1992	27-Jul-1992	20-Jul-1992	27-Jul-1992	4-Aug-1992	10-Aug-1992
Client Sample ID	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE
Time	-	11:25	-	12:20	12:25	-	12:00	-	11:55	15:06	13:59	14:33	14:15	13:30	14:30
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In Situ															
Temperature (°C)	10.4	-	10.4	-	-	10.3	-	13.7	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	11.4	-	10.7	-	-	10.6	-	9.40	-	-	-	-	-	-	-
Physical Tests															
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour (TAC)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hardness (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	7.60	-	-	-	7.50	7.60	7.70	7.70	7.60	7.40	7.70
Turbidity (NTU)	-	1.50	-	1.70	4.40	-	2.00	-	4.10	2.10	1.30	2.70	1.30	0.900	0.900
Acidity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions															
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (SO_4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients															
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Dissolved	-	0.00500	-	0.00500	0.00500	-	0.00500	-	0.00500	0.00500	0.00500	0.00500	0.00500	0.0210	0.00500
Nitrate+Nitrite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate, Dissolved (as NO_3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate+ Nitrite, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite, Dissolved (as N)	-	0.00500	-	0.00500	0.00500	-	0.00500	-	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500
Total Organic Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Phosphorus (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Orthophosphate (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silica, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon															
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals															
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400435	400435	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125
Date	4-Aug-1992	10-Aug-1992	3-Oct-2001	10-Oct-2001	10-Oct-2001	22-Oct-2001	22-Oct-2001	29-Oct-2001	29-Oct-2001	8-Aug-2002	8-Aug-2002	14-Aug-2002	14-Aug-2002	20-Aug-2002	20-Aug-2002
Client Sample ID	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE
Time	13:50	15:11	14:30	14:00	14:10	12:30	12:40	12:00	12:10	-	16:00	-	16:00	-	16:00
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In Situ															
Temperature (°C)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Tests															
Colour, True	-	-	3.00	3.00	-	8.00	-	3.00	-	-	5.00	-	5.00	-	5.00
Colour (TAC)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	50.0	54.0	-	56.0	-	58.0	-	-	52.0	-	-	-	-
Hardness (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	7.70	7.80	7.43	7.65	-	7.45	-	7.75	-	-	-	-	-	-	-
Turbidity (NTU)	0.900	1.80	1.53	0.540	-	0.680	-	0.810	-	-	3.77	-	4.28	-	1.14
Acidity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions															
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (SO_4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients															
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	0.0700	-	-	-	-
Total Dissolved Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Dissolved	0.00700	0.00500	-	-	-	-	-	-	-	-	0.00500	-	-	-	-
Nitrate+Nitrite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate, Dissolved (as NO_3)	-	-	-	0.001000	-	0.00300	-	0.00500	-	-	0.0270	-	-	-	-
Nitrate+ Nitrite, Dissolved	-	-	0.00200	0.00300	-	0.00500	-	0.00700	-	-	0.0290	-	-	-	-
Nitrite, Dissolved (as N)	0.00500	0.00500	0.00200	0.00200	-	0.00200	-	0.00200	-	-	0.00200	-	-	-	-
Total Organic Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Phosphorus (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Orthophosphate (as P)	-	-	-	-	-	-	-	-	-	-	0.001000	-	-	-	-
Silica, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon															
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals															
Aluminum (Al)	-	-	0.0599	0.0600	-	0.0600	-	0.0600	-	-	0.0878	-	-	-	-
Antimony (Sb)	-	-	0.0000230	0.0600	-	0.0600	-	0.0600	-	-	0.0000210	-	-	-	-
Arsenic (As)	-	-	1.00E-04	0.0600	-	0.0600	-	0.0600	-	-	0.000200	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125
Date	27-Aug-2002	27-Aug-2002	3-Sep-2002	3-Sep-2002	7-Oct-2002	7-Oct-2002	15-Oct-2002	21-Oct-2002	28-Oct-2002	28-Oct-2002	3-Nov-2002	3-Nov-2002	12-Nov-2002	12-Nov-2002	18-Nov-2002
Client Sample ID	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE
Time	-	16:00	-	16:00	-	16:00	-	-	-	16:00	-	16:00	-	16:00	10:59
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In Situ															
Temperature (°C)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Tests															
Colour, True	-	5.00	-	5.00	-	5.00	-	-	-	5.00	-	5.00	-	5.00	-
Colour (TAC)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	51.0	-	-	-	58.0	-	-	-	-	-
Hardness (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	-	7.70	-	-	-	7.70	-	-	-	-	-
Turbidity (NTU)	-	1.02	-	1.29	-	17.9	-	-	-	0.780	-	0.560	-	0.500	-
Acidity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions															
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	-	-	-	-	-	-	-	-	-	0.500	-	-	-	-	-
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (SO_4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients															
Total Nitrogen	-	-	-	-	-	0.210	-	-	-	0.0600	-	-	-	-	-
Total Dissolved Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Dissolved	-	-	-	-	-	0.00900	-	-	-	0.00500	-	-	-	-	-
Nitrate+Nitrite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate, Dissolved (as NO_3)	-	-	-	-	-	0.00600	-	-	-	0.0130	-	-	-	-	-
Nitrate+ Nitrite, Dissolved	-	-	-	-	-	0.00600	-	-	-	0.0130	-	-	-	-	-
Nitrite, Dissolved (as N)	-	-	-	-	-	0.00200	-	-	-	0.00200	-	-	-	-	-
Total Organic Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Phosphorus (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Orthophosphate (as P)	-	-	-	-	-	0.00200	-	-	-	0.00200	-	-	-	-	-
Silica, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon															
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals															
Aluminum (Al)	-	-	-	-	-	0.233	-	-	-	0.0243	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	0.0000100	-	-	-	0.0000110	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	1.00E-04	-	-	-	1.00E-04	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E242647	E242646	E242647	E242646	E242647	400187	E242646	E242647
Date	18-Nov-2002	18-Nov-2002	18-Nov-2002	18-Nov-2002	18-Nov-2002	25-Nov-2002	25-Nov-2002	2-Sep-2004	17-May-2006	17-May-2006	15-Jun-2006	15-Jun-2006	19-Jul-2006	19-Jul-2006	19-Jul-2006
Client Sample ID	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE
Time	11:02	11:05	11:08	11:11	16:00	-	16:00	16:00	-	-	11:00	11:15	11:05	10:45	10:50
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Aliquot	Aliquot	Aliquot	Aliquot	Aliquot
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In Situ															
Temperature (°C)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Tests															
Colour, True	-	-	-	-	5.00	-	10.00	5.00	-	-	-	-	-	-	-
Colour (TAC)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	108	107	107	95.0	71.0	144	122
Hardness (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	-	7.30	7.20	8.00	7.80	7.90	8.20	7.90
Turbidity (NTU)	-	-	-	-	0.780	-	2.58	0.560	14.1	11.3	3.30	1.50	2.00	0.400	0.500
Acidity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	-	-	-	-	-	-	-	0.900	-	-	-	-	-	-	-
Alkalinity (pH 4.5)	-	-	-	-	-	-	-	40.7	55.8	47.9	53.7	30.0	29.5	72.1	33.9
Alkalinity (pH 8.3)	-	-	-	-	-	-	-	-	0.500	0.500	0.500	0.500	0.500	0.500	0.500
Alkalinity, Bicarbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions															
Bromide (Br)	-	-	-	-	-	-	-	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
Chloride (Cl)	-	-	-	-	-	-	-	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (SO_4)	-	-	-	-	-	-	-	21.9	1.30	6.70	2.10	14.2	4.20	1.10	24.6
Nutrients															
Total Nitrogen	-	-	-	-	-	-	-	0.0900	-	-	-	-	-	-	-
Total Dissolved Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Dissolved	-	-	-	-	-	-	-	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00700	0.00500
Nitrate+Nitrite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate, Dissolved (as NO_3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate+ Nitrite, Dissolved	-	-	-	-	-	-	-	0.0570	0.0380	0.0380	0.00200	0.0320	0.00300	0.0320	0.0170
Nitrite, Dissolved (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Phosphorus (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Orthophosphate (as P)	-	-	-	-	-	-	-	0.00200	0.00500	0.00500	0.00600	0.00400	0.001000	0.00300	0.00200
Silica, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon															
Total Organic Carbon	-	-	-	-	-	-	-	0.500	-	-	-	-	-	-	-
Dissolved Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Inorganic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals															
Aluminum (Al)	-	-	-	-	-	-	-	0.0227	0.117	0.0862	0.105	0.0616	0.0656	0.0163	0.0114
Antimony (Sb)	-	-	-	-	-	-	-	0.0000870	0.0000490	0.0000580	0.000138	0.0000860	0.0000330	0.000145	0.0000790
Arsenic (As)	-	-	-	-	-	-	-	1.00E-04	0.000300	0.000300	0.000400	1.00E-04	1.00E-04	0.000300	1.00E-04

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	E242646	E242646	E242647	E242647	E242647	400187	E242646	E242647	400187	E242646	E242647	400187	E242646	E242647
Date	14-Aug-2006	14-Aug-2006	23-Aug-2006	14-Aug-2006	23-Aug-2006	23-Aug-2006	6-Sep-2006	6-Sep-2006	6-Sep-2006	16-Oct-2006	16-Oct-2006	16-Oct-2006	14-Nov-2006	14-Nov-2006	14-Nov-2006
Client Sample ID	TELKWA R AT VILLAGE	TENAS CREEK	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	GOATHORN CR ABOVE TENAS CR CONFLUENCE	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE
Time	11:20	11:00	12:45	11:05	15:20	15:25	-	-	-	-	-	-	-	-	-
QAQC	Aliquot	Aliquot	Regular	Aliquot	Regular	Replicate	Aliquot	Aliquot	Aliquot	Aliquot	Aliquot	Aliquot	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In Situ															
Temperature (°C)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Tests															
Colour, True	-	-	5.00	-	5.00	5.00	-	-	-	-	-	-	-	-	-
Colour (TAC)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	63.0	156	-	126	-	-	68.0	184	138	94.0	172	156	111	179	167
Hardness (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	7.80	8.10	-	7.90	-	-	7.80	8.20	7.90	7.80	8.10	7.80	7.90	8.00	7.90
Turbidity (NTU)	3.50	4.30	0.200	0.500	0.300	0.300	7.30	0.300	0.300	1.60	1.60	0.400	1.000	0.500	0.500
Acidity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 4.5)	26.7	110	87.3	34.4	38.9	38.9	29.0	95.3	41.0	42.3	89.7	45.1	50.7	93.3	52.6
Alkalinity (pH 8.3)	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
Alkalinity, Bicarbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions															
Bromide (Br)	0.1000	0.1000	-	0.1000	-	-	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
Chloride (Cl)	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (SO_4)	5.00	3.70	0.500	23.8	35.4	35.2	4.00	3.30	24.0	6.20	3.20	31.5	6.60	3.90	25.5
Nutrients															
Total Nitrogen	-	-	0.0400	-	0.0700	0.0900	-	-	-	-	-	-	-	-	-
Total Dissolved Nitrogen	-	-	0.0380	-	0.0760	0.0900	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen, Dissolved	-	-	0.0300	-	0.0200	0.0500	-	-	-	-	-	-	-	-	-
Ammonia, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Dissolved	0.0150	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	-	-	-	-	-	-
Nitrate+Nitrite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate, Dissolved (as NO_3)	-	-	0.00600	-	0.0540	0.0380	-	-	-	-	-	-	-	-	-
Nitrate+ Nitrite, Dissolved	0.00400	0.00500	0.00800	0.0300	0.0560	0.0400	0.00300	0.00500	0.0420	0.00200	0.00200	0.0470	0.0370	0.0430	0.126
Nitrite, Dissolved (as N)	-	-	0.00200	-	0.00200	0.00200	-	-	-	-	-	-	-	-	-
Total Organic Nitrogen	-	-	0.0300	-	0.0200	0.0400	-	-	-	-	-	-	-	-	-
Total Phosphorus (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Orthophosphate (as P)	0.001000	0.00200	0.00300	0.00200	0.00500	0.00300	0.001000	0.00500	0.00200	-	-	-	-	-	-
Silica, Dissolved	-	-	-	-	-	-	-	-	-	4.80	7.20	5.60	5.90	6.30	5.10
Carbon															
Total Organic Carbon	-	-	1.50	-	1.000	1.000	-	-	-	-	-	-	-	-	-
Dissolved Organic Carbon	-	-	-	-	-	-	-	-	-	0.500	1.10	0.500	2.80	3.40	3.30
Total Inorganic Carbon	-	-	-	-	-	-	-	-	-	11.1	22.8	12.0	13.6	23.6	13.1
Total Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals															
Aluminum (Al)	0.0585	0.00850	0.0133	0.00870	0.0114	0.0153	0.305	0.0159	0.0112	0.0368	0.0368	0.00630	0.0145	0.0163	0.00460
Antimony (Sb)	0.0000270	0.000143	0.000125	0.0000750	0.0000750	0.0000760	0.0000270	0.000130	0.0000700	0.0000360	0.000105	0.0000660	0.0000330	0.0000910	0.0000570
Arsenic (As)	1.00E-04	0.000400	0.000400	0.000200	0.000200	1.00E-04	1.00E-04	0.000400	1.00E-04	1.00E-04	0.000200	1.00E-04	0.000200	0.000300	0.000200

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	E242646	E242647	400187	E242646	E242647	400187	E242646	E242647	400187	E242646	E242647	400435	400435	E242646
Date	18-Dec-2006	18-Dec-2006	18-Dec-2006	22-Jan-2007	22-Jan-2007	22-Jan-2007	12-Feb-2007	12-Feb-2007	12-Feb-2007	19-Mar-2007	19-Mar-2007	19-Mar-2007	26-Sep-2007	26-Sep-2007	17-Dec-2007
Client Sample ID	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	TENAS CREEK
Time	13:30	12:30	13:05	12:15	10:54	11:15	12:33	11:34	11:55	13:10	12:25	12:05	1:30	1:31	13:30
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Aliquot	Aliquot	Aliquot	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In Situ															
Temperature (°C)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Tests															
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	5.00	5.00	-
Colour (TAC)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	125	200	167	127	211	177	118	205	175	119	207	180	-	-	180
Hardness (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88.0
pH	7.80	8.00	7.80	7.80	8.10	7.90	7.80	8.10	7.90	7.90	8.10	7.90	-	-	8.10
Turbidity (NTU)	0.900	0.300	0.1000	1.000	0.200	0.1000	1.10	0.200	0.200	1.50	0.700	0.200	1.40	1.40	-
Acidity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 4.5)	57.7	99.9	57.1	57.3	104	62.4	55.1	103	64.0	54.0	102	67.0	31.0	31.0	87.0
Alkalinity (pH 8.3)	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
Alkalinity, Bicarbonate	-	-	-	-	-	-	-	-	-	-	-	-	38.0	38.0	110
Alkalinity, Carbonate	-	-	-	-	-	-	-	-	-	-	-	-	0.500	0.500	0.500
Anions															
Bromide (Br)	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	-	-	0.1000
Chloride (Cl)	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0600
Sulphate (SO_4)	6.70	5.80	24.9	7.50	7.40	25.4	7.10	4.70	23.0	4.30	5.30	20.4	5.00	4.70	3.10
Nutrients															
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	0.0900	0.0900	0.120
Total Dissolved Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	0.0870	0.0940	0.123
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	0.0800	0.0900	0.0800
Ammonia, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	0.0130	0.0250	0.00500
Nitrate+Nitrite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate, Dissolved (as NO_3)	-	-	-	-	-	-	-	-	-	-	-	-	0.00700	0.00400	0.0430
Nitrate+ Nitrite, Dissolved	0.0830	0.0730	0.162	0.0870	0.0860	0.164	0.0780	0.0740	0.152	0.0610	0.0490	0.133	0.00700	0.00400	0.0430
Nitrite, Dissolved (as N)	-	-	-	-	-	-	-	-	-	-	-	-	0.00200	0.00200	0.00200
Total Organic Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	0.0700	0.0600	0.0800
Total Phosphorus (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00200
Dissolved Orthophosphate (as P)	-	-	-	-	-	-	-	-	-	-	-	-	0.00800	0.00400	0.001000
Silica, Dissolved	7.10	6.90	5.00	7.10	7.00	4.10	7.50	7.00	5.50	7.50	7.30	5.20	-	-	7.90
Carbon															
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	1.000	0.700	-
Dissolved Organic Carbon	0.500	0.800	0.500	0.500	0.500	0.500	1.70	2.00	2.00	1.90	3.00	1.80	-	-	2.50
Total Inorganic Carbon	14.3	24.4	14.5	13.2	7.40	13.2	13.7	25.9	13.0	14.7	24.8	16.9	-	-	21.7
Total Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals															
Aluminum (Al)	0.0166	0.0154	0.00440	0.0123	0.0118	0.00290	0.0216	0.00820	0.00250	0.0389	0.0307	0.00560	0.0709	0.0748	0.0361
Antimony (Sb)	0.0000300	0.0000870	0.0000550	0.0000310	0.0000650	0.0000460	0.0000280	0.0000730	0.0000470	0.0000290	0.0000730	0.0000470	0.0000290	0.0000280	0.0000800
Arsenic (As)	0.000200	0.000300	1.00E-04	0.000200	0.000300	1.00E-04	0.000300	0.000300	0.000200	0.000300	0.000500	0.000200	0.000400	0.000400	0.000320

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	E242647	400187	E242646	400187	E242646	400187	E242646	E242647	400187	E242646	E242646	E242647	E242647	400187	E242646
Date	17-Dec-2007	22-Jan-2008	22-Jan-2008	18-Mar-2008	18-Mar-2008	15-Apr-2008	15-Apr-2008	15-Apr-2008	17-Jun-2008	17-Jun-2008	17-Jun-2008	17-Jun-2008	17-Jun-2008	21-Jul-2008	21-Jul-2008
Client Sample ID	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	TELKWA R AT VILLAGE	TENAS CREEK	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK
Time	13:00	13:00	13:30	13:00	13:30	14:25	15:00	14:55	12:30	12:40	15:30	12:00	15:00	13:15	14:10
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In Situ															
Temperature (°C)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Tests															
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour (TAC)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	160	130	190	140	220	130	200	210	60.0	110	110	110	110	59.0	110
Hardness (as $CaCO_3$)	79.9	64.8	98.3	65.9	106	68.3	98.9	108	28.3	51.6	53.6	51.0	50.1	27.0	53.1
pH	8.00	7.90	8.10	8.00	8.20	8.10	8.20	8.20	7.50	7.80	7.80	7.70	7.70	7.80	8.10
Turbidity (NTU)	-	-	-	-	-	-	-	-	-	-	-	-	-	8.50	1.60
Acidity (pH 4.5)	-	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
Acidity (pH 8.3)	-	2.40	2.50	2.40	3.30	1.90	2.50	1.80	1.50	1.60	1.70	1.80	1.70	2.80	2.80
Alkalinity (pH 4.5)	63.0	60.0	95.0	65.0	110	60.0	95.0	80.0	25.0	51.0	52.0	37.0	37.0	26.0	57.0
Alkalinity (pH 8.3)	0.500	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate	77.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate	0.500	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions															
Bromide (Br)	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	-	-	-	-	-	-	-
Chloride (Cl)	0.500	0.500	0.500	0.900	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.800
Fluoride (F)	0.0600	-	-	0.0500	0.0500	0.0400	0.0700	0.0400	0.0200	0.0300	0.0300	0.0200	0.0200	0.0200	0.0300
Sulphate (SO_4)	17.1	5.00	4.40	7.10	6.60	6.90	9.80	27.0	3.70	1.40	2.70	15.0	15.0	4.50	2.40
Nutrients															
Total Nitrogen	0.170	0.0900	0.160	0.130	0.120	0.190	0.180	0.230	0.0300	0.0400	0.0500	0.0900	0.0800	0.0500	0.0800
Total Dissolved Nitrogen	0.166	-	0.158	-	0.120	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	0.0200	-	0.0400	-	0.130	0.0800	0.1000	0.0300	0.0400	0.0500	0.0600	0.0500	0.0400	0.0800
Total Kjeldahl Nitrogen, Dissolved	0.0800	-	0.1000	-	0.0600	-	-	-	-	-	-	-	-	-	-
Ammonia, Total	-	-	-	0.0000000	-	0.0000000	0.0400	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Ammonia, Dissolved	0.00500	0.00500	0.00600	0.00500	0.00500	0.00500	0.0380	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500
Nitrate+Nitrite	-	0.0700	-	0.0900	-	0.0600	0.1000	0.130	0.0000000	0.0000000	0.0000000	0.0300	0.0300	0.01000	0.0000000
Nitrate, Dissolved (as NO_3)	0.0840	0.0780	0.0580	0.0840	0.0600	0.0590	0.0510	0.127	0.00500	0.00200	0.00200	0.0290	0.0290	0.00600	0.00200
Nitrate+ Nitrite, Dissolved	0.0860	0.0780	0.0580	0.0840	0.0600	0.0590	0.1000	0.127	0.00700	0.00300	0.00200	0.0310	0.0290	0.00800	0.00200
Nitrite, Dissolved (as N)	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.0490	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200
Total Organic Nitrogen	0.0800	0.0200	0.1000	0.0400	0.0600	0.130	0.0400	0.1000	0.0300	0.0400	0.0500	0.0600	0.0500	0.0400	0.0800
Total Phosphorus (as P)	0.00300	0.00400	0.00800	0.00600	0.00500	0.00600	0.0180	0.00300	0.00200	0.00200	0.00200	0.00200	0.00200	0.00600	0.00200
Dissolved Orthophosphate (as P)	0.001000	0.00500	0.00400	0.00400	0.00400	0.00300	0.001000	0.00200	0.00300	0.001000	0.001000	0.001000	0.001000	0.00400	0.00200
Silica, Dissolved	6.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon															
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Organic Carbon	2.20	1.10	1.90	1.30	1.90	3.80	4.60	3.50	2.30	3.40	3.50	2.50	2.70	0.600	1.20
Total Inorganic Carbon	15.5	15.0	23.6	16.1	27.5	15.5	24.4	19.9	5.80	13.3	14.8	11.3	9.30	5.40	13.2
Total Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals															
Aluminum (Al)	0.0226	0.0189	0.0191	0.0157	0.0190	0.0740	0.288	0.0257	0.0793	0.0464	0.0504	0.0371	0.0379	0.0913	0.0189
Antimony (Sb)	0.0000600	0.0000400	0.0000900	0.0000300	0.0000800	0.0000300	0.0000700	0.0000500	0.0000400	0.000110	0.000130	0.0000800	0.0000800	0.0000400	0.000180
Arsenic (As)	0.000130	0.000200	0.000320	0.000190	0.000280	0.000240	0.000430	0.000130	0.000210	0.000400	0.000450	0.000190	0.000190	0.000150	0.000410

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	E242646	E242647	400187	400187	E242646	E242647	E242647	400187	E242646	E242647	400187	E242646	E242647	400187
Date	18-Aug-2008	18-Aug-2008	18-Aug-2008	15-Sep-2008	15-Sep-2008	15-Sep-2008	15-Sep-2008	15-Sep-2008	20-Oct-2008	20-Oct-2008	20-Oct-2008	19-Nov-2008	19-Nov-2008	19-Nov-2008	15-Dec-2008
Client Sample ID	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE
Time	12:50	13:55	13:30	10:55	14:05	11:45	11:30	13:30	12:50	12:00	12:25	12:25	13:25	13:00	11:00
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In Situ															
Temperature (°C)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Tests															
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour (TAC)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	54.0	130	120	80.0	80.0	150	130	130	98.0	170	140	93.0	160	140	120
Hardness (as $CaCO_3$)	24.7	62.2	49.1	35.8	36.7	69.1	57.3	57.1	45.1	83.2	65.1	44.5	77.9	64.9	54.0
pH	7.70	8.10	7.80	7.80	7.80	8.10	7.90	7.90	7.80	8.10	7.90	7.90	8.10	8.00	7.90
Turbidity (NTU)	23.0	0.800	0.700	3.40	4.40	0.500	1.10	0.700	0.900	0.700	0.500	2.00	1.000	1.30	2.70
Acidity (pH 4.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 4.5)	23.0	67.0	29.0	35.0	35.0	74.0	41.0	41.0	44.0	85.0	50.0	44.0	81.0	55.0	56.0
Alkalinity (pH 8.3)	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
Alkalinity, Bicarbonate	28.0	82.0	36.0	43.0	43.0	91.0	50.0	50.0	54.0	100.0	61.0	54.0	99.0	67.0	69.0
Alkalinity, Carbonate	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
Anions															
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	0.1000	0.1000	0.1000	0.1000
Chloride (Cl)	0.500	0.500	0.500	0.500	0.500	0.600	0.500	0.500	1.10	0.700	1.000	0.700	0.800	0.500	0.500
Fluoride (F)	0.0200	0.0300	0.0200	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0200	0.0400	0.0400	0.0400	0.0300
Sulphate (SO_4)	4.20	2.40	23.0	5.50	5.50	3.50	21.0	21.0	5.80	4.10	21.0	4.00	3.20	15.0	4.10
Nutrients															
Total Nitrogen	0.0600	0.0800	0.0900	0.0400	0.0300	0.0500	0.0700	0.0800	0.0600	0.0400	0.0900	0.0500	0.0800	0.140	0.120
Total Dissolved Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	0.0500	0.0700	0.0600	0.0300	0.0200	0.0500	0.0500	0.0500	0.0600	0.0400	0.0400	0.0200	0.0700	0.0900	0.0700
Total Kjeldahl Nitrogen, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total	0.0000000	0.0000000	0.01000	0.01000	-	0.0000000	0.01000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.01000	0.0000000
Ammonia, Dissolved	0.00500	0.00700	0.00700	0.00600	0.00500	0.00500	0.00600	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.01000	0.00500
Nitrate+Nitrite	0.01000	0.01000	0.0300	0.01000	0.01000	0.0000000	0.0200	0.0300	0.0000000	0.0000000	0.0500	0.0300	0.01000	0.0500	0.0500
Nitrate, Dissolved (as NO_3)	0.00200	0.00200	0.0260	0.0110	0.00900	0.00200	0.0260	0.0270	0.00400	0.00200	0.0470	0.0320	0.0160	0.0510	0.0420
Nitrate+ Nitrite, Dissolved	0.00800	0.00200	0.0260	0.0110	0.00900	0.00200	0.0260	0.0270	0.00600	0.00200	0.0470	0.0320	0.0160	0.0510	0.0440
Nitrite, Dissolved (as N)	0.0120	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200
Total Organic Nitrogen	0.0500	0.0700	0.0500	0.0200	0.0200	0.0500	0.0400	0.0500	0.0600	0.0400	0.0400	0.0200	0.0700	0.0800	0.0700
Total Phosphorus (as P)	0.0170	0.00300	0.00200	0.00700	0.00700	0.00400	0.00300	0.00300	0.00400	0.00300	0.00400	0.00800	0.00400	0.00400	0.00400
Dissolved Orthophosphate (as P)	0.0160	0.00200	0.001000	0.00300	0.00300	0.00200	0.001000	0.00200	0.00200	0.001000	0.001000	0.00200	0.00200	0.00200	0.00300
Silica, Dissolved	3.50	6.90	5.60	5.00	4.90	6.80	5.70	5.60	6.20	7.00	5.60	7.30	8.00	6.00	9.00
Carbon															
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Organic Carbon	0.500	0.500	0.500	1.50	1.50	0.500	0.700	1.30	1.20	1.50	1.10	3.00	5.60	4.30	3.60
Total Inorganic Carbon	3.90	14.2	5.10	8.10	7.00	15.1	8.50	8.70	11.5	22.1	12.6	10.6	20.2	13.9	12.5
Total Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals															
Aluminum (Al)	0.370	0.0209	0.0151	0.141	0.127	0.00780	0.0178	0.0140	0.0183	0.0157	0.0104	0.0493	0.0587	0.0341	0.0450
Antimony (Sb)	0.0000300	0.000210	0.0000900	0.0000400	0.0000400	0.000150	0.0000800	0.0000800	0.0000400	1.00E-04	0.0000600	0.0000400	0.0000900	0.0000600	0.0000400
Arsenic (As)	0.000130	0.000410	0.000130	0.000130	0.000120	0.000330	0.000160	0.000160	0.000160	0.000260	0.000120	0.000190	0.000330	0.000150	0.000240

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	E242646	E242647	400187	400187	400434	400435	400435	400434	400434	400434	400435	400435	400435	400435	400435
Date	15-Dec-2008	15-Dec-2008	17-Feb-2009	15-Mar-2009	29-Aug-2012	29-Aug-2012	29-Aug-2012	6-Sep-2012	18-Sep-2012	26-Sep-2012	6-Sep-2012	18-Sep-2012	26-Sep-2012	26-Sep-2012	26-Sep-2012
Client Sample ID	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS
Time	12:15	11:50	13:10	11:05	14:00	-	14:45	14:00	14:00	13:40	14:30	14:40	9:50	11:50	12:40
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Replicate-First
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In Situ															
Temperature (°C)	-	-	-	-	-	-	-	13.7	12.7	11.3	13.7	12.6	10.1	10.1	-
pH	-	-	-	-	-	-	-	7.11	7.62	7.62	7.13	7.57	7.40	7.40	-
Conductivity (µS/cm)	-	-	-	-	-	-	-	56.1	58.4	58.6	56.8	59.0	58.8	58.8	-
Dissolved Oxygen	-	-	-	-	-	-	-	9.52	10.1	9.82	9.60	9.57	10.2	10.2	-
Physical Tests															
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour (TAC)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm)	170	140	120	130	-	-	-	-	-	-	-	-	-	-	-
Hardness (as $CaCO_3$)	63.1	70.4	53.3	57.7	-	-	-	-	-	-	-	-	-	-	-
pH	8.10	7.90	7.90	8.00	-	-	-	-	-	-	-	-	-	-	-
Turbidity (NTU)	1.30	2.00	-	-	-	2.12	-	-	1.71	-	-	1.61	-	-	-
Acidity (pH 4.5)	-	-	0.500	0.500	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	-	-	0.500	0.500	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 4.5)	88.0	57.0	57.0	59.0	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (pH 8.3)	0.500	0.500	0.500	0.500	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate	110	69.0	69.0	72.0	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate	0.500	0.500	0.500	0.500	-	-	-	-	-	-	-	-	-	-	-
Anions															
Bromide (Br)	0.1000	0.1000	0.1000	0.1000	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	0.500	0.500	0.600	0.500	-	0.550	-	-	0.880	-	-	1.20	-	-	-
Fluoride (F)	0.0400	0.0300	0.0400	0.0300	-	-	-	-	-	-	-	-	-	-	-
Sulphate (SO_4)	2.00	15.0	4.90	5.90	-	-	-	-	-	-	-	-	-	-	-
Nutrients															
Total Nitrogen	0.120	0.130	0.150	0.110	-	0.176	-	-	0.0610	-	-	0.122	-	-	-
Total Dissolved Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	0.0900	0.1000	0.0700	0.0300	-	0.166	-	-	0.0250	-	-	0.0980	-	-	-
Total Kjeldahl Nitrogen, Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total	0.0000000	0.0000000	0.0000000	0.01000	-	0.0000000	-	-	0.00500	-	-	0.0200	-	-	-
Ammonia, Dissolved	0.00500	0.00500	0.00500	0.00800	-	0.00500	-	-	0.0150	-	-	0.0200	-	-	-
Nitrate+Nitrite	0.0300	0.0300	0.0800	0.0800	-	0.01000	-	-	0.0360	-	-	0.0240	-	-	-
Nitrate, Dissolved (as NO_3)	0.0300	0.0330	0.0760	0.0820	-	0.00940	-	-	0.0329	-	-	0.0232	-	-	-
Nitrate+ Nitrite, Dissolved	0.0300	0.0330	0.0780	0.0840	-	0.00940	-	-	0.0356	-	-	0.0232	-	-	-
Nitrite, Dissolved (as N)	0.00200	0.00200	0.00200	0.00200	-	0.00200	-	-	0.00270	-	-	0.00200	-	-	-
Total Organic Nitrogen	0.0900	0.1000	0.0700	0.0200	-	0.166	-	-	0.0200	-	-	0.0780	-	-	-
Total Phosphorus (as P)	0.00300	0.00400	0.00200	0.00400	-	0.00200	-	-	0.00250	-	-	0.00200	-	-	-
Dissolved Orthophosphate (as P)	0.00300	0.00400	0.001000	0.001000	-	0.00130	-	-	0.001000	-	-	0.001000	-	-	-
Silica, Dissolved	8.10	6.30	8.50	7.90	-	-	-	-	-	-	-	-	-	-	-
Carbon															
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Organic Carbon	7.20	5.80	2.90	2.50	-	-	-	-	-	-	-	-	-	-	-
Total Inorganic Carbon	15.7	13.4	13.5	14.2	-	-	-	-	-	-	-	-	-	-	-
Total Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals															
Aluminum (Al)	0.0373	0.0261	0.0200	0.00970	-	0.0876	-	-	0.0671	-	-	0.0638	-	-	-
Antimony (Sb)	0.0000600	0.0000600	0.0000400	0.0000300	-	0.000500	-	-	0.000500	-	-	0.000500	-	-	-
Arsenic (As)	0.000280	0.000170	0.000190	0.000170	-	1.00E-04	-	-	0.000150	-	-	0.000130	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	**400435**
Date	**26-Sep-2012**
Client Sample ID	**BULKLEY R. IDZ AT SMITHERS**
Time	**13:10**
QAQC	**Replicate-Second**
ALS Sample ID	**-**
In Situ	
Temperature (°C)	-
pH	-
Conductivity (µS/cm)	-
Dissolved Oxygen	-
Physical Tests	
Colour, True	-
Colour (TAC)	-
Conductivity (µS/cm)	-
Hardness (as $CaCO_3$)	-
pH	-
Turbidity (NTU)	-
Acidity (pH 4.5)	-
Acidity (pH 8.3)	-
Alkalinity (pH 4.5)	-
Alkalinity (pH 8.3)	-
Alkalinity, Bicarbonate	-
Alkalinity, Carbonate	-
Anions	
Bromide (Br)	-
Chloride (Cl)	-
Fluoride (F)	-
Sulphate (SO_4)	-
Nutrients	
Total Nitrogen	-
Total Dissolved Nitrogen	-
Total Kjeldahl Nitrogen	-
Total Kjeldahl Nitrogen, Dissolved	-
Ammonia, Total	-
Ammonia, Dissolved	-
Nitrate+Nitrite	-
Nitrate, Dissolved (as NO_3)	-
Nitrate+ Nitrite, Dissolved	-
Nitrite, Dissolved (as N)	-
Total Organic Nitrogen	-
Total Phosphorus (as P)	-
Dissolved Orthophosphate (as P)	-
Silica, Dissolved	-
Carbon	
Total Organic Carbon	-
Dissolved Organic Carbon	-
Total Inorganic Carbon	-
Total Carbon	-
Total Metals	
Aluminum (Al)	-
Antimony (Sb)	-
Arsenic (As)	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	400187	400434	400435	400434	400435	400187	400434	400435	400434	400434	400435	400435	400187	400434
Date	20-Mar-1974	4-Jun-1974	25-Jun-1974	25-Jun-1974	10-Jul-1974	10-Jul-1974	17-Sep-1974	24-Sep-1974	24-Sep-1974	21-May-1975	21-May-1975	21-May-1975	21-May-1975	2-Jun-1975	25-Jun-1975
Client Sample ID	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE
Time	8:30	17:05	11:45	11:40	10:10	10:00	22:15	15:30	15:40	9:15	9:20	9:20	9:30	17:45	10:30
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals *(cont'd)*															
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-	-	-	-	-	-	-	-	-	12.8	-
Chromium (Cr)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0110	-
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0200	-
Iron (Fe)	-	-	-	-	-	-	-	-	-	-	-	-	-	18.4	-
Lead (Pb)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00400	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.500	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000500	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)	0.00800	0.0200	-	-	-	-	0.0260	-	-	0.0500	-	0.0480	-	0.340	0.0460
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium (Te)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00500	-
Zirconium (Zr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals															
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	0.000500	-	0.000500	-	-	-
Calcium (Ca)	19.7	9.40	-	-	-	-	7.70	-	-	8.80	-	8.90	-	8.40	19.0
Chromium (Cr)	0.00500	-	-	-	-	-	0.00500	-	-	0.00500	-	0.00500	-	-	-
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	0.001000	-	-	-	-	-	0.001000	-	-	0.00200	-	0.00300	-	-	-
Iron (Fe)	0.1000	-	-	-	-	-	0.1000	-	-	0.1000	-	0.1000	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400435	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187
Date	25-Jun-1975	17-Jul-1975	7-Oct-1975	11-Feb-1985	11-Mar-1985	17-Apr-1985	13-May-1985	12-Jun-1985	9-Jul-1985	13-Aug-1985	10-Sep-1985	8-Oct-1985	5-Nov-1985	10-Dec-1985	8-Jan-1986
Client Sample ID	BULKLEY R. IDZ AT SMITHERS	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE
Time	10:45	16:30	12:00	11:00	-	13:45	8:00	14:30	10:30	14:00	11:10	9:00	8:30	7:00	13:00
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals *(cont'd)*															
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	0.000500	-	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500
Calcium (Ca)	-	-	8.40	16.3	19.5	15.6	13.6	8.12	7.38	8.45	11.7	12.9	16.8	17.0	19.3
Chromium (Cr)	-	0.00500	0.00500	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
Cobalt (Co)	-	-	-	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
Copper (Cu)	-	0.00500	0.001000	0.001000	0.001000	0.00200	0.00400	0.00300	0.00200	0.00300	0.001000	0.001000	0.001000	0.00300	0.00200
Iron (Fe)	-	1.30	0.200	0.150	0.400	0.980	2.02	1.30	0.680	0.270	0.220	0.190	0.290	0.140	0.230
Lead (Pb)	-	0.00300	0.001000	0.00200	0.001000	0.00200	0.001000	0.001000	0.00200	0.001000	0.001000	0.00200	0.001000	0.00500	0.00500
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	1.40	0.920	3.30	3.35	3.29	3.11	1.82	1.39	1.20	1.78	2.35	2.62	2.93	2.97
Manganese (Mn)	-	0.0600	-	0.01000	0.0200	0.0400	0.0700	0.0500	0.0300	0.0200	0.0200	0.0200	0.0300	0.01000	0.01000
Mercury (Hg)	-	-	0.0000500	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	0.000500	-	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
Nickel (Ni)	-	0.01000	-	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500
Phosphorus (P)	0.0480	0.0310	0.00600	0.00500	0.0110	0.0270	0.0410	0.0240	0.0210	0.00800	0.00500	0.00500	0.00400	0.00500	0.00900
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium (Te)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
Zinc (Zn)	-	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00600	0.00500
Zirconium (Zr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals															
Aluminum (Al)	-	-	-	0.0200	0.0200	0.0800	0.1000	0.0400	0.0700	0.0500	0.0300	0.0200	0.0300	0.0200	0.0200
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000
Barium (Ba)	-	-	-	0.0400	0.0300	0.0300	0.0200	0.01000	0.0200	0.0300	0.0400	0.0300	0.0500	0.0400	0.0500
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
Cadmium (Cd)	-	-	-	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500
Calcium (Ca)	7.50	9.10	8.30	15.8	15.0	14.9	12.7	7.80	7.12	8.19	10.9	12.9	16.8	16.2	19.3
Chromium (Cr)	-	-	-	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
Cobalt (Co)	-	-	-	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
Copper (Cu)	-	-	-	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000
Iron (Fe)	-	-	-	0.0800	0.180	0.310	0.260	0.0700	0.0600	0.0500	0.0900	0.120	0.170	0.0700	0.230

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187
Date	11-Feb-1986	19-Mar-1986	7-Apr-1986	7-May-1986	2-Jun-1986	8-Jul-1986	5-Aug-1986	4-Sep-1986	4-Oct-1986	9-Oct-1986	12-Nov-1986	10-Dec-1986	12-Jan-1987	18-Feb-1987	26-Mar-1987
Client Sample ID	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE
Time	12:00	9:30	14:00	9:00	9:30	14:00	10:00	9:30	18:00	8:30	10:30	9:30	9:45	9:15	8:15
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals *(cont'd)*															
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.01000	-	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500
Calcium (Ca)	20.3	18.2	18.1	13.0	8.25	8.65	9.21	8.78	-	9.53	13.9	18.5	18.2	18.2	21.9
Chromium (Cr)	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	-	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
Cobalt (Co)	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	-	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
Copper (Cu)	0.001000	0.00300	0.001000	0.00600	0.00400	0.00300	0.00400	0.0300	-	0.00400	0.001000	0.001000	0.001000	0.00200	0.0400
Iron (Fe)	0.150	0.630	1.37	2.97	1.80	0.940	1.02	13.8	-	3.18	0.170	0.120	0.160	0.310	0.510
Lead (Pb)	0.001000	0.001000	0.001000	0.00500	0.00200	0.00300	0.001000	0.1000	-	0.00400	0.001000	0.00300	0.001000	0.00200	0.00500
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	3.56	3.45	3.85	3.17	1.97	1.55	1.65	4.84	-	2.73	2.19	2.89	3.13	3.10	3.61
Manganese (Mn)	0.01000	0.0200	0.0500	0.150	0.0800	0.0400	0.0400	0.540	-	0.110	0.0200	0.01000	0.01000	0.0200	0.0200
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	-	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
Nickel (Ni)	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	-	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500
Phosphorus (P)	0.00500	0.0190	0.0260	0.0520	0.0290	0.0260	0.0350	0.585	-	0.0900	0.00500	0.00300	0.00300	0.00500	0.00900
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium (Te)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.0300	-	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
Zinc (Zn)	0.00500	0.00500	0.00500	0.00500	0.00600	0.00700	0.0120	0.0800	-	0.0200	0.00500	0.00500	0.00500	0.00500	0.00500
Zirconium (Zr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals															
Aluminum (Al)	0.0200	0.0400	0.0400	0.140	0.0600	0.0300	0.0500	-	-	0.0800	0.0200	0.0300	0.0200	0.0200	0.0300
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	-	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000
Barium (Ba)	0.0400	0.0400	0.0300	0.0300	0.0200	0.0200	0.0200	0.0700	-	0.0200	0.0200	0.0400	0.0400	0.0400	0.0400
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	-	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
Cadmium (Cd)	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	-	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500
Calcium (Ca)	19.4	16.8	17.6	11.6	6.94	8.13	7.89	7.25	-	8.16	12.2	17.2	17.6	18.2	20.3
Chromium (Cr)	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	-	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
Cobalt (Co)	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	-	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
Copper (Cu)	0.001000	0.001000	0.001000	0.001000	0.00200	0.001000	0.001000	0.00300	-	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000
Iron (Fe)	0.110	0.160	0.300	0.350	0.0700	0.0500	0.0600	0.130	-	0.110	0.0900	0.1000	0.0900	0.180	0.180

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	400187	400187	400187	400187	400434	400434	400434	400435	400435	400435	400187	400434	400434	400435
Date	21-Apr-1987	19-May-1987	17-Jun-1987	14-Jul-1987	11-Aug-1987	16-Aug-1987	23-Aug-1987	31-Aug-1987	16-Aug-1987	23-Aug-1987	31-Aug-1987	8-Sep-1987	8-Sep-1987	14-Sep-1987	8-Sep-1987
Client Sample ID	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS
Time	9:30	10:15	13:30	11:50	11:00	15:00	12:40	16:00	15:30	13:30	16:30	11:30	18:30	18:15	18:00
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals *(cont'd)*															
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	0.000500	0.000500	0.000500	0.000500	0.000500	-	-	0.01000	-	-	0.01000	0.000500	0.01000	0.01000	0.01000
Calcium (Ca)	17.3	11.7	10.3	8.90	8.53	-	-	7.78	-	-	7.83	9.21	7.38	8.02	7.39
Chromium (Cr)	0.01000	0.01000	0.01000	0.01000	0.01000	-	-	0.0200	-	-	0.0200	0.01000	0.01000	0.01000	0.01000
Cobalt (Co)	0.1000	0.1000	0.1000	0.1000	0.1000	-	-	0.1000	-	-	0.1000	0.1000	0.1000	0.1000	0.1000
Copper (Cu)	0.00300	0.00500	0.00200	0.001000	0.001000	-	-	0.0200	-	-	0.0200	0.00300	0.01000	0.01000	0.01000
Iron (Fe)	1.15	0.530	0.390	0.710	0.950	-	-	0.460	-	-	0.410	0.770	0.200	0.200	0.0700
Lead (Pb)	0.001000	0.00200	0.00300	0.00200	0.00700	-	-	0.1000	-	-	0.1000	0.00300	0.1000	0.1000	0.1000
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	3.14	1.88	1.70	1.40	1.60	-	-	1.16	-	-	1.13	1.55	0.930	0.960	0.880
Manganese (Mn)	0.0500	0.0300	0.0200	0.0300	0.0300	-	-	0.0200	-	-	0.0200	0.0300	0.01000	0.01000	0.01000
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	0.01000	0.01000	0.01000	0.01000	0.01000	-	-	0.0200	-	-	0.01000	0.01000	0.01000	0.01000	0.01000
Nickel (Ni)	0.0500	0.0500	0.0500	0.0500	0.0500	-	-	0.0500	-	-	0.0500	0.0500	0.0500	0.0500	0.0500
Phosphorus (P)	0.0240	0.0180	0.0110	0.0140	0.0140	0.01000	0.00800	0.0210	0.00800	0.00900	0.0190	0.0200	0.0110	0.0110	0.0110
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium (Te)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	0.01000	0.01000	0.01000	0.01000	0.01000	-	-	0.0200	-	-	0.0200	0.01000	0.01000	0.01000	0.01000
Zinc (Zn)	0.00500	0.00500	0.00500	0.0500	0.00500	-	-	0.01000	-	-	0.0200	0.00500	0.01000	0.01000	0.01000
Zirconium (Zr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals															
Aluminum (Al)	0.180	0.140	0.0200	0.0600	0.0700	-	-	-	-	-	-	0.0700	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	0.001000	0.001000	0.001000	0.001000	0.001000	-	-	-	-	-	-	0.001000	-	-	-
Barium (Ba)	0.0300	0.0300	0.0200	0.0200	0.0200	-	-	-	-	-	-	0.01000	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	0.01000	0.01000	0.01000	0.01000	0.01000	-	-	-	-	-	-	0.01000	-	-	-
Cadmium (Cd)	0.000500	0.000500	0.000500	0.000500	0.000500	-	-	-	-	-	-	0.000500	-	-	-
Calcium (Ca)	16.3	11.7	10.3	8.90	8.52	-	-	-	-	-	-	9.20	-	-	-
Chromium (Cr)	0.01000	0.01000	0.01000	0.01000	0.01000	-	-	-	-	-	-	0.01000	-	-	-
Cobalt (Co)	0.1000	0.1000	0.1000	0.1000	0.1000	-	-	-	-	-	-	0.1000	-	-	-
Copper (Cu)	0.001000	0.001000	0.001000	0.001000	0.001000	-	-	-	-	-	-	0.001000	-	-	-
Iron (Fe)	0.310	0.130	0.0300	0.0400	0.0500	-	-	-	-	-	-	0.0300	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400435	400187	400187	400187	400187	400434	400434	400434	400435	400435	400435	400434	400434	400435	400435
Date	14-Sep-1987	7-Oct-1987	16-Nov-1987	8-Feb-1988	8-Mar-1988	16-Aug-1988	22-Aug-1988	29-Aug-1988	16-Aug-1988	22-Aug-1988	29-Aug-1988	6-Sep-1988	12-Sep-1988	6-Sep-1988	12-Sep-1988
Client Sample ID	BULKLEY R. IDZ AT SMITHERS	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS
Time	17:30	11:00	11:30	9:00	9:00	13:00	14:30	12:45	13:30	14:00	12:15	12:45	12:00	12:15	11:30
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals *(cont'd)*															
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	0.01000	0.000500	0.000500	0.000500	0.000500	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	7.48	12.2	12.5	18.6	19.0	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	0.01000	0.01000	0.01000	0.01000	0.01000	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	0.1000	0.1000	0.1000	0.1000	0.1000	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	0.01000	0.00400	0.01000	0.00200	0.00400	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	0.130	0.580	0.200	0.210	0.300	-	-	-	-	-	-	-	-	-	-
Lead (Pb)	0.1000	0.001000	0.00200	0.001000	0.001000	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	0.920	1.89	2.20	3.32	3.33	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	0.01000	0.0300	0.01000	0.01000	0.01000	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	0.01000	0.01000	0.01000	0.01000	0.01000	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	0.0500	0.0500	0.0500	0.0500	0.0500	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)	0.00900	0.0150	0.00700	0.00400	0.00300	-	-	-	-	-	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium (Te)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	0.01000	0.01000	0.01000	0.01000	0.01000	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	0.01000	0.00500	0.00500	0.00500	0.00500	-	-	-	-	-	-	-	-	-	-
Zirconium (Zr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals															
Aluminum (Al)	-	0.0400	0.0900	0.01000	0.01000	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	0.001000	0.001000	0.001000	0.001000	-	-	-	-	-	-	-	-	-	-
Barium (Ba)	-	0.0300	0.0300	0.0400	0.0400	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	0.01000	0.01000	0.01000	0.01000	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	0.000500	0.000500	0.000500	0.000500	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	-	11.3	12.5	17.8	19.0	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	-	0.01000	0.01000	0.01000	0.01000	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	-	0.1000	0.1000	0.1000	0.1000	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	-	0.001000	0.00200	0.001000	0.001000	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	-	0.0400	0.140	0.0800	0.170	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400434	400434	400435	400435	400434	400434	400434	400435	400435	400435	400434	400435	400434	400434	400434
Date	24-Jul-1989	31-Jul-1989	24-Jul-1989	31-Jul-1989	8-Aug-1989	14-Aug-1989	21-Aug-1989	8-Aug-1989	14-Aug-1989	21-Aug-1989	26-Jun-1990	26-Jun-1990	3-Jul-1990	9-Jul-1990	18-Jul-1990
Client Sample ID	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE
Time	12:12	10:00	13:00	9:40	10:38	-	-	11:05	-	11:50	14:28	14:46	14:02	13:12	12:48
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals *(cont'd)*															
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead (Pb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium (Te)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium (Zr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals															
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400434	400435	400435	400435	400435	400434	400434	400434	400434	400434	400434	400435	400435	400435	400435
Date	23-Jul-1990	3-Jul-1990	9-Jul-1990	18-Jul-1990	23-Jul-1990	16-Jul-1991	16-Jul-1991	22-Jul-1991	22-Jul-1991	31-Jul-1991	31-Jul-1991	16-Jul-1991	16-Jul-1991	22-Jul-1991	22-Jul-1991
Client Sample ID	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS
Time	12:10	14:25	13:28	11:45	12:28	-	15:50	-	15:45	-	12:15	-	15:20	-	15:15
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals *(cont'd)*															
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead (Pb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium (Te)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium (Zr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals															
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400435	400435	400434	400434	400434	400435	400435	400435	400435	400434	400434	400435	400435	400434	400434
Date	31-Jul-1991	31-Jul-1991	6-Aug-1991	6-Aug-1991	15-Aug-1991	6-Aug-1991	6-Aug-1991	15-Aug-1991	15-Aug-1991	20-Jul-1992	27-Jul-1992	20-Jul-1992	27-Jul-1992	4-Aug-1992	10-Aug-1992
Client Sample ID	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE
Time	-	11:25	-	12:20	12:25	-	12:00	-	11:55	15:06	13:59	14:33	14:15	13:30	14:30
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals *(cont'd)*															
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead (Pb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium (Te)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium (Zr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals															
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	**400435**	**400435**	**E246125**	**E246125**	**E246125**	**E246125**	**E246125**	**E246125**	**E246125**	**E246125**	**E246125**	**E246125**	**E246125**	**E246125**	**E246125**
Date	**4-Aug-1992**	**10-Aug-1992**	**3-Oct-2001**	**10-Oct-2001**	**10-Oct-2001**	**22-Oct-2001**	**22-Oct-2001**	**29-Oct-2001**	**29-Oct-2001**	**8-Aug-2002**	**8-Aug-2002**	**14-Aug-2002**	**14-Aug-2002**	**20-Aug-2002**	**20-Aug-2002**
Client Sample ID	**BULKLEY R. IDZ AT SMITHERS**	**BULKLEY R. IDZ AT SMITHERS**	**BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE**	**BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE**	**BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE**	**BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE**	**BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE**	**BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE**	**BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE**	**BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE**	**BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE**	**BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE**	**BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE**	**BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE**	**BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE**
Time	**13:50**	**15:11**	**14:30**	**14:00**	**14:10**	**12:30**	**12:40**	**12:00**	**12:10**	**-**	**16:00**	**-**	**16:00**	**-**	**16:00**
QAQC	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**	**Regular**
ALS Sample ID	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Total Metals *(cont'd)*															
Barium (Ba)	-	-	0.0189	0.0190	-	0.0200	-	0.0170	-	-	0.0203	-	-	-	-
Beryllium (Be)	-	-	0.0000070	0.001000	-	0.001000	-	0.001000	-	-	0.0000200	-	-	-	-
Bismuth (Bi)	-	-	0.0000200	-	-	-	-	-	-	-	0.0000200	-	-	-	-
Boron (B)	-	-	0.00200	0.01000	-	0.01000	-	0.01000	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	0.0000100	0.00600	-	0.00600	-	0.00600	-	-	0.0000100	-	-	-	-
Calcium (Ca)	-	-	7.20	8.10	-	9.20	-	8.00	-	-	7.85	-	-	-	-
Chromium (Cr)	-	-	0.00700	0.00600	-	0.00600	-	0.00600	-	-	0.000200	-	-	-	-
Cobalt (Co)	-	-	0.0000520	0.00600	-	0.00600	-	0.00600	-	-	0.0000050	-	-	-	-
Copper (Cu)	-	-	0.00106	0.00600	-	0.00600	-	0.00600	-	-	0.000800	-	-	-	-
Iron (Fe)	-	-	0.103	0.0750	-	0.0670	-	0.0570	-	-	-	-	-	-	-
Lead (Pb)	-	-	0.0000400	0.0600	-	0.0600	-	0.0600	-	-	0.000130	-	-	-	-
Lithium (Li)	-	-	0.000120	-	-	-	-	-	-	-	0.0000500	-	-	-	-
Magnesium (Mg)	-	-	0.821	0.800	-	1.000	-	0.900	-	-	0.850	-	-	-	-
Manganese (Mn)	-	-	0.00645	0.00600	-	0.00500	-	0.00400	-	-	0.00996	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	0.000510	0.01000	-	0.01000	-	0.01000	-	-	0.000350	-	-	-	-
Nickel (Ni)	-	-	0.000520	0.0200	-	0.0200	-	0.0200	-	-	0.0000500	-	-	-	-
Phosphorus (P)	-	-	0.1000	0.1000	-	0.1000	-	0.1000	-	-	0.00300	-	-	-	-
Potassium (K)	-	-	0.300	0.200	-	0.200	-	0.200	-	-	-	-	-	-	-
Selenium (Se)	-	-	0.000500	0.0600	-	0.0600	-	0.0600	-	-	0.000300	-	-	-	-
Silicon (Si)	-	-	1.43	1.38	-	1.69	-	1.41	-	-	-	-	-	-	-
Silver (Ag)	-	-	0.0000200	0.01000	-	0.01000	-	0.01000	-	-	0.0000200	-	-	-	-
Sodium (Na)	-	-	0.900	0.900	-	1.000	-	0.900	-	-	-	-	-	-	-
Strontium (Sr)	-	-	0.0337	0.0280	-	0.0300	-	0.0260	-	-	0.0315	-	-	-	-
Sulphur (S)	-	-	1.08	1.11	-	1.10	-	0.910	-	-	-	-	-	-	-
Tellurium (Te)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	0.0000030	-	-	-	-	-	-	-	0.0000020	-	-	-	-
Tin (Sn)	-	-	0.0000100	0.0600	-	0.0600	-	0.0600	-	-	0.0000200	-	-	-	-
Titanium (Ti)	-	-	0.00300	0.00200	-	0.00200	-	0.00200	-	-	-	-	-	-	-
Uranium (U)	-	-	0.0000230	-	-	-	-	-	-	-	0.0000020	-	-	-	-
Vanadium (V)	-	-	0.00204	0.01000	-	0.01000	-	0.01000	-	-	0.000320	-	-	-	-
Zinc (Zn)	-	-	1.00E-04	0.00200	-	0.00200	-	0.00200	-	-	0.000500	-	-	-	-
Zirconium (Zr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals															
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125
Date	27-Aug-2002	27-Aug-2002	3-Sep-2002	3-Sep-2002	7-Oct-2002	7-Oct-2002	15-Oct-2002	21-Oct-2002	28-Oct-2002	28-Oct-2002	3-Nov-2002	3-Nov-2002	12-Nov-2002	12-Nov-2002	18-Nov-2002
Client Sample ID	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE
Time	-	16:00	-	16:00	-	16:00	-	-	-	16:00	-	16:00	-	16:00	10:59
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals *(cont'd)*															
Barium (Ba)	-	-	-	-	-	0.0293	-	-	-	0.0188	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	0.0000200	-	-	-	0.0000200	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	0.0000200	-	-	-	0.0000200	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	0.0000100	-	-	-	0.0000100	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-	8.16	-	-	-	8.94	-	-	-	-	-
Chromium (Cr)	-	-	-	-	-	0.000200	-	-	-	0.000200	-	-	-	-	-
Cobalt (Co)	-	-	-	-	-	0.0000050	-	-	-	0.0000050	-	-	-	-	-
Copper (Cu)	-	-	-	-	-	0.00191	-	-	-	0.000340	-	-	-	-	-
Iron (Fe)	-	-	-	-	-	0.604	-	-	-	0.0410	-	-	-	-	-
Lead (Pb)	-	-	-	-	-	0.00102	-	-	-	0.0000100	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	0.0000800	-	-	-	0.000530	-	-	-	-	-
Magnesium (Mg)	-	-	-	-	-	0.990	-	-	-	1.07	-	-	-	-	-
Manganese (Mn)	-	-	-	-	-	0.0251	-	-	-	0.00151	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	0.000400	-	-	-	0.000400	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	0.0000500	-	-	-	0.0000500	-	-	-	-	-
Phosphorus (P)	-	-	-	-	-	0.0160	-	-	-	0.00200	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	0.000200	-	-	-	0.000200	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	0.0000200	-	-	-	0.0000200	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	0.0388	-	-	-	0.0355	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium (Te)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	0.0000020	-	-	-	0.0000020	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	0.0000100	-	-	-	0.0000200	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	0.0000430	-	-	-	0.0000070	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	0.000960	-	-	-	0.000320	-	-	-	-	-
Zinc (Zn)	-	-	-	-	-	0.00180	-	-	-	1.00E-04	-	-	-	-	-
Zirconium (Zr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals															
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E242647	E242646	E242647	E242646	E242647	400187	E242646	E242647
Date	18-Nov-2002	18-Nov-2002	18-Nov-2002	18-Nov-2002	18-Nov-2002	25-Nov-2002	25-Nov-2002	2-Sep-2004	17-May-2006	17-May-2006	15-Jun-2006	15-Jun-2006	19-Jul-2006	19-Jul-2006	19-Jul-2006
Client Sample ID	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE
Time	11:02	11:05	11:08	11:11	16:00	-	16:00	16:00	-	-	11:00	11:15	11:05	10:45	10:50
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Aliquot	Aliquot	Aliquot	Aliquot	Aliquot
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals *(cont'd)*															
Barium (Ba)	-	-	-	-	-	-	-	0.0572	0.0229	0.0534	0.0253	0.0469	0.0314	0.0311	0.0491
Beryllium (Be)	-	-	-	-	-	-	-	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200
Bismuth (Bi)	-	-	-	-	-	-	-	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200
Boron (B)	-	-	-	-	-	-	-	0.00800	0.00900	0.00800	0.00800	0.00800	0.00800	0.00800	0.00800
Cadmium (Cd)	-	-	-	-	-	-	-	0.0000100	0.0000100	0.0000200	0.0000100	0.0000100	0.0000100	0.0000100	0.0000200
Calcium (Ca)	-	-	-	-	-	-	-	19.5	17.4	15.3	17.2	14.8	11.0	22.6	18.7
Chromium (Cr)	-	-	-	-	-	-	-	0.000200	0.000200	0.000200	0.000300	0.000200	0.000200	0.000200	0.000200
Cobalt (Co)	-	-	-	-	-	-	-	0.0000170	0.0000810	1.00E-04	0.0000670	0.0000700	0.0000290	0.0000140	0.0000060
Copper (Cu)	-	-	-	-	-	-	-	0.000750	0.00198	0.00253	0.00170	0.00234	0.000550	0.000640	0.000910
Iron (Fe)	-	-	-	-	-	-	-	0.0390	0.296	0.285	0.0750	0.0830	0.111	0.0150	0.0140
Lead (Pb)	-	-	-	-	-	-	-	0.0000400	0.0000400	0.0000800	0.0000400	0.0000400	0.000140	0.0000200	0.0000200
Lithium (Li)	-	-	-	-	-	-	-	0.000550	0.000550	0.000440	0.000830	0.000630	0.000160	0.000730	0.000450
Magnesium (Mg)	-	-	-	-	-	-	-	3.11	3.29	3.10	3.04	2.20	1.45	4.10	2.73
Manganese (Mn)	-	-	-	-	-	-	-	0.00211	0.00837	0.00992	0.00720	0.00565	0.00719	0.00505	0.00154
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	0.000640	0.000130	0.000330	1.00E-04	0.000480	0.000700	0.000120	0.000520
Nickel (Ni)	-	-	-	-	-	-	-	0.0000700	0.000190	0.000280	0.000140	0.000210	0.0000500	0.0000500	1.00E-04
Phosphorus (P)	-	-	-	-	-	-	-	0.0510	0.0590	0.0580	0.0515	0.0515	0.0510	0.0510	0.0510
Potassium (K)	-	-	-	-	-	-	-	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Selenium (Se)	-	-	-	-	-	-	-	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200
Sodium (Na)	-	-	-	-	-	-	-	1.95	2.81	1.98	2.45	1.32	1.14	3.32	1.70
Strontium (Sr)	-	-	-	-	-	-	-	0.0681	0.0631	0.0486	0.0754	0.0455	0.0507	0.0981	0.0581
Sulphur (S)	-	-	-	-	-	-	-	7.70	0.500	2.50	0.700	5.20	1.80	1.000	8.20
Tellurium (Te)	-	-	-	-	-	-	-	0.0500	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	0.0000020	0.0000020	0.0000030	0.0000020	0.0000020	0.0000050	0.0000020	0.0000020
Tin (Sn)	-	-	-	-	-	-	-	0.0000500	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100
Titanium (Ti)	-	-	-	-	-	-	-	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300
Uranium (U)	-	-	-	-	-	-	-	0.0000200	0.0000870	0.0000370	0.0000490	0.0000250	0.0000290	0.0000690	0.0000140
Vanadium (V)	-	-	-	-	-	-	-	0.0000900	0.000770	0.000310	0.000930	0.000190	0.000230	0.000620	0.0000600
Zinc (Zn)	-	-	-	-	-	-	-	0.00160	0.000700	0.00120	0.001000	0.00160	0.000200	1.00E-04	0.000300
Zirconium (Zr)	-	-	-	-	-	-	-	0.00500	-	-	-	-	-	-	-
Dissolved Metals															
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	E242646	E242646	E242647	E242647	E242647	400187	E242646	E242647	400187	E242646	E242647	400187	E242646	E242647
Date	14-Aug-2006	14-Aug-2006	23-Aug-2006	14-Aug-2006	23-Aug-2006	23-Aug-2006	6-Sep-2006	6-Sep-2006	6-Sep-2006	16-Oct-2006	16-Oct-2006	16-Oct-2006	14-Nov-2006	14-Nov-2006	14-Nov-2006
Client Sample ID	TELKWA R AT VILLAGE	TENAS CREEK	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	GOATHORN CR ABOVE TENAS CR CONFLUENCE	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE
Time	11:20	11:00	12:45	11:05	15:20	15:25	-	-	-	-	-	-	-	-	-
QAQC	Aliquot	Aliquot	Regular	Aliquot	Regular	Replicate	Aliquot	Aliquot	Aliquot	Aliquot	Aliquot	Aliquot	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals *(cont'd)*															
Barium (Ba)	0.0302	0.0326	0.0350	0.0544	0.0521	0.0548	0.0396	0.0429	0.0626	0.0420	0.0368	0.0617	0.0402	0.0335	0.0562
Beryllium (Be)	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200
Bismuth (Bi)	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200
Boron (B)	0.00800	0.0160	0.01000	0.00900	0.00800	0.00800	0.00800	0.0160	0.00800	0.00800	0.00900	0.00800	0.00800	0.0170	0.00800
Cadmium (Cd)	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000200	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100
Calcium (Ca)	8.88	19.4	27.6	17.0	20.3	20.9	10.9	29.1	21.1	13.1	24.6	19.6	18.6	29.6	25.6
Chromium (Cr)	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200
Cobalt (Co)	0.0000130	0.0000050	0.0000060	0.0000050	0.0000050	0.0000050	0.0000790	0.0000070	0.0000050	0.0000090	0.0000130	0.0000050	0.0000230	0.0000090	0.0000050
Copper (Cu)	0.000380	0.000530	0.000610	0.000730	0.000860	0.000800	0.000680	0.000680	0.000660	0.000360	0.000540	0.000500	0.000440	0.000600	0.000600
Iron (Fe)	0.0910	0.00600	0.0210	0.00500	0.0130	0.0220	0.291	0.0220	0.0110	0.0910	0.0130	0.00500	0.189	0.0180	0.00600
Lead (Pb)	0.000120	0.0000100	0.0000100	0.0000100	0.0000200	0.0000200	0.000310	0.0000100	0.0000100	0.0000500	0.0000100	0.0000100	0.0000600	0.0000100	0.0000100
Lithium (Li)	0.000180	0.000620	0.000690	0.000460	0.000560	0.000500	0.000270	0.000670	0.000600	0.000300	0.000550	0.000420	0.000380	0.000560	0.000430
Magnesium (Mg)	1.14	3.62	4.89	2.49	2.92	3.00	1.39	5.24	3.12	1.83	4.62	3.08	2.80	5.56	4.19
Manganese (Mn)	0.00559	0.00270	0.00234	0.00109	0.00207	0.00225	0.0160	0.00305	0.00166	0.00950	0.00346	0.00147	0.0180	0.00293	0.00108
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	0.000570	0.000130	0.000120	0.000590	0.000510	0.000530	0.000590	0.000150	0.000590	0.000650	0.000130	0.000430	0.000510	0.000150	0.000430
Nickel (Ni)	0.0000500	0.0000500	0.0000500	0.0000500	0.0000500	0.0000500	0.000140	0.0000600	0.0000500	0.0000500	0.000160	0.0000800	0.000220	0.000160	0.000180
Phosphorus (P)	0.0515	0.0525	0.0520	0.0510	0.0515	0.0520	0.0525	0.0510	0.0510	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
Potassium (K)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Selenium (Se)	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200
Sodium (Na)	0.910	3.12	3.77	1.59	1.89	1.87	1.11	4.11	1.95	1.53	3.85	2.02	2.23	4.48	2.97
Strontium (Sr)	0.0433	0.0980	0.109	0.0620	0.0599	0.0612	0.0511	0.129	0.0713	0.0648	0.109	0.0705	0.0740	0.117	0.0758
Sulphur (S)	1.90	1.30	1.30	9.40	8.60	8.60	1.70	1.40	8.30	3.00	1.80	10.9	2.30	1.70	9.10
Tellurium (Te)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000030	0.0000020	0.0000040	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020
Tin (Sn)	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000600	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100
Titanium (Ti)	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300
Uranium (U)	0.0000220	0.0000830	0.000104	0.0000160	0.0000160	0.0000160	0.0000430	0.000144	0.0000160	0.0000450	0.000131	0.0000160	0.0000590	0.000167	0.0000330
Vanadium (V)	0.000130	0.000590	0.000650	0.0000600	1.00E-04	0.000110	0.000510	0.000590	0.000110	0.000210	0.000600	0.0000800	0.000210	0.000390	0.0000600
Zinc (Zn)	0.000300	1.00E-04	1.00E-04	0.000400	0.000600	0.00220	0.00220	1.00E-04	1.00E-04	1.00E-04	1.00E-04	0.000200	0.000900	1.00E-04	0.000700
Zirconium (Zr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals															
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	-	-	-	-	-	-	-	-	-	0.0230	0.00500	0.00500	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	E242646	E242647	400187	E242646	E242647	400187	E242646	E242647	400187	E242646	E242647	400435	400435	E242646
Date	18-Dec-2006	18-Dec-2006	18-Dec-2006	22-Jan-2007	22-Jan-2007	22-Jan-2007	12-Feb-2007	12-Feb-2007	12-Feb-2007	19-Mar-2007	19-Mar-2007	19-Mar-2007	26-Sep-2007	26-Sep-2007	17-Dec-2007
Client Sample ID	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	TENAS CREEK
Time	13:30	12:30	13:05	12:15	10:54	11:15	12:33	11:34	11:55	13:10	12:25	12:05	1:30	1:31	13:30
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Aliquot	Aliquot	Aliquot	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals *(cont'd)*															
Barium (Ba)	0.0425	0.0367	0.0591	0.0436	0.0399	0.0641	0.0414	0.0375	0.0625	0.0393	0.0386	0.0645	0.0262	0.0257	0.0354
Beryllium (Be)	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000300	0.0000200	0.0000100
Bismuth (Bi)	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000050
Boron (B)	0.00800	0.0180	0.00800	0.00800	0.0230	0.00800	0.00800	0.0210	0.00800	0.00800	0.00800	0.00800	0.00900	0.00800	0.0130
Cadmium (Cd)	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000400	0.0000100	0.0000100	0.0000100	0.0000050
Calcium (Ca)	19.7	29.9	24.9	19.0	31.0	25.8	18.9	31.3	26.3	17.8	32.2	25.6	11.0	11.0	-
Chromium (Cr)	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200
Cobalt (Co)	0.0000050	0.0000080	0.0000050	0.0000210	0.0000350	0.0000080	0.0000110	0.0000150	0.0000050	0.0000290	0.0000550	0.0000050	0.0000470	0.0000470	0.0000650
Copper (Cu)	0.000510	0.00258	0.000990	0.000570	0.000620	0.000590	0.000560	0.000660	0.000590	0.000410	0.000790	0.000330	0.000880	0.000880	0.00117
Iron (Fe)	0.138	0.0170	0.00600	0.189	0.0170	0.01000	0.305	0.0140	0.00800	0.473	0.0320	0.0110	0.0930	0.0930	0.0480
Lead (Pb)	0.0000600	0.0000100	0.0000100	0.0000700	0.0000100	0.0000300	0.0000400	0.0000100	0.0000100	0.0000600	0.0000500	0.0000100	0.0000400	0.0000500	0.0000070
Lithium (Li)	0.000270	0.000580	0.000390	0.000300	0.000600	0.000710	0.000140	0.000240	0.000160	0.000290	0.000400	0.000300	0.000330	0.000260	0.000600
Magnesium (Mg)	3.19	5.96	4.40	2.99	6.04	4.53	3.01	6.14	4.67	2.89	6.09	4.68	1.53	1.50	-
Manganese (Mn)	0.00338	0.00190	0.00110	0.00479	0.00154	0.000913	0.00796	0.00148	0.000612	0.0150	0.00266	0.000811	0.0252	0.0245	0.00402
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	0.000440	0.000150	0.000430	0.000410	0.000150	0.000420	0.000880	0.000180	0.000460	0.000440	0.000180	0.000510	0.000560	0.000520	0.000120
Nickel (Ni)	0.0000500	0.0000500	0.0000500	0.000290	0.000350	0.000270	0.0000900	0.000180	0.000130	0.0000500	0.000160	0.000130	0.0000500	0.0000500	0.000170
Phosphorus (P)	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.0525	0.0515	0.00300
Potassium (K)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	-
Selenium (Se)	0.000300	0.000300	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000400	0.000500	0.000500	0.000400	0.000200	0.0000400
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.34
Silver (Ag)	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000200	0.0000050
Sodium (Na)	2.55	4.79	3.20	2.30	4.72	3.35	2.44	5.11	3.68	2.46	5.31	3.79	1.65	1.61	-
Strontium (Sr)	0.0753	0.121	0.0771	0.0755	0.125	0.0800	0.0767	0.130	0.0808	0.0720	0.124	0.0795	0.0500	0.0468	0.118
Sulphur (S)	2.40	2.00	8.80	2.20	2.10	8.40	2.00	2.00	8.10	1.80	2.20	7.30	1.40	1.40	-
Tellurium (Te)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020
Tin (Sn)	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000200	0.0000100	0.0000100	0.0000100	0.0000100	0.0000400	0.0000100	0.0000100	0.0000100	0.0000100
Titanium (Ti)	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.000800
Uranium (U)	0.0000680	0.000196	0.0000420	0.0000650	0.000217	0.0000510	0.0000680	0.000234	0.0000620	0.0000670	0.000251	0.0000770	0.0000390	0.0000350	0.000161
Vanadium (V)	0.000200	0.000350	0.0000600	0.000190	0.000330	0.0000600	0.000120	0.000200	0.0000600	0.000350	0.000420	0.0000600	0.000400	0.000410	0.000300
Zinc (Zn)	1.00E-04	1.00E-04	1.00E-04	0.000500	0.000200	0.000500	1.00E-04	0.000400	0.000300	1.00E-04	0.001000	1.00E-04	0.000600	0.000500	0.000300
Zirconium (Zr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals															
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0163
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000800
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000310
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0335
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000100
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000050
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0130
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000050
Calcium (Ca)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26.8
Chromium (Cr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000300
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000650
Copper (Cu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00109
Iron (Fe)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0320

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	E242647	400187	E242646	400187	E242646	400187	E242646	E242647	400187	E242646	E242646	E242647	E242647	400187	E242646
Date	17-Dec-2007	22-Jan-2008	22-Jan-2008	18-Mar-2008	18-Mar-2008	15-Apr-2008	15-Apr-2008	15-Apr-2008	17-Jun-2008	17-Jun-2008	17-Jun-2008	17-Jun-2008	17-Jun-2008	21-Jul-2008	21-Jul-2008
Client Sample ID	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	TELKWA R AT VILLAGE	TENAS CREEK	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK
Time	13:00	13:00	13:30	13:00	13:30	14:25	15:00	14:55	12:30	12:40	15:30	12:00	15:00	13:15	14:10
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals *(cont'd)*															
Barium (Ba)	0.0671	0.0504	0.0403	0.0464	0.0414	0.0438	0.0431	0.0783	0.0246	0.0250	0.0274	0.0558	0.0560	0.0273	0.0225
Beryllium (Be)	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100
Bismuth (Bi)	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000070	0.0000050
Boron (B)	0.00500	0.00500	0.0170	0.00500	0.0180	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500
Cadmium (Cd)	0.0000050	0.0000050	0.0000050	0.0000070	0.0000050	0.0000060	0.0000100	0.0000100	0.0000050	0.0000050	0.0000050	0.0000090	0.0000070	0.0000090	0.0000050
Calcium (Ca)	-	-	-	20.7	-	19.8	29.7	29.7	8.96	16.6	16.9	15.9	16.1	7.98	14.5
Chromium (Cr)	1.00E-04	1.00E-04	0.000300	1.00E-04	0.000200	0.000200	0.000400	1.00E-04	1.00E-04	0.000300	0.000300	1.00E-04	1.00E-04	1.00E-04	0.000200
Cobalt (Co)	0.0000170	0.0000370	0.0000510	0.0000200	0.0000600	0.0000490	0.000301	0.0000270	0.0000400	0.0000370	0.0000360	0.0000310	0.0000300	0.0000620	0.0000150
Copper (Cu)	0.00126	0.000510	0.000990	0.000490	0.000770	0.000870	0.00221	0.000970	0.001000	0.00130	0.00150	0.00138	0.00139	0.00114	0.000620
Iron (Fe)	0.0180	0.115	0.0320	0.211	0.0200	0.329	0.308	0.0260	0.104	0.0410	0.0410	0.0480	0.0480	0.162	0.0180
Lead (Pb)	0.0000050	0.0000360	0.0000130	0.0000180	0.0000050	0.0000320	0.000107	0.0000080	0.0000560	0.0000110	0.0000210	0.0000160	0.0000160	0.000248	0.0000110
Lithium (Li)	0.000600	0.000500	0.000600	0.000500	0.000600	0.000500	0.000700	0.000600	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000600
Magnesium (Mg)	-	-	-	3.76	-	3.78	6.28	6.65	1.45	3.02	3.08	2.84	2.88	1.13	2.69
Manganese (Mn)	0.000750	0.0142	0.00414	0.0116	0.00498	0.0161	0.0145	0.00186	0.00590	0.00280	0.00290	0.00263	0.00262	0.00868	0.00250
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	0.000450	0.000530	0.000170	0.000500	0.000190	0.000430	0.000130	0.000540	0.000380	0.0000900	1.00E-04	0.000500	0.000510	0.000610	0.0000800
Nickel (Ni)	0.000170	0.000240	0.000320	0.000270	0.000160	0.000180	0.000840	0.000200	1.00E-04	0.000130	0.000210	0.000180	0.000240	0.0000700	0.0000500
Phosphorus (P)	0.00300	0.00700	0.00700	0.00600	0.00600	0.00800	0.0180	0.00300	0.00300	0.00500	0.00300	0.00200	0.00200	0.00600	0.00400
Potassium (K)	-	-	-	0.330	-	0.370	0.310	0.420	0.180	0.170	0.190	0.300	0.300	0.210	0.160
Selenium (Se)	0.0000700	0.0000700	0.0000500	0.0000800	0.0000400	0.0000600	0.0000400	0.0000700	0.0000500	0.0000400	0.0000400	0.0000600	0.0000600	0.0000800	0.0000400
Silicon (Si)	2.69	3.62	3.65	3.58	3.40	3.98	3.90	2.74	2.38	3.20	3.26	2.40	2.44	2.26	3.33
Silver (Ag)	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000150	0.0000050	0.0000050	0.0000050
Sodium (Na)	-	-	-	3.05	-	2.99	4.67	4.76	1.16	2.52	2.57	1.71	1.74	0.890	2.34
Strontium (Sr)	0.0829	0.0925	0.133	0.0914	0.143	0.0875	0.133	0.107	0.0445	0.0765	0.0818	0.0554	0.0573	0.0400	0.0683
Sulphur (S)	-	-	-	3.00	-	3.00	3.00	10.00	3.00	3.00	3.00	5.00	5.00	3.00	3.00
Tellurium (Te)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000030	0.0000020	0.0000030	0.0000020
Tin (Sn)	0.0000100	0.0000200	0.0000200	0.0000100	0.0000300	0.0000100	0.0000100	0.0000100	0.0000200	0.0000300	0.0000200	0.0000200	0.0000100	0.0000600	0.0000300
Titanium (Ti)	0.000700	0.00120	0.000500	0.001000	0.000800	0.00110	0.00420	0.000500	0.00150	0.000500	0.000500	0.000500	0.000600	0.00440	0.000500
Uranium (U)	0.0000760	0.0000890	0.000213	0.0000900	0.000270	0.0000910	0.000253	0.000142	0.0000290	0.0000510	0.0000560	0.0000250	0.0000240	0.0000320	0.0000380
Vanadium (V)	0.000200	0.000300	0.000200	0.000200	0.000200	0.000300	0.000800	0.000200	0.000500	0.000800	0.000800	0.000200	0.000200	0.000400	0.000700
Zinc (Zn)	0.000500	0.000400	0.000500	0.000300	0.000300	0.000500	0.00150	0.000400	0.000600	0.000400	0.000500	0.000800	0.000800	0.000900	0.000200
Zirconium (Zr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals															
Aluminum (Al)	0.00830	0.00550	0.00820	0.00460	0.0125	0.0175	0.0315	0.00580	0.0239	0.0164	0.0160	0.00940	0.00930	0.0176	0.00840
Antimony (Sb)	0.0000600	0.0000400	0.0000800	0.0000400	0.0000800	0.0000400	0.0000800	0.0000600	0.0000400	0.000110	0.000120	0.0000800	0.0000800	0.0000400	0.000190
Arsenic (As)	0.000130	0.000160	0.000290	0.000180	0.000290	0.000230	0.000330	0.000130	0.000190	0.000370	0.000400	0.000180	0.000190	0.000110	0.000400
Barium (Ba)	0.0641	0.0458	0.0385	0.0460	0.0417	0.0430	0.0394	0.0776	0.0245	0.0240	0.0243	0.0540	0.0530	0.0258	0.0237
Beryllium (Be)	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100
Bismuth (Bi)	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050
Boron (B)	0.00500	0.00500	0.0150	0.00500	0.0170	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500
Cadmium (Cd)	0.0000060	0.0000050	0.0000050	0.0000050	0.0000050	0.0000070	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000090	0.0000080	0.0000050	0.0000050
Calcium (Ca)	24.2	20.3	29.6	20.4	31.9	21.0	29.7	32.1	8.93	15.8	16.4	15.7	15.4	8.83	16.4
Chromium (Cr)	1.00E-04	1.00E-04	0.000200	1.00E-04	0.000200	0.000200	0.000200	1.00E-04	1.00E-04	0.000200	0.000200	1.00E-04	1.00E-04	1.00E-04	0.000200
Cobalt (Co)	0.0000180	0.0000130	0.0000440	0.0000240	0.0000650	0.0000300	0.0000830	0.0000200	0.0000170	0.0000310	0.0000290	0.0000250	0.0000180	0.0000330	0.0000180
Copper (Cu)	0.00124	0.000380	0.000880	0.000490	0.000750	0.000860	0.00159	0.000980	0.000840	0.00110	0.00136	0.00130	0.00126	0.000470	0.000580
Iron (Fe)	0.0110	0.0680	0.0190	0.139	0.01000	0.213	0.0230	0.00800	0.0340	0.0120	0.0130	0.01000	0.00900	0.0240	0.00700

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	E242646	E242647	400187	400187	E242646	E242647	E242647	400187	E242646	E242647	400187	E242646	E242647	400187
Date	18-Aug-2008	18-Aug-2008	18-Aug-2008	15-Sep-2008	15-Sep-2008	15-Sep-2008	15-Sep-2008	15-Sep-2008	20-Oct-2008	20-Oct-2008	20-Oct-2008	19-Nov-2008	19-Nov-2008	19-Nov-2008	15-Dec-2008
Client Sample ID	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE
Time	12:50	13:55	13:30	10:55	14:05	11:45	11:30	13:30	12:50	12:00	12:25	12:25	13:25	13:00	11:00
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals *(cont'd)*															
Barium (Ba)	0.0404	0.0296	0.0441	0.0380	0.0372	0.0311	0.0576	0.0565	0.0429	0.0325	0.0578	0.0374	0.0338	0.0575	0.0395
Beryllium (Be)	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100
Bismuth (Bi)	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050
Boron (B)	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500
Cadmium (Cd)	0.0000130	0.0000050	0.0000180	0.0000080	0.0000060	0.0000050	0.0000170	0.0000130	0.0000060	0.0000050	0.0000080	0.0000050	0.0000050	0.0000070	0.0000080
Calcium (Ca)	8.37	19.4	16.5	11.7	11.4	21.1	18.6	19.0	14.4	24.5	19.8	13.6	23.4	19.2	17.2
Chromium (Cr)	0.000200	0.000200	1.00E-04	1.00E-04	1.00E-04	0.000200	1.00E-04	1.00E-04	1.00E-04	0.000200	1.00E-04	1.00E-04	0.000300	0.000200	0.000200
Cobalt (Co)	0.000207	0.0000190	0.0000130	0.0000330	0.0000370	0.0000150	0.0000170	0.0000150	0.0000190	0.0000430	0.0000110	0.0000330	0.000101	0.0000230	0.0000390
Copper (Cu)	0.00115	0.000630	0.000760	0.000650	0.000580	0.000610	0.00107	0.00105	0.001000	0.000640	0.000730	0.000780	0.00172	0.00153	0.00106
Iron (Fe)	0.469	0.0170	0.0140	0.151	0.150	0.0120	0.0200	0.0160	0.144	0.0240	0.0120	0.225	0.0860	0.0390	0.233
Lead (Pb)	0.000371	0.0000050	0.0000080	0.000144	0.000150	0.0000050	0.0000110	0.0000100	0.0000300	0.0000060	0.0000050	0.0000320	0.0000070	0.0000140	0.0000440
Lithium (Li)	0.000600	0.000600	0.000500	0.000500	0.000500	0.000600	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500
Magnesium (Mg)	1.23	3.65	2.38	1.68	1.64	4.02	3.03	3.12	2.33	4.79	3.53	2.25	4.62	3.72	2.86
Manganese (Mn)	0.0147	0.00203	0.00142	0.00653	0.00675	0.001000	0.00175	0.00160	0.0147	0.00406	0.00142	0.0189	0.00502	0.00199	0.0199
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	0.000590	0.000110	0.000650	0.000640	0.000630	1.00E-04	0.000500	0.000490	0.000610	0.000130	0.000470	0.000500	0.000120	0.000390	0.000460
Nickel (Ni)	0.000250	0.000770	0.000160	0.0000500	0.0000400	0.0000600	0.000190	0.000220	0.0000900	0.000120	0.000140	1.00E-04	0.000320	0.000250	0.000210
Phosphorus (P)	0.0170	0.00400	0.00200	0.00900	0.00800	0.00400	0.00300	0.00300	0.00400	0.00400	0.00400	0.00800	0.00600	0.00600	0.00500
Potassium (K)	0.350	0.200	0.340	0.280	0.280	0.190	0.330	0.330	0.280	0.220	0.310	0.250	0.200	0.290	0.270
Selenium (Se)	0.0000600	0.0000400	0.0000700	0.0000900	0.0000800	0.0000500	0.0000900	0.0000800	0.0000800	0.0000400	0.0000500	0.0000800	0.0000400	0.0000700	0.0000700
Silicon (Si)	1.69	2.69	1.96	2.52	2.38	3.13	2.52	2.52	2.83	3.23	2.53	3.57	3.55	2.92	4.45
Silver (Ag)	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050
Sodium (Na)	0.860	2.90	1.58	1.40	1.32	3.42	1.83	1.87	1.66	3.53	2.14	1.77	3.60	2.31	2.14
Strontium (Sr)	0.0429	0.0905	0.0537	0.0561	0.0556	0.0951	0.0638	0.0630	0.0682	0.107	0.0664	0.0641	0.103	0.0666	0.0791
Sulphur (S)	3.00	3.00	9.00	3.00	3.00	3.00	8.00	8.00	3.00	3.00	7.00	3.00	3.00	5.00	3.00
Tellurium (Te)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	0.0000060	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020
Tin (Sn)	0.0000200	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000400	0.0000200	0.0000100	0.0000400	0.0000300	0.0000100	0.0000100	0.0000100	0.0000400
Titanium (Ti)	0.0262	0.000500	0.000500	0.00320	0.00340	0.000500	0.000500	0.000500	0.001000	0.000900	0.000600	0.00140	0.00160	0.00140	0.00150
Uranium (U)	0.0000360	0.0000530	0.0000140	0.0000240	0.0000220	0.0000720	0.0000230	0.0000210	0.0000530	0.000122	0.0000310	0.0000490	0.000112	0.0000350	0.0000610
Vanadium (V)	0.001000	0.000800	0.000200	0.000300	0.000300	0.000500	0.000200	0.000200	0.000500	0.000200	0.000200	0.000200	0.000300	0.000200	0.000300
Zinc (Zn)	0.00230	0.000200	0.00120	0.000600	0.000600	1.00E-04	0.000900	0.000900	0.000300	0.000400	0.000500	0.000400	0.000500	0.000600	0.000600
Zirconium (Zr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals															
Aluminum (Al)	0.0972	0.0155	0.0116	0.0388	0.0445	0.00790	0.00690	0.00700	0.00810	0.00810	0.00440	0.0295	0.0459	0.0181	0.0325
Antimony (Sb)	0.0000300	0.000190	0.0000900	0.0000400	0.0000400	0.000150	0.0000800	0.0000800	0.0000400	0.000110	0.0000700	0.0000400	0.0000900	0.0000700	0.0000400
Arsenic (As)	0.000120	0.000390	0.000140	0.000130	0.0000900	0.000370	0.000170	0.000160	0.000170	0.000310	0.000140	0.000190	0.000330	0.000160	0.000230
Barium (Ba)	0.0292	0.0282	0.0434	0.0357	0.0357	0.0307	0.0552	0.0541	0.0432	0.0341	0.0607	0.0368	0.0338	0.0584	0.0397
Beryllium (Be)	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100
Bismuth (Bi)	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050
Boron (B)	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500
Cadmium (Cd)	0.0000070	0.0000050	0.0000150	0.0000090	0.0000100	0.0000050	0.0000130	0.0000150	0.0000080	0.0000050	0.0000070	0.0000070	0.0000050	0.0000090	0.0000070
Calcium (Ca)	8.08	18.9	15.7	11.6	11.9	21.0	18.1	18.0	14.3	25.3	20.2	14.0	23.7	19.6	16.8
Chromium (Cr)	1.00E-04	0.000200	0.000200	1.00E-04	1.00E-04	0.000200	1.00E-04	1.00E-04	1.00E-04	0.000300	1.00E-04	1.00E-04	0.000300	1.00E-04	0.000200
Cobalt (Co)	0.0000300	0.0000140	0.0000090	0.0000210	0.0000220	0.0000200	0.0000110	0.0000100	0.0000130	0.0000370	0.0000120	0.0000310	0.0000950	0.0000170	0.0000360
Copper (Cu)	0.000500	0.000580	0.000710	0.000600	0.000590	0.000650	0.000970	0.000990	0.000510	0.000680	0.000800	0.000810	0.00170	0.00157	0.00106
Iron (Fe)	0.0850	0.00700	0.00500	0.0690	0.0850	0.0130	0.00600	0.00700	0.113	0.0130	0.00500	0.174	0.0780	0.0240	0.191

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	E242646	E242647	400187	400187	400434	400435	400435	400434	400434	400434	400435	400435	400435	400435	400435
Date	15-Dec-2008	15-Dec-2008	17-Feb-2009	15-Mar-2009	29-Aug-2012	29-Aug-2012	29-Aug-2012	6-Sep-2012	18-Sep-2012	26-Sep-2012	6-Sep-2012	18-Sep-2012	26-Sep-2012	26-Sep-2012	26-Sep-2012
Client Sample ID	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS
Time	12:15	11:50	13:10	11:05	14:00	-	14:45	14:00	14:00	13:40	14:30	14:40	9:50	11:50	12:40
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Replicate-First
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals *(cont'd)*															
Barium (Ba)	0.0262	0.0568	0.0407	0.0369	-	0.0223	-	-	0.0229	-	-	0.0220	-	-	-
Beryllium (Be)	0.0000100	0.0000100	0.0000100	0.0000100	-	1.00E-04	-	-	1.00E-04	-	-	1.00E-04	-	-	-
Bismuth (Bi)	0.0000050	0.0000050	0.0000050	0.0000050	-	0.001000	-	-	0.001000	-	-	0.001000	-	-	-
Boron (B)	0.0500	0.0500	0.0500	0.0500	-	0.0500	-	-	0.0500	-	-	0.0500	-	-	-
Cadmium (Cd)	0.0000050	0.0000070	0.0000110	0.0000050	-	0.0000100	-	-	0.0000100	-	-	0.0000100	-	-	-
Calcium (Ca)	19.6	21.5	16.4	17.7	-	7.85	-	-	8.76	-	-	8.27	-	-	-
Chromium (Cr)	0.000300	1.00E-04	1.00E-04	1.00E-04	-	0.001000	-	-	0.001000	-	-	0.001000	-	-	-
Cobalt (Co)	0.0000560	0.0000220	0.0000170	0.0000090	-	0.000500	-	-	0.000500	-	-	0.000500	-	-	-
Copper (Cu)	0.00144	0.00162	0.000780	0.000400	-	0.000750	-	-	0.000680	-	-	0.000640	-	-	-
Iron (Fe)	0.0590	0.0310	0.253	0.149	-	0.136	-	-	0.106	-	-	0.104	-	-	-
Lead (Pb)	0.0000110	0.0000090	0.0000510	0.0000160	-	0.000200	-	-	0.000200	-	-	0.000200	-	-	-
Lithium (Li)	0.000500	0.000500	0.000500	0.000500	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	3.69	4.16	2.91	2.92	-	0.900	-	-	1.000	-	-	0.963	-	-	-
Manganese (Mn)	0.00297	0.00173	0.00553	0.00566	-	0.01000	-	-	0.0177	-	-	0.0211	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	0.000120	0.000400	0.000500	0.000490	-	0.001000	-	-	0.001000	-	-	0.001000	-	-	-
Nickel (Ni)	0.000320	0.000240	0.000170	0.0000400	-	0.001000	-	-	0.001000	-	-	0.001000	-	-	-
Phosphorus (P)	0.00400	0.00400	0.00200	0.00500	-	0.00890	-	-	0.00695	-	-	0.00770	-	-	-
Potassium (K)	0.170	0.320	0.280	0.270	-	0.249	-	-	0.275	-	-	0.251	-	-	-
Selenium (Se)	0.0000400	0.0000500	0.0000900	0.0000900	-	1.00E-04	-	-	1.00E-04	-	-	1.00E-04	-	-	-
Silicon (Si)	3.23	3.08	3.65	3.90	-	1.72	-	-	1.78	-	-	1.64	-	-	-
Silver (Ag)	0.0000050	0.0000050	0.0000050	0.0000050	-	0.0000200	-	-	0.0000200	-	-	0.0000200	-	-	-
Sodium (Na)	2.86	2.61	2.27	2.19	-	0.931	-	-	1.02	-	-	0.998	-	-	-
Strontium (Sr)	0.0859	0.0752	0.0778	0.0812	-	0.0330	-	-	0.0356	-	-	0.0345	-	-	-
Sulphur (S)	3.00	6.00	3.00	3.00	-	3.00	-	-	3.00	-	-	3.00	-	-	-
Tellurium (Te)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	0.0000020	0.0000020	0.0000020	0.0000020	-	0.0000500	-	-	0.0000500	-	-	0.0000500	-	-	-
Tin (Sn)	0.0000100	0.0000100	0.0000500	0.0000100	-	0.00500	-	-	0.00500	-	-	0.00500	-	-	-
Titanium (Ti)	0.00130	0.00140	0.000500	0.000500	-	0.00500	-	-	0.00500	-	-	0.00500	-	-	-
Uranium (U)	0.000102	0.0000460	0.0000630	0.0000630	-	1.00E-04	-	-	1.00E-04	-	-	1.00E-04	-	-	-
Vanadium (V)	0.000300	0.000200	0.000300	0.000200	-	0.00500	-	-	0.00500	-	-	0.00500	-	-	-
Zinc (Zn)	0.000300	0.000600	0.000500	0.000400	-	0.00500	-	-	0.00500	-	-	0.00500	-	-	-
Zirconium (Zr)	-	-	-	-	-	0.000500	-	-	0.000500	-	-	0.000500	-	-	-
Dissolved Metals															
Aluminum (Al)	0.0346	0.0193	0.0115	0.00550	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	0.0000700	0.0000600	0.0000400	0.0000500	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	0.000280	0.000180	0.000170	0.000140	-	-	-	-	-	-	-	-	-	-	-
Barium (Ba)	0.0269	0.0589	0.0408	0.0378	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	0.0000100	0.0000100	0.0000100	0.0000100	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	0.0000050	0.0000050	0.0000050	0.0000050	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	0.0500	0.0500	0.0500	0.0500	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	0.0000050	0.0000060	0.0000080	0.0000050	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	19.2	21.2	16.5	18.0	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	0.000300	1.00E-04	1.00E-04	1.00E-04	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	0.0000530	0.0000210	0.0000120	0.0000100	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	0.00140	0.00171	0.000820	0.000330	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	0.0510	0.0250	0.192	0.136	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	**400435**
Date	**26-Sep-2012**
Client Sample ID	**BULKLEY R. IDZ AT SMITHERS**
Time	**13:10**
QAQC	**Replicate-Second**
ALS Sample ID	**-**
Total Metals *(cont'd)*	
Barium (Ba)	-
Beryllium (Be)	-
Bismuth (Bi)	-
Boron (B)	-
Cadmium (Cd)	-
Calcium (Ca)	-
Chromium (Cr)	-
Cobalt (Co)	-
Copper (Cu)	-
Iron (Fe)	-
Lead (Pb)	-
Lithium (Li)	-
Magnesium (Mg)	-
Manganese (Mn)	-
Mercury (Hg)	-
Molybdenum (Mo)	-
Nickel (Ni)	-
Phosphorus (P)	-
Potassium (K)	-
Selenium (Se)	-
Silicon (Si)	-
Silver (Ag)	-
Sodium (Na)	-
Strontium (Sr)	-
Sulphur (S)	-
Tellurium (Te)	-
Thallium (Tl)	-
Tin (Sn)	-
Titanium (Ti)	-
Uranium (U)	-
Vanadium (V)	-
Zinc (Zn)	-
Zirconium (Zr)	-
Dissolved Metals	
Aluminum (Al)	-
Antimony (Sb)	-
Arsenic (As)	-
Barium (Ba)	-
Beryllium (Be)	-
Bismuth (Bi)	-
Boron (B)	-
Cadmium (Cd)	-
Calcium (Ca)	-
Chromium (Cr)	-
Cobalt (Co)	-
Copper (Cu)	-
Iron (Fe)	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	400187	400434	400435	400434	400435	400187	400434	400435	400434	400434	400435	400435	400187	400434
Date	20-Mar-1974	4-Jun-1974	25-Jun-1974	25-Jun-1974	10-Jul-1974	10-Jul-1974	17-Sep-1974	24-Sep-1974	24-Sep-1974	21-May-1975	21-May-1975	21-May-1975	21-May-1975	2-Jun-1975	25-Jun-1975
Client Sample ID	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE
Time	8:30	17:05	11:45	11:40	10:10	10:00	22:15	15:30	15:40	9:15	9:20	9:20	9:30	17:45	10:30
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals *(cont'd)*															
Lead (Pb)	0.001000	-	-	-	-	-	0.001000	-	-	0.001000	-	0.001000	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	3.40	1.84	-	-	-	-	1.04	-	-	1.60	-	1.60	-	1.40	7.60
Manganese (Mn)	0.0200	-	-	-	-	-	0.0200	-	-	0.0200	-	0.0200	-	-	-
Mercury (Hg)	0.0000500	-	-	-	-	-	0.0000500	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	-	-	-	-	0.01000	-	0.01000	-	-	-
Potassium (K)	0.300	-	-	-	-	-	0.200	-	-	-	-	-	-	0.200	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	2.80	-	-	-	-	-	1.000	-	-	1.60	-	1.50	-	1.60	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	0.00500	-	-	-	-	-	0.00500	-	-	0.00500	-	0.00500	-	-	-
Bacteria															
Total Coli (MPN)	-	-	-	-	-	-	-	-	-	-	40.0	-	20.0	-	80.0
F. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (MPN)	-	-	-	-	-	-	-	-	-	-	20.0	-	20.0	-	20.0
E. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enterococci (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400435	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187
Date	25-Jun-1975	17-Jul-1975	7-Oct-1975	11-Feb-1985	11-Mar-1985	17-Apr-1985	13-May-1985	12-Jun-1985	9-Jul-1985	13-Aug-1985	10-Sep-1985	8-Oct-1985	5-Nov-1985	10-Dec-1985	8-Jan-1986
Client Sample ID	BULKLEY R. IDZ AT SMITHERS	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE
Time	10:45	16:30	12:00	11:00	-	13:45	8:00	14:30	10:30	14:00	11:10	9:00	8:30	7:00	13:00
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals (cont'd)															
Lead (Pb)	-	-	-	0.001000	0.001000	0.1000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	0.950	1.20	0.890	3.11	3.00	3.11	2.56	1.34	1.10	1.08	1.74	2.13	2.50	2.84	2.94
Manganese (Mn)	-	-	-	0.01000	0.01000	0.0200	0.0200	0.01000	0.01000	0.01000	0.01000	0.0200	0.0200	0.01000	0.01000
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
Nickel (Ni)	-	-	-	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500
Potassium (K)	-	-	0.300	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	0.900	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
Zinc (Zn)	-	-	-	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500
Bacteria															
Total Coli (MPN)	50.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (MPN)	20.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enterococci (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187	400187
Date	11-Feb-1986	19-Mar-1986	7-Apr-1986	7-May-1986	2-Jun-1986	8-Jul-1986	5-Aug-1986	4-Sep-1986	4-Oct-1986	9-Oct-1986	12-Nov-1986	10-Dec-1986	12-Jan-1987	18-Feb-1987	26-Mar-1987
Client Sample ID	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE
Time	12:00	9:30	14:00	9:00	9:30	14:00	10:00	9:30	18:00	8:30	10:30	9:30	9:45	9:15	8:15
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals *(cont'd)*															
Lead (Pb)	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000	-	0.001000	0.001000	0.001000	0.001000	0.001000	0.001000
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	3.36	3.31	3.18	2.26	1.24	1.13	1.10	0.960	-	1.23	2.06	2.67	2.91	3.01	3.32
Manganese (Mn)	0.01000	0.01000	0.0200	0.0200	0.01000	0.01000	0.01000	0.0200	-	0.01000	0.0200	0.01000	0.01000	0.01000	0.01000
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	-	0.01000	0.01000	0.0200	0.01000	0.01000	0.01000
Nickel (Ni)	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	-	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	-	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
Zinc (Zn)	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	-	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500
Bacteria															
Total Coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enterococci (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	400187	400187	400187	400187	400434	400434	400434	400435	400435	400435	400187	400434	400434	400435
Date	21-Apr-1987	19-May-1987	17-Jun-1987	14-Jul-1987	11-Aug-1987	16-Aug-1987	23-Aug-1987	31-Aug-1987	16-Aug-1987	23-Aug-1987	31-Aug-1987	8-Sep-1987	8-Sep-1987	14-Sep-1987	8-Sep-1987
Client Sample ID	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS
Time	9:30	10:15	13:30	11:50	11:00	15:00	12:40	16:00	15:30	13:30	16:30	11:30	18:30	18:15	18:00
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals *(cont'd)*															
Lead (Pb)	0.001000	0.001000	0.00200	0.001000	0.001000	-	-	-	-	-	-	0.00200	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	2.90	1.82	1.39	1.27	1.20	-	-	-	-	-	-	1.34	-	-	-
Manganese (Mn)	0.0200	0.01000	0.01000	0.01000	0.01000	-	-	-	-	-	-	0.01000	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	0.01000	0.01000	0.01000	0.01000	0.01000	-	-	-	-	-	-	0.01000	-	-	-
Nickel (Ni)	0.0500	0.0500	0.0500	0.0500	0.0500	-	-	-	-	-	-	0.0500	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	0.01000	0.01000	0.01000	0.01000	0.01000	-	-	-	-	-	-	0.01000	-	-	-
Zinc (Zn)	0.00500	0.00500	-	0.00500	0.00500	-	-	-	-	-	-	0.00500	-	-	-
Bacteria															
Total Coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (MPN)	-	-	-	-	-	2.20	2.20	49.0	23.0	5.00	8.00	-	2.00	23.0	2.00
E. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enterococci (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400435	400187	400187	400187	400187	400434	400434	400434	400435	400435	400435	400434	400434	400435	400435
Date	14-Sep-1987	7-Oct-1987	16-Nov-1987	8-Feb-1988	8-Mar-1988	16-Aug-1988	22-Aug-1988	29-Aug-1988	16-Aug-1988	22-Aug-1988	29-Aug-1988	6-Sep-1988	12-Sep-1988	6-Sep-1988	12-Sep-1988
Client Sample ID	BULKLEY R. IDZ AT SMITHERS	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS
Time	17:30	11:00	11:30	9:00	9:00	13:00	14:30	12:45	13:30	14:00	12:15	12:45	12:00	12:15	11:30
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals *(cont'd)*															
Lead (Pb)	-	0.001000	0.001000	0.001000	0.001000	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	1.63	2.14	3.07	3.33	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	-	0.01000	0.01000	0.01000	0.01000	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	0.01000	0.01000	0.01000	0.01000	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	0.0500	0.0500	0.0500	0.0500	-	-	-	-	-	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	0.01000	0.01000	0.01000	0.01000	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	-	0.00500	0.00500	0.00500	0.00500	-	-	-	-	-	-	-	-	-	-
Bacteria															
Total Coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (CFU)	-	-	-	-	-	8.00	4.00	9.00	2.00	6.00	10.00	2.00	2.00	4.00	2.00
F. coli (MPN)	23.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enterococci (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400434	400434	400435	400435	400434	400434	400434	400435	400435	400435	400434	400435	400434	400434	400434
Date	24-Jul-1989	31-Jul-1989	24-Jul-1989	31-Jul-1989	8-Aug-1989	14-Aug-1989	21-Aug-1989	8-Aug-1989	14-Aug-1989	21-Aug-1989	26-Jun-1990	26-Jun-1990	3-Jul-1990	9-Jul-1990	18-Jul-1990
Client Sample ID	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE
Time	12:12	10:00	13:00	9:40	10:38	-	-	11:05	-	11:50	14:28	14:46	14:02	13:12	12:48
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals *(cont'd)*															
Lead (Pb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria															
Total Coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (CFU)	7.00	6.00	16.0	7.00	2.00	8.00	19.0	9.00	8.00	3.00	7.00	7.00	35.0	5.00	10.00
F. coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enterococci (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400434	400435	400435	400435	400435	400434	400434	400434	400434	400434	400434	400435	400435	400435	400435
Date	23-Jul-1990	3-Jul-1990	9-Jul-1990	18-Jul-1990	23-Jul-1990	16-Jul-1991	16-Jul-1991	22-Jul-1991	22-Jul-1991	31-Jul-1991	31-Jul-1991	16-Jul-1991	16-Jul-1991	22-Jul-1991	22-Jul-1991
Client Sample ID	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS
Time	12:10	14:25	13:28	11:45	12:28	-	15:50	-	15:45	-	12:15	-	15:20	-	15:15
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals *(cont'd)*															
Lead (Pb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria															
Total Coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (CFU)	4.00	33.0	11.0	7.00	3.00	-	2.00	-	4.00	-	1.000	-	4.00	-	2.00
F. coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enterococci (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400435	400435	400434	400434	400434	400435	400435	400435	400435	400434	400434	400435	400435	400434	400434
Date	31-Jul-1991	31-Jul-1991	6-Aug-1991	6-Aug-1991	15-Aug-1991	6-Aug-1991	6-Aug-1991	15-Aug-1991	15-Aug-1991	20-Jul-1992	27-Jul-1992	20-Jul-1992	27-Jul-1992	4-Aug-1992	10-Aug-1992
Client Sample ID	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE
Time	-	11:25	-	12:20	12:25	-	12:00	-	11:55	15:06	13:59	14:33	14:15	13:30	14:30
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals *(cont'd)*															
Lead (Pb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria															
Total Coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (CFU)	-	3.00	-	6.00	7.00	-	1.000	-	9.00	2.00	2.00	2.00	2.00	5.00	1.000
F. coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enterococci (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400435	400435	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125
Date	4-Aug-1992	10-Aug-1992	3-Oct-2001	10-Oct-2001	10-Oct-2001	22-Oct-2001	22-Oct-2001	29-Oct-2001	29-Oct-2001	8-Aug-2002	8-Aug-2002	14-Aug-2002	14-Aug-2002	20-Aug-2002	20-Aug-2002
Client Sample ID	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE
Time	13:50	15:11	14:30	14:00	14:10	12:30	12:40	12:00	12:10	-	16:00	-	16:00	-	16:00
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals *(cont'd)*															
Lead (Pb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria															
Total Coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (CFU)	2.00	1.000	-	-	2.00	-	1.000	-	1.000	1.000	-	3.00	-	2.00	-
F. coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli (CFU)	-	-	-	-	2.00	-	1.000	-	1.000	1.000	-	2.00	-	1.000	-
Enterococci (CFU)	-	-	-	-	1.000	-	1.000	-	1.000	-	-	9.00	-	2.00	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E246125
Date	27-Aug-2002	27-Aug-2002	3-Sep-2002	3-Sep-2002	7-Oct-2002	7-Oct-2002	15-Oct-2002	21-Oct-2002	28-Oct-2002	28-Oct-2002	3-Nov-2002	3-Nov-2002	12-Nov-2002	12-Nov-2002	18-Nov-2002
Client Sample ID	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE
Time	-	16:00	-	16:00	-	16:00	-	-	-	16:00	-	16:00	-	16:00	10:59
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals *(cont'd)*															
Lead (Pb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria															
Total Coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (CFU)	2.00	-	4.00	-	7.00	-	5.00	1.000	1.000	-	1.000	-	2.00	-	5.00
F. coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli (CFU)	1.000	-	4.00	-	5.00	-	2.00	1.000	1.000	-	1.000	-	2.00	-	4.00
Enterococci (CFU)	1.000	-	3.00	-	4.00	-	1.000	1.000	4.00	-	1.000	-	3.00	-	10.00

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	E246125	E246125	E246125	E246125	E246125	E246125	E246125	E242647	E242646	E242647	E242646	E242647	400187	E242646	E242647
Date	18-Nov-2002	18-Nov-2002	18-Nov-2002	18-Nov-2002	18-Nov-2002	25-Nov-2002	25-Nov-2002	2-Sep-2004	17-May-2006	17-May-2006	15-Jun-2006	15-Jun-2006	19-Jul-2006	19-Jul-2006	19-Jul-2006
Client Sample ID	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	BULKLEY RIVER AT TELKWA WATER SYSTEM INTAKE	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE
Time	11:02	11:05	11:08	11:11	16:00	-	16:00	16:00	-	-	11:00	11:15	11:05	10:45	10:50
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Aliquot	Aliquot	Aliquot	Aliquot	Aliquot
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals *(cont'd)*															
Lead (Pb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria															
Total Coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (CFU)	5.00	3.00	2.00	6.00	-	5.00	-	-	-	-	-	-	-	-	-
F. coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli (CFU)	2.00	1.000	1.000	2.00	-	3.00	-	-	-	-	-	-	-	-	-
Enterococci (CFU)	5.00	24.0	2.00	29.0	-	4.00	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	E242646	E242646	E242647	E242647	E242647	400187	E242646	E242647	400187	E242646	E242647	400187	E242646	E242647
Date	14-Aug-2006	14-Aug-2006	23-Aug-2006	14-Aug-2006	23-Aug-2006	23-Aug-2006	6-Sep-2006	6-Sep-2006	6-Sep-2006	16-Oct-2006	16-Oct-2006	16-Oct-2006	14-Nov-2006	14-Nov-2006	14-Nov-2006
Client Sample ID	TELKWA R AT VILLAGE	TENAS CREEK	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	GOATHORN CR ABOVE TENAS CR CONFLUENCE	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE
Time	11:20	11:00	12:45	11:05	15:20	15:25	-	-	-	-	-	-	-	-	-
QAQC	Aliquot	Aliquot	Regular	Aliquot	Regular	Replicate	Aliquot	Aliquot	Aliquot	Aliquot	Aliquot	Aliquot	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals *(cont'd)*															
Lead (Pb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	-	-	-	-	-	-	-	-	-	0.00600	0.00200	0.001000	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria															
Total Coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enterococci (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	E242646	E242647	400187	E242646	E242647	400187	E242646	E242647	400187	E242646	E242647	400435	400435	E242646
Date	18-Dec-2006	18-Dec-2006	18-Dec-2006	22-Jan-2007	22-Jan-2007	22-Jan-2007	12-Feb-2007	12-Feb-2007	12-Feb-2007	19-Mar-2007	19-Mar-2007	19-Mar-2007	26-Sep-2007	26-Sep-2007	17-Dec-2007
Client Sample ID	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	TENAS CREEK
Time	13:30	12:30	13:05	12:15	10:54	11:15	12:33	11:34	11:55	13:10	12:25	12:05	1:30	1:31	13:30
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Aliquot	Aliquot	Aliquot	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals *(cont'd)*															
Lead (Pb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000050
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000600
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.15
Manganese (Mn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00363
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000130
Nickel (Ni)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000140
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.205
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000400
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.29
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000050
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.80
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.115
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.00
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000020
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000100
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000500
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000165
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000400
Zinc (Zn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000300
Bacteria															
Total Coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enterococci (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	E242647	400187	E242646	400187	E242646	400187	E242646	E242647	400187	E242646	E242646	E242647	E242647	400187	E242646
Date	17-Dec-2007	22-Jan-2008	22-Jan-2008	18-Mar-2008	18-Mar-2008	15-Apr-2008	15-Apr-2008	15-Apr-2008	17-Jun-2008	17-Jun-2008	17-Jun-2008	17-Jun-2008	17-Jun-2008	21-Jul-2008	21-Jul-2008
Client Sample ID	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	TELKWA R AT VILLAGE	TENAS CREEK	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK
Time	13:00	13:00	13:30	13:00	13:30	14:25	15:00	14:55	12:30	12:40	15:30	12:00	15:00	13:15	14:10
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals *(cont'd)*															
Lead (Pb)	0.0000050	0.0000070	0.0000050	0.0000090	0.0000050	0.0000200	0.0000210	0.0000050	0.0000160	0.0000050	0.0000050	0.0000050	0.0000050	0.0000290	0.0000050
Lithium (Li)	0.000500	0.000500	0.000500	0.000500	0.000600	0.000500	0.000500	0.000600	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500
Magnesium (Mg)	4.74	3.46	5.93	3.64	6.41	3.86	6.02	6.86	1.46	2.96	3.08	2.86	2.83	1.20	2.96
Manganese (Mn)	0.000200	0.00621	0.00341	0.00985	0.00450	0.0138	0.00418	0.00133	0.00361	0.00177	0.00169	0.00177	0.00177	0.00493	0.00200
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	0.000470	0.000600	0.000150	0.000490	0.000190	0.000460	0.000170	0.000550	0.000420	1.00E-04	0.000110	0.000560	0.000570	0.000630	0.0000900
Nickel (Ni)	0.000120	0.0000600	0.000170	0.000140	0.000140	0.000190	0.000590	0.000190	0.0000600	0.000130	0.000120	0.000140	0.000150	0.0000200	0.0000800
Potassium (K)	0.340	0.305	0.220	0.320	0.240	0.390	0.280	0.450	0.180	0.160	0.180	0.300	0.290	0.210	0.180
Selenium (Se)	0.0000700	0.0000600	0.0000400	0.0000700	0.0000400	0.0000500	0.0000400	0.0000700	0.0000600	0.0000500	0.0000600	0.0000800	0.0000800	0.0000500	0.0000400
Silicon (Si)	2.86	3.32	3.55	3.43	3.24	4.37	3.64	3.04	2.54	3.31	3.40	2.55	2.48	1.77	2.68
Silver (Ag)	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050
Sodium (Na)	2.90	2.83	4.43	2.93	4.93	2.98	4.50	4.77	1.18	2.40	2.49	1.70	1.67	0.930	2.55
Strontium (Sr)	0.0818	0.0885	0.130	0.0923	0.144	0.0891	0.133	0.109	0.0446	0.0748	0.0766	0.0557	0.0548	0.0435	0.0731
Sulphur (S)	6.50	3.00	3.00	3.00	3.00	3.00	3.00	10.00	3.00	3.00	3.00	5.00	5.00	3.00	3.00
Thallium (Tl)	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020
Tin (Sn)	0.0000200	0.0000100	0.0000100	0.0000100	0.0000300	0.0000200	0.0000200	0.0000200	0.0000100	0.0000300	0.0000200	0.0000100	0.0000200	0.0000100	0.0000100
Titanium (Ti)	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500
Uranium (U)	0.0000750	0.0000120	0.000198	0.0000900	0.000271	0.0000910	0.000247	0.000140	0.0000280	0.0000510	0.0000520	0.0000230	0.0000210	0.0000210	0.0000390
Vanadium (V)	0.000200	0.000200	0.000200	0.000200	0.000200	0.000300	0.000500	0.000200	0.000300	0.000600	0.000600	0.000200	0.000200	0.000200	0.000700
Zinc (Zn)	0.000400	0.000200	0.000200	0.000200	0.000300	0.000300	0.000200	0.000600	0.000200	0.000200	0.000300	0.000600	0.000500	0.000300	1.00E-04
Bacteria															
Total Coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enterococci (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	400187	E242646	E242647	400187	400187	E242646	E242647	E242647	400187	E242646	E242647	400187	E242646	E242647	400187
Date	18-Aug-2008	18-Aug-2008	18-Aug-2008	15-Sep-2008	15-Sep-2008	15-Sep-2008	15-Sep-2008	15-Sep-2008	20-Oct-2008	20-Oct-2008	20-Oct-2008	19-Nov-2008	19-Nov-2008	19-Nov-2008	15-Dec-2008
Client Sample ID	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE
Time	12:50	13:55	13:30	10:55	14:05	11:45	11:30	13:30	12:50	12:00	12:25	12:25	13:25	13:00	11:00
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals *(cont'd)*															
Lead (Pb)	0.000109	0.0000050	0.0000090	0.0000720	0.0000820	0.0000050	0.0000050	0.0000050	0.0000260	0.0000050	0.0000050	0.0000230	0.0000080	0.0000090	0.0000270
Lithium (Li)	0.000500	0.000600	0.000500	0.000500	0.000500	0.000600	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500
Magnesium (Mg)	1.09	3.64	2.40	1.67	1.69	4.04	2.95	2.95	2.28	4.86	3.57	2.31	4.56	3.87	2.93
Manganese (Mn)	0.00524	0.00149	0.00109	0.00273	0.00242	0.000230	0.00131	0.00130	0.0134	0.00362	0.00120	0.0184	0.00460	0.00168	0.0191
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	0.000580	0.000110	0.000640	0.000640	0.000640	0.000110	0.000500	0.000500	0.000600	0.000120	0.000480	0.000510	0.000110	0.000410	0.000460
Nickel (Ni)	0.000120	0.000110	0.0000500	0.0000400	0.0000500	0.0000800	0.0000800	0.000220	0.0000400	1.00E-04	0.000160	0.0000700	0.000310	0.000180	0.000160
Potassium (K)	0.280	0.190	0.320	0.260	0.260	0.190	0.320	0.320	0.270	0.230	0.330	0.250	0.200	0.310	0.270
Selenium (Se)	0.0000600	0.0000400	0.0000700	0.0000800	0.0000900	0.0000400	0.0000900	0.0000900	0.0000900	0.0000400	0.0000600	0.000110	0.0000700	0.0000900	0.0000800
Silicon (Si)	1.66	2.33	2.09	2.28	2.54	3.19	2.59	2.73	2.77	3.19	2.51	3.65	4.05	2.93	4.20
Silver (Ag)	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050
Sodium (Na)	0.850	2.82	1.54	1.27	1.29	3.06	1.80	1.80	1.61	3.57	2.17	1.83	3.69	2.38	2.24
Strontium (Sr)	0.0409	0.0879	0.0542	0.0568	0.0572	0.0969	0.0637	0.0618	0.0697	0.112	0.0708	0.0659	0.106	0.0693	0.0797
Sulphur (S)	3.00	3.00	9.00	3.00	3.00	3.00	7.00	8.00	3.00	3.00	8.00	3.00	3.00	5.00	3.00
Thallium (Tl)	0.0000020	0.0000020	0.0000020	0.0000030	0.0000020	0.0000020	0.0000050	0.0000040	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020	0.0000020
Tin (Sn)	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000100	0.0000500	0.0000300	0.0000100	0.0000300	0.0000400	0.0000100	0.0000200	0.0000100	0.0000400
Titanium (Ti)	0.00550	0.00120	0.00110	0.001000	0.00160	0.000500	0.000700	0.000600	0.00130	0.00140	0.00140	0.000900	0.00150	0.001000	0.00140
Uranium (U)	0.0000250	0.0000500	0.0000030	0.0000200	0.0000200	0.0000790	0.0000130	0.0000240	0.0000540	0.000122	0.0000320	0.0000500	0.000112	0.0000360	0.0000600
Vanadium (V)	0.000400	0.000600	0.000200	0.000200	0.000300	0.000600	0.000200	0.000200	0.000500	0.000300	0.000200	0.000300	0.000400	0.000200	0.000300
Zinc (Zn)	0.000600	0.000300	0.001000	0.000600	0.000400	1.00E-04	0.000900	0.000800	0.000200	0.000200	0.000600	0.000500	0.000600	0.000300	0.000500
Bacteria															
Total Coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enterococci (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	E242646	E242647	400187	400187	400434	400435	400435	400434	400434	400434	400435	400435	400435	400435	400435
Date	15-Dec-2008	15-Dec-2008	17-Feb-2009	15-Mar-2009	29-Aug-2012	29-Aug-2012	29-Aug-2012	6-Sep-2012	18-Sep-2012	26-Sep-2012	6-Sep-2012	18-Sep-2012	26-Sep-2012	26-Sep-2012	26-Sep-2012
Client Sample ID	TENAS CREEK	GOATHORN CR ABOVE TENAS CR CONFLUENCE	TELKWA R AT VILLAGE	TELKWA R AT VILLAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS	BULKLEY R. IDZ AT SMITHERS
Time	12:15	11:50	13:10	11:05	14:00	-	14:45	14:00	14:00	13:40	14:30	14:40	9:50	11:50	12:40
QAQC	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Replicate-First
ALS Sample ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals *(cont'd)*															
Lead (Pb)	0.0000070	0.0000070	0.0000280	0.0000090	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	0.000500	0.000500	0.000500	0.000500	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	3.69	4.25	2.94	3.10	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	0.00256	0.00157	0.00451	0.00555	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	1.00E-04	0.000390	0.000470	0.000510	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	0.000290	0.000280	0.000120	0.0000500	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	0.160	0.320	0.280	0.270	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	0.0000500	0.0000900	0.0000900	1.00E-04	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	3.16	2.88	3.66	3.73	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	0.0000050	0.0000050	0.0000050	0.0000050	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	2.93	2.73	2.26	2.02	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	0.0887	0.0765	0.0829	0.0830	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	3.00	6.00	3.00	3.00	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	0.0000020	0.0000020	0.0000020	0.0000020	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	0.0000100	0.0000100	0.0000400	0.0000100	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	0.00140	0.00170	0.000500	0.000500	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	0.000105	0.0000460	0.0000600	0.0000510	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	0.000300	0.000200	0.000200	0.000300	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	0.000300	0.000500	0.000500	0.000300	-	-	-	-	-	-	-	-	-	-	-
Bacteria															
Total Coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. coli (MPN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli (CFU)	-	-	-	-	4.00	-	2.00	2.00	1.000	1.000	1.000	1.000	2.00	-	-
Enterococci (CFU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 8-D. Water Quality Historical Data, Tenas Project, 1974 to 2012

Site	**400435**
Date	**26-Sep-2012**
Client Sample ID	**BULKLEY R. IDZ AT SMITHERS**
Time	**13:10**
QAQC	**Replicate-Second**
ALS Sample ID	**-**
Dissolved Metals *(cont'd)*	
Lead (Pb)	-
Lithium (Li)	-
Magnesium (Mg)	-
Manganese (Mn)	-
Mercury (Hg)	-
Molybdenum (Mo)	-
Nickel (Ni)	-
Potassium (K)	-
Selenium (Se)	-
Silicon (Si)	-
Silver (Ag)	-
Sodium (Na)	-
Strontium (Sr)	-
Sulphur (S)	-
Thallium (Tl)	-
Tin (Sn)	-
Titanium (Ti)	-
Uranium (U)	-
Vanadium (V)	-
Zinc (Zn)	-
Bacteria	
Total Coli (MPN)	-
F. coli (CFU)	-
F. coli (MPN)	-
E. coli (CFU)	-
Enterococci (CFU)	-

Appendix 9-A

Sediment Quality Analytical Results, Tenas Project, 1986 and 2017

Appendix 9-A. Sediment Quality Analytical Results, Tenas Project, 1986 and 2017

Site	STRM93L861699	WQS01			WQS02				STRM93L861412	WQS05			WQS08			
Date	1986	20-Sep-2017			19-Sep-2017				1986	18-Sep-2017			18-Sep-2017			
Replicate	1	1	2	3	1	2	3		1	1	2	3	1	2	3	
QAQC	-	-	-	-	-	-	-	SPLIT	-	-	-	-	-	-	-	SPLIT
ALS Sample ID	-	L1996387-1	L1996387-2	L1996387-3	L1996387-4	L1996387-5	L1996387-6	L1996387-19	-	L1996387-7	L1996387-8	L1996387-9	L1996387-10	L1996387-11	L1996387-12	L1996387-21
Physical																
pH (1:2 soil:water)	-	8.34	8.33	8.38	8.19	8.25	8.29	8.19	-	8.11	8.13	8.09	7.86	7.53	7.50	7.66
Particle Size																
% Gravel (>2 mm)	-	<1.0	18.3	4.90	6.20	42.6	17.2	19.8	-	22.3	39.0	13.4	86.5	24.4	<1.0	1.20
% Sand (2 - 0.063 mm)	-	82.6	66.9	86.4	89.2	52.8	79.4	76.0	-	72.2	59.0	81.6	13.3	74.4	90.8	90.8
% Silt (0.063 mm - 4 µm)	-	13.5	11.7	6.90	3.60	3.60	2.60	3.20	-	3.90	1.50	3.60	<1.0	1.20	7.40	6.80
% Clay (<4 µm)	-	3.60	3.20	1.90	<1.0	1.00	<1.0	<1.0	-	1.70	<1.0	1.40	<1.0	<1.0	1.20	1.20
Organic Carbon																
Total Organic Carbon (%)	-	0.290	0.555	0.228	0.152	0.134	0.245	0.079	-	0.287	0.192	0.249	<0.050	<0.050	0.195	0.101
Metals																
Aluminum	20,600	24,400	21,500	23,800	28,800	24,900	24,100	33,800	20,500	18,500	19,100	18,400	30,200	27,300	25,200	24,400
Antimony	0.300	1.65	1.61	1.51	1.03	1.49	1.04	1.08	0.340	0.970	0.830	0.820	0.420	0.420	0.430	0.420
Arsenic	6.60	13.9	13.1	14.0	12.4	13.0	10.6	13.3	9.00	14.8	15.9	15.5	8.34	7.46	7.42	6.85
Barium	176	213	201	186	196	238	178	228	172	400	506	401	281	286	257	242
Beryllium	-	0.390	0.380	0.360	0.360	0.360	0.330	0.380	-	0.440	0.470	0.450	0.440	0.360	0.430	0.430
Bismuth	0.070	0.120	0.120	0.100	<0.10	0.110	<0.10	<0.10	0.100	0.280	0.270	0.310	<0.10	<0.10	<0.10	<0.10
Boron	-	<10	<10	<10	<10	<10	<10	<10	-	<10	<10	<10	<10	<10	<10	<10
Cadmium	0.180	0.251	0.225	0.273	0.267	0.231	0.218	0.271	0.190	0.490	0.606	0.571	0.370	0.348	0.330	0.318
Calcium	14,800	15,800	14,200	16,400	17,200	14,100	13,900	20,600	11,300	9,110	9,520	9,040	16,100	15,000	13,400	12,800
Chromium	26.2	44.4	42.8	42.3	39.0	48.6	34.8	43.9	34.1	31.1	29.7	28.4	35.0	30.5	33.3	29.8
Cobalt	16.9	20.2	18.3	20.3	21.1	20.4	18.1	22.4	16.3	18.0	19.2	18.7	19.3	16.5	15.9	15.0
Copper	31.3	45.0	41.4	43.9	43.4	42.0	36.0	46.3	35.2	59.8	62.4	63.9	41.3	36.3	41.4	38.0
Gallium	4.70	-	-	-	-	-	-	-	5.30	-	-	-	-	-	-	-
Gold	0.001	-	-	-	-	-	-	-	0.002	-	-	-	-	-	-	-
Iron	45,100	50,900	50,600	48,200	45,100	59,600	43,500	50,400	51,700	48,500	51,000	48,600	46,600	42,700	50,500	46,900
Lanthanum	7.00	-	-	-	-	-	-	-	8.50	-	-	-	-	-	-	-
Lead	6.43	7.66	7.52	7.06	6.53	7.69	5.98	6.64	7.66	9.96	9.53	9.87	8.97	8.95	12.0	12.1
Lithium	-	17.6	15.4	16.7	16.5	16.5	15.5	17.4	-	13.9	14.2	13.7	16.4	13.6	14.1	13.7
Magnesium	8,600	11,700	10,600	11,500	11,700	11,800	10,300	12,800	8,900	8,560	8,690	8,410	13,300	11,200	10,400	9,920
Manganese	1,044	1,330	1,180	1,440	1,550	1,350	1,240	1,610	949	1,140	1,290	1,190	1,670	1,350	1,220	1,100
Mercury	0.017	0.026	0.024	0.026	0.020	0.019	0.018	0.021	0.018	0.046	0.039	0.041	0.022	0.015	0.013	0.019
Molybdenum	0.360	0.530	0.370	0.340	0.380	0.410	0.320	0.410	0.410	1.05	1.41	1.23	0.890	0.620	0.690	0.760
Nickel	24.7	31.3	28.4	29.9	30.6	31.5	26.7	33.2	25.9	28.6	30.7	29.5	29.3	23.4	20.1	18.6
Phosphorus	470	689	711	582	555	697	508	597	630	635	665	630	836	868	943	848
Potassium	800	1,260	1,070	1,030	1,150	1,050	1,070	1,310	800	1,410	1,430	1,450	1,620	1,370	1,440	1,440
Selenium	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.300	0.180	0.210	0.220	0.160	0.110	0.120	0.120
Silver	0.034	0.078	0.076	0.067	0.067	0.056	0.056	0.108	0.040	0.110	0.100	0.105	0.100	0.195	0.120	0.104
Sodium	680	550	500	530	700	630	580	810	610	430	470	410	1,360	1,080	740	680
Strontium	118	85.4	79.6	83.3	102	85.9	83.3	115	96.1	66.0	69.0	64.6	125	123	130	122
Thallium	<0.02	0.066	0.060	0.056	0.055	0.052	0.050	0.054	0.040	0.091	0.101	0.095	0.055	<0.050	0.053	0.055
Thorium	1.00	-	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-
Tin	-	0.510	0.530	0.480	0.530	0.590	0.480	0.520	-	0.560	0.480	0.460	0.550	0.490	0.520	0.510
Tellurium	0.020	-	-	-	-	-	-	-	0.020	-	-	-	-	-	-	-
Titanium	970	953	1,030	906	911	1,270	850	1,150	1,320	525	461	415	1,400	1,230	1,170	1,180
Tungsten	<0.1	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	-
Uranium	0.400	0.409	0.421	0.375	0.394	0.456	0.353	0.397	0.500	0.466	0.458	0.467	0.612	0.565	0.738	0.786
Vanadium	97.0	117	122	107	100	152	94.9	119	118	90.2	85.1	84.3	113	108	131	119
Zinc	71.0	80.4	75.9	73.1	72.9	84.5	66.2	77.9	79.6	119	131	129	107	95.5	97.9	93.4

Appendix 9-A. Sediment Quality Analytical Results, Tenas Project, 1986 and 2017

Site	WQS09			WQS12			
Date	19-Sep-2017			20-Sep-2017			
Replicate	1	2	3	1		2	3
QAQC	-	-	-	-	SPLIT	-	-
ALS Sample ID	L1996387-13	L1996387-14	L1996387-15	L1996387-16	L1996387-23	L1996387-17	L1996387-18
Physical							
pH (1:2 soil:water)	7.48	7.58	7.61	7.42	7.38	7.52	7.53
Particle Size							
% Gravel (>2 mm)	<1.0	6.90	2.60	7.40	7.00	73.3	6.00
% Sand (2 - 0.063 mm)	58.4	86.7	95.7	77.0	76.9	26.3	90.0
% Silt (0.063 mm - 4 µm)	36.3	5.30	1.30	13.8	14.2	<1.0	3.40
% Clay (<4 µm)	5.30	1.20	<1.0	1.80	1.90	<1.0	<1.0
Organic Carbon							
Total Organic Carbon (%)	1.70	0.334	0.152	0.313	0.299	<0.050	0.074
Metals							
Aluminum	16,000	18,300	26,100	20,100	16,800	21,700	19,000
Antimony	0.570	0.610	0.540	0.570	0.530	0.590	0.500
Arsenic	8.38	9.26	10.5	9.75	8.03	10.1	8.83
Barium	235	302	279	222	192	222	210
Beryllium	0.360	0.400	0.410	0.410	0.390	0.390	0.380
Bismuth	0.180	0.170	0.110	0.110	0.110	<0.10	<0.10
Boron	<10	<10	<10	<10	<10	<10	<10
Cadmium	0.370	0.385	0.405	0.317	0.285	0.295	0.288
Calcium	8,660	10,100	14,400	10,100	8,770	9,770	9,580
Chromium	24.5	28.0	26.5	34.7	30.7	32.8	28.7
Cobalt	12.2	14.2	16.7	14.0	12.2	16.0	13.5
Copper	44.7	45.3	43.0	37.1	31.7	33.1	33.2
Gallium	-	-	-	-	-	-	-
Gold	-	-	-	-	-	-	-
Iron	40,700	45,800	41,900	43,900	39,200	45,400	38,800
Lanthanum	-	-	-	-	-	-	-
Lead	10.9	10.4	9.26	9.77	9.10	8.06	8.37
Lithium	10.9	11.9	13.5	12.7	11.9	15.4	12.2
Magnesium	7,610	8,120	9,540	8,620	7,740	10,800	8,280
Manganese	828	1,050	1,350	1,120	959	1,350	1,080
Mercury	0.023	0.024	0.024	0.021	0.029	0.019	0.021
Molybdenum	0.750	0.830	0.900	0.700	0.640	1.07	0.640
Nickel	17.8	19.7	23.5	22.3	19.4	27.1	21.1
Phosphorus	838	799	705	1,030	886	945	872
Potassium	1,080	1,170	1,520	1,220	900	1,280	1,070
Selenium	0.160	0.160	0.170	0.180	0.160	0.130	0.170
Silver	0.124	0.116	0.094	0.117	0.100	0.106	0.091
Sodium	460	510	810	530	450	660	500
Strontium	68.4	81.8	114	68.2	59.3	70.4	65.4
Thallium	0.061	0.062	0.068	0.061	0.053	0.055	0.057
Thorium	-	-	-	-	-	-	-
Tin	0.400	0.470	0.480	0.500	0.440	0.690	0.420
Tellurium	-	-	-	-	-	-	-
Titanium	771	883	932	1,290	1,050	1,230	1,090
Tungsten	-	-	-	-	-	-	-
Uranium	0.631	0.670	0.581	0.712	0.664	0.674	0.642
Vanadium	88.9	103	87.1	114	98.8	104	95.2
Zinc	89.5	95.3	92.6	97.9	88.4	108	89.1

All units are in mg/kg unless otherwise noted.

Appendix 9-B

Sediment Quality Relative Percent Difference Results, Tenas Project, 2017

Appendix 9-B. Sediment Quality Relative Percent Difference Results, Tenas Project, 2017

Site	WQS02			WQS08			WQS12		
Replicate	3			3			1		
Date	19-Sep-2017			18-Sep-2017			20-Sep-2017		
ALS Sample ID	L1996387-6	L1996387-19	RPD (%)	L1996387-12	L1996387-21	RPD (%)	L1996387-16	L1996387-23	RPD (%)
Physical									
pH	8.29	8.19	1.2	7.50	7.66	2.1	7.42	7.38	0.5
Particle Size									
% Gravel (>2 mm)	17.2	19.8	14.1	<1.0	1.2	n/a	7.4	7.0	5.6
% Sand (2.0 - 0.063 mm)	79.4	76.0	4.4	90.8	90.8	0.0	77.0	76.9	0.1
% Silt (0.063 mm - 4 µm)	2.6	3.2	n/a	7.4	6.8	8.5	13.8	14.2	2.9
% Clay (<4 µm)	<1.0	<1.0	n/a	1.2	1.2	n/a	1.8	1.9	n/a
Organic Carbon									
Total Organic Carbon (%)	0.245	0.079	n/a	0.195	0.101	n/a	0.313	0.299	4.6
Metals									
Aluminum (Al)	24,100	33,800	*33.5*	25,200	24,400	3.2	20,100	16,800	17.9
Antimony (Sb)	1.04	1.08	3.8	0.43	0.42	n/a	0.57	0.53	7.3
Arsenic (As)	10.6	13.3	*22.6*	7.4	6.9	8.0	9.8	8.0	19.3
Barium (Ba)	178	228	*24.6*	257	242	6.0	222	192	14.5
Beryllium (Be)	0.33	0.38	n/a	0.43	0.43	n/a	0.41	0.39	n/a
Bismuth (Bi)	<0.10	<0.10	n/a	<0.10	<0.10	n/a	0.11	0.11	n/a
Boron (B)	<10	<10	n/a	<10	<10	n/a	<10	<10	n/a
Cadmium (Cd)	0.218	0.271	n/a	0.330	0.318	3.7	0.317	0.285	10.6
Calcium (Ca)	13,900	20,600	*38.8*	13,400	12,800	4.6	10,100	8,770	14.1
Chromium (Cr)	34.8	43.9	*23.1*	33.3	29.8	11.1	34.7	30.7	12.2
Cobalt (Co)	18.1	22.4	*21.2*	15.9	15.0	5.8	14.0	12.2	13.7
Copper (Cu)	36.0	46.3	*25.0*	41.4	38.0	8.6	37.1	31.7	15.7
Iron (Fe)	43,500	50,400	14.7	50,500	46,900	7.4	43,900	39,200	11.3
Lead (Pb)	5.98	6.64	10.5	12.00	12.10	0.8	9.77	9.10	7.1
Lithium (Li)	15.5	17.4	n/a	14.1	13.7	n/a	12.7	11.9	n/a
Magnesium (Mg)	10,300	12,800	*21.6*	10,400	9,920	4.7	8,620	7,740	10.8
Manganese (Mn)	1,240	1,610	*26.0*	1,220	1,100	10.3	1,120	959	15.5
Mercury (Hg)	0.0176	0.0214	n/a	0.0131	0.0193	n/a	0.0210	0.0285	n/a
Molybdenum (Mo)	0.32	0.41	n/a	0.69	0.76	9.7	0.70	0.64	9.0
Nickel (Ni)	26.7	33.2	*21.7*	20.1	18.6	7.8	22.3	19.4	13.9
Phosphorus (P)	508	597	16.1	943	848	10.6	1,030	886	15.0
Potassium (K)	1,070	1,310	*20.2*	1,440	1,440	0.0	1,220	900	*30.2*
Selenium (Se)	<0.10	<0.10	n/a	0.12	0.12	n/a	0.18	0.16	n/a
Silver (Ag)	0.056	0.108	n/a	0.120	0.104	n/a	0.117	0.100	n/a
Sodium (Na)	580	810	*33.1*	740	680	8.5	530	450	n/a
Strontium (Sr)	83.3	115.0	*32.0*	130.0	122.0	6.3	68.2	59.3	14.0
Thallium (Tl)	0.050	0.054	n/a	0.053	0.055	n/a	0.061	0.053	n/a
Tin (Sn)	0.48	0.52	n/a	0.52	0.51	n/a	0.50	0.44	n/a
Titanium (Ti)	850	1,150	*30.0*	1,170	1,180	0.9	1,290	1,050	*20.5*
Uranium (U)	0.353	0.397	11.7	0.738	0.786	6.3	0.712	0.664	7.0
Vanadium (V)	94.9	119.0	*22.5*	131.0	119.0	9.6	114.0	98.8	14.3
Zinc (Zn)	66.2	77.9	16.2	97.9	93.4	4.7	97.9	88.4	10.2

Notes:

All units are in mg/kg unless otherwise noted.

n/a = not applicable when values are less than five times the detection limit.

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Appendix 10-A

Periphyton Biomass (as Chlorophyll a), Tenas Project, 2017

Appendix 10-A. Periphyton Biomass (as Chlorophyll *a*), Tenas Project, 2017

Site	Replicate	Sample ID	Date	ALS Sample ID	Chlorophyll *a* (µg)	Detection Limit (µg)	Filtered Volume (mL)	Total Volume (mL)	Percent Filtered	Area Sampled (cm^2)	Chlorophyll *a* ($µg/cm^2$)
WQS01	1	WQS01 REP 1	20-Sep-2017	L2019411-1	8.69	0.05	50	155	0.32	58.9	0.457
WQS01	2	WQS01 REP 2	20-Sep-2017	L2019411-2	4.54	0.02	50	223	0.22	58.9	0.344
WQS01	3	WQS01 REP 3	20-Sep-2017	L2019411-3	4.46	0.02	50	191	0.26	58.9	0.289
WQS02	1	WQS02 REP 1	19-Sep-2017	L2019411-4	14.1	0.05	50	102	0.49	58.9	0.488
WQS02	2	WQS02 REP 2	19-Sep-2017	L2019411-5	5.62	0.02	50	217	0.23	58.9	0.414
WQS02	3	WQS02 REP 3	19-Sep-2017	L2019411-6	4.47	0.02	50	112	0.45	58.9	0.170
WQS05	1	WQS05 REP 1	18-Sep-2017	L2019411-7	0.313	0.01	40	90	0.44	58.9	0.012
WQS05	2	WQS05 REP 2	18-Sep-2017	L2019411-8	3.51	0.02	50	96	0.52	58.9	0.114
WQS05	3	WQS05 REP 3	18-Sep-2017	L2019411-9	1.89	0.01	50	108	0.46	58.9	0.069
WQS08	1	WQS08 REP 1	18-Sep-2017	L2019411-10	10.5	0.05	50	170	0.29	58.9	0.606
WQS08	2	WQS08 REP 2	18-Sep-2017	L2019411-11	36.3	0.2	50	228	0.22	58.9	2.810
WQS08	3	WQS08 REP 3	18-Sep-2017	L2019411-12	21.1	0.1	50	347	0.14	58.9	2.486
WQS09	1	WQS09 REP 1	19-Sep-2017	L2019411-13	26.9	0.1	50	260	0.19	58.9	2.375
WQS09	2	WQS09 REP 2	19-Sep-2017	L2019411-14	24.7	0.1	50	428	0.12	58.9	3.589
WQS09	3	WQS09 REP 3	19-Sep-2017	L2019411-15	27.4	0.1	50	352	0.14	58.9	3.275
WQS12	1	WQS12 REP 1	20-Sep-2017	L2019411-16	14	0.05	50	361	0.14	58.9	1.716
WQS12	2	WQS12 REP 2	20-Sep-2017	L2019411-17	12.9	0.05	50	278	0.18	58.9	1.218
WQS12	3	WQS12 REP 3	20-Sep-2017	L2019411-18	12.4	0.05	50	283	0.18	58.9	1.191
400434	1	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	11-Sep-1987								0.500
400434	2	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	11-Sep-1987								1.020
400434	3	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	11-Sep-1987								0.770
400434	1	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	31-Aug-1988								0.540
400434	2	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	31-Aug-1988								0.610
400434	3	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	31-Aug-1988								0.680
400434	4	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	31-Aug-1988								0.720
400434	5	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	31-Aug-1988								0.460
400434	6	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	31-Aug-1988								0.710
400434	1	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	21-Aug-1989								0.840
400434	2	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	21-Aug-1989								0.770
400434	3	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	21-Aug-1989								3.310
400434	4	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	21-Aug-1989								1.080
400434	5	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	21-Aug-1989								0.550
400434	6	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	21-Aug-1989								0.740
400434	1	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	27-Aug-1990								0.730
400434	2	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	27-Aug-1990								1.160
400434	3	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	27-Aug-1990								1.360
400434	4	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	27-Aug-1990								2.830
400434	5	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	27-Aug-1990								0.740
400434	6	BULKLEY R UPSTREAM FROM SMITHERS SEWAGE	27-Aug-1990								2.010
400435	1	BULKLEY R. IDZ AT SMITHERS	11-Sep-1987								1.390
400435	2	BULKLEY R. IDZ AT SMITHERS	11-Sep-1987								0.960
400435	3	BULKLEY R. IDZ AT SMITHERS	11-Sep-1987								1.420
400435	1	BULKLEY R. IDZ AT SMITHERS	31-Aug-1988								0.520
400435	2	BULKLEY R. IDZ AT SMITHERS	31-Aug-1988								0.460
400435	3	BULKLEY R. IDZ AT SMITHERS	31-Aug-1988								0.580
400435	4	BULKLEY R. IDZ AT SMITHERS	31-Aug-1988								0.400
400435	5	BULKLEY R. IDZ AT SMITHERS	31-Aug-1988								0.490
400435	6	BULKLEY R. IDZ AT SMITHERS	31-Aug-1988								0.650
400435	1	BULKLEY R. IDZ AT SMITHERS	21-Aug-1989								0.470
400435	2	BULKLEY R. IDZ AT SMITHERS	21-Aug-1989								1.970
400435	3	BULKLEY R. IDZ AT SMITHERS	21-Aug-1989								0.830
400435	4	BULKLEY R. IDZ AT SMITHERS	21-Aug-1989								3.210
400435	5	BULKLEY R. IDZ AT SMITHERS	21-Aug-1989								0.570
400435	6	BULKLEY R. IDZ AT SMITHERS	21-Aug-1989								1.060
400435	1	BULKLEY R. IDZ AT SMITHERS	27-Aug-1990								2.170
400435	2	BULKLEY R. IDZ AT SMITHERS	27-Aug-1990								2.300

Appendix 10-A. Periphyton Biomass (as Chlorophyll *a*), Tenas Project, 2017

Site	Replicate	Sample ID	Date	ALS Sample ID	Chlorophyll *a* (µg)	Detection Limit (µg)	Filtered Volume (mL)	Total Volume (mL)	Percent Filtered	Area Sampled (cm^2)	Chlorophyll *a* ($\mu g/cm^2$)
400435	3	BULKLEY R. IDZ AT SMITHERS	27-Aug-1990								1.460
400435	4	BULKLEY R. IDZ AT SMITHERS	27-Aug-1990								1.660
400435	5	BULKLEY R. IDZ AT SMITHERS	27-Aug-1990								1.270
400435	6	BULKLEY R. IDZ AT SMITHERS	27-Aug-1990								3.190

Appendix 10-B

Stream Periphyton, Tenas Project, 2017

Appendix 10-B. Stream Periphyton, Tenas Project, 2017

Site	Replicate	Lab Sample ID	Date	Taxon	Phylum	Class	Order	Family	Genus	Microscope Factor (cm^2)	Fields of View Counted	Subsample Volume (mL)	Units Counted	Number of Cells/Unit	Unit Density (cm^2)
WQS01	1	pp17-089-001	20-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	17.52	15	1	6	1.0	105.1
WQS01	1	pp17-089-001	20-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	17.52	15	1	5	1.0	87.6
WQS01	1	pp17-089-001	20-Sep-2017	*Plagioselmis nanoplanctica*	Cryptophyta	Cryptophyceae	Pyrenomonadales	Geminigeraceae	*Plagioselmis*	17.52	15	1	1	1.0	17.5
WQS01	1	pp17-089-001	20-Sep-2017	*Chroococcus* sp.	Cyanophyta	Cyanophyceae	Chroococcales	Chroococcaceae	*Chroococcus*	17.52	15	1	9	5.9	157.7
WQS01	1	pp17-089-001	20-Sep-2017	*Heteroleibeinia* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Heteroleibleiniaceae	*Heteroleibeinia*	17.52	15	1	314	8.0	5,502.2
WQS01	1	pp17-089-001	20-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	17.52	15	1	6	16.0	105.1
WQS01	1	pp17-089-001	20-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	17.52	15	1	8	9.3	140.2
WQS01	1	pp17-089-001	20-Sep-2017	Cyanophyte (colony)	Cyanophyta	Cyanophyceae				17.52	15	1	1	10.0	17.5
WQS01	2	pp17-089-002	20-Sep-2017	*Nitzschia* sp.	Bacillariophyta	Bacillariophyceae	Bacillariales	Bacillariacea	*Nitzschia*	17.52	15	1	3	1.0	52.6
WQS01	2	pp17-089-002	20-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	17.52	15	1	1	1.0	17.5
WQS01	2	pp17-089-002	20-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	17.52	15	1	3	1.0	52.6
WQS01	2	pp17-089-002	20-Sep-2017	Pennate Diatom	Bacillariophyta	Bacillariophyceae				17.52	15	1	1	1.0	17.5
WQS01	2	pp17-089-002	20-Sep-2017	*Aphanothece* sp.	Cyanophyta	Cyanophyceae	Chroococcales	Aphanothecaceae	*Aphanothece*	17.52	15	1	1	5.0	17.5
WQS01	2	pp17-089-002	20-Sep-2017	*Chroococcus* sp.	Cyanophyta	Cyanophyceae	Chroococcales	Chroococcaceae	*Chroococcus*	17.52	15	1	5	2.0	87.6
WQS01	2	pp17-089-002	20-Sep-2017	*Heteroleibeinia* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Heteroleibleiniaceae	*Heteroleibeinia*	17.52	15	1	259	8.0	4,538.4
WQS01	2	pp17-089-002	20-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	17.52	15	1	37	4.0	648.3
WQS01	2	pp17-089-002	20-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	17.52	15	1	17	4.0	297.9
WQS01	3	pp17-089-003	20-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	13.14	20	1	11	1.0	144.6
WQS01	3	pp17-089-003	20-Sep-2017	*Encyonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Encyonema*	13.14	20	1	1	1.0	13.1
WQS01	3	pp17-089-003	20-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	13.14	20	1	14	1.0	184.0
WQS01	3	pp17-089-003	20-Sep-2017	*Aphanothece* sp.	Cyanophyta	Cyanophyceae	Chroococcales	Aphanothecaceae	*Aphanothece*	13.14	20	1	1	14.0	13.1
WQS01	3	pp17-089-003	20-Sep-2017	*Phormidium* sp.	Cyanophyta	Cyanophyceae	Oscillatoriales	Oscillatoriaceae	*Phormidium*	13.14	20	1	1	4.0	13.1
WQS01	3	pp17-089-003	20-Sep-2017	*Heteroleibeinia* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Heteroleibleiniaceae	*Heteroleibeinia*	13.14	20	1	262	10.0	3,443.3
WQS01	3	pp17-089-003	20-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	13.14	20	1	28	8.0	368.0
WQS01	3	pp17-089-003	20-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	13.14	20	1	11	6.0	144.6
WQS01	3	pp17-089-003	20-Sep-2017	Cyanophyte (colony)	Cyanophyta	Cyanophyceae				13.14	20	1	2	6.0	26.3
WQS02	1	pp17-089-004	19-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	5.26	25	2	40	1.0	210.3
WQS02	1	pp17-089-004	19-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	5.26	25	2	2	1.0	10.5
WQS02	1	pp17-089-004	19-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	5.26	25	2	6	1.0	31.5
WQS02	1	pp17-089-004	19-Sep-2017	*Hannaea arcus*	Bacillariophyta	Bacillariophyceae	Licmophorales	Ulnariaceae	*Hannaea*	5.26	25	2	1	1.0	5.3
WQS02	1	pp17-089-004	19-Sep-2017	Pennate Diatom	Bacillariophyta	Bacillariophyceae				5.26	25	2	1	1.0	5.3
WQS02	1	pp17-089-004	19-Sep-2017	*Hyella* sp.	Cyanophyta	Cyanophyceae	Pleurocapsales	Hyellaceae	*Hyella*	5.26	25	2	2	4.0	10.5
WQS02	1	pp17-089-004	19-Sep-2017	*Heteroleibeinia* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Heteroleibleiniaceae	*Heteroleibeinia*	5.26	25	2	219	7.0	1,151.3
WQS02	1	pp17-089-004	19-Sep-2017	*Tapinothrix* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Heteroleibleiniaceae	*Tapinothrix*	5.26	25	2	5	6.0	26.3
WQS02	1	pp17-089-004	19-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	5.26	25	2	15	8.0	78.9
WQS02	1	pp17-089-004	19-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	5.26	25	2	7	7.0	36.8
WQS02	1	pp17-089-004	19-Sep-2017	Cyanophyte (colony)	Cyanophyta	Cyanophyceae				5.26	25	2	6	16.0	31.5
WQS02	2	pp17-089-005	19-Sep-2017	*Nitzschia* sp.	Bacillariophyta	Bacillariophyceae	Bacillariales	Bacillariacea	*Nitzschia*	5.26	25	2	2	1.0	10.5
WQS02	2	pp17-089-005	19-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	5.26	25	2	12	1.0	63.1
WQS02	2	pp17-089-005	19-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	5.26	25	2	5	1.0	26.3
WQS02	2	pp17-089-005	19-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	5.26	25	2	12	1.0	63.1
WQS02	2	pp17-089-005	19-Sep-2017	*Fragilaria ulna*	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	5.26	25	2	2	1.0	10.5
WQS02	2	pp17-089-005	19-Sep-2017	*Hannaea arcus*	Bacillariophyta	Bacillariophyceae	Licmophorales	Ulnariaceae	*Hannaea*	5.26	25	2	5	1.0	26.3
WQS02	2	pp17-089-005	19-Sep-2017	*Navicula* sp.	Bacillariophyta	Bacillariophyceae	Naviculales	Naviculaceae	*Navicula*	5.26	25	2	1	1.0	5.3
WQS02	2	pp17-089-005	19-Sep-2017	*Aphanothece* sp.	Cyanophyta	Cyanophyceae	Chroococcales	Aphanothecaceae	*Aphanothece*	5.26	25	2	1	20.0	5.3
WQS02	2	pp17-089-005	19-Sep-2017	*Phormidium* sp.	Cyanophyta	Cyanophyceae	Oscillatoriales	Oscillatoriaceae	*Phormidium*	5.26	25	2	59	9.3	310.2
WQS02	2	pp17-089-005	19-Sep-2017	*Hyella* sp.	Cyanophyta	Cyanophyceae	Pleurocapsales	Hyellaceae	*Hyella*	5.26	25	2	1	4.0	5.3
WQS02	2	pp17-089-005	19-Sep-2017	*Heteroleibeinia* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Heteroleibleiniaceae	*Heteroleibeinia*	5.26	25	2	155	8.0	814.8
WQS02	2	pp17-089-005	19-Sep-2017	*Tapinothrix* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Heteroleibleiniaceae	*Tapinothrix*	5.26	25	2	3	10.0	15.8
WQS02	2	pp17-089-005	19-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	5.26	25	2	15	10.0	78.9
WQS02	2	pp17-089-005	19-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	5.26	25	2	13	5.0	68.3
WQS02	2	pp17-089-005	19-Sep-2017	Cyanophyte (colony)	Cyanophyta	Cyanophyceae				5.26	25	2	4	13.0	21.0
WQS02	3	pp17-089-006	19-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	3.98	33	2	2	1.0	8.0
WQS02	3	pp17-089-006	19-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	3.98	33	2	2	1.0	8.0
WQS02	3	pp17-089-006	19-Sep-2017	*Diatoma* sp.	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Diatoma*	3.98	33	2	1	1.0	4.0

Appendix 10-B. Stream Periphyton, Tenas Project, 2017

Site	Replicate	Lab Sample ID	Date	Taxon	Cell Density (cm^2)	Excluded Taxa (Density Only)
WQS01	1	pp17-089-001	20-Sep-2017	*Achnanthidium minutissimum*	105.1	ok
WQS01	1	pp17-089-001	20-Sep-2017	*Fragilaria* sp.	87.6	ok
WQS01	1	pp17-089-001	20-Sep-2017	*Plagioselmis nanoplanctica*	17.5	ok
WQS01	1	pp17-089-001	20-Sep-2017	*Chroococcus* sp.	926.5	ok
WQS01	1	pp17-089-001	20-Sep-2017	*Heteroleibeinia* sp.	44,017.6	ok
WQS01	1	pp17-089-001	20-Sep-2017	*Leptolyngbya* sp.	1,682.2	ok
WQS01	1	pp17-089-001	20-Sep-2017	*Pseudanabaena* sp.	1,308.4	ok
WQS01	1	pp17-089-001	20-Sep-2017	Cyanophyte (colony)	175.2	Exclude
WQS01	2	pp17-089-002	20-Sep-2017	*Nitzschia* sp.	52.6	ok
WQS01	2	pp17-089-002	20-Sep-2017	*Achnanthidium minutissimum*	17.5	ok
WQS01	2	pp17-089-002	20-Sep-2017	*Gomphonema* sp.	52.6	ok
WQS01	2	pp17-089-002	20-Sep-2017	Pennate Diatom	17.5	Exclude
WQS01	2	pp17-089-002	20-Sep-2017	*Aphanothece* sp.	87.6	ok
WQS01	2	pp17-089-002	20-Sep-2017	*Chroococcus* sp.	175.2	ok
WQS01	2	pp17-089-002	20-Sep-2017	*Heteroleibeinia* sp.	36,307.6	ok
WQS01	2	pp17-089-002	20-Sep-2017	*Leptolyngbya* sp.	2,593.4	ok
WQS01	2	pp17-089-002	20-Sep-2017	*Pseudanabaena* sp.	1,191.6	ok
WQS01	3	pp17-089-003	20-Sep-2017	*Achnanthidium minutissimum*	144.6	ok
WQS01	3	pp17-089-003	20-Sep-2017	*Encyonema* sp.	13.1	ok
WQS01	3	pp17-089-003	20-Sep-2017	*Gomphonema* sp.	184.0	ok
WQS01	3	pp17-089-003	20-Sep-2017	*Aphanothece* sp.	184.0	ok
WQS01	3	pp17-089-003	20-Sep-2017	*Phormidium* sp.	52.6	ok
WQS01	3	pp17-089-003	20-Sep-2017	*Heteroleibeinia* sp.	34,432.6	ok
WQS01	3	pp17-089-003	20-Sep-2017	*Leptolyngbya* sp.	2,943.9	ok
WQS01	3	pp17-089-003	20-Sep-2017	*Pseudanabaena* sp.	867.4	ok
WQS01	3	pp17-089-003	20-Sep-2017	Cyanophyte (colony)	157.7	Exclude
WQS02	1	pp17-089-004	19-Sep-2017	*Achnanthidium minutissimum*	210.3	ok
WQS02	1	pp17-089-004	19-Sep-2017	*Gomphonema* sp.	10.5	ok
WQS02	1	pp17-089-004	19-Sep-2017	*Fragilaria* sp.	31.5	ok
WQS02	1	pp17-089-004	19-Sep-2017	*Hannaea arcus*	5.3	ok
WQS02	1	pp17-089-004	19-Sep-2017	Pennate Diatom	5.3	Exclude
WQS02	1	pp17-089-004	19-Sep-2017	*Hyella* sp.	42.1	ok
WQS02	1	pp17-089-004	19-Sep-2017	*Heteroleibeinia* sp.	8,058.8	ok
WQS02	1	pp17-089-004	19-Sep-2017	*Tapinothrix* sp.	157.7	ok
WQS02	1	pp17-089-004	19-Sep-2017	*Leptolyngbya* sp.	630.8	ok
WQS02	1	pp17-089-004	19-Sep-2017	*Pseudanabaena* sp.	257.6	ok
WQS02	1	pp17-089-004	19-Sep-2017	Cyanophyte (colony)	504.7	Exclude
WQS02	2	pp17-089-005	19-Sep-2017	*Nitzschia* sp.	10.5	ok
WQS02	2	pp17-089-005	19-Sep-2017	*Achnanthidium minutissimum*	63.1	ok
WQS02	2	pp17-089-005	19-Sep-2017	*Gomphonema* sp.	26.3	ok
WQS02	2	pp17-089-005	19-Sep-2017	*Fragilaria* sp.	63.1	ok
WQS02	2	pp17-089-005	19-Sep-2017	*Fragilaria ulna*	10.5	ok
WQS02	2	pp17-089-005	19-Sep-2017	*Hannaea arcus*	26.3	ok
WQS02	2	pp17-089-005	19-Sep-2017	*Navicula* sp.	5.3	ok
WQS02	2	pp17-089-005	19-Sep-2017	*Aphanothece* sp.	105.1	ok
WQS02	2	pp17-089-005	19-Sep-2017	*Phormidium* sp.	2,868.9	ok
WQS02	2	pp17-089-005	19-Sep-2017	*Hyella* sp.	21.0	ok
WQS02	2	pp17-089-005	19-Sep-2017	*Heteroleibeinia* sp.	6,518.5	ok
WQS02	2	pp17-089-005	19-Sep-2017	*Tapinothrix* sp.	157.7	ok
WQS02	2	pp17-089-005	19-Sep-2017	*Leptolyngbya* sp.	788.5	ok
WQS02	2	pp17-089-005	19-Sep-2017	*Pseudanabaena* sp.	341.7	ok
WQS02	2	pp17-089-005	19-Sep-2017	Cyanophyte (colony)	273.4	Exclude
WQS02	3	pp17-089-006	19-Sep-2017	*Achnanthidium minutissimum*	8.0	ok
WQS02	3	pp17-089-006	19-Sep-2017	*Fragilaria* sp.	8.0	ok
WQS02	3	pp17-089-006	19-Sep-2017	*Diatoma* sp.	4.0	ok

Appendix 10-B. Stream Periphyton, Tenas Project, 2017

Site	Replicate	Lab Sample ID	Date	Taxon	Phylum	Class	Order	Family	Genus	Microscope Factor (cm^2)	Fields of View Counted	Subsample Volume (mL)	Units Counted	Number of Cells/Unit	Unit Density (cm^2)
WQS02	3	pp17-089-006	19-Sep-2017	*Hyella* sp.	Cyanophyta	Cyanophyceae	Pleurocapsales	Hyellaceae	*Hyella*	3.98	33	2	1	4.0	4.0
WQS02	3	pp17-089-006	19-Sep-2017	*Heteroleibeinia* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Heteroleibleiniaceae	*Heteroleibeinia*	3.98	33	2	210	8.0	836.3
WQS02	3	pp17-089-006	19-Sep-2017	*Tapinothrix* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Heteroleibleiniaceae	*Tapinothrix*	3.98	33	2	4	7.0	15.9
WQS02	3	pp17-089-006	19-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	3.98	33	2	7	8.0	27.9
WQS02	3	pp17-089-006	19-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	3.98	33	2	33	5.0	131.4
WQS05	1	pp17-089-007	18-Sep-2017	*Nitzschia* sp.	Bacillariophyta	Bacillariophyceae	Bacillariales	Bacillariacea	*Nitzschia*	2.63	100	1	1	1.0	2.6
WQS05	1	pp17-089-007	18-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	2.63	100	1	38	1.0	99.9
WQS05	1	pp17-089-007	18-Sep-2017	*Encyonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Encyonema*	2.63	100	1	4	1.0	10.5
WQS05	1	pp17-089-007	18-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	2.63	100	1	19	1.0	49.9
WQS05	1	pp17-089-007	18-Sep-2017	*Eunotia* sp.	Bacillariophyta	Bacillariophyceae	Eunotiales	Eunotiaceae	*Eunotia*	2.63	100	1	1	1.0	2.6
WQS05	1	pp17-089-007	18-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	2.63	100	1	16	1.0	42.1
WQS05	1	pp17-089-007	18-Sep-2017	*Navicula* cf. *cincta*	Bacillariophyta	Bacillariophyceae	Naviculales	Naviculaceae	*Navicula*	2.63	100	1	2	1.0	5.3
WQS05	1	pp17-089-007	18-Sep-2017	*Diatoma* sp.	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Diatoma*	2.63	100	1	4	1.0	10.5
WQS05	1	pp17-089-007	18-Sep-2017	*Aphanothece* sp.	Cyanophyta	Cyanophyceae	Chroococcales	Aphanothecaceae	*Aphanothece*	2.63	100	1	8	7.6	21.0
WQS05	1	pp17-089-007	18-Sep-2017	*Phormidium* sp.	Cyanophyta	Cyanophyceae	Oscillatoriales	Oscillatoriaceae	*Phormidium*	2.63	100	1	6	8.0	15.8
WQS05	1	pp17-089-007	18-Sep-2017	*Heteroleibeinia* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Heteroleibleiniaceae	*Heteroleibeinia*	2.63	100	1	42	8.0	110.4
WQS05	1	pp17-089-007	18-Sep-2017	*Tapinothrix* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Heteroleibleiniaceae	*Tapinothrix*	2.63	100	1	20	8.0	52.6
WQS05	1	pp17-089-007	18-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	2.63	100	1	30	8.0	78.9
WQS05	1	pp17-089-007	18-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	2.63	100	1	1	16.0	2.6
WQS05	1	pp17-089-007	18-Sep-2017	Cyanophyte (colony)	Cyanophyta	Cyanophyceae				2.63	100	1	4	6.0	10.5
WQS05	2	pp17-089-008	18-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	2.63	100	1	59	1.0	155.1
WQS05	2	pp17-089-008	18-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	2.63	100	1	4	1.0	10.5
WQS05	2	pp17-089-008	18-Sep-2017	*Eunotia* sp.	Bacillariophyta	Bacillariophyceae	Eunotiales	Eunotiaceae	*Eunotia*	2.63	100	1	2	1.0	5.3
WQS05	2	pp17-089-008	18-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	2.63	100	1	6	1.0	15.8
WQS05	2	pp17-089-008	18-Sep-2017	*Hannaea arcus*	Bacillariophyta	Bacillariophyceae	Licmophorales	Ulnariaceae	*Hannaea*	2.63	100	1	1	1.0	2.6
WQS05	2	pp17-089-008	18-Sep-2017	*Achnantes* cf. *clevei*	Bacillariophyta	Bacillariophyceae	Mastogloiales	Achnanthaceae	*Achnantes*	2.63	100	1	1	1.0	2.6
WQS05	2	pp17-089-008	18-Sep-2017	Pennate Diatom	Bacillariophyta	Bacillariophyceae				2.63	100	1	2	1.0	5.3
WQS05	2	pp17-089-008	18-Sep-2017	*Phormidium* sp.	Cyanophyta	Cyanophyceae	Oscillatoriales	Oscillatoriaceae	*Phormidium*	2.63	100	1	3	6.0	7.9
WQS05	2	pp17-089-008	18-Sep-2017	*Heteroleibeinia* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Heteroleibleiniaceae	*Heteroleibeinia*	2.63	100	1	97	6.0	255.0
WQS05	2	pp17-089-008	18-Sep-2017	*Tapinothrix* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Heteroleibleiniaceae	*Tapinothrix*	2.63	100	1	15	7.0	39.4
WQS05	2	pp17-089-008	18-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	2.63	100	1	39	7.0	102.5
WQS05	2	pp17-089-008	18-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	2.63	100	1	15	11.5	39.4
WQS05	2	pp17-089-008	18-Sep-2017	Cyanophyte (colony)	Cyanophyta	Cyanophyceae				2.63	100	1	1	4.0	2.6
WQS05	3	pp17-089-009	18-Sep-2017	*Nitzschia* sp.	Bacillariophyta	Bacillariophyceae	Bacillariales	Bacillariacea	*Nitzschia*	2.63	100	1	1	1.0	2.6
WQS05	3	pp17-089-009	18-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	2.63	100	1	93	1.0	244.4
WQS05	3	pp17-089-009	18-Sep-2017	*Encyonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Encyonema*	2.63	100	1	10	1.0	26.3
WQS05	3	pp17-089-009	18-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	2.63	100	1	50	1.0	131.4
WQS05	3	pp17-089-009	18-Sep-2017	*Eunotia* sp.	Bacillariophyta	Bacillariophyceae	Eunotiales	Eunotiaceae	*Eunotia*	2.63	100	1	10	1.0	26.3
WQS05	3	pp17-089-009	18-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	2.63	100	1	4	1.0	10.5
WQS05	3	pp17-089-009	18-Sep-2017	*Hannaea arcus*	Bacillariophyta	Bacillariophyceae	Licmophorales	Ulnariaceae	*Hannaea*	2.63	100	1	5	1.0	13.1
WQS05	3	pp17-089-009	18-Sep-2017	*Navicula* cf. *gregaria*	Bacillariophyta	Bacillariophyceae	Naviculales	Naviculaceae	*Navicula*	2.63	100	1	1	1.0	2.6
WQS05	3	pp17-089-009	18-Sep-2017	Pennate Diatom	Bacillariophyta	Bacillariophyceae				2.63	100	1	2	1.0	5.3
WQS05	3	pp17-089-009	18-Sep-2017	*Phormidium* sp.	Cyanophyta	Cyanophyceae	Oscillatoriales	Oscillatoriaceae	*Phormidium*	2.63	100	1	2	6.0	5.3
WQS05	3	pp17-089-009	18-Sep-2017	*Heteroleibeinia* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Heteroleibleiniaceae	*Heteroleibeinia*	2.63	100	1	19	12.0	49.9
WQS05	3	pp17-089-009	18-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	2.63	100	1	12	11.0	31.5
WQS05	3	pp17-089-009	18-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	2.63	100	1	6	4.0	15.8
WQS08	1	pp17-089-010	18-Sep-2017	*Nitzschia* sp.	Bacillariophyta	Bacillariophyceae	Bacillariales	Bacillariacea	*Nitzschia*	18.77	70	0.2	2	1.0	37.5
WQS08	1	pp17-089-010	18-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	18.77	70	0.2	92	1.0	1,727.3
WQS08	1	pp17-089-010	18-Sep-2017	*Didymosphenia geminata*	Bacillariophyta	Bacillariophyceae	Cymbellales	Cymbellaceae	*Didymosphenia*	18.77	70	0.2	1	1.0	18.8
WQS08	1	pp17-089-010	18-Sep-2017	*Encyonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Encyonema*	18.77	70	0.2	23	1.0	431.8
WQS08	1	pp17-089-010	18-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	18.77	70	0.2	4	1.0	75.1
WQS08	1	pp17-089-010	18-Sep-2017	*Eunotia* sp.	Bacillariophyta	Bacillariophyceae	Eunotiales	Eunotiaceae	*Eunotia*	18.77	70	0.2	30	1.0	563.2
WQS08	1	pp17-089-010	18-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	18.77	70	0.2	129	1.0	2,421.9
WQS08	1	pp17-089-010	18-Sep-2017	*Fragilaria ulna*	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	18.77	70	0.2	7	1.0	131.4
WQS08	1	pp17-089-010	18-Sep-2017	*Navicula* sp.	Bacillariophyta	Bacillariophyceae	Naviculales	Naviculaceae	*Navicula*	18.77	70	0.2	15	1.0	281.6

Appendix 10-B. Stream Periphyton, Tenas Project, 2017

Site	Replicate	Lab Sample ID	Date	Taxon	Cell Density (cm^2)	Excluded Taxa (Density Only)
WQS02	3	pp17-089-006	19-Sep-2017	*Hyella* sp.	15.9	ok
WQS02	3	pp17-089-006	19-Sep-2017	*Heteroleibeinia* sp.	6,690.6	ok
WQS02	3	pp17-089-006	19-Sep-2017	*Tapinothrix* sp.	111.5	ok
WQS02	3	pp17-089-006	19-Sep-2017	*Leptolyngbya* sp.	223.0	ok
WQS02	3	pp17-089-006	19-Sep-2017	*Pseudanabaena* sp.	657.1	ok
WQS05	1	pp17-089-007	18-Sep-2017	*Nitzschia* sp.	2.6	ok
WQS05	1	pp17-089-007	18-Sep-2017	*Achnanthidium minutissimum*	99.9	ok
WQS05	1	pp17-089-007	18-Sep-2017	*Encyonema* sp.	10.5	ok
WQS05	1	pp17-089-007	18-Sep-2017	*Gomphonema* sp.	49.9	ok
WQS05	1	pp17-089-007	18-Sep-2017	*Eunotia* sp.	2.6	ok
WQS05	1	pp17-089-007	18-Sep-2017	*Fragilaria* sp.	42.1	ok
WQS05	1	pp17-089-007	18-Sep-2017	*Navicula* cf. *cincta*	5.3	ok
WQS05	1	pp17-089-007	18-Sep-2017	*Diatoma* sp.	10.5	ok
WQS05	1	pp17-089-007	18-Sep-2017	*Aphanothece* sp.	158.9	ok
WQS05	1	pp17-089-007	18-Sep-2017	*Phormidium* sp.	126.2	ok
WQS05	1	pp17-089-007	18-Sep-2017	*Heteroleibeinia* sp.	883.2	ok
WQS05	1	pp17-089-007	18-Sep-2017	*Tapinothrix* sp.	420.6	ok
WQS05	1	pp17-089-007	18-Sep-2017	*Leptolyngbya* sp.	630.8	ok
WQS05	1	pp17-089-007	18-Sep-2017	*Pseudanabaena* sp.	42.1	ok
WQS05	1	pp17-089-007	18-Sep-2017	Cyanophyte (colony)	63.1	Exclude
WQS05	2	pp17-089-008	18-Sep-2017	*Achnanthidium minutissimum*	155.1	ok
WQS05	2	pp17-089-008	18-Sep-2017	*Gomphonema* sp.	10.5	ok
WQS05	2	pp17-089-008	18-Sep-2017	*Eunotia* sp.	5.3	ok
WQS05	2	pp17-089-008	18-Sep-2017	*Fragilaria* sp.	15.8	ok
WQS05	2	pp17-089-008	18-Sep-2017	*Hannaea arcus*	2.6	ok
WQS05	2	pp17-089-008	18-Sep-2017	*Achnantes* cf. *clevei*	2.6	ok
WQS05	2	pp17-089-008	18-Sep-2017	Pennate Diatom	5.3	Exclude
WQS05	2	pp17-089-008	18-Sep-2017	*Phormidium* sp.	47.3	ok
WQS05	2	pp17-089-008	18-Sep-2017	*Heteroleibeinia* sp.	1,529.8	ok
WQS05	2	pp17-089-008	18-Sep-2017	*Tapinothrix* sp.	276.0	ok
WQS05	2	pp17-089-008	18-Sep-2017	*Leptolyngbya* sp.	717.6	ok
WQS05	2	pp17-089-008	18-Sep-2017	*Pseudanabaena* sp.	453.4	ok
WQS05	2	pp17-089-008	18-Sep-2017	Cyanophyte (colony)	10.5	Exclude
WQS05	3	pp17-089-009	18-Sep-2017	*Nitzschia* sp.	2.6	ok
WQS05	3	pp17-089-009	18-Sep-2017	*Achnanthidium minutissimum*	244.4	ok
WQS05	3	pp17-089-009	18-Sep-2017	*Encyonema* sp.	26.3	ok
WQS05	3	pp17-089-009	18-Sep-2017	*Gomphonema* sp.	131.4	ok
WQS05	3	pp17-089-009	18-Sep-2017	*Eunotia* sp.	26.3	ok
WQS05	3	pp17-089-009	18-Sep-2017	*Fragilaria* sp.	10.5	ok
WQS05	3	pp17-089-009	18-Sep-2017	*Hannaea arcus*	13.1	ok
WQS05	3	pp17-089-009	18-Sep-2017	*Navicula* cf. *gregaria*	2.6	ok
WQS05	3	pp17-089-009	18-Sep-2017	Pennate Diatom	5.3	Exclude
WQS05	3	pp17-089-009	18-Sep-2017	*Phormidium* sp.	31.5	ok
WQS05	3	pp17-089-009	18-Sep-2017	*Heteroleibeinia* sp.	599.3	ok
WQS05	3	pp17-089-009	18-Sep-2017	*Leptolyngbya* sp.	347.0	ok
WQS05	3	pp17-089-009	18-Sep-2017	*Pseudanabaena* sp.	63.1	ok
WQS08	1	pp17-089-010	18-Sep-2017	*Nitzschia* sp.	37.5	ok
WQS08	1	pp17-089-010	18-Sep-2017	*Achnanthidium minutissimum*	1,727.3	ok
WQS08	1	pp17-089-010	18-Sep-2017	*Didymosphenia geminata*	18.8	ok
WQS08	1	pp17-089-010	18-Sep-2017	*Encyonema* sp.	431.8	ok
WQS08	1	pp17-089-010	18-Sep-2017	*Gomphonema* sp.	75.1	ok
WQS08	1	pp17-089-010	18-Sep-2017	*Eunotia* sp.	563.2	ok
WQS08	1	pp17-089-010	18-Sep-2017	*Fragilaria* sp.	2,421.9	ok
WQS08	1	pp17-089-010	18-Sep-2017	*Fragilaria ulna*	131.4	ok
WQS08	1	pp17-089-010	18-Sep-2017	*Navicula* sp.	281.6	ok

Appendix 10-B. Stream Periphyton, Tenas Project, 2017

Site	Replicate	Lab Sample ID	Date	Taxon	Phylum	Class	Order	Family	Genus	Microscope Factor (cm^2)	Fields of View Counted	Subsample Volume (mL)	Units Counted	Number of Cells/Unit	Unit Density (cm^2)
WQS08	1	pp17-089-010	18-Sep-2017	*Diatoma* sp.	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Diatoma*	18.77	70	0.2	4	1.0	75.1
WQS08	1	pp17-089-010	18-Sep-2017	*Tabellaria fenestrata*	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Tabellaria*	18.77	70	0.2	2	1.0	37.5
WQS08	1	pp17-089-010	18-Sep-2017	Pennate Diatom	Bacillariophyta	Bacillariophyceae				18.77	70	0.2	8	1.0	150.2
WQS08	1	pp17-089-010	18-Sep-2017	*Cladophora* sp.	Chlorophyta	Ulvophyceae	Cladophorales	Cladophoraceae	*Cladophora*	18.77	70	0.2	5	1.0	93.9
WQS08	1	pp17-089-010	18-Sep-2017	*Ulothrix* sp.	Chlorophyta	Ulvophyceae	Ulotrichales	Ulotrichaceae	*Ulothrix*	18.77	70	0.2	7	1.0	131.4
WQS08	1	pp17-089-010	18-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	18.77	70	0.2	4	8.5	75.1
WQS08	1	pp17-089-010	18-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	18.77	70	0.2	5	6.0	93.9
WQS08	2	pp17-089-011	18-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	18.77	70	0.2	88	1.0	1,652.2
WQS08	2	pp17-089-011	18-Sep-2017	*Didymosphenia geminata*	Bacillariophyta	Bacillariophyceae	Cymbellales	Cymbellaceae	*Didymosphenia*	18.77	70	0.2	1	1.0	18.8
WQS08	2	pp17-089-011	18-Sep-2017	*Encyonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Encyonema*	18.77	70	0.2	27	1.0	506.9
WQS08	2	pp17-089-011	18-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	18.77	70	0.2	11	1.0	206.5
WQS08	2	pp17-089-011	18-Sep-2017	*Eunotia* sp.	Bacillariophyta	Bacillariophyceae	Eunotiales	Eunotiaceae	*Eunotia*	18.77	70	0.2	23	1.0	431.8
WQS08	2	pp17-089-011	18-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	18.77	70	0.2	65	1.0	1,220.3
WQS08	2	pp17-089-011	18-Sep-2017	*Fragilaria ulna*	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	18.77	70	0.2	3	1.0	56.3
WQS08	2	pp17-089-011	18-Sep-2017	*Hannaea arcus*	Bacillariophyta	Bacillariophyceae	Licmophorales	Ulnariaceae	*Hannaea*	18.77	70	0.2	1	1.0	18.8
WQS08	2	pp17-089-011	18-Sep-2017	*Navicula* sp.	Bacillariophyta	Bacillariophyceae	Naviculales	Naviculaceae	*Navicula*	18.77	70	0.2	13	1.0	244.1
WQS08	2	pp17-089-011	18-Sep-2017	*Diatoma* sp.	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Diatoma*	18.77	70	0.2	4	1.0	75.1
WQS08	2	pp17-089-011	18-Sep-2017	Pennate Diatom	Bacillariophyta	Bacillariophyceae				18.77	70	0.2	7	1.0	131.4
WQS08	2	pp17-089-011	18-Sep-2017	*Cladophora* sp.	Chlorophyta	Ulvophyceae	Cladophorales	Cladophoraceae	*Cladophora*	18.77	70	0.2	25	1.0	469.4
WQS08	2	pp17-089-011	18-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	18.77	70	0.2	17	5.0	319.2
WQS08	2	pp17-089-011	18-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	18.77	70	0.2	16	5.8	300.4
WQS08	3	pp17-089-012	18-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	21.90	60	0.2	161	1.0	3,526.5
WQS08	3	pp17-089-012	18-Sep-2017	*Encyonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Encyonema*	21.90	60	0.2	9	1.0	197.1
WQS08	3	pp17-089-012	18-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	21.90	60	0.2	5	1.0	109.5
WQS08	3	pp17-089-012	18-Sep-2017	*Eunotia* sp.	Bacillariophyta	Bacillariophyceae	Eunotiales	Eunotiaceae	*Eunotia*	21.90	60	0.2	14	1.0	306.7
WQS08	3	pp17-089-012	18-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	21.90	60	0.2	64	1.0	1,401.8
WQS08	3	pp17-089-012	18-Sep-2017	*Fragilaria ulna*	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	21.90	60	0.2	3	1.0	65.7
WQS08	3	pp17-089-012	18-Sep-2017	*Hannaea arcus*	Bacillariophyta	Bacillariophyceae	Licmophorales	Ulnariaceae	*Hannaea*	21.90	60	0.2	1	1.0	21.9
WQS08	3	pp17-089-012	18-Sep-2017	*Navicula* sp.	Bacillariophyta	Bacillariophyceae	Naviculales	Naviculaceae	*Navicula*	21.90	60	0.2	10	1.0	219.0
WQS08	3	pp17-089-012	18-Sep-2017	*Diatoma* sp.	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Diatoma*	21.90	60	0.2	2	1.0	43.8
WQS08	3	pp17-089-012	18-Sep-2017	Pennate Diatom	Bacillariophyta	Bacillariophyceae				21.90	60	0.2	10	1.0	219.0
WQS08	3	pp17-089-012	18-Sep-2017	*Cladophora* sp.	Chlorophyta	Ulvophyceae	Cladophorales	Cladophoraceae	*Cladophora*	21.90	60	0.2	24	1.0	525.7
WQS08	3	pp17-089-012	18-Sep-2017	*Ulothrix* sp.	Chlorophyta	Ulvophyceae	Ulotrichales	Ulotrichaceae	*Ulothrix*	21.90	60	0.2	13	1.0	284.7
WQS08	3	pp17-089-012	18-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	21.90	60	0.2	7	8.0	153.3
WQS08	3	pp17-089-012	18-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	21.90	60	0.2	4	6.0	87.6
WQS09	1	pp17-089-013	19-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	328.56	8	0.1	185	1.0	60,782.7
WQS09	1	pp17-089-013	19-Sep-2017	*Encyonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Encyonema*	328.56	8	0.1	4	1.0	1,314.2
WQS09	1	pp17-089-013	19-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	328.56	8	0.1	2	1.0	657.1
WQS09	1	pp17-089-013	19-Sep-2017	*Eunotia* sp.	Bacillariophyta	Bacillariophyceae	Eunotiales	Eunotiaceae	*Eunotia*	328.56	8	0.1	2	1.0	657.1
WQS09	1	pp17-089-013	19-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	328.56	8	0.1	71	1.0	23,327.4
WQS09	1	pp17-089-013	19-Sep-2017	*Fragilaria ulna*	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	328.56	8	0.1	2	1.0	657.1
WQS09	1	pp17-089-013	19-Sep-2017	*Synedra* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Synedra*	328.56	8	0.1	9	1.0	2,957.0
WQS09	1	pp17-089-013	19-Sep-2017	*Navicula* sp.	Bacillariophyta	Bacillariophyceae	Naviculales	Naviculaceae	*Navicula*	328.56	8	0.1	4	1.0	1,314.2
WQS09	1	pp17-089-013	19-Sep-2017	*Diatoma* sp.	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Diatoma*	328.56	8	0.1	4	1.0	1,314.2
WQS09	1	pp17-089-013	19-Sep-2017	Pennate Diatom	Bacillariophyta	Bacillariophyceae				328.56	8	0.1	9	1.0	2,957.0
WQS09	1	pp17-089-013	19-Sep-2017	*Phormidium* sp.	Cyanophyta	Cyanophyceae	Oscillatoriales	Oscillatoriaceae	*Phormidium*	328.56	8	0.1	1	4.0	328.6
WQS09	1	pp17-089-013	19-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	328.56	8	0.1	3	8.0	985.7
WQS09	2	pp17-089-014	19-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	328.56	8	0.1	102	1.0	33,512.6
WQS09	2	pp17-089-014	19-Sep-2017	*Cymbella* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Cymbellaceae	*Cymbella*	328.56	8	0.1	1	1.0	328.6
WQS09	2	pp17-089-014	19-Sep-2017	*Encyonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Encyonema*	328.56	8	0.1	3	1.0	985.7
WQS09	2	pp17-089-014	19-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	328.56	8	0.1	9	1.0	2,957.0
WQS09	2	pp17-089-014	19-Sep-2017	*Eunotia* sp.	Bacillariophyta	Bacillariophyceae	Eunotiales	Eunotiaceae	*Eunotia*	328.56	8	0.1	6	1.0	1,971.3
WQS09	2	pp17-089-014	19-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	328.56	8	0.1	169	1.0	55,525.8
WQS09	2	pp17-089-014	19-Sep-2017	*Fragilaria ulna*	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	328.56	8	0.1	2	1.0	657.1
WQS09	2	pp17-089-014	19-Sep-2017	*Synedra* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Synedra*	328.56	8	0.1	6	1.0	1,971.3

Appendix 10-B. Stream Periphyton, Tenas Project, 2017

Site	Replicate	Lab Sample ID	Date	Taxon	Cell Density (cm^2)	Excluded Taxa (Density Only)
WQS08	1	pp17-089-010	18-Sep-2017	*Diatoma* sp.	75.1	ok
WQS08	1	pp17-089-010	18-Sep-2017	*Tabellaria fenestrata*	37.5	ok
WQS08	1	pp17-089-010	18-Sep-2017	Pennate Diatom	150.2	Exclude
WQS08	1	pp17-089-010	18-Sep-2017	*Cladophora* sp.	93.9	ok
WQS08	1	pp17-089-010	18-Sep-2017	*Ulothrix* sp.	131.4	ok
WQS08	1	pp17-089-010	18-Sep-2017	*Leptolyngbya* sp.	638.3	ok
WQS08	1	pp17-089-010	18-Sep-2017	*Pseudanabaena* sp.	563.2	ok
WQS08	2	pp17-089-011	18-Sep-2017	*Achnanthidium minutissimum*	1,652.2	ok
WQS08	2	pp17-089-011	18-Sep-2017	*Didymosphenia geminata*	18.8	ok
WQS08	2	pp17-089-011	18-Sep-2017	*Encyonema* sp.	506.9	ok
WQS08	2	pp17-089-011	18-Sep-2017	*Gomphonema* sp.	206.5	ok
WQS08	2	pp17-089-011	18-Sep-2017	*Eunotia* sp.	431.8	ok
WQS08	2	pp17-089-011	18-Sep-2017	*Fragilaria* sp.	1,220.3	ok
WQS08	2	pp17-089-011	18-Sep-2017	*Fragilaria ulna*	56.3	ok
WQS08	2	pp17-089-011	18-Sep-2017	*Hannaea arcus*	18.8	ok
WQS08	2	pp17-089-011	18-Sep-2017	*Navicula* sp.	244.1	ok
WQS08	2	pp17-089-011	18-Sep-2017	*Diatoma* sp.	75.1	ok
WQS08	2	pp17-089-011	18-Sep-2017	Pennate Diatom	131.4	Exclude
WQS08	2	pp17-089-011	18-Sep-2017	*Cladophora* sp.	469.4	ok
WQS08	2	pp17-089-011	18-Sep-2017	*Leptolyngbya* sp.	1,595.8	ok
WQS08	2	pp17-089-011	18-Sep-2017	*Pseudanabaena* sp.	1,735.6	ok
WQS08	3	pp17-089-012	18-Sep-2017	*Achnanthidium minutissimum*	3,526.5	ok
WQS08	3	pp17-089-012	18-Sep-2017	*Encyonema* sp.	197.1	ok
WQS08	3	pp17-089-012	18-Sep-2017	*Gomphonema* sp.	109.5	ok
WQS08	3	pp17-089-012	18-Sep-2017	*Eunotia* sp.	306.7	ok
WQS08	3	pp17-089-012	18-Sep-2017	*Fragilaria* sp.	1,401.8	ok
WQS08	3	pp17-089-012	18-Sep-2017	*Fragilaria ulna*	65.7	ok
WQS08	3	pp17-089-012	18-Sep-2017	*Hannaea arcus*	21.9	ok
WQS08	3	pp17-089-012	18-Sep-2017	*Navicula* sp.	219.0	ok
WQS08	3	pp17-089-012	18-Sep-2017	*Diatoma* sp.	43.8	ok
WQS08	3	pp17-089-012	18-Sep-2017	Pennate Diatom	219.0	Exclude
WQS08	3	pp17-089-012	18-Sep-2017	*Cladophora* sp.	525.7	ok
WQS08	3	pp17-089-012	18-Sep-2017	*Ulothrix* sp.	284.7	ok
WQS08	3	pp17-089-012	18-Sep-2017	*Leptolyngbya* sp.	1,226.6	ok
WQS08	3	pp17-089-012	18-Sep-2017	*Pseudanabaena* sp.	525.7	ok
WQS09	1	pp17-089-013	19-Sep-2017	*Achnanthidium minutissimum*	60,782.7	ok
WQS09	1	pp17-089-013	19-Sep-2017	*Encyonema* sp.	1,314.2	ok
WQS09	1	pp17-089-013	19-Sep-2017	*Gomphonema* sp.	657.1	ok
WQS09	1	pp17-089-013	19-Sep-2017	*Eunotia* sp.	657.1	ok
WQS09	1	pp17-089-013	19-Sep-2017	*Fragilaria* sp.	23,327.4	ok
WQS09	1	pp17-089-013	19-Sep-2017	*Fragilaria ulna*	657.1	ok
WQS09	1	pp17-089-013	19-Sep-2017	*Synedra* sp.	2,957.0	ok
WQS09	1	pp17-089-013	19-Sep-2017	*Navicula* sp.	1,314.2	ok
WQS09	1	pp17-089-013	19-Sep-2017	*Diatoma* sp.	1,314.2	ok
WQS09	1	pp17-089-013	19-Sep-2017	Pennate Diatom	2,957.0	Exclude
WQS09	1	pp17-089-013	19-Sep-2017	*Phormidium* sp.	1,314.2	ok
WQS09	1	pp17-089-013	19-Sep-2017	*Pseudanabaena* sp.	7,885.3	ok
WQS09	2	pp17-089-014	19-Sep-2017	*Achnanthidium minutissimum*	33,512.6	ok
WQS09	2	pp17-089-014	19-Sep-2017	*Cymbella* sp.	328.6	ok
WQS09	2	pp17-089-014	19-Sep-2017	*Encyonema* sp.	985.7	ok
WQS09	2	pp17-089-014	19-Sep-2017	*Gomphonema* sp.	2,957.0	ok
WQS09	2	pp17-089-014	19-Sep-2017	*Eunotia* sp.	1,971.3	ok
WQS09	2	pp17-089-014	19-Sep-2017	*Fragilaria* sp.	55,525.8	ok
WQS09	2	pp17-089-014	19-Sep-2017	*Fragilaria ulna*	657.1	ok
WQS09	2	pp17-089-014	19-Sep-2017	*Synedra* sp.	1,971.3	ok

Appendix 10-B. Stream Periphyton, Tenas Project, 2017

Site	Replicate	Lab Sample ID	Date	Taxon	Phylum	Class	Order	Family	Genus	Microscope Factor (cm^2)	Fields of View Counted	Subsample Volume (mL)	Units Counted	Number of Cells/Unit	Unit Density (cm^2)
WQS09	2	pp17-089-014	19-Sep-2017	*Navicula* sp.	Bacillariophyta	Bacillariophyceae	Naviculales	Naviculaceae	*Navicula*	328.56	8	0.1	2	1.0	657.1
WQS09	2	pp17-089-014	19-Sep-2017	*Diatoma* sp.	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Diatoma*	328.56	8	0.1	8	1.0	2,628.4
WQS09	2	pp17-089-014	19-Sep-2017	Pennate Diatom	Bacillariophyta	Bacillariophyceae				328.56	8	0.1	8	1.0	2,628.4
WQS09	2	pp17-089-014	19-Sep-2017	*Ulothrix* sp.	Chlorophyta	Ulvophyceae	Ulotrichales	Ulotrichaceae	*Ulothrix*	328.56	8	0.1	17	1.0	5,585.4
WQS09	2	pp17-089-014	19-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	328.56	8	0.1	1	5.0	328.6
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	328.56	8	0.1	88	1.0	28,912.9
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Didymosphenia geminata*	Bacillariophyta	Bacillariophyceae	Cymbellales	Cymbellaceae	*Didymosphenia*	328.56	8	0.1	1	1.0	328.6
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Encyonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Encyonema*	328.56	8	0.1	3	1.0	985.7
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	328.56	8	0.1	6	1.0	1,971.3
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Eunotia* sp.	Bacillariophyta	Bacillariophyceae	Eunotiales	Eunotiaceae	*Eunotia*	328.56	8	0.1	6	1.0	1,971.3
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	328.56	8	0.1	151	1.0	49,611.8
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Fragilaria ulna*	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	328.56	8	0.1	1	1.0	328.6
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Synedra* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Synedra*	328.56	8	0.1	9	1.0	2,957.0
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Navicula* sp.	Bacillariophyta	Bacillariophyceae	Naviculales	Naviculaceae	*Navicula*	328.56	8	0.1	3	1.0	985.7
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Diatoma* sp.	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Diatoma*	328.56	8	0.1	8	1.0	2,628.4
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Tabellaria fenestrata*	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Tabellaria*	328.56	8	0.1	1	1.0	328.6
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	Pennate Diatom	Bacillariophyta	Bacillariophyceae				328.56	8	0.1	10	1.0	3,285.6
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	328.56	8	0.1	1	10.0	328.6
WQS09	3	pp17-089-015	19-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	202.19	13	0.1	148	1.0	29,923.8
WQS09	3	pp17-089-015	19-Sep-2017	*Didymosphenia geminata*	Bacillariophyta	Bacillariophyceae	Cymbellales	Cymbellaceae	*Didymosphenia*	202.19	13	0.1	1	1.0	202.2
WQS09	3	pp17-089-015	19-Sep-2017	*Encyonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Encyonema*	202.19	13	0.1	4	1.0	808.8
WQS09	3	pp17-089-015	19-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	202.19	13	0.1	7	1.0	1,415.3
WQS09	3	pp17-089-015	19-Sep-2017	*Eunotia* sp.	Bacillariophyta	Bacillariophyceae	Eunotiales	Eunotiaceae	*Eunotia*	202.19	13	0.1	14	1.0	2,830.6
WQS09	3	pp17-089-015	19-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	202.19	13	0.1	122	1.0	24,666.9
WQS09	3	pp17-089-015	19-Sep-2017	*Fragilaria ulna*	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	202.19	13	0.1	4	1.0	808.8
WQS09	3	pp17-089-015	19-Sep-2017	*Synedra* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Synedra*	202.19	13	0.1	3	1.0	606.6
WQS09	3	pp17-089-015	19-Sep-2017	*Navicula* sp.	Bacillariophyta	Bacillariophyceae	Naviculales	Naviculaceae	*Navicula*	202.19	13	0.1	3	1.0	606.6
WQS09	3	pp17-089-015	19-Sep-2017	*Synedra* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Synedra*	202.19	13	0.1	3	1.0	606.6
WQS09	3	pp17-089-015	19-Sep-2017	*Navicula* sp.	Bacillariophyta	Bacillariophyceae	Naviculales	Naviculaceae	*Navicula*	202.19	13	0.1	3	1.0	606.6
WQS09	3	pp17-089-015	19-Sep-2017	*Diatoma* sp.	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Diatoma*	202.19	13	0.1	2	1.0	404.4
WQS09	3	pp17-089-015	19-Sep-2017	Pennate Diatom	Bacillariophyta	Bacillariophyceae				202.19	13	0.1	9	1.0	1,819.7
WQS09	3	pp17-089-015	19-Sep-2017	*Ulothrix* sp.	Chlorophyta	Ulvophyceae	Ulotrichales	Ulotrichaceae	*Ulothrix*	202.19	13	0.1	23	1.0	4,650.3
WQS09	3	pp17-089-015	19-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	202.19	13	0.1	6	11.0	1,213.1
WQS12	1	pp17-089-016	20-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	73.01	18	0.2	86	1.0	6,279.1
WQS12	1	pp17-089-016	20-Sep-2017	*Encyonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Encyonema*	73.01	18	0.2	10	1.0	730.1
WQS12	1	pp17-089-016	20-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	73.01	18	0.2	31	1.0	2,263.4
WQS12	1	pp17-089-016	20-Sep-2017	*Gomphonema truncatum*	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	73.01	18	0.2	2	1.0	146.0
WQS12	1	pp17-089-016	20-Sep-2017	*Eunotia* sp.	Bacillariophyta	Bacillariophyceae	Eunotiales	Eunotiaceae	*Eunotia*	73.01	18	0.2	6	1.0	438.1
WQS12	1	pp17-089-016	20-Sep-2017	*Fragilaria crotonensis*	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	73.01	18	0.2	6	1.0	438.1
WQS12	1	pp17-089-016	20-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	73.01	18	0.2	81	1.0	5,914.0
WQS12	1	pp17-089-016	20-Sep-2017	*Fragilaria ulna*	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	73.01	18	0.2	13	1.0	949.2
WQS12	1	pp17-089-016	20-Sep-2017	*Synedra* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Synedra*	73.01	18	0.2	16	1.0	1,168.2
WQS12	1	pp17-089-016	20-Sep-2017	*Brachysira* sp.	Bacillariophyta	Bacillariophyceae	Naviculales	Brachysiraceae	*Brachysira*	73.01	18	0.2	1	1.0	73.0
WQS12	1	pp17-089-016	20-Sep-2017	*Navicula* sp.	Bacillariophyta	Bacillariophyceae	Naviculales	Naviculaceae	*Navicula*	73.01	18	0.2	8	1.0	584.1
WQS12	1	pp17-089-016	20-Sep-2017	*Diatoma* sp.	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Diatoma*	73.01	18	0.2	28	1.0	2,044.3
WQS12	1	pp17-089-016	20-Sep-2017	*Tabellaria flocculosa*	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Tabellaria*	73.01	18	0.2	4	1.0	292.0
WQS12	1	pp17-089-016	20-Sep-2017	Pennate Diatom	Bacillariophyta	Bacillariophyceae				73.01	18	0.2	6	1.0	438.1
WQS12	1	pp17-089-016	20-Sep-2017	*Desmodesmus* sp.	Chlorophyta	Chlorophyceae	Sphaeropleales	Scenedesmaceae	*Desmodesmus*	73.01	18	0.2	2	1.0	146.0
WQS12	1	pp17-089-016	20-Sep-2017	*Phormidium* sp.	Cyanophyta	Cyanophyceae	Oscillatoriales	Oscillatoriaceae	*Phormidium*	73.01	18	0.2	16	6.0	1,168.2
WQS12	1	pp17-089-016	20-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	73.01	18	0.2	4	8.0	292.0
WQS12	1	pp17-089-016	20-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	73.01	18	0.2	6	8.3	438.1
WQS12	2	pp17-089-017	20-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	57.14	23	0.2	49	1.0	2,799.9
WQS12	2	pp17-089-017	20-Sep-2017	*Cymbella* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Cymbellaceae	*Cymbella*	57.14	23	0.2	2	1.0	114.3
WQS12	2	pp17-089-017	20-Sep-2017	*Encyonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Encyonema*	57.14	23	0.2	4	1.0	228.6
WQS12	2	pp17-089-017	20-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	57.14	23	0.2	38	1.0	2,171.3
WQS12	2	pp17-089-017	20-Sep-2017	*Eunotia* sp.	Bacillariophyta	Bacillariophyceae	Eunotiales	Eunotiaceae	*Eunotia*	57.14	23	0.2	9	1.0	514.3
WQS12	2	pp17-089-017	20-Sep-2017	*Fragilaria crotonensis*	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	57.14	23	0.2	4	1.0	228.6

Appendix 10-B. Stream Periphyton, Tenas Project, 2017

Site	Replicate	Lab Sample ID	Date	Taxon	Cell Density (cm^2)	Excluded Taxa (Density Only)
WQS09	2	pp17-089-014	19-Sep-2017	*Navicula* sp.	657.1	ok
WQS09	2	pp17-089-014	19-Sep-2017	*Diatoma* sp.	2,628.4	ok
WQS09	2	pp17-089-014	19-Sep-2017	Pennate Diatom	2,628.4	Exclude
WQS09	2	pp17-089-014	19-Sep-2017	*Ulothrix* sp.	5,585.4	ok
WQS09	2	pp17-089-014	19-Sep-2017	*Leptolyngbya* sp.	1,642.8	ok
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Achnanthidium minutissimum*	28,912.9	ok
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Didymosphenia geminata*	328.6	ok
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Encyonema* sp.	985.7	ok
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Gomphonema* sp.	1,971.3	ok
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Eunotia* sp.	1,971.3	ok
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Fragilaria* sp.	49,611.8	ok
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Fragilaria ulna*	328.6	ok
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Synedra* sp.	2,957.0	ok
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Navicula* sp.	985.7	ok
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Diatoma* sp.	2,628.4	ok
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Tabellaria fenestrata*	328.6	ok
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	Pennate Diatom	3,285.6	Exclude
WQS09-QA	2	pp17-089-014QA	19-Sep-2017	*Leptolyngbya* sp.	3,285.6	ok
WQS09	3	pp17-089-015	19-Sep-2017	*Achnanthidium minutissimum*	29,923.8	ok
WQS09	3	pp17-089-015	19-Sep-2017	*Didymosphenia geminata*	202.2	ok
WQS09	3	pp17-089-015	19-Sep-2017	*Encyonema* sp.	808.8	ok
WQS09	3	pp17-089-015	19-Sep-2017	*Gomphonema* sp.	1,415.3	ok
WQS09	3	pp17-089-015	19-Sep-2017	*Eunotia* sp.	2,830.6	ok
WQS09	3	pp17-089-015	19-Sep-2017	*Fragilaria* sp.	24,666.9	ok
WQS09	3	pp17-089-015	19-Sep-2017	*Fragilaria ulna*	808.8	ok
WQS09	3	pp17-089-015	19-Sep-2017	*Synedra* sp.	606.6	ok
WQS09	3	pp17-089-015	19-Sep-2017	*Navicula* sp.	606.6	ok
WQS09	3	pp17-089-015	19-Sep-2017	*Synedra* sp.	606.6	ok
WQS09	3	pp17-089-015	19-Sep-2017	*Navicula* sp.	606.6	ok
WQS09	3	pp17-089-015	19-Sep-2017	*Diatoma* sp.	404.4	ok
WQS09	3	pp17-089-015	19-Sep-2017	Pennate Diatom	1,819.7	Exclude
WQS09	3	pp17-089-015	19-Sep-2017	*Ulothrix* sp.	4,650.3	ok
WQS09	3	pp17-089-015	19-Sep-2017	*Pseudanabaena* sp.	13,344.4	ok
WQS12	1	pp17-089-016	20-Sep-2017	*Achnanthidium minutissimum*	6,279.1	ok
WQS12	1	pp17-089-016	20-Sep-2017	*Encyonema* sp.	730.1	ok
WQS12	1	pp17-089-016	20-Sep-2017	*Gomphonema* sp.	2,263.4	ok
WQS12	1	pp17-089-016	20-Sep-2017	*Gomphonema truncatum*	146.0	ok
WQS12	1	pp17-089-016	20-Sep-2017	*Eunotia* sp.	438.1	ok
WQS12	1	pp17-089-016	20-Sep-2017	*Fragilaria crotonensis*	438.1	ok
WQS12	1	pp17-089-016	20-Sep-2017	*Fragilaria* sp.	5,914.0	ok
WQS12	1	pp17-089-016	20-Sep-2017	*Fragilaria ulna*	949.2	ok
WQS12	1	pp17-089-016	20-Sep-2017	*Synedra* sp.	1,168.2	ok
WQS12	1	pp17-089-016	20-Sep-2017	*Brachysira* sp.	73.0	ok
WQS12	1	pp17-089-016	20-Sep-2017	*Navicula* sp.	584.1	ok
WQS12	1	pp17-089-016	20-Sep-2017	*Diatoma* sp.	2,044.3	ok
WQS12	1	pp17-089-016	20-Sep-2017	*Tabellaria flocculosa*	292.0	ok
WQS12	1	pp17-089-016	20-Sep-2017	Pennate Diatom	438.1	Exclude
WQS12	1	pp17-089-016	20-Sep-2017	*Desmodesmus* sp.	146.0	ok
WQS12	1	pp17-089-016	20-Sep-2017	*Phormidium* sp.	7,009.2	ok
WQS12	1	pp17-089-016	20-Sep-2017	*Leptolyngbya* sp.	2,336.4	ok
WQS12	1	pp17-089-016	20-Sep-2017	*Pseudanabaena* sp.	3,614.1	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Achnanthidium minutissimum*	2,799.9	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Cymbella* sp.	114.3	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Encyonema* sp.	228.6	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Gomphonema* sp.	2,171.3	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Eunotia* sp.	514.3	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Fragilaria crotonensis*	228.6	ok

Appendix 10-B. Stream Periphyton, Tenas Project, 2017

Site	Replicate	Lab Sample ID	Date	Taxon	Phylum	Class	Order	Family	Genus	Microscope Factor (cm^2)	Fields of View Counted	Subsample Volume (mL)	Units Counted	Number of Cells/Unit	Unit Density (cm^2)
WQS12	2	pp17-089-017	20-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	57.14	23	0.2	96	1.0	5,485.4
WQS12	2	pp17-089-017	20-Sep-2017	*Fragilaria ulna*	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	57.14	23	0.2	9	1.0	514.3
WQS12	2	pp17-089-017	20-Sep-2017	*Synedra* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Synedra*	57.14	23	0.2	5	1.0	285.7
WQS12	2	pp17-089-017	20-Sep-2017	*Navicula* sp.	Bacillariophyta	Bacillariophyceae	Naviculales	Naviculaceae	*Navicula*	57.14	23	0.2	2	1.0	114.3
WQS12	2	pp17-089-017	20-Sep-2017	*Diatoma* sp.	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Diatoma*	57.14	23	0.2	39	1.0	2,228.5
WQS12	2	pp17-089-017	20-Sep-2017	*Tabellaria flocculosa*	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Tabellaria*	57.14	23	0.2	9	1.0	514.3
WQS12	2	pp17-089-017	20-Sep-2017	Pennate Diatom	Bacillariophyta	Bacillariophyceae				57.14	23	0.2	12	1.0	685.7
WQS12	2	pp17-089-017	20-Sep-2017	*Closterium* sp.	Charophyta	Conjugatophyceae (Zygnematophyceae)	Desmidiales	Closteriaceae	*Closterium*	57.14	23	0.2	1	1.0	57.1
WQS12	2	pp17-089-017	20-Sep-2017	*Cosmarium* sp.1	Charophyta	Conjugatophyceae (Zygnematophyceae)	Desmidiales	Desmidiacea	*Cosmarium*	57.14	23	0.2	2	1.0	114.3
WQS12	2	pp17-089-017	20-Sep-2017	*Cosmarium* sp.2	Charophyta	Conjugatophyceae (Zygnematophyceae)	Desmidiales	Desmidiacea	*Cosmarium*	57.14	23	0.2	1	1.0	57.1
WQS12	2	pp17-089-017	20-Sep-2017	*Actinotaenium* sp.	Charophyta	Conjugatophyceae (Zygnematophyceae)	Desmidiales	Desmidiaceae	*Actinotaenium*	57.14	23	0.2	1	1.0	57.1
WQS12	2	pp17-089-017	20-Sep-2017	*Ulothrix* sp.	Chlorophyta	Ulvophyceae	Ulotrichales	Ulotrichaceae	*Ulothrix*	57.14	23	0.2	9	1.0	514.3
WQS12	2	pp17-089-017	20-Sep-2017	*Phormidium* sp.	Cyanophyta	Cyanophyceae	Oscillatoriales	Oscillatoriaceae	*Phormidium*	57.14	23	0.2	4	16.0	228.6
WQS12	2	pp17-089-017	20-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	57.14	23	0.2	1	6.0	57.1
WQS12	2	pp17-089-017	20-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	57.14	23	0.2	5	4.0	285.7
WQS12	3	pp17-089-018	20-Sep-2017	*Nitzschia* sp.	Bacillariophyta	Bacillariophyceae	Bacillariales	Bacillariacea	*Nitzschia*	57.14	23	0.2	2	1.0	114.3
WQS12	3	pp17-089-018	20-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	57.14	23	0.2	44	1.0	2,514.2
WQS12	3	pp17-089-018	20-Sep-2017	*Cymbella* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Cymbellaceae	*Cymbella*	57.14	23	0.2	2	1.0	114.3
WQS12	3	pp17-089-018	20-Sep-2017	*Encyonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Encyonema*	57.14	23	0.2	8	1.0	457.1
WQS12	3	pp17-089-018	20-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	57.14	23	0.2	31	1.0	1,771.3
WQS12	3	pp17-089-018	20-Sep-2017	*Eunotia* sp.	Bacillariophyta	Bacillariophyceae	Eunotiales	Eunotiaceae	*Eunotia*	57.14	23	0.2	12	1.0	685.7
WQS12	3	pp17-089-018	20-Sep-2017	*Fragilaria crotonensis*	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	57.14	23	0.2	19	1.0	1,085.7
WQS12	3	pp17-089-018	20-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	57.14	23	0.2	85	1.0	4,856.9
WQS12	3	pp17-089-018	20-Sep-2017	*Fragilaria ulna*	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	57.14	23	0.2	5	1.0	285.7
WQS12	3	pp17-089-018	20-Sep-2017	*Synedra* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Synedra*	57.14	23	0.2	16	1.0	914.2
WQS12	3	pp17-089-018	20-Sep-2017	*Brachysira* sp.	Bacillariophyta	Bacillariophyceae	Naviculales	Brachysiraceae	*Brachysira*	57.14	23	0.2	1	1.0	57.1
WQS12	3	pp17-089-018	20-Sep-2017	*Navicula* cf. *ignota*	Bacillariophyta	Bacillariophyceae	Naviculales	Naviculaceae	*Navicula*	57.14	23	0.2	1	1.0	57.1
WQS12	3	pp17-089-018	20-Sep-2017	*Navicula* sp.	Bacillariophyta	Bacillariophyceae	Naviculales	Naviculaceae	*Navicula*	57.14	23	0.2	4	1.0	228.6
WQS12	3	pp17-089-018	20-Sep-2017	*Diatoma* sp.	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Diatoma*	57.14	23	0.2	56	1.0	3,199.8
WQS12	3	pp17-089-018	20-Sep-2017	*Tabellaria fenestrata*	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Tabellaria*	57.14	23	0.2	11	1.0	628.5
WQS12	3	pp17-089-018	20-Sep-2017	Pennate Diatom	Bacillariophyta	Bacillariophyceae				57.14	23	0.2	12	1.0	685.7
WQS12	3	pp17-089-018	20-Sep-2017	*Cosmarium* sp.1	Charophyta	Conjugatophyceae (Zygnematophyceae)	Desmidiales	Desmidiacea	*Cosmarium*	57.14	23	0.2	5	1.0	285.7
WQS12	3	pp17-089-018	20-Sep-2017	*Phormidium* sp.	Cyanophyta	Cyanophyceae	Oscillatoriales	Oscillatoriaceae	*Phormidium*	57.14	23	0.2	11	10.0	628.5
WQS12	3	pp17-089-018	20-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	57.14	23	0.2	1	6.0	57.1
WQS12	3	pp17-089-018	20-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	57.14	23	0.2	5	5.0	285.7
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Nitzschia* sp.	Bacillariophyta	Bacillariophyceae	Bacillariales	Bacillariacea	*Nitzschia*	57.14	23	0.2	2	1.0	114.3
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Achnanthidium minutissimum*	Bacillariophyta	Bacillariophyceae	Cocconeidales	Achnanthidiaceae	*Achnanthidium*	57.14	23	0.2	49	1.0	2,799.9
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Cymbella* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Cymbellaceae	*Cymbella*	57.14	23	0.2	5	1.0	285.7
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Encyonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Encyonema*	57.14	23	0.2	8	1.0	457.1
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Gomphonema* sp.	Bacillariophyta	Bacillariophyceae	Cymbellales	Gomphonemataceae	*Gomphonema*	57.14	23	0.2	33	1.0	1,885.6
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Eunotia* sp.	Bacillariophyta	Bacillariophyceae	Eunotiales	Eunotiaceae	*Eunotia*	57.14	23	0.2	10	1.0	571.4
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Fragilaria crotonensis*	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	57.14	23	0.2	10	1.0	571.4
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Fragilaria* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	57.14	23	0.2	83	1.0	4,742.6
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Fragilaria ulna*	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Fragilaria*	57.14	23	0.2	3	1.0	171.4
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Synedra* sp.	Bacillariophyta	Bacillariophyceae	Fragilariales	Fragilariaceae	*Synedra*	57.14	23	0.2	14	1.0	800.0
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Navicula* sp.	Bacillariophyta	Bacillariophyceae	Naviculales	Naviculaceae	*Navicula*	57.14	23	0.2	5	1.0	285.7
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Diatoma* sp.	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Diatoma*	57.14	23	0.2	55	1.0	3,142.7
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Tabellaria flocculosa*	Bacillariophyta	Bacillariophyceae	Tabellariales	Tabellariaceae	*Tabellaria*	57.14	23	0.2	1	1.0	57.1
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	Pennate Diatom	Bacillariophyta	Bacillariophyceae				57.14	23	0.2	9	1.0	514.3
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Cosmarium* sp.1	Charophyta	Conjugatophyceae (Zygnematophyceae)	Desmidiales	Desmidiacea	*Cosmarium*	57.14	23	0.2	3	1.0	171.4
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Cosmarium* sp.2	Charophyta	Conjugatophyceae (Zygnematophyceae)	Desmidiales	Desmidiacea	*Cosmarium*	57.14	23	0.2	1	1.0	57.1
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Leptolyngbya* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Leptolyngbyaceae	*Leptolyngbya*	57.14	23	0.2	1	10.0	57.1
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Phormidium* sp.	Cyanophyta	Cyanophyceae	Oscillatoriales	Oscillatoriaceae	*Phormidium*	57.14	23	0.2	5	14.0	285.7
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Pseudanabaena* sp.	Cyanophyta	Cyanophyceae	Synechococcales	Pseudanabaenacea	*Pseudanabaena*	57.14	23	0.2	2	8.0	114.3

Appendix 10-B. Stream Periphyton, Tenas Project, 2017

Site	Replicate	Lab Sample ID	Date	Taxon	Cell Density (cm^2)	Excluded Taxa (Density Only)
WQS12	2	pp17-089-017	20-Sep-2017	*Fragilaria* sp.	5,485.4	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Fragilaria ulna*	514.3	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Synedra* sp.	285.7	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Navicula* sp.	114.3	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Diatoma* sp.	2,228.5	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Tabellaria flocculosa*	514.3	ok
WQS12	2	pp17-089-017	20-Sep-2017	Pennate Diatom	685.7	Exclude
WQS12	2	pp17-089-017	20-Sep-2017	*Closterium* sp.	57.1	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Cosmarium* sp.1	114.3	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Cosmarium* sp.2	57.1	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Actinotaenium* sp.	57.1	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Ulothrix* sp.	514.3	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Phormidium* sp.	3,657.0	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Leptolyngbya* sp.	342.8	ok
WQS12	2	pp17-089-017	20-Sep-2017	*Pseudanabaena* sp.	1,142.8	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Nitzschia* sp.	114.3	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Achnanthidium minutissimum*	2,514.2	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Cymbella* sp.	114.3	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Encyonema* sp.	457.1	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Gomphonema* sp.	1,771.3	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Eunotia* sp.	685.7	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Fragilaria crotonensis*	1,085.7	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Fragilaria* sp.	4,856.9	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Fragilaria ulna*	285.7	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Synedra* sp.	914.2	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Brachysira* sp.	57.1	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Navicula* cf. *ignota*	57.1	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Navicula* sp.	228.6	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Diatoma* sp.	3,199.8	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Tabellaria fenestrata*	628.5	ok
WQS12	3	pp17-089-018	20-Sep-2017	Pennate Diatom	685.7	Exclude
WQS12	3	pp17-089-018	20-Sep-2017	*Cosmarium* sp.1	285.7	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Phormidium* sp.	6,285.4	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Leptolyngbya* sp.	342.8	ok
WQS12	3	pp17-089-018	20-Sep-2017	*Pseudanabaena* sp.	1,428.5	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Nitzschia* sp.	114.3	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Achnanthidium minutissimum*	2,799.9	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Cymbella* sp.	285.7	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Encyonema* sp.	457.1	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Gomphonema* sp.	1,885.6	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Eunotia* sp.	571.4	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Fragilaria crotonensis*	571.4	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Fragilaria* sp.	4,742.6	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Fragilaria ulna*	171.4	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Synedra* sp.	800.0	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Navicula* sp.	285.7	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Diatoma* sp.	3,142.7	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Tabellaria flocculosa*	57.1	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	Pennate Diatom	514.3	Exclude
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Cosmarium* sp.1	171.4	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Cosmarium* sp.2	57.1	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Leptolyngbya* sp.	571.4	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Phormidium* sp.	3,999.8	ok
WQS12-QA	3	pp17-089-018QA	20-Sep-2017	*Pseudanabaena* sp.	914.2	ok

2017 samples were analyzed by Biologica.

Appendix 10-C

Stream Periphyton QA/QC, Tenas Project, 2017

Appendix 10-C. Stream Periphyton QA/QC, Tenas Project, 2017

Client Sample #	Biologica Sample #	Original Density	QA Density	Percent Agreement
WQS09_Rep 2	pp17-089-014	98,238	111,052	**86.96**
WQS12_Rep 3	pp17-089-018	22,113	25,999	**82.43**

*Percent Agreement: (100- [(difference in abundance between samples) / total abundance of original sample)] *100)%*

Appendix 10-D

Stream Benthic Invertebrates, Tenas Project, 2017

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Lab Sample ID	Replicate	Date	Taxon	Phylum	Class	Order	Family	Genus	Adult	Juvenile	Larvae	Nymph	Pupa	Deutonymph	Raw Count	Split
WQS01	fb17-089-001	1	20-Sep-2017	*Hygrobates* sp.	Arthropoda	Arachnida	Trombidiformes	Hygrobatidae	*Hygrobates*	2						2	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Lebertia* sp.	Arthropoda	Arachnida	Trombidiformes	Lebertiidae	*Lebertia*	1						1	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Sperchon* sp.	Arthropoda	Arachnida	Trombidiformes	Sperchontidae	*Sperchon*	2						2	17/100
WQS01	fb17-089-001	1	20-Sep-2017	Collembola indet.	Arthropoda	Collembola	Collembola			1						1	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Pericoma/Telmatoscopus* sp.	Arthropoda	Insecta	Diptera	Psychodidae	*Pericoma/Telmatoscopus*			1				1	17/100
WQS01	fb17-089-001	1	20-Sep-2017	Simuliidae indet.	Arthropoda	Insecta	Diptera	Simuliidae				1				1	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Brillia* sp.	Arthropoda	Insecta	Diptera	Chironomidae	*Brillia*			2				2	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Tvetenia* sp.	Arthropoda	Insecta	Diptera	Chironomidae	*Tvetenia*			5				5	17/100
WQS01	fb17-089-001	1	20-Sep-2017	Chironomidae indet.	Arthropoda	Insecta	Diptera	Chironomidae				3		3		6	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Ameletus* sp.	Arthropoda	Insecta	Ephemeroptera	Ameletidae	*Ameletus*				4			4	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Baetis* sp.	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*				36			36	17/100
WQS01	fb17-089-001	1	20-Sep-2017	Baetidae indet.	Arthropoda	Insecta	Ephemeroptera	Baetidae					10			10	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Drunella doddsii*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*				18			18	17/100
WQS01	fb17-089-001	1	20-Sep-2017	Ephemerellidae indet.	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae					15			15	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Cinygmula* sp.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Cinygmula*				12			12	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Epeorus deceptivus*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*				3			3	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Epeorus* sp.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*				2			2	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Rhithrogena* sp.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Rhithrogena*				19			19	17/100
WQS01	fb17-089-001	1	20-Sep-2017	Heptageniidae indet.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae					50			50	17/100
WQS01	fb17-089-001	1	20-Sep-2017	Capniidae indet.	Arthropoda	Insecta	Plecoptera	Capniidae					6			6	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Sweltsa* sp.	Arthropoda	Insecta	Plecoptera	Chloroperlidae	*Sweltsa*				1			1	17/100
WQS01	fb17-089-001	1	20-Sep-2017	Chloroperlidae indet.	Arthropoda	Insecta	Plecoptera	Chloroperlidae					4			4	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Zapada cinctipes*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				3			3	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Zapada columbiana*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				13			13	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Zapada oregonensis* group	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				5			5	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Zapada* sp.	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				35			35	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Megarcys* sp.	Arthropoda	Insecta	Plecoptera	Perlodidae	*Megarcys*				4			4	17/100
WQS01	fb17-089-001	1	20-Sep-2017	Perlodidae indet.	Arthropoda	Insecta	Plecoptera	Perlodidae					10			10	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Taenionema* sp.	Arthropoda	Insecta	Plecoptera	Taeniopterygidae	*Taenionema*				6			6	17/100
WQS01	fb17-089-001	1	20-Sep-2017	Plecoptera indet.	Arthropoda	Insecta	Plecoptera						19			19	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Parapsyche* sp.	Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Parapsyche*			1				1	17/100
WQS01	fb17-089-001	1	20-Sep-2017	Hydropsychidae indet.	Arthropoda	Insecta	Trichoptera	Hydropsychidae				8				8	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Rhyacophila atrata* complex	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			1				1	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Rhyacophila betteni* group	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			2				2	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Rhyacophila brunnea/vemna* group	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			1				1	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Rhyacophila hyalinata* group	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			1				1	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Rhyacophila* sp.	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			7				7	17/100
WQS01	fb17-089-001	1	20-Sep-2017	*Rhyacophila vofixa* group	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			2				2	17/100
WQS01	fb17-089-001	1	20-Sep-2017	Trichoptera indet.	Arthropoda	Insecta	Trichoptera					2				2	17/100
WQS02	fb17-089-002	1	19-Sep-2017	*Hygrobates* sp.	Arthropoda	Arachnida	Trombidiformes	Hygrobatidae	*Hygrobates*	1						1	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Sperchon* sp.	Arthropoda	Arachnida	Trombidiformes	Sperchontidae	*Sperchon*	1						1	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Pericoma/Telmatoscopus* sp.	Arthropoda	Insecta	Diptera	Psychodidae	*Pericoma/Telmatoscopus*			2				2	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Brillia* sp.	Arthropoda	Insecta	Diptera	Chironomidae	*Brillia*			1				1	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Tvetenia* sp.	Arthropoda	Insecta	Diptera	Chironomidae	*Tvetenia*			2				2	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Ameletus* sp.	Arthropoda	Insecta	Ephemeroptera	Ameletidae	*Ameletus*				3			3	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Baetis* sp.	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*				8			8	6/100
WQS02	fb17-089-002	1	19-Sep-2017	Baetidae indet.	Arthropoda	Insecta	Ephemeroptera	Baetidae					10			10	6/100

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Total Abundance	Taxa Exclude Completely	Taxa Damaged Exclude	Lab Comments
WQS01	11.8	ok	ok	-
WQS01	5.9	ok	ok	-
WQS01	11.8	ok	ok	-
WQS01	5.9	Exclude	Exclude	-
WQS01	5.9	ok	ok	-
WQS01	5.9	ok	ok	-
WQS01	11.8	ok	ok	-
WQS01	29.4	ok	ok	-
WQS01	35.3	ok	ok	-
WQS01	23.5	ok	Exclude	Damaged
WQS01	211.8	ok	ok	-
WQS01	58.8	ok	Exclude	Damaged/immature
WQS01	105.9	ok	ok	-
WQS01	88.2	ok	ok	-
WQS01	70.6	ok	ok	-
WQS01	17.6	ok	ok	-
WQS01	11.8	ok	Exclude	Damaged
WQS01	111.8	ok	ok	-
WQS01	294.1	ok	Exclude	Damaged/immature
WQS01	35.3	ok	ok	-
WQS01	5.9	ok	ok	-
WQS01	23.5	ok	ok	-
WQS01	17.6	ok	ok	-
WQS01	23.5	ok	ok	-
WQS01	17.6	ok	ok	-
WQS01	76.5	ok	ok	-
WQS01	29.4	ok	ok	-
WQS01	205.9	ok	ok	-
WQS01	23.5	ok	ok	-
WQS01	58.8	ok	Exclude	Damaged/immature
WQS01	35.3	ok	ok	-
WQS01	111.8	ok	Exclude	-
WQS01	5.9	ok	ok	-
WQS01	47.1	ok	Exclude	Damaged/immature
WQS01	5.9	ok	ok	-
WQS01	11.8	ok	ok	-
WQS01	5.9	ok	ok	-
WQS01	5.9	ok	ok	-
WQS01	41.2	ok	Exclude	Damaged/immature
WQS01	11.8	ok	ok	-
WQS01	11.8	ok	Exclude	Damaged/immature
WQS02	16.7	ok	ok	-
WQS02	16.7	ok	ok	-
WQS02	33.3	ok	ok	-
WQS02	16.7	ok	ok	-
WQS02	33.3	ok	ok	-
WQS02	50.0	ok	ok	-
WQS02	133.3	ok	ok	-
WQS02	166.7	ok	ok	-

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Lab Sample ID	Replicate	Date	Taxon	Phylum	Class	Order	Family	Genus	Adult	Juvenile	Larvae	Nymph	Pupa	Deutonymph	Raw Count	Split
WQS02	fb17-089-002	1	19-Sep-2017	*Drunella doddsii*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*				28			28	6/100
WQS02	fb17-089-002	1	19-Sep-2017	Ephemerellidae indet.	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae					23			23	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Cinygmula* sp.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Cinygmula*				3			3	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Epeorus grandis* group	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*				7			7	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Epeorus* sp.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*				2			2	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Rhithrogena* sp.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Rhithrogena*				17			17	6/100
WQS02	fb17-089-002	1	19-Sep-2017	Heptageniidae indet.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae					70			70	6/100
WQS02	fb17-089-002	1	19-Sep-2017	Ephemeroptera indet.	Arthropoda	Insecta	Ephemeroptera						3			3	6/100
WQS02	fb17-089-002	1	19-Sep-2017	Capniidae indet.	Arthropoda	Insecta	Plecoptera	Capniidae					3			3	6/100
WQS02	fb17-089-002	1	19-Sep-2017	Chloroperlidae indet.	Arthropoda	Insecta	Plecoptera	Chloroperlidae					1			1	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Zapada cinctipes*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				11			11	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Zapada columbiana*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				7			7	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Zapada oregonensis* group	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				2			2	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Zapada* sp.	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				40			40	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Hesperoperla* sp.	Arthropoda	Insecta	Plecoptera	Perlidae	*Hesperoperla*				1			1	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Megarcys* sp.	Arthropoda	Insecta	Plecoptera	Perlodidae	*Megarcys*				1			1	6/100
WQS02	fb17-089-002	1	19-Sep-2017	Perlodidae indet.	Arthropoda	Insecta	Plecoptera	Perlodidae					9			9	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Taenionema* sp.	Arthropoda	Insecta	Plecoptera	Taeniopterygidae	*Taenionema*				43			43	6/100
WQS02	fb17-089-002	1	19-Sep-2017	Plecoptera indet.	Arthropoda	Insecta	Plecoptera						9			9	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Parapsyche* sp.	Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Parapsyche*			1				1	6/100
WQS02	fb17-089-002	1	19-Sep-2017	Hydropsychidae indet.	Arthropoda	Insecta	Trichoptera	Hydropsychidae				2				2	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Rhyacophila atrata* complex	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			1				1	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Rhyacophila betteni* group	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			2				2	6/100
WQS02	fb17-089-002	1	19-Sep-2017	*Rhyacophila vofixa* group	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			5				5	6/100
WQS02	fb17-089-002	1	19-Sep-2017	Trichoptera indet.	Arthropoda	Insecta	Trichoptera					12				12	6/100
WQS05	fb17-089-003	1	18-Sep-2017	*Hygrobates* sp.	Arthropoda	Arachnida	Trombidiformes	Hygrobatidae	*Hygrobates*	1						1	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Oreoleptis* sp.	Arthropoda	Insecta	Diptera	Oreoleptidae	*Oreoleptis*			1				1	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Simulium* sp.	Arthropoda	Insecta	Diptera	Simuliidae	*Simulium*			22				22	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Brillia* sp.	Arthropoda	Insecta	Diptera	Chironomidae	*Brillia*			2				2	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Tvetenia* sp.	Arthropoda	Insecta	Diptera	Chironomidae	*Tvetenia*			1				1	22/100
WQS05	fb17-089-003	1	18-Sep-2017	Chironomini indet.	Arthropoda	Insecta	Diptera	Chironomidae				1				1	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Ameletus* sp.	Arthropoda	Insecta	Ephemeroptera	Ameletidae	*Ameletus*				6			6	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Acentrella* sp.	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Acentrella*				1			1	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Baetis fuscatus* group	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*				6			6	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Baetis* sp.	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*				44			44	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Baetis vernus* complex	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*				54			54	22/100
WQS05	fb17-089-003	1	18-Sep-2017	Baetidae indet.	Arthropoda	Insecta	Ephemeroptera	Baetidae					19			19	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Drunella doddsii*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*				8			8	22/100
WQS05	fb17-089-003	1	18-Sep-2017	Ephemerellidae indet.	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae					7			7	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Epeorus deceptivus*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*				4			4	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Epeorus grandis* group	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*				6			6	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Epeorus* sp.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*				5			5	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Rhithrogena* sp.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Rhithrogena*				19			19	22/100
WQS05	fb17-089-003	1	18-Sep-2017	Heptageniidae indet.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae					14			14	22/100
WQS05	fb17-089-003	1	18-Sep-2017	Capniidae indet.	Arthropoda	Insecta	Plecoptera	Capniidae					15			15	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Paraperla* sp.	Arthropoda	Insecta	Plecoptera	Chloroperlidae	*Paraperla*				11			11	22/100
WQS05	fb17-089-003	1	18-Sep-2017	Leuctridae indet.	Arthropoda	Insecta	Plecoptera	Leuctridae					1			1	22/100

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Total Abundance	Taxa Exclude Completely	Taxa Damaged Exclude	Lab Comments
WQS02	466.7	ok	ok	-
WQS02	383.3	ok	ok	-
WQS02	50.0	ok	ok	-
WQS02	116.7	ok	ok	-
WQS02	33.3	ok	ok	-
WQS02	283.3	ok	ok	-
WQS02	1,166.7	ok	ok	-
WQS02	50.0	ok	Exclude	Damaged
WQS02	50.0	ok	ok	-
WQS02	16.7	ok	ok	-
WQS02	183.3	ok	ok	-
WQS02	116.7	ok	ok	-
WQS02	33.3	ok	ok	-
WQS02	666.7	ok	ok	-
WQS02	16.7	ok	ok	-
WQS02	16.7	ok	ok	-
WQS02	150.0	ok	ok	-
WQS02	716.7	ok	ok	-
WQS02	150.0	ok	Exclude	-
WQS02	16.7	ok	ok	-
WQS02	33.3	ok	ok	-
WQS02	16.7	ok	ok	-
WQS02	33.3	ok	ok	-
WQS02	16.7	ok	ok	-
WQS02	33.3	ok	ok	-
WQS02	83.3	ok	ok	-
WQS02	200.0	ok	Exclude	-
WQS05	4.5	ok	ok	-
WQS05	4.5	ok	ok	-
WQS05	100.0	ok	ok	-
WQS05	9.1	ok	ok	-
WQS05	4.5	ok	ok	-
WQS05	4.5	ok	ok	-
WQS05	27.3	ok	ok	-
WQS05	4.5	ok	ok	-
WQS05	27.3	ok	ok	-
WQS05	200.0	ok	ok	-
WQS05	245.5	ok	ok	-
WQS05	86.4	ok	Exclude	Damaged/immature
WQS05	36.4	ok	ok	-
WQS05	31.8	ok	ok	-
WQS05	18.2	ok	ok	-
WQS05	27.3	ok	ok	-
WQS05	22.7	ok	Exclude	Damaged
WQS05	86.4	ok	ok	-
WQS05	63.6	ok	Exclude	Damaged/immature
WQS05	68.2	ok	ok	-
WQS05	50.0	ok	ok	-
WQS05	4.5	ok	Exclude	Damaged/immature

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Lab Sample ID	Replicate	Date	Taxon	Phylum	Class	Order	Family	Genus	Adult	Juvenile	Larvae	Nymph	Pupa	Deutonymph	Raw Count	Split
WQS05	fb17-089-003	1	18-Sep-2017	*Zapada cinctipes*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				7			7	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Zapada columbiana*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				1			1	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Zapada* sp.	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				7			7	22/100
WQS05	fb17-089-003	1	18-Sep-2017	Perlodidae indet.	Arthropoda	Insecta	Plecoptera	Perlodidae					1			1	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Taenionema* sp.	Arthropoda	Insecta	Plecoptera	Taeniopterygidae	*Taenionema*				24			24	22/100
WQS05	fb17-089-003	1	18-Sep-2017	Plecoptera indet.	Arthropoda	Insecta	Plecoptera						4			4	22/100
WQS05	fb17-089-003	1	18-Sep-2017	Hydropsychidae indet.	Arthropoda	Insecta	Trichoptera	Hydropsychidae				5				5	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Rhyacophila atrata* complex	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			8				8	22/100
WQS05	fb17-089-003	1	18-Sep-2017	*Rhyacophila* sp.	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			2				2	22/100
WQS05	fb17-089-003	1	18-Sep-2017	Trichoptera indet.	Arthropoda	Insecta	Trichoptera					3				3	22/100
WQS08	fb17-089-004	1	18-Sep-2017	*Aturus* sp.	Arthropoda	Arachnida	Trombidiformes	Aturidae	*Aturus*	1						1	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Hygrobates* sp.	Arthropoda	Arachnida	Trombidiformes	Hygrobatidae	*Hygrobates*	2						2	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Lebertia* sp.	Arthropoda	Arachnida	Trombidiformes	Lebertiidae	*Lebertia*	12						12	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Sperchon* sp.	Arthropoda	Arachnida	Trombidiformes	Sperchontidae	*Sperchon*	5						5	11/100
WQS08	fb17-089-004	1	18-Sep-2017	Acari indet.	Arthropoda	Arachnida									2	2	11/100
WQS08	fb17-089-004	1	18-Sep-2017	Amphipoda indet.	Arthropoda	Malacostraca	Amphipoda				1					1	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Clinocera* sp.	Arthropoda	Insecta	Diptera	Empididae	*Clinocera*			1				1	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Simulium* sp.	Arthropoda	Insecta	Diptera	Simuliidae	*Simulium*			5				5	11/100
WQS08	fb17-089-004	1	18-Sep-2017	Simuliidae indet.	Arthropoda	Insecta	Diptera	Simuliidae				15				15	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Cricotopus/Orthocladius* sp. complex	Arthropoda	Insecta	Diptera	Chironomidae	*Cricotopus/Orthocladius*			14				14	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Rheotanytarsus* sp.	Arthropoda	Insecta	Diptera	Chironomidae	*Rheotanytarsus*			1				1	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Tvetenia* sp.	Arthropoda	Insecta	Diptera	Chironomidae	*Tvetenia*			53				53	11/100
WQS08	fb17-089-004	1	18-Sep-2017	Chironomidae indet.	Arthropoda	Insecta	Diptera	Chironomidae				25		3		28	11/100
WQS08	fb17-089-004	1	18-Sep-2017	Orthocladiinae indet.	Arthropoda	Insecta	Diptera	Chironomidae				1				1	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Ameletus* sp.	Arthropoda	Insecta	Ephemeroptera	Ameletidae	*Ameletus*				1			1	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Baetis fuscatus* group	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*				2			2	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Baetis* sp.	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*				5			5	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Baetis vernus* complex	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*				17			17	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Serratella* sp.	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Serratella*				1			1	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Drunella doddsii*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*				19			19	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Drunella grandis/spinifera* group	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*				1			1	11/100
WQS08	fb17-089-004	1	18-Sep-2017	Ephemerellidae indet.	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae					16			16	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Epeorus deceptivus*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*				8			8	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Epeorus* sp.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*				1			1	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Rhithrogena* sp.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Rhithrogena*				9			9	11/100
WQS08	fb17-089-004	1	18-Sep-2017	Heptageniidae indet.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae					27			27	11/100
WQS08	fb17-089-004	1	18-Sep-2017	Ephemeroptera indet.	Arthropoda	Insecta	Ephemeroptera						3			3	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Stylodrilus heringianus*	Annelida	Clitellata	Lumbriculida	Lumbriculidae	*Stylodrilus*	1						1	11/100
WQS08	fb17-089-004	1	18-Sep-2017	Capniidae indet.	Arthropoda	Insecta	Plecoptera	Capniidae					20			20	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Paraperla* sp.	Arthropoda	Insecta	Plecoptera	Chloroperlidae	*Paraperla*				3			3	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Sweltsa* sp.	Arthropoda	Insecta	Plecoptera	Chloroperlidae	*Sweltsa*				1			1	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Zapada columbiana*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				3			3	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Zapada oregonensis* group	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				1			1	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Zapada* sp.	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				4			4	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Megarcys* sp.	Arthropoda	Insecta	Plecoptera	Perlodidae	*Megarcys*				5			5	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Skwala* sp.	Arthropoda	Insecta	Plecoptera	Perlodidae	*Skwala*				2			2	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Taenionema* sp.	Arthropoda	Insecta	Plecoptera	Taeniopterygidae	*Taenionema*				14			14	11/100

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Total Abundance	Taxa Exclude Completely	Taxa Damaged Exclude	Lab Comments
WQS05	31.8	ok	ok	-
WQS05	4.5	ok	ok	-
WQS05	31.8	ok	ok	-
WQS05	4.5	ok	ok	-
WQS05	109.1	ok	ok	-
WQS05	18.2	ok	Exclude	Damaged/immature
WQS05	22.7	ok	Exclude	Damaged/immature
WQS05	36.4	ok	ok	-
WQS05	9.1	ok	ok	-
WQS05	13.6	ok	Exclude	Damaged/immature
WQS08	9.1	ok	ok	-
WQS08	18.2	ok	ok	-
WQS08	109.1	ok	ok	-
WQS08	45.5	ok	ok	-
WQS08	18.2	ok	Exclude	-
WQS08	9.1	ok	Exclude	-
WQS08	9.1	ok	ok	-
WQS08	45.5	ok	ok	-
WQS08	136.4	ok	Exclude	Damaged/immature
WQS08	127.3	ok	ok	-
WQS08	9.1	ok	ok	-
WQS08	481.8	ok	ok	-
WQS08	254.5	ok	ok	-
WQS08	9.1	ok	ok	-
WQS08	9.1	ok	ok	-
WQS08	18.2	ok	ok	-
WQS08	45.5	ok	ok	-
WQS08	154.5	ok	ok	-
WQS08	9.1	ok	ok	-
WQS08	172.7	ok	ok	-
WQS08	9.1	ok	ok	-
WQS08	145.5	ok	Exclude	Damaged/immature
WQS08	72.7	ok	ok	-
WQS08	9.1	ok	ok	-
WQS08	81.8	ok	ok	-
WQS08	245.5	ok	Exclude	Damaged/immature
WQS08	27.3	ok	Exclude	Damaged/immature
WQS08	9.1	ok	ok	-
WQS08	181.8	ok	ok	-
WQS08	27.3	ok	ok	-
WQS08	9.1	ok	ok	-
WQS08	27.3	ok	ok	-
WQS08	9.1	ok	ok	-
WQS08	36.4	ok	Exclude	Damaged/immature
WQS08	45.5	ok	ok	-
WQS08	18.2	ok	ok	-
WQS08	127.3	ok	ok	-

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Lab Sample ID	Replicate	Date	Taxon	Phylum	Class	Order	Family	Genus	Adult	Juvenile	Larvae	Nymph	Pupa	Deutonymph	Raw Count	Split
WQS08	fb17-089-004	1	18-Sep-2017	Plecoptera indet.	Arthropoda	Insecta	Plecoptera						9			9	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Glossosoma* sp.	Arthropoda	Insecta	Trichoptera	Glossosomatidae	*Glossosoma*			2				2	11/100
WQS08	fb17-089-004	1	18-Sep-2017	Hydropsychidae indet.	Arthropoda	Insecta	Trichoptera	Hydropsychidae				3				3	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Lepidostoma* sp.	Arthropoda	Insecta	Trichoptera	Lepidostomatidae	*Lepidostoma*			2				2	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Rhyacophila atrata* complex	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			1				1	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Rhyacophila brunnea/vemna* group	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			2				2	11/100
WQS08	fb17-089-004	1	18-Sep-2017	*Rhyacophila* sp.	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			4				4	11/100
WQS09	fb17-089-005	1	19-Sep-2017	Hygrobatidae indet.	Arthropoda	Arachnida	Trombidiformes	Hygrobatidae							1	1	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Lebertia* sp.	Arthropoda	Arachnida	Trombidiformes	Lebertiidae	*Lebertia*	16						16	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Sperchon* sp.	Arthropoda	Arachnida	Trombidiformes	Sperchontidae	*Sperchon*	9						9	14/100
WQS09	fb17-089-005	1	19-Sep-2017	Sperchontidaeindet.	Arthropoda	Arachnida	Trombidiformes	Sperchontidae							2	2	14/100
WQS09	fb17-089-005	1	19-Sep-2017	Acari indet.	Arthropoda	Arachnida						1			3	4	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Wiedemannia* sp.	Arthropoda	Insecta	Diptera	Empididae	*Wiedemannia*			3				3	14/100
WQS09	fb17-089-005	1	19-Sep-2017	Empididae indet.	Arthropoda	Insecta	Diptera	Empididae						1		1	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Simulium* sp.	Arthropoda	Insecta	Diptera	Simuliidae	*Simulium*			1				1	14/100
WQS09	fb17-089-005	1	19-Sep-2017	Simuliidae indet.	Arthropoda	Insecta	Diptera	Simuliidae				9				9	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Brillia* sp.	Arthropoda	Insecta	Diptera	Chironomidae	*Brillia*			2				2	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Cricotopus/Orthocladius* sp. complex	Arthropoda	Insecta	Diptera	Chironomidae	*Cricotopus/Orthocladius*			22				22	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Tvetenia* sp.	Arthropoda	Insecta	Diptera	Chironomidae	*Tvetenia*			8				8	14/100
WQS09	fb17-089-005	1	19-Sep-2017	Chironomidae indet.	Arthropoda	Insecta	Diptera	Chironomidae				17		3		20	14/100
WQS09	fb17-089-005	1	19-Sep-2017	Orthocladiinae indet.	Arthropoda	Insecta	Diptera	Chironomidae				2				2	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Ameletus* sp.	Arthropoda	Insecta	Ephemeroptera	Ameletidae	*Ameletus*				1			1	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Baetis* sp.	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*				20			20	14/100
WQS09	fb17-089-005	1	19-Sep-2017	Baetidae indet.	Arthropoda	Insecta	Ephemeroptera	Baetidae					10			10	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Serratella* sp.	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Serratella*				1			1	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Drunella coloradensis*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*				1			1	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Drunella doddsii*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*				5			5	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Drunella grandis/spinifera* group	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*				1			1	14/100
WQS09	fb17-089-005	1	19-Sep-2017	Ephemerellidae indet.	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae					33			33	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Cinygmula* sp.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Cinygmula*				1			1	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Epeorus deceptivus*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*				1			1	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Epeorus grandis* group	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*				2			2	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Rhithrogena* sp.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Rhithrogena*				3			3	14/100
WQS09	fb17-089-005	1	19-Sep-2017	Heptageniidae indet.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae					8			8	14/100
WQS09	fb17-089-005	1	19-Sep-2017	Leptophlebiidae indet.	Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae					1			1	14/100
WQS09	fb17-089-005	1	19-Sep-2017	Ephemeroptera indet.	Arthropoda	Insecta	Ephemeroptera						2			2	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Stylodrilus heringianus*	Annelida	Clitellata	Lumbriculida	Lumbriculidae	*Stylodrilus*	2						2	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Nais behningi*	Annelida	Clitellata	Tubificida	Naididae	*Nais*	1						1	14/100
WQS09	fb17-089-005	1	19-Sep-2017	Enchytraeidae indet.	Annelida	Clitellata		Enchytraeidae			1					1	14/100
WQS09	fb17-089-005	1	19-Sep-2017	Capniidae indet.	Arthropoda	Insecta	Plecoptera	Capniidae					31			31	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Paraperla* sp.	Arthropoda	Insecta	Plecoptera	Chloroperlidae	*Paraperla*				10			10	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Sweltsa* sp.	Arthropoda	Insecta	Plecoptera	Chloroperlidae	*Sweltsa*				1			1	14/100
WQS09	fb17-089-005	1	19-Sep-2017	Chloroperlidae indet.	Arthropoda	Insecta	Plecoptera	Chloroperlidae					2			2	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Zapada cinctipes*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				3			3	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Zapada columbiana*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				2			2	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Zapada* sp.	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				3			3	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Megarcys* sp.	Arthropoda	Insecta	Plecoptera	Perlodidae	*Megarcys*				6			6	14/100

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Total Abundance	Taxa Exclude Completely	Taxa Damaged Exclude	Lab Comments
WQS08	81.8	ok	Exclude	Damaged/immature
WQS08	18.2	ok	ok	-
WQS08	27.3	ok	Exclude	Damaged/immature
WQS08	18.2	ok	ok	-
WQS08	9.1	ok	ok	-
WQS08	18.2	ok	ok	-
WQS08	36.4	ok	Exclude	Damaged/immature
WQS09	7.1	ok	ok	-
WQS09	114.3	ok	ok	-
WQS09	64.3	ok	ok	-
WQS09	14.3	ok	ok	-
WQS09	28.6	ok	Exclude	-
WQS09	21.4	ok	ok	-
WQS09	7.1	ok	ok	-
WQS09	7.1	ok	ok	-
WQS09	64.3	ok	ok	-
WQS09	14.3	ok	ok	-
WQS09	157.1	ok	ok	-
WQS09	57.1	ok	ok	-
WQS09	142.9	ok	ok	-
WQS09	14.3	ok	ok	-
WQS09	7.1	ok	ok	-
WQS09	142.9	ok	ok	-
WQS09	7.1	ok	ok	-
WQS09	142.9	ok	ok	-
WQS09	71.4	ok	ok	-
WQS09	7.1	ok	ok	-
WQS09	7.1	ok	ok	-
WQS09	35.7	ok	ok	-
WQS09	7.1	ok	ok	-
WQS09	235.7	ok	ok	-
WQS09	7.1	ok	ok	-
WQS09	7.1	ok	ok	-
WQS09	14.3	ok	ok	-
WQS09	21.4	ok	ok	-
WQS09	57.1	ok	ok	-
WQS09	7.1	ok	ok	-
WQS09	14.3	ok	Exclude	-
WQS09	14.3	ok	ok	-
WQS09	7.1	ok	ok	-
WQS09	7.1	ok	ok	-
WQS09	221.4	ok	ok	-
WQS09	71.4	ok	ok	-
WQS09	7.1	ok	ok	-
WQS09	14.3	ok	ok	-
WQS09	21.4	ok	ok	-
WQS09	14.3	ok	ok	-
WQS09	21.4	ok	ok	-
WQS09	42.9	ok	ok	-

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Lab Sample ID	Replicate	Date	Taxon	Phylum	Class	Order	Family	Genus	Adult	Juvenile	Larvae	Nymph	Pupa	Deutonymph	Raw Count	Split
WQS09	fb17-089-005	1	19-Sep-2017	Perlodidae indet.	Arthropoda	Insecta	Plecoptera	Perlodidae					6			6	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Taenionema* sp.	Arthropoda	Insecta	Plecoptera	Taeniopterygidae	*Taenionema*				16			16	14/100
WQS09	fb17-089-005	1	19-Sep-2017	Plecoptera indet.	Arthropoda	Insecta	Plecoptera						7			7	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Arctopsyche* sp.	Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Arctopsyche*			4				4	14/100
WQS09	fb17-089-005	1	19-Sep-2017	Hydropsychidae indet.	Arthropoda	Insecta	Trichoptera	Hydropsychidae				4				4	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Lepidostoma* sp.	Arthropoda	Insecta	Trichoptera	Lepidostomatidae	*Lepidostoma*			1				1	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Ecclisomyia* sp.	Arthropoda	Insecta	Trichoptera	Limnephilidae	*Ecclisomyia*			1				1	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Rhyacophila atrata* complex	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			2				2	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Rhyacophila brunnea/vemna* group	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			1				1	14/100
WQS09	fb17-089-005	1	19-Sep-2017	*Rhyacophila* sp.	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			6				6	14/100
WQS12	fb17-089-006	1	20-Sep-2017	*Hygrobates* sp.	Arthropoda	Arachnida	Trombidiformes	Hygrobatidae	*Hygrobates*	1						1	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Lebertia* sp.	Arthropoda	Arachnida	Trombidiformes	Lebertiidae	*Lebertia*	6						6	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Sperchon* sp.	Arthropoda	Arachnida	Trombidiformes	Sperchontidae	*Sperchon*	5						5	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Hemerodromia* sp.	Arthropoda	Insecta	Diptera	Empididae	*Hemerodromia*			1				1	22/100
WQS12	fb17-089-006	1	20-Sep-2017	Simuliidae indet.	Arthropoda	Insecta	Diptera	Simuliidae				4				4	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Cricotopus/Orthocladius* sp. complex	Arthropoda	Insecta	Diptera	Chironomidae	*Cricotopus/Orthocladius*			6				6	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Polypedilum* sp.	Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum*			1				1	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Tanytarsus* sp.	Arthropoda	Insecta	Diptera	Chironomidae	*Tanytarsus*			1				1	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Tvetenia* sp.	Arthropoda	Insecta	Diptera	Chironomidae	*Tvetenia*			2				2	22/100
WQS12	fb17-089-006	1	20-Sep-2017	Chironomini indet.	Arthropoda	Insecta	Diptera	Chironomidae				1				1	22/100
WQS12	fb17-089-006	1	20-Sep-2017	Orthocladiinae indet.	Arthropoda	Insecta	Diptera	Chironomidae				1				1	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Ameletus* sp.	Arthropoda	Insecta	Ephemeroptera	Ameletidae	*Ameletus*				5			5	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Acentrella turbida*	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Acentrella*				3			3	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Baetis fuscatus* group	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*				7			7	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Baetis* sp.	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*				11			11	22/100
WQS12	fb17-089-006	1	20-Sep-2017	Baetidae indet.	Arthropoda	Insecta	Ephemeroptera	Baetidae					27			27	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Serratella* sp.	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Serratella*				5			5	22/100
WQS12	fb17-089-006	1	20-Sep-2017	Ephemerellidae indet.	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae					37			37	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Rhithrogena* sp.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Rhithrogena*				40			40	22/100
WQS12	fb17-089-006	1	20-Sep-2017	Heptageniidae indet.	Arthropoda	Insecta	Ephemeroptera	Heptageniidae					56			56	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Neoleptophlebia* sp.	Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	*Neoleptophlebia*				1			1	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Stylodrilus heringianus*	Annelida	Clitellata	Lumbriculida	Lumbriculidae	*Stylodrilus*		1					1	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Nais behningi*	Annelida	Clitellata	Tubificida	Naididae	*Nais*	2						2	22/100
WQS12	fb17-089-006	1	20-Sep-2017	Enchytraeidae indet.	Annelida	Clitellata		Enchytraeidae		1	3					4	22/100
WQS12	fb17-089-006	1	20-Sep-2017	Capniidae indet.	Arthropoda	Insecta	Plecoptera	Capniidae					13			13	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Paraperla* sp.	Arthropoda	Insecta	Plecoptera	Chloroperlidae	*Paraperla*				3			3	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Sweltsa* sp.	Arthropoda	Insecta	Plecoptera	Chloroperlidae	*Sweltsa*				3			3	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Zapada cinctipes*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*				1			1	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Skwala* sp.	Arthropoda	Insecta	Plecoptera	Perlodidae	*Skwala*				2			2	22/100
WQS12	fb17-089-006	1	20-Sep-2017	Perlodidae indet.	Arthropoda	Insecta	Plecoptera	Perlodidae					1			1	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Taenionema* sp.	Arthropoda	Insecta	Plecoptera	Taeniopterygidae	*Taenionema*				42			42	22/100
WQS12	fb17-089-006	1	20-Sep-2017	Plecoptera indet.	Arthropoda	Insecta	Plecoptera						9			9	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Glossosoma* sp.	Arthropoda	Insecta	Trichoptera	Glossosomatidae	*Glossosoma*			6				6	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Arctopsyche* sp.	Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Arctopsyche*			1				1	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Hydropsyche* sp.	Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Hydropsyche*			3				3	22/100
WQS12	fb17-089-006	1	20-Sep-2017	Hydropsychidae indet.	Arthropoda	Insecta	Trichoptera	Hydropsychidae				3				3	22/100
WQS12	fb17-089-006	1	20-Sep-2017	*Lepidostoma* sp.	Arthropoda	Insecta	Trichoptera	Lepidostomatidae	*Lepidostoma*			4				4	22/100

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Total Abundance	Taxa Exclude Completely	Taxa Damaged Exclude	Lab Comments
WQS09	42.9	ok	ok	-
WQS09	114.3	ok	ok	-
WQS09	50.0	ok	Exclude	-
WQS09	28.6	ok	ok	-
WQS09	28.6	ok	ok	-
WQS09	7.1	ok	ok	-
WQS09	7.1	ok	ok	-
WQS09	14.3	ok	ok	-
WQS09	7.1	ok	ok	-
WQS09	42.9	ok	ok	-
WQS12	4.5	ok	ok	-
WQS12	27.3	ok	ok	-
WQS12	22.7	ok	ok	-
WQS12	4.5	ok	ok	-
WQS12	18.2	ok	ok	-
WQS12	27.3	ok	ok	-
WQS12	4.5	ok	ok	-
WQS12	4.5	ok	ok	-
WQS12	9.1	ok	ok	-
WQS12	4.5	ok	ok	-
WQS12	4.5	ok	ok	-
WQS12	22.7	ok	ok	-
WQS12	13.6	ok	ok	-
WQS12	22.7	ok	ok	-
WQS12	13.6	ok	ok	-
WQS12	31.8	ok	ok	-
WQS12	50.0	ok	ok	-
WQS12	122.7	ok	ok	-
WQS12	22.7	ok	ok	-
WQS12	168.2	ok	ok	-
WQS12	181.8	ok	ok	-
WQS12	254.5	ok	ok	-
WQS12	4.5	ok	ok	-
WQS12	4.5	ok	ok	-
WQS12	9.1	ok	ok	-
WQS12	18.2	ok	ok	-
WQS12	59.1	ok	ok	-
WQS12	13.6	ok	ok	-
WQS12	13.6	ok	ok	-
WQS12	4.5	ok	ok	-
WQS12	9.1	ok	ok	-
WQS12	4.5	ok	ok	-
WQS12	190.9	ok	ok	-
WQS12	40.9	ok	Exclude	-
WQS12	27.3	ok	ok	-
WQS12	4.5	ok	ok	-
WQS12	13.6	ok	ok	-
WQS12	13.6	ok	ok	-
WQS12	18.2	ok	ok	-

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Lab Sample ID	Replicate	Date	Taxon	Phylum	Class	Order	Family	Genus	Adult	Juvenile	Larvae	Nymph	Pupa	Deutonymph	Raw Count	Split
WQS12	fb17-089-006	1	20-Sep-2017	*Rhyacophila* sp.	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*			1				1	22/100
BUL01	28549	1	22-Aug-2016	*Atractides*	Arthropoda	Arachnida	Trombidiformes	Hygrobatidae	*Atractides*							4	14/100
BUL01	28549	1	22-Aug-2016	*Sperchon*	Arthropoda	Arachnida	Trombidiformes	Sperchontidae	*Sperchon*							4	14/100
BUL01	28549	1	22-Aug-2016	*Lebertia*	Arthropoda	Arachnida	Trombidiformes	Lebertiidae	*Lebertia*							6	14/100
BUL01	28549	1	22-Aug-2016	*Ameletus*	Arthropoda	Insecta	Ephemeroptera	Ameletidae	*Ameletus*							8	14/100
BUL01	28549	1	22-Aug-2016	*Acentrella*	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Acentrella*							3	14/100
BUL01	28549	1	22-Aug-2016	*Baetis*	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*							65	14/100
BUL01	28549	1	22-Aug-2016	*Serratella*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Serratella*							3	14/100
BUL01	28549	1	22-Aug-2016	Ephemerellidae	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae								34	14/100
BUL01	28549	1	22-Aug-2016	Leptophlebiidae	Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae								1	14/100
BUL01	28549	1	22-Aug-2016	*Rhithrogena*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Rhithrogena*							9	14/100
BUL01	28549	1	22-Aug-2016	Heptageniidae	Arthropoda	Insecta	Ephemeroptera	Heptageniidae								39	14/100
BUL01	28549	1	22-Aug-2016	*Nais*	Annelida	Clitellata	Tubificida	Naididae	*Nais*							1	14/100
BUL01	28549	1	22-Aug-2016	Perlidae	Arthropoda	Insecta	Plecoptera	Perlidae								3	14/100
BUL01	28549	1	22-Aug-2016	*Claassenia sabulosa*	Arthropoda	Insecta	Plecoptera	Perlidae	*Claassenia*							1	14/100
BUL01	28549	1	22-Aug-2016	*Skwala*	Arthropoda	Insecta	Plecoptera	Perlodidae	*Skwala*							3	14/100
BUL01	28549	1	22-Aug-2016	Perlodidae	Arthropoda	Insecta	Plecoptera	Perlodidae								3	14/100
BUL01	28549	1	22-Aug-2016	Plecoptera	Arthropoda	Insecta	Plecoptera									1	14/100
BUL01	28549	1	22-Aug-2016	Capniidae	Arthropoda	Insecta	Plecoptera	Capniidae								4	14/100
BUL01	28549	1	22-Aug-2016	*Arctopsyche*	Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Arctopsyche*							4	14/100
BUL01	28549	1	22-Aug-2016	*Arctopsyche grandis*	Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Arctopsyche*							39	14/100
BUL01	28549	1	22-Aug-2016	*Hydropsyche*	Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Hydropsyche*							16	14/100
BUL01	28549	1	22-Aug-2016	Hydropsychidae	Arthropoda	Insecta	Trichoptera	Hydropsychidae								13	14/100
BUL01	28549	1	22-Aug-2016	*Lepidostoma*	Arthropoda	Insecta	Trichoptera	Lepidostomatidae	*Lepidostoma*							7	14/100
BUL01	28549	1	22-Aug-2016	*Rhyacophila*	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*							2	14/100
BUL01	28549	1	22-Aug-2016	*Glossosoma*	Arthropoda	Insecta	Trichoptera	Glossosomatidae	*Glossosoma*							8	14/100
BUL01	28549	1	22-Aug-2016	*Neoplasta*	Arthropoda	Insecta	Diptera	Empididae	*Neoplasta*							1	14/100
BUL01	28549	1	22-Aug-2016	*Simulium*	Arthropoda	Insecta	Diptera	Simuliidae	*Simulium*							2	14/100
BUL01	28549	1	22-Aug-2016	*Brillia*	Arthropoda	Insecta	Diptera	Chironomidae	*Brillia*							1	14/100
BUL01	28549	1	22-Aug-2016	*Tvetenia*	Arthropoda	Insecta	Diptera	Chironomidae	*Tvetenia*							11	14/100
BUL01	28549	1	22-Aug-2016	Chironomidae	Arthropoda	Insecta	Diptera	Chironomidae								18	14/100
BUL01	28549	1	22-Aug-2016	*Corynoneura*	Arthropoda	Insecta	Diptera	Chironomidae	*Corynoneura*							1	14/100
BUL01	28549	1	22-Aug-2016	*Eukiefferiella*	Arthropoda	Insecta	Diptera	Chironomidae	*Eukiefferiella*							1	14/100
BUL01	28549	1	22-Aug-2016	*Heleniella*	Arthropoda	Insecta	Diptera	Chironomidae	*Heleniella*							1	14/100
BUL01	28549	1	22-Aug-2016	*Micropsectra*	Arthropoda	Insecta	Diptera	Chironomidae	*Micropsectra*							10	14/100
BUL01	28549	1	22-Aug-2016	*Pagastia*	Arthropoda	Insecta	Diptera	Chironomidae	*Pagastia*							1	14/100
BUL01	28549	1	22-Aug-2016	*Parakiefferiella*	Arthropoda	Insecta	Diptera	Chironomidae	*Parakiefferiella*							1	14/100
BUL01	28549	1	22-Aug-2016	*Phaenopsectra*	Arthropoda	Insecta	Diptera	Chironomidae	*Phaenopsectra*							15	14/100
BUL01	28549	1	22-Aug-2016	*Rheocricotopus*	Arthropoda	Insecta	Diptera	Chironomidae	*Rheocricotopus*							2	14/100
BUL01	28549	1	22-Aug-2016	*Robackia demeijerei*	Arthropoda	Insecta	Diptera	Chironomidae	*Robackia*							2	14/100
BUL15	3144	1	3-Sep-2000	*Ameletus*	Arthropoda	Insecta	Ephemeroptera	Ameletidae	*Ameletus*							6	100/100
BUL15	3144	1	3-Sep-2000	*Baetis*	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*							13	100/100
BUL15	3144	1	3-Sep-2000	Ephemerellidae	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae								5	100/100
BUL15	3144	1	3-Sep-2000	Heptageniidae	Arthropoda	Insecta	Ephemeroptera	Heptageniidae								1	100/100
BUL15	3144	1	3-Sep-2000	Chloroperlidae	Arthropoda	Insecta	Plecoptera	Chloroperlidae								7	100/100
BUL15	3144	1	3-Sep-2000	Leuctridae	Arthropoda	Insecta	Plecoptera	Leuctridae								3	100/100
BUL15	3144	1	3-Sep-2000	*Zapada*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*							1	100/100

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Total Abundance	Taxa Exclude Completely	Taxa Damaged Exclude	Lab Comments
WQS12	4.5	ok	ok	-
BUL01	28.6	ok	ok	-
BUL01	28.6	ok	ok	-
BUL01	42.9	ok	ok	-
BUL01	57.1	ok	ok	-
BUL01	21.4	ok	ok	-
BUL01	464.3	ok	ok	-
BUL01	21.4	ok	ok	-
BUL01	242.9	ok	ok	-
BUL01	7.1	ok	ok	-
BUL01	64.3	ok	ok	-
BUL01	278.6	ok	ok	-
BUL01	7.1	ok	ok	-
BUL01	21.4	ok	ok	-
BUL01	7.1	ok	ok	-
BUL01	21.4	ok	ok	-
BUL01	21.4	ok	ok	-
BUL01	7.1	ok	Exclude	-
BUL01	28.6	ok	ok	-
BUL01	28.6	ok	ok	-
BUL01	278.6	ok	ok	-
BUL01	114.3	ok	ok	-
BUL01	92.9	ok	ok	-
BUL01	114.3	ok	ok	-
BUL01	92.9	ok	ok	-
BUL01	50.0	ok	ok	-
BUL01	14.3	ok	ok	-
BUL01	57.1	ok	ok	-
BUL01	7.1	ok	ok	-
BUL01	14.3	ok	ok	-
BUL01	7.1	ok	ok	-
BUL01	78.6	ok	ok	-
BUL01	128.6	ok	ok	-
BUL01	7.1	ok	ok	-
BUL01	7.1	ok	ok	-
BUL01	7.1	ok	ok	-
BUL01	71.4	ok	ok	-
BUL01	7.1	ok	ok	-
BUL01	7.1	ok	ok	-
BUL01	107.1	ok	ok	-
BUL01	14.3	ok	ok	-
BUL01	14.3	ok	ok	-
BUL15	6.0	ok	ok	-
BUL15	13.0	ok	ok	-
BUL15	5.0	ok	ok	-
BUL15	1.0	ok	ok	-
BUL15	7.0	ok	ok	-
BUL15	3.0	ok	ok	-
BUL15	1.0	ok	ok	-

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Lab Sample ID	Replicate	Date	Taxon	Phylum	Class	Order	Family	Genus	Adult	Juvenile	Larvae	Nymph	Pupa	Deutonymph	Raw Count	Split
BUL15	3144	1	3-Sep-2000	*Doroneuria*	Arthropoda	Insecta	Plecoptera	Perlidae	*Doroneuria*							1	100/100
BUL15	3144	1	3-Sep-2000	Perlodidae	Arthropoda	Insecta	Plecoptera	Perlodidae								6	100/100
BUL15	3144	1	3-Sep-2000	*Taenionema*	Arthropoda	Insecta	Plecoptera	Taeniopterygidae	*Taenionema*							2	100/100
BUL15	3144	1	3-Sep-2000	*Rhyacophila*	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*							4	100/100
BUL15	3144	1	3-Sep-2000	Brachycentridae	Arthropoda	Insecta	Trichoptera	Brachycentridae								2	100/100
BUL15	3144	1	3-Sep-2000	Arachnida	Arthropoda	Arachnida										8	100/100
BUL15	3144	1	3-Sep-2000	*Hemerodromia*	Arthropoda	Insecta	Diptera	Empididae	*Hemerodromia*							1	100/100
BUL15	3144	1	3-Sep-2000	*Pericoma*	Arthropoda	Insecta	Diptera	Psychodidae	*Pericoma*							32	100/100
BUL15	3144	1	3-Sep-2000	*Bezzia*	Arthropoda	Insecta	Diptera	Ceratopogonidae	*Bezzia*							4	100/100
BUL15	3144	1	3-Sep-2000	Chironomidae	Arthropoda	Insecta	Diptera	Chironomidae								186	100/100
BUL15	3145	2	3-Sep-2000	*Ameletus*	Arthropoda	Insecta	Ephemeroptera	Ameletidae	*Ameletus*							1	100/100
BUL15	3145	2	3-Sep-2000	*Baetis*	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*							38	100/100
BUL15	3145	2	3-Sep-2000	*Drunella*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*							7	100/100
BUL15	3145	2	3-Sep-2000	Ephemerellidae	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae								4	100/100
BUL15	3145	2	3-Sep-2000	*Epeorus*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*							9	100/100
BUL15	3145	2	3-Sep-2000	*Rhithrogena*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Rhithrogena*							15	100/100
BUL15	3145	2	3-Sep-2000	Heptageniidae	Arthropoda	Insecta	Ephemeroptera	Heptageniidae								4	100/100
BUL15	3145	2	3-Sep-2000	Chloroperlidae	Arthropoda	Insecta	Plecoptera	Chloroperlidae								5	100/100
BUL15	3145	2	3-Sep-2000	Leuctridae	Arthropoda	Insecta	Plecoptera	Leuctridae								1	100/100
BUL15	3145	2	3-Sep-2000	*Zapada*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*							6	100/100
BUL15	3145	2	3-Sep-2000	*Skwala*	Arthropoda	Insecta	Plecoptera	Perlodidae	*Skwala*							2	100/100
BUL15	3145	2	3-Sep-2000	*Taenionema*	Arthropoda	Insecta	Plecoptera	Taeniopterygidae	*Taenionema*							44	100/100
BUL15	3145	2	3-Sep-2000	Plecoptera	Arthropoda	Insecta	Plecoptera									1	100/100
BUL15	3145	2	3-Sep-2000	Capniidae	Arthropoda	Insecta	Plecoptera	Capniidae								9	100/100
BUL15	3145	2	3-Sep-2000	*Parapsyche*	Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Parapsyche*							4	100/100
BUL15	3145	2	3-Sep-2000	Limnephilidae	Arthropoda	Insecta	Trichoptera	Limnephilidae								2	100/100
BUL15	3145	2	3-Sep-2000	*Rhyacophila*	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*							3	100/100
BUL15	3145	2	3-Sep-2000	Brachycentridae	Arthropoda	Insecta	Trichoptera	Brachycentridae								2	100/100
BUL15	3145	2	3-Sep-2000	*Glossosoma*	Arthropoda	Insecta	Trichoptera	Glossosomatidae	*Glossosoma*							15	100/100
BUL15	3145	2	3-Sep-2000	Arachnida	Arthropoda	Arachnida										6	100/100
BUL15	3145	2	3-Sep-2000	Empididae	Arthropoda	Insecta	Diptera	Empididae								2	100/100
BUL15	3145	2	3-Sep-2000	*Pericoma*	Arthropoda	Insecta	Diptera	Psychodidae	*Pericoma*							10	100/100
BUL15	3145	2	3-Sep-2000	*Bezzia*	Arthropoda	Insecta	Diptera	Ceratopogonidae	*Bezzia*							1	100/100
BUL15	3145	2	3-Sep-2000	*Antocha*	Arthropoda	Insecta	Diptera	Tipulidae	*Antocha*							2	100/100
BUL15	3145	2	3-Sep-2000	Chironomidae	Arthropoda	Insecta	Diptera	Chironomidae								52	100/100
BUL15	3145	2	3-Sep-2000	Turbellaria	Platyhelminthes	Turbellaria										2	100/100
BUL15	3146	3	3-Sep-2000	Collembola	Arthropoda	Collembola	Collembola									1	100/100
BUL15	3146	3	3-Sep-2000	*Baetis*	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*							3	100/100
BUL15	3146	3	3-Sep-2000	Baetidae	Arthropoda	Insecta	Ephemeroptera	Baetidae								38	100/100
BUL15	3146	3	3-Sep-2000	*Drunella*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*							3	100/100
BUL15	3146	3	3-Sep-2000	*Cinygmula*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Cinygmula*							1	100/100
BUL15	3146	3	3-Sep-2000	*Epeorus*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*							7	100/100
BUL15	3146	3	3-Sep-2000	*Rhithrogena*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Rhithrogena*							8	100/100
BUL15	3146	3	3-Sep-2000	Heptageniidae	Arthropoda	Insecta	Ephemeroptera	Heptageniidae								6	100/100
BUL15	3146	3	3-Sep-2000	Leuctridae	Arthropoda	Insecta	Plecoptera	Leuctridae								1	100/100
BUL15	3146	3	3-Sep-2000	*Zapada*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*							6	100/100
BUL15	3146	3	3-Sep-2000	*Taenionema*	Arthropoda	Insecta	Plecoptera	Taeniopterygidae	*Taenionema*							32	100/100

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Total Abundance	Taxa Exclude Completely	Taxa Damaged Exclude	Lab Comments
BUL15	1.0	ok	ok	-
BUL15	6.0	ok	ok	-
BUL15	2.0	ok	ok	-
BUL15	4.0	ok	ok	-
BUL15	2.0	ok	ok	-
BUL15	8.0	ok	Exclude	-
BUL15	1.0	ok	ok	-
BUL15	32.0	ok	ok	-
BUL15	4.0	ok	ok	-
BUL15	186.0	ok	ok	-
BUL15	1.0	ok	ok	-
BUL15	38.0	ok	ok	-
BUL15	7.0	ok	ok	-
BUL15	4.0	ok	ok	-
BUL15	9.0	ok	ok	-
BUL15	15.0	ok	ok	-
BUL15	4.0	ok	ok	-
BUL15	5.0	ok	ok	-
BUL15	1.0	ok	ok	-
BUL15	6.0	ok	ok	-
BUL15	2.0	ok	ok	-
BUL15	44.0	ok	ok	-
BUL15	1.0	ok	Exclude	-
BUL15	9.0	ok	ok	-
BUL15	4.0	ok	ok	-
BUL15	2.0	ok	ok	-
BUL15	3.0	ok	ok	-
BUL15	2.0	ok	ok	-
BUL15	15.0	ok	ok	-
BUL15	6.0	ok	Exclude	-
BUL15	2.0	ok	ok	-
BUL15	10.0	ok	ok	-
BUL15	1.0	ok	ok	-
BUL15	2.0	ok	ok	-
BUL15	52.0	ok	ok	-
BUL15	2.0	Exclude	Exclude	-
BUL15	1.0	Exclude	Exclude	-
BUL15	3.0	ok	ok	-
BUL15	38.0	ok	ok	-
BUL15	3.0	ok	ok	-
BUL15	1.0	ok	ok	-
BUL15	7.0	ok	ok	-
BUL15	8.0	ok	ok	-
BUL15	6.0	ok	ok	-
BUL15	1.0	ok	ok	-
BUL15	6.0	ok	ok	-
BUL15	32.0	ok	ok	-

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Lab Sample ID	Replicate	Date	Taxon	Phylum	Class	Order	Family	Genus	Adult	Juvenile	Larvae	Nymph	Pupa	Deutonymph	Raw Count	Split
BUL15	3146	3	3-Sep-2000	Plecoptera	Arthropoda	Insecta	Plecoptera									10	100/100
BUL15	3146	3	3-Sep-2000	Trichoptera	Arthropoda	Insecta	Trichoptera									1	100/100
BUL15	3146	3	3-Sep-2000	*Glossosoma*	Arthropoda	Insecta	Trichoptera	Glossosomatidae	*Glossosoma*							3	100/100
BUL15	3146	3	3-Sep-2000	Arachnida	Arthropoda	Arachnida										1	100/100
BUL15	3146	3	3-Sep-2000	*Pericoma*	Arthropoda	Insecta	Diptera	Psychodidae	*Pericoma*							13	100/100
BUL15	3146	3	3-Sep-2000	Tipulidae	Arthropoda	Insecta	Diptera	Tipulidae								1	100/100
BUL15	3146	3	3-Sep-2000	Chironomidae	Arthropoda	Insecta	Diptera	Chironomidae								39	100/100
BUL15	9920	1	23-Aug-2006	*Sperchon*	Arthropoda	Arachnida	Trombidiformes	Sperchontidae	*Sperchon*							42	100/100
BUL15	9920	1	23-Aug-2006	*Lebertia*	Arthropoda	Arachnida	Trombidiformes	Lebertiidae	*Lebertia*							57	100/100
BUL15	9920	1	23-Aug-2006	*Ameletus*	Arthropoda	Insecta	Ephemeroptera	Ameletidae	*Ameletus*							1	100/100
BUL15	9920	1	23-Aug-2006	*Baetis*	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*							247	100/100
BUL15	9920	1	23-Aug-2006	*Drunella coloradensis*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*							10	100/100
BUL15	9920	1	23-Aug-2006	*Drunella doddsii*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*							18	100/100
BUL15	9920	1	23-Aug-2006	*Serratella*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Serratella*							1	100/100
BUL15	9920	1	23-Aug-2006	*Paraleptophlebia*	Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	*Paraleptophlebia*							73	100/100
BUL15	9920	1	23-Aug-2006	*Cinygmula*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Cinygmula*							19	100/100
BUL15	9920	1	23-Aug-2006	*Epeorus deceptivus*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*							70	100/100
BUL15	9920	1	23-Aug-2006	*Epeorus longimanus*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*							32	100/100
BUL15	9920	1	23-Aug-2006	*Rhithrogena*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Rhithrogena*							77	100/100
BUL15	9920	1	23-Aug-2006	*Sweltsa*	Arthropoda	Insecta	Plecoptera	Chloroperlidae	*Sweltsa*							8	100/100
BUL15	9920	1	23-Aug-2006	Chloroperlidae	Arthropoda	Insecta	Plecoptera	Chloroperlidae								8	100/100
BUL15	9920	1	23-Aug-2006	*Suwallia*	Arthropoda	Insecta	Plecoptera	Chloroperlidae	*Suwallia*							2	100/100
BUL15	9920	1	23-Aug-2006	*Despaxia*	Arthropoda	Insecta	Plecoptera	Leuctridae	*Despaxia*							8	100/100
BUL15	9920	1	23-Aug-2006	*Zapada*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*							133	100/100
BUL15	9920	1	23-Aug-2006	*Kogotus*	Arthropoda	Insecta	Plecoptera	Perlodidae	*Kogotus*							2	100/100
BUL15	9920	1	23-Aug-2006	Taeniopterygidae	Arthropoda	Insecta	Plecoptera	Taeniopterygidae								26	100/100
BUL15	9920	1	23-Aug-2006	Capniidae	Arthropoda	Insecta	Plecoptera	Capniidae								26	100/100
BUL15	9920	1	23-Aug-2006	*Arctopsyche*	Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Arctopsyche*							1	100/100
BUL15	9920	1	23-Aug-2006	*Rhyacophila*	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*							58	100/100
BUL15	9920	1	23-Aug-2006	*Amiocentrus*	Arthropoda	Insecta	Trichoptera	Brachycentridae	*Amiocentrus*							65	100/100
BUL15	9920	1	23-Aug-2006	*Chelifera*	Arthropoda	Insecta	Diptera	Empididae	*Chelifera*							1	100/100
BUL15	9920	1	23-Aug-2006	*Pericoma*	Arthropoda	Insecta	Diptera	Psychodidae	*Pericoma*							384	100/100
BUL15	9920	1	23-Aug-2006	*Simulium*	Arthropoda	Insecta	Diptera	Simuliidae	*Simulium*							57	100/100
BUL15	9920	1	23-Aug-2006	*Bezzia/Palpomyia*	Arthropoda	Insecta	Diptera	Ceratopogonidae	*Bezzia/Palpomyia*							8	100/100
BUL15	9920	1	23-Aug-2006	*Antocha*	Arthropoda	Insecta	Diptera	Tipulidae	*Antocha*							1	100/100
BUL15	9920	1	23-Aug-2006	*Rhabdomastix*	Arthropoda	Insecta	Diptera	Tipulidae	*Rhabdomastix*							8	100/100
BUL15	9920	1	23-Aug-2006	Chironomidae	Arthropoda	Insecta	Diptera	Chironomidae								426	100/100
BUL15	9920	1	23-Aug-2006	*Polycelis*	Platyhelminthes	Turbellaria	Tricladida	Planariidae	*Polycelis*							28	100/100
BUL15	9920	1	23-Aug-2006	Ostracoda	Arthropoda	Ostracoda										16	100/100
BUL16	2534	1	3-Sep-2004	*Baetis*	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*							234	100/100
BUL16	2534	1	3-Sep-2004	*Drunella doddsii*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*							18	100/100
BUL16	2534	1	3-Sep-2004	Ephemerellidae	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae								12	100/100
BUL16	2534	1	3-Sep-2004	*Paraleptophlebia*	Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	*Paraleptophlebia*							18	100/100
BUL16	2534	1	3-Sep-2004	*Cinygmula*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Cinygmula*							2	100/100
BUL16	2534	1	3-Sep-2004	*Epeorus*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*							24	100/100
BUL16	2534	1	3-Sep-2004	*Rhithrogena*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Rhithrogena*							32	100/100
BUL16	2534	1	3-Sep-2004	Heptageniidae	Arthropoda	Insecta	Ephemeroptera	Heptageniidae								78	100/100

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Total Abundance	Taxa Exclude Completely	Taxa Damaged Exclude	Lab Comments
BUL15	10.0	ok	Exclude	-
BUL15	1.0	ok	Exclude	-
BUL15	3.0	ok	ok	-
BUL15	1.0	ok	Exclude	-
BUL15	13.0	ok	ok	-
BUL15	1.0	ok	ok	-
BUL15	39.0	ok	ok	-
BUL15	42.0	ok	ok	-
BUL15	57.0	ok	ok	-
BUL15	1.0	ok	ok	-
BUL15	247.0	ok	ok	-
BUL15	10.0	ok	ok	-
BUL15	18.0	ok	ok	-
BUL15	1.0	ok	ok	-
BUL15	73.0	ok	ok	-
BUL15	19.0	ok	ok	-
BUL15	70.0	ok	ok	-
BUL15	32.0	ok	ok	-
BUL15	77.0	ok	ok	-
BUL15	8.0	ok	ok	-
BUL15	8.0	ok	ok	-
BUL15	2.0	ok	ok	-
BUL15	8.0	ok	ok	-
BUL15	2.0	ok	ok	-
BUL15	8.0	ok	ok	-
BUL15	133.0	ok	ok	-
BUL15	2.0	ok	ok	-
BUL15	26.0	ok	ok	-
BUL15	26.0	ok	ok	-
BUL15	1.0	ok	ok	-
BUL15	58.0	ok	ok	-
BUL15	65.0	ok	ok	-
BUL15	1.0	ok	ok	-
BUL15	384.0	ok	ok	-
BUL15	57.0	ok	ok	-
BUL15	8.0	ok	ok	-
BUL15	1.0	ok	ok	-
BUL15	8.0	ok	ok	-
BUL15	426.0	ok	ok	-
BUL15	28.0	Exclude	ok	-
BUL15	16.0	Exclude	Exclude	-
BUL16	234.0	ok	ok	-
BUL16	18.0	ok	ok	-
BUL16	12.0	ok	ok	-
BUL16	18.0	ok	ok	-
BUL16	2.0	ok	ok	-
BUL16	24.0	ok	ok	-
BUL16	32.0	ok	ok	-
BUL16	78.0	ok	ok	-

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Lab Sample ID	Replicate	Date	Taxon	Phylum	Class	Order	Family	Genus	Adult	Juvenile	Larvae	Nymph	Pupa	Deutonymph	Raw Count	Split
BUL16	2534	1	3-Sep-2004	Chloroperlidae	Arthropoda	Insecta	Plecoptera	Chloroperlidae								16	100/100
BUL16	2534	1	3-Sep-2004	*Suwallia*	Arthropoda	Insecta	Plecoptera	Chloroperlidae	*Suwallia*							2	100/100
BUL16	2534	1	3-Sep-2004	*Zapada*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*							12	100/100
BUL16	2534	1	3-Sep-2004	Taeniopterygidae	Arthropoda	Insecta	Plecoptera	Taeniopterygidae								40	100/100
BUL16	2534	1	3-Sep-2004	Capniidae	Arthropoda	Insecta	Plecoptera	Capniidae								10	100/100
BUL16	2534	1	3-Sep-2004	Hydropsychidae	Arthropoda	Insecta	Trichoptera	Hydropsychidae								4	100/100
BUL16	2534	1	3-Sep-2004	*Rhyacophila*	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*							16	100/100
BUL16	2534	1	3-Sep-2004	*Glossosoma*	Arthropoda	Insecta	Trichoptera	Glossosomatidae	*Glossosoma*							2	100/100
BUL16	2534	1	3-Sep-2004	Arachnida	Arthropoda	Arachnida										14	100/100
BUL16	2534	1	3-Sep-2004	*Oreogeton*	Arthropoda	Insecta	Diptera	Empididae	*Oreogeton*							2	100/100
BUL16	2534	1	3-Sep-2004	*Pericoma*	Arthropoda	Insecta	Diptera	Psychodidae	*Pericoma*							4	100/100
BUL16	2534	1	3-Sep-2004	*Bezzia*	Arthropoda	Insecta	Diptera	Ceratopogonidae	*Bezzia*							6	100/100
BUL16	2534	1	3-Sep-2004	*Antocha*	Arthropoda	Insecta	Diptera	Tipulidae	*Antocha*							4	100/100
BUL16	2534	1	3-Sep-2004	*Tipula*	Arthropoda	Insecta	Diptera	Tipulidae	*Tipula*							2	100/100
BUL16	2534	1	3-Sep-2004	Chironomidae	Arthropoda	Insecta	Diptera	Chironomidae								166	100/100
BUL16	2534	1	3-Sep-2004	*Polycelis*	Platyhelminthes	Turbellaria	Tricladida	Planariidae	*Polycelis*							12	100/100
BUL16	3084	1	3-Sep-2000	*Baetis*	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*							14	100/100
BUL16	3084	1	3-Sep-2000	*Drunella*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*							2	100/100
BUL16	3084	1	3-Sep-2000	*Epeorus*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*							2	100/100
BUL16	3084	1	3-Sep-2000	Heptageniidae	Arthropoda	Insecta	Ephemeroptera	Heptageniidae								9	100/100
BUL16	3084	1	3-Sep-2000	*Suwallia*	Arthropoda	Insecta	Plecoptera	Chloroperlidae	*Suwallia*							3	100/100
BUL16	3084	1	3-Sep-2000	*Zapada*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*							2	100/100
BUL16	3084	1	3-Sep-2000	Taeniopterygidae	Arthropoda	Insecta	Plecoptera	Taeniopterygidae								2	100/100
BUL16	3084	1	3-Sep-2000	Plecoptera	Arthropoda	Insecta	Plecoptera									16	100/100
BUL16	3084	1	3-Sep-2000	*Rhyacophila*	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*							3	100/100
BUL16	3084	1	3-Sep-2000	Trichoptera	Arthropoda	Insecta	Trichoptera									1	100/100
BUL16	3084	1	3-Sep-2000	Arachnida	Arthropoda	Arachnida										6	100/100
BUL16	3084	1	3-Sep-2000	*Deuterophlebia*	Arthropoda	Insecta	Diptera	Deuterophlebiidae	*Deuterophlebia*							2	100/100
BUL16	3084	1	3-Sep-2000	Chironomidae	Arthropoda	Insecta	Diptera	Chironomidae								53	100/100
BUL16	3084	1	3-Sep-2000	Turbellaria	Platyhelminthes	Turbellaria										4	100/100
BUL16	3085	2	3-Sep-2000	*Ameletus*	Arthropoda	Insecta	Ephemeroptera	Ameletidae	*Ameletus*							3	100/100
BUL16	3085	2	3-Sep-2000	*Baetis*	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*							28	100/100
BUL16	3085	2	3-Sep-2000	*Drunella*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*							4	100/100
BUL16	3085	2	3-Sep-2000	*Serratella*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Serratella*							1	100/100
BUL16	3085	2	3-Sep-2000	Ephemerellidae	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae								3	100/100
BUL16	3085	2	3-Sep-2000	*Paraleptophlebia*	Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	*Paraleptophlebia*							4	100/100
BUL16	3085	2	3-Sep-2000	*Epeorus*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*							4	100/100
BUL16	3085	2	3-Sep-2000	*Rhithrogena*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Rhithrogena*							8	100/100
BUL16	3085	2	3-Sep-2000	Chloroperlidae	Arthropoda	Insecta	Plecoptera	Chloroperlidae								2	100/100
BUL16	3085	2	3-Sep-2000	Leuctridae	Arthropoda	Insecta	Plecoptera	Leuctridae								6	100/100
BUL16	3085	2	3-Sep-2000	*Zapada*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*							2	100/100
BUL16	3085	2	3-Sep-2000	*Taenionema*	Arthropoda	Insecta	Plecoptera	Taeniopterygidae	*Taenionema*							2	100/100
BUL16	3085	2	3-Sep-2000	Plecoptera	Arthropoda	Insecta	Plecoptera									7	100/100
BUL16	3085	2	3-Sep-2000	Hydropsychidae	Arthropoda	Insecta	Trichoptera	Hydropsychidae								1	100/100
BUL16	3085	2	3-Sep-2000	*Glossosoma*	Arthropoda	Insecta	Trichoptera	Glossosomatidae	*Glossosoma*							1	100/100
BUL16	3085	2	3-Sep-2000	Arachnida	Arthropoda	Arachnida										5	100/100
BUL16	3085	2	3-Sep-2000	*Pericoma*	Arthropoda	Insecta	Diptera	Psychodidae	*Pericoma*							3	100/100

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Total Abundance	Taxa Exclude Completely	Taxa Damaged Exclude	Lab Comments
BUL16	16.0	ok	ok	-
BUL16	2.0	ok	ok	-
BUL16	12.0	ok	ok	-
BUL16	40.0	ok	ok	-
BUL16	10.0	ok	ok	-
BUL16	4.0	ok	ok	-
BUL16	16.0	ok	ok	-
BUL16	2.0	ok	ok	-
BUL16	14.0	ok	Exclude	-
BUL16	2.0	ok	ok	-
BUL16	4.0	ok	ok	-
BUL16	6.0	ok	ok	-
BUL16	4.0	ok	ok	-
BUL16	2.0	ok	ok	-
BUL16	166.0	ok	ok	-
BUL16	12.0	Exclude	ok	-
BUL16	14.0	ok	ok	-
BUL16	2.0	ok	ok	-
BUL16	2.0	ok	ok	-
BUL16	9.0	ok	ok	-
BUL16	3.0	ok	ok	-
BUL16	2.0	ok	ok	-
BUL16	2.0	ok	ok	-
BUL16	2.0	ok	ok	-
BUL16	16.0	ok	Exclude	-
BUL16	3.0	ok	ok	-
BUL16	1.0	ok	Exclude	-
BUL16	6.0	ok	Exclude	-
BUL16	2.0	ok	ok	-
BUL16	53.0	ok	ok	-
BUL16	4.0	Exclude	Exclude	-
BUL16	3.0	ok	ok	-
BUL16	28.0	ok	ok	-
BUL16	4.0	ok	ok	-
BUL16	1.0	ok	ok	-
BUL16	3.0	ok	ok	-
BUL16	4.0	ok	ok	-
BUL16	4.0	ok	ok	-
BUL16	8.0	ok	ok	-
BUL16	2.0	ok	ok	-
BUL16	6.0	ok	ok	-
BUL16	2.0	ok	ok	-
BUL16	2.0	ok	ok	-
BUL16	7.0	ok	Exclude	-
BUL16	1.0	ok	ok	-
BUL16	1.0	ok	ok	-
BUL16	5.0	ok	Exclude	-
BUL16	3.0	ok	ok	-

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Lab Sample ID	Replicate	Date	Taxon	Phylum	Class	Order	Family	Genus	Adult	Juvenile	Larvae	Nymph	Pupa	Deutonymph	Raw Count	Split
BUL16	3085	2	3-Sep-2000	Chironomidae	Arthropoda	Insecta	Diptera	Chironomidae								47	100/100
BUL16	3085	2	3-Sep-2000	Turbellaria	Platyhelminthes	Turbellaria										6	100/100
BUL16	3085	2	3-Sep-2000	Arthropoda	Arthropoda											1	100/100
BUL16	3086	3	3-Sep-2000	*Baetis*	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*							7	100/100
BUL16	3086	3	3-Sep-2000	*Drunella*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*							3	100/100
BUL16	3086	3	3-Sep-2000	Ephemeroptera	Arthropoda	Insecta	Ephemeroptera									8	100/100
BUL16	3086	3	3-Sep-2000	*Epeorus*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*							2	100/100
BUL16	3086	3	3-Sep-2000	*Rhithrogena*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Rhithrogena*							3	100/100
BUL16	3086	3	3-Sep-2000	Heptageniidae	Arthropoda	Insecta	Ephemeroptera	Heptageniidae								11	100/100
BUL16	3086	3	3-Sep-2000	*Sweltsa*	Arthropoda	Insecta	Plecoptera	Chloroperlidae	*Sweltsa*							5	100/100
BUL16	3086	3	3-Sep-2000	Leuctridae	Arthropoda	Insecta	Plecoptera	Leuctridae								2	100/100
BUL16	3086	3	3-Sep-2000	*Zapada*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*							2	100/100
BUL16	3086	3	3-Sep-2000	Taeniopterygidae	Arthropoda	Insecta	Plecoptera	Taeniopterygidae								7	100/100
BUL16	3086	3	3-Sep-2000	Plecoptera	Arthropoda	Insecta	Plecoptera									7	100/100
BUL16	3086	3	3-Sep-2000	*Rhyacophila*	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*							1	100/100
BUL16	3086	3	3-Sep-2000	Psychodidae	Arthropoda	Insecta	Diptera	Psychodidae								1	100/100
BUL16	3086	3	3-Sep-2000	*Deuterophlebia*	Arthropoda	Insecta	Diptera	Deuterophlebiidae	*Deuterophlebia*							1	100/100
BUL16	3086	3	3-Sep-2000	Turbellaria	Platyhelminthes	Turbellaria										3	100/100
BUL16	3086	3	3-Sep-2000	Arthropoda	Arthropoda											1	100/100
BUL16	3086	3	3-Sep-2000	Clitellata	Annelida	Clitellata										2	100/100
BUL16	9923	1	23-Aug-2006	*Hygrobates*	Arthropoda	Arachnida	Trombidiformes	Hygrobatidae	*Hygrobates*							8	100/100
BUL16	9923	1	23-Aug-2006	*Sperchon*	Arthropoda	Arachnida	Trombidiformes	Sperchontidae	*Sperchon*							28	100/100
BUL16	9923	1	23-Aug-2006	*Wandesia*	Arthropoda	Arachnida	Trombidiformes	Hydryphantidae	*Wandesia*							3	100/100
BUL16	9923	1	23-Aug-2006	*Lebertia*	Arthropoda	Arachnida	Trombidiformes	Lebertiidae	*Lebertia*							36	100/100
BUL16	9923	1	23-Aug-2006	*Ameletus*	Arthropoda	Insecta	Ephemeroptera	Ameletidae	*Ameletus*							31	100/100
BUL16	9923	1	23-Aug-2006	*Acentrella*	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Acentrella*							5	100/100
BUL16	9923	1	23-Aug-2006	*Baetis*	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*							98	100/100
BUL16	9923	1	23-Aug-2006	*Drunella coloradensis*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*							3	100/100
BUL16	9923	1	23-Aug-2006	*Drunella doddsii*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Drunella*							15	100/100
BUL16	9923	1	23-Aug-2006	*Serratella*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Serratella*							1	100/100
BUL16	9923	1	23-Aug-2006	*Ephemerella*	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	*Ephemerella*							8	100/100
BUL16	9923	1	23-Aug-2006	*Paraleptophlebia*	Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	*Paraleptophlebia*							1	100/100
BUL16	9923	1	23-Aug-2006	*Cinygmula*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Cinygmula*							56	100/100
BUL16	9923	1	23-Aug-2006	*Epeorus deceptivus*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Epeorus*							8	100/100
BUL16	9923	1	23-Aug-2006	*Rhithrogena*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Rhithrogena*							11	100/100
BUL16	9923	1	23-Aug-2006	Heptageniidae	Arthropoda	Insecta	Ephemeroptera	Heptageniidae								72	100/100
BUL16	9923	1	23-Aug-2006	Enchytraeidae	Annelida	Clitellata		Enchytraeidae								3	100/100
BUL16	9923	1	23-Aug-2006	*Suwallia*	Arthropoda	Insecta	Plecoptera	Chloroperlidae	*Suwallia*							19	100/100
BUL16	9923	1	23-Aug-2006	*Despaxia*	Arthropoda	Insecta	Plecoptera	Leuctridae	*Despaxia*							4	100/100
BUL16	9923	1	23-Aug-2006	*Zapada*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*							5	100/100
BUL16	9923	1	23-Aug-2006	Perlodidae	Arthropoda	Insecta	Plecoptera	Perlodidae								1	100/100
BUL16	9923	1	23-Aug-2006	*Kogotus*	Arthropoda	Insecta	Plecoptera	Perlodidae	*Kogotus*							2	100/100
BUL16	9923	1	23-Aug-2006	Capniidae	Arthropoda	Insecta	Plecoptera	Capniidae								10	100/100
BUL16	9923	1	23-Aug-2006	*Parapsyche*	Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Parapsyche*							1	100/100
BUL16	9923	1	23-Aug-2006	*Rhyacophila*	Arthropoda	Insecta	Trichoptera	Rhyacophilidae	*Rhyacophila*							20	100/100
BUL16	9923	1	23-Aug-2006	Trichoptera	Arthropoda	Insecta	Trichoptera									1	100/100
BUL16	9923	1	23-Aug-2006	*Amiocentrus*	Arthropoda	Insecta	Trichoptera	Brachycentridae	*Amiocentrus*							11	100/100

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Total Abundance	Taxa Exclude Completely	Taxa Damaged Exclude	Lab Comments
BUL16	47.0	ok	ok	-
BUL16	6.0	Exclude	Exclude	-
BUL16	1.0	Exclude	Exclude	-
BUL16	7.0	ok	ok	-
BUL16	3.0	ok	ok	-
BUL16	8.0	ok	Exclude	-
BUL16	2.0	ok	ok	-
BUL16	3.0	ok	ok	-
BUL16	11.0	ok	ok	-
BUL16	5.0	ok	ok	-
BUL16	2.0	ok	ok	-
BUL16	2.0	ok	ok	-
BUL16	7.0	ok	ok	-
BUL16	7.0	ok	Exclude	-
BUL16	1.0	ok	ok	-
BUL16	1.0	ok	ok	-
BUL16	1.0	ok	ok	-
BUL16	3.0	Exclude	Exclude	-
BUL16	1.0	Exclude	Exclude	-
BUL16	2.0	ok	Exclude	-
BUL16	8.0	ok	ok	-
BUL16	28.0	ok	ok	-
BUL16	3.0	ok	ok	-
BUL16	36.0	ok	ok	-
BUL16	31.0	ok	ok	-
BUL16	5.0	ok	ok	-
BUL16	98.0	ok	ok	-
BUL16	3.0	ok	ok	-
BUL16	15.0	ok	ok	-
BUL16	1.0	ok	ok	-
BUL16	8.0	ok	ok	-
BUL16	1.0	ok	ok	-
BUL16	56.0	ok	ok	-
BUL16	8.0	ok	ok	-
BUL16	11.0	ok	ok	-
BUL16	72.0	ok	ok	-
BUL16	3.0	ok	ok	-
BUL16	19.0	ok	ok	-
BUL16	4.0	ok	ok	-
BUL16	5.0	ok	ok	-
BUL16	1.0	ok	ok	-
BUL16	2.0	ok	ok	-
BUL16	10.0	ok	ok	-
BUL16	1.0	ok	ok	-
BUL16	20.0	ok	ok	-
BUL16	1.0	ok	Exclude	-
BUL16	11.0	ok	ok	-

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Lab Sample ID	Replicate	Date	Taxon	Phylum	Class	Order	Family	Genus	Adult	Juvenile	Larvae	Nymph	Pupa	Deutonymph	Raw Count	Split
BUL16	9923	1	23-Aug-2006	*Glossosoma*	Arthropoda	Insecta	Trichoptera	Glossosomatidae	*Glossosoma*							5	100/100
BUL16	9923	1	23-Aug-2006	*Chelifera*	Arthropoda	Insecta	Diptera	Empididae	*Chelifera*							5	100/100
BUL16	9923	1	23-Aug-2006	*Pericoma*	Arthropoda	Insecta	Diptera	Psychodidae	*Pericoma*							11	100/100
BUL16	9923	1	23-Aug-2006	*Bezzia/Palpomyia*	Arthropoda	Insecta	Diptera	Ceratopogonidae	*Bezzia/Palpomyia*							4	100/100
BUL16	9923	1	23-Aug-2006	*Antocha*	Arthropoda	Insecta	Diptera	Tipulidae	*Antocha*							5	100/100
BUL16	9923	1	23-Aug-2006	*Rhabdomastix*	Arthropoda	Insecta	Diptera	Tipulidae	*Rhabdomastix*							1	100/100
BUL16	9923	1	23-Aug-2006	Chironomidae	Arthropoda	Insecta	Diptera	Chironomidae								168	100/100
BUL16	9923	1	23-Aug-2006	*Polycelis*	Platyhelminthes	Turbellaria	Tricladida	Planariidae	*Polycelis*							5	100/100
BUL16	9923	1	23-Aug-2006	Ostracoda	Arthropoda	Ostracoda										5	100/100
BUL16	9923	1	23-Aug-2006	*Heterlimnius*	Arthropoda	Insecta	Coleoptera	Elmidae	*Heterlimnius*							1	100/100
BUL73	13002	1	26-Sep-2007	*Sperchon*	Arthropoda	Arachnida	Trombidiformes	Sperchontidae	*Sperchon*							87.96	100/100
BUL73	13002	1	26-Sep-2007	*Lebertia*	Arthropoda	Arachnida	Trombidiformes	Lebertiidae	*Lebertia*							9.87	100/100
BUL73	13002	1	26-Sep-2007	*Acentrella*	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Acentrella*							7.85	100/100
BUL73	13002	1	26-Sep-2007	*Baetis bicaudatus*	Arthropoda	Insecta	Ephemeroptera	Baetidae	*Baetis*							11.89	100/100
BUL73	13002	1	26-Sep-2007	Ephemerellidae	Arthropoda	Insecta	Ephemeroptera	Ephemerellidae								359.94	100/100
BUL73	13002	1	26-Sep-2007	*Paraleptophlebia*	Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	*Paraleptophlebia*							7.85	100/100
BUL73	13002	1	26-Sep-2007	*Rhithrogena*	Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Rhithrogena*							133.97	100/100
BUL73	13002	1	26-Sep-2007	Heptageniidae	Arthropoda	Insecta	Ephemeroptera	Heptageniidae								31.86	100/100
BUL73	13002	1	26-Sep-2007	*Sweltsa*	Arthropoda	Insecta	Plecoptera	Chloroperlidae	*Sweltsa*							1.8	100/100
BUL73	13002	1	26-Sep-2007	Chloroperlidae	Arthropoda	Insecta	Plecoptera	Chloroperlidae								7.85	100/100
BUL73	13002	1	26-Sep-2007	*Suwallia*	Arthropoda	Insecta	Plecoptera	Chloroperlidae	*Suwallia*							1.8	100/100
BUL73	13002	1	26-Sep-2007	*Zapada cinctipes*	Arthropoda	Insecta	Plecoptera	Nemouridae	*Zapada*							3.81	100/100
BUL73	13002	1	26-Sep-2007	Perlidae	Arthropoda	Insecta	Plecoptera	Perlidae								1.8	100/100
BUL73	13002	1	26-Sep-2007	Perlodidae	Arthropoda	Insecta	Plecoptera	Perlodidae								17.95	100/100
BUL73	13002	1	26-Sep-2007	*Taenionema*	Arthropoda	Insecta	Plecoptera	Taeniopterygidae	*Taenionema*							149.9	100/100
BUL73	13002	1	26-Sep-2007	Capniidae	Arthropoda	Insecta	Plecoptera	Capniidae								97.84	100/100
BUL73	13002	1	26-Sep-2007	*Yoraperla*	Arthropoda	Insecta	Plecoptera	Peltoperlidae	*Yoraperla*							7.85	100/100
BUL73	13002	1	26-Sep-2007	*Pteronarcys*	Arthropoda	Insecta	Plecoptera	Pteronarcyidae	*Pteronarcys*							7.85	100/100
BUL73	13002	1	26-Sep-2007	*Arctopsyche*	Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Arctopsyche*							175.93	100/100
BUL73	13002	1	26-Sep-2007	*Hydropsyche*	Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Hydropsyche*							163.81	100/100
BUL73	13002	1	26-Sep-2007	Hydropsychidae	Arthropoda	Insecta	Trichoptera	Hydropsychidae								589.95	100/100
BUL73	13002	1	26-Sep-2007	Limnephilidae	Arthropoda	Insecta	Trichoptera	Limnephilidae								7.85	100/100
BUL73	13002	1	26-Sep-2007	*Glossosoma*	Arthropoda	Insecta	Trichoptera	Glossosomatidae	*Glossosoma*							7.85	100/100
BUL73	13002	1	26-Sep-2007	*Hemerodromia*	Arthropoda	Insecta	Diptera	Empididae	*Hemerodromia*							1.8	100/100
BUL73	13002	1	26-Sep-2007	*Chelifera/Metachela*	Arthropoda	Insecta	Diptera	Empididae	*Chelifera/Metachela*							9.87	100/100
BUL73	13002	1	26-Sep-2007	*Prosimulium*	Arthropoda	Insecta	Diptera	Simuliidae	*Prosimulium*							51.84	100/100
BUL73	13002	1	26-Sep-2007	*Agathon*	Arthropoda	Insecta	Diptera	Blephariceridae	*Agathon*							1.8	100/100
BUL73	13002	1	26-Sep-2007	*Hexatoma*	Arthropoda	Insecta	Diptera	Tipulidae	*Hexatoma*							3.81	100/100
BUL73	13002	1	26-Sep-2007	Chironomidae	Arthropoda	Insecta	Diptera	Chironomidae								181.99	100/100
BUL73	13002	1	26-Sep-2007	Clitellata	Annelida	Clitellata										93.8	100/100

Appendix 10-D. Stream Benthic Invertebrates, Tenas Project, 2017

Site	Total Abundance	Taxa Exclude Completely	Taxa Damaged Exclude	Lab Comments
BUL16	5.0	ok	ok	-
BUL16	5.0	ok	ok	-
BUL16	11.0	ok	ok	-
BUL16	4.0	ok	ok	-
BUL16	5.0	ok	ok	-
BUL16	1.0	ok	ok	-
BUL16	168.0	ok	ok	-
BUL16	5.0	Exclude	ok	-
BUL16	5.0	Exclude	Exclude	-
BUL16	1.0	ok	ok	-
BUL73	88.0	ok	ok	-
BUL73	9.9	ok	ok	-
BUL73	7.9	ok	ok	-
BUL73	11.9	ok	ok	-
BUL73	359.9	ok	ok	-
BUL73	7.9	ok	ok	-
BUL73	134.0	ok	ok	-
BUL73	31.9	ok	ok	-
BUL73	1.8	ok	ok	-
BUL73	7.9	ok	ok	-
BUL73	1.8	ok	ok	-
BUL73	3.8	ok	ok	-
BUL73	1.8	ok	ok	-
BUL73	3.8	ok	ok	-
BUL73	1.8	ok	ok	-
BUL73	18.0	ok	ok	-
BUL73	149.9	ok	ok	-
BUL73	97.8	ok	ok	-
BUL73	7.9	ok	ok	-
BUL73	7.9	ok	ok	-
BUL73	175.9	ok	ok	-
BUL73	163.8	ok	ok	-
BUL73	590.0	ok	ok	-
BUL73	7.9	ok	ok	-
BUL73	7.9	ok	ok	-
BUL73	1.8	ok	ok	-
BUL73	9.9	ok	ok	-
BUL73	51.8	ok	ok	-
BUL73	1.8	ok	ok	-
BUL73	3.8	ok	ok	-
BUL73	182.0	ok	ok	-
BUL73	93.8	ok	Exclude	-

Notes:
Samples were collected with a 400 µm CABIN kick-net.
2017 samples were analyzed by Biologica.

Appendix 10-E

Stream Benthic Invertebrates QA/QC, Tenas Project, 2017

Appendix 10-E. Stream Benthic Invertebrates QA/QC, Tenas Project, 2017

Table 1. Sorting Efficiency and Taxonomy

Benthic report of quality control, quality assurance for sorting efficiency and taxonomy for ERM Telkwa Coal, 2017.

Biologica Sample ID	Client Sample ID	Sorting Efficiency QA: Random whole resorts	Bray-Curtis similarity for taxonomy & enumeration	Percent taxonomic Disagreement (PTD)	Percent difference in Enumeration (PDE)
fb17-089-006	WQS12	99.69%	98.28%	0.00%	99.69%

Table 2. QA Identification

Biologica Sample #	Client Sample #	Agreements	Disagreements/ Misidentification	Difference in Resolution	Difference in Enumeration	Found in Original Sample	Total Organisms Found in QA	Percent taxonomic Agreement (PTA)
fb17-089-006	WQS12	34	0	6	1	320	319	100.00%

Notes:

Identification Agreement Rate: [(# incorrect identifications/total organisms found in audit) x100%]-100

Enumeration, questionable taxonomic resolution and insufficient taxonomic resolution are not included in the % Agreement Rate

Appendix 11-A

Fish Stream Morphology and Habitat Information for the Tenas Coal Project for Seven Sampling Sites Located in the Project Area Visited in 2017

Appendix 11-A. Fish Stream Morphology and Habitat Information for the Tenas Coal Project for Seven Sampling Sites Located in the Project Area Visited in 2017

		Channel Width (m)						Wetted Width (m)						Residual Pools					Bankfull Depth			
Stream	Site ID	Width (m)	Width (m)	Width (m)	Width (m)	Width (m)	Mean Channel Width (m)	Width (m)	Width (m)	Width (m)	Width (m)	Width (m)	Mean Wetted Width (m)	Depth (m)	Depth (m)	Depth (m)	Depth (m)	Mean Residual Pool Depth (m)	Depth (m)	Depth (m)	Depth (m)	Mean Bankfull Depth (m)
Tenas Creek	WQS01	4.3	4.5	3.4	4.0	4.3	4.10	8.0	16.0	14.0	12.0	9.3	11.86	0.3	0.4	0.3	0.3	0.33	0.6	1.2		0.9
Tenas Creek	WQS02	8.0	8.8	11.0	15.0	10.2	10.60	4.2	4.7	5.0	5.3	4.0	4.64	0.2	0.3	0.4	0.2	0.28	1.5	0.9		1.2
Goathorn Creek	WQS05	16.0	14.0	16.0	20.0	18.0	16.80	11.0	6.0	8.5	12.0	12.0	9.90	0.3	0.3	0.4	0.7	0.43	0.5	0.4		0.5
Telkwa River	WQS08	38.0	35.0	35.0			36.00	30.0	32.0	30.0			30.67	1.0	0.8			0.90	2.5	1.7	2.0	2.1
Telkwa River	WQS09	45.0	42.0	45.0			44.00	32.0	30.0	28.0			30.00	0.6	0.5			0.55	2.0	2.0		2.0
Bulkley River	WQS11b	120.0					120.00	90.0					90.00						2.5	3.0		2.8
Bulkley River	WQS12b	120.0					120.00	85.0					85.00	0.9	0.6			0.75	3.0	3.0		3.0

Appendix 11-A. Fish Stream Morphology and Habitat Information for the Tenas Coal Project for Seven Sampling Sites Located in the Project Area Visited in 2017

		Gradient					Water Quality			Cover										
Stream	Site ID	Gradient #1 (%)	Gradient #2 (%)	Gradient #3 (%)	Mean Gradient (%)	Stage	Temperature (°C)	Conductivity (µS/cm)	Turbidity	Total Cover	Small Woody Debris	Large Woody Debris	Boulders	Undercut Banks	Deep Pools	Overhanging Vegetation	Instream Vegetation	Crown Closure	Functional LWD	LWD Distribution	Instream Vegetation Type
Tenas Creek	WQS01	2.00	3.00		2.5%	low	3	164	Clear	abundant	none	trace	dominant	none	trace	trace	none	21-40%	none		none
Tenas Creek	WQS02	3.00	3.00	4.00	3.3%	moderate	2	178	Clear	abundant	trace	trace	dominant	trace	trace	trace	none	21-40%	few	evenly distributed	none
Goathorn Creek	WQS05	1.50	2.00		1.8%	moderate	3	198	Clear	moderate	trace	dominant	sub-dominant	sub-dominant	trace	trace	none	1-20%	few	clumped	none
Telkwa River	WQS08	1.50	2.00		1.8%	moderate	2	107	Clear	moderate	none	none	dominant	none	trace	trace	none	1-20%	none		vascular plants
Telkwa River	WQS09	2.00	1.50		1.8%	moderate	3	113	Clear	moderate	none	trace	dominant	none	trace	trace	none	1-20%	none		none
Bulkley River	WQS11b	1.00	1.00		1.0%	moderate	9	60	Clear	trace	none	trace	trace	none	trace	none	none	1-20%	none		none
Bulkley River	WQS12b	0.50	1.00	1.00	0.8%	moderate	8	66	Clear	moderate	trace	trace	dominant	trace	trace	trace	none	1-20%	none		none

Appendix 11-A. Fish Stream Morphology and Habitat Information for the Tenas Coal Project for Seven Sampling Sites Located in the Project Area Visited in 2017

		Bank Morphology										Bed Material			
Stream	Site ID	L. Bank Shape	L. Bank Texture Dominant 1	L. Bank Texture Dominant 2	L. Bank Riparian Vegetation	L. Bank Riparian Vegetation Stage	R. Bank Shape	R. Bank Texture Dominant 1	R. Bank Texture Dominant 2	R. Bank Riparian Vegetation	R. Bank Riparian Vegetation Stage	Dominant	Subdominant	D95 (cm)	D (cm)
Tenas Creek	WQS01	sloping	gravels	fines	shrubs	mature forest	V-shaped	fines		shrubs	mature forest	cobbles	gravels	65.0	50.0
Tenas Creek	WQS02	sloping	gravels	fines	coniferous forest	mature forest	V-shaped	gravels	cobbles	coniferous forest	mature forest	cobbles	boulders	50.0	40.0
Goathorn Creek	WQS05	sloping	fines	gravels	mixed forest	mature forest	V-shaped	fines	gravels	coniferous forest	mature forest	gravels	cobbles	40.0	30.0
Telkwa River	WQS08	V-shaped	fines	gravels	mixed forest	mature forest	V-shaped	gravels	cobbles	mixed forest	mature forest	cobbles	boulders	200.0	50.0
Telkwa River	WQS09	V-shaped	gravels	cobbles	mixed forest	young forest	V-shaped	gravels	cobbles	mixed forest	young forest	cobbles	boulders	60.0	40.0
Bulkley River	WQS11b	V-shaped	fines	gravels	shrubs	mature forest	V-shaped	fines	gravels	shrubs	mature forest	gravels	cobbles	100.0	15.0
Bulkley River	WQS12b	V-shaped	fines	gravels	mixed forest	mature forest	sloping	fines	gravels	deciduous forest	mature forest	gravels	cobbles	20.0	20.0

Appendix 11-A. Fish Stream Morphology and Habitat Information for the Tenas Coal Project for Seven Sampling Sites Located in the Project Area Visited in 2017

		Channel Morphology					
Stream	**Site ID**	**Morphology**	**Pattern**	**Coupling**	**Confinement**	**Feature Type**	**Comments**
Tenas Creek	WQS01	riffle-pool	irregular wandering	Partially Coupled	occasionally confined		S: important evidence of resident DV spawning = good gravels; R: good, lots of rearing hab & invert production; O: fair - few areas of slack water pools; M: fair - similar hab upstream
Tenas Creek	WQS02	riffle-pool	irregular wandering	Partially Coupled	occasionally confined		S: v. good, lots of patches of suitable gravels for resident DV & RB; R: v. good - lots of cobble cover & invert production; O: fair, flow not too fast, but limited pools & slack water areas; M: good - more good rearing/spawning habitat noted upstream; Overall: Important
Goathorn Creek	WQS05	riffle-pool	irregular wandering	Decoupled	unconfined		S: good - patches of good gravels w/ good flow for salmon and resident fish; R: good - good cover for small fish/good invert production; O: fair - shallow, few pools; M: good - lots of habitat, incl. DV spawning upstream; Overall: Important
Telkwa River	WQS08	riffle-pool	irregular wandering	Partially Coupled	confined		S: fair - some small areas w/ suitable gravel/flow; R: good - lots of cobble/boulder cover & invert production; O: fair - few pools or slack water areas; M: good - lots of spawning/rearing hab upstream
Telkwa River	WQS09	riffle-pool	irregular wandering	Decoupled	occasionally confined	fisheries sensitive zone	S: good - areas w/ very good gravels & flows for salmon; R: good - lots of boulder cover for small fish, few LWD structures; O: good - sufficient flow but few slack water areas; M: good - spawning & rearing habitat upstream; Overall: Critical Fisheries sensitive zone - back channel rearing habitat for salmon fry
Bulkley River	WQS11b	large channel	irregular wandering	Decoupled	unconfined		S: good - lots of patches of suitable gravels (and dead pink salmon along banks); R: fair - not a lot of cover/cobbles for fry; O: fair - not a lot of slack water pools; M: good - major salmon spawning habitat upstream
Bulkley River	WQS12b	large channel	irregular wandering	Decoupled	unconfined	fisheries sensitive zone	S: critical - pink salmon spawning at site, extensive spawning hab; R: good - limited cover for small fish, but extensive back-channel/slough provides important rearing hab; O: good - mainstem is deep enough; M: good - extensive salmon spawning habitat upstream; Overall: Critical

Appendix 11-B

Electrofishing Specifications and Catch per Unit Effort (CPUE) for Electrofishing Sampling Efforts at Seven Sampling Sites Located in the Project Area Visited in 2017

Appendix 11-B. Electrofishing Specifications and Catch per Unit Effort (CPUE) for Electrofishing Sampling Efforts at Seven Sampling Sites Located in the Project Area Visited in 2017

Stream	Site ID	Temperature (°C)	Conductivity (µS)	Turbidity (NTU)	EF Seconds	Ef Length (m)	Ef Width (m)	Enclosure	Voltage (V)	Frequency (Hz)	Species	Stage	Total	CPUE
Tenas Creek	WQS01	2.3	164	clear	860	350	2	Open	400	30	Dolly Varden	juvenile	14	1.63
Tenas Creek	WQS01	2.3	164	clear	860	350	2	Open	400	30	Rainbow Trout	juvenile	9	1.05
Tenas Creek	WQS02	2	177	clear	1007	250	2	Open	425	30	Dolly Varden	juvenile	7	0.7
Tenas Creek	WQS02	2	177	clear	1007	250	2	Open	425	30	Rainbow Trout	juvenile	22	2.18
Goathorn Creek	WQS05	3	187	clear	1035	300	2	Open	450	30	Coho Salmon	fry	2	0.19
Goathorn Creek	WQS05	3	187	clear	1035	300	2	Open	450	30	Dolly Varden	juvenile	4	0.39
Goathorn Creek	WQS05	3	187	clear	1035	300	2	Open	450	30	Rainbow Trout	juvenile	22	2.13
Telkwa River	WQS08	2	107	clear	1232	500	2	Open	550	30	Coho Salmon	fry	11	0.89
Telkwa River	WQS08	2	107	clear	1232	500	2	Open	550	30	Dolly Varden	juvenile	2	0.16
Telkwa River	WQS08	2	107	clear	1232	500	2	Open	550	30	Mountain Whitefish	juvenile	1	0.08
Telkwa River	WQS08	2	107	clear	1232	500	2	Open	550	30	Rainbow Trout	juvenile	17	1.38
Telkwa River	WQS09	3	113	clear	830	250	2	Open	550	30	Coho Salmon	fry	2	0.24
Telkwa River	WQS09	3	113	clear	830	250	2	Open	550	30	Dolly Varden	adult	2	0.24
Telkwa River	WQS09	3	113	clear	830	250	2	Open	550	30	Mountain Whitefish	juvenile	2	0.24
Telkwa River	WQS09	3	113	clear	830	250	2	Open	550	30	Rainbow Trout	juvenile	18	2.17
Bulkley River	WQS11b	8.8	60	clear	684	250	2	Open	700	30	Coho Salmon	fry	12	1.75
Bulkley River	WQS11b	8.8	60	clear	684	250	2	Open	700	30	Lamprey (General)	juvenile	1	0.15
Bulkley River	WQS11b	8.8	60	clear	684	250	2	Open	700	30	Rainbow Trout	juvenile	19	2.78
Bulkley River	WQS11b	8.8	60	clear	684	250	2	Open	700	30	Sucker (General)	juvenile	3	0.44
Bulkley River	WQS12b	8	66	clear	1356	600	2	Open	700	30	Coho Salmon	fry	21	1.55
Bulkley River	WQS12b	8	66	clear	1356	600	2	Open	700	30	Rainbow Trout	juvenile	21	1.55
Bulkley River	WQS12b	8	66	clear	1356	600	2	Open	700	30	Sucker (General)	juvenile	3	0.22

Appendix 11-C

Individual Fish Data Collected during Field Sampling Efforts at Seven Sites in the Project Area during 2017

Appendix 11-C. Individual Fish Data Collected during Field Sampling Efforts at Seven Sites in the Project Area during 2017

Date	Site	Waterbody	Sample Method	H/P#	Sample ID	Species	Sex	Maturity	Fork Length (mm)	Total Weight (g)	Condition	Liver Weight (g)	Aging Tissue	DELTs/Comments	Sampling Program
11-Oct-17	WQS05	Goathorn Creek	EF	1	S05-1	Dolly Varden	U	U	141	28.93	1.03		SC+FC		
11-Oct-17	WQS05		EF	1	S05-2	Dolly Varden	U	U	95	7.86	0.92		SC+FC		
11-Oct-17	WQS05		EF	1	S05-3	Rainbow Trout	U	U	82	6.34	1.15		SC+FC		
11-Oct-17	WQS05		EF	1	S05-4	Rainbow trout	U	U	72	5.3	1.42		SC+FC		
11-Oct-17	WQS05		EF	1	S05-5	Rainbow trout	U	U	71	5.3	1.48		SC+FC		
11-Oct-17	WQS05		EF	1	S05-6	Rainbow trout	U	U	75	4.73	1.12		SC+FC		
11-Oct-17	WQS05		EF	1	S05-7	Rainbow trout	U	U	85	6.13	1.00		SC+FC		
11-Oct-17	WQS05		EF	1	-	Coho salmon	U	U	97	9.76	1.07		-		
11-Oct-17	WQS05		EF	1	-	Rainbow trout	U	U	41	0.73	1.06		-		
11-Oct-17	WQS05		EF	1	-	Dolly Varden	U	U	51	1.01	0.76		-		
11-Oct-17	WQS05		EF	1	-	Rainbow trout	U	U	52	1.31	0.93		-		
11-Oct-17	WQS05		EF		-	Rainbow trout	U	U	45	1.04	1.14		-		
11-Oct-17	WQS05		EF	1	-	Coho salmon	U	U	62	2.37	0.99		-		
11-Oct-17	WQS05		EF	1	-	Rainbow trout	U	U	48	1.11	1.00		-		
11-Oct-17	WQS05		EF	1	-	Rainbow trout	U	U	44	0.99	1.16		-		
11-Oct-17	WQS05		EF	1	-	Dolly Varden	U	U	52	1.13	0.80		-		
11-Oct-17	WQS05		EF	1	-	Rainbow trout	U	U	49	1.21	1.03		-		
11-Oct-17	WQS05		EF	1	-	Rainbow trout	U	U	50	1.13	0.90		-		
11-Oct-17	WQS05		EF	1	-	Rainbow trout	U	U	39	0.68	1.15		-		
11-Oct-17	WQS05		EF	1	-	Rainbow trout	U	U	45	1.02	1.12		-		
11-Oct-17	WQS05		EF	1	S05-8	Rainbow trout	U	U	99	10.44	1.08	0.09	SC+2 OTO		MMER
11-Oct-17	WQS05		EF	1	S05-9	Rainbow trout	U	U	110	13.38	1.01	0.11	SC+1 OTO		MMER
11-Oct-17	WQS05		EF	1	S05-10	Rainbow trout	U	U	98	8.95	0.95	0.06	SC+2 OTO		MMER
11-Oct-17	WQS05		EF	1	S05-11	Rainbow trout	U	U	116	16.69	1.07	0.15	SC+2 OTO		MMER
11-Oct-17	WQS05		EF	1	S05-12	Rainbow trout	U	U	115	15.86	1.04	0.15	SC+2 OTO		MMER
11-Oct-17	WQS05		EF	1	S05-13	Rainbow trout	U	U	95	11.34	1.32	0.13	SC+2 OTO		MMER
11-Oct-17	WQS05		EF	1	S05-14	Rainbow trout	U	U	82	5.52	1.00	0.07	SC+2 OTO		MMER
11-Oct-17	WQS05		EF	1	S05-15	Rainbow trout	U	U	106	12.17	1.02	0.08	SC+2 OTO		MMER
12-Oct-17	WQS01	Tenas Creek	EF	1	S05-01	Dolly Varden	U	U	109	11.65	0.90		SC+FC		
12-Oct-17	WQS01		EF	1	S05-02	Dolly Varden	U	U	96	7.54	0.85		SC+FC		
12-Oct-17	WQS01		EF	1	-	Dolly Varden	U	U	102	9.92	0.93		-		
12-Oct-17	WQS01		EF	1	S05-03	Dolly Varden	U	U	99	9.04	0.93		SC+FC		
12-Oct-17	WQS01		EF	1	S05-04	Dolly Varden	U	M	138	25.59	0.97		SC+FC		
12-Oct-17	WQS01		EF	1	S05-05	Dolly Varden	U	U	112	12.98	0.92		SC+FC		
12-Oct-17	WQS01		EF	1	S05-06	Dolly Varden	U	U	89	6.8	0.96		SC+FC		
12-Oct-17	WQS01		EF	1	S05-07	Dolly Varden	U	M	155	32.98	0.89		SC+FC		
12-Oct-17	WQS01		EF	1	S05-08	Dolly Varden	U	U	138	21.84	0.83		SC+FC		
12-Oct-17	WQS01		EF	1	S05-09	Rainbow Trout	U	U	109	15.88	1.23		SC+FC		
12-Oct-17	WQS01		EF	1	S05-10	Dolly Varden	U	U	115	14.02	0.92		SC+FC		
12-Oct-17	WQS01		EF	1	-	Dolly Varden	U	U	112	14.35	1.02		-		
12-Oct-17	WQS01		EF	1	-	Dolly Varden	U	U	119	14.39	0.85		-		
12-Oct-17	WQS01		EF	1	-	Dolly Varden	U	U	90	7.72	1.06		-		
12-Oct-17	WQS01		EF	1	-	Dolly Varden	U	U	74	4	0.99		-		

Appendix 11-C. Individual Fish Data Collected during Field Sampling Efforts at Seven Sites in the Project Area during 2017

Date	Site	Waterbody	Sample Method	H/P#	Sample ID	Species	Sex	Maturity	Fork Length (mm)	Total Weight (g)	Condition	Liver Weight (g)	Aging Tissue	DELTs/Comments	Sampling Program
12-Oct-17	WQS01	Tenas Creek *(cont'd)*	EF	1	S01-11	Rainbow Trout	U	U	108	12.71	1.01	0.12	SC+2 OTO		MMER
12-Oct-17	WQS01		EF	1	S01-12	Rainbow Trout	U	U	112	13.93	0.99	0.14	SC+2 OTO		MMER
12-Oct-17	WQS01		EF	1	S01-13	Rainbow Trout	U	U	122	16.42	0.90	0.16	SC+2 OTO		MMER
12-Oct-17	WQS01		EF	1	S01-14	Rainbow Trout	U	U	119	17.34	1.03	0.16	SC+2 OTO		MMER
12-Oct-17	WQS01		EF	1	S01-15	Rainbow Trout	U	U	105	13.31	1.15	0.14	SC+2 OTO		MMER
12-Oct-17	WQS01		EF	1	S01-16	Rainbow Trout	U	U	132	24.18	1.05	0.24	SC+2 OTO		MMER
12-Oct-17	WQS01		EF	1	S01-17	Rainbow Trout	U	U	103	9.59	0.88	0.08	SC+2 OTO		MMER
12-Oct-17	WQS01		EF	1	S01-18	Rainbow Trout	U	U	117	17.36	1.08	0.15	SC+2 OTO		MMER
12-Oct-17	WQS11b	Bulkley River	EF	1	-	Coho salmon	U	U	47	0.9	0.87				
12-Oct-17	WQS11b		EF	1	-	Coho salmon	U	U	53	1.55	1.04				
12-Oct-17	WQS11b		EF	1	-	Rainbow trout	U	U	63	2.66	1.06				
12-Oct-17	WQS11b		EF	1	-	Coho salmon	U	U	83	6.75	1.18				
12-Oct-17	WQS11b		EF	1	S11-1	Rainbow trout	U	U	145	32.59	1.07		SC+FC		
12-Oct-17	WQS11b		EF	1	S11-2	Rainbow trout	U	U	153	38.7	1.08		SC+FC		
12-Oct-17	WQS11b		EF	1	S11-3	Rainbow trout	U	U	170	57.25	1.17		SC+FC		
12-Oct-17	WQS11b		EF	1	S11-4	Sucker (general)	U	U	134	24.91	1.04		SC+FC	Sucker (general) - Longnose or White	
12-Oct-17	WQS11b		EF	1	S11-5	Rainbow trout	U	U	135	23.85	0.97		SC+FC		
12-Oct-17	WQS11b		EF	1	S11-6	Rainbow trout	U	U	97	8.68	0.95		SC+FC		
12-Oct-17	WQS11b		EF	1	S11-7	Rainbow trout	U	U	85	7.56	1.23		SC+FC		
12-Oct-17	WQS11b		EF	1	S11-8	Rainbow trout	U	U	96	6.13	0.69		SC+FC		
12-Oct-17	WQS11b		EF	1	S11-9	Sucker (general)	U	U	93	8.64	1.07		SC+FC	Sucker (general) - Longnose or White	
12-Oct-17	WQS11b		EF	1	-	Coho salmon	U	U	85	6.02	0.98				
12-Oct-17	WQS11b		EF	1	-	Rainbow trout	U	U	50						
12-Oct-17	WQS11b		EF	1	-	Coho salmon	U	U	57						
12-Oct-17	WQS11b		EF	1	-	Coho salmon	U	U	65						
12-Oct-17	WQS11b		EF	1	-	Coho salmon	U	U	53						
12-Oct-17	WQS11b		EF	1	-	Coho salmon	U	U	52	1.85	1.32				
12-Oct-17	WQS11b		EF	1	-	Coho salmon	U	U	69	2.51	0.76				
12-Oct-17	WQS11b		EF	1	-	Coho salmon	U	U	72	4.63	1.24				
12-Oct-17	WQS11b		EF	1	-	Rainbow trout	U	U	71						
12-Oct-17	WQS11b		EF	1	-	Coho salmon	U	U	70						
12-Oct-17	WQS11b		EF	1	-	Coho salmon	U	U	52						
12-Oct-17	WQS11b		EF	1	-	Sucker (general)	U	U	53					Sucker (general) - Longnose or White	
12-Oct-17	WQS11b		EF	1	-	Rainbow trout	U	U	68						
12-Oct-17	WQS11b		EF	1	-	Lamprey (general)	U	U	80					Lamprey SP - Unidentified	
12-Oct-17	WQS11b		EF	1	S11-10	Rainbow trout	U	U	133	26.43	1.12	0.21	SC+2 OTO		MMER
12-Oct-17	WQS11b		EF	1	S11-11	Rainbow trout	U	U	125	26.08	1.34	0.33	SC+2 OTO		MMER
12-Oct-17	WQS11b		EF	1	S11-12	Rainbow trout	U	U	124	20.68	1.08	0.19	SC+2 OTO		MMER
12-Oct-17	WQS11b		EF	1	S11-13	Rainbow trout	U	U	97	10.83	1.19	0.12	SC+2 OTO		MMER
12-Oct-17	WQS11b		EF	1	S11-14	Rainbow trout	U	U	106	13.83	1.16	0.12	SC+2 OTO		MMER
12-Oct-17	WQS11b		EF	1	S11-15	Rainbow trout	U	U	99	10.9	1.12	0.1	SC+2 OTO		MMER
12-Oct-17	WQS11b		EF	1	S11-16	Rainbow trout	U	U	107	14.69	1.20	0.15	SC+2 OTO		MMER
12-Oct-17	WQS11b		EF	1	S11-17	Rainbow trout	U	U	125	22.93	1.17	0.25	SC+2 OTO		MMER

Appendix 11-C. Individual Fish Data Collected during Field Sampling Efforts at Seven Sites in the Project Area during 2017

Date	Site	Waterbody	Sample Method	H/P#	Sample ID	Species	Sex	Maturity	Fork Length (mm)	Total Weight (g)	Condition	Liver Weight (g)	Aging Tissue	DELTs/Comments	Sampling Program
13-Oct-17	WQS08	Telkwa River	EF	1	S08-01	Rainbow Trout	U	U	161	47.43	1.14		SC+FC		
13-Oct-17	WQS08		EF	1	S08-02	Mountain whitefish	U	U	97	7.18	0.79		SC+FC		
13-Oct-17	WQS08		EF	1	S08-03	Dolly Varden	U	U	98	8.68	0.92		FC		
13-Oct-17	WQS08		EF	1	-	Coho salmon	U	U	80	5.69	1.11		-		
13-Oct-17	WQS08		EF	1	-	Coho salmon	U	U	85	6.88	1.12		-		
13-Oct-17	WQS08		EF	1	S08-04	Dolly Varden	U	U	91	6.77	0.90		FC		
13-Oct-17	WQS08		EF	1	-	Coho salmon	U	U	55	1.57	0.94		-		
13-Oct-17	WQS08		EF	1	-	Coho salmon	U	U	64	3	1.14		-		
13-Oct-17	WQS08		EF	1	-	Coho salmon	U	U	59	2.13	1.04		-		
13-Oct-17	WQS08		EF	1	-	Coho salmon	U	U	63	2.88	1.15		-		
13-Oct-17	WQS08		EF	1	-	Rainbow Trout	U	U	45	0.99	1.09		-		
13-Oct-17	WQS08		EF	1	-	Coho salmon	U	U	65	3.77	1.37		-		
13-Oct-17	WQS08		EF	1	-	Coho salmon	U	U	67	2.89	0.96		-		
13-Oct-17	WQS08		EF	1	-	Coho salmon	U	U	76	4.71	1.07		-		
13-Oct-17	WQS08		EF	1	-	Rainbow Trout	U	U	68	3.31	1.05		-		
13-Oct-17	WQS08		EF	1	-	Coho salmon	U	U	90	7.58	1.04		-		
13-Oct-17	WQS08		EF	1	-	Coho salmon	U	U	55	1.84	1.11		-		
13-Oct-17	WQS08		EF	1	-	Rainbow Trout	U	U	68	3.54	1.13		-		
13-Oct-17	WQS08		EF	1	-	Rainbow Trout	U	U	79	5.42	1.10		-		
13-Oct-17	WQS08		EF	1	-	Rainbow Trout	U	U	63	3.38	1.35		-		
13-Oct-17	WQS08		EF	1	-	Rainbow Trout	U	U	40	0.64	1.00		-		
13-Oct-17	WQS08		EF	1	-	Rainbow Trout	U	U	44	0.84	0.99		-		
13-Oct-17	WQS08		EF	1	-	Rainbow Trout	U	U	66	3.31	1.15		-		
13-Oct-17	WQS08		MT		-	Coho salmon	U	U					-	Fry	
13-Oct-17	WQS08		MT		-	Coho salmon	U	U					-	Fry	
13-Oct-17	WQS08		MT		-	Rainbow Trout	U	U					-		
13-Oct-17	WQS08		MT		-	Rainbow Trout	U	U					-		
13-Oct-17	WQS08		EF	1	S08-5	Rainbow Trout	U	U	101	10.69	1.04	0.1	SC+2 OTO		MMER
13-Oct-17	WQS08		EF	1	S08-6	Rainbow Trout	U	U	95	9.03	1.05	0.1	SC+2 OTO		MMER
13-Oct-17	WQS08		EF	1	S08-7	Rainbow Trout	U	U	104	11.72	1.04	0.11	SC+2 OTO		MMER
13-Oct-17	WQS08		EF	1	S08-8	Rainbow Trout	U	U	107	12.88	1.05	0.1	SC+2 OTO		MMER
13-Oct-17	WQS08		EF	1	S08-9	Rainbow Trout	U	U	78	4.74	1.00	0.04	SC+2 OTO		MMER
13-Oct-17	WQS08		EF	1	S08-10	Rainbow Trout	U	U	96	8.79	0.99	0.07	SC+2 OTO		MMER
13-Oct-17	WQS08		EF	1	S08-11	Rainbow Trout	U	U	81	5.18	0.97	0.04	SC+2 OTO		MMER
13-Oct-17	WQS08		EF	1	S08-12	Rainbow Trout	U	U	98	11.44	1.22	0.12	SC+2 OTO		MMER
13-Oct-17	WQS09	Telkwa River	EF	1	S09-01	Dolly Varden	U	U	171	46.88	0.94		SC+FC		
13-Oct-17	WQS09		EF	1	S09-02	Dolly Varden	U	U	160	43.33	1.06		SC+FC		
13-Oct-17	WQS09		EF	1	-	Rainbow trout	U	U	75	4.53	1.07		-		
13-Oct-17	WQS09		EF	1	-	Coho salmon	U	U	105	11.83	1.02		-		
13-Oct-17	WQS09		EF	1	-	Rainbow trout	U	U	66	3.34	1.16		-		
13-Oct-17	WQS09		EF	1	-	Rainbow trout	U	U	75	4.35	1.03		-		
13-Oct-17	WQS09		EF	1	-	Rainbow trout	U	U	73	4.87	1.25		-		
13-Oct-17	WQS09		EF	1	S09-03	Rainbow trout	U	U	77	5.13	1.12		SC+FC		

Appendix 11-C. Individual Fish Data Collected during Field Sampling Efforts at Seven Sites in the Project Area during 2017

Date	Site	Waterbody	Sample Method	H/P#	Sample ID	Species	Sex	Maturity	Fork Length (mm)	Total Weight (g)	Condition	Liver Weight (g)	Aging Tissue	DELTs/Comments	Sampling Program
13-Oct-17	WQS09	Telkwa River *(cont'd)*	EF	1	S09-04	Rainbow trout	U	U	80	5.15	1.01		SC+FC		
13-Oct-17	WQS09		EF	1	S09-05	Rainbow trout	U	U	76	4.62	1.05		SC+FC		
13-Oct-17	WQS09		EF	1	-	Rainbow trout	U	U	67	3.03	1.01		-		
13-Oct-17	WQS09		EF	1	-	Rainbow trout	U	U	68	3.16	1.00		-		
13-Oct-17	WQS09		EF	1	-	Coho salmon	U	U	52				-		
13-Oct-17	WQS09		EF	1	-	Mountain whitefish	U	U	55	1.34	0.81		-		
13-Oct-17	WQS09		EF	1	-	Mountain whitefish	U	U	62	1.82	0.76		-		
13-Oct-17	WQS09		EF	1	-	Rainbow trout	U	U	39	0.49	0.83		-		
13-Oct-17	WQS09		MT		-	Dolly Varden	U	U					-		
13-Oct-17	WQS09		MT		-	Mountain whitefish	U	U					-		
13-Oct-17	WQS09		MT		-	Mountain whitefish	U	U					-		
13-Oct-17	WQS09		EF	1	S09-6	Rainbow trout	U	U	106	11.84	0.99	0.1	SC+2 OTO		MMER
13-Oct-17	WQS09		EF	1	S09-7	Rainbow trout	U	U	93	8.4	1.04	0.11	SC+2 OTO		MMER
13-Oct-17	WQS09		EF	1	S09-8	Rainbow trout	U	U	126	18.86	0.94	0.12	SC+2 OTO		MMER
13-Oct-17	WQS09		EF	1	S09-9	Rainbow trout	U	U	101	10.8	1.05	0.1	SC+2 OTO		MMER
13-Oct-17	WQS09		EF	1	S09-10	Rainbow trout	U	U	96	9.14	1.03	0.07	SC+2 OTO		MMER
13-Oct-17	WQS09		EF	1	S09-11	Rainbow trout	U	U	85	6.24	1.02	0.05	SC+2 OTO		MMER
13-Oct-17	WQS09		EF	1	S09-12	Rainbow trout	U	U	95	8.78	1.02	0.6	SC+2 OTO		MMER
13-Oct-17	WQS09		EF	1	S09-13	Rainbow trout	U	U	91	8.06	1.07	0.08	SC+2 OTO		MMER
14-Oct-17	WQS02	Tenas Creek	EF	1	S02-1	Rainbow Trout	U	U	178	62.25	1.10		SC+FC		
14-Oct-17	WQS02		EF	1	S02-2	Rainbow Trout	U	U	142	30.56	1.07		SC+FC		
14-Oct-17	WQS02		EF	1	S02-3	Rainbow Trout	U	U	126	21.63	1.08		SC+FC		
14-Oct-17	WQS02		EF	1	S02-4	Dolly Varden	U	U	126	18.77	0.94		SC+FC		
14-Oct-17	WQS02		EF	1	S02-5	Dolly Varden	U	U	128	19.67	0.94		SC+FC		
14-Oct-17	WQS02		EF	1	S02-6	Dolly Varden	U	U	126	17	0.85		SC+FC		
14-Oct-17	WQS02		EF	1	S02-7	Dolly Varden	U	U	115	14.88	0.98		SC+FC		
14-Oct-17	WQS02		EF	1	S02-8	Rainbow Trout	U	U	86	6.93	1.09		SC+FC		
14-Oct-17	WQS02		EF	1	S02-9	Rainbow Trout	U	U	94	8.2	0.99		SC+FC		
14-Oct-17	WQS02		EF	1	-	Rainbow Trout	U	U	95	8.35	0.97		-		
14-Oct-17	WQS02		EF	1	-	Rainbow Trout	U	U	86	7.25	1.14		-		
14-Oct-17	WQS02		EF	1	-	Rainbow Trout	U	U	88	7.76	1.14		-		
14-Oct-17	WQS02		EF	1	-	Dolly Varden	U	U	86	6.55	1.03		-		
14-Oct-17	WQS02		EF	1	-	Dolly Varden	U	U	77	4.4	0.96		-		
14-Oct-17	WQS02		EF	1	-	Dolly Varden	U	U	82	5.9	1.07		-		
14-Oct-17	WQS02		EF	1	-	Rainbow Trout	U	U	51	1.2	0.90		-		
14-Oct-17	WQS02		EF	1	-	Rainbow Trout	U	U	48	1.05	0.95		-		
14-Oct-17	WQS02		EF	1	-	Rainbow Trout	U	U	42	0.77	1.04		-		
14-Oct-17	WQS02		EF	1	-	Rainbow Trout	U	U	42	0.92	1.24		-		
14-Oct-17	WQS02		EF	1	-	Rainbow Trout	U	U	43	0.91	1.14		-		
14-Oct-17	WQS02		EF	1	-	Rainbow Trout	U	U	43	0.87	1.09		-		
14-Oct-17	WQS02		EF	1	S02-10	Rainbow Trout	U	U	108	16.39	1.30	0.17	SC+2 OTO		MMER
14-Oct-17	WQS02		EF	1	S02-11	Rainbow Trout	U	U	81	7.11	1.34	0.08	SC+2 OTO		MMER
14-Oct-17	WQS02		EF	1	S02-12	Rainbow Trout	U	U	105	15.06	1.30	0.15	SC+2 OTO		MMER

Appendix 11-C. Individual Fish Data Collected during Field Sampling Efforts at Seven Sites in the Project Area during 2017

Date	Site	Waterbody	Sample Method	H/P#	Sample ID	Species	Sex	Maturity	Fork Length (mm)	Total Weight (g)	Condition	Liver Weight (g)	Aging Tissue	DELTs/Comments	Sampling Program
14-Oct-17	WQS02	Tenas Creek *(cont'd)*	EF	1	S02-13	Rainbow Trout	U	U	88	8.85	1.30	0.1	SC+2 OTO		MMER
14-Oct-17	WQS02		EF	1	S02-14	Rainbow Trout	U	U	105	12.81	1.11	0.13	SC+2 OTO		MMER
14-Oct-17	WQS02		EF	1	S02-15	Rainbow Trout	U	U	113	17.64	1.22	0.18	SC+2 OTO		MMER
14-Oct-17	WQS02		EF	1	S02-16	Rainbow Trout	U	U	98	10.16	1.08	0.12	SC+2 OTO		MMER
14-Oct-17	WQS02		EF	1	S02-17	Rainbow Trout	U	U	121	22.28	1.26	0.23	SC+2 OTO		MMER
14-Oct-17	WQS12b	Bulkley River	EF	1	-	Rainbow trout	U	U	50	1.39	1.11		-		
14-Oct-17	WQS12b		EF	1	S12-01	Sucker (general)	U	U	142	33.2	1.16		SC+FC		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	88	7.68	1.13		-		
14-Oct-17	WQS12b		EF	1	S12-02	Rainbow trout	U	U	92	9.19	1.18		SC+FC		
14-Oct-17	WQS12b		EF	1	-	Rainbow trout	U	U	71	4.07	1.14		-		
14-Oct-17	WQS12b		EF	1	-	Rainbow trout	U	U	74	4.4	1.09		-		
14-Oct-17	WQS12b		EF	1	S12-03	Sucker (general)	U	U	101	12.43	1.21		SC+FC		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	95	8.38	0.98		-		
14-Oct-17	WQS12b		EF	1	S12-04	Sucker (general)	U	U	100	12.99	1.30		SC+FC		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	75	5.15	1.22		-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	49	1.84	1.56		-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	68	3.11	0.99		-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	59	2.16	1.05		-		
14-Oct-17	WQS12b		EF	1	S12-05	Rainbow trout	U	U	76	4.91	1.12		SC+FC		
14-Oct-17	WQS12b		EF	1	-	Rainbow trout	U	U	87	7.16	1.09		-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	81	6.21	1.17		-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	74	4.8	1.18		-		
14-Oct-17	WQS12b		EF	1	-	Rainbow trout	U	U	63	3.4	1.36		-		
14-Oct-17	WQS12b		EF	1	-	Rainbow trout	U	U	73	5.22	1.34		-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	88	7.3	1.07		-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	72	4.43	1.19		-		
14-Oct-17	WQS12b		EF	1	-	Rainbow trout	U	U	64	3.39	1.29		-		
14-Oct-17	WQS12b		EF	1	-	Rainbow trout	U	U	70	3.93	1.15		-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	53	1.96	1.32		-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	75	4.86	1.15		-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	54	1.91	1.21		-		
14-Oct-17	WQS12b		EF	1	-	Rainbow trout	U	U	68	3.83	1.22		-		
14-Oct-17	WQS12b		EF	1	-	Rainbow trout	U	U	40				-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	56	1.94	1.10		-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	54	2.14	1.36		-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	51	1.74	1.31		-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	62	2.49	1.04		-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	60	2.5	1.16		-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	44				-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	44				-		
14-Oct-17	WQS12b		EF	1	-	Coho salmon	U	U	45				-		
14-Oct-17	WQS12b		EF	1	-	Rainbow trout	U	U	42				-		
14-Oct-17	WQS12b		EF	1	S12-6	Rainbow trout	U	U	132	23.64	1.03	0.21	SC+2 OTO		MMER

Appendix 11-C. Individual Fish Data Collected during Field Sampling Efforts at Seven Sites in the Project Area during 2017

Date	Site	Waterbody	Sample Method	H/P#	Sample ID	Species	Sex	Maturity	Fork Length (mm)	Total Weight (g)	Condition	Liver Weight (g)	Aging Tissue	DELTs/Comments	Sampling Program
14-Oct-17	WQS12b	Bulkley River *(cont'd)*	EF	1	S12-7	Rainbow trout	U	U	82	6.73	1.22	0.06	SC+2 OTO		MMER
14-Oct-17	WQS12b		EF	1	S12-8	Rainbow trout	U	U	111	17.17	1.26	0.17	SC+2 OTO		MMER
14-Oct-17	WQS12b		EF	1	S12-9	Rainbow trout	U	U	94	8.88	1.07	0.08	SC+2 OTO		MMER
14-Oct-17	WQS12b		EF	1	S12-10	Rainbow trout	U	U	71	3.57	1.00	0.02	SC+2 OTO		MMER
14-Oct-17	WQS12b		EF	1	S12-11	Rainbow trout	U	U	102	11.9	1.12	0.15	SC+2 OTO		MMER
14-Oct-17	WQS12b		EF	1	S12-12	Rainbow trout	U	U	130	24.75	1.13	0.26	SC+2 OTO		MMER
14-Oct-17	WQS12b		EF	1	S12-13	Rainbow trout	F	IM	151	36.29	1.05	0.37	SC+2 OTO		MMER

Appendix 11-D

Tissue Metals Analysis and Quality Assurance / Quality Control Results

ALS Environmental

INVOICE #: E1616316

SOLD TO:

ERM Consultants Canada Ltd.
ATTN: Accounts Payable
1500-1111 West Hastings Street
Vancouver BC V6E 2J3

REPORTED TO: RES100

ERM Consultants Canada Ltd.
ATTN:Genevieve Morinville
Richmond Adelaide Centre
120 Adelaide St. W., Suite 2010
Toronto ON M5H 1T1

JOB #: 0403488-0008

Quote #: Q64799

Date	Account #	Terms	Due Date	PO Number/Reference
31-Jan-2018	RES100	Net 30 Days	02-Mar-2018	Not Submitted

Matrix	Analysis	Description	Surcharge	Qty	Unit Price	Total Price
Misc.	SAMPLE-DISPOSAL-VA	Sample Handling and Disposal Fee		56	$1.75	$98.00
Tissue	AG-WET-CCMS-N-VA	Silver in Tissue by CRC ICPMS (WET)		7	$32.50	$227.50
Tissue	AG-WET-MICR-HRMS-VA	Silver in Tissue by HR-ICPMS Micro (WET)		49	$45.50	$2,229.50
Tissue	HG-WET-CVAFS-N-VA	Mercury in Tissue by CVAFS (WET)		7	$13.00	$91.00
Tissue	HG-WET-MICR-CVAF-VA	Mercury in Tissue by CVAFS Micro (WET)		49	$13.00	$637.00
Tissue	MET-WET-CCMS-N-VA	Metals in Tissue by CRC ICPMS (WET)		7	$107.25	$750.75
Tissue	MET-WET-MICR-HRMS-VA	Metals in Tissue by HR-ICPMS Micro (WET)		49	$113.75	$5,573.75
Tissue	MOISTURE-MICR-VA	Moisture in Tissue		49	$3.25	$159.25
Tissue	MOISTURE-TISS-VA	% Moisture in Tissues		7	$3.25	$22.75
Tissue	PREP-MICR-DIGEST-VA	Tissue/Vegetation MIcro Preparation		49	$32.50	$1,592.50
Tissue	PREP-TISS-DIGEST-VA	Tissue/Vegetation Sample Preparation		7	$13.00	$91.00

ALS Work Order Numbers and Receive Dates:
L2019410 07-NOV-2017

GST/HST BN 100938885

Sub-total: $11,473.00
GST (5%): $573.65
Total (CAD): $12,046.65
PRICES REFLECT DISCOUNT

Contact Information:
Amber Springer, B.Sc
Phone #: (604) 253-4188
Fax #: (604) 253-6700
VANCOUVER

Please remit payment to ALS Canada Ltd. at the address below. We accept Visa and Mastercard.

ADDRESS: 2103 Dollarton Hwy. North Vancouver BC V7H 0A7 Canada

Sample Receipt Confirmation

Report Distribution:

Company Name: ERM Consultants Canada Ltd.
Contact: Genevieve Morinville
Address: 1500-1111 West Hastings Street, Vancouver, BC, V6E 2J3
Phone: 604-689-9460
Fax: 604-687-4277
Email: genevieve.morinville@erm.com, korina.houghton@erm.com, kathy.chambers@erm.com
EDD Email: genevieve.morinville@erm.com, korina.houghton@erm.com, kathy.chambers@erm.com
Distribution: Hard Copy: Y Email: Y Fax: N EDD: N

Invoice Distribution:

Acct Name: ERM Consultants Canada Ltd.
Contact: Accounts Payable
Address: 1500-1111 West Hastings Street, Vancouver, BC, V6E 2J3
Phone: 604-689-9460
Fax: --
Invoice Email: erm.canadapayables@erm.com
Project #: N/A
Account #: RES100

Client Information:

Job Reference #: 0403488-0008
Project PO #:
Legal Site Description: N/A
Quote #: N/A
Date Sampled: 11-OCT-17
Date Received: 07-NOV-17
Sampled By: Glen Keddie
Chain Of Custody: 1, 2, 3, 4, 5

Workorder Summary:

Lab Work Order #: L2019410
Estimated completion date:
56 Samples received at ALS in VANCOUVER
Client Job #: 0403488-0008
Account Manager: Amber Springer, B.Sc
Estimated sample disposal date: See Sample Disposal Information section below.

Lab Sample ID	Client Sample ID	Date Sampled	Date Received	Sample Due Date	Priority Flag	Sample Type
L2019410-1	505-8	11-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-2	505-9	11-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-3	505-10	11-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-4	505-11	11-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-5	505-12	11-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-6	505-13	11-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-7	505-14	11-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-8	505-15	11-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-9	501-11	11-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-10	501-12	12-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-11	501-13	12-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-12	501-14	12-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-13	501-15	12-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-14	501-16	12-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-15	501-17	12-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-16	501-18	12-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-17	511-10	12-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-18	511-11	12-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-19	511-12	12-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-20	511-13	12-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-21	511-14	12-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-22	511-15	12-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-23	511-16	12-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-24	511-17	12-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-25	508-5	13-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-26	508-6	13-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-27	508-7	13-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-28	508-8	13-OCT-17 00:00	07-NOV-17 22:49			Tissue

Lab Sample ID	Client Sample ID	Date Sampled	Date Received	Sample Due Date	Priority Flag	Sample Type
L2019410-29	508-9	13-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-30	508-10	13-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-31	508-11	13-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-32	508-12	13-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-33	509-6	13-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-34	509-7	13-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-35	509-8	13-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-36	509-9	13-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-37	509-10	13-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-38	509-11	13-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-39	509-12	13-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-40	509-13	13-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-41	502-10	14-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-42	502-11	14-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-43	502-12	14-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-44	502-13	14-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-45	502-14	14-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-46	502-15	14-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-47	502-16	14-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-48	502-17	14-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-49	512-6	14-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-50	512-7	14-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-51	512-8	14-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-52	512-9	14-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-53	512-10	14-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-54	512-11	14-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-55	512-12	14-OCT-17 00:00	07-NOV-17 22:49			Tissue
L2019410-56	512-13	14-OCT-17 00:00	07-NOV-17 22:49			Tissue

Analysis Requested :	Hold	Sample Handling and Disposal Fee
505-8	✓	✓
505-9	✓	✓
505-10	✓	✓
505-11	✓	✓
505-12	✓	✓
505-13	✓	✓
505-14	✓	✓
505-15	✓	✓
501-11	✓	✓
501-12	✓	✓
501-13	✓	✓
501-14	✓	✓
501-15	✓	✓
501-16	✓	✓
501-17	✓	✓
501-18	✓	✓
511-10	✓	✓
511-11	✓	✓
511-12	✓	✓
511-13	✓	✓
511-14	✓	✓
511-15	✓	✓
511-16	✓	✓
511-17	✓	✓
508-5	✓	✓
508-6	✓	✓
508-7	✓	✓
508-8	✓	✓
508-9	✓	✓
508-10	✓	✓

Analysis Requested :	Hold	Sample Handling and Disposal Fee
508-11	✓	✓
508-12	✓	✓
509-6	✓	✓
509-7	✓	✓
509-8	✓	✓
509-9	✓	✓
509-10	✓	✓
509-11	✓	✓
509-12	✓	✓
509-13	✓	✓
502-10	✓	✓
502-11	✓	✓
502-12	✓	✓
502-13	✓	✓
502-14	✓	✓
502-15	✓	✓
502-16	✓	✓
502-17	✓	✓
512-6	✓	✓
512-7	✓	✓
512-8	✓	✓
512-9	✓	✓
512-10	✓	✓
512-11	✓	✓
512-12	✓	✓
512-13	✓	✓

Sample Integrity Observations: No observations were identified for this work order submission.

Sample Disposal Information:

Where possible, ALS will store samples for the following durations, measured from date of sample submission: 45 days for Soil and Water samples; 6 months for Tissue/Biota samples; 14 days for air samples collected on re-usable media; and 3 days for water samples submitted for microbiological testing. Longer storage times are available upon request.

For information about ALS accreditations and certifications please contact your Account Manager or visit our webpage at www.alsglobal.com (see Canada downloads).

ALS Group strives to deliver on-time results to our clients at all times. However, there are times when due to capacity issues or other unforeseen circumstances we are unable to meet our expected turnaround times. The information above is related to a recent workorder you have submitted to our laboratory. In the event that you have an inquiry, please refer to the Lab Work Order # when calling your Account Manager.

ALS Group appreciates your business. Thank you for the opportunity to work with you.

Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # 101

Page 5 of 5

RM	Report Format / Distribution: ☑ Standard ☐ Other	Service Requested (Rush for routine analysis subject to availability): ◉ Regular (Standard Turnaround times—Business Days)
enevieve Morinville	☑ PDF ☑ Excel ☑ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
chmond Adelaide Centre	Email 1: genevieve.morinville@erm.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
0 Adelaide St. W.] Suite 2010; Toronto, ON	Email 2: karina.houghton@erm.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
7-288- 09 Fax:	Email 3: kathy.chambers@erm.com	Analysis Request
me as Report ☑ Yes ☐ No	Client / Project Information	Please indicate below Filtered, Preserved or both (F, P, F/P)
nvoice with Re ☑ Yes ☑ No	Job #: 0403488-0006	
RM	PO / AFE:	
ccounts Payables (ERM.CanadaPayables@	LSD:	
th Floor, 1111 W. Hastings St.; Vancouver,		
4-689-9 Fax:	Quote #:	
rder # nly)	ALS Contact: Amber Springer Sampler:	

Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Percent Moisture	Standard CCMS Metals	Mercury	Silver	Number of Containers
512 - 6	14 OCT		Tissue	x	x	x	x	1
512 - 7	↓		Tissue	x	x	x	x	1
512 - 8			Tissue	x	x	x	x	1
512 - 9			Tissue	x	x	x	x	1
512 - 10			Tissue	x	x	x	x	1
512 - 11			Tissue	x	x	x	x	1
512 - 12			Tissue	x	x	x	x	1
512 - 13	↓		Tissue	x	x	x	x	1
			Tissue	x	x	x	x	1
			Tissue	x	x	x	x	1
			Tissue	x	x	x	x	1
			Tissue	x	x	x	x	1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

KEEP FROZEN. HOLD FOR ANALYSIS UNTIL FURTHER INSTRUCTIONS RECEIVED

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NT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
	Date (dd-mmm)	Time (hh:mm)	Received by:	Date:	Time:	Temperature	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			TP	Nov 7	22:50	1 °C				

GENF 18.01 Front

L2019410-COFC

Environmental

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Page 4 of 5

RM	Report Format / Distribution: ☑ Standard ☐ Other	Service Requested (Rush for routine analysis subject to availability): ◉ Regular (Standard Turnaround Times - Business Days)
enevieve Morinville	☑ PDF ☑ Excel ☑ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
chmond Adelaide Centre	Email 1: genevieve.morinville@erm.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
0 Adelaide St. W.	Suite 2010; Toronto, ON	Email 2: korina.houghton@erm.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
7-288-89	Fax:	Email 3: kathy.chambers@erm.com	Analysis Request
ime as Report ☑ Yes	☐ No	Client / Project Information	Please indicate below Filtered, Preserved or both (F, P, F/P)
nvoice with Re ☑ Yes	☑ No	Job #: 0403488-0008	
RM		PO / AFE:	
counts Payables (ERM.CanadaPayables@		LSD:	
th Floor, 1111 W. Hastings St.; Vancouver,			
4-689-9	Fax:	Quote #:	
rder # nly)		ALS Contact: Amber Springer	Sampler:

Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Percent Moisture	Standard CCME Metals	Mercury	Silver								Number of Containers
09-10	30 OCT		Tissue	x	x	x	x								1
09-11	↓		Tissue	x	x	x	x								1
09-12			Tissue	x	x	x	x								1
09-13	↓		Tissue	x	x	x	x								1
02-10	14 OCT		Tissue	x	x	x	x								1
02-11	↓		Tissue	x	x	x	x								1
02-12			Tissue	x	x	x	x								1
02-13			Tissue	x	x	x	x								1
02-14			Tissue	x	x	x	x								1
02-15			Tissue	x	x	x	x								1
02-16			Tissue	x	x	x	x								1
02-17	↓		Tissue	x	x	x	x								1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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T RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
	Date (dd-mmm	Time (hh:m	Received by:	Date:	Time:	Temperatu	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			TP	Nov 1	22:50	1 °C				

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COC # 101

Page 3 of 5

Environmental

M	Report Format / Distribution: ☑ Standard ☐ Other	Service Requested (Rush for routine analysis subject to availability): ◉ Regular (Standard Turnaround Times – Business Days)
nevieve Monnville	☑ pdf ☑ Excel ☑ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
hmond Adelaide Centre	Email 1: genevieve.monnville@erm.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
0 Adelaide St. W.	Suite 2010; Toronto, ON	Email 2: korina.houghton@erm.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
7-288- 99	Fax:	Email 3: kathy.chambers@erm.com	
me as Report ☑ Yes	☐ No	Client / Project Information	
voice with Re ☑ m3	☑ No	Job #: 0403488-0008	
M		PO / AFE:	
counts Payables (ERM.CanadaPayables@e		LSD:	
h Floor, 1111 W. Hastings St.; Vancouver,			
4-689-9/	Fax:	Quote #:	
rder# nly)		ALS Contact: Amber Springer	Sampler:

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Percent Moisture	Standard CCME Metals	Mercury	Silver	Number of Containers
503-5	13 Oct		Tissue	X	X	X	X	1
503-6	↓		Tissue	X	X	X	X	1
503-7			Tissue	X	X	X	X	1
503-8			Tissue	X	X	X	X	1
503-9			Tissue	X	X	X	X	1
503-10			Tissue	X	X	X	X	1
508-11			Tissue	X	X	X	X	1
508-12			Tissue	X	X	X	X	1
509-6			Tissue	X	X	X	X	1
509-7			Tissue	X	X	X	X	1
509-8			Tissue	X	X	X	X	1
509-9	↓		Tissue	X	X	X	X	1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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T RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
	Date (dd-mmm	Time (hh-m	Received by:	Date:	Time:	Temperatu	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			TR	Nov 7	22:50	1 °C				

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Environmental

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COC # 101

Page 2 of 5

RM	Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
anevieve Morinville	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
chmond Adelaide Centre	☑ PDF ☑ Excel ☑ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
0 Adelaide St. W.	Suite 2010; Toronto, ON	Email 1: genevieve.morinville@erm.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
7-288-	Fax:	Email 2: korina.houghton@erm.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
89		Email 3: kathy.chambers@erm.com	
me as Report ☑ Yes	☐ No	Client / Project Information	Analysis Request
voice with Re ☑ ins	☑ No	Job #: 0403488-0008	Please indicate below Filtered, Preserved or both (F, P, F/P)
RM		PO / AFE:	
counts Payables (ERM.CanadaPayables@		LSD:	
th Floor, 1111 W. Hastings St.; Vancouver,			
4-689-9	Fax:	Quote #:	
rder #		ALS Contact: Amber Springer	Sampler:

Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Percent Moisture	Standard CCMS Metals	Mercury	Silver	Number of Containers
Ci-15	12 OCT		Tissue	x	x	x	x	1
01-16			Tissue	x	x	x	x	1
01-17			Tissue	x	x	x	x	1
01-18			Tissue	x	x	x	x	1
11-10			Tissue	x	x	x	x	1
11-11			Tissue	x	x	x	x	1
11-12			Tissue	x	x	x	x	1
1-13			Tissue	x	x	x	x	1
11-14			Tissue	x	x	x	x	1
11-15			Tissue	x	x	x	x	1
1-16			Tissue	x	x	x	x	1
1-17	↓		Tissue	x	x	x	x	1

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	Date (dd-mmm	Time (hh-m	Received by:	Date:	Time:	Temperatu	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			TP	Nov 7	22:50	1 °C				

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Page 1 of 5

Environmental

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Genevieve Morinville	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Richmond Adelaide Centre	☑ PDF ☑ Excel ☑ Digital ☐	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
20 Adelaide St. W. | Suite 2010; Toronto, ON	Email 1: genevieve.morinville@erm.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
47-288-789 Fax:	Email 2: korina.houghton@erm.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
ame as Report ☑ Yes ☐ No	Email 3: kathy.chambers@erm.com	Analysis Request
Invoice with Re ☑ Yes ☐ No	Client / Project Information	Please indicate below Filtered, Preserved or both (F, P, F/P)
RM	Job #: 0403488-0008	
ccounts Payables (ERM.CanadaPayables@	PO / AFE:	
5th Floor, 1111 W. Hastings St.; Vancouver,	LSD:	
04-689-9 Fax:	Quote #	
Order # (only)	ALS Contact: Amber Springer	Sampler: GLEN KEDDIE

Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Percent Moisture	Standard CCME Metals	Mercury	Silver	Number of Containers
505-8	11 OCT		Tissue	x	x	x	x	1
505-9			Tissue	x	x	x	x	1
505-10			Tissue	x	x	x	x	1
505-11			Tissue	x	x	x	x	1
505-12			Tissue	x	x	x	x	1
505-13			Tissue	x	x	x	x	1
505-14			Tissue	x	x	x	x	1
505-15			Tissue	x	x	x	x	1
501-11	12 OCT		Tissue	x	x	x	x	1
501-12			Tissue	x	x	x	x	1
501-13			Tissue	x	x	x	x	1
501-14			Tissue	x	x	x	x	1

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	Date (dd-mm	Time (hh-m	Received by:	Date:	Time:	Temperatu	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			TP	Nov 7	22:50	1 °C				

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L2019410-COFC

October 17, 2017

ALS Quote: Q64799
Created: 17-Oct-2017

Genevieve Morinville
ERM Consultants Canada Ltd.
Richmond Adelaide Centre
120 Adelaide St. W., Suite 2010
Toronto, ON M5H 1T1

Dear: Genevieve Morinville,

RE: Price Quotation for Telkwa - Tissue Analysis

We are pleased to present our technical and price quotation to carry out the work as outlined under the above referenced project.

Our price quotation and a list of ALS Environmental's unique technical and service advantages are attached.

Thank you for requesting our quotation. We look forward to the prospect of providing you with the quality service you require. Please call us at (604) 253-4188 or 1-800-668-9878 if you require any additional information.

Sincerely,

Amber Springer, B.Sc
Account Manager

Price Quotation for Telkwa - Tissue Analysis

Please reference the above ALS quote number on the chain of custody when submitting samples for analysis under this quotation.

The following prices are in Canadian dollars, and are valid from 17-Oct-2017 to 17-Apr-2018.

Est. # of Samples	Product	Description	Price per Sample	Sub-Total Price
	Tissue Samples			
70	AG-DRY-CCMS-N-VA	Silver in Tissue by CRC ICPMS (DRY)	$0.00	$0.00
70	AG-WET-CCMS-N-VA	Silver in Tissue by CRC ICPMS (WET)	$32.50	$2,275.00
70	HG-DRY-CVAFS-N-VA	Mercury in Tissue by CVAFS (DRY)	$0.00	$0.00
70	HG-WET-CVAFS-N-VA	Mercury in Tissue by CVAFS (WET)	$13.00	$910.00
70	MET-DRY-CCMS-N-VA	Metals in Tissue by CRC ICPMS (DRY)	$0.00	$0.00
70	MET-WET-CCMS-N-VA	Metals in Tissue by CRC ICPMS (WET)	$107.25	$7,507.50
70	MOISTURE-TISS-VA	% Moisture in Tissues	$3.25	$227.50
70	PREP-TISS-DIGEST-VA	Tissue/Vegetation Sample Preparation	$13.00	$910.00
	Misc. Samples			
70	SAMPLE-DISPOSAL-VA	Sample Handling and Disposal Fee	$1.75	$122.50
		Total Amount (excluding taxes)		$11,952.50

Additional Comments

Listed codes, costs and DLs are applicable to samples with a minimum of 3.5g of material available for digestion, after homogenization. Please contact ALS for details relating to smaller samples, if needed.

Any dissections or large-volume homogenization will be billed at a rate of $48.75 per hour.

Technical and Service Highlights (Canada)

The ALS Group's Environmental Division (ALS) is a full-service, testing, research, and consulting laboratory specializing in environmental chemistry. We offer several unique advantages that will benefit your project. The most notable highlights are as follows:

Previous Experience - ALS has provided analytical services and technical support to environmental consulting and engineering firms, industry, and government since 1982. These environmental projects routinely involve trace level determinations in a variety of sample matrices, and require stringent quality control and rapid sample turnaround. Repeat business by our valued clients shows that they appreciate our unique services and dedication to quality. Routine testing for all industries is supported by more specialized services, such as;

- Agricultural Testing
- Air Quality Analysis including stack testing, ambient air monitoring and siloxanes testing from landfills
- Asbestos Testing
- Drilling Waste Testing
- Drinking water microbial source tracking
- Drug Testing
- E mergency spill response
- Food Microbiology Services
- Food Safety
- Occupational Exposure Monitoring including arsenic speciation and other metals in urine
- Industrial Hygiene
- Ultra Trace Metals Analysis including speciation of Arsenic, Chromium, Mercury and Selenium
- Mould Analysis
- Mining Industry Services including acid base accounting (ABA) and kinetic cell testing
- Radiochemistry
- Research and Method Development

Laboratory Locations - ALS's Environmental Division (Canada) has 17 locations throughout BC, AB, SK, MB, ON, NWT, and YT with the additional support from over 50 ALS laboratories in 21 countries all over the globe. Please visit www.alsglobal.com for more details.

Range of Services and Resources - ALS's Canadian Environmental laboratories are well-equipped and staffed by more than 600 professionals who provide the necessary technical resources required by our clients. Many alternative analytical procedures and the instrumentation necessary are readily available in our facility. ALS can meet our promised turnaround time commitments because we have a large test capacity, each primary piece of equipment has one or more backup systems, and our chemists are cross-trained in a variety of procedures. This gives us a great deal of flexibility to direct resources where they are most needed.

For information about ALS accreditations and certifications please contact your Account Manager or visit our webpage at www.alsglobal.com (see Canada downloads).

Sampling Supplies - ALS will provide all necessary sample containers, labels (including pre-labeling of containers), chain of custodies, preservation chemicals, and shipping containers. Instructions for sampling and preservation will be provided as required.

Analysis Methods - All samples will be analyzed in accordance with the needs of the requisite regulatory agency. We perform only environmental analyses so all equipment and apparatus is dedicated to low-level determinations.

Data Reliability - Environmental professionals trust ALS because of consistent performance in providing credible results

Technical and Service Highlights (Canada)

using validated methods and incorporating a comprehensive quality management program. ALS strives to be a leader among laboratories in quality. Through participation in inter laboratory and certification programs, we have demonstrated exceptional performance in testing for a wide range of parameters in various sample types. At ALS, we stand behind all data produced.

Data Management - ALS's Environmental Division in Canada has a fully integrated computer system utilized by all our locations for data management and reporting. All data is entered "only once" by the analysts into our Laboratory Information Management System (LIMS) which improves quality by eliminating future transcription errors. Data will be provided in a formal report summarizing the results, methodology, and appropriate comments.

Data can be sent in a variety of custom electronic data deliverables (EDDs) or accessed 24/7 through our secure web-based server (Webtrieve). Webtrieve will allow registered clients to automatically compare their data against most commonly used regulations in Canada and provide a quick visual presentation of any results that have exceeded regulatory limits.

Project Support and Access to Expertise - ALS is well known for an ability to complete projects on time and on budget. We provide qualified assistance with project mobilization, final review, and follow up. ALS has a philosophy of open communication that ensures direct contact with all personnel, including senior management and our Centre of Excellence. This "resource" can often be of assistance in problem solving or data interpretation.

Security and Confidentiality - All information generated by ALS, and all communication with our clients, is treated confidentially. The security and integrity of our database has always been a priority.

APPENDIX

GENERAL TERMS AND CONDITIONS:

These terms and conditions are incorporated in and form part of the Agreement between ALS Group's Environmental Division and the party named in the Offer (the "Client").
1. Definitions. Capitalized Terms not defined in these Terms and Conditions have the definitions set out in the other Agreement documents.
2. The Services. ALS will provide the Services to the Client as described in the Offer and in any chain of custody form provided with any sample.
3. Prices. ALS may review and change all prices, fees, surcharges or other charges set out in the Agreement if there are changes to ALS's cost beyond ALS's control, including changes in legislative requirements, Client variations of sample numbers and Client requests for changes to standard reporting requirements. Notwithstanding Condition 3, all quotations are reviewed and updated on a yearly basis.
4. Payment Terms. The Client shall pay ALS within 30 days of the invoice date OAC. ALS may, for reasonable business reasons, require the Client to arrange for payment in advance.
5. Quotation Numbers. The Client shall provide the quotation number to ALS (where applicable) to ensure correct pricing.
6. Taxes. Applicable taxes are not included in prices, surcharges and additional fees and will be added at the time of invoicing.
7. Quality Control. ALS has an extensive QA/QC program. Clients' samples are analyzed using approved, referenced procedures followed by thorough data validation prior to reporting the analytical results.
8. Test Results are Not Guaranteed. Results are obtained from analytical measurements that are subject to inherent variability. Measurement results reflect characteristics of submitted test samples at time of analysis. The Client is responsible for informing itself on the limitation of test results and acknowledges that test results are not guaranteed.
9. Standard of Care. ALS will use reasonable care and diligence as required by the laws of the province or territory where the sample is tested.
10. Storage. Where possible, ALS will store samples for 30 days from the date a final report is issued to the Client, after which ALS may discard the samples.
11. Holds. If the Client requests a sample to be placed on hold, ALS will store the sample for 30 days from date of receipt, after which ALS will invoice the Client and discard the sample. Longer hold periods are available upon request.
12. Archives. If the Client requests a sample be archived, ALS will invoice in advance and store the sample for the period requested, after which ALS may discard the sample.
13. Handling Protocol. Legal sample handling protocol must be arranged before samples are collected. ALS charges a minimum 20% surcharge on the list price plus the hourly technologist or chemist rates for legal sample protocol. Additional charges will apply for samples that require storage by ALS.
14. Samples. The quality, condition, content and source of samples stored and tested are not known to ALS except as declared and described on the chain of custody form completed and submitted by the Client and accompanying the sample.
15. Risk of Loss. ALS will use reasonable care to protect samples during storage, however all samples are stored at the Client's risk and the Client is responsible for obtaining appropriate insurance, if desired. The Client acknowledges that during the performance of the Services samples may be altered, lost, damaged or destroyed and the Client releases ALS from any claim the Client may have for any loss or damage to the sample.
16. Environmental. The Client must comply with all applicable environment legislation, including labeling all hazardous samples to comply with WHMIS and TDG regulations, and must provide appropriate safety data sheets (previously referred to as 'MSDS") that include the nature of the hazard and a contact name and phone number to call for information. The Client will indemnify ALS for all loss or damages, including any fine or cost of complying with an order of any government authority, resulting from the Client's breach of this paragraph.
17. Hazardous Materials Disposal. ALS may return, at the Client's cost, hazardous material to the Client for disposal.
18. Hazardous Materials Surcharge. ALS may apply an additional surcharge for handling of hazardous samples or samples with Naturally Occurring Radioactive Materials (NORM), H2S, CN, etc.
19. Sample Containers. ALS may ship sample containers to the Client's location by the most cost effective means using ALS preferred courier suppliers, within the specified project timeline.
20. Additional Charges. ALS may charge the Client (a) its cost for emergency bottle shipments and shipments to and from a remote site, and (b) where pick up and delivery services are provided, subject in each instance to a minimum charge of $25.00.
21. Re-Tests. ALS reserves the right to re-test any samples that remains in its possession. Re-tests requested by the Client may be charged.
22. Waiver. The Client is responsible for making any assessment regarding the suitability of the Services and the intended results for the Client's purposes and waives any claims against ALS it may have as a result of the interpretation of the results. The Client shall indemnify ALS for all claims made by any third party against ALS in respect of all losses however arising from the performance of the Services or the use of any report provided in the performance of the Services.
23. Limitation of Liability. In no event shall ALS be liable for any consequential, indirect, incidental, special, exemplary or punitive damages, whether foreseeable or unforeseeable, (including claims for loss of profits or revenue or losses caused by stoppage of other work or impairment of other assets) incurred by the Client arising out of breach or failure of express or implied warranty, breach of contract, breach of warranty, misrepresentation, negligence, strict liability in tort or otherwise. In any event, the liability of ALS to the Client shall be limited to the cost of testing the sample as requested in the chain of custody form under which the sample was originally deposited. For the purposes of this paragraph and paragraphs 8, 15, 16, 22 and 24, as the applicable, "ALS" includes without limitations its directors, officers, employees and affiliates and the "Client" includes without limitation any third party that may have a claim against ALS through the Client.
24. Notice of Liability. Notwithstanding paragraph 23, ALS shall not be liable to the Client unless the Client provides notice in writing to ALS of such loss or damage, together with full particulars thereof, within 30 days of the Client's receipt of the report of the analysis of the sample giving rise to such liability. The provisions of this paragraph allocate the risk under the Agreement between the Client and ALS, and the fees to be paid by the Client to ALS reflect this allocation of risks and the limitations of liability in this Agreement.
25. Third Party Service Provider Indemnity. Should the Client require ALS to forward samples and/or obtain services from a third party service provider, the Client will provide ALS notice in writing. The Client indemnifies ALS against any breach of this Agreement, all liabilities or losses incurred in connection with the third party service provider, including but not limited to courier services, testing turn-around time, and any additional costs associated with such third party.
26. Third Party Service Provider Indemnity. If ALS is required to engage a third party service provider for whatever reason, the Client indemnifies ALS against any breach of this Agreement, liabilities or losses incurred in connection with the third party service provider, including but not limited to courier services, testing turn-around time, and any additional costs associated with such third party.
27. Entire Agreement. The Agreement is the entire agreement between the parties and supersedes and takes precedence over any terms and conditions contained in any documentation provided by the Client. ALS's execution of any subsequent documentation from the Client only acknowledges receipt and not acceptance of any terms or conditions therein. If there is a conflict between these terms and conditions and any other Agreement document, these terms and conditions prevail.
28. Term. Providing the first batch of samples to which this tender refers is submitted within three months of the starting date of this quotation, the following prices, terms and conditions will remain firm until the closing date. This offer, and terms and conditions will automatically lapse if the offer has not been accepted, and samples not delivered to ALS, within the Closing Date.
29. Termination. (a) Either party may terminate this Agreement for any reason by giving the other party thirty (30) days written notice (Notice Period).(b) If the Agreement is terminated pursuant to clause (a), then the Client must pay ALS for all Services performed up to the expiry of the Notice Period.

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Tissue-Physical Tests			
% Moisture	Puget Sound WQ Authority, Apr 1997	0.50	%
Tissue-Metals			
Aluminum (Al)-Total	EPA 200.3/6020A	0.40	mg/kg wwt
Aluminum (Al)-Total	EPA 200.3/6020A	2.0	mg/kg
Antimony (Sb)-Total	EPA 200.3/6020A	0.0020	mg/kg wwt
Antimony (Sb)-Total	EPA 200.3/6020A	0.010	mg/kg
Arsenic (As)-Total	EPA 200.3/6020A	0.0040	mg/kg wwt
Arsenic (As)-Total	EPA 200.3/6020A	0.020	mg/kg
Barium (Ba)-Total	EPA 200.3/6020A	0.010	mg/kg wwt
Barium (Ba)-Total	EPA 200.3/6020A	0.050	mg/kg
Beryllium (Be)-Total	EPA 200.3/6020A	0.0020	mg/kg wwt
Beryllium (Be)-Total	EPA 200.3/6020A	0.010	mg/kg
Bismuth (Bi)-Total	EPA 200.3/6020A	0.0020	mg/kg wwt
Bismuth (Bi)-Total	EPA 200.3/6020A	0.010	mg/kg
Boron (B)-Total	EPA 200.3/6020A	0.20	mg/kg wwt
Boron (B)-Total	EPA 200.3/6020A	1.0	mg/kg
Cadmium (Cd)-Total	EPA 200.3/6020A	0.0010	mg/kg wwt
Cadmium (Cd)-Total	EPA 200.3/6020A	0.0050	mg/kg
Calcium (Ca)-Total	EPA 200.3/6020A	4.0	mg/kg wwt
Calcium (Ca)-Total	EPA 200.3/6020A	20	mg/kg
Cesium (Cs)-Total	EPA 200.3/6020A	0.0010	mg/kg wwt
Cesium (Cs)-Total	EPA 200.3/6020A	0.0050	mg/kg
Chromium (Cr)-Total	EPA 200.3/6020A	0.010	mg/kg wwt
Chromium (Cr)-Total	EPA 200.3/6020A	0.050	mg/kg
Cobalt (Co)-Total	EPA 200.3/6020A	0.0040	mg/kg wwt
Cobalt (Co)-Total	EPA 200.3/6020A	0.020	mg/kg
Copper (Cu)-Total	EPA 200.3/6020A	0.020	mg/kg wwt
Copper (Cu)-Total	EPA 200.3/6020A	0.10	mg/kg
Iron (Fe)-Total	EPA 200.3/6020A	0.60	mg/kg wwt
Iron (Fe)-Total	EPA 200.3/6020A	3.0	mg/kg

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Lead (Pb)-Total	EPA 200.3/6020A	0.0040	mg/kg wwt
Lead (Pb)-Total	EPA 200.3/6020A	0.020	mg/kg
Lithium (Li)-Total	EPA 200.3/6020A	0.10	mg/kg wwt
Lithium (Li)-Total	EPA 200.3/6020A	0.50	mg/kg
Magnesium (Mg)-Total	EPA 200.3/6020A	0.40	mg/kg wwt
Magnesium (Mg)-Total	EPA 200.3/6020A	2.0	mg/kg
Manganese (Mn)-Total	EPA 200.3/6020A	0.010	mg/kg wwt
Manganese (Mn)-Total	EPA 200.3/6020A	0.050	mg/kg
Mercury (Hg)-Total	EPA 200.3, EPA 245.7	0.0010	mg/kg wwt
Mercury (Hg)-Total	EPA 200.3, EPA 245.7	0.0050	mg/kg
Molybdenum (Mo)-Total	EPA 200.3/6020A	0.0040	mg/kg wwt
Molybdenum (Mo)-Total	EPA 200.3/6020A	0.020	mg/kg
Nickel (Ni)-Total	EPA 200.3/6020A	0.040	mg/kg wwt
Nickel (Ni)-Total	EPA 200.3/6020A	0.20	mg/kg
Phosphorus (P)-Total	EPA 200.3/6020A	2.0	mg/kg wwt
Phosphorus (P)-Total	EPA 200.3/6020A	10	mg/kg
Potassium (K)-Total	EPA 200.3/6020A	4.0	mg/kg wwt
Potassium (K)-Total	EPA 200.3/6020A	20	mg/kg
Rubidium (Rb)-Total	EPA 200.3/6020A	0.010	mg/kg wwt
Rubidium (Rb)-Total	EPA 200.3/6020A	0.050	mg/kg
Selenium (Se)-Total	EPA 200.3/6020A	0.010	mg/kg wwt
Selenium (Se)-Total	EPA 200.3/6020A	0.050	mg/kg
Silver (Ag)-Total	EPA 200.3/6020A	0.0010	mg/kg wwt
Silver (Ag)-Total	EPA 200.3/6020A	0.0050	mg/kg
Sodium (Na)-Total	EPA 200.3/6020A	4.0	mg/kg wwt
Sodium (Na)-Total	EPA 200.3/6020A	20	mg/kg
Strontium (Sr)-Total	EPA 200.3/6020A	0.010	mg/kg wwt
Strontium (Sr)-Total	EPA 200.3/6020A	0.050	mg/kg
Tellurium (Te)-Total	EPA 200.3/6020A	0.0040	mg/kg wwt
Tellurium (Te)-Total	EPA 200.3/6020A	0.020	mg/kg
Thallium (Tl)-Total	EPA 200.3/6020A	0.00040	mg/kg wwt

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Thallium (Tl)-Total	EPA 200.3/6020A	0.0020	mg/kg
Tin (Sn)-Total	EPA 200.3/6020A	0.020	mg/kg wwt
Tin (Sn)-Total	EPA 200.3/6020A	0.10	mg/kg
Uranium (U)-Total	EPA 200.3/6020A	0.00040	mg/kg wwt
Uranium (U)-Total	EPA 200.3/6020A	0.0020	mg/kg
Vanadium (V)-Total	EPA 200.3/6020A	0.020	mg/kg wwt
Vanadium (V)-Total	EPA 200.3/6020A	0.10	mg/kg
Zinc (Zn)-Total	EPA 200.3/6020A	0.10	mg/kg wwt
Zinc (Zn)-Total	EPA 200.3/6020A	0.50	mg/kg
Zirconium (Zr)-Total	EPA 200.3/6020A	0.040	mg/kg wwt
Zirconium (Zr)-Total	EPA 200.3/6020A	0.20	mg/kg

DRAFT

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Date Received: 07-NOV-17
Report Date: 31-JAN-18 15:34 (MT)
Version: FINAL

Client Phone: 416-646-3608

Certificate of Analysis

Lab Work Order #: L2019410

Project P.O. #: NOT SUBMITTED
Job Reference: 0403488-0008
C of C Numbers: 1, 2, 3, 4, 5
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

Sample ID	L2019410-1	L2019410-2	L2019410-3	L2019410-4	L2019410-5
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	11-OCT-17	11-OCT-17	11-OCT-17	11-OCT-17	11-OCT-17
Sampled Time					
Client ID	505-8	505-9	505-10	505-11	505-12
Grouping / **Analyte**					
TISSUE					
Physical Tests % Moisture (%)	78.0	78.1	78.0	77.7	77.9
Metals Aluminum (Al)-Total (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
Aluminum (Al)-Total (mg/kg wwt)	<1.0	<1.0	<1.0	<1.0	<1.0
Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Arsenic (As)-Total (mg/kg)	0.092	0.167	0.080	0.092	0.127
Arsenic (As)-Total (mg/kg wwt)	0.0202	0.0364	0.0176	0.0206	0.0280
Barium (Ba)-Total (mg/kg)	1.49	0.685	1.73	0.606	0.565
Barium (Ba)-Total (mg/kg wwt)	0.327	0.150	0.381	0.136	0.125
Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (B)-Total (mg/kg wwt)	<0.20	<0.20	<0.20	<0.20	<0.20
Cadmium (Cd)-Total (mg/kg)	0.063	0.011	0.039	0.024	0.029
Cadmium (Cd)-Total (mg/kg wwt)	0.0139	0.0023	0.0086	0.0054	0.0064
Calcium (Ca)-Total (mg/kg)	4310	4010	6500	2530	2120
Calcium (Ca)-Total (mg/kg wwt)	946	878	1430	566	468
Cesium (Cs)-Total (mg/kg)	0.438	0.417	0.384	0.447	0.421
Cesium (Cs)-Total (mg/kg wwt)	0.0961	0.0912	0.0845	0.0998	0.0931
Chromium (Cr)-Total (mg/kg)	0.22	<0.20	0.60	0.27	0.25
Chromium (Cr)-Total (mg/kg wwt)	0.048	<0.040	0.131	0.060	0.054
Cobalt (Co)-Total (mg/kg)	0.198	0.118	0.088	0.178	0.219
Cobalt (Co)-Total (mg/kg wwt)	0.0435	0.0258	0.0194	0.0398	0.0485
Copper (Cu)-Total (mg/kg)	2.22	1.45	1.13	2.05	1.61
Copper (Cu)-Total (mg/kg wwt)	0.487	0.317	0.248	0.459	0.356
Iron (Fe)-Total (mg/kg)	25.4	13.8	19.3	20.9	15.0
Iron (Fe)-Total (mg/kg wwt)	5.6	3.0	4.3	4.7	3.3
Lead (Pb)-Total (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
Lead (Pb)-Total (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)-Total (mg/kg)	1060	1190	1190	1080	1180
Magnesium (Mg)-Total (mg/kg wwt)	233	260	263	242	262
Manganese (Mn)-Total (mg/kg)	1.19	1.21	2.60	0.951	1.05
Manganese (Mn)-Total (mg/kg wwt)	0.261	0.265	0.571	0.213	0.233

Sample ID	L2019410-6	L2019410-7	L2019410-8	L2019410-9	L2019410-10
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	11-OCT-17	11-OCT-17	11-OCT-17	11-OCT-17	12-OCT-17
Sampled Time					
Client ID	505-13	505-14	505-15	501-11	501-12
Grouping / **Analyte**					
TISSUE					
Physical Tests % Moisture (%)	78.2	78.1	78.6	77.8	76.4
Metals Aluminum (Al)-Total (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
Aluminum (Al)-Total (mg/kg wwt)	<1.0	<1.0	<1.0	<1.0	<1.0
Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Arsenic (As)-Total (mg/kg)	0.078	0.092	0.452	0.070	0.127
Arsenic (As)-Total (mg/kg wwt)	0.0171	0.0203	0.0966	0.0155	0.0300
Barium (Ba)-Total (mg/kg)	1.62	1.14	0.824	1.04	0.896
Barium (Ba)-Total (mg/kg wwt)	0.352	0.250	0.176	0.230	0.211
Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	0.050	<0.010
Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	0.0111	<0.0020
Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (B)-Total (mg/kg wwt)	<0.20	<0.20	<0.20	<0.20	<0.20
Cadmium (Cd)-Total (mg/kg)	0.072	0.081	0.021	0.018	<0.010
Cadmium (Cd)-Total (mg/kg wwt)	0.0156	0.0177	0.0044	0.0041	0.0023
Calcium (Ca)-Total (mg/kg)	3990	4900	2390	4020	4160
Calcium (Ca)-Total (mg/kg wwt)	868	1070	511	890	981
Cesium (Cs)-Total (mg/kg)	0.464	0.402	0.367	0.869	1.25
Cesium (Cs)-Total (mg/kg wwt)	0.101	0.0882	0.0785	0.193	0.294
Chromium (Cr)-Total (mg/kg)	<0.20	0.24	<0.20	0.36	<0.20
Chromium (Cr)-Total (mg/kg wwt)	<0.040	0.052	<0.040	0.079	<0.040
Cobalt (Co)-Total (mg/kg)	0.168	0.179	0.109	0.072	0.069
Cobalt (Co)-Total (mg/kg wwt)	0.0365	0.0393	0.0233	0.0161	0.0162
Copper (Cu)-Total (mg/kg)	1.27	1.68	0.94	1.58	1.46
Copper (Cu)-Total (mg/kg wwt)	0.277	0.368	0.201	0.350	0.345
Iron (Fe)-Total (mg/kg)	16.3	19.8	11.7	15.7	14.3
Iron (Fe)-Total (mg/kg wwt)	3.5	4.3	2.5	3.5	3.4
Lead (Pb)-Total (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
Lead (Pb)-Total (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)-Total (mg/kg)	1190	1180	1190	1250	1110
Magnesium (Mg)-Total (mg/kg wwt)	259	258	254	277	262
Manganese (Mn)-Total (mg/kg)	2.55	2.21	0.978	2.01	1.55
Manganese (Mn)-Total (mg/kg wwt)	0.556	0.485	0.209	0.446	0.366

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Sample ID	L2019410-11	L2019410-12	L2019410-13	L2019410-14	L2019410-15
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	12-OCT-17	12-OCT-17	12-OCT-17	12-OCT-17	12-OCT-17
Sampled Time					
Client ID	501-13	501-14	501-15	501-16	501-17
Grouping / **Analyte**					
TISSUE					
Physical Tests % Moisture (%)	76.6	76.2	77.0	78.3	78.1
Metals Aluminum (Al)-Total (mg/kg)	<5.0	<5.0	<5.0	<2.0	<5.0
Aluminum (Al)-Total (mg/kg wwt)	<1.0	<1.0	<1.0	<0.40	<1.0
Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Arsenic (As)-Total (mg/kg)	0.180	0.198	0.089	0.095	0.192
Arsenic (As)-Total (mg/kg wwt)	0.0421	0.0472	0.0205	0.0206	0.0422
Barium (Ba)-Total (mg/kg)	0.969	0.571	0.463	0.449	0.838
Barium (Ba)-Total (mg/kg wwt)	0.227	0.136	0.106	0.097	0.184
Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Bismuth (Bi)-Total (mg/kg)	<0.010	0.772	<0.010	<0.010	<0.010
Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	0.184	<0.0020	0.0022	<0.0020
Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (B)-Total (mg/kg wwt)	<0.20	<0.20	<0.20	<0.20	<0.20
Cadmium (Cd)-Total (mg/kg)	<0.010	<0.010	<0.010	0.0051	<0.010
Cadmium (Cd)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	0.0011	<0.0020
Calcium (Ca)-Total (mg/kg)	5570	2530	3170	2330	2500
Calcium (Ca)-Total (mg/kg wwt)	1300	604	729	507	547
Cesium (Cs)-Total (mg/kg)	1.03	1.44	0.930	0.944	1.01
Cesium (Cs)-Total (mg/kg wwt)	0.241	0.343	0.214	0.205	0.221
Chromium (Cr)-Total (mg/kg)	<0.20	<0.20	<0.20	0.157	<0.20
Chromium (Cr)-Total (mg/kg wwt)	<0.040	0.044	<0.040	0.034	0.040
Cobalt (Co)-Total (mg/kg)	0.067	0.048	0.035	0.047	0.092
Cobalt (Co)-Total (mg/kg wwt)	0.0157	0.0114	0.0079	0.0102	0.0201
Copper (Cu)-Total (mg/kg)	1.45	1.86	1.60	1.82	1.87
Copper (Cu)-Total (mg/kg wwt)	0.341	0.444	0.368	0.394	0.410
Iron (Fe)-Total (mg/kg)	13.5	20.5	17.5	16.3	19.9
Iron (Fe)-Total (mg/kg wwt)	3.2	4.9	4.0	3.54	4.4
Lead (Pb)-Total (mg/kg)	<0.050	<0.050	<0.050	<0.020	<0.050
Lead (Pb)-Total (mg/kg wwt)	<0.010	<0.010	<0.010	<0.0040	<0.010
Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)-Total (mg/kg)	1200	1140	1100	1280	1150
Magnesium (Mg)-Total (mg/kg wwt)	281	273	253	277	252
Manganese (Mn)-Total (mg/kg)	1.61	5.91	1.35	0.854	0.998
Manganese (Mn)-Total (mg/kg wwt)	0.377	1.41	0.310	0.185	0.219

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Sample ID	L2019410-16	L2019410-17	L2019410-18	L2019410-19	L2019410-20
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	12-OCT-17	12-OCT-17	12-OCT-17	12-OCT-17	12-OCT-17
Sampled Time					
Client ID	501-18	511-10	511-11	511-12	511-13
Grouping / **Analyte**					
TISSUE					
Physical Tests % Moisture (%)	78.0	77.8	79.1	76.6	78.9
Metals Aluminum (Al)-Total (mg/kg)	<5.0	<2.0	<2.0	<5.0	<5.0
Aluminum (Al)-Total (mg/kg wwt)	<1.0	<0.40	<0.40	<1.0	<1.0
Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Antimony (Sb)-Total (mg/kg wwt)	<0.0020	0.0021	<0.0020	<0.0020	<0.0020
Arsenic (As)-Total (mg/kg)	0.120	0.203	0.196	0.113	0.128
Arsenic (As)-Total (mg/kg wwt)	0.0265	0.0451	0.0409	0.0265	0.0269
Barium (Ba)-Total (mg/kg)	0.596	0.803	2.46	1.58	1.40
Barium (Ba)-Total (mg/kg wwt)	0.131	0.179	0.513	0.368	0.295
Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (B)-Total (mg/kg wwt)	<0.20	<0.20	<0.20	<0.20	<0.20
Cadmium (Cd)-Total (mg/kg)	<0.010	0.0157	0.0133	<0.010	0.012
Cadmium (Cd)-Total (mg/kg wwt)	<0.0020	0.0035	0.0028	<0.0020	0.0025
Calcium (Ca)-Total (mg/kg)	3720	3560	4700	5600	3720
Calcium (Ca)-Total (mg/kg wwt)	819	792	981	1310	782
Cesium (Cs)-Total (mg/kg)	1.33	0.0326	0.0228	0.0443	0.0311
Cesium (Cs)-Total (mg/kg wwt)	0.292	0.0073	0.0048	0.0103	0.0066
Chromium (Cr)-Total (mg/kg)	<0.20	0.140	0.131	<0.20	<0.20
Chromium (Cr)-Total (mg/kg wwt)	<0.040	0.031	0.027	<0.040	<0.040
Cobalt (Co)-Total (mg/kg)	0.070	0.046	0.044	0.028	0.054
Cobalt (Co)-Total (mg/kg wwt)	0.0154	0.0103	0.0093	0.0066	0.0113
Copper (Cu)-Total (mg/kg)	1.64	1.49	1.70	1.19	1.33
Copper (Cu)-Total (mg/kg wwt)	0.362	0.331	0.355	0.278	0.281
Iron (Fe)-Total (mg/kg)	14.0	18.0	18.8	13.4	16.3
Iron (Fe)-Total (mg/kg wwt)	3.1	4.00	3.93	3.1	3.4
Lead (Pb)-Total (mg/kg)	<0.050	<0.020	<0.020	<0.050	<0.050
Lead (Pb)-Total (mg/kg wwt)	<0.010	<0.0040	<0.0040	<0.010	<0.010
Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)-Total (mg/kg)	1220	1390	1380	1280	1250
Magnesium (Mg)-Total (mg/kg wwt)	268	309	289	299	264
Manganese (Mn)-Total (mg/kg)	1.25	1.87	3.35	1.85	2.25
Manganese (Mn)-Total (mg/kg wwt)	0.276	0.415	0.700	0.432	0.475

Sample ID	L2019410-21	L2019410-22	L2019410-23	L2019410-24	L2019410-25
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	12-OCT-17	12-OCT-17	12-OCT-17	12-OCT-17	13-OCT-17
Sampled Time					
Client ID	511-14	511-15	511-16	511-17	508-5
Grouping / **Analyte**					
TISSUE					
Physical Tests % Moisture (%)	78.4	79.0	77.7	78.5	78.9
Metals Aluminum (Al)-Total (mg/kg)	<5.0	<5.0	<5.0	<2.0	<5.0
Aluminum (Al)-Total (mg/kg wwt)	<1.0	<1.0	<1.0	0.42	<1.0
Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Arsenic (As)-Total (mg/kg)	0.104	0.109	0.130	0.182	0.052
Arsenic (As)-Total (mg/kg wwt)	0.0225	0.0230	0.0290	0.0392	0.0109
Barium (Ba)-Total (mg/kg)	1.15	1.32	0.894	1.59	3.19
Barium (Ba)-Total (mg/kg wwt)	0.248	0.278	0.200	0.342	0.672
Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (B)-Total (mg/kg wwt)	<0.20	<0.20	<0.20	<0.20	<0.20
Cadmium (Cd)-Total (mg/kg)	0.018	0.017	<0.010	0.0119	0.042
Cadmium (Cd)-Total (mg/kg wwt)	0.0038	0.0036	<0.0020	0.0026	0.0088
Calcium (Ca)-Total (mg/kg)	4250	4110	1920	5080	10300
Calcium (Ca)-Total (mg/kg wwt)	916	865	429	1090	2160
Cesium (Cs)-Total (mg/kg)	0.0280	0.0261	0.0170	0.0281	0.0701
Cesium (Cs)-Total (mg/kg wwt)	0.0060	0.0055	0.0038	0.0060	0.0148
Chromium (Cr)-Total (mg/kg)	0.48	0.33	<0.20	0.063	<0.20
Chromium (Cr)-Total (mg/kg wwt)	0.103	0.070	<0.040	0.014	<0.040
Cobalt (Co)-Total (mg/kg)	0.038	0.057	0.039	0.026	0.061
Cobalt (Co)-Total (mg/kg wwt)	0.0083	0.0119	0.0086	0.0055	0.0129
Copper (Cu)-Total (mg/kg)	1.35	1.58	1.29	1.63	1.07
Copper (Cu)-Total (mg/kg wwt)	0.290	0.333	0.289	0.350	0.224
Iron (Fe)-Total (mg/kg)	18.0	19.6	14.0	17.8	13.6
Iron (Fe)-Total (mg/kg wwt)	3.9	4.1	3.1	3.83	2.9
Lead (Pb)-Total (mg/kg)	<0.050	<0.050	<0.050	<0.020	<0.050
Lead (Pb)-Total (mg/kg wwt)	<0.010	<0.010	<0.010	<0.0040	<0.010
Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)-Total (mg/kg)	1340	1270	1120	1370	1210
Magnesium (Mg)-Total (mg/kg wwt)	290	268	250	295	255
Manganese (Mn)-Total (mg/kg)	4.83	3.43	1.59	2.60	6.04
Manganese (Mn)-Total (mg/kg wwt)	1.04	0.722	0.355	0.560	1.27

Sample ID	L2019410-26	L2019410-27	L2019410-28	L2019410-29	L2019410-30
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	13-OCT-17	13-OCT-17	13-OCT-17	13-OCT-17	13-OCT-17
Sampled Time					
Client ID	508-6	508-7	508-8	508-9	508-10
Grouping / **Analyte**					
TISSUE					
Physical Tests % Moisture (%)	79.2	79.5	80.1	80.1	80.9
Metals Aluminum (Al)-Total (mg/kg)	<5.0	7.4	<5.0	<5.0	<5.0
Aluminum (Al)-Total (mg/kg wwt)	<1.0	1.5	<1.0	<1.0	<1.0
Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Arsenic (As)-Total (mg/kg)	0.068	0.253	0.097	0.086	0.109
Arsenic (As)-Total (mg/kg wwt)	0.0141	0.0519	0.0192	0.0171	0.0207
Barium (Ba)-Total (mg/kg)	1.42	1.21	0.768	2.60	1.00
Barium (Ba)-Total (mg/kg wwt)	0.296	0.248	0.153	0.518	0.192
Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	1.0	1.4
Boron (B)-Total (mg/kg wwt)	<0.20	<0.20	<0.20	0.20	0.27
Cadmium (Cd)-Total (mg/kg)	0.017	0.019	0.024	0.058	0.020
Cadmium (Cd)-Total (mg/kg wwt)	0.0035	0.0038	0.0047	0.0116	0.0037
Calcium (Ca)-Total (mg/kg)	4350	2470	1880	6230	2160
Calcium (Ca)-Total (mg/kg wwt)	905	506	373	1240	412
Cesium (Cs)-Total (mg/kg)	0.0859	0.179	0.0828	0.0877	0.0798
Cesium (Cs)-Total (mg/kg wwt)	0.0179	0.0367	0.0165	0.0175	0.0152
Chromium (Cr)-Total (mg/kg)	0.31	0.42	0.28	0.32	<0.20
Chromium (Cr)-Total (mg/kg wwt)	0.066	0.086	0.056	0.064	<0.040
Cobalt (Co)-Total (mg/kg)	0.041	0.090	0.141	0.398	0.163
Cobalt (Co)-Total (mg/kg wwt)	0.0085	0.0184	0.0281	0.0792	0.0310
Copper (Cu)-Total (mg/kg)	1.58	1.49	0.92	1.68	1.55
Copper (Cu)-Total (mg/kg wwt)	0.328	0.305	0.183	0.335	0.295
Iron (Fe)-Total (mg/kg)	16.6	26.7	20.4	34.7	20.0
Iron (Fe)-Total (mg/kg wwt)	3.4	5.5	4.0	6.9	3.8
Lead (Pb)-Total (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
Lead (Pb)-Total (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)-Total (mg/kg)	1340	1270	1270	1310	1390
Magnesium (Mg)-Total (mg/kg wwt)	279	261	252	260	265
Manganese (Mn)-Total (mg/kg)	3.34	2.53	1.53	5.70	1.98
Manganese (Mn)-Total (mg/kg wwt)	0.696	0.519	0.305	1.13	0.378

Sample ID	L2019410-31	L2019410-32	L2019410-33	L2019410-34	L2019410-35
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	13-OCT-17	13-OCT-17	13-OCT-17	13-OCT-17	13-OCT-17
Sampled Time					
Client ID	508-11	508-12	509-6	509-7	509-8
Grouping / **Analyte**					
TISSUE					
Physical Tests % Moisture (%)	79.3	77.6	79.7	79.3	79.0
Metals Aluminum (Al)-Total (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
Aluminum (Al)-Total (mg/kg wwt)	<1.0	<1.0	<1.0	<1.0	<1.0
Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Arsenic (As)-Total (mg/kg)	0.069	0.087	0.072	0.078	0.141
Arsenic (As)-Total (mg/kg wwt)	0.0142	0.0194	0.0147	0.0162	0.0297
Barium (Ba)-Total (mg/kg)	1.18	0.794	1.12	1.00	0.628
Barium (Ba)-Total (mg/kg wwt)	0.245	0.178	0.228	0.208	0.132
Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	0.013	<0.010
Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	0.0027	<0.0020
Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (B)-Total (mg/kg wwt)	<0.20	<0.20	<0.20	<0.20	<0.20
Cadmium (Cd)-Total (mg/kg)	0.119	<0.010	0.053	0.021	0.011
Cadmium (Cd)-Total (mg/kg wwt)	0.0245	<0.0020	0.0108	0.0044	0.0023
Calcium (Ca)-Total (mg/kg)	4570	3580	3520	2500	2880
Calcium (Ca)-Total (mg/kg wwt)	943	802	712	518	606
Cesium (Cs)-Total (mg/kg)	0.0868	0.106	0.112	0.254	0.117
Cesium (Cs)-Total (mg/kg wwt)	0.0179	0.0237	0.0226	0.0527	0.0245
Chromium (Cr)-Total (mg/kg)	<0.20	<0.20	0.26	0.57	<0.20
Chromium (Cr)-Total (mg/kg wwt)	<0.040	<0.040	0.052	0.118	<0.040
Cobalt (Co)-Total (mg/kg)	0.182	0.040	0.100	0.077	0.094
Cobalt (Co)-Total (mg/kg wwt)	0.0376	0.0090	0.0202	0.0160	0.0197
Copper (Cu)-Total (mg/kg)	1.62	1.15	1.58	1.27	1.17
Copper (Cu)-Total (mg/kg wwt)	0.335	0.258	0.320	0.264	0.245
Iron (Fe)-Total (mg/kg)	23.0	14.2	20.9	14.1	27.9
Iron (Fe)-Total (mg/kg wwt)	4.7	3.2	4.2	2.9	5.9
Lead (Pb)-Total (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
Lead (Pb)-Total (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)-Total (mg/kg)	1170	1130	1320	1250	1230
Magnesium (Mg)-Total (mg/kg wwt)	241	253	268	258	258
Manganese (Mn)-Total (mg/kg)	2.13	1.62	1.95	1.57	2.01
Manganese (Mn)-Total (mg/kg wwt)	0.441	0.363	0.396	0.326	0.422

Sample ID	L2019410-36	L2019410-37	L2019410-38	L2019410-39	L2019410-40
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	13-OCT-17	13-OCT-17	13-OCT-17	13-OCT-17	13-OCT-17
Sampled Time					
Client ID	509-9	509-10	509-11	509-12	509-13
Grouping / **Analyte**					
TISSUE					
Physical Tests % Moisture (%)	79.0	80.0	79.5	79.2	79.2
Metals Aluminum (Al)-Total (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
Aluminum (Al)-Total (mg/kg wwt)	<1.0	<1.0	<1.0	<1.0	<1.0
Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Arsenic (As)-Total (mg/kg)	0.101	0.075	0.087	0.114	0.060
Arsenic (As)-Total (mg/kg wwt)	0.0211	0.0150	0.0177	0.0237	0.0125
Barium (Ba)-Total (mg/kg)	1.01	1.68	1.26	1.30	0.818
Barium (Ba)-Total (mg/kg wwt)	0.212	0.336	0.259	0.270	0.170
Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	1.0	<1.0
Boron (B)-Total (mg/kg wwt)	<0.20	<0.20	<0.20	0.21	<0.20
Cadmium (Cd)-Total (mg/kg)	0.043	0.021	0.012	0.018	0.051
Cadmium (Cd)-Total (mg/kg wwt)	0.0090	0.0042	0.0025	0.0037	0.0106
Calcium (Ca)-Total (mg/kg)	3240	5980	3130	4040	2230
Calcium (Ca)-Total (mg/kg wwt)	678	1200	641	842	464
Cesium (Cs)-Total (mg/kg)	0.164	0.173	0.112	0.122	0.131
Cesium (Cs)-Total (mg/kg wwt)	0.0343	0.0346	0.0230	0.0255	0.0273
Chromium (Cr)-Total (mg/kg)	<0.20	0.26	0.24	0.25	<0.20
Chromium (Cr)-Total (mg/kg wwt)	<0.040	0.051	0.049	0.051	<0.040
Cobalt (Co)-Total (mg/kg)	0.176	0.185	0.074	0.134	0.184
Cobalt (Co)-Total (mg/kg wwt)	0.0369	0.0370	0.0152	0.0279	0.0383
Copper (Cu)-Total (mg/kg)	1.31	1.63	1.92	1.64	1.97
Copper (Cu)-Total (mg/kg wwt)	0.274	0.325	0.394	0.342	0.409
Iron (Fe)-Total (mg/kg)	17.0	21.0	19.8	17.6	26.0
Iron (Fe)-Total (mg/kg wwt)	3.6	4.2	4.1	3.7	5.4
Lead (Pb)-Total (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
Lead (Pb)-Total (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)-Total (mg/kg)	1270	1480	1330	1240	1270
Magnesium (Mg)-Total (mg/kg wwt)	265	297	272	259	265
Manganese (Mn)-Total (mg/kg)	2.25	3.29	2.06	2.44	2.00
Manganese (Mn)-Total (mg/kg wwt)	0.472	0.658	0.421	0.509	0.415

Sample ID	L2019410-41	L2019410-42	L2019410-43	L2019410-44	L2019410-45
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	14-OCT-17	14-OCT-17	14-OCT-17	14-OCT-17	14-OCT-17
Sampled Time					
Client ID	502-10	502-11	502-12	502-13	502-14
Grouping / **Analyte**					
TISSUE					
Physical Tests % Moisture (%)	78.9	78.0	77.2	76.5	76.2
Metals Aluminum (Al)-Total (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
Aluminum (Al)-Total (mg/kg wwt)	<1.0	<1.0	<1.0	<1.0	<1.0
Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Arsenic (As)-Total (mg/kg)	0.101	0.117	0.130	0.158	0.220
Arsenic (As)-Total (mg/kg wwt)	0.0213	0.0256	0.0296	0.0370	0.0523
Barium (Ba)-Total (mg/kg)	0.596	1.53	0.468	0.301	0.400
Barium (Ba)-Total (mg/kg wwt)	0.125	0.337	0.107	0.071	0.095
Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (B)-Total (mg/kg wwt)	<0.20	<0.20	<0.20	<0.20	<0.20
Cadmium (Cd)-Total (mg/kg)	<0.010	0.013	<0.010	<0.010	0.010
Cadmium (Cd)-Total (mg/kg wwt)	<0.0020	0.0028	<0.0020	<0.0020	0.0024
Calcium (Ca)-Total (mg/kg)	2910	7280	2860	2030	1840
Calcium (Ca)-Total (mg/kg wwt)	613	1600	653	476	438
Cesium (Cs)-Total (mg/kg)	0.627	0.664	0.632	0.804	0.762
Cesium (Cs)-Total (mg/kg wwt)	0.132	0.146	0.144	0.189	0.181
Chromium (Cr)-Total (mg/kg)	0.24	0.31	<0.20	<0.20	<0.20
Chromium (Cr)-Total (mg/kg wwt)	0.050	0.068	<0.040	0.040	<0.040
Cobalt (Co)-Total (mg/kg)	0.047	0.084	0.044	0.075	0.054
Cobalt (Co)-Total (mg/kg wwt)	0.0099	0.0185	0.0100	0.0175	0.0129
Copper (Cu)-Total (mg/kg)	1.93	1.88	1.62	2.26	2.16
Copper (Cu)-Total (mg/kg wwt)	0.407	0.415	0.370	0.531	0.515
Iron (Fe)-Total (mg/kg)	20.3	24.7	18.1	18.8	20.7
Iron (Fe)-Total (mg/kg wwt)	4.3	5.4	4.1	4.4	4.9
Lead (Pb)-Total (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
Lead (Pb)-Total (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)-Total (mg/kg)	1250	1330	1130	988	1010
Magnesium (Mg)-Total (mg/kg wwt)	263	293	258	232	241
Manganese (Mn)-Total (mg/kg)	1.49	2.74	1.30	0.682	0.876
Manganese (Mn)-Total (mg/kg wwt)	0.314	0.604	0.297	0.160	0.208

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Sample ID	L2019410-46	L2019410-47	L2019410-48	L2019410-49	L2019410-50
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	14-OCT-17	14-OCT-17	14-OCT-17	14-OCT-17	14-OCT-17
Sampled Time					
Client ID	502-15	502-16	502-17	512-6	512-7
Grouping / **Analyte**					
TISSUE					
Physical Tests % Moisture (%)	76.0	76.7	77.3	77.4	79.2
Metals Aluminum (Al)-Total (mg/kg)	<5.0	<5.0	<5.0	<2.0	<5.0
Aluminum (Al)-Total (mg/kg wwt)	<1.0	<1.0	<1.0	<0.40	<1.0
Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Arsenic (As)-Total (mg/kg)	0.206	0.226	0.164	0.157	0.166
Arsenic (As)-Total (mg/kg wwt)	0.0494	0.0527	0.0373	0.0355	0.0346
Barium (Ba)-Total (mg/kg)	0.744	0.599	0.897	0.778	1.45
Barium (Ba)-Total (mg/kg wwt)	0.178	0.140	0.204	0.176	0.301
Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (B)-Total (mg/kg wwt)	<0.20	<0.20	<0.20	<0.20	<0.20
Cadmium (Cd)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.0050	0.016
Cadmium (Cd)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0010	0.0033
Calcium (Ca)-Total (mg/kg)	2510	1600	5980	2990	3990
Calcium (Ca)-Total (mg/kg wwt)	601	374	1360	677	831
Cesium (Cs)-Total (mg/kg)	0.669	0.894	0.835	0.0359	0.0303
Cesium (Cs)-Total (mg/kg wwt)	0.160	0.208	0.190	0.0081	0.0063
Chromium (Cr)-Total (mg/kg)	<0.20	0.29	<0.20	0.107	<0.20
Chromium (Cr)-Total (mg/kg wwt)	<0.040	0.068	<0.040	0.024	<0.040
Cobalt (Co)-Total (mg/kg)	0.041	0.044	0.098	0.027	0.086
Cobalt (Co)-Total (mg/kg wwt)	0.0099	0.0104	0.0222	0.0061	0.0180
Copper (Cu)-Total (mg/kg)	1.41	2.26	1.55	1.67	0.99
Copper (Cu)-Total (mg/kg wwt)	0.339	0.527	0.352	0.378	0.206
Iron (Fe)-Total (mg/kg)	14.7	21.3	15.9	16.3	10.1
Iron (Fe)-Total (mg/kg wwt)	3.5	5.0	3.6	3.69	2.1
Lead (Pb)-Total (mg/kg)	<0.050	<0.050	<0.050	<0.020	<0.050
Lead (Pb)-Total (mg/kg wwt)	<0.010	<0.010	<0.010	<0.0040	<0.010
Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)-Total (mg/kg)	1230	1110	1280	1310	1120
Magnesium (Mg)-Total (mg/kg wwt)	295	259	291	297	233
Manganese (Mn)-Total (mg/kg)	1.61	0.904	2.36	1.17	2.95
Manganese (Mn)-Total (mg/kg wwt)	0.386	0.211	0.536	0.264	0.614

Sample ID	L2019410-51	L2019410-52	L2019410-53	L2019410-54	L2019410-55
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	14-OCT-17	14-OCT-17	14-OCT-17	14-OCT-17	14-OCT-17
Sampled Time					
Client ID	512-8	512-9	512-10	512-11	512-12
Grouping / **Analyte**					
TISSUE					
Physical Tests % Moisture (%)	79.2	77.7	81.3	79.2	79.2
Metals Aluminum (Al)-Total (mg/kg)	<5.0	<5.0	21.8	6.6	3.7
Aluminum (Al)-Total (mg/kg wwt)	<1.0	<1.0	4.1	1.4	0.76
Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Arsenic (As)-Total (mg/kg)	0.754	0.320	0.341	0.157	0.482
Arsenic (As)-Total (mg/kg wwt)	0.156	0.0714	0.0639	0.0327	0.100
Barium (Ba)-Total (mg/kg)	2.07	0.816	6.63	2.09	0.710
Barium (Ba)-Total (mg/kg wwt)	0.430	0.182	1.24	0.436	0.148
Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Boron (B)-Total (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (B)-Total (mg/kg wwt)	<0.20	<0.20	<0.20	<0.20	<0.20
Cadmium (Cd)-Total (mg/kg)	<0.010	<0.010	0.049	<0.010	0.0081
Cadmium (Cd)-Total (mg/kg wwt)	<0.0020	<0.0020	0.0092	0.0020	0.0017
Calcium (Ca)-Total (mg/kg)	4760	2080	8960	3550	2250
Calcium (Ca)-Total (mg/kg wwt)	987	465	1680	741	468
Cesium (Cs)-Total (mg/kg)	0.0459	0.0251	0.0552	0.0331	0.0350
Cesium (Cs)-Total (mg/kg wwt)	0.0095	0.0056	0.0103	0.0069	0.0073
Chromium (Cr)-Total (mg/kg)	<0.20	<0.20	0.44	<0.20	0.103
Chromium (Cr)-Total (mg/kg wwt)	<0.040	0.042	0.083	<0.040	0.021
Cobalt (Co)-Total (mg/kg)	0.044	0.070	0.345	0.097	0.058
Cobalt (Co)-Total (mg/kg wwt)	0.0091	0.0156	0.0646	0.0202	0.0120
Copper (Cu)-Total (mg/kg)	1.04	1.46	1.37	0.98	1.73
Copper (Cu)-Total (mg/kg wwt)	0.216	0.325	0.257	0.205	0.360
Iron (Fe)-Total (mg/kg)	10.4	15.3	80.2	17.7	16.0
Iron (Fe)-Total (mg/kg wwt)	2.2	3.4	15.0	3.7	3.33
Lead (Pb)-Total (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.020
Lead (Pb)-Total (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.0040
Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)-Total (mg/kg)	1280	1040	1290	1180	1300
Magnesium (Mg)-Total (mg/kg wwt)	265	233	241	247	270
Manganese (Mn)-Total (mg/kg)	6.30	1.73	9.64	3.49	1.76
Manganese (Mn)-Total (mg/kg wwt)	1.31	0.387	1.81	0.726	0.366

	Sample ID	L2019410-56				
	Description	Tissue				
	Sampled Date	14-OCT-17				
	Sampled Time					
	Client ID	512-13				
Grouping	**Analyte**					
TISSUE						
Physical Tests	% Moisture (%)	79.4				
Metals	Aluminum (Al)-Total (mg/kg)	2.7				
	Aluminum (Al)-Total (mg/kg wwt)	0.55				
	Antimony (Sb)-Total (mg/kg)	<0.010				
	Antimony (Sb)-Total (mg/kg wwt)	<0.0020				
	Arsenic (As)-Total (mg/kg)	0.225				
	Arsenic (As)-Total (mg/kg wwt)	0.0462				
	Barium (Ba)-Total (mg/kg)	0.711				
	Barium (Ba)-Total (mg/kg wwt)	0.146				
	Beryllium (Be)-Total (mg/kg)	<0.010				
	Beryllium (Be)-Total (mg/kg wwt)	<0.0020				
	Bismuth (Bi)-Total (mg/kg)	<0.010				
	Bismuth (Bi)-Total (mg/kg wwt)	<0.0020				
	Boron (B)-Total (mg/kg)	<1.0				
	Boron (B)-Total (mg/kg wwt)	<0.20				
	Cadmium (Cd)-Total (mg/kg)	0.0172				
	Cadmium (Cd)-Total (mg/kg wwt)	0.0035				
	Calcium (Ca)-Total (mg/kg)	2760				
	Calcium (Ca)-Total (mg/kg wwt)	568				
	Cesium (Cs)-Total (mg/kg)	0.0514				
	Cesium (Cs)-Total (mg/kg wwt)	0.0106				
	Chromium (Cr)-Total (mg/kg)	0.187				
	Chromium (Cr)-Total (mg/kg wwt)	0.038				
	Cobalt (Co)-Total (mg/kg)	0.034				
	Cobalt (Co)-Total (mg/kg wwt)	0.0070				
	Copper (Cu)-Total (mg/kg)	1.59				
	Copper (Cu)-Total (mg/kg wwt)	0.326				
	Iron (Fe)-Total (mg/kg)	21.6				
	Iron (Fe)-Total (mg/kg wwt)	4.45				
	Lead (Pb)-Total (mg/kg)	<0.020				
	Lead (Pb)-Total (mg/kg wwt)	<0.0040				
	Lithium (Li)-Total (mg/kg)	<0.50				
	Lithium (Li)-Total (mg/kg wwt)	<0.10				
	Magnesium (Mg)-Total (mg/kg)	1330				
	Magnesium (Mg)-Total (mg/kg wwt)	273				
	Manganese (Mn)-Total (mg/kg)	1.80				
	Manganese (Mn)-Total (mg/kg wwt)	0.371				

Sample ID	L2019410-1	L2019410-2	L2019410-3	L2019410-4	L2019410-5
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	11-OCT-17	11-OCT-17	11-OCT-17	11-OCT-17	11-OCT-17
Sampled Time					
Client ID	505-8	505-9	505-10	505-11	505-12
Grouping / **Analyte**					
TISSUE					
Metals Mercury (Hg)-Total (mg/kg)	0.0906	0.122	0.110	0.112	0.0859
Mercury (Hg)-Total (mg/kg wwt)	0.0199	0.0266	0.0242	0.0251	0.0190
Molybdenum (Mo)-Total (mg/kg)	<0.040	<0.040	<0.040	<0.040	<0.040
Molybdenum (Mo)-Total (mg/kg wwt)	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080
Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Nickel (Ni)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040
Phosphorus (P)-Total (mg/kg)	10600	10800	11500	9790	10800
Phosphorus (P)-Total (mg/kg wwt)	2330	2360	2520	2190	2400
Potassium (K)-Total (mg/kg)	16900	19000	16500	17500	17100
Potassium (K)-Total (mg/kg wwt)	3710	4160	3630	3900	3780
Rubidium (Rb)-Total (mg/kg)	21.7	21.8	16.3	22.2	24.8
Rubidium (Rb)-Total (mg/kg wwt)	4.77	4.76	3.57	4.96	5.49
Selenium (Se)-Total (mg/kg)	1.79	1.67	1.41	1.69	1.50
Selenium (Se)-Total (mg/kg wwt)	0.394	0.364	0.310	0.378	0.333
Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silver (Ag)-Total (mg/kg wwt)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium (Na)-Total (mg/kg)	3110	2680	2750	2730	2280
Sodium (Na)-Total (mg/kg wwt)	684	586	606	611	505
Strontium (Sr)-Total (mg/kg)	3.24	2.46	5.90	1.47	1.36
Strontium (Sr)-Total (mg/kg wwt)	0.711	0.539	1.30	0.328	0.301
Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
Tellurium (Te)-Total (mg/kg wwt)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Thallium (Tl)-Total (mg/kg)	0.0208	0.0195	0.0179	0.0180	0.0257
Thallium (Tl)-Total (mg/kg wwt)	0.00456	0.00427	0.00393	0.00402	0.00568
Tin (Sn)-Total (mg/kg)	<0.10	<0.10	<0.10	0.11	<0.10
Tin (Sn)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	0.025	<0.020
Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Uranium (U)-Total (mg/kg wwt)	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium (V)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (Zn)-Total (mg/kg)	45.6	25.9	34.0	26.9	25.2
Zinc (Zn)-Total (mg/kg wwt)	10.0	5.66	7.49	6.00	5.56
Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Zirconium (Zr)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Sample ID	L2019410-6	L2019410-7	L2019410-8	L2019410-9	L2019410-10
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	11-OCT-17	11-OCT-17	11-OCT-17	11-OCT-17	12-OCT-17
Sampled Time					
Client ID	505-13	505-14	505-15	501-11	501-12
Grouping / **Analyte**					
TISSUE					
Metals Mercury (Hg)-Total (mg/kg)	0.0790	0.0876	0.0984	0.0621	0.0658
Mercury (Hg)-Total (mg/kg wwt)	0.0172	0.0192	0.0210	0.0138	0.0155
Molybdenum (Mo)-Total (mg/kg)	<0.040	<0.040	<0.040	<0.040	<0.040
Molybdenum (Mo)-Total (mg/kg wwt)	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080
Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Nickel (Ni)-Total (mg/kg wwt)	<0.040	0.042	<0.040	<0.040	<0.040
Phosphorus (P)-Total (mg/kg)	11400	12000	10000	11500	10400
Phosphorus (P)-Total (mg/kg wwt)	2470	2630	2140	2550	2450
Potassium (K)-Total (mg/kg)	18600	17500	18600	18100	15100
Potassium (K)-Total (mg/kg wwt)	4050	3850	3970	4010	3570
Rubidium (Rb)-Total (mg/kg)	21.0	25.4	23.6	16.8	19.0
Rubidium (Rb)-Total (mg/kg wwt)	4.57	5.57	5.04	3.73	4.49
Selenium (Se)-Total (mg/kg)	1.40	1.79	1.49	2.50	2.27
Selenium (Se)-Total (mg/kg wwt)	0.305	0.393	0.319	0.554	0.535
Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silver (Ag)-Total (mg/kg wwt)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium (Na)-Total (mg/kg)	2640	3020	2670	2680	2400
Sodium (Na)-Total (mg/kg wwt)	574	664	571	593	567
Strontium (Sr)-Total (mg/kg)	3.70	2.79	1.32	3.11	3.75
Strontium (Sr)-Total (mg/kg wwt)	0.806	0.612	0.282	0.688	0.884
Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
Tellurium (Te)-Total (mg/kg wwt)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Thallium (Tl)-Total (mg/kg)	0.0245	0.0277	0.0247	0.0116	0.0142
Thallium (Tl)-Total (mg/kg wwt)	0.00533	0.00609	0.00527	0.00257	0.00336
Tin (Sn)-Total (mg/kg)	<0.10	<0.10	<0.10	0.23	<0.10
Tin (Sn)-Total (mg/kg wwt)	<0.020	0.020	<0.020	0.050	<0.020
Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Uranium (U)-Total (mg/kg wwt)	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium (V)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (Zn)-Total (mg/kg)	27.9	34.9	25.4	28.6	30.0
Zinc (Zn)-Total (mg/kg wwt)	6.07	7.66	5.42	6.34	7.07
Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Zirconium (Zr)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040

Sample ID	L2019410-11	L2019410-12	L2019410-13	L2019410-14	L2019410-15
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	12-OCT-17	12-OCT-17	12-OCT-17	12-OCT-17	12-OCT-17
Sampled Time					
Client ID	501-13	501-14	501-15	501-16	501-17
Grouping / **Analyte**					
TISSUE					
Metals Mercury (Hg)-Total (mg/kg)	0.0822	0.0835	0.0818	0.0965	0.0917
Mercury (Hg)-Total (mg/kg wwt)	0.0193	0.0199	0.0188	0.0209	0.0201
Molybdenum (Mo)-Total (mg/kg)	<0.040	<0.040	<0.040	<0.020	<0.040
Molybdenum (Mo)-Total (mg/kg wwt)	<0.0080	<0.0080	<0.0080	<0.0040	<0.0080
Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Nickel (Ni)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040
Phosphorus (P)-Total (mg/kg)	11700	9720	9360	11500	10300
Phosphorus (P)-Total (mg/kg wwt)	2750	2320	2150	2500	2270
Potassium (K)-Total (mg/kg)	15800	16700	16500	17900	17700
Potassium (K)-Total (mg/kg wwt)	3690	3990	3790	3870	3870
Rubidium (Rb)-Total (mg/kg)	17.8	19.5	15.2	16.9	20.0
Rubidium (Rb)-Total (mg/kg wwt)	4.17	4.64	3.49	3.67	4.39
Selenium (Se)-Total (mg/kg)	2.71	2.34	2.54	2.03	3.13
Selenium (Se)-Total (mg/kg wwt)	0.635	0.559	0.584	0.439	0.687
Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silver (Ag)-Total (mg/kg wwt)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium (Na)-Total (mg/kg)	2700	2410	2450	2750	2840
Sodium (Na)-Total (mg/kg wwt)	632	575	562	596	623
Strontium (Sr)-Total (mg/kg)	5.32	1.92	1.86	1.58	2.26
Strontium (Sr)-Total (mg/kg wwt)	1.25	0.456	0.427	0.344	0.496
Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
Tellurium (Te)-Total (mg/kg wwt)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Thallium (Tl)-Total (mg/kg)	0.0119	0.0171	0.0112	0.0148	0.0163
Thallium (Tl)-Total (mg/kg wwt)	0.00278	0.00409	0.00257	0.00321	0.00356
Tin (Sn)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	0.11
Tin (Sn)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	0.025
Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Uranium (U)-Total (mg/kg wwt)	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium (V)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (Zn)-Total (mg/kg)	40.6	27.2	25.5	25.8	32.8
Zinc (Zn)-Total (mg/kg wwt)	9.50	6.47	5.86	5.59	7.19
Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	0.33	<0.20
Zirconium (Zr)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	0.072	<0.040

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Sample ID	L2019410-16	L2019410-17	L2019410-18	L2019410-19	L2019410-20
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	12-OCT-17	12-OCT-17	12-OCT-17	12-OCT-17	12-OCT-17
Sampled Time					
Client ID	501-18	511-10	511-11	511-12	511-13
Grouping / **Analyte**					
TISSUE					
Metals Mercury (Hg)-Total (mg/kg)	0.0548	0.0884	0.112	0.0417	0.0934
Mercury (Hg)-Total (mg/kg wwt)	0.0121	0.0197	0.0234	0.0097	0.0197
Molybdenum (Mo)-Total (mg/kg)	<0.040	<0.020	<0.020	<0.040	<0.040
Molybdenum (Mo)-Total (mg/kg wwt)	<0.0080	<0.0040	<0.0040	<0.0080	<0.0080
Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Nickel (Ni)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040
Phosphorus (P)-Total (mg/kg)	11000	13000	14100	12500	11500
Phosphorus (P)-Total (mg/kg wwt)	2420	2880	2950	2920	2410
Potassium (K)-Total (mg/kg)	17400	19000	18100	17400	19500
Potassium (K)-Total (mg/kg wwt)	3820	4230	3780	4070	4100
Rubidium (Rb)-Total (mg/kg)	20.4	7.27	6.27	7.05	8.70
Rubidium (Rb)-Total (mg/kg wwt)	4.49	1.62	1.31	1.65	1.83
Selenium (Se)-Total (mg/kg)	1.79	1.51	1.24	1.36	1.22
Selenium (Se)-Total (mg/kg wwt)	0.395	0.335	0.259	0.319	0.258
Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silver (Ag)-Total (mg/kg wwt)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium (Na)-Total (mg/kg)	2490	2550	3510	2420	2760
Sodium (Na)-Total (mg/kg wwt)	548	567	733	564	582
Strontium (Sr)-Total (mg/kg)	3.10	3.17	4.36	5.01	3.49
Strontium (Sr)-Total (mg/kg wwt)	0.683	0.704	0.911	1.17	0.734
Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
Tellurium (Te)-Total (mg/kg wwt)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Thallium (Tl)-Total (mg/kg)	0.0195	0.0077	0.0093	0.0070	0.0081
Thallium (Tl)-Total (mg/kg wwt)	0.00429	0.00171	0.00195	0.00164	0.00171
Tin (Sn)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Uranium (U)-Total (mg/kg wwt)	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium (V)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (Zn)-Total (mg/kg)	25.0	26.1	29.3	23.1	26.7
Zinc (Zn)-Total (mg/kg wwt)	5.50	5.80	6.11	5.39	5.63
Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Zirconium (Zr)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040

Sample ID	L2019410-21	L2019410-22	L2019410-23	L2019410-24	L2019410-25
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	12-OCT-17	12-OCT-17	12-OCT-17	12-OCT-17	13-OCT-17
Sampled Time					
Client ID	511-14	511-15	511-16	511-17	508-5
Grouping / **Analyte**					
TISSUE					
Metals Mercury (Hg)-Total (mg/kg)	0.0664	0.0821	0.305	0.246	0.0650
Mercury (Hg)-Total (mg/kg wwt)	0.0143	0.0173	0.0681	0.0529	0.0137
Molybdenum (Mo)-Total (mg/kg)	0.088	<0.040	<0.040	<0.020	<0.040
Molybdenum (Mo)-Total (mg/kg wwt)	0.0190	<0.0080	<0.0080	<0.0040	<0.0080
Nickel (Ni)-Total (mg/kg)	<0.20	0.21	<0.20	<0.20	<0.20
Nickel (Ni)-Total (mg/kg wwt)	<0.040	0.045	<0.040	<0.040	<0.040
Phosphorus (P)-Total (mg/kg)	12300	11800	10200	13000	14000
Phosphorus (P)-Total (mg/kg wwt)	2660	2490	2270	2800	2940
Potassium (K)-Total (mg/kg)	18500	17200	15600	16300	18000
Potassium (K)-Total (mg/kg wwt)	3990	3620	3480	3510	3790
Rubidium (Rb)-Total (mg/kg)	7.56	6.17	5.02	6.04	12.0
Rubidium (Rb)-Total (mg/kg wwt)	1.63	1.30	1.12	1.30	2.54
Selenium (Se)-Total (mg/kg)	1.18	1.25	0.93	1.41	2.14
Selenium (Se)-Total (mg/kg wwt)	0.255	0.263	0.208	0.304	0.451
Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silver (Ag)-Total (mg/kg wwt)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium (Na)-Total (mg/kg)	2430	2540	2650	3160	2600
Sodium (Na)-Total (mg/kg wwt)	523	534	592	680	548
Strontium (Sr)-Total (mg/kg)	4.16	3.70	1.69	4.91	8.20
Strontium (Sr)-Total (mg/kg wwt)	0.897	0.778	0.378	1.06	1.73
Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
Tellurium (Te)-Total (mg/kg wwt)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Thallium (Tl)-Total (mg/kg)	0.0097	0.0073	0.0070	0.0051	0.0067
Thallium (Tl)-Total (mg/kg wwt)	0.00208	0.00154	0.00157	0.00110	0.00142
Tin (Sn)-Total (mg/kg)	<0.10	0.17	<0.10	<0.10	<0.10
Tin (Sn)-Total (mg/kg wwt)	<0.020	0.036	<0.020	<0.020	<0.020
Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	0.0028
Uranium (U)-Total (mg/kg wwt)	<0.00040	<0.00040	<0.00040	<0.00040	0.00058
Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium (V)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (Zn)-Total (mg/kg)	33.1	38.1	27.1	29.2	31.7
Zinc (Zn)-Total (mg/kg wwt)	7.14	8.03	6.06	6.27	6.67
Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Zirconium (Zr)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040

Sample ID	L2019410-26	L2019410-27	L2019410-28	L2019410-29	L2019410-30
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	13-OCT-17	13-OCT-17	13-OCT-17	13-OCT-17	13-OCT-17
Sampled Time					
Client ID	508-6	508-7	508-8	508-9	508-10
Grouping / **Analyte**					
TISSUE					
Metals Mercury (Hg)-Total (mg/kg)	0.102	0.0972	0.0844	0.0646	0.101
Mercury (Hg)-Total (mg/kg wwt)	0.0212	0.0199	0.0168	0.0129	0.0194
Molybdenum (Mo)-Total (mg/kg)	<0.040	<0.040	<0.040	<0.040	<0.040
Molybdenum (Mo)-Total (mg/kg wwt)	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080
Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Nickel (Ni)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040
Phosphorus (P)-Total (mg/kg)	12100	11300	11100	13200	11500
Phosphorus (P)-Total (mg/kg wwt)	2520	2310	2200	2630	2200
Potassium (K)-Total (mg/kg)	19000	19300	19900	19400	20200
Potassium (K)-Total (mg/kg wwt)	3950	3950	3970	3870	3850
Rubidium (Rb)-Total (mg/kg)	12.6	14.7	13.7	18.3	12.4
Rubidium (Rb)-Total (mg/kg wwt)	2.62	3.02	2.73	3.63	2.36
Selenium (Se)-Total (mg/kg)	1.82	1.39	2.38	2.74	2.00
Selenium (Se)-Total (mg/kg wwt)	0.380	0.284	0.473	0.545	0.381
Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silver (Ag)-Total (mg/kg wwt)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium (Na)-Total (mg/kg)	2530	2650	2980	3580	3220
Sodium (Na)-Total (mg/kg wwt)	527	544	593	713	615
Strontium (Sr)-Total (mg/kg)	3.28	1.80	1.34	6.19	1.89
Strontium (Sr)-Total (mg/kg wwt)	0.682	0.368	0.266	1.23	0.361
Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
Tellurium (Te)-Total (mg/kg wwt)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Thallium (Tl)-Total (mg/kg)	0.0109	0.0126	0.0125	0.0147	0.0109
Thallium (Tl)-Total (mg/kg wwt)	0.00226	0.00258	0.00249	0.00292	0.00207
Tin (Sn)-Total (mg/kg)	<0.10	<0.10	<0.10	0.16	0.12
Tin (Sn)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	0.032	0.023
Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Uranium (U)-Total (mg/kg wwt)	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium (V)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (Zn)-Total (mg/kg)	27.3	22.3	23.1	39.0	27.1
Zinc (Zn)-Total (mg/kg wwt)	5.67	4.57	4.60	7.76	5.18
Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Zirconium (Zr)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040

Sample ID	L2019410-31	L2019410-32	L2019410-33	L2019410-34	L2019410-35
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	13-OCT-17	13-OCT-17	13-OCT-17	13-OCT-17	13-OCT-17
Sampled Time					
Client ID	508-11	508-12	509-6	509-7	509-8
Grouping / **Analyte**					
TISSUE					
Metals Mercury (Hg)-Total (mg/kg)	0.0656	0.0845	0.0812	0.0807	0.0741
Mercury (Hg)-Total (mg/kg wwt)	0.0136	0.0189	0.0165	0.0167	0.0156
Molybdenum (Mo)-Total (mg/kg)	<0.040	<0.040	<0.040	<0.040	<0.040
Molybdenum (Mo)-Total (mg/kg wwt)	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080
Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	0.25	<0.20
Nickel (Ni)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	0.052	<0.040
Phosphorus (P)-Total (mg/kg)	11900	10500	11400	10200	10400
Phosphorus (P)-Total (mg/kg wwt)	2460	2360	2320	2110	2180
Potassium (K)-Total (mg/kg)	19800	17400	20600	19700	19300
Potassium (K)-Total (mg/kg wwt)	4090	3890	4170	4080	4040
Rubidium (Rb)-Total (mg/kg)	18.2	13.2	17.8	15.8	16.4
Rubidium (Rb)-Total (mg/kg wwt)	3.76	2.96	3.60	3.28	3.45
Selenium (Se)-Total (mg/kg)	1.99	1.26	1.91	1.98	1.83
Selenium (Se)-Total (mg/kg wwt)	0.412	0.283	0.387	0.411	0.385
Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silver (Ag)-Total (mg/kg wwt)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium (Na)-Total (mg/kg)	3350	2480	3630	3280	2810
Sodium (Na)-Total (mg/kg wwt)	693	556	736	680	591
Strontium (Sr)-Total (mg/kg)	3.91	3.68	2.99	1.58	1.83
Strontium (Sr)-Total (mg/kg wwt)	0.808	0.825	0.605	0.328	0.384
Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
Tellurium (Te)-Total (mg/kg wwt)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Thallium (Tl)-Total (mg/kg)	0.0101	0.0068	0.0097	0.0096	0.0106
Thallium (Tl)-Total (mg/kg wwt)	0.00209	0.00151	0.00197	0.00199	0.00223
Tin (Sn)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Uranium (U)-Total (mg/kg wwt)	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium (V)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (Zn)-Total (mg/kg)	36.6	28.7	25.6	24.0	20.3
Zinc (Zn)-Total (mg/kg wwt)	7.56	6.43	5.20	4.97	4.27
Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Zirconium (Zr)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040

Sample ID	L2019410-36	L2019410-37	L2019410-38	L2019410-39	L2019410-40
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	13-OCT-17	13-OCT-17	13-OCT-17	13-OCT-17	13-OCT-17
Sampled Time					
Client ID	509-9	509-10	509-11	509-12	509-13
Grouping / **Analyte**					
TISSUE					
Metals Mercury (Hg)-Total (mg/kg)	0.0767	0.118	0.0733	0.0762	0.0886
Mercury (Hg)-Total (mg/kg wwt)	0.0161	0.0236	0.0150	0.0159	0.0184
Molybdenum (Mo)-Total (mg/kg)	<0.040	<0.040	<0.040	<0.040	<0.040
Molybdenum (Mo)-Total (mg/kg wwt)	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080
Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Nickel (Ni)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040
Phosphorus (P)-Total (mg/kg)	10800	13400	11700	11300	11000
Phosphorus (P)-Total (mg/kg wwt)	2260	2690	2410	2370	2290
Potassium (K)-Total (mg/kg)	18500	20700	20100	19300	19500
Potassium (K)-Total (mg/kg wwt)	3880	4140	4110	4020	4060
Rubidium (Rb)-Total (mg/kg)	23.4	20.5	15.5	17.0	19.9
Rubidium (Rb)-Total (mg/kg wwt)	4.90	4.10	3.17	3.54	4.14
Selenium (Se)-Total (mg/kg)	2.16	1.70	1.61	1.59	2.37
Selenium (Se)-Total (mg/kg wwt)	0.452	0.340	0.331	0.332	0.493
Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silver (Ag)-Total (mg/kg wwt)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium (Na)-Total (mg/kg)	3080	3490	3540	3110	3150
Sodium (Na)-Total (mg/kg wwt)	646	700	724	647	655
Strontium (Sr)-Total (mg/kg)	2.64	4.73	2.86	3.51	1.80
Strontium (Sr)-Total (mg/kg wwt)	0.553	0.948	0.587	0.732	0.374
Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
Tellurium (Te)-Total (mg/kg wwt)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Thallium (Tl)-Total (mg/kg)	0.0142	0.0156	0.0085	0.0103	0.0152
Thallium (Tl)-Total (mg/kg wwt)	0.00298	0.00313	0.00174	0.00214	0.00316
Tin (Sn)-Total (mg/kg)	<0.10	<0.10	0.11	<0.10	<0.10
Tin (Sn)-Total (mg/kg wwt)	<0.020	<0.020	0.022	<0.020	<0.020
Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Uranium (U)-Total (mg/kg wwt)	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium (V)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (Zn)-Total (mg/kg)	23.7	27.1	33.2	29.9	26.0
Zinc (Zn)-Total (mg/kg wwt)	4.97	5.43	6.81	6.24	5.40
Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Zirconium (Zr)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040

Sample ID	L2019410-41	L2019410-42	L2019410-43	L2019410-44	L2019410-45
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	14-OCT-17	14-OCT-17	14-OCT-17	14-OCT-17	14-OCT-17
Sampled Time					
Client ID	502-10	502-11	502-12	502-13	502-14
Grouping / **Analyte**					
TISSUE					
Metals Mercury (Hg)-Total (mg/kg)	0.141	0.0657	0.0947	0.0771	0.0788
Mercury (Hg)-Total (mg/kg wwt)	0.0297	0.0145	0.0216	0.0181	0.0187
Molybdenum (Mo)-Total (mg/kg)	<0.040	<0.040	<0.040	<0.040	<0.040
Molybdenum (Mo)-Total (mg/kg wwt)	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080
Nickel (Ni)-Total (mg/kg)	<0.20	0.25	<0.20	<0.20	<0.20
Nickel (Ni)-Total (mg/kg wwt)	<0.040	0.056	<0.040	<0.040	<0.040
Phosphorus (P)-Total (mg/kg)	11100	13100	9990	8790	8820
Phosphorus (P)-Total (mg/kg wwt)	2330	2880	2280	2060	2100
Potassium (K)-Total (mg/kg)	18300	18000	15700	16200	15500
Potassium (K)-Total (mg/kg wwt)	3840	3960	3590	3810	3680
Rubidium (Rb)-Total (mg/kg)	14.0	15.0	13.2	18.0	15.7
Rubidium (Rb)-Total (mg/kg wwt)	2.95	3.30	3.00	4.22	3.74
Selenium (Se)-Total (mg/kg)	2.27	2.18	2.13	2.71	2.99
Selenium (Se)-Total (mg/kg wwt)	0.479	0.480	0.486	0.636	0.710
Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silver (Ag)-Total (mg/kg wwt)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium (Na)-Total (mg/kg)	2550	2630	2480	2550	2610
Sodium (Na)-Total (mg/kg wwt)	536	578	567	598	622
Strontium (Sr)-Total (mg/kg)	2.17	6.60	2.06	1.18	1.23
Strontium (Sr)-Total (mg/kg wwt)	0.457	1.45	0.471	0.277	0.293
Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
Tellurium (Te)-Total (mg/kg wwt)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Thallium (Tl)-Total (mg/kg)	0.0143	0.0132	0.0131	0.0191	0.0183
Thallium (Tl)-Total (mg/kg wwt)	0.00300	0.00290	0.00300	0.00447	0.00435
Tin (Sn)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	0.020
Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Uranium (U)-Total (mg/kg wwt)	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium (V)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (Zn)-Total (mg/kg)	24.9	38.8	29.8	29.0	25.5
Zinc (Zn)-Total (mg/kg wwt)	5.23	8.53	6.79	6.79	6.07
Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Zirconium (Zr)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	0.046

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Sample ID	L2019410-46	L2019410-47	L2019410-48	L2019410-49	L2019410-50
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	14-OCT-17	14-OCT-17	14-OCT-17	14-OCT-17	14-OCT-17
Sampled Time					
Client ID	502-15	502-16	502-17	512-6	512-7
Grouping / **Analyte**					
TISSUE					
Metals Mercury (Hg)-Total (mg/kg)	0.0786	0.0918	0.0927	0.0884	0.0908
Mercury (Hg)-Total (mg/kg wwt)	0.0188	0.0214	0.0211	0.0200	0.0189
Molybdenum (Mo)-Total (mg/kg)	<0.040	<0.040	<0.040	<0.020	<0.040
Molybdenum (Mo)-Total (mg/kg wwt)	<0.0080	<0.0080	<0.0080	<0.0040	<0.0080
Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Nickel (Ni)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040
Phosphorus (P)-Total (mg/kg)	10700	9260	12300	12100	10100
Phosphorus (P)-Total (mg/kg wwt)	2570	2160	2810	2730	2110
Potassium (K)-Total (mg/kg)	17900	17600	18700	18200	17500
Potassium (K)-Total (mg/kg wwt)	4290	4090	4250	4110	3640
Rubidium (Rb)-Total (mg/kg)	14.0	17.0	17.8	6.21	6.92
Rubidium (Rb)-Total (mg/kg wwt)	3.36	3.96	4.05	1.40	1.44
Selenium (Se)-Total (mg/kg)	1.79	2.50	2.42	1.30	1.30
Selenium (Se)-Total (mg/kg wwt)	0.429	0.582	0.551	0.295	0.270
Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silver (Ag)-Total (mg/kg wwt)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium (Na)-Total (mg/kg)	2310	2730	2730	2360	2730
Sodium (Na)-Total (mg/kg wwt)	554	635	621	534	568
Strontium (Sr)-Total (mg/kg)	2.31	1.20	5.18	2.89	3.41
Strontium (Sr)-Total (mg/kg wwt)	0.554	0.281	1.18	0.654	0.711
Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
Tellurium (Te)-Total (mg/kg wwt)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Thallium (Tl)-Total (mg/kg)	0.0170	0.0167	0.0213	0.0072	0.0072
Thallium (Tl)-Total (mg/kg wwt)	0.00407	0.00390	0.00483	0.00164	0.00151
Tin (Sn)-Total (mg/kg)	0.18	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Total (mg/kg wwt)	0.044	<0.020	<0.020	<0.020	<0.020
Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Uranium (U)-Total (mg/kg wwt)	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium (V)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (Zn)-Total (mg/kg)	20.9	25.0	25.7	23.3	30.9
Zinc (Zn)-Total (mg/kg wwt)	5.02	5.82	5.84	5.26	6.44
Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Zirconium (Zr)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Sample ID	L2019410-51	L2019410-52	L2019410-53	L2019410-54	L2019410-55
Description	Tissue	Tissue	Tissue	Tissue	Tissue
Sampled Date	14-OCT-17	14-OCT-17	14-OCT-17	14-OCT-17	14-OCT-17
Sampled Time					
Client ID	512-8	512-9	512-10	512-11	512-12
Grouping / **Analyte**					
TISSUE					
Metals Mercury (Hg)-Total (mg/kg)	0.111	0.101	0.160	0.0830	0.153
Mercury (Hg)-Total (mg/kg wwt)	0.0231	0.0226	0.0299	0.0173	0.0318
Molybdenum (Mo)-Total (mg/kg)	<0.040	<0.040	<0.040	<0.040	<0.020
Molybdenum (Mo)-Total (mg/kg wwt)	<0.0080	<0.0080	<0.0080	<0.0080	<0.0040
Nickel (Ni)-Total (mg/kg)	<0.20	<0.20	0.96	<0.20	<0.20
Nickel (Ni)-Total (mg/kg wwt)	<0.040	<0.040	0.179	<0.040	<0.040
Phosphorus (P)-Total (mg/kg)	12100	9000	13800	10600	12300
Phosphorus (P)-Total (mg/kg wwt)	2510	2010	2590	2210	2560
Potassium (K)-Total (mg/kg)	19300	15700	19300	17000	20000
Potassium (K)-Total (mg/kg wwt)	4000	3510	3610	3540	4160
Rubidium (Rb)-Total (mg/kg)	12.6	6.95	14.5	8.59	8.27
Rubidium (Rb)-Total (mg/kg wwt)	2.61	1.55	2.71	1.79	1.72
Selenium (Se)-Total (mg/kg)	1.25	1.29	2.85	1.26	1.24
Selenium (Se)-Total (mg/kg wwt)	0.259	0.287	0.533	0.262	0.257
Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silver (Ag)-Total (mg/kg wwt)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium (Na)-Total (mg/kg)	2850	2600	3850	2600	2450
Sodium (Na)-Total (mg/kg wwt)	591	580	722	541	509
Strontium (Sr)-Total (mg/kg)	5.32	1.80	7.52	4.07	2.15
Strontium (Sr)-Total (mg/kg wwt)	1.10	0.402	1.41	0.848	0.447
Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
Tellurium (Te)-Total (mg/kg wwt)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Thallium (Tl)-Total (mg/kg)	0.0086	0.0084	0.0144	0.0064	0.0068
Thallium (Tl)-Total (mg/kg wwt)	0.00178	0.00187	0.00269	0.00134	0.00141
Tin (Sn)-Total (mg/kg)	<0.10	0.12	2.16	0.34	<0.10
Tin (Sn)-Total (mg/kg wwt)	<0.020	0.028	0.404	0.071	<0.020
Uranium (U)-Total (mg/kg)	<0.0020	<0.0020	0.0030	<0.0020	<0.0020
Uranium (U)-Total (mg/kg wwt)	<0.00040	<0.00040	0.00057	<0.00040	<0.00040
Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium (V)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (Zn)-Total (mg/kg)	27.5	28.6	53.3	31.8	26.5
Zinc (Zn)-Total (mg/kg wwt)	5.71	6.38	9.99	6.63	5.51
Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
Zirconium (Zr)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040

	Sample ID	L2019410-56				
	Description	Tissue				
	Sampled Date	14-OCT-17				
	Sampled Time					
	Client ID	512-13				
Grouping	**Analyte**					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	0.124				
	Mercury (Hg)-Total (mg/kg wwt)	0.0255				
	Molybdenum (Mo)-Total (mg/kg)	<0.020				
	Molybdenum (Mo)-Total (mg/kg wwt)	<0.0040				
	Nickel (Ni)-Total (mg/kg)	0.21				
	Nickel (Ni)-Total (mg/kg wwt)	0.044				
	Phosphorus (P)-Total (mg/kg)	12500				
	Phosphorus (P)-Total (mg/kg wwt)	2570				
	Potassium (K)-Total (mg/kg)	20200				
	Potassium (K)-Total (mg/kg wwt)	4140				
	Rubidium (Rb)-Total (mg/kg)	11.0				
	Rubidium (Rb)-Total (mg/kg wwt)	2.26				
	Selenium (Se)-Total (mg/kg)	1.51				
	Selenium (Se)-Total (mg/kg wwt)	0.310				
	Silver (Ag)-Total (mg/kg)	<0.0050				
	Silver (Ag)-Total (mg/kg wwt)	<0.0010				
	Sodium (Na)-Total (mg/kg)	2510				
	Sodium (Na)-Total (mg/kg wwt)	516				
	Strontium (Sr)-Total (mg/kg)	2.35				
	Strontium (Sr)-Total (mg/kg wwt)	0.483				
	Tellurium (Te)-Total (mg/kg)	<0.020				
	Tellurium (Te)-Total (mg/kg wwt)	<0.0040				
	Thallium (Tl)-Total (mg/kg)	0.0078				
	Thallium (Tl)-Total (mg/kg wwt)	0.00161				
	Tin (Sn)-Total (mg/kg)	<0.10				
	Tin (Sn)-Total (mg/kg wwt)	<0.020				
	Uranium (U)-Total (mg/kg)	<0.0020				
	Uranium (U)-Total (mg/kg wwt)	<0.00040				
	Vanadium (V)-Total (mg/kg)	<0.10				
	Vanadium (V)-Total (mg/kg wwt)	<0.020				
	Zinc (Zn)-Total (mg/kg)	21.9				
	Zinc (Zn)-Total (mg/kg wwt)	4.51				
	Zirconium (Zr)-Total (mg/kg)	0.41				
	Zirconium (Zr)-Total (mg/kg wwt)	0.085				

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Zirconium (Zr)-Total	DUP-H	L2019410-14, -17, -18, -24, -49, -55, -56
Duplicate	Barium (Ba)-Total	DUP-H	L2019410-30, -31, -33, -37, -38, -39, -40, -41, -42, -46, -47, -48
Duplicate	Bismuth (Bi)-Total	DUP-H	L2019410-15, -16, -19, -20, -21, -22, -23, -25, -26, -27, -28, -29, -5, -6, -7, -8, -9
Duplicate	Calcium (Ca)-Total	DUP-H	L2019410-30, -31, -33, -37, -38, -39, -40, -41, -42, -46, -47, -48
Duplicate	Manganese (Mn)-Total	DUP-H	L2019410-15, -16, -19, -20, -21, -22, -23, -25, -26, -27, -28, -29, -5, -6, -7, -8, -9
Duplicate	Manganese (Mn)-Total	DUP-H	L2019410-30, -31, -33, -37, -38, -39, -40, -41, -42, -46, -47, -48
Duplicate	Strontium (Sr)-Total	DUP-H	L2019410-30, -31, -33, -37, -38, -39, -40, -41, -42, -46, -47, -48
Duplicate	Tin (Sn)-Total	DUP-H	L2019410-15, -16, -19, -20, -21, -22, -23, -25, -26, -27, -28, -29, -5, -6, -7, -8, -9
Duplicate	Zirconium (Zr)-Total	DUP-H	L2019410-14, -17, -18, -24, -49, -55, -56
Duplicate	Barium (Ba)-Total	DUP-H	L2019410-30, -31, -33, -37, -38, -39, -40, -41, -42, -46, -47, -48
Duplicate	Bismuth (Bi)-Total	DUP-H	L2019410-15, -16, -19, -20, -21, -22, -23, -25, -26, -27, -28, -29, -5, -6, -7, -8, -9
Duplicate	Calcium (Ca)-Total	DUP-H	L2019410-30, -31, -33, -37, -38, -39, -40, -41, -42, -46, -47, -48
Duplicate	Manganese (Mn)-Total	DUP-H	L2019410-15, -16, -19, -20, -21, -22, -23, -25, -26, -27, -28, -29, -5, -6, -7, -8, -9
Duplicate	Manganese (Mn)-Total	DUP-H	L2019410-30, -31, -33, -37, -38, -39, -40, -41, -42, -46, -47, -48
Duplicate	Strontium (Sr)-Total	DUP-H	L2019410-30, -31, -33, -37, -38, -39, -40, -41, -42, -46, -47, -48
Duplicate	Tin (Sn)-Total	DUP-H	L2019410-15, -16, -19, -20, -21, -22, -23, -25, -26, -27, -28, -29, -5, -6, -7, -8, -9
Certified Reference Material	Lead (Pb)-Total	MES	L2019410-14, -17, -18, -24, -49, -55, -56
Certified Reference Material	Zirconium (Zr)-Total	MES	L2019410-14, -17, -18, -24, -49, -55, -56
Certified Reference Material	Arsenic (As)-Total	MES	L2019410-1, -10, -11, -12, -13, -2, -3, -32, -34, -35, -36, -4, -43, -44, -45, -50, -51, -52, -53, -54
Certified Reference Material	Arsenic (As)-Total	MES	L2019410-15, -16, -19, -20, -21, -22, -23, -25, -26, -27, -28, -29, -5, -6, -7, -8, -9
Certified Reference Material	Arsenic (As)-Total	MES	L2019410-30, -31, -33, -37, -38, -39, -40, -41, -42, -46, -47, -48
Certified Reference Material	Lead (Pb)-Total	MES	L2019410-14, -17, -18, -24, -49, -55, -56
Certified Reference Material	Zirconium (Zr)-Total	MES	L2019410-14, -17, -18, -24, -49, -55, -56

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
AG-DRY-CCMS-N-VA	Tissue	Silver in Tissue by CRC ICPMS (DRY)	EPA 200.3/6020A

This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

AG-DRY-MICR-HRMS-VA	Tissue	Silver in Tissue by HR-ICPMS Micro (DRY)	EPA 200.3/200.8

Trace metals in tissue are analyzed by high resolution inductively coupled plasma mass spectrometry (HR-ICPMS) modified from US EPA Method 200.8, (Revision 5.5). The sample preparation procedure is modified from US EPA 200.3. Analytical results are reported on dry weight basis.

Reference Information

AG-WET-CCMS-N-VA Tissue Silver in Tissue by CRC ICPMS (WET) EPA 200.3/6020A

This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

AG-WET-MICR-HRMS-VA Tissue Silver in Tissue by HR-ICPMS Micro (WET) EPA 200.3/200.8

Trace metals in tissue are analyzed by high resolution inductively coupled plasma mass spectrometry (HR-ICPMS) modified from US EPA Method 200.8, (Revision 5.5). The sample preparation procedure is modified from US EPA 200.3. Analytical results are reported on wet weight basis.

HG-DRY-CVAFS-N-VA Tissue Mercury in Tissue by CVAFS (DRY) EPA 200.3, EPA 245.7

This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Analysis is by atomic fluorescence spectrophotometry or atomic absorption spectrophotometry, adapted from US EPA Method 245.7.

HG-DRY-MICR-CVAF-VA Tissue Mercury in Tissue by CVAFS Micro (DRY) EPA 200.3, EPA 245.7

This method is adapted from US EPA Method 200.3 "Sample Procedures for Spectrochemical Determination of Total Recoverable Elements in Biological Tissues" (1996). Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with repeated additions of hydrogen peroxide. Analysis is by atomic fluorescence spectrophotometry or atomic absorption spectrophotometry, adapted from US EPA Method 245.7.

HG-WET-CVAFS-N-VA Tissue Mercury in Tissue by CVAFS (WET) EPA 200.3, EPA 245.7

This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Analysis is by atomic fluorescence spectrophotometry or atomic absorption spectrophotometry, adapted from US EPA Method 245.7.

HG-WET-MICR-CVAF-VA Tissue Mercury in Tissue by CVAFS Micro (WET) EPA 200.3, EPA 245.7

This method is adapted from US EPA Method 200.3 "Sample Procedures for Spectrochemical Determination of Total Recoverable Elements in Biological Tissues" (1996). Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with repeated additions of hydrogen peroxide. Analysis is by atomic fluorescence spectrophotometry or atomic absorption spectrophotometry, adapted from US EPA Method 245.7.

MET-DRY-CCMS-N-VA Tissue Metals in Tissue by CRC ICPMS (DRY) EPA 200.3/6020A

This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

MET-DRY-MICR-HRMS-VA Tissue Metals in Tissue by HR-ICPMS Micro (DRY) EPA 200.3/200.8

Trace metals in tissue are analyzed by high resolution inductively coupled plasma mass spectrometry (HR-ICPMS) modified from US EPA Method 200.8, (Revision 5.5). The sample preparation procedure is modified from US EPA 200.3. Analytical results are reported on dry weight basis.

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

MET-WET-CCMS-N-VA Tissue Metals in Tissue by CRC ICPMS (WET) EPA 200.3/6020A

This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

MET-WET-MICR-HRMS-VA Tissue Metals in Tissue by HR-ICPMS Micro (WET) EPA 200.3/200.8

Trace metals in tissue are analyzed by high resolution inductively coupled plasma mass spectrometry (HR-ICPMS) modified from US EPA Method 200.8, (Revision 5.5). The sample preparation procedure is modified from US EPA 200.3. Analytical results are reported on wet weight basis.

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals.

Reference Information

Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

MOISTURE-MICR-VA Tissue Moisture in Tissue Puget Sound WQ Authority, Apr 1997

This analysis is carried out gravimetrically by drying the sample at <60 deg. C.

MOISTURE-TISS-VA Tissue % Moisture in Tissues Puget Sound WQ Authority, Apr 1997

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1 2 3 4 5

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Environmental

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COC # 101

Page 5 of 5

RM	Report Format / Distribution: ☑ Standard ☐ Other	Service Requested (Rush for routine analysis subject to availability): ◉ Regular (Standard Turnaround times—Business Days)
enevieve Morinville	☑ PDF ☑ Excel ☑ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
chmond Adelaide Centre	Email 1: genevieve.morinville@erm.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
0 Adelaide St. W.] Suite 2010; Toronto, ON	Email 2: karina.houghton@erm.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
7-288- 09 Fax:	Email 3: kathy.chambers@erm.com	Analysis Request
me as Report ☑ Yes ☐ No	Client / Project Information	Please indicate below Filtered, Preserved or both (F, P, F/P)
nvoice with Re ☑ Yes ☑ No	Job #: 0403488-0006	
RM	PO / AFE:	
ccounts Payables (ERM.CanadaPayables@	LSD:	
th Floor, 1111 W. Hastings St.; Vancouver,		
4-689-9 Fax:	Quote #:	
rder # nly)	ALS Contact: Amber Springer Sampler:	

Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Percent Moisture	Standard CCMS Metals	Mercury	Silver	Number of Containers
512 - 6	14 OCT		Tissue	x	x	x	x	1
512 - 7	↓		Tissue	x	x	x	x	1
512 - 8			Tissue	x	x	x	x	1
512 - 9			Tissue	x	x	x	x	1
512 - 10			Tissue	x	x	x	x	1
512 - 11			Tissue	x	x	x	x	1
512 - 12			Tissue	x	x	x	x	1
512 - 13	↓		Tissue	x	x	x	x	1
			Tissue	x	x	x	x	1
			Tissue	x	x	x	x	1
			Tissue	x	x	x	x	1
			Tissue	x	x	x	x	1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

KEEP FROZEN. HOLD FOR ANALYSIS UNTIL FURTHER INSTRUCTIONS RECEIVED

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

NT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
	Date (dd-mmm)	Time (hh:mm)	Received by:	Date:	Time:	Temperature	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			TP	Nov 7	22:50	1 °C				

GENF 18.01 Front

L2019410-COFC

Environmental

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COC # 101

Page 4 of 5

RM	Report Format / Distribution: ☑ Standard ☐ Other	Service Requested (Rush for routine analysis subject to availability): ◉ Regular (Standard Turnaround Times - Business Days)
enevieve Morinville	☑ PDF ☑ Excel ☑ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
chmond Adelaide Centre	Email 1: genevieve.morinville@erm.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
0 Adelaide St. W.	Suite 2010; Toronto, ON	Email 2: korina.houghton@erm.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
7-288-89	Fax:	Email 3: kathy.chambers@erm.com	Analysis Request
ime as Report ☑ Yes	☐ No	Client / Project Information	Please indicate below Filtered, Preserved or both (F, P, F/P)
nvoice with Re ☑ Yes	☑ No	Job #: 0403488-0008	
RM		PO / AFE:	
counts Payables (ERM.CanadaPayables@		LSD:	
th Floor, 1111 W. Hastings St.; Vancouver,			
4-689-9	Fax:	Quote #:	
rder # nly)		ALS Contact: Amber Springer	Sampler:

Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Percent Moisture	Standard CCME Metals	Mercury	Silver								Number of Containers
09-10	30 OCT		Tissue	x	x	x	x								1
09-11	↓		Tissue	x	x	x	x								1
09-12			Tissue	x	x	x	x								1
09-13	↓		Tissue	x	x	x	x								1
02-10	14 OCT		Tissue	x	x	x	x								1
02-11	↓		Tissue	x	x	x	x								1
02-12			Tissue	x	x	x	x								1
02-13			Tissue	x	x	x	x								1
02-14			Tissue	x	x	x	x								1
02-15			Tissue	x	x	x	x								1
02-16			Tissue	x	x	x	x								1
02-17	↓		Tissue	x	x	x	x								1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

KEEP FROZEN. HOLD FOR ANALYSIS UNTIL FURTHER INSTRUCTIONS RECEIVED

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

T RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
	Date (dd-mmm	Time (hh:m	Received by:	Date:	Time:	Temperatu	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			TP	Nov 1	22:50	1 °C				

GENF 10.01 Front

L2019410-COFC

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # 101

Page 3 of 5

Environmental

M	Report Format / Distribution: ☑ Standard ☐ Other	Service Requested (Rush for routine analysis subject to availability): ◉ Regular (Standard Turnaround Times – Business Days)
nevieve Monnville	☑ pdf ☑ Excel ☑ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
hmond Adelaide Centre	Email 1: genevieve.monnville@erm.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
0 Adelaide St. W.	Suite 2010; Toronto, ON	Email 2: korina.houghton@erm.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
7-288- 99	Fax:	Email 3: kathy.chambers@erm.com	
me as Report ☑ Yes	☐ No	Client / Project Information	
voice with Re ☑ m3	☑ No	Job #: 0403488-0008	
M		PO / AFE:	
counts Payables (ERM.CanadaPayables@e		LSD:	
h Floor, 1111 W. Hastings St.; Vancouver,			
4-689-9/	Fax:	Quote #:	
rder# nly)		ALS Contact: Amber Springer	Sampler:

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Percent Moisture	Standard CCME Metals	Mercury	Silver	Number of Containers
503-5	13 Oct		Tissue	X	X	X	X	1
503-6	↓		Tissue	X	X	X	X	1
503-7			Tissue	X	X	X	X	1
503-8			Tissue	X	X	X	X	1
503-9			Tissue	X	X	X	X	1
503-10			Tissue	X	X	X	X	1
508-11			Tissue	X	X	X	X	1
508-12			Tissue	X	X	X	X	1
509-6			Tissue	X	X	X	X	1
509-7			Tissue	X	X	X	X	1
509-8			Tissue	X	X	X	X	1
509-9	↓		Tissue	X	X	X	X	1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

KEEP FROZEN. HOLD FOR ANALYSIS UNTIL FURTHER INSTRUCTIONS RECEIVED

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

T RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
	Date (dd-mmm	Time (hh-m	Received by:	Date:	Time:	Temperatu	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			TR	Nov 7	22:50	1 °C				

GENF 18.01 Front

Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # 101

Page 2 of 5

RM	Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
anevieve Morinville	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
chmond Adelaide Centre	☑ PDF ☑ Excel ☑ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
0 Adelaide St. W.	Suite 2010; Toronto, ON	Email 1: genevieve.morinville@erm.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
7-288-	Fax:	Email 2: korina.houghton@erm.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
89		Email 3: kathy.chambers@erm.com	
me as Report ☑ Yes	☐ No	Client / Project Information	Analysis Request
voice with Re ☑ ins	☑ No	Job #: 0403488-0008	Please indicate below Filtered, Preserved or both (F, P, F/P)
RM		PO / AFE:	
counts Payables (ERM.CanadaPayables@		LSD:	
th Floor, 1111 W. Hastings St.; Vancouver,			
4-689-9	Fax:	Quote #:	
rder #		ALS Contact: Amber Springer	Sampler:

Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Percent Moisture	Standard CCMS Metals	Mercury	Silver	Number of Containers
Ci-15	12 OCT		Tissue	x	x	x	x	1
01-16			Tissue	x	x	x	x	1
01-17			Tissue	x	x	x	x	1
01-18			Tissue	x	x	x	x	1
11-10			Tissue	x	x	x	x	1
11-11			Tissue	x	x	x	x	1
11-12			Tissue	x	x	x	x	1
1-13			Tissue	x	x	x	x	1
11-14			Tissue	x	x	x	x	1
11-15			Tissue	x	x	x	x	1
1-16			Tissue	x	x	x	x	1
1-17	↓		Tissue	x	x	x	x	1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

KEEP FROZEN. HOLD FOR ANALYSIS UNTIL FURTHER INSTRUCTIONS RECEIVED

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T RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
	Date (dd-mmm	Time (hh-m	Received by:	Date:	Time:	Temperatu	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			TP	Nov 7	22:50	1 °C				

GENF 18.01 Front

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # 101

Page 1 of 5

Environmental

RM	Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Genevieve Morinville	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Richmond Adelaide Centre	☑ PDF ☑ Excel ☑ Digital ☐	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
20 Adelaide St. W. | Suite 2010; Toronto, ON	Email 1: genevieve.morinville@erm.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
47-288-789 Fax:	Email 2: korina.houghton@erm.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
ame as Report ☑ Yes ☐ No	Email 3: kathy.chambers@erm.com	Analysis Request
Invoice with Re ☑ Yes ☐ No	Client / Project Information	Please indicate below Filtered, Preserved or both (F, P, F/P)
RM	Job #: 0403488-0008	
ccounts Payables (ERM.CanadaPayables@	PO / AFE:	
5th Floor, 1111 W. Hastings St.; Vancouver,	LSD:	
04-689-9 Fax:	Quote #	
Order # (only)	ALS Contact: Amber Springer	Sampler: GLEN KEDDIE

Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Percent Moisture	Standard CCME Metals	Mercury	Silver	Number of Containers
505-8	11 OCT		Tissue	x	x	x	x	1
505-9			Tissue	x	x	x	x	1
505-10			Tissue	x	x	x	x	1
505-11			Tissue	x	x	x	x	1
505-12			Tissue	x	x	x	x	1
505-13			Tissue	x	x	x	x	1
505-14			Tissue	x	x	x	x	1
505-15			Tissue	x	x	x	x	1
501-11	12 OCT		Tissue	x	x	x	x	1
501-12			Tissue	x	x	x	x	1
501-13			Tissue	x	x	x	x	1
501-14			Tissue	x	x	x	x	1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

KEEP FROZEN. HOLD FOR ANALYSIS UNTIL FURTHER INSTRUCTIONS RECEIVED

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Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

T RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
	Date (dd-mm	Time (hh-m	Received by:	Date:	Time:	Temperatu	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			TP	Nov 7	22:50	1 °C				

GENF 18.01 Front

L2019410-COFC

Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Richmond Adelaide Centre
120 Adelaide St. W., Suite 2010
Toronto, ON M5H 1T1

Client Phone 416-646-3608

Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Revision	1
Version	FINAL

Certificate of Analysis

Lab Work Order #	L2019410
Project P.O. #	
Job Reference	0403488-0008
Legal Site Description	
C of C Numbers	1
	2
	3
	4
	5

Case Narrative/Comments

Amber Springer, B.Sc
Account Manager

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Sample Summary L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Sample Details

ALS Sample ID	Client Sample ID	Matrix	Date Sampled
L2019410-1	505-8	Tissue	11-Oct-17
L2019410-2	505-9	Tissue	11-Oct-17
L2019410-3	505-10	Tissue	11-Oct-17
L2019410-4	505-11	Tissue	11-Oct-17
L2019410-5	505-12	Tissue	11-Oct-17
L2019410-6	505-13	Tissue	11-Oct-17
L2019410-7	505-14	Tissue	11-Oct-17
L2019410-8	505-15	Tissue	11-Oct-17
L2019410-9	501-11	Tissue	11-Oct-17
L2019410-10	501-12	Tissue	12-Oct-17
L2019410-11	501-13	Tissue	12-Oct-17
L2019410-12	501-14	Tissue	12-Oct-17
L2019410-13	501-15	Tissue	12-Oct-17
L2019410-14	501-16	Tissue	12-Oct-17
L2019410-15	501-17	Tissue	12-Oct-17
L2019410-16	501-18	Tissue	12-Oct-17
L2019410-17	511-10	Tissue	12-Oct-17
L2019410-18	511-11	Tissue	12-Oct-17
L2019410-19	511-12	Tissue	12-Oct-17
L2019410-20	511-13	Tissue	12-Oct-17
L2019410-21	511-14	Tissue	12-Oct-17
L2019410-22	511-15	Tissue	12-Oct-17
L2019410-23	511-16	Tissue	12-Oct-17
L2019410-24	511-17	Tissue	12-Oct-17
L2019410-25	508-5	Tissue	13-Oct-17
L2019410-26	508-6	Tissue	13-Oct-17
L2019410-27	508-7	Tissue	13-Oct-17
L2019410-28	508-8	Tissue	13-Oct-17
L2019410-29	508-9	Tissue	13-Oct-17
L2019410-30	508-10	Tissue	13-Oct-17
L2019410-31	508-11	Tissue	13-Oct-17
L2019410-32	508-12	Tissue	13-Oct-17
L2019410-33	509-6	Tissue	13-Oct-17
L2019410-34	509-7	Tissue	13-Oct-17
L2019410-35	509-8	Tissue	13-Oct-17
L2019410-36	509-9	Tissue	13-Oct-17
L2019410-37	509-10	Tissue	13-Oct-17
L2019410-38	509-11	Tissue	13-Oct-17
L2019410-39	509-12	Tissue	13-Oct-17
L2019410-40	509-13	Tissue	13-Oct-17

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Sample Summary L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Sample Details

ALS Sample ID	Client Sample ID	Matrix	Date Sampled
L2019410-41	502-10	Tissue	14-Oct-17
L2019410-42	502-11	Tissue	14-Oct-17
L2019410-43	502-12	Tissue	14-Oct-17
L2019410-44	502-13	Tissue	14-Oct-17
L2019410-45	502-14	Tissue	14-Oct-17
L2019410-46	502-15	Tissue	14-Oct-17
L2019410-47	502-16	Tissue	14-Oct-17
L2019410-48	502-17	Tissue	14-Oct-17
L2019410-49	512-6	Tissue	14-Oct-17
L2019410-50	512-7	Tissue	14-Oct-17
L2019410-51	512-8	Tissue	14-Oct-17
L2019410-52	512-9	Tissue	14-Oct-17
L2019410-53	512-10	Tissue	14-Oct-17
L2019410-54	512-11	Tissue	14-Oct-17
L2019410-55	512-12	Tissue	14-Oct-17
L2019410-56	512-13	Tissue	14-Oct-17

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results Summary L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Client Sample ID			505-8	505-9	505-10	505-11	505-12	505-13	505-14	505-15	501-11	501-12	501-13	501-14	501-15	501-16	501-17	501-18	511-10	511-11	511-12
Date Sampled			11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017
Time Sampled			0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID	Lowest Detection Limit	Units	L2019410-1	L2019410-2	L2019410-3	L2019410-4	L2019410-5	L2019410-6	L2019410-7	L2019410-8	L2019410-9	L2019410-10	L2019410-11	L2019410-12	L2019410-13	L2019410-14	L2019410-15	L2019410-16	L2019410-17	L2019410-18	L2019410-19
Parameter			Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Physical Tests (Tissue)																					
% Moisture	0.50	%	78.0	78.1	78.0	77.7	77.9	78.2	78.1	78.6	77.8	76.4	76.6	76.2	77.0	78.3	78.1	78.0	77.8	79.1	76.6
Metals (Tissue)																					
Aluminum (Al)-Total	2.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<2.0	<2.0	<5.0
Aluminum (Al)-Total	0.40	mg/kg wwt	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.40	<1.0	<1.0	<0.40	<0.40	<1.0
Antimony (Sb)-Total	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Antimony (Sb)-Total	0.0020	mg/kg wwt	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0021	<0.0020	<0.0020
Arsenic (As)-Total	0.020	mg/kg	0.092	0.167	0.080	0.092	0.127	0.078	0.092	0.452	0.070	0.127	0.180	0.198	0.089	0.095	0.192	0.120	0.203	0.196	0.113
Arsenic (As)-Total	0.0040	mg/kg wwt	0.0202	0.0364	0.0176	0.0206	0.0280	0.0171	0.0203	0.0966	0.0155	0.0300	0.0421	0.0472	0.0205	0.0206	0.0422	0.0265	0.0451	0.0409	0.0265
Barium (Ba)-Total	0.050	mg/kg	1.49	0.685	1.73	0.606	0.565	1.62	1.14	0.824	1.04	0.896	0.969	0.571	0.463	0.449	0.838	0.596	0.803	2.46	1.58
Barium (Ba)-Total	0.010	mg/kg wwt	0.327	0.150	0.381	0.136	0.125	0.352	0.250	0.176	0.230	0.211	0.227	0.136	0.106	0.097	0.184	0.131	0.179	0.513	0.368
Beryllium (Be)-Total	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)-Total	0.0020	mg/kg wwt	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Bismuth (Bi)-Total	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.050	<0.010	<0.010	0.772	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth (Bi)-Total	0.0020	mg/kg wwt	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0111	<0.0020	<0.0020	0.184	<0.0020	0.0022	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Boron (B)-Total	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (B)-Total	0.20	mg/kg wwt	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Cadmium (Cd)-Total	0.0050	mg/kg	0.063	0.011	0.039	0.024	0.029	0.072	0.081	0.021	0.018	<0.010	<0.010	<0.010	<0.010	0.0051	<0.010	<0.010	0.0157	0.0133	<0.010
Cadmium (Cd)-Total	0.0010	mg/kg wwt	0.0139	0.0023	0.0086	0.0054	0.0064	0.0156	0.0177	0.0044	0.0041	0.0023	<0.0020	<0.0020	<0.0020	0.0011	<0.0020	<0.0020	0.0035	0.0028	<0.0020
Calcium (Ca)-Total	20	mg/kg	4310	4010	6500	2530	2120	3990	4900	2390	4020	4160	5570	2530	3170	2330	2500	3720	3560	4700	5600
Calcium (Ca)-Total	4.0	mg/kg wwt	946	878	1430	566	468	868	1070	511	890	981	1300	604	729	507	547	819	792	981	1310
Cesium (Cs)-Total	0.0050	mg/kg	0.438	0.417	0.384	0.447	0.421	0.464	0.402	0.367	0.869	1.25	1.03	1.44	0.930	0.944	1.01	1.33	0.0326	0.0228	0.0443
Cesium (Cs)-Total	0.0010	mg/kg wwt	0.0961	0.0912	0.0845	0.0998	0.0931	0.101	0.0882	0.0785	0.193	0.294	0.241	0.343	0.214	0.205	0.221	0.292	0.0073	0.0048	0.0103
Chromium (Cr)-Total	0.050	mg/kg	0.22	<0.20	0.60	0.27	0.25	<0.20	0.24	<0.20	0.36	<0.20	<0.20	<0.20	<0.20	0.157	<0.20	<0.20	0.140	0.131	<0.20
Chromium (Cr)-Total	0.010	mg/kg wwt	0.048	<0.040	0.131	0.060	0.054	<0.040	0.052	<0.040	0.079	<0.040	<0.040	0.044	<0.040	0.034	0.040	<0.040	0.031	0.027	<0.040
Cobalt (Co)-Total	0.020	mg/kg	0.198	0.118	0.088	0.178	0.219	0.168	0.179	0.109	0.072	0.069	0.067	0.048	0.035	0.047	0.092	0.070	0.046	0.044	0.028
Cobalt (Co)-Total	0.0040	mg/kg wwt	0.0435	0.0258	0.0194	0.0398	0.0485	0.0365	0.0393	0.0233	0.0161	0.0162	0.0157	0.0114	0.0079	0.0102	0.0201	0.0154	0.0103	0.0093	0.0066
Copper (Cu)-Total	0.10	mg/kg	2.22	1.45	1.13	2.05	1.61	1.27	1.68	0.94	1.58	1.46	1.45	1.86	1.60	1.82	1.87	1.64	1.49	1.70	1.19
Copper (Cu)-Total	0.020	mg/kg wwt	0.487	0.317	0.248	0.459	0.356	0.277	0.368	0.201	0.350	0.345	0.341	0.444	0.368	0.394	0.410	0.362	0.331	0.355	0.278
Iron (Fe)-Total	3.0	mg/kg	25.4	13.8	19.3	20.9	15.0	16.3	19.8	11.7	15.7	14.3	13.5	20.5	17.5	16.3	19.9	14.0	18.0	18.8	13.4
Iron (Fe)-Total	0.60	mg/kg wwt	5.6	3.0	4.3	4.7	3.3	3.5	4.3	2.5	3.5	3.4	3.2	4.9	4.0	3.54	4.4	3.1	4.00	3.93	3.1
Lead (Pb)-Total	0.020	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.020	<0.050	<0.050	<0.020	<0.020	<0.050
Lead (Pb)-Total	0.0040	mg/kg wwt	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0040	<0.010	<0.010	<0.0040	<0.0040	<0.010
Lithium (Li)-Total	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Lithium (Li)-Total	0.10	mg/kg wwt	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)-Total	2.0	mg/kg	1060	1190	1190	1080	1180	1190	1180	1190	1250	1110	1200	1140	1100	1280	1150	1220	1390	1380	1280
Magnesium (Mg)-Total	0.40	mg/kg wwt	233	260	263	242	262	259	258	254	277	262	281	273	253	277	252	268	309	289	299
Manganese (Mn)-Total	0.050	mg/kg	1.19	1.21	2.60	0.951	1.05	2.55	2.21	0.978	2.01	1.55	1.61	5.91	1.35	0.854	0.998	1.25	1.87	3.35	1.85
Manganese (Mn)-Total	0.010	mg/kg wwt	0.261	0.265	0.571	0.213	0.233	0.556	0.485	0.209	0.446	0.366	0.377	1.41	0.310	0.185	0.219	0.276	0.415	0.700	0.432
Mercury (Hg)-Total	0.0050	mg/kg	0.0906	0.122	0.110	0.112	0.0859	0.0790	0.0876	0.0984	0.0621	0.0658	0.0822	0.0835	0.0818	0.0965	0.0917	0.0548	0.0884	0.112	0.0417
Mercury (Hg)-Total	0.0010	mg/kg wwt	0.0199	0.0266	0.0242	0.0251	0.0190	0.0172	0.0192	0.0210	0.0138	0.0155	0.0193	0.0199	0.0188	0.0209	0.0201	0.0121	0.0197	0.0234	0.0097
Molybdenum (Mo)-Total	0.020	mg/kg	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.020	<0.040	<0.040	<0.020	<0.020	<0.040
Molybdenum (Mo)-Total	0.0040	mg/kg wwt	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0040	<0.0080	<0.0080	<0.0040	<0.0040	<0.0080
Nickel (Ni)-Total	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Nickel (Ni)-Total	0.040	mg/kg wwt	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.042	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Phosphorus (P)-Total	10	mg/kg	10600	10800	11500	9790	10800	11400	12000	10000	11500	10400	11700	9720	9360	11500	10300	11000	13000	14100	12500
Phosphorus (P)-Total	2.0	mg/kg wwt	2330	2360	2520	2190	2400	2470	2630	2140	2550	2450	2750	2320	2150	2500	2270	2420	2880	2950	2920

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results Summary L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Client Sample ID			511-13	511-14	511-15	511-16	511-17	508-5	508-6	508-7	508-8	508-9	508-10	508-11	508-12	509-6	509-7	509-8	509-9	509-10	509-11
Date Sampled			12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017
Time Sampled			0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID	**Lowest Detection Limit**		L2019410-20	L2019410-21	L2019410-22	L2019410-23	L2019410-24	L2019410-25	L2019410-26	L2019410-27	L2019410-28	L2019410-29	L2019410-30	L2019410-31	L2019410-32	L2019410-33	L2019410-34	L2019410-35	L2019410-36	L2019410-37	L2019410-38
Parameter		**Units**	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Physical Tests (Tissue)																					
% Moisture	0.50	%	78.9	78.4	79.0	77.7	78.5	78.9	79.2	79.5	80.1	80.1	80.9	79.3	77.6	79.7	79.3	79.0	79.0	80.0	79.5
Metals (Tissue)																					
Aluminum (Al)-Total	2.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	7.4	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aluminum (Al)-Total	0.40	mg/kg wwt	<1.0	<1.0	<1.0	<1.0	0.42	<1.0	<1.0	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Antimony (Sb)-Total	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Antimony (Sb)-Total	0.0020	mg/kg wwt	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Arsenic (As)-Total	0.020	mg/kg	0.128	0.104	0.109	0.130	0.182	0.052	0.068	0.253	0.097	0.086	0.109	0.069	0.087	0.072	0.078	0.141	0.101	0.075	0.087
Arsenic (As)-Total	0.0040	mg/kg wwt	0.0269	0.0225	0.0230	0.0290	0.0392	0.0109	0.0141	0.0519	0.0192	0.0171	0.0207	0.0142	0.0194	0.0147	0.0162	0.0297	0.0211	0.0150	0.0177
Barium (Ba)-Total	0.050	mg/kg	1.40	1.15	1.32	0.894	1.59	3.19	1.42	1.21	0.768	2.60	1.00	1.18	0.794	1.12	1.00	0.628	1.01	1.68	1.26
Barium (Ba)-Total	0.010	mg/kg wwt	0.295	0.248	0.278	0.200	0.342	0.672	0.296	0.248	0.153	0.518	0.192	0.245	0.178	0.228	0.208	0.132	0.212	0.336	0.259
Beryllium (Be)-Total	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)-Total	0.0020	mg/kg wwt	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Bismuth (Bi)-Total	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	<0.010	<0.010	<0.010	<0.010
Bismuth (Bi)-Total	0.0020	mg/kg wwt	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0027	<0.0020	<0.0020	<0.0020	<0.0020
Boron (B)-Total	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (B)-Total	0.20	mg/kg wwt	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	0.27	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Cadmium (Cd)-Total	0.0050	mg/kg	0.012	0.018	0.017	<0.010	0.0119	0.042	0.017	0.019	0.024	0.058	0.020	0.119	<0.010	0.053	0.021	0.011	0.043	0.021	0.012
Cadmium (Cd)-Total	0.0010	mg/kg wwt	0.0025	0.0038	0.0036	<0.0020	0.0026	0.0088	0.0035	0.0038	0.0047	0.0116	0.0037	0.0245	<0.0020	0.0108	0.0044	0.0023	0.0090	0.0042	0.0025
Calcium (Ca)-Total	20	mg/kg	3720	4250	4110	1920	5080	10300	4350	2470	1880	6230	2160	4570	3580	3520	2500	2880	3240	5980	3130
Calcium (Ca)-Total	4.0	mg/kg wwt	782	916	865	429	1090	2160	905	506	373	1240	412	943	802	712	518	606	678	1200	641
Cesium (Cs)-Total	0.0050	mg/kg	0.0311	0.0280	0.0261	0.0170	0.0281	0.0701	0.0859	0.179	0.0828	0.0877	0.0798	0.0868	0.106	0.112	0.254	0.117	0.164	0.173	0.112
Cesium (Cs)-Total	0.0010	mg/kg wwt	0.0066	0.0060	0.0055	0.0038	0.0060	0.0148	0.0179	0.0367	0.0165	0.0175	0.0152	0.0179	0.0237	0.0226	0.0527	0.0245	0.0343	0.0346	0.0230
Chromium (Cr)-Total	0.050	mg/kg	<0.20	0.48	0.33	<0.20	0.063	<0.20	0.31	0.42	0.28	0.32	<0.20	<0.20	<0.20	0.26	0.57	<0.20	<0.20	0.26	0.24
Chromium (Cr)-Total	0.010	mg/kg wwt	<0.040	0.103	0.070	<0.040	0.014	<0.040	0.066	0.086	0.056	0.064	<0.040	<0.040	<0.040	0.052	0.118	<0.040	<0.040	0.051	0.049
Cobalt (Co)-Total	0.020	mg/kg	0.054	0.038	0.057	0.039	0.026	0.061	0.041	0.090	0.141	0.398	0.163	0.182	0.040	0.100	0.077	0.094	0.176	0.185	0.074
Cobalt (Co)-Total	0.0040	mg/kg wwt	0.0113	0.0083	0.0119	0.0086	0.0055	0.0129	0.0085	0.0184	0.0281	0.0792	0.0310	0.0376	0.0090	0.0202	0.0160	0.0197	0.0369	0.0370	0.0152
Copper (Cu)-Total	0.10	mg/kg	1.33	1.35	1.58	1.29	1.63	1.07	1.58	1.49	0.92	1.68	1.55	1.62	1.15	1.58	1.27	1.17	1.31	1.63	1.92
Copper (Cu)-Total	0.020	mg/kg wwt	0.281	0.290	0.333	0.289	0.350	0.224	0.328	0.305	0.183	0.335	0.295	0.335	0.258	0.320	0.264	0.245	0.274	0.325	0.394
Iron (Fe)-Total	3.0	mg/kg	16.3	18.0	19.6	14.0	17.8	13.6	16.6	26.7	20.4	34.7	20.0	23.0	14.2	20.9	14.1	27.9	17.0	21.0	19.8
Iron (Fe)-Total	0.60	mg/kg wwt	3.4	3.9	4.1	3.1	3.83	2.9	3.4	5.5	4.0	6.9	3.8	4.7	3.2	4.2	2.9	5.9	3.6	4.2	4.1
Lead (Pb)-Total	0.020	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.020	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Lead (Pb)-Total	0.0040	mg/kg wwt	<0.010	<0.010	<0.010	<0.010	<0.0040	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lithium (Li)-Total	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Lithium (Li)-Total	0.10	mg/kg wwt	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)-Total	2.0	mg/kg	1250	1340	1270	1120	1370	1210	1340	1270	1270	1310	1390	1170	1130	1320	1250	1230	1270	1480	1330
Magnesium (Mg)-Total	0.40	mg/kg wwt	264	290	268	250	295	255	279	261	252	260	265	241	253	268	258	258	265	297	272
Manganese (Mn)-Total	0.050	mg/kg	2.25	4.83	3.43	1.59	2.60	6.04	3.34	2.53	1.53	5.70	1.98	2.13	1.62	1.95	1.57	2.01	2.25	3.29	2.06
Manganese (Mn)-Total	0.010	mg/kg wwt	0.475	1.04	0.722	0.355	0.560	1.27	0.696	0.519	0.305	1.13	0.378	0.441	0.363	0.396	0.326	0.422	0.472	0.658	0.421
Mercury (Hg)-Total	0.0050	mg/kg	0.0934	0.0664	0.0821	0.305	0.246	0.0650	0.102	0.0972	0.0844	0.0646	0.101	0.0656	0.0845	0.0812	0.0807	0.0741	0.0767	0.118	0.0733
Mercury (Hg)-Total	0.0010	mg/kg wwt	0.0197	0.0143	0.0173	0.0681	0.0529	0.0137	0.0212	0.0199	0.0168	0.0129	0.0194	0.0136	0.0189	0.0165	0.0167	0.0156	0.0161	0.0236	0.0150
Molybdenum (Mo)-Total	0.020	mg/kg	<0.040	0.088	<0.040	<0.040	<0.020	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Molybdenum (Mo)-Total	0.0040	mg/kg wwt	<0.0080	0.0190	<0.0080	<0.0080	<0.0040	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080
Nickel (Ni)-Total	0.20	mg/kg	<0.20	<0.20	0.21	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.25	<0.20	<0.20	<0.20	<0.20
Nickel (Ni)-Total	0.040	mg/kg wwt	<0.040	<0.040	0.045	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.052	<0.040	<0.040	<0.040	<0.040
Phosphorus (P)-Total	10	mg/kg	11500	12300	11800	10200	13000	14000	12100	11300	11100	13200	11500	11900	10500	11400	10200	10400	10800	13400	11700
Phosphorus (P)-Total	2.0	mg/kg wwt	2410	2660	2490	2270	2800	2940	2520	2310	2200	2630	2200	2460	2360	2320	2110	2180	2260	2690	2410

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results Summary L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Client Sample ID			509-12	509-13	502-10	502-11	502-12	502-13	502-14	502-15	502-16	502-17	512-6	512-7	512-8	512-9	512-10	512-11	512-12	512-13
Date Sampled			13-Oct-2017	13-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017
Time Sampled			0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID	Lowest Detection Limit	Units	L2019410-39	L2019410-40	L2019410-41	L2019410-42	L2019410-43	L2019410-44	L2019410-45	L2019410-46	L2019410-47	L2019410-48	L2019410-49	L2019410-50	L2019410-51	L2019410-52	L2019410-53	L2019410-54	L2019410-55	L2019410-56
Parameter			Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Physical Tests (Tissue)																				
% Moisture	0.50	%	79.2	79.2	78.9	78.0	77.2	76.5	76.2	76.0	76.7	77.3	77.4	79.2	79.2	77.7	81.3	79.2	79.2	79.4
Metals (Tissue)																				
Aluminum (Al)-Total	2.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	21.8	6.6	3.7	2.7
Aluminum (Al)-Total	0.40	mg/kg wwt	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.40	<1.0	<1.0	<1.0	4.1	1.4	0.76	0.55
Antimony (Sb)-Total	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Antimony (Sb)-Total	0.0020	mg/kg wwt	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Arsenic (As)-Total	0.020	mg/kg	0.114	0.060	0.101	0.117	0.130	0.158	0.220	0.206	0.226	0.164	0.157	0.166	0.754	0.320	0.341	0.157	0.482	0.225
Arsenic (As)-Total	0.0040	mg/kg wwt	0.0237	0.0125	0.0213	0.0256	0.0296	0.0370	0.0523	0.0494	0.0527	0.0373	0.0355	0.0346	0.156	0.0714	0.0639	0.0327	0.100	0.0462
Barium (Ba)-Total	0.050	mg/kg	1.30	0.818	0.596	1.53	0.468	0.301	0.400	0.744	0.599	0.897	0.778	1.45	2.07	0.816	6.63	2.09	0.710	0.711
Barium (Ba)-Total	0.010	mg/kg wwt	0.270	0.170	0.125	0.337	0.107	0.071	0.095	0.178	0.140	0.204	0.176	0.301	0.430	0.182	1.24	0.436	0.148	0.146
Beryllium (Be)-Total	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)-Total	0.0020	mg/kg wwt	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Bismuth (Bi)-Total	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth (Bi)-Total	0.0020	mg/kg wwt	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Boron (B)-Total	1.0	mg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (B)-Total	0.20	mg/kg wwt	0.21	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Cadmium (Cd)-Total	0.0050	mg/kg	0.018	0.051	<0.010	0.013	<0.010	<0.010	0.010	<0.010	<0.010	<0.010	<0.0050	0.016	<0.010	<0.010	0.049	<0.010	0.0081	0.0172
Cadmium (Cd)-Total	0.0010	mg/kg wwt	0.0037	0.0106	<0.0020	0.0028	<0.0020	<0.0020	0.0024	<0.0020	<0.0020	<0.0020	<0.0010	0.0033	<0.0020	<0.0020	0.0092	0.0020	0.0017	0.0035
Calcium (Ca)-Total	20	mg/kg	4040	2230	2910	7280	2860	2030	1840	2510	1600	5980	2990	3990	4760	2080	8960	3550	2250	2760
Calcium (Ca)-Total	4.0	mg/kg wwt	842	464	613	1600	653	476	438	601	374	1360	677	831	987	465	1680	741	468	568
Cesium (Cs)-Total	0.0050	mg/kg	0.122	0.131	0.627	0.664	0.632	0.804	0.762	0.669	0.894	0.835	0.0359	0.0303	0.0459	0.0251	0.0552	0.0331	0.0350	0.0514
Cesium (Cs)-Total	0.0010	mg/kg wwt	0.0255	0.0273	0.132	0.146	0.144	0.189	0.181	0.160	0.208	0.190	0.0081	0.0063	0.0095	0.0056	0.0103	0.0069	0.0073	0.0106
Chromium (Cr)-Total	0.050	mg/kg	0.25	<0.20	0.24	0.31	<0.20	<0.20	<0.20	<0.20	0.29	<0.20	0.107	<0.20	<0.20	<0.20	0.44	<0.20	0.103	0.187
Chromium (Cr)-Total	0.010	mg/kg wwt	0.051	<0.040	0.050	0.068	<0.040	0.040	<0.040	<0.040	0.068	<0.040	0.024	<0.040	<0.040	0.042	0.083	<0.040	0.021	0.038
Cobalt (Co)-Total	0.020	mg/kg	0.134	0.184	0.047	0.084	0.044	0.075	0.054	0.041	0.044	0.098	0.027	0.086	0.044	0.070	0.345	0.097	0.058	0.034
Cobalt (Co)-Total	0.0040	mg/kg wwt	0.0279	0.0383	0.0099	0.0185	0.0100	0.0175	0.0129	0.0099	0.0104	0.0222	0.0061	0.0180	0.0091	0.0156	0.0646	0.0202	0.0120	0.0070
Copper (Cu)-Total	0.10	mg/kg	1.64	1.97	1.93	1.88	1.62	2.26	2.16	1.41	2.26	1.55	1.67	0.99	1.04	1.46	1.37	0.98	1.73	1.59
Copper (Cu)-Total	0.020	mg/kg wwt	0.342	0.409	0.407	0.415	0.370	0.531	0.515	0.339	0.527	0.352	0.378	0.206	0.216	0.325	0.257	0.205	0.360	0.326
Iron (Fe)-Total	3.0	mg/kg	17.6	26.0	20.3	24.7	18.1	18.8	20.7	14.7	21.3	15.9	16.3	10.1	10.4	15.3	80.2	17.7	16.0	21.6
Iron (Fe)-Total	0.60	mg/kg wwt	3.7	5.4	4.3	5.4	4.1	4.4	4.9	3.5	5.0	3.6	3.69	2.1	2.2	3.4	15.0	3.7	3.33	4.45
Lead (Pb)-Total	0.020	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.020	<0.050	<0.050	<0.050	<0.050	<0.050	<0.020	<0.020
Lead (Pb)-Total	0.0040	mg/kg wwt	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0040	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0040	<0.0040
Lithium (Li)-Total	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Lithium (Li)-Total	0.10	mg/kg wwt	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)-Total	2.0	mg/kg	1240	1270	1250	1330	1130	988	1010	1230	1110	1280	1310	1120	1280	1040	1290	1180	1300	1330
Magnesium (Mg)-Total	0.40	mg/kg wwt	259	265	263	293	258	232	241	295	259	291	297	233	265	233	241	247	270	273
Manganese (Mn)-Total	0.050	mg/kg	2.44	2.00	1.49	2.74	1.30	0.682	0.876	1.61	0.904	2.36	1.17	2.95	6.30	1.73	9.64	3.49	1.76	1.80
Manganese (Mn)-Total	0.010	mg/kg wwt	0.509	0.415	0.314	0.604	0.297	0.160	0.208	0.386	0.211	0.536	0.264	0.614	1.31	0.387	1.81	0.726	0.366	0.371
Mercury (Hg)-Total	0.0050	mg/kg	0.0762	0.0886	0.141	0.0657	0.0947	0.0771	0.0788	0.0786	0.0918	0.0927	0.0884	0.0908	0.111	0.101	0.160	0.0830	0.153	0.124
Mercury (Hg)-Total	0.0010	mg/kg wwt	0.0159	0.0184	0.0297	0.0145	0.0216	0.0181	0.0187	0.0188	0.0214	0.0211	0.0200	0.0189	0.0231	0.0226	0.0299	0.0173	0.0318	0.0255
Molybdenum (Mo)-Total	0.020	mg/kg	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.020	<0.040	<0.040	<0.040	<0.040	<0.040	<0.020	<0.020
Molybdenum (Mo)-Total	0.0040	mg/kg wwt	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0040	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0040	<0.0040
Nickel (Ni)-Total	0.20	mg/kg	<0.20	<0.20	<0.20	0.25	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.96	<0.20	<0.20	0.21
Nickel (Ni)-Total	0.040	mg/kg wwt	<0.040	<0.040	<0.040	0.056	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.179	<0.040	<0.040	0.044
Phosphorus (P)-Total	10	mg/kg	11300	11000	11100	13100	9990	8790	8820	10700	9260	12300	12100	10100	12100	9000	13800	10600	12300	12500
Phosphorus (P)-Total	2.0	mg/kg wwt	2370	2290	2330	2880	2280	2060	2100	2570	2160	2810	2730	2110	2510	2010	2590	2210	2560	2570

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results Summary L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Client Sample ID			505-8	505-9	505-10	505-11	505-12	505-13	505-14	505-15	501-11	501-12	501-13	501-14	501-15	501-16	501-17	501-18	511-10	511-11	511-12
Date Sampled			11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017
Time Sampled			0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID	Lowest Detection Limit		L2019410-1	L2019410-2	L2019410-3	L2019410-4	L2019410-5	L2019410-6	L2019410-7	L2019410-8	L2019410-9	L2019410-10	L2019410-11	L2019410-12	L2019410-13	L2019410-14	L2019410-15	L2019410-16	L2019410-17	L2019410-18	L2019410-19
Parameter		Units	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Potassium (K)-Total	20	mg/kg	16900	19000	16500	17500	17100	18600	17500	18600	18100	15100	15800	16700	16500	17900	17700	17400	19000	18100	17400
Potassium (K)-Total	4.0	mg/kg wwt	3710	4160	3630	3900	3780	4050	3850	3970	4010	3570	3690	3990	3790	3870	3870	3820	4230	3780	4070
Rubidium (Rb)-Total	0.050	mg/kg	21.7	21.8	16.3	22.2	24.8	21.0	25.4	23.6	16.8	19.0	17.8	19.5	15.2	16.9	20.0	20.4	7.27	6.27	7.05
Rubidium (Rb)-Total	0.010	mg/kg wwt	4.77	4.76	3.57	4.96	5.49	4.57	5.57	5.04	3.73	4.49	4.17	4.64	3.49	3.67	4.39	4.49	1.62	1.31	1.65
Selenium (Se)-Total	0.050	mg/kg	1.79	1.67	1.41	1.69	1.50	1.40	1.79	1.49	2.50	2.27	2.71	2.34	2.54	2.03	3.13	1.79	1.51	1.24	1.36
Selenium (Se)-Total	0.010	mg/kg wwt	0.394	0.364	0.310	0.378	0.333	0.305	0.393	0.319	0.554	0.535	0.635	0.559	0.584	0.439	0.687	0.395	0.335	0.259	0.319
Silver (Ag)-Total	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silver (Ag)-Total	0.0010	mg/kg wwt	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium (Na)-Total	20	mg/kg	3110	2680	2750	2730	2280	2640	3020	2670	2680	2400	2700	2410	2450	2750	2840	2490	2550	3510	2420
Sodium (Na)-Total	4.0	mg/kg wwt	684	586	606	611	505	574	664	571	593	567	632	575	562	596	623	548	567	733	564
Strontium (Sr)-Total	0.050	mg/kg	3.24	2.46	5.90	1.47	1.36	3.70	2.79	1.32	3.11	3.75	5.32	1.92	1.86	1.58	2.26	3.10	3.17	4.36	5.01
Strontium (Sr)-Total	0.010	mg/kg wwt	0.711	0.539	1.30	0.328	0.301	0.806	0.612	0.282	0.688	0.884	1.25	0.456	0.427	0.344	0.496	0.683	0.704	0.911	1.17
Tellurium (Te)-Total	0.020	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Tellurium (Te)-Total	0.0040	mg/kg wwt	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Thallium (Tl)-Total	0.0020	mg/kg	0.0208	0.0195	0.0179	0.0180	0.0257	0.0245	0.0277	0.0247	0.0116	0.0142	0.0119	0.0171	0.0112	0.0148	0.0163	0.0195	0.0077	0.0093	0.0070
Thallium (Tl)-Total	0.00040	mg/kg wwt	0.00456	0.00427	0.00393	0.00402	0.00568	0.00533	0.00609	0.00527	0.00257	0.00336	0.00278	0.00409	0.00257	0.00321	0.00356	0.00429	0.00171	0.00195	0.00164
Tin (Sn)-Total	0.10	mg/kg	<0.10	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	<0.10	0.23	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	<0.10
Tin (Sn)-Total	0.020	mg/kg wwt	<0.020	<0.020	<0.020	0.025	<0.020	<0.020	0.020	<0.020	0.050	<0.020	<0.020	<0.020	<0.020	<0.020	0.025	<0.020	<0.020	<0.020	<0.020
Uranium (U)-Total	0.0020	mg/kg	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Uranium (U)-Total	0.00040	mg/kg wwt	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Vanadium (V)-Total	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium (V)-Total	0.020	mg/kg wwt	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (Zn)-Total	0.50	mg/kg	45.6	25.9	34.0	26.9	25.2	27.9	34.9	25.4	28.6	30.0	40.6	27.2	25.5	25.8	32.8	25.0	26.1	29.3	23.1
Zinc (Zn)-Total	0.10	mg/kg wwt	10.0	5.66	7.49	6.00	5.56	6.07	7.66	5.42	6.34	7.07	9.50	6.47	5.86	5.59	7.19	5.50	5.80	6.11	5.39
Zirconium (Zr)-Total	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.33	<0.20	<0.20	<0.20	<0.20	<0.20
Zirconium (Zr)-Total	0.040	mg/kg wwt	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.072	<0.040	<0.040	<0.040	<0.040	<0.040

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results Summary L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Client Sample ID			511-13	511-14	511-15	511-16	511-17	508-5	508-6	508-7	508-8	508-9	508-10	508-11	508-12	509-6	509-7	509-8	509-9	509-10	509-11
Date Sampled			12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017
Time Sampled			0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID	Lowest Detection Limit		L2019410-20	L2019410-21	L2019410-22	L2019410-23	L2019410-24	L2019410-25	L2019410-26	L2019410-27	L2019410-28	L2019410-29	L2019410-30	L2019410-31	L2019410-32	L2019410-33	L2019410-34	L2019410-35	L2019410-36	L2019410-37	L2019410-38
Parameter		Units	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Potassium (K)-Total	20	mg/kg	19500	18500	17200	15600	16300	18000	19000	19300	19900	19400	20200	19800	17400	20600	19700	19300	18500	20700	20100
Potassium (K)-Total	4.0	mg/kg wwt	4100	3990	3620	3480	3510	3790	3950	3950	3970	3870	3850	4090	3890	4170	4080	4040	3880	4140	4110
Rubidium (Rb)-Total	0.050	mg/kg	8.70	7.56	6.17	5.02	6.04	12.0	12.6	14.7	13.7	18.3	12.4	18.2	13.2	17.8	15.8	16.4	23.4	20.5	15.5
Rubidium (Rb)-Total	0.010	mg/kg wwt	1.83	1.63	1.30	1.12	1.30	2.54	2.62	3.02	2.73	3.63	2.36	3.76	2.96	3.60	3.28	3.45	4.90	4.10	3.17
Selenium (Se)-Total	0.050	mg/kg	1.22	1.18	1.25	0.93	1.41	2.14	1.82	1.39	2.38	2.74	2.00	1.99	1.26	1.91	1.98	1.83	2.16	1.70	1.61
Selenium (Se)-Total	0.010	mg/kg wwt	0.258	0.255	0.263	0.208	0.304	0.451	0.380	0.284	0.473	0.545	0.381	0.412	0.283	0.387	0.411	0.385	0.452	0.340	0.331
Silver (Ag)-Total	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silver (Ag)-Total	0.0010	mg/kg wwt	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium (Na)-Total	20	mg/kg	2760	2430	2540	2650	3160	2600	2530	2650	2980	3580	3220	3350	2480	3630	3280	2810	3080	3490	3540
Sodium (Na)-Total	4.0	mg/kg wwt	582	523	534	592	680	548	527	544	593	713	615	693	556	736	680	591	646	700	724
Strontium (Sr)-Total	0.050	mg/kg	3.49	4.16	3.70	1.69	4.91	8.20	3.28	1.80	1.34	6.19	1.89	3.91	3.68	2.99	1.58	1.83	2.64	4.73	2.86
Strontium (Sr)-Total	0.010	mg/kg wwt	0.734	0.897	0.778	0.378	1.06	1.73	0.682	0.368	0.266	1.23	0.361	0.808	0.825	0.605	0.328	0.384	0.553	0.948	0.587
Tellurium (Te)-Total	0.020	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Tellurium (Te)-Total	0.0040	mg/kg wwt	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Thallium (Tl)-Total	0.0020	mg/kg	0.0081	0.0097	0.0073	0.0070	0.0051	0.0067	0.0109	0.0126	0.0125	0.0147	0.0109	0.0101	0.0068	0.0097	0.0096	0.0106	0.0142	0.0156	0.0085
Thallium (Tl)-Total	0.00040	mg/kg wwt	0.00171	0.00208	0.00154	0.00157	0.00110	0.00142	0.00226	0.00258	0.00249	0.00292	0.00207	0.00209	0.00151	0.00197	0.00199	0.00223	0.00298	0.00313	0.00174
Tin (Sn)-Total	0.10	mg/kg	<0.10	<0.10	0.17	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.16	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11
Tin (Sn)-Total	0.020	mg/kg wwt	<0.020	<0.020	0.036	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.032	0.023	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.022
Uranium (U)-Total	0.0020	mg/kg	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0028	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Uranium (U)-Total	0.00040	mg/kg wwt	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.00058	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Vanadium (V)-Total	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium (V)-Total	0.020	mg/kg wwt	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (Zn)-Total	0.50	mg/kg	26.7	33.1	38.1	27.1	29.2	31.7	27.3	22.3	23.1	39.0	27.1	36.6	28.7	25.6	24.0	20.3	23.7	27.1	33.2
Zinc (Zn)-Total	0.10	mg/kg wwt	5.63	7.14	8.03	6.06	6.27	6.67	5.67	4.57	4.60	7.76	5.18	7.56	6.43	5.20	4.97	4.27	4.97	5.43	6.81
Zirconium (Zr)-Total	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Zirconium (Zr)-Total	0.040	mg/kg wwt	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results Summary L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Client Sample ID			509-12	509-13	502-10	502-11	502-12	502-13	502-14	502-15	502-16	502-17	512-6	512-7	512-8	512-9	512-10	512-11	512-12	512-13
Date Sampled			13-Oct-2017	13-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017
Time Sampled			0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID	Lowest Detection Limit		L2019410-39	L2019410-40	L2019410-41	L2019410-42	L2019410-43	L2019410-44	L2019410-45	L2019410-46	L2019410-47	L2019410-48	L2019410-49	L2019410-50	L2019410-51	L2019410-52	L2019410-53	L2019410-54	L2019410-55	L2019410-56
Parameter		Units	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Potassium (K)-Total	20	mg/kg	19300	19500	18300	18000	15700	16200	15500	17900	17600	18700	18200	17500	19300	15700	19300	17000	20000	20200
Potassium (K)-Total	4.0	mg/kg wwt	4020	4060	3840	3960	3590	3810	3680	4290	4090	4250	4110	3640	4000	3510	3610	3540	4160	4140
Rubidium (Rb)-Total	0.050	mg/kg	17.0	19.9	14.0	15.0	13.2	18.0	15.7	14.0	17.0	17.8	6.21	6.92	12.6	6.95	14.5	8.59	8.27	11.0
Rubidium (Rb)-Total	0.010	mg/kg wwt	3.54	4.14	2.95	3.30	3.00	4.22	3.74	3.36	3.96	4.05	1.40	1.44	2.61	1.55	2.71	1.79	1.72	2.26
Selenium (Se)-Total	0.050	mg/kg	1.59	2.37	2.27	2.18	2.13	2.71	2.99	1.79	2.50	2.42	1.30	1.30	1.25	1.29	2.85	1.26	1.24	1.51
Selenium (Se)-Total	0.010	mg/kg wwt	0.332	0.493	0.479	0.480	0.486	0.636	0.710	0.429	0.582	0.551	0.295	0.270	0.259	0.287	0.533	0.262	0.257	0.310
Silver (Ag)-Total	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silver (Ag)-Total	0.0010	mg/kg wwt	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium (Na)-Total	20	mg/kg	3110	3150	2550	2630	2480	2550	2610	2310	2730	2730	2360	2730	2850	2600	3850	2600	2450	2510
Sodium (Na)-Total	4.0	mg/kg wwt	647	655	536	578	567	598	622	554	635	621	534	568	591	580	722	541	509	516
Strontium (Sr)-Total	0.050	mg/kg	3.51	1.80	2.17	6.60	2.06	1.18	1.23	2.31	1.20	5.18	2.89	3.41	5.32	1.80	7.52	4.07	2.15	2.35
Strontium (Sr)-Total	0.010	mg/kg wwt	0.732	0.374	0.457	1.45	0.471	0.277	0.293	0.554	0.281	1.18	0.654	0.711	1.10	0.402	1.41	0.848	0.447	0.483
Tellurium (Te)-Total	0.020	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Tellurium (Te)-Total	0.0040	mg/kg wwt	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Thallium (Tl)-Total	0.0020	mg/kg	0.0103	0.0152	0.0143	0.0132	0.0131	0.0191	0.0183	0.0170	0.0167	0.0213	0.0072	0.0072	0.0086	0.0084	0.0144	0.0064	0.0068	0.0078
Thallium (Tl)-Total	0.00040	mg/kg wwt	0.00214	0.00316	0.00300	0.00290	0.00300	0.00447	0.00435	0.00407	0.00390	0.00483	0.00164	0.00151	0.00178	0.00187	0.00269	0.00134	0.00141	0.00161
Tin (Sn)-Total	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.18	<0.10	<0.10	<0.10	<0.10	<0.10	0.12	2.16	0.34	<0.10	<0.10
Tin (Sn)-Total	0.020	mg/kg wwt	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	0.044	<0.020	<0.020	<0.020	<0.020	<0.020	0.028	0.404	0.071	<0.020	<0.020
Uranium (U)-Total	0.0020	mg/kg	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0030	<0.0020	<0.0020	<0.0020
Uranium (U)-Total	0.00040	mg/kg wwt	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.00057	<0.00040	<0.00040	<0.00040
Vanadium (V)-Total	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium (V)-Total	0.020	mg/kg wwt	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (Zn)-Total	0.50	mg/kg	29.9	26.0	24.9	38.8	29.8	29.0	25.5	20.9	25.0	25.7	23.3	30.9	27.5	28.6	53.3	31.8	26.5	21.9
Zinc (Zn)-Total	0.10	mg/kg wwt	6.24	5.40	5.23	8.53	6.79	6.79	6.07	5.02	5.82	5.84	5.26	6.44	5.71	6.38	9.99	6.63	5.51	4.51
Zirconium (Zr)-Total	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.41
Zirconium (Zr)-Total	0.040	mg/kg wwt	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.046	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.085

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Physical Tests (Tissue)														
% Moisture	L2019410-1	505-8	MOISTURE-MICR-VA	78.0	2.0	%	11-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	0.092	0.030	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	0.0202	0.0060	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	1.49	0.050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	0.327	0.010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	0.063	0.010	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	0.0139	0.0020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	4310	20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	946	4.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	0.438	0.0050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	0.0961	0.0010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	0.22	0.20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	0.048	0.040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	0.198	0.020	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	0.0435	0.0040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	2.22	0.20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	0.487	0.040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	25.4	5.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	5.6	1.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Magnesium (Mg)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	1060	2.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	233	0.40	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	1.19	0.050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	0.261	0.010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-1	505-8	HG-DRY-MICR-CVAF-VA	0.0906	0.0050	mg/kg	11-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-1	505-8	HG-WET-MICR-CVAF-VA	0.0199	0.0010	mg/kg wwt	11-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	10600	10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	2330	2.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	16900	20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	3710	4.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	21.7	0.050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	4.77	0.010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	1.79	0.10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	0.394	0.020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-1	505-8	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-1	505-8	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	3110	20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	684	4.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	3.24	0.10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	0.711	0.020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	0.0208	0.0020	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	0.00456	0.00040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	45.6	1.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Zinc (Zn)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	10.0	0.20	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-1	505-8	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-1	505-8	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-2	505-9	MOISTURE-MICR-VA	78.1	2.0	%	11-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	0.167	0.030	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	0.0364	0.0060	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	0.685	0.050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	0.150	0.010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	0.011	0.010	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	0.0023	0.0020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	4010	20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	878	4.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	0.417	0.0050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	0.0912	0.0010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	0.118	0.020	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	0.0258	0.0040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	1.45	0.20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	0.317	0.040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	13.8	5.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	3.0	1.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Lead (Pb)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	1190	2.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	260	0.40	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	1.21	0.050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	0.265	0.010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-2	505-9	HG-DRY-MICR-CVAF-VA	0.122	0.0050	mg/kg	11-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-2	505-9	HG-WET-MICR-CVAF-VA	0.0266	0.0010	mg/kg wwt	11-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	10800	10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	2360	2.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	19000	20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	4160	4.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	21.8	0.050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	4.76	0.010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	1.67	0.10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	0.364	0.020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-2	505-9	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-2	505-9	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	2680	20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	586	4.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	2.46	0.10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	0.539	0.020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	0.0195	0.0020	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	0.00427	0.00040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Vanadium (V)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	25.9	1.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	5.66	0.20	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-2	505-9	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-2	505-9	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-3	505-10	MOISTURE-MICR-VA	78.0	2.0	%	11-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	0.080	0.030	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	0.0176	0.0060	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	1.73	0.050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	0.381	0.010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	0.039	0.010	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	0.0086	0.0020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	6500	20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	1430	4.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	0.384	0.0050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	0.0845	0.0010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	0.60	0.20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	0.131	0.040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	0.088	0.020	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	0.0194	0.0040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	1.13	0.20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	0.248	0.040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Iron (Fe)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	19.3	5.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	4.3	1.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	1190	2.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	263	0.40	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	2.60	0.050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	0.571	0.010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-3	505-10	HG-DRY-MICR-CVAF-VA	0.110	0.0050	mg/kg	11-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-3	505-10	HG-WET-MICR-CVAF-VA	0.0242	0.0010	mg/kg wwt	11-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	11500	10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	2520	2.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	16500	20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	3630	4.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	16.3	0.050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	3.57	0.010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	1.41	0.10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	0.310	0.020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-3	505-10	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-3	505-10	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	2750	20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	606	4.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	5.90	0.10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	1.30	0.020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	0.0179	0.0020	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	0.00393	0.00040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Tin (Sn)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	34.0	1.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	7.49	0.20	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-3	505-10	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-3	505-10	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-4	505-11	MOISTURE-MICR-VA	77.7	2.0	%	11-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	0.092	0.030	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	0.0206	0.0060	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	0.606	0.050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	0.136	0.010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	0.024	0.010	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	0.0054	0.0020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	2530	20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	566	4.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	0.447	0.0050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	0.0998	0.0010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	0.27	0.20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	0.060	0.040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	0.178	0.020	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Cobalt (Co)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	0.0398	0.0040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	2.05	0.20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	0.459	0.040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	20.9	5.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	4.7	1.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	1080	2.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	242	0.40	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	0.951	0.050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	0.213	0.010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-4	505-11	HG-DRY-MICR-CVAF-VA	0.112	0.0050	mg/kg	11-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-4	505-11	HG-WET-MICR-CVAF-VA	0.0251	0.0010	mg/kg wwt	11-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	9790	10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	2190	2.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	17500	20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	3900	4.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	22.2	0.050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	4.96	0.010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	1.69	0.10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	0.378	0.020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-4	505-11	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-4	505-11	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	2730	20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	611	4.0	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	1.47	0.10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	0.328	0.020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Thallium (Tl)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	0.0180	0.0020	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	0.00402	0.00040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	0.11	0.10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	0.025	0.020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	26.9	1.0	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	6.00	0.20	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-4	505-11	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-4	505-11	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-5	505-12	MOISTURE-MICR-VA	77.9	2.0	%	11-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	0.127	0.030	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	0.0280	0.0060	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	0.565	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	0.125	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	0.029	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	0.0064	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	2120	20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	468	4.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	0.421	0.0050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	0.0931	0.0010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Chromium (Cr)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	0.25	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	0.054	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	0.219	0.020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	0.0485	0.0040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	1.61	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	0.356	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	15.0	5.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	3.3	1.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	1180	2.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	262	0.40	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	1.05	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	0.233	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-5	505-12	HG-DRY-MICR-CVAF-VA	0.0859	0.0050	mg/kg	11-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-5	505-12	HG-WET-MICR-CVAF-VA	0.0190	0.0010	mg/kg wwt	11-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	10800	10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	2400	2.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	17100	20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	3780	4.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	24.8	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	5.49	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	1.50	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	0.333	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-5	505-12	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-5	505-12	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	2280	20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	505	4.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	1.36	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Strontium (Sr)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	0.301	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	0.0257	0.0020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	0.00568	0.00040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	25.2	1.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	5.56	0.20	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-5	505-12	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-5	505-12	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-6	505-13	MOISTURE-MICR-VA	78.2	2.0	%	11-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	0.078	0.030	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	0.0171	0.0060	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	1.62	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	0.352	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	0.072	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	0.0156	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	3990	20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Calcium (Ca)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	868	4.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	0.464	0.0050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	0.101	0.0010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	0.168	0.020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	0.0365	0.0040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	1.27	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	0.277	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	16.3	5.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	3.5	1.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	1190	2.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	259	0.40	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	2.55	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	0.556	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-6	505-13	HG-DRY-MICR-CVAF-VA	0.0790	0.0050	mg/kg	11-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-6	505-13	HG-WET-MICR-CVAF-VA	0.0172	0.0010	mg/kg wwt	11-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	11400	10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	2470	2.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	18600	20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	4050	4.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	21.0	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	4.57	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	1.40	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	0.305	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-6	505-13	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-6	505-13	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Sodium (Na)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	2640	20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	574	4.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	3.70	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	0.806	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	0.0245	0.0020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	0.00533	0.00040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	27.9	1.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	6.07	0.20	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-6	505-13	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-6	505-13	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-7	505-14	MOISTURE-MICR-VA	78.1	2.0	%	11-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	0.092	0.030	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	0.0203	0.0060	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	1.14	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	0.250	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Cadmium (Cd)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	0.081	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	0.0177	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	4900	20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	1070	4.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	0.402	0.0050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	0.0882	0.0010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	0.24	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	0.052	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	0.179	0.020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	0.0393	0.0040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	1.68	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	0.368	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	19.8	5.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	4.3	1.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	1180	2.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	258	0.40	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	2.21	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	0.485	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-7	505-14	HG-DRY-MICR-CVAF-VA	0.0876	0.0050	mg/kg	11-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-7	505-14	HG-WET-MICR-CVAF-VA	0.0192	0.0010	mg/kg wwt	11-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	0.042	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	12000	10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	2630	2.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	17500	20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	3850	4.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	25.4	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	5.57	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	1.79	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Selenium (Se)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	0.393	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-7	505-14	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-7	505-14	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	3020	20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	664	4.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	2.79	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	0.612	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	0.0277	0.0020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	0.00609	0.00040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	0.020	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	34.9	1.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	7.66	0.20	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-7	505-14	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-7	505-14	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-8	505-15	MOISTURE-MICR-VA	78.6	2.0	%	11-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	0.452	0.030	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	0.0966	0.0060	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	0.824	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	0.176	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Bismuth (Bi)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	0.021	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	0.0044	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	2390	20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	511	4.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	0.367	0.0050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	0.0785	0.0010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	0.109	0.020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	0.0233	0.0040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	0.94	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	0.201	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	11.7	5.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	2.5	1.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	1190	2.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	254	0.40	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	0.978	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	0.209	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-8	505-15	HG-DRY-MICR-CVAF-VA	0.0984	0.0050	mg/kg	11-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-8	505-15	HG-WET-MICR-CVAF-VA	0.0210	0.0010	mg/kg wwt	11-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	10000	10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	2140	2.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	18600	20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	3970	4.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations
û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Rubidium (Rb)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	23.6	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	5.04	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	1.49	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	0.319	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-8	505-15	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-8	505-15	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	2670	20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	571	4.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	1.32	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	0.282	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	0.0247	0.0020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	0.00527	0.00040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	25.4	1.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	5.42	0.20	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-8	505-15	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-8	505-15	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-9	501-11	MOISTURE-MICR-VA	77.8	2.0	%	11-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	0.070	0.030	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	0.0155	0.0060	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	1.04	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	0.230	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Beryllium (Be)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	0.050	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	0.0111	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	0.018	0.010	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	0.0041	0.0020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	4020	20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	890	4.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	0.869	0.0050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	0.193	0.0010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	0.36	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	0.079	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	0.072	0.020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	0.0161	0.0040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	1.58	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	0.350	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	15.7	5.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	3.5	1.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	1250	2.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	277	0.40	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	2.01	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	0.446	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-9	501-11	HG-DRY-MICR-CVAF-VA	0.0621	0.0050	mg/kg	11-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-9	501-11	HG-WET-MICR-CVAF-VA	0.0138	0.0010	mg/kg wwt	11-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	11500	10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Phosphorus (P)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	2550	2.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	18100	20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	4010	4.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	16.8	0.050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	3.73	0.010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	2.50	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	0.554	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-9	501-11	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-9	501-11	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	2680	20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	593	4.0	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	3.11	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	0.688	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	0.0116	0.0020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	0.00257	0.00040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	0.23	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	0.050	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	28.6	1.0	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	6.34	0.20	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-9	501-11	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-9	501-11	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	11-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-10	501-12	MOISTURE-MICR-VA	76.4	2.0	%	12-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	0.127	0.030	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
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Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Arsenic (As)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	0.0300	0.0060	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	0.896	0.050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	0.211	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	0.0023	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	4160	20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	981	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	1.25	0.0050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	0.294	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	0.069	0.020	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	0.0162	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	1.46	0.20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	0.345	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	14.3	5.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	3.4	1.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	1110	2.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	262	0.40	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	1.55	0.050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	0.366	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-10	501-12	HG-DRY-MICR-CVAF-VA	0.0658	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-10	501-12	HG-WET-MICR-CVAF-VA	0.0155	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

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Date Received 7-Nov-2017 22:49
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Evaluation Legend
ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations
û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Nickel (Ni)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	10400	10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	2450	2.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	15100	20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	3570	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	19.0	0.050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	4.49	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	2.27	0.10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	0.535	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-10	501-12	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-10	501-12	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	2400	20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	567	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	3.75	0.10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	0.884	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	0.0142	0.0020	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	0.00336	0.00040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	30.0	1.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	7.07	0.20	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-10	501-12	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-10	501-12	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-11	501-13	MOISTURE-MICR-VA	76.6	2.0	%	12-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Antimony (Sb)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	0.180	0.030	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	0.0421	0.0060	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	0.969	0.050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	0.227	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	5570	20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	1300	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	1.03	0.0050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	0.241	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	0.067	0.020	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	0.0157	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	1.45	0.20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	0.341	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	13.5	5.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	3.2	1.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	1200	2.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	281	0.40	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	1.61	0.050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	0.377	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-11	501-13	HG-DRY-MICR-CVAF-VA	0.0822	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Mercury (Hg)-Total	L2019410-11	501-13	HG-WET-MICR-CVAF-VA	0.0193	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	11700	10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	2750	2.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	15800	20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	3690	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	17.8	0.050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	4.17	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	2.71	0.10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	0.635	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-11	501-13	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-11	501-13	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	2700	20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	632	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	5.32	0.10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	1.25	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	0.0119	0.0020	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	0.00278	0.00040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	40.6	1.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	9.50	0.20	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-11	501-13	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-11	501-13	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-12	501-14	MOISTURE-MICR-VA	76.2	2.0	%	12-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü	QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations
û	QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	0.198	0.030	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	0.0472	0.0060	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	0.571	0.050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	0.136	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	0.772	0.010	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	0.184	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	2530	20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	604	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	1.44	0.0050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	0.343	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	0.044	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	0.048	0.020	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	0.0114	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	1.86	0.20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	0.444	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	20.5	5.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	4.9	1.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	1140	2.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	273	0.40	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Manganese (Mn)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	5.91	0.050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	1.41	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-12	501-14	HG-DRY-MICR-CVAF-VA	0.0835	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-12	501-14	HG-WET-MICR-CVAF-VA	0.0199	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	9720	10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	2320	2.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	16700	20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	3990	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	19.5	0.050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	4.64	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	2.34	0.10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	0.559	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-12	501-14	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-12	501-14	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	2410	20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	575	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	1.92	0.10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	0.456	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	0.0171	0.0020	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	0.00409	0.00040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	27.2	1.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	6.47	0.20	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-12	501-14	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Zirconium (Zr)-Total	L2019410-12	501-14	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-13	501-15	MOISTURE-MICR-VA	77.0	2.0	%	12-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	0.089	0.030	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	0.0205	0.0060	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	0.463	0.050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	0.106	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	3170	20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	729	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	0.930	0.0050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	0.214	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	0.035	0.020	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	0.0079	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	1.60	0.20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	0.368	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	17.5	5.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	4.0	1.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Lithium (Li)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	1100	2.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	253	0.40	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	1.35	0.050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	0.310	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-13	501-15	HG-DRY-MICR-CVAF-VA	0.0818	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-13	501-15	HG-WET-MICR-CVAF-VA	0.0188	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	9360	10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	2150	2.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	16500	20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	3790	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	15.2	0.050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	3.49	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	2.54	0.10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	0.584	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-13	501-15	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-13	501-15	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	2450	20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	562	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	1.86	0.10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	0.427	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	0.0112	0.0020	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	0.00257	0.00040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Zinc (Zn)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	25.5	1.0	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	5.86	0.20	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-13	501-15	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-13	501-15	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-14	501-16	MOISTURE-TISS-VA	78.3	0.50	%	12-Oct-17		24-Jan-18	805438	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	<2.0	2.0	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	<0.40	0.40	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	0.095	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	0.0206	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	0.449	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	0.097	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	0.0022	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	<1.0	1.0	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	<0.20	0.20	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	0.0051	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	0.0011	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	2330	20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	507	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	0.944	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	0.205	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	0.157	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	0.034	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	0.047	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	0.0102	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	1.82	0.10	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	0.394	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	16.3	3.0	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	3.54	0.60	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Lead (Pb)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	<0.50	0.50	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	<0.10	0.10	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	1280	2.0	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	277	0.40	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	0.854	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	0.185	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-14	501-16	HG-DRY-CVAFS-N-VA	0.0965	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-14	501-16	HG-WET-CVAFS-N-VA	0.0209	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	11500	10	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	2500	2.0	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	17900	20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	3870	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	16.9	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	3.67	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	2.03	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	0.439	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-14	501-16	AG-DRY-CCMS-N-VA	<0.0050	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-14	501-16	AG-WET-CCMS-N-VA	<0.0010	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	2750	20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	596	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	1.58	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	0.344	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	0.0148	0.0020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	0.00321	0.00040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	<0.10	0.10	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	<0.0020	0.0020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations
û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Uranium (U)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	<0.00040	0.00040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	<0.10	0.10	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	25.8	0.50	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	5.59	0.10	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-14	501-16	MET-DRY-CCMS-N-VA	0.33	0.20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-14	501-16	MET-WET-CCMS-N-VA	0.072	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-15	501-17	MOISTURE-MICR-VA	78.1	2.0	%	12-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	0.192	0.030	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	0.0422	0.0060	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	0.838	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	0.184	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	2500	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	547	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	1.01	0.0050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	0.221	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	0.092	0.020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	0.0201	0.0040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	1.87	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Copper (Cu)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	0.410	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	19.9	5.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	4.4	1.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	1150	2.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	252	0.40	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	0.998	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	0.219	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-15	501-17	HG-DRY-MICR-CVAF-VA	0.0917	0.0050	mg/kg	12-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-15	501-17	HG-WET-MICR-CVAF-VA	0.0201	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	10300	10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	2270	2.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	17700	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	3870	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	20.0	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	4.39	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	3.13	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	0.687	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-15	501-17	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-15	501-17	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	2840	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	623	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	2.26	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	0.496	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	0.0163	0.0020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	0.00356	0.00040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Tin (Sn)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	0.11	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	0.025	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	32.8	1.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	7.19	0.20	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-15	501-17	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-15	501-17	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-16	501-18	MOISTURE-MICR-VA	78.0	2.0	%	12-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	0.120	0.030	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	0.0265	0.0060	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	0.596	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	0.131	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	3720	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	819	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	1.33	0.0050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	0.292	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Cobalt (Co)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	0.070	0.020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	0.0154	0.0040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	1.64	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	0.362	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	14.0	5.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	3.1	1.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	1220	2.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	268	0.40	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	1.25	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	0.276	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-16	501-18	HG-DRY-MICR-CVAF-VA	0.0548	0.0050	mg/kg	12-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-16	501-18	HG-WET-MICR-CVAF-VA	0.0121	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	11000	10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	2420	2.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	17400	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	3820	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	20.4	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	4.49	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	1.79	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	0.395	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-16	501-18	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-16	501-18	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	2490	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	548	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	3.10	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	0.683	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations
û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Tellurium (Te)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	0.0195	0.0020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	0.00429	0.00040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	25.0	1.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	5.50	0.20	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-16	501-18	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-16	501-18	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-17	511-10	MOISTURE-TISS-VA	77.8	0.50	%	12-Oct-17		24-Jan-18	805438	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	<2.0	2.0	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	<0.40	0.40	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	0.0021	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	0.203	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	0.0451	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	0.803	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	0.179	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	<1.0	1.0	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	<0.20	0.20	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	0.0157	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	0.0035	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	3560	20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	792	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	0.0326	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Cesium (Cs)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	0.0073	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	0.140	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	0.031	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	0.046	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	0.0103	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	1.49	0.10	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	0.331	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	18.0	3.0	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	4.00	0.60	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	<0.50	0.50	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	<0.10	0.10	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	1390	2.0	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	309	0.40	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	1.87	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	0.415	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-17	511-10	HG-DRY-CVAFS-N-VA	0.0884	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-17	511-10	HG-WET-CVAFS-N-VA	0.0197	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	13000	10	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	2880	2.0	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	19000	20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	4230	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	7.27	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	1.62	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	1.51	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	0.335	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-17	511-10	AG-DRY-CCMS-N-VA	<0.0050	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-17	511-10	AG-WET-CCMS-N-VA	<0.0010	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	2550	20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	567	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Strontium (Sr)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	3.17	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	0.704	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	0.0077	0.0020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	0.00171	0.00040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	<0.10	0.10	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	<0.0020	0.0020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	<0.00040	0.00040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	<0.10	0.10	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	26.1	0.50	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	5.80	0.10	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-17	511-10	MET-DRY-CCMS-N-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-17	511-10	MET-WET-CCMS-N-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-18	511-11	MOISTURE-TISS-VA	79.1	0.50	%	12-Oct-17		24-Jan-18	805438	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	<2.0	2.0	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	<0.40	0.40	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	0.196	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	0.0409	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	2.46	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	0.513	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	<1.0	1.0	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	<0.20	0.20	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	0.0133	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	0.0028	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Calcium (Ca)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	4700	20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	981	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	0.0228	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	0.0048	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	0.131	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	0.027	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	0.044	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	0.0093	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	1.70	0.10	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	0.355	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	18.8	3.0	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	3.93	0.60	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	<0.50	0.50	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	<0.10	0.10	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	1380	2.0	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	289	0.40	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	3.35	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	0.700	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-18	511-11	HG-DRY-CVAFS-N-VA	0.112	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-18	511-11	HG-WET-CVAFS-N-VA	0.0234	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	14100	10	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	2950	2.0	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	18100	20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	3780	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	6.27	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	1.31	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	1.24	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	0.259	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-18	511-11	AG-DRY-CCMS-N-VA	<0.0050	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations
û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Silver (Ag)-Total	L2019410-18	511-11	AG-WET-CCMS-N-VA	<0.0010	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	3510	20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	733	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	4.36	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	0.911	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	0.0093	0.0020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	0.00195	0.00040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	<0.10	0.10	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	<0.0020	0.0020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	<0.00040	0.00040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	<0.10	0.10	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	29.3	0.50	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	6.11	0.10	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-18	511-11	MET-DRY-CCMS-N-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-18	511-11	MET-WET-CCMS-N-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-19	511-12	MOISTURE-MICR-VA	76.6	2.0	%	12-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	0.113	0.030	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	0.0265	0.0060	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	1.58	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	0.368	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Boron (B)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	5600	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	1310	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	0.0443	0.0050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	0.0103	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	0.028	0.020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	0.0066	0.0040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	1.19	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	0.278	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	13.4	5.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	3.1	1.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	1280	2.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	299	0.40	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	1.85	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	0.432	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-19	511-12	HG-DRY-MICR-CVAF-VA	0.0417	0.0050	mg/kg	12-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-19	511-12	HG-WET-MICR-CVAF-VA	0.0097	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	12500	10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	2920	2.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	17400	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	4070	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	7.05	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	1.65	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Selenium (Se)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	1.36	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	0.319	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-19	511-12	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-19	511-12	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	2420	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	564	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	5.01	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	1.17	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	0.0070	0.0020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	0.00164	0.00040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	23.1	1.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	5.39	0.20	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-19	511-12	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-19	511-12	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-20	511-13	MOISTURE-MICR-VA	78.9	2.0	%	12-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	0.128	0.030	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	0.0269	0.0060	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	1.40	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	0.295	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Bismuth (Bi)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	0.012	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	0.0025	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	3720	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	782	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	0.0311	0.0050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	0.0066	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	0.054	0.020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	0.0113	0.0040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	1.33	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	0.281	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	16.3	5.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	3.4	1.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	1250	2.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	264	0.40	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	2.25	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	0.475	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-20	511-13	HG-DRY-MICR-CVAF-VA	0.0934	0.0050	mg/kg	12-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-20	511-13	HG-WET-MICR-CVAF-VA	0.0197	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	11500	10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	2410	2.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	19500	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Potassium (K)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	4100	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	8.70	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	1.83	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	1.22	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	0.258	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-20	511-13	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-20	511-13	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	2760	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	582	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	3.49	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	0.734	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	0.0081	0.0020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	0.00171	0.00040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	26.7	1.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	5.63	0.20	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-20	511-13	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-20	511-13	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-21	511-14	MOISTURE-MICR-VA	78.4	2.0	%	12-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	0.104	0.030	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	0.0225	0.0060	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	1.15	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Barium (Ba)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	0.248	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	0.018	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	0.0038	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	4250	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	916	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	0.0280	0.0050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	0.0060	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	0.48	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	0.103	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	0.038	0.020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	0.0083	0.0040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	1.35	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	0.290	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	18.0	5.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	3.9	1.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	1340	2.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	290	0.40	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	4.83	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	1.04	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-21	511-14	HG-DRY-MICR-CVAF-VA	0.0664	0.0050	mg/kg	12-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-21	511-14	HG-WET-MICR-CVAF-VA	0.0143	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	0.088	0.040	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	0.0190	0.0080	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations
û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Phosphorus (P)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	12300	10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	2660	2.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	18500	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	3990	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	7.56	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	1.63	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	1.18	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	0.255	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-21	511-14	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-21	511-14	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	2430	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	523	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	4.16	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	0.897	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	0.0097	0.0020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	0.00208	0.00040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	33.1	1.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	7.14	0.20	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-21	511-14	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-21	511-14	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-22	511-15	MOISTURE-MICR-VA	79.0	2.0	%	12-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Arsenic (As)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	0.109	0.030	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	0.0230	0.0060	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	1.32	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	0.278	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	0.017	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	0.0036	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	4110	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	865	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	0.0261	0.0050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	0.0055	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	0.33	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	0.070	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	0.057	0.020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	0.0119	0.0040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	1.58	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	0.333	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	19.6	5.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	4.1	1.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	1270	2.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	268	0.40	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	3.43	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	0.722	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-22	511-15	HG-DRY-MICR-CVAF-VA	0.0821	0.0050	mg/kg	12-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-22	511-15	HG-WET-MICR-CVAF-VA	0.0173	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Molybdenum (Mo)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	0.21	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	0.045	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	11800	10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	2490	2.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	17200	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	3620	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	6.17	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	1.30	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	1.25	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	0.263	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-22	511-15	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-22	511-15	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	2540	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	534	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	3.70	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	0.778	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	0.0073	0.0020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	0.00154	0.00040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	0.17	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	0.036	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	38.1	1.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	8.03	0.20	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-22	511-15	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-22	511-15	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-23	511-16	MOISTURE-MICR-VA	77.7	2.0	%	12-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Aluminum (Al)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	0.130	0.030	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	0.0290	0.0060	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	0.894	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	0.200	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	1920	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	429	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	0.0170	0.0050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	0.0038	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	0.039	0.020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	0.0086	0.0040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	1.29	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	0.289	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	14.0	5.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	3.1	1.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	1120	2.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	250	0.40	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	1.59	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	0.355	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Mercury (Hg)-Total	L2019410-23	511-16	HG-DRY-MICR-CVAF-VA	0.305	0.0050	mg/kg	12-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-23	511-16	HG-WET-MICR-CVAF-VA	0.0681	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	10200	10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	2270	2.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	15600	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	3480	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	5.02	0.050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	1.12	0.010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	0.93	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	0.208	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-23	511-16	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-23	511-16	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	2650	20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	592	4.0	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	1.69	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	0.378	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	0.0070	0.0020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	0.00157	0.00040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	27.1	1.0	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	6.06	0.20	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-23	511-16	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-23	511-16	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Physical Tests (Tissue)														
% Moisture	L2019410-24	511-17	MOISTURE-TISS-VA	78.5	0.50	%	12-Oct-17		24-Jan-18	805438	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	<2.0	2.0	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	0.42	0.40	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	0.182	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	0.0392	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	1.59	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	0.342	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	<1.0	1.0	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	<0.20	0.20	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	0.0119	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	0.0026	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	5080	20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	1090	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	0.0281	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	0.0060	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	0.063	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	0.014	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	0.026	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	0.0055	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	1.63	0.10	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	0.350	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	17.8	3.0	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	3.83	0.60	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	<0.50	0.50	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	<0.10	0.10	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Magnesium (Mg)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	1370	2.0	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	295	0.40	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	2.60	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	0.560	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-24	511-17	HG-DRY-CVAFS-N-VA	0.246	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-24	511-17	HG-WET-CVAFS-N-VA	0.0529	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	13000	10	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	2800	2.0	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	16300	20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	3510	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	6.04	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	1.30	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	1.41	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	0.304	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-24	511-17	AG-DRY-CCMS-N-VA	<0.0050	0.0050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-24	511-17	AG-WET-CCMS-N-VA	<0.0010	0.0010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	3160	20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	680	4.0	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	4.91	0.050	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	1.06	0.010	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	0.0051	0.0020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	0.00110	0.00040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	<0.10	0.10	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	<0.0020	0.0020	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	<0.00040	0.00040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	<0.10	0.10	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	<0.020	0.020	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	29.2	0.50	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Zinc (Zn)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	6.27	0.10	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-24	511-17	MET-DRY-CCMS-N-VA	<0.20	0.20	mg/kg	12-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-24	511-17	MET-WET-CCMS-N-VA	<0.040	0.040	mg/kg wwt	12-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-25	508-5	MOISTURE-MICR-VA	78.9	2.0	%	13-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	0.052	0.030	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	0.0109	0.0060	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	3.19	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	0.672	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	0.042	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	0.0088	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	10300	20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	2160	4.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	0.0701	0.0050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	0.0148	0.0010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	0.061	0.020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	0.0129	0.0040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	1.07	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	0.224	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	13.6	5.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	2.9	1.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Lead (Pb)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	1210	2.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	255	0.40	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	6.04	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	1.27	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-25	508-5	HG-DRY-MICR-CVAF-VA	0.0650	0.0050	mg/kg	13-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-25	508-5	HG-WET-MICR-CVAF-VA	0.0137	0.0010	mg/kg wwt	13-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	14000	10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	2940	2.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	18000	20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	3790	4.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	12.0	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	2.54	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	2.14	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	0.451	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-25	508-5	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-25	508-5	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	2600	20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	548	4.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	8.20	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	1.73	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	0.0067	0.0020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	0.00142	0.00040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	0.0028	0.0020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	0.00058	0.00040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Vanadium (V)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	31.7	1.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	6.67	0.20	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-25	508-5	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-25	508-5	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-26	508-6	MOISTURE-MICR-VA	79.2	2.0	%	13-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	0.068	0.030	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	0.0141	0.0060	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	1.42	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	0.296	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	0.017	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	0.0035	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	4350	20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	905	4.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	0.0859	0.0050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	0.0179	0.0010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	0.31	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	0.066	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	0.041	0.020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	0.0085	0.0040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	1.58	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	0.328	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Iron (Fe)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	16.6	5.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	3.4	1.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	1340	2.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	279	0.40	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	3.34	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	0.696	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-26	508-6	HG-DRY-MICR-CVAF-VA	0.102	0.0050	mg/kg	13-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-26	508-6	HG-WET-MICR-CVAF-VA	0.0212	0.0010	mg/kg wwt	13-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	12100	10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	2520	2.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	19000	20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	3950	4.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	12.6	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	2.62	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	1.82	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	0.380	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-26	508-6	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-26	508-6	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	2530	20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	527	4.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	3.28	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	0.682	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	0.0109	0.0020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	0.00226	0.00040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Tin (Sn)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	27.3	1.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	5.67	0.20	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-26	508-6	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-26	508-6	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-27	508-7	MOISTURE-MICR-VA	79.5	2.0	%	13-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	7.4	5.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	1.5	1.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	0.253	0.030	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	0.0519	0.0060	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	1.21	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	0.248	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	0.019	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	0.0038	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	2470	20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	506	4.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	0.179	0.0050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	0.0367	0.0010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	0.42	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	0.086	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	0.090	0.020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Cobalt (Co)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	0.0184	0.0040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	1.49	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	0.305	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	26.7	5.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	5.5	1.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	1270	2.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	261	0.40	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	2.53	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	0.519	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-27	508-7	HG-DRY-MICR-CVAF-VA	0.0972	0.0050	mg/kg	13-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-27	508-7	HG-WET-MICR-CVAF-VA	0.0199	0.0010	mg/kg wwt	13-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	11300	10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	2310	2.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	19300	20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	3950	4.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	14.7	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	3.02	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	1.39	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	0.284	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-27	508-7	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-27	508-7	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	2650	20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	544	4.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	1.80	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	0.368	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Thallium (Tl)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	0.0126	0.0020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	0.00258	0.00040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	22.3	1.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	4.57	0.20	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-27	508-7	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-27	508-7	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-28	508-8	MOISTURE-MICR-VA	80.1	2.0	%	13-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	0.097	0.030	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	0.0192	0.0060	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	0.768	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	0.153	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	0.024	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	0.0047	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	1880	20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	373	4.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	0.0828	0.0050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	0.0165	0.0010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Chromium (Cr)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	0.28	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	0.056	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	0.141	0.020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	0.0281	0.0040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	0.92	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	0.183	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	20.4	5.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	4.0	1.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	1270	2.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	252	0.40	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	1.53	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	0.305	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-28	508-8	HG-DRY-MICR-CVAF-VA	0.0844	0.0050	mg/kg	13-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-28	508-8	HG-WET-MICR-CVAF-VA	0.0168	0.0010	mg/kg wwt	13-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	11100	10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	2200	2.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	19900	20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	3970	4.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	13.7	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	2.73	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	2.38	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	0.473	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-28	508-8	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-28	508-8	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	2980	20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	593	4.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	1.34	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Strontium (Sr)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	0.266	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	0.0125	0.0020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	0.00249	0.00040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	23.1	1.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	4.60	0.20	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-28	508-8	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-28	508-8	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-29	508-9	MOISTURE-MICR-VA	80.1	2.0	%	13-Oct-17		23-Jan-18	805082	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	0.086	0.030	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	0.0171	0.0060	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	2.60	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	0.518	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	1.0	1.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	0.20	0.20	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	0.058	0.010	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	0.0116	0.0020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	6230	20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Calcium (Ca)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	1240	4.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	0.0877	0.0050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	0.0175	0.0010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	0.32	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	0.064	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	0.398	0.020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	0.0792	0.0040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	1.68	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	0.335	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	34.7	5.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	6.9	1.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	1310	2.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	260	0.40	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	5.70	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	1.13	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-29	508-9	HG-DRY-MICR-CVAF-VA	0.0646	0.0050	mg/kg	13-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-29	508-9	HG-WET-MICR-CVAF-VA	0.0129	0.0010	mg/kg wwt	13-Oct-17	25-Jan-18	27-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	13200	10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	2630	2.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	19400	20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	3870	4.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	18.3	0.050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	3.63	0.010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	2.74	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	0.545	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-29	508-9	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-29	508-9	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations
û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Sodium (Na)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	3580	20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	713	4.0	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	6.19	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	1.23	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	0.0147	0.0020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	0.00292	0.00040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	0.16	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	0.032	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	39.0	1.0	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	7.76	0.20	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-29	508-9	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-29	508-9	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	25-Jan-18	29-Jan-18	805064	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-30	508-10	MOISTURE-MICR-VA	80.9	2.0	%	13-Oct-17		24-Jan-18	805446	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	0.109	0.030	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	0.0207	0.0060	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	1.00	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	0.192	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	1.4	1.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	0.27	0.20	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Cadmium (Cd)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	0.020	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	0.0037	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	2160	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	412	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	0.0798	0.0050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	0.0152	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	0.163	0.020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	0.0310	0.0040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	1.55	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	0.295	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	20.0	5.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	3.8	1.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	1390	2.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	265	0.40	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	1.98	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	0.378	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-30	508-10	HG-DRY-MICR-CVAF-VA	0.101	0.0050	mg/kg	13-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-30	508-10	HG-WET-MICR-CVAF-VA	0.0194	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	11500	10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	2200	2.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	20200	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	3850	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	12.4	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	2.36	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	2.00	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Selenium (Se)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	0.381	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-30	508-10	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-30	508-10	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	3220	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	615	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	1.89	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	0.361	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	0.0109	0.0020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	0.00207	0.00040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	0.12	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	0.023	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	27.1	1.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	5.18	0.20	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-30	508-10	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-30	508-10	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-31	508-11	MOISTURE-MICR-VA	79.3	2.0	%	13-Oct-17		24-Jan-18	805446	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	0.069	0.030	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	0.0142	0.0060	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	1.18	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	0.245	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Bismuth (Bi)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	0.119	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	0.0245	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	4570	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	943	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	0.0868	0.0050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	0.0179	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	0.182	0.020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	0.0376	0.0040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	1.62	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	0.335	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	23.0	5.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	4.7	1.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	1170	2.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	241	0.40	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	2.13	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	0.441	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-31	508-11	HG-DRY-MICR-CVAF-VA	0.0656	0.0050	mg/kg	13-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-31	508-11	HG-WET-MICR-CVAF-VA	0.0136	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	11900	10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	2460	2.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	19800	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	4090	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Rubidium (Rb)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	18.2	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	3.76	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	1.99	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	0.412	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-31	508-11	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-31	508-11	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	3350	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	693	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	3.91	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	0.808	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	0.0101	0.0020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	0.00209	0.00040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	36.6	1.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	7.56	0.20	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-31	508-11	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-31	508-11	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-32	508-12	MOISTURE-MICR-VA	77.6	2.0	%	13-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	0.087	0.030	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	0.0194	0.0060	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	0.794	0.050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	0.178	0.010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Beryllium (Be)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	3580	20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	802	4.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	0.106	0.0050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	0.0237	0.0010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	0.040	0.020	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	0.0090	0.0040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	1.15	0.20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	0.258	0.040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	14.2	5.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	3.2	1.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	1130	2.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	253	0.40	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	1.62	0.050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	0.363	0.010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-32	508-12	HG-DRY-MICR-CVAF-VA	0.0845	0.0050	mg/kg	13-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-32	508-12	HG-WET-MICR-CVAF-VA	0.0189	0.0010	mg/kg wwt	13-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	10500	10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Phosphorus (P)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	2360	2.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	17400	20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	3890	4.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	13.2	0.050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	2.96	0.010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	1.26	0.10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	0.283	0.020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-32	508-12	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-32	508-12	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	2480	20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	556	4.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	3.68	0.10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	0.825	0.020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	0.0068	0.0020	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	0.00151	0.00040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	28.7	1.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	6.43	0.20	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-32	508-12	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-32	508-12	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-33	509-6	MOISTURE-MICR-VA	79.7	2.0	%	13-Oct-17		24-Jan-18	805446	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	0.072	0.030	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Arsenic (As)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	0.0147	0.0060	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	1.12	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	0.228	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	0.053	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	0.0108	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	3520	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	712	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	0.112	0.0050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	0.0226	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	0.26	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	0.052	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	0.100	0.020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	0.0202	0.0040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	1.58	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	0.320	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	20.9	5.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	4.2	1.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	1320	2.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	268	0.40	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	1.95	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	0.396	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-33	509-6	HG-DRY-MICR-CVAF-VA	0.0812	0.0050	mg/kg	13-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-33	509-6	HG-WET-MICR-CVAF-VA	0.0165	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Nickel (Ni)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	11400	10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	2320	2.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	20600	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	4170	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	17.8	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	3.60	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	1.91	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	0.387	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-33	509-6	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-33	509-6	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	3630	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	736	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	2.99	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	0.605	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	0.0097	0.0020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	0.00197	0.00040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	25.6	1.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	5.20	0.20	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-33	509-6	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-33	509-6	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-34	509-7	MOISTURE-MICR-VA	79.3	2.0	%	13-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Antimony (Sb)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	0.078	0.030	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	0.0162	0.0060	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	1.00	0.050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	0.208	0.010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	0.013	0.010	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	0.0027	0.0020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	0.021	0.010	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	0.0044	0.0020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	2500	20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	518	4.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	0.254	0.0050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	0.0527	0.0010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	0.57	0.20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	0.118	0.040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	0.077	0.020	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	0.0160	0.0040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	1.27	0.20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	0.264	0.040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	14.1	5.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	2.9	1.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	1250	2.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	258	0.40	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	1.57	0.050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	0.326	0.010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-34	509-7	HG-DRY-MICR-CVAF-VA	0.0807	0.0050	mg/kg	13-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Mercury (Hg)-Total	L2019410-34	509-7	HG-WET-MICR-CVAF-VA	0.0167	0.0010	mg/kg wwt	13-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	0.25	0.20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	0.052	0.040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	10200	10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	2110	2.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	19700	20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	4080	4.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	15.8	0.050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	3.28	0.010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	1.98	0.10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	0.411	0.020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-34	509-7	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-34	509-7	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	3280	20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	680	4.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	1.58	0.10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	0.328	0.020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	0.0096	0.0020	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	0.00199	0.00040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	24.0	1.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	4.97	0.20	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-34	509-7	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-34	509-7	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-35	509-8	MOISTURE-MICR-VA	79.0	2.0	%	13-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	0.141	0.030	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	0.0297	0.0060	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	0.628	0.050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	0.132	0.010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	0.011	0.010	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	0.0023	0.0020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	2880	20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	606	4.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	0.117	0.0050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	0.0245	0.0010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	0.094	0.020	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	0.0197	0.0040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	1.17	0.20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	0.245	0.040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	27.9	5.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	5.9	1.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	1230	2.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	258	0.40	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Manganese (Mn)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	2.01	0.050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	0.422	0.010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-35	509-8	HG-DRY-MICR-CVAF-VA	0.0741	0.0050	mg/kg	13-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-35	509-8	HG-WET-MICR-CVAF-VA	0.0156	0.0010	mg/kg wwt	13-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	10400	10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	2180	2.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	19300	20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	4040	4.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	16.4	0.050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	3.45	0.010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	1.83	0.10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	0.385	0.020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-35	509-8	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-35	509-8	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	2810	20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	591	4.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	1.83	0.10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	0.384	0.020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	0.0106	0.0020	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	0.00223	0.00040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	20.3	1.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	4.27	0.20	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-35	509-8	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations
û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Zirconium (Zr)-Total	L2019410-35	509-8	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-36	509-9	MOISTURE-MICR-VA	79.0	2.0	%	13-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	0.101	0.030	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	0.0211	0.0060	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	1.01	0.050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	0.212	0.010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	0.043	0.010	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	0.0090	0.0020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	3240	20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	678	4.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	0.164	0.0050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	0.0343	0.0010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	0.176	0.020	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	0.0369	0.0040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	1.31	0.20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	0.274	0.040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	17.0	5.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	3.6	1.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Lithium (Li)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	1270	2.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	265	0.40	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	2.25	0.050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	0.472	0.010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-36	509-9	HG-DRY-MICR-CVAF-VA	0.0767	0.0050	mg/kg	13-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-36	509-9	HG-WET-MICR-CVAF-VA	0.0161	0.0010	mg/kg wwt	13-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	10800	10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	2260	2.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	18500	20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	3880	4.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	23.4	0.050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	4.90	0.010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	2.16	0.10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	0.452	0.020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-36	509-9	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-36	509-9	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	3080	20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	646	4.0	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	2.64	0.10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	0.553	0.020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	0.0142	0.0020	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	0.00298	0.00040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Zinc (Zn)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	23.7	1.0	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	4.97	0.20	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-36	509-9	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-36	509-9	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-37	509-10	MOISTURE-MICR-VA	80.0	2.0	%	13-Oct-17		24-Jan-18	805446	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	0.075	0.030	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	0.0150	0.0060	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	1.68	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	0.336	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	0.021	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	0.0042	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	5980	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	1200	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	0.173	0.0050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	0.0346	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	0.26	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	0.051	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	0.185	0.020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	0.0370	0.0040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	1.63	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	0.325	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	21.0	5.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	4.2	1.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Lead (Pb)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	1480	2.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	297	0.40	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	3.29	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	0.658	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-37	509-10	HG-DRY-MICR-CVAF-VA	0.118	0.0050	mg/kg	13-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-37	509-10	HG-WET-MICR-CVAF-VA	0.0236	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	13400	10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	2690	2.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	20700	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	4140	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	20.5	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	4.10	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	1.70	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	0.340	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-37	509-10	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-37	509-10	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	3490	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	700	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	4.73	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	0.948	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	0.0156	0.0020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	0.00313	0.00040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Uranium (U)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	27.1	1.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	5.43	0.20	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-37	509-10	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-37	509-10	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-38	509-11	MOISTURE-MICR-VA	79.5	2.0	%	13-Oct-17		24-Jan-18	805446	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	0.087	0.030	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	0.0177	0.0060	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	1.26	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	0.259	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	0.012	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	0.0025	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	3130	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	641	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	0.112	0.0050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	0.0230	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	0.24	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	0.049	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	0.074	0.020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	0.0152	0.0040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	1.92	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Copper (Cu)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	0.394	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	19.8	5.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	4.1	1.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	1330	2.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	272	0.40	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	2.06	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	0.421	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-38	509-11	HG-DRY-MICR-CVAF-VA	0.0733	0.0050	mg/kg	13-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-38	509-11	HG-WET-MICR-CVAF-VA	0.0150	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	11700	10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	2410	2.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	20100	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	4110	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	15.5	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	3.17	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	1.61	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	0.331	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-38	509-11	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-38	509-11	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	3540	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	724	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	2.86	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	0.587	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	0.0085	0.0020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	0.00174	0.00040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Tin (Sn)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	0.11	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	0.022	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	33.2	1.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	6.81	0.20	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-38	509-11	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-38	509-11	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-39	509-12	MOISTURE-MICR-VA	79.2	2.0	%	13-Oct-17		24-Jan-18	805446	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	0.114	0.030	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	0.0237	0.0060	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	1.30	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	0.270	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	1.0	1.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	0.21	0.20	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	0.018	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	0.0037	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	4040	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	842	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	0.122	0.0050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	0.0255	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	0.25	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	0.051	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Cobalt (Co)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	0.134	0.020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	0.0279	0.0040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	1.64	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	0.342	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	17.6	5.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	3.7	1.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	1240	2.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	259	0.40	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	2.44	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	0.509	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-39	509-12	HG-DRY-MICR-CVAF-VA	0.0762	0.0050	mg/kg	13-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-39	509-12	HG-WET-MICR-CVAF-VA	0.0159	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	11300	10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	2370	2.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	19300	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	4020	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	17.0	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	3.54	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	1.59	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	0.332	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-39	509-12	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-39	509-12	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	3110	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	647	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	3.51	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	0.732	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Tellurium (Te)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	0.0103	0.0020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	0.00214	0.00040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	29.9	1.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	6.24	0.20	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-39	509-12	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-39	509-12	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-40	509-13	MOISTURE-MICR-VA	79.2	2.0	%	13-Oct-17		24-Jan-18	805446	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	0.060	0.030	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	0.0125	0.0060	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	0.818	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	0.170	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	0.051	0.010	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	0.0106	0.0020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	2230	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	464	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	0.131	0.0050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Cesium (Cs)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	0.0273	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	0.184	0.020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	0.0383	0.0040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	1.97	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	0.409	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	26.0	5.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	5.4	1.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	1270	2.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	265	0.40	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	2.00	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	0.415	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-40	509-13	HG-DRY-MICR-CVAF-VA	0.0886	0.0050	mg/kg	13-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-40	509-13	HG-WET-MICR-CVAF-VA	0.0184	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	11000	10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	2290	2.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	19500	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	4060	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	19.9	0.050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	4.14	0.010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	2.37	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	0.493	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-40	509-13	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-40	509-13	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	3150	20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	655	4.0	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Strontium (Sr)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	1.80	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	0.374	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	0.0152	0.0020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	0.00316	0.00040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	26.0	1.0	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	5.40	0.20	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-40	509-13	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-40	509-13	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	13-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-41	502-10	MOISTURE-MICR-VA	78.9	2.0	%	14-Oct-17		24-Jan-18	805446	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	0.101	0.030	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	0.0213	0.0060	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	0.596	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	0.125	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Calcium (Ca)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	2910	20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	613	4.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	0.627	0.0050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	0.132	0.0010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	0.24	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	0.050	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	0.047	0.020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	0.0099	0.0040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	1.93	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	0.407	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	20.3	5.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	4.3	1.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	1250	2.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	263	0.40	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	1.49	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	0.314	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-41	502-10	HG-DRY-MICR-CVAF-VA	0.141	0.0050	mg/kg	14-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-41	502-10	HG-WET-MICR-CVAF-VA	0.0297	0.0010	mg/kg wwt	14-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	11100	10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	2330	2.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	18300	20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	3840	4.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	14.0	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	2.95	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	2.27	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	0.479	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-41	502-10	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Silver (Ag)-Total	L2019410-41	502-10	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	2550	20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	536	4.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	2.17	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	0.457	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	0.0143	0.0020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	0.00300	0.00040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	24.9	1.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	5.23	0.20	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-41	502-10	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-41	502-10	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-42	502-11	MOISTURE-MICR-VA	78.0	2.0	%	14-Oct-17		24-Jan-18	805446	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	0.117	0.030	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	0.0256	0.0060	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	1.53	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	0.337	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Boron (B)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	0.013	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	0.0028	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	7280	20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	1600	4.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	0.664	0.0050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	0.146	0.0010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	0.31	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	0.068	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	0.084	0.020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	0.0185	0.0040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	1.88	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	0.415	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	24.7	5.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	5.4	1.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	1330	2.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	293	0.40	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	2.74	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	0.604	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-42	502-11	HG-DRY-MICR-CVAF-VA	0.0657	0.0050	mg/kg	14-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-42	502-11	HG-WET-MICR-CVAF-VA	0.0145	0.0010	mg/kg wwt	14-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	0.25	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	0.056	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	13100	10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	2880	2.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	18000	20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	3960	4.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	15.0	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	3.30	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Selenium (Se)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	2.18	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	0.480	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-42	502-11	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-42	502-11	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	2630	20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	578	4.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	6.60	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	1.45	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	0.0132	0.0020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	0.00290	0.00040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	38.8	1.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	8.53	0.20	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-42	502-11	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-42	502-11	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-43	502-12	MOISTURE-MICR-VA	77.2	2.0	%	14-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	0.130	0.030	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	0.0296	0.0060	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	0.468	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	0.107	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Bismuth (Bi)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	2860	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	653	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	0.632	0.0050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	0.144	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	0.044	0.020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	0.0100	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	1.62	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	0.370	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	18.1	5.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	4.1	1.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	1130	2.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	258	0.40	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	1.30	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	0.297	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-43	502-12	HG-DRY-MICR-CVAF-VA	0.0947	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-43	502-12	HG-WET-MICR-CVAF-VA	0.0216	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	9990	10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	2280	2.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	15700	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations
û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Potassium (K)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	3590	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	13.2	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	3.00	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	2.13	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	0.486	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-43	502-12	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-43	502-12	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	2480	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	567	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	2.06	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	0.471	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	0.0131	0.0020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	0.00300	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	29.8	1.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	6.79	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-43	502-12	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-43	502-12	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-44	502-13	MOISTURE-MICR-VA	76.5	2.0	%	14-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	0.158	0.030	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	0.0370	0.0060	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	0.301	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Barium (Ba)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	0.071	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	2030	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	476	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	0.804	0.0050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	0.189	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	0.075	0.020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	0.0175	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	2.26	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	0.531	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	18.8	5.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	4.4	1.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	988	2.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	232	0.40	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	0.682	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	0.160	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-44	502-13	HG-DRY-MICR-CVAF-VA	0.0771	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-44	502-13	HG-WET-MICR-CVAF-VA	0.0181	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Phosphorus (P)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	8790	10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	2060	2.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	16200	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	3810	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	18.0	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	4.22	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	2.71	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	0.636	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-44	502-13	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-44	502-13	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	2550	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	598	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	1.18	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	0.277	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	0.0191	0.0020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	0.00447	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	29.0	1.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	6.79	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-44	502-13	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-44	502-13	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-45	502-14	MOISTURE-MICR-VA	76.2	2.0	%	14-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Arsenic (As)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	0.220	0.030	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	0.0523	0.0060	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	0.400	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	0.095	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	0.0024	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	1840	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	438	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	0.762	0.0050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	0.181	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	0.054	0.020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	0.0129	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	2.16	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	0.515	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	20.7	5.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	4.9	1.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	1010	2.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	241	0.40	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	0.876	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	0.208	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-45	502-14	HG-DRY-MICR-CVAF-VA	0.0788	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-45	502-14	HG-WET-MICR-CVAF-VA	0.0187	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Molybdenum (Mo)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	8820	10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	2100	2.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	15500	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	3680	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	15.7	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	3.74	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	2.99	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	0.710	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-45	502-14	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-45	502-14	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	2610	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	622	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	1.23	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	0.293	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	0.0183	0.0020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	0.00435	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	25.5	1.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	6.07	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-45	502-14	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-45	502-14	MET-WET-MICR-HRMS-VA	0.046	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-46	502-15	MOISTURE-MICR-VA	76.0	2.0	%	14-Oct-17		24-Jan-18	805446	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Aluminum (Al)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	0.206	0.030	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	0.0494	0.0060	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	0.744	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	0.178	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	2510	20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	601	4.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	0.669	0.0050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	0.160	0.0010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	0.041	0.020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	0.0099	0.0040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	1.41	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	0.339	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	14.7	5.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	3.5	1.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	1230	2.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	295	0.40	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	1.61	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	0.386	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Mercury (Hg)-Total	L2019410-46	502-15	HG-DRY-MICR-CVAF-VA	0.0786	0.0050	mg/kg	14-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-46	502-15	HG-WET-MICR-CVAF-VA	0.0188	0.0010	mg/kg wwt	14-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	10700	10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	2570	2.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	17900	20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	4290	4.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	14.0	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	3.36	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	1.79	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	0.429	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-46	502-15	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-46	502-15	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	2310	20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	554	4.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	2.31	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	0.554	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	0.0170	0.0020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	0.00407	0.00040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	0.18	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	0.044	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	20.9	1.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	5.02	0.20	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-46	502-15	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-46	502-15	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Physical Tests (Tissue)														
% Moisture	L2019410-47	502-16	MOISTURE-MICR-VA	76.7	2.0	%	14-Oct-17		24-Jan-18	805446	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	0.226	0.030	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	0.0527	0.0060	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	0.599	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	0.140	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	1600	20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	374	4.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	0.894	0.0050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	0.208	0.0010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	0.29	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	0.068	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	0.044	0.020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	0.0104	0.0040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	2.26	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	0.527	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	21.3	5.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	5.0	1.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Magnesium (Mg)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	1110	2.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	259	0.40	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	0.904	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	0.211	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-47	502-16	HG-DRY-MICR-CVAF-VA	0.0918	0.0050	mg/kg	14-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-47	502-16	HG-WET-MICR-CVAF-VA	0.0214	0.0010	mg/kg wwt	14-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	9260	10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	2160	2.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	17600	20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	4090	4.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	17.0	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	3.96	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	2.50	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	0.582	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-47	502-16	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-47	502-16	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	2730	20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	635	4.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	1.20	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	0.281	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	0.0167	0.0020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	0.00390	0.00040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	25.0	1.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Zinc (Zn)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	5.82	0.20	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-47	502-16	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-47	502-16	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-48	502-17	MOISTURE-MICR-VA	77.3	2.0	%	14-Oct-17		24-Jan-18	805446	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	0.164	0.030	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	0.0373	0.0060	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	0.897	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	0.204	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	5980	20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	1360	4.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	0.835	0.0050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	0.190	0.0010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	0.098	0.020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	0.0222	0.0040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	1.55	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	0.352	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	15.9	5.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	3.6	1.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Lead (Pb)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	1280	2.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	291	0.40	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	2.36	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	0.536	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-48	502-17	HG-DRY-MICR-CVAF-VA	0.0927	0.0050	mg/kg	14-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-48	502-17	HG-WET-MICR-CVAF-VA	0.0211	0.0010	mg/kg wwt	14-Oct-17	28-Jan-18	31-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	12300	10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	2810	2.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	18700	20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	4250	4.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	17.8	0.050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	4.05	0.010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	2.42	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	0.551	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-48	502-17	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-48	502-17	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	2730	20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	621	4.0	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	5.18	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	1.18	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	0.0213	0.0020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	0.00483	0.00040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Vanadium (V)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	25.7	1.0	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	5.84	0.20	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-48	502-17	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-48	502-17	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	28-Jan-18	29-Jan-18	805445	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-49	512-6	MOISTURE-TISS-VA	77.4	0.50	%	14-Oct-17		24-Jan-18	805438	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	<2.0	2.0	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	<0.40	0.40	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	0.157	0.020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	0.0355	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	0.778	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	0.176	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	<1.0	1.0	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	<0.20	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	<0.0050	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	2990	20	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	677	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	0.0359	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	0.0081	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	0.107	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	0.024	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	0.027	0.020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	0.0061	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	1.67	0.10	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	0.378	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Iron (Fe)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	16.3	3.0	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	3.69	0.60	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	<0.50	0.50	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	<0.10	0.10	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	1310	2.0	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	297	0.40	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	1.17	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	0.264	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-49	512-6	HG-DRY-CVAFS-N-VA	0.0884	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-49	512-6	HG-WET-CVAFS-N-VA	0.0200	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	12100	10	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	2730	2.0	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	18200	20	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	4110	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	6.21	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	1.40	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	1.30	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	0.295	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-49	512-6	AG-DRY-CCMS-N-VA	<0.0050	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-49	512-6	AG-WET-CCMS-N-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	2360	20	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	534	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	2.89	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	0.654	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	0.0072	0.0020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	0.00164	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations
û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Tin (Sn)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	<0.0020	0.0020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	<0.00040	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	23.3	0.50	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	5.26	0.10	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-49	512-6	MET-DRY-CCMS-N-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-49	512-6	MET-WET-CCMS-N-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-50	512-7	MOISTURE-MICR-VA	79.2	2.0	%	14-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	0.166	0.030	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	0.0346	0.0060	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	1.45	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	0.301	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	0.016	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	0.0033	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	3990	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	831	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	0.0303	0.0050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	0.0063	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	0.086	0.020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Cobalt (Co)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	0.0180	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	0.99	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	0.206	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	10.1	5.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	2.1	1.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	1120	2.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	233	0.40	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	2.95	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	0.614	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-50	512-7	HG-DRY-MICR-CVAF-VA	0.0908	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-50	512-7	HG-WET-MICR-CVAF-VA	0.0189	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	10100	10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	2110	2.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	17500	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	3640	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	6.92	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	1.44	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	1.30	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	0.270	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-50	512-7	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-50	512-7	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	2730	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	568	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	3.41	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	0.711	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Thallium (Tl)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	0.0072	0.0020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	0.00151	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	30.9	1.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	6.44	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-50	512-7	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-50	512-7	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-51	512-8	MOISTURE-MICR-VA	79.2	2.0	%	14-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	0.754	0.030	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	0.156	0.0060	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	2.07	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	0.430	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	4760	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	987	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	0.0459	0.0050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	0.0095	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Chromium (Cr)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	0.044	0.020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	0.0091	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	1.04	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	0.216	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	10.4	5.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	2.2	1.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	1280	2.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	265	0.40	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	6.30	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	1.31	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-51	512-8	HG-DRY-MICR-CVAF-VA	0.111	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-51	512-8	HG-WET-MICR-CVAF-VA	0.0231	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	12100	10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	2510	2.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	19300	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	4000	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	12.6	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	2.61	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	1.25	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	0.259	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-51	512-8	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-51	512-8	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	2850	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	591	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	5.32	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Strontium (Sr)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	1.10	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	0.0086	0.0020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	0.00178	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	27.5	1.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	5.71	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-51	512-8	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-51	512-8	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-52	512-9	MOISTURE-MICR-VA	77.7	2.0	%	14-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	<5.0	5.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	<1.0	1.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	0.320	0.030	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	0.0714	0.0060	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	0.816	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	0.182	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	2080	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Calcium (Ca)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	465	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	0.0251	0.0050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	0.0056	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	0.042	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	0.070	0.020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	0.0156	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	1.46	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	0.325	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	15.3	5.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	3.4	1.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	1040	2.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	233	0.40	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	1.73	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	0.387	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-52	512-9	HG-DRY-MICR-CVAF-VA	0.101	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-52	512-9	HG-WET-MICR-CVAF-VA	0.0226	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	9000	10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	2010	2.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	15700	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	3510	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	6.95	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	1.55	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	1.29	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	0.287	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-52	512-9	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-52	512-9	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations
û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Sodium (Na)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	2600	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	580	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	1.80	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	0.402	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	0.0084	0.0020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	0.00187	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	0.12	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	0.028	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	28.6	1.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	6.38	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-52	512-9	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-52	512-9	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-53	512-10	MOISTURE-MICR-VA	81.3	2.0	%	14-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	21.8	5.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	4.1	1.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	0.341	0.030	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	0.0639	0.0060	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	6.63	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	1.24	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Cadmium (Cd)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	0.049	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	0.0092	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	8960	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	1680	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	0.0552	0.0050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	0.0103	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	0.44	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	0.083	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	0.345	0.020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	0.0646	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	1.37	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	0.257	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	80.2	5.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	15.0	1.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	1290	2.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	241	0.40	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	9.64	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	1.81	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-53	512-10	HG-DRY-MICR-CVAF-VA	0.160	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-53	512-10	HG-WET-MICR-CVAF-VA	0.0299	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	0.96	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	0.179	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	13800	10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	2590	2.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	19300	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	3610	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	14.5	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	2.71	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	2.85	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Selenium (Se)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	0.533	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-53	512-10	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-53	512-10	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	3850	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	722	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	7.52	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	1.41	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	0.0144	0.0020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	0.00269	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	2.16	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	0.404	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	0.0030	0.0020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	0.00057	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	53.3	1.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	9.99	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-53	512-10	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-53	512-10	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-54	512-11	MOISTURE-MICR-VA	79.2	2.0	%	14-Oct-17		22-Jan-18	804318	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	6.6	5.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	1.4	1.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	0.157	0.030	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	û	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	0.0327	0.0060	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	2.09	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	0.436	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Bismuth (Bi)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	<1.0	1.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	<0.20	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	3550	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	741	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	0.0331	0.0050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	0.0069	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	0.097	0.020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	0.0202	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	0.98	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	0.205	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	17.7	5.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	3.7	1.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	<0.050	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	<0.010	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	<0.50	0.50	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	<0.10	0.10	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	1180	2.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	247	0.40	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	3.49	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	0.726	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-54	512-11	HG-DRY-MICR-CVAF-VA	0.0830	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-54	512-11	HG-WET-MICR-CVAF-VA	0.0173	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	<0.040	0.040	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	<0.0080	0.0080	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	10600	10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	2210	2.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	17000	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	3540	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Rubidium (Rb)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	8.59	0.050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	1.79	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	1.26	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	0.262	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-54	512-11	AG-DRY-MICR-HRMS-VA	<0.0050	0.0050	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-54	512-11	AG-WET-MICR-HRMS-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	2600	20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	541	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	4.07	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	0.848	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	0.0064	0.0020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	0.00134	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	0.34	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	0.071	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	<0.0020	0.0020	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	<0.00040	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	31.8	1.0	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	6.63	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-54	512-11	MET-DRY-MICR-HRMS-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-54	512-11	MET-WET-MICR-HRMS-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	25-Jan-18	804300	ü	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-55	512-12	MOISTURE-TISS-VA	79.2	0.50	%	14-Oct-17		24-Jan-18	805438	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	3.7	2.0	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	0.76	0.40	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	0.482	0.020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	0.100	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	0.710	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	0.148	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Beryllium (Be)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	<1.0	1.0	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	<0.20	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	0.0081	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	0.0017	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	2250	20	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	468	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	0.0350	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	0.0073	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	0.103	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	0.021	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	0.058	0.020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	0.0120	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	1.73	0.10	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	0.360	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	16.0	3.0	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	3.33	0.60	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	<0.50	0.50	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	<0.10	0.10	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	1300	2.0	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	270	0.40	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	1.76	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	0.366	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-55	512-12	HG-DRY-CVAFS-N-VA	0.153	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-55	512-12	HG-WET-CVAFS-N-VA	0.0318	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	12300	10	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations
û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Phosphorus (P)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	2560	2.0	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	20000	20	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	4160	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	8.27	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	1.72	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	1.24	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	0.257	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-55	512-12	AG-DRY-CCMS-N-VA	<0.0050	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-55	512-12	AG-WET-CCMS-N-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	2450	20	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	509	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	2.15	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	0.447	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	0.0068	0.0020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	0.00141	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	<0.0020	0.0020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	<0.00040	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	26.5	0.50	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	5.51	0.10	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-55	512-12	MET-DRY-CCMS-N-VA	<0.20	0.20	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-55	512-12	MET-WET-CCMS-N-VA	<0.040	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Physical Tests (Tissue)														
% Moisture	L2019410-56	512-13	MOISTURE-TISS-VA	79.4	0.50	%	14-Oct-17		24-Jan-18	805438	ü	ü	Tissue	Physical Tests
Metals (Tissue)														
Aluminum (Al)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	2.7	2.0	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Aluminum (Al)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	0.55	0.40	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Antimony (Sb)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Arsenic (As)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	0.225	0.020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Arsenic (As)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	0.0462	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	0.711	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Barium (Ba)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	0.146	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Beryllium (Be)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	<0.010	0.010	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Bismuth (Bi)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	<0.0020	0.0020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	<1.0	1.0	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Boron (B)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	<0.20	0.20	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	0.0172	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cadmium (Cd)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	0.0035	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	2760	20	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Calcium (Ca)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	568	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	0.0514	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cesium (Cs)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	0.0106	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	0.187	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Chromium (Cr)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	0.038	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	0.034	0.020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Cobalt (Co)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	0.0070	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	1.59	0.10	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Copper (Cu)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	0.326	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	21.6	3.0	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Iron (Fe)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	4.45	0.60	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Lead (Pb)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	<0.50	0.50	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Lithium (Li)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	<0.10	0.10	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	1330	2.0	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Magnesium (Mg)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	273	0.40	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	1.80	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Manganese (Mn)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	0.371	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-56	512-13	HG-DRY-CVAFS-N-VA	0.124	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Mercury (Hg)-Total	L2019410-56	512-13	HG-WET-CVAFS-N-VA	0.0255	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Molybdenum (Mo)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Results of Analysis L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives or Test result met ALS Hold Time Recommendations

û QC Lot did not meet ALS Data Quality Objectives or Test result did not meet ALS Hold Time Recommendations

Parameter	ALS ID	Client Sample ID	ALS Test Code	Results	Detection Limit	Units	Date Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval	Matrix	Class
Nickel (Ni)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	0.21	0.20	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Nickel (Ni)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	0.044	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	12500	10	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Phosphorus (P)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	2570	2.0	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	20200	20	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Potassium (K)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	4140	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	11.0	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Rubidium (Rb)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	2.26	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	1.51	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Selenium (Se)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	0.310	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-56	512-13	AG-DRY-CCMS-N-VA	<0.0050	0.0050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Silver (Ag)-Total	L2019410-56	512-13	AG-WET-CCMS-N-VA	<0.0010	0.0010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	2510	20	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Sodium (Na)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	516	4.0	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	2.35	0.050	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Strontium (Sr)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	0.483	0.010	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	<0.020	0.020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tellurium (Te)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	<0.0040	0.0040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	0.0078	0.0020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Thallium (Tl)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	0.00161	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Tin (Sn)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	<0.0020	0.0020	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Uranium (U)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	<0.00040	0.00040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	<0.10	0.10	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Vanadium (V)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	<0.020	0.020	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	21.9	0.50	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zinc (Zn)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	4.51	0.10	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	ü	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-56	512-13	MET-DRY-CCMS-N-VA	0.41	0.20	mg/kg	14-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals
Zirconium (Zr)-Total	L2019410-56	512-13	MET-WET-CCMS-N-VA	0.085	0.040	mg/kg wwt	14-Oct-17	24-Jan-18	26-Jan-18	805430	û	ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
Physical Tests (Tissue)																	
WG2702677-3	L2019410-4	505-11	DUP	804318	% Moisture	77.7	77.8	2.0	%	0.2	25	-			ü	Tissue	ıysical Tes
WG2703661-3	L2019410-9	501-11	DUP	805082	% Moisture	77.8	77.6	2.0	%	0.3	25	-			ü	Tissue	ıysical Tes
WG2704113-3	L2019410-14	501-16	DUP	805438	% Moisture	78.3	76.5	0.50	%	2.4	20	-			ü	Tissue	ıysical Tes
WG2704125-3	L2019410-30	508-10	DUP	805446	% Moisture	80.9	80.4	2.0	%	0.6	25	-			ü	Tissue	ıysical Tes
Metals (Tissue)																	
WG2702663-2	L2019410-4	505-11	DUP	804300	Aluminum (Al)-Total	<5.0	<5.0	5.0	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Aluminum (Al)-Total	<5.0	<5.0	5.0	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Aluminum (Al)-Total	2.7	4.1	2.0	mg/kg	-		1.4	4		ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Aluminum (Al)-Total	<5.0	<5.0	5.0	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Aluminum (Al)-Total	<1.0	<1.0	1.0	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Aluminum (Al)-Total	<1.0	<1.0	1.0	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Aluminum (Al)-Total	0.55	0.84	0.40	mg/kg wwt	-		0.29	0.8		ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Aluminum (Al)-Total	<1.0	<1.0	1.0	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Antimony (Sb)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Antimony (Sb)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Antimony (Sb)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Antimony (Sb)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Antimony (Sb)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Antimony (Sb)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Antimony (Sb)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Antimony (Sb)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Arsenic (As)-Total	0.092	0.084	0.030	mg/kg	8.9	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Arsenic (As)-Total	0.070	0.070	0.030	mg/kg	0.6	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Arsenic (As)-Total	0.225	0.224	0.020	mg/kg	0.5	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Arsenic (As)-Total	0.109	0.117	0.030	mg/kg	7.6	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Arsenic (As)-Total	0.0206	0.0188	0.0060	mg/kg wwt	8.9	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Arsenic (As)-Total	0.0155	0.0154	0.0060	mg/kg wwt	0.6	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Arsenic (As)-Total	0.0462	0.0460	0.0040	mg/kg wwt	0.5	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Arsenic (As)-Total	0.0207	0.0224	0.0060	mg/kg wwt	7.6	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Barium (Ba)-Total	0.606	0.477	0.050	mg/kg	24	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Barium (Ba)-Total	1.04	0.879	0.050	mg/kg	16	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Barium (Ba)-Total	0.711	0.656	0.050	mg/kg	8.1	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Barium (Ba)-Total	1.00	1.78	0.050	mg/kg	56	40	-		DUP-H	û	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Barium (Ba)-Total	0.136	0.106	0.010	mg/kg wwt	24	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
WG2703646-2	L2019410-9	501-11	DUP	805064	Barium (Ba)-Total	0.230	0.195	0.010	mg/kg wwt	16	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Barium (Ba)-Total	0.146	0.135	0.010	mg/kg wwt	8.1	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Barium (Ba)-Total	0.192	0.341	0.010	mg/kg wwt	56	40	-		DUP-H	û	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Beryllium (Be)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Beryllium (Be)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Beryllium (Be)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Beryllium (Be)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Beryllium (Be)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Beryllium (Be)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Beryllium (Be)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Beryllium (Be)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Bismuth (Bi)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Bismuth (Bi)-Total	0.050	<0.010	0.010	mg/kg	N/A	40	-		DUP-H	ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Bismuth (Bi)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Bismuth (Bi)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Bismuth (Bi)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Bismuth (Bi)-Total	0.0111	<0.0020	0.0020	mg/kg wwt	N/A	40	-		DUP-H	ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Bismuth (Bi)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Bismuth (Bi)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Boron (B)-Total	<1.0	<1.0	1.0	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Boron (B)-Total	<1.0	<1.0	1.0	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Boron (B)-Total	<1.0	<1.0	1.0	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Boron (B)-Total	1.4	1.1	1.0	mg/kg	23	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Boron (B)-Total	<0.20	<0.20	0.20	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Boron (B)-Total	<0.20	<0.20	0.20	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Boron (B)-Total	<0.20	<0.20	0.20	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Boron (B)-Total	0.27	0.21	0.20	mg/kg wwt	23	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Cadmium (Cd)-Total	0.024	0.024	0.010	mg/kg	0.2	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Cadmium (Cd)-Total	0.018	0.011	0.010	mg/kg	-		0.007	0.02		ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Cadmium (Cd)-Total	0.0172	0.0159	0.0050	mg/kg	7.7	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Cadmium (Cd)-Total	0.020	0.027	0.010	mg/kg	31	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Cadmium (Cd)-Total	0.0054	0.0054	0.0020	mg/kg wwt	0.2	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Cadmium (Cd)-Total	0.0041	0.0025	0.0020	mg/kg wwt	-		0.0015	0.004		ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Cadmium (Cd)-Total	0.0035	0.0033	0.0010	mg/kg wwt	7.7	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Cadmium (Cd)-Total	0.0037	0.0051	0.0020	mg/kg wwt	31	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
WG2702663-2	L2019410-4	505-11	DUP	804300	Calcium (Ca)-Total	2530	2010	20	mg/kg	23	60	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Calcium (Ca)-Total	4020	3110	20	mg/kg	26	60	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Calcium (Ca)-Total	2760	1820	20	mg/kg	41	60	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Calcium (Ca)-Total	2160	4880	20	mg/kg	77	60	-		DUP-H	û	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Calcium (Ca)-Total	566	450	4.0	mg/kg wwt	23	60	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Calcium (Ca)-Total	890	688	4.0	mg/kg wwt	26	60	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Calcium (Ca)-Total	568	373	4.0	mg/kg wwt	41	60	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Calcium (Ca)-Total	412	931	4.0	mg/kg wwt	77	60	-		DUP-H	û	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Cesium (Cs)-Total	0.447	0.419	0.0050	mg/kg	6.3	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Cesium (Cs)-Total	0.869	0.831	0.0050	mg/kg	4.5	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Cesium (Cs)-Total	0.0514	0.0488	0.0050	mg/kg	5.1	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Cesium (Cs)-Total	0.0798	0.0754	0.0050	mg/kg	5.6	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Cesium (Cs)-Total	0.0998	0.0937	0.0010	mg/kg wwt	6.3	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Cesium (Cs)-Total	0.193	0.184	0.0010	mg/kg wwt	4.5	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Cesium (Cs)-Total	0.0106	0.0100	0.0010	mg/kg wwt	5.1	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Cesium (Cs)-Total	0.0152	0.0144	0.0010	mg/kg wwt	5.6	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Chromium (Cr)-Total	0.27	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Chromium (Cr)-Total	0.36	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Chromium (Cr)-Total	0.187	0.257	0.050	mg/kg	32	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Chromium (Cr)-Total	<0.20	0.22	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Chromium (Cr)-Total	0.060	<0.040	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Chromium (Cr)-Total	0.079	0.043	0.040	mg/kg wwt	-		0.036	0.08		ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Chromium (Cr)-Total	0.038	0.053	0.010	mg/kg wwt	32	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Chromium (Cr)-Total	<0.040	0.041	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Cobalt (Co)-Total	0.178	0.156	0.020	mg/kg	13	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Cobalt (Co)-Total	0.072	0.063	0.020	mg/kg	14	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Cobalt (Co)-Total	0.034	0.035	0.020	mg/kg	2.1	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Cobalt (Co)-Total	0.163	0.178	0.020	mg/kg	9.2	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Cobalt (Co)-Total	0.0398	0.0348	0.0040	mg/kg wwt	13	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Cobalt (Co)-Total	0.0161	0.0140	0.0040	mg/kg wwt	14	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Cobalt (Co)-Total	0.0070	0.0071	0.0040	mg/kg wwt	2.1	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Cobalt (Co)-Total	0.0310	0.0341	0.0040	mg/kg wwt	9.2	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Copper (Cu)-Total	2.05	2.35	0.20	mg/kg	14	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Copper (Cu)-Total	1.58	1.70	0.20	mg/kg	7.3	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Copper (Cu)-Total	1.59	1.26	0.10	mg/kg	23	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
WG2704117-6	L2019410-30	508-10	DUP	805445	Copper (Cu)-Total	1.55	1.83	0.20	mg/kg	17	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Copper (Cu)-Total	0.459	0.526	0.040	mg/kg wwt	14	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Copper (Cu)-Total	0.350	0.377	0.040	mg/kg wwt	7.3	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Copper (Cu)-Total	0.326	0.259	0.020	mg/kg wwt	23	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Copper (Cu)-Total	0.295	0.349	0.040	mg/kg wwt	17	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Iron (Fe)-Total	20.9	22.5	5.0	mg/kg	7.6	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Iron (Fe)-Total	15.7	15.2	5.0	mg/kg	3.4	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Iron (Fe)-Total	21.6	18.8	3.0	mg/kg	14	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Iron (Fe)-Total	20.0	24.2	5.0	mg/kg	19	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Iron (Fe)-Total	4.7	5.0	1.0	mg/kg wwt	7.6	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Iron (Fe)-Total	3.5	3.4	1.0	mg/kg wwt	3.4	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Iron (Fe)-Total	4.45	3.87	0.60	mg/kg wwt	14	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Iron (Fe)-Total	3.8	4.6	1.0	mg/kg wwt	19	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Lead (Pb)-Total	<0.050	<0.050	0.050	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Lead (Pb)-Total	<0.050	<0.050	0.050	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Lead (Pb)-Total	<0.020	<0.020	0.020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Lead (Pb)-Total	<0.050	<0.050	0.050	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Lead (Pb)-Total	<0.010	<0.010	0.010	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Lead (Pb)-Total	<0.010	<0.010	0.010	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Lead (Pb)-Total	<0.0040	<0.0040	0.0040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Lead (Pb)-Total	<0.010	<0.010	0.010	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Lithium (Li)-Total	<0.50	<0.50	0.50	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Lithium (Li)-Total	<0.50	<0.50	0.50	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Lithium (Li)-Total	<0.50	<0.50	0.50	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Lithium (Li)-Total	<0.50	<0.50	0.50	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Lithium (Li)-Total	<0.10	<0.10	0.10	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Lithium (Li)-Total	<0.10	<0.10	0.10	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Lithium (Li)-Total	<0.10	<0.10	0.10	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Lithium (Li)-Total	<0.10	<0.10	0.10	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Magnesium (Mg)-Total	1080	1060	2.0	mg/kg	1.8	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Magnesium (Mg)-Total	1250	1080	2.0	mg/kg	14	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Magnesium (Mg)-Total	1330	1390	2.0	mg/kg	4.7	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Magnesium (Mg)-Total	1390	1440	2.0	mg/kg	3.8	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Magnesium (Mg)-Total	242	238	0.40	mg/kg wwt	1.8	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Magnesium (Mg)-Total	277	240	0.40	mg/kg wwt	14	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
WG2704091-2	L2019410-56	512-13	DUP	805430	Magnesium (Mg)-Total	273	286	0.40	mg/kg wwt	4.7	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Magnesium (Mg)-Total	265	275	0.40	mg/kg wwt	3.8	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Manganese (Mn)-Total	0.951	0.774	0.050	mg/kg	21	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Manganese (Mn)-Total	2.01	1.18	0.050	mg/kg	52	40	-		DUP-H	û	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Manganese (Mn)-Total	1.80	1.33	0.050	mg/kg	30	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Manganese (Mn)-Total	1.98	4.49	0.050	mg/kg	78	40	-		DUP-H	û	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Manganese (Mn)-Total	0.213	0.173	0.010	mg/kg wwt	21	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Manganese (Mn)-Total	0.446	0.262	0.010	mg/kg wwt	52	40	-		DUP-H	û	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Manganese (Mn)-Total	0.371	0.273	0.010	mg/kg wwt	30	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Manganese (Mn)-Total	0.378	0.858	0.010	mg/kg wwt	78	40	-		DUP-H	û	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Mercury (Hg)-Total	0.112	0.113	0.0050	mg/kg	0.2	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Mercury (Hg)-Total	0.0621	0.0621	0.0050	mg/kg	0.1	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Mercury (Hg)-Total	0.124	0.126	0.0050	mg/kg	1.3	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Mercury (Hg)-Total	0.101	0.0954	0.0050	mg/kg	6.1	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Mercury (Hg)-Total	0.0251	0.0252	0.0010	mg/kg wwt	0.2	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Mercury (Hg)-Total	0.0138	0.0138	0.0010	mg/kg wwt	0.1	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Mercury (Hg)-Total	0.0255	0.0259	0.0010	mg/kg wwt	1.3	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Mercury (Hg)-Total	0.0194	0.0182	0.0010	mg/kg wwt	6.1	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Molybdenum (Mo)-Tota	<0.040	<0.040	0.040	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Molybdenum (Mo)-Tota	<0.040	<0.040	0.040	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Molybdenum (Mo)-Tota	<0.020	<0.020	0.020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Molybdenum (Mo)-Tota	<0.040	<0.040	0.040	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Molybdenum (Mo)-Tota	<0.0080	<0.0080	0.0080	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Molybdenum (Mo)-Tota	<0.0080	<0.0080	0.0080	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Molybdenum (Mo)-Tota	<0.0040	<0.0040	0.0040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Molybdenum (Mo)-Tota	<0.0080	<0.0080	0.0080	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Nickel (Ni)-Total	<0.20	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Nickel (Ni)-Total	<0.20	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Nickel (Ni)-Total	0.21	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Nickel (Ni)-Total	<0.20	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Nickel (Ni)-Total	<0.040	<0.040	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Nickel (Ni)-Total	<0.040	<0.040	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Nickel (Ni)-Total	0.044	<0.040	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Nickel (Ni)-Total	<0.040	<0.040	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Phosphorus (P)-Total	9790	9390	10	mg/kg	4.1	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
WG2703646-2	L2019410-9	501-11	DUP	805064	Phosphorus (P)-Total	11500	10200	10	mg/kg	12	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Phosphorus (P)-Total	12500	12600	10	mg/kg	0.7	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Phosphorus (P)-Total	11500	13400	10	mg/kg	15	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Phosphorus (P)-Total	2190	2100	2.0	mg/kg wwt	4.1	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Phosphorus (P)-Total	2550	2260	2.0	mg/kg wwt	12	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Phosphorus (P)-Total	2570	2580	2.0	mg/kg wwt	0.7	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Phosphorus (P)-Total	2200	2570	2.0	mg/kg wwt	15	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Potassium (K)-Total	17500	17900	20	mg/kg	2.4	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Potassium (K)-Total	18100	17600	20	mg/kg	2.6	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Potassium (K)-Total	20200	20900	20	mg/kg	3.8	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Potassium (K)-Total	20200	20900	20	mg/kg	3.6	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Potassium (K)-Total	3900	4000	4.0	mg/kg wwt	2.4	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Potassium (K)-Total	4010	3910	4.0	mg/kg wwt	2.6	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Potassium (K)-Total	4140	4300	4.0	mg/kg wwt	3.8	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Potassium (K)-Total	3850	3990	4.0	mg/kg wwt	3.6	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Rubidium (Rb)-Total	22.2	21.2	0.050	mg/kg	4.5	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Rubidium (Rb)-Total	16.8	16.0	0.050	mg/kg	5.1	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Rubidium (Rb)-Total	11.0	11.3	0.050	mg/kg	3.1	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Rubidium (Rb)-Total	12.4	11.9	0.050	mg/kg	4	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Rubidium (Rb)-Total	4.96	4.74	0.010	mg/kg wwt	4.5	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Rubidium (Rb)-Total	3.73	3.54	0.010	mg/kg wwt	5.1	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Rubidium (Rb)-Total	2.26	2.33	0.010	mg/kg wwt	3.1	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Rubidium (Rb)-Total	2.36	2.27	0.010	mg/kg wwt	4	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Selenium (Se)-Total	1.69	1.75	0.10	mg/kg	3.3	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Selenium (Se)-Total	2.50	2.48	0.10	mg/kg	0.8	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Selenium (Se)-Total	1.51	1.54	0.050	mg/kg	1.9	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Selenium (Se)-Total	2.00	2.04	0.10	mg/kg	2.2	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Selenium (Se)-Total	0.378	0.391	0.020	mg/kg wwt	3.3	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Selenium (Se)-Total	0.554	0.550	0.020	mg/kg wwt	0.8	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Selenium (Se)-Total	0.310	0.316	0.010	mg/kg wwt	1.9	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Selenium (Se)-Total	0.381	0.390	0.020	mg/kg wwt	2.2	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Silver (Ag)-Total	<0.0050	<0.0050	0.0050	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Silver (Ag)-Total	<0.0050	<0.0050	0.0050	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Silver (Ag)-Total	<0.0050	<0.0050	0.0050	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Silver (Ag)-Total	<0.0050	<0.0050	0.0050	mg/kg	N/A	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
WG2702663-2	L2019410-4	505-11	DUP	804300	Silver (Ag)-Total	<0.0010	<0.0010	0.0010	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Silver (Ag)-Total	<0.0010	<0.0010	0.0010	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Silver (Ag)-Total	<0.0010	<0.0010	0.0010	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Silver (Ag)-Total	<0.0010	<0.0010	0.0010	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Sodium (Na)-Total	2730	2710	20	mg/kg	0.8	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Sodium (Na)-Total	2680	2670	20	mg/kg	0.1	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Sodium (Na)-Total	2510	2610	20	mg/kg	4	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Sodium (Na)-Total	3220	3350	20	mg/kg	4.1	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Sodium (Na)-Total	611	606	4.0	mg/kg wwt	0.8	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Sodium (Na)-Total	593	592	4.0	mg/kg wwt	0.1	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Sodium (Na)-Total	516	537	4.0	mg/kg wwt	4	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Sodium (Na)-Total	615	640	4.0	mg/kg wwt	4.1	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Strontium (Sr)-Total	1.47	1.06	0.10	mg/kg	32	60	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Strontium (Sr)-Total	3.11	2.72	0.10	mg/kg	13	60	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Strontium (Sr)-Total	2.35	1.63	0.050	mg/kg	36	60	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Strontium (Sr)-Total	1.89	4.73	0.10	mg/kg	86	60	-		DUP-H	û	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Strontium (Sr)-Total	0.328	0.237	0.020	mg/kg wwt	32	60	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Strontium (Sr)-Total	0.688	0.602	0.020	mg/kg wwt	13	60	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Strontium (Sr)-Total	0.483	0.336	0.010	mg/kg wwt	36	60	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Strontium (Sr)-Total	0.361	0.904	0.020	mg/kg wwt	86	60	-		DUP-H	û	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Tellurium (Te)-Total	<0.020	<0.020	0.020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Tellurium (Te)-Total	<0.020	<0.020	0.020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Tellurium (Te)-Total	<0.020	<0.020	0.020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Tellurium (Te)-Total	<0.020	<0.020	0.020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Tellurium (Te)-Total	<0.0040	<0.0040	0.0040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Tellurium (Te)-Total	<0.0040	<0.0040	0.0040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Tellurium (Te)-Total	<0.0040	<0.0040	0.0040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Tellurium (Te)-Total	<0.0040	<0.0040	0.0040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Thallium (Tl)-Total	0.0180	0.0182	0.0020	mg/kg	1.2	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Thallium (Tl)-Total	0.0116	0.0123	0.0020	mg/kg	5.5	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Thallium (Tl)-Total	0.0078	0.0072	0.0020	mg/kg	8.2	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Thallium (Tl)-Total	0.0109	0.0121	0.0020	mg/kg	10	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Thallium (Tl)-Total	0.00402	0.00407	0.00040	mg/kg wwt	1.2	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Thallium (Tl)-Total	0.00257	0.00272	0.00040	mg/kg wwt	5.5	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Thallium (Tl)-Total	0.00161	0.00148	0.00040	mg/kg wwt	8.2	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
WG2704117-6	L2019410-30	508-10	DUP	805445	Thallium (Tl)-Total	0.00207	0.00230	0.00040	mg/kg wwt	10	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Tin (Sn)-Total	0.11	<0.10	0.10	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Tin (Sn)-Total	0.23	<0.10	0.10	mg/kg	N/A	40	-		DUP-H	ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Tin (Sn)-Total	<0.10	<0.10	0.10	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Tin (Sn)-Total	0.12	0.14	0.10	mg/kg	14	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Tin (Sn)-Total	0.025	0.022	0.020	mg/kg wwt	15	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Tin (Sn)-Total	0.050	<0.020	0.020	mg/kg wwt	N/A	40	-		DUP-H	ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Tin (Sn)-Total	<0.020	<0.020	0.020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Tin (Sn)-Total	0.023	0.026	0.020	mg/kg wwt	14	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Uranium (U)-Total	<0.0020	<0.0020	0.0020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Uranium (U)-Total	<0.0020	<0.0020	0.0020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Uranium (U)-Total	<0.0020	<0.0020	0.0020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Uranium (U)-Total	<0.0020	<0.0020	0.0020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Uranium (U)-Total	<0.00040	<0.00040	0.00040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Uranium (U)-Total	<0.00040	<0.00040	0.00040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Uranium (U)-Total	<0.00040	<0.00040	0.00040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Uranium (U)-Total	<0.00040	<0.00040	0.00040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Vanadium (V)-Total	<0.10	<0.10	0.10	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Vanadium (V)-Total	<0.10	<0.10	0.10	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Vanadium (V)-Total	<0.10	<0.10	0.10	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Vanadium (V)-Total	<0.10	<0.10	0.10	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Vanadium (V)-Total	<0.020	<0.020	0.020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Vanadium (V)-Total	<0.020	<0.020	0.020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Vanadium (V)-Total	<0.020	<0.020	0.020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Vanadium (V)-Total	<0.020	<0.020	0.020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Zinc (Zn)-Total	26.9	23.8	1.0	mg/kg	12	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Zinc (Zn)-Total	28.6	29.1	1.0	mg/kg	1.9	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Zinc (Zn)-Total	21.9	20.9	0.50	mg/kg	4.8	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Zinc (Zn)-Total	27.1	33.1	1.0	mg/kg	20	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Zinc (Zn)-Total	6.00	5.31	0.20	mg/kg wwt	12	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Zinc (Zn)-Total	6.34	6.46	0.20	mg/kg wwt	1.9	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Zinc (Zn)-Total	4.51	4.30	0.10	mg/kg wwt	4.8	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Zinc (Zn)-Total	5.18	6.33	0.20	mg/kg wwt	20	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Zirconium (Zr)-Total	<0.20	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Zirconium (Zr)-Total	<0.20	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
WG2704091-2	L2019410-56	512-13	DUP	805430	Zirconium (Zr)-Total	0.41	<0.20	0.20	mg/kg	N/A	40	-		DUP-H	ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Zirconium (Zr)-Total	<0.20	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Zirconium (Zr)-Total	<0.040	<0.040	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Zirconium (Zr)-Total	<0.040	<0.040	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Zirconium (Zr)-Total	0.085	<0.040	0.040	mg/kg wwt	N/A	40	-		DUP-H	ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Zirconium (Zr)-Total	<0.040	<0.040	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
Physical Tests (Tissue)																	
WG2702677-3	L2019410-4	505-11	DUP	804318	% Moisture	77.7	77.8	2.0	%	0.2	25	-			ü	Tissue	Physical Tests
WG2703661-3	L2019410-9	501-11	DUP	805082	% Moisture	77.8	77.6	2.0	%	0.3	25	-			ü	Tissue	Physical Tests
WG2704113-3	L2019410-14	501-16	DUP	805438	% Moisture	78.3	76.5	0.50	%	2.4	20	-			ü	Tissue	Physical Tests
WG2704125-3	L2019410-30	508-10	DUP	805446	% Moisture	80.9	80.4	2.0	%	0.6	25	-			ü	Tissue	Physical Tests
Metals (Tissue)																	
WG2702663-2	L2019410-4	505-11	DUP	804300	Aluminum (Al)-Total	<5.0	<5.0	5.0	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Aluminum (Al)-Total	<5.0	<5.0	5.0	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Aluminum (Al)-Total	2.7	4.1	2.0	mg/kg	-		1.4	4		ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Aluminum (Al)-Total	<5.0	<5.0	5.0	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Aluminum (Al)-Total	<1.0	<1.0	1.0	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Aluminum (Al)-Total	<1.0	<1.0	1.0	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Aluminum (Al)-Total	0.55	0.84	0.40	mg/kg wwt	-		0.29	0.8		ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Aluminum (Al)-Total	<1.0	<1.0	1.0	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Antimony (Sb)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Antimony (Sb)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Antimony (Sb)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Antimony (Sb)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Antimony (Sb)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Antimony (Sb)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Antimony (Sb)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Antimony (Sb)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Arsenic (As)-Total	0.092	0.084	0.030	mg/kg	8.9	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Arsenic (As)-Total	0.070	0.070	0.030	mg/kg	0.6	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Arsenic (As)-Total	0.225	0.224	0.020	mg/kg	0.5	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Arsenic (As)-Total	0.109	0.117	0.030	mg/kg	7.6	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Arsenic (As)-Total	0.0206	0.0188	0.0060	mg/kg wwt	8.9	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Arsenic (As)-Total	0.0155	0.0154	0.0060	mg/kg wwt	0.6	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Arsenic (As)-Total	0.0462	0.0460	0.0040	mg/kg wwt	0.5	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Arsenic (As)-Total	0.0207	0.0224	0.0060	mg/kg wwt	7.6	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Barium (Ba)-Total	0.606	0.477	0.050	mg/kg	24	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Barium (Ba)-Total	1.04	0.879	0.050	mg/kg	16	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Barium (Ba)-Total	0.711	0.656	0.050	mg/kg	8.1	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Barium (Ba)-Total	1.00	1.78	0.050	mg/kg	56	40	-		DUP-H	û	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Barium (Ba)-Total	0.136	0.106	0.010	mg/kg wwt	24	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.
Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
WG2703646-2	L2019410-9	501-11	DUP	805064	Barium (Ba)-Total	0.230	0.195	0.010	mg/kg wwt	16	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Barium (Ba)-Total	0.146	0.135	0.010	mg/kg wwt	8.1	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Barium (Ba)-Total	0.192	0.341	0.010	mg/kg wwt	56	40	-		DUP-H	û	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Beryllium (Be)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Beryllium (Be)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Beryllium (Be)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Beryllium (Be)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Beryllium (Be)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Beryllium (Be)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Beryllium (Be)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Beryllium (Be)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Bismuth (Bi)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Bismuth (Bi)-Total	0.050	<0.010	0.010	mg/kg	N/A	40	-		DUP-H	ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Bismuth (Bi)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Bismuth (Bi)-Total	<0.010	<0.010	0.010	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Bismuth (Bi)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Bismuth (Bi)-Total	0.0111	<0.0020	0.0020	mg/kg wwt	N/A	40	-		DUP-H	ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Bismuth (Bi)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Bismuth (Bi)-Total	<0.0020	<0.0020	0.0020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Boron (B)-Total	<1.0	<1.0	1.0	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Boron (B)-Total	<1.0	<1.0	1.0	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Boron (B)-Total	<1.0	<1.0	1.0	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Boron (B)-Total	1.4	1.1	1.0	mg/kg	23	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Boron (B)-Total	<0.20	<0.20	0.20	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Boron (B)-Total	<0.20	<0.20	0.20	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Boron (B)-Total	<0.20	<0.20	0.20	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Boron (B)-Total	0.27	0.21	0.20	mg/kg wwt	23	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Cadmium (Cd)-Total	0.024	0.024	0.010	mg/kg	0.2	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Cadmium (Cd)-Total	0.018	0.011	0.010	mg/kg	-		0.007	0.02		ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Cadmium (Cd)-Total	0.0172	0.0159	0.0050	mg/kg	7.7	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Cadmium (Cd)-Total	0.020	0.027	0.010	mg/kg	31	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Cadmium (Cd)-Total	0.0054	0.0054	0.0020	mg/kg wwt	0.2	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Cadmium (Cd)-Total	0.0041	0.0025	0.0020	mg/kg wwt	-		0.0015	0.004		ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Cadmium (Cd)-Total	0.0035	0.0033	0.0010	mg/kg wwt	7.7	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Cadmium (Cd)-Total	0.0037	0.0051	0.0020	mg/kg wwt	31	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.

Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
WG2702663-2	L2019410-4	505-11	DUP	804300	Calcium (Ca)-Total	2530	2010	20	mg/kg	23	60	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Calcium (Ca)-Total	4020	3110	20	mg/kg	26	60	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Calcium (Ca)-Total	2760	1820	20	mg/kg	41	60	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Calcium (Ca)-Total	2160	4880	20	mg/kg	77	60	-		DUP-H	û	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Calcium (Ca)-Total	566	450	4.0	mg/kg wwt	23	60	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Calcium (Ca)-Total	890	688	4.0	mg/kg wwt	26	60	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Calcium (Ca)-Total	568	373	4.0	mg/kg wwt	41	60	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Calcium (Ca)-Total	412	931	4.0	mg/kg wwt	77	60	-		DUP-H	û	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Cesium (Cs)-Total	0.447	0.419	0.0050	mg/kg	6.3	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Cesium (Cs)-Total	0.869	0.831	0.0050	mg/kg	4.5	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Cesium (Cs)-Total	0.0514	0.0488	0.0050	mg/kg	5.1	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Cesium (Cs)-Total	0.0798	0.0754	0.0050	mg/kg	5.6	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Cesium (Cs)-Total	0.0998	0.0937	0.0010	mg/kg wwt	6.3	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Cesium (Cs)-Total	0.193	0.184	0.0010	mg/kg wwt	4.5	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Cesium (Cs)-Total	0.0106	0.0100	0.0010	mg/kg wwt	5.1	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Cesium (Cs)-Total	0.0152	0.0144	0.0010	mg/kg wwt	5.6	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Chromium (Cr)-Total	0.27	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Chromium (Cr)-Total	0.36	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Chromium (Cr)-Total	0.187	0.257	0.050	mg/kg	32	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Chromium (Cr)-Total	<0.20	0.22	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Chromium (Cr)-Total	0.060	<0.040	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Chromium (Cr)-Total	0.079	0.043	0.040	mg/kg wwt	-		0.036	0.08		ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Chromium (Cr)-Total	0.038	0.053	0.010	mg/kg wwt	32	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Chromium (Cr)-Total	<0.040	0.041	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Cobalt (Co)-Total	0.178	0.156	0.020	mg/kg	13	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Cobalt (Co)-Total	0.072	0.063	0.020	mg/kg	14	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Cobalt (Co)-Total	0.034	0.035	0.020	mg/kg	2.1	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Cobalt (Co)-Total	0.163	0.178	0.020	mg/kg	9.2	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Cobalt (Co)-Total	0.0398	0.0348	0.0040	mg/kg wwt	13	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Cobalt (Co)-Total	0.0161	0.0140	0.0040	mg/kg wwt	14	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Cobalt (Co)-Total	0.0070	0.0071	0.0040	mg/kg wwt	2.1	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Cobalt (Co)-Total	0.0310	0.0341	0.0040	mg/kg wwt	9.2	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Copper (Cu)-Total	2.05	2.35	0.20	mg/kg	14	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Copper (Cu)-Total	1.58	1.70	0.20	mg/kg	7.3	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Copper (Cu)-Total	1.59	1.26	0.10	mg/kg	23	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.
Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
WG2704117-6	L2019410-30	508-10	DUP	805445	Copper (Cu)-Total	1.55	1.83	0.20	mg/kg	17	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Copper (Cu)-Total	0.459	0.526	0.040	mg/kg wwt	14	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Copper (Cu)-Total	0.350	0.377	0.040	mg/kg wwt	7.3	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Copper (Cu)-Total	0.326	0.259	0.020	mg/kg wwt	23	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Copper (Cu)-Total	0.295	0.349	0.040	mg/kg wwt	17	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Iron (Fe)-Total	20.9	22.5	5.0	mg/kg	7.6	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Iron (Fe)-Total	15.7	15.2	5.0	mg/kg	3.4	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Iron (Fe)-Total	21.6	18.8	3.0	mg/kg	14	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Iron (Fe)-Total	20.0	24.2	5.0	mg/kg	19	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Iron (Fe)-Total	4.7	5.0	1.0	mg/kg wwt	7.6	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Iron (Fe)-Total	3.5	3.4	1.0	mg/kg wwt	3.4	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Iron (Fe)-Total	4.45	3.87	0.60	mg/kg wwt	14	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Iron (Fe)-Total	3.8	4.6	1.0	mg/kg wwt	19	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Lead (Pb)-Total	<0.050	<0.050	0.050	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Lead (Pb)-Total	<0.050	<0.050	0.050	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Lead (Pb)-Total	<0.020	<0.020	0.020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Lead (Pb)-Total	<0.050	<0.050	0.050	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Lead (Pb)-Total	<0.010	<0.010	0.010	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Lead (Pb)-Total	<0.010	<0.010	0.010	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Lead (Pb)-Total	<0.0040	<0.0040	0.0040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Lead (Pb)-Total	<0.010	<0.010	0.010	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Lithium (Li)-Total	<0.50	<0.50	0.50	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Lithium (Li)-Total	<0.50	<0.50	0.50	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Lithium (Li)-Total	<0.50	<0.50	0.50	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Lithium (Li)-Total	<0.50	<0.50	0.50	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Lithium (Li)-Total	<0.10	<0.10	0.10	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Lithium (Li)-Total	<0.10	<0.10	0.10	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Lithium (Li)-Total	<0.10	<0.10	0.10	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Lithium (Li)-Total	<0.10	<0.10	0.10	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Magnesium (Mg)-Total	1080	1060	2.0	mg/kg	1.8	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Magnesium (Mg)-Total	1250	1080	2.0	mg/kg	14	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Magnesium (Mg)-Total	1330	1390	2.0	mg/kg	4.7	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Magnesium (Mg)-Total	1390	1440	2.0	mg/kg	3.8	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Magnesium (Mg)-Total	242	238	0.40	mg/kg wwt	1.8	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Magnesium (Mg)-Total	277	240	0.40	mg/kg wwt	14	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.
Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
WG2704091-2	L2019410-56	512-13	DUP	805430	Magnesium (Mg)-Total	273	286	0.40	mg/kg wwt	4.7	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Magnesium (Mg)-Total	265	275	0.40	mg/kg wwt	3.8	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Manganese (Mn)-Total	0.951	0.774	0.050	mg/kg	21	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Manganese (Mn)-Total	2.01	1.18	0.050	mg/kg	52	40	-		DUP-H	û	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Manganese (Mn)-Total	1.80	1.33	0.050	mg/kg	30	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Manganese (Mn)-Total	1.98	4.49	0.050	mg/kg	78	40	-		DUP-H	û	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Manganese (Mn)-Total	0.213	0.173	0.010	mg/kg wwt	21	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Manganese (Mn)-Total	0.446	0.262	0.010	mg/kg wwt	52	40	-		DUP-H	û	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Manganese (Mn)-Total	0.371	0.273	0.010	mg/kg wwt	30	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Manganese (Mn)-Total	0.378	0.858	0.010	mg/kg wwt	78	40	-		DUP-H	û	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Mercury (Hg)-Total	0.112	0.113	0.0050	mg/kg	0.2	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Mercury (Hg)-Total	0.0621	0.0621	0.0050	mg/kg	0.1	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Mercury (Hg)-Total	0.124	0.126	0.0050	mg/kg	1.3	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Mercury (Hg)-Total	0.101	0.0954	0.0050	mg/kg	6.1	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Mercury (Hg)-Total	0.0251	0.0252	0.0010	mg/kg wwt	0.2	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Mercury (Hg)-Total	0.0138	0.0138	0.0010	mg/kg wwt	0.1	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Mercury (Hg)-Total	0.0255	0.0259	0.0010	mg/kg wwt	1.3	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Mercury (Hg)-Total	0.0194	0.0182	0.0010	mg/kg wwt	6.1	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Molybdenum (Mo)-Tota	<0.040	<0.040	0.040	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Molybdenum (Mo)-Tota	<0.040	<0.040	0.040	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Molybdenum (Mo)-Tota	<0.020	<0.020	0.020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Molybdenum (Mo)-Tota	<0.040	<0.040	0.040	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Molybdenum (Mo)-Tota	<0.0080	<0.0080	0.0080	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Molybdenum (Mo)-Tota	<0.0080	<0.0080	0.0080	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Molybdenum (Mo)-Tota	<0.0040	<0.0040	0.0040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Molybdenum (Mo)-Tota	<0.0080	<0.0080	0.0080	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Nickel (Ni)-Total	<0.20	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Nickel (Ni)-Total	<0.20	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Nickel (Ni)-Total	0.21	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Nickel (Ni)-Total	<0.20	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Nickel (Ni)-Total	<0.040	<0.040	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Nickel (Ni)-Total	<0.040	<0.040	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Nickel (Ni)-Total	0.044	<0.040	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Nickel (Ni)-Total	<0.040	<0.040	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Phosphorus (P)-Total	9790	9390	10	mg/kg	4.1	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.
Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
WG2703646-2	L2019410-9	501-11	DUP	805064	Phosphorus (P)-Total	11500	10200	10	mg/kg	12	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Phosphorus (P)-Total	12500	12600	10	mg/kg	0.7	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Phosphorus (P)-Total	11500	13400	10	mg/kg	15	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Phosphorus (P)-Total	2190	2100	2.0	mg/kg wwt	4.1	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Phosphorus (P)-Total	2550	2260	2.0	mg/kg wwt	12	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Phosphorus (P)-Total	2570	2580	2.0	mg/kg wwt	0.7	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Phosphorus (P)-Total	2200	2570	2.0	mg/kg wwt	15	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Potassium (K)-Total	17500	17900	20	mg/kg	2.4	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Potassium (K)-Total	18100	17600	20	mg/kg	2.6	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Potassium (K)-Total	20200	20900	20	mg/kg	3.8	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Potassium (K)-Total	20200	20900	20	mg/kg	3.6	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Potassium (K)-Total	3900	4000	4.0	mg/kg wwt	2.4	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Potassium (K)-Total	4010	3910	4.0	mg/kg wwt	2.6	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Potassium (K)-Total	4140	4300	4.0	mg/kg wwt	3.8	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Potassium (K)-Total	3850	3990	4.0	mg/kg wwt	3.6	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Rubidium (Rb)-Total	22.2	21.2	0.050	mg/kg	4.5	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Rubidium (Rb)-Total	16.8	16.0	0.050	mg/kg	5.1	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Rubidium (Rb)-Total	11.0	11.3	0.050	mg/kg	3.1	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Rubidium (Rb)-Total	12.4	11.9	0.050	mg/kg	4	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Rubidium (Rb)-Total	4.96	4.74	0.010	mg/kg wwt	4.5	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Rubidium (Rb)-Total	3.73	3.54	0.010	mg/kg wwt	5.1	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Rubidium (Rb)-Total	2.26	2.33	0.010	mg/kg wwt	3.1	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Rubidium (Rb)-Total	2.36	2.27	0.010	mg/kg wwt	4	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Selenium (Se)-Total	1.69	1.75	0.10	mg/kg	3.3	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Selenium (Se)-Total	2.50	2.48	0.10	mg/kg	0.8	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Selenium (Se)-Total	1.51	1.54	0.050	mg/kg	1.9	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Selenium (Se)-Total	2.00	2.04	0.10	mg/kg	2.2	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Selenium (Se)-Total	0.378	0.391	0.020	mg/kg wwt	3.3	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Selenium (Se)-Total	0.554	0.550	0.020	mg/kg wwt	0.8	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Selenium (Se)-Total	0.310	0.316	0.010	mg/kg wwt	1.9	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Selenium (Se)-Total	0.381	0.390	0.020	mg/kg wwt	2.2	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Silver (Ag)-Total	<0.0050	<0.0050	0.0050	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Silver (Ag)-Total	<0.0050	<0.0050	0.0050	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Silver (Ag)-Total	<0.0050	<0.0050	0.0050	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Silver (Ag)-Total	<0.0050	<0.0050	0.0050	mg/kg	N/A	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.
Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
WG2702663-2	L2019410-4	505-11	DUP	804300	Silver (Ag)-Total	<0.0010	<0.0010	0.0010	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Silver (Ag)-Total	<0.0010	<0.0010	0.0010	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Silver (Ag)-Total	<0.0010	<0.0010	0.0010	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Silver (Ag)-Total	<0.0010	<0.0010	0.0010	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Sodium (Na)-Total	2730	2710	20	mg/kg	0.8	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Sodium (Na)-Total	2680	2670	20	mg/kg	0.1	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Sodium (Na)-Total	2510	2610	20	mg/kg	4	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Sodium (Na)-Total	3220	3350	20	mg/kg	4.1	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Sodium (Na)-Total	611	606	4.0	mg/kg wwt	0.8	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Sodium (Na)-Total	593	592	4.0	mg/kg wwt	0.1	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Sodium (Na)-Total	516	537	4.0	mg/kg wwt	4	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Sodium (Na)-Total	615	640	4.0	mg/kg wwt	4.1	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Strontium (Sr)-Total	1.47	1.06	0.10	mg/kg	32	60	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Strontium (Sr)-Total	3.11	2.72	0.10	mg/kg	13	60	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Strontium (Sr)-Total	2.35	1.63	0.050	mg/kg	36	60	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Strontium (Sr)-Total	1.89	4.73	0.10	mg/kg	86	60	-		DUP-H	û	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Strontium (Sr)-Total	0.328	0.237	0.020	mg/kg wwt	32	60	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Strontium (Sr)-Total	0.688	0.602	0.020	mg/kg wwt	13	60	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Strontium (Sr)-Total	0.483	0.336	0.010	mg/kg wwt	36	60	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Strontium (Sr)-Total	0.361	0.904	0.020	mg/kg wwt	86	60	-		DUP-H	û	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Tellurium (Te)-Total	<0.020	<0.020	0.020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Tellurium (Te)-Total	<0.020	<0.020	0.020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Tellurium (Te)-Total	<0.020	<0.020	0.020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Tellurium (Te)-Total	<0.020	<0.020	0.020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Tellurium (Te)-Total	<0.0040	<0.0040	0.0040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Tellurium (Te)-Total	<0.0040	<0.0040	0.0040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Tellurium (Te)-Total	<0.0040	<0.0040	0.0040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Tellurium (Te)-Total	<0.0040	<0.0040	0.0040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Thallium (Tl)-Total	0.0180	0.0182	0.0020	mg/kg	1.2	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Thallium (Tl)-Total	0.0116	0.0123	0.0020	mg/kg	5.5	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Thallium (Tl)-Total	0.0078	0.0072	0.0020	mg/kg	8.2	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Thallium (Tl)-Total	0.0109	0.0121	0.0020	mg/kg	10	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Thallium (Tl)-Total	0.00402	0.00407	0.00040	mg/kg wwt	1.2	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Thallium (Tl)-Total	0.00257	0.00272	0.00040	mg/kg wwt	5.5	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Thallium (Tl)-Total	0.00161	0.00148	0.00040	mg/kg wwt	8.2	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.
Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
WG2704117-6	L2019410-30	508-10	DUP	805445	Thallium (Tl)-Total	0.00207	0.00230	0.00040	mg/kg wwt	10	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Tin (Sn)-Total	0.11	<0.10	0.10	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Tin (Sn)-Total	0.23	<0.10	0.10	mg/kg	N/A	40	-		DUP-H	ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Tin (Sn)-Total	<0.10	<0.10	0.10	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Tin (Sn)-Total	0.12	0.14	0.10	mg/kg	14	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Tin (Sn)-Total	0.025	0.022	0.020	mg/kg wwt	15	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Tin (Sn)-Total	0.050	<0.020	0.020	mg/kg wwt	N/A	40	-		DUP-H	ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Tin (Sn)-Total	<0.020	<0.020	0.020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Tin (Sn)-Total	0.023	0.026	0.020	mg/kg wwt	14	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Uranium (U)-Total	<0.0020	<0.0020	0.0020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Uranium (U)-Total	<0.0020	<0.0020	0.0020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Uranium (U)-Total	<0.0020	<0.0020	0.0020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Uranium (U)-Total	<0.0020	<0.0020	0.0020	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Uranium (U)-Total	<0.00040	<0.00040	0.00040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Uranium (U)-Total	<0.00040	<0.00040	0.00040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Uranium (U)-Total	<0.00040	<0.00040	0.00040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Uranium (U)-Total	<0.00040	<0.00040	0.00040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Vanadium (V)-Total	<0.10	<0.10	0.10	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Vanadium (V)-Total	<0.10	<0.10	0.10	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Vanadium (V)-Total	<0.10	<0.10	0.10	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Vanadium (V)-Total	<0.10	<0.10	0.10	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Vanadium (V)-Total	<0.020	<0.020	0.020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Vanadium (V)-Total	<0.020	<0.020	0.020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Vanadium (V)-Total	<0.020	<0.020	0.020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Vanadium (V)-Total	<0.020	<0.020	0.020	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Zinc (Zn)-Total	26.9	23.8	1.0	mg/kg	12	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Zinc (Zn)-Total	28.6	29.1	1.0	mg/kg	1.9	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Zinc (Zn)-Total	21.9	20.9	0.50	mg/kg	4.8	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Zinc (Zn)-Total	27.1	33.1	1.0	mg/kg	20	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Zinc (Zn)-Total	6.00	5.31	0.20	mg/kg wwt	12	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Zinc (Zn)-Total	6.34	6.46	0.20	mg/kg wwt	1.9	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Zinc (Zn)-Total	4.51	4.30	0.10	mg/kg wwt	4.8	40	-			ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Zinc (Zn)-Total	5.18	6.33	0.20	mg/kg wwt	20	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Zirconium (Zr)-Total	<0.20	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Zirconium (Zr)-Total	<0.20	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Duplicates L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend
DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.
Evaluation Legend
ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

ALS ID	Reference	Client Sample ID	QC Type	QC Lot #	Analyte	Sample Result	Duplicate Result	Detection Limit	Units	RPD	RPD Limit	Diff	Diff Limit	Qual	Eval	Matrix	Class
WG2704091-2	L2019410-56	512-13	DUP	805430	Zirconium (Zr)-Total	0.41	<0.20	0.20	mg/kg	N/A	40	-		DUP-H	ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Zirconium (Zr)-Total	<0.20	<0.20	0.20	mg/kg	N/A	40	-			ü	Tissue	Metals
WG2702663-2	L2019410-4	505-11	DUP	804300	Zirconium (Zr)-Total	<0.040	<0.040	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2703646-2	L2019410-9	501-11	DUP	805064	Zirconium (Zr)-Total	<0.040	<0.040	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals
WG2704091-2	L2019410-56	512-13	DUP	805430	Zirconium (Zr)-Total	0.085	<0.040	0.040	mg/kg wwt	N/A	40	-		DUP-H	ü	Tissue	Metals
WG2704117-6	L2019410-30	508-10	DUP	805445	Zirconium (Zr)-Total	<0.040	<0.040	0.040	mg/kg wwt	N/A	40	-			ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
Metals (Tissue)													
CRM	Aluminum (Al)-Total	804300	WG2702663-3	1090	1280	mg/kg	85.5	70-130	%		ü	Tissue	Metals
CRM	Aluminum (Al)-Total	805064	WG2703646-3	1100	1280	mg/kg	85.7	70-130	%		ü	Tissue	Metals
CRM	Aluminum (Al)-Total	805430	WG2704091-3	1290	1280	mg/kg	100.9	70-130	%		ü	Tissue	Metals
CRM	Aluminum (Al)-Total	805445	WG2704117-7	1140	1280	mg/kg	89.3	70-130	%		ü	Tissue	Metals
CRM	Aluminum (Al)-Total	805430	WG2704091-3	1290	1280	mg/kg wwt	100.9	70-130	%		ü	Tissue	Metals
CRM	Arsenic (As)-Total	804300	WG2702663-3	6.79	4.4	mg/kg	154.4	70-130	%	MES	û	Tissue	Metals
CRM	Arsenic (As)-Total	805064	WG2703646-3	6.08	4.4	mg/kg	138.1	70-130	%	MES	û	Tissue	Metals
CRM	Arsenic (As)-Total	805430	WG2704091-3	6.63	6.87	mg/kg	96.5	70-130	%		ü	Tissue	Metals
CRM	Arsenic (As)-Total	805445	WG2704117-7	6.03	4.4	mg/kg	137.0	70-130	%	MES	û	Tissue	Metals
CRM	Arsenic (As)-Total	805430	WG2704091-3	6.63	6.87	mg/kg wwt	96.5	70-130	%		ü	Tissue	Metals
CRM	Barium (Ba)-Total	804300	WG2702663-3	5.51	4.4	mg/kg	125.2	70-130	%		ü	Tissue	Metals
CRM	Barium (Ba)-Total	805064	WG2703646-3	4.92	4.4	mg/kg	111.8	70-130	%		ü	Tissue	Metals
CRM	Barium (Ba)-Total	805430	WG2704091-3	4.66	4.4	mg/kg	105.9	70-130	%		ü	Tissue	Metals
CRM	Barium (Ba)-Total	805445	WG2704117-7	4.50	4.4	mg/kg	102.3	70-130	%		ü	Tissue	Metals
CRM	Barium (Ba)-Total	805430	WG2704091-3	4.66	4.4	mg/kg wwt	105.9	70-130	%		ü	Tissue	Metals
CRM	Beryllium (Be)-Total	804300	WG2702663-3	0.017	0.015	mg/kg	0.017	.005-.025	mg/kg		ü	Tissue	Metals
CRM	Beryllium (Be)-Total	805064	WG2703646-3	0.016	0.015	mg/kg	0.016	.005-.025	mg/kg		ü	Tissue	Metals
CRM	Beryllium (Be)-Total	805430	WG2704091-3	0.017	0.015	mg/kg	0.017	.005-.025	mg/kg		ü	Tissue	Metals
CRM	Beryllium (Be)-Total	805445	WG2704117-7	0.017	0.015	mg/kg	0.017	.005-.025	mg/kg		ü	Tissue	Metals
CRM	Beryllium (Be)-Total	805430	WG2704091-3	0.0167	0.015	mg/kg wwt	0.0167	.005-.025	mg/kg wwt		ü	Tissue	Metals
CRM	Bismuth (Bi)-Total	804300	WG2702663-3	0.013	0.012	mg/kg	0.013	.002-.022	mg/kg		ü	Tissue	Metals
CRM	Bismuth (Bi)-Total	805064	WG2703646-3	0.011	0.012	mg/kg	0.011	.002-.022	mg/kg		ü	Tissue	Metals
CRM	Bismuth (Bi)-Total	805430	WG2704091-3	0.013	0.012	mg/kg	0.013	.002-.022	mg/kg		ü	Tissue	Metals
CRM	Bismuth (Bi)-Total	805445	WG2704117-7	<0.010	0.012	mg/kg	0.008	.002-.022	mg/kg		ü	Tissue	Metals
CRM	Bismuth (Bi)-Total	805430	WG2704091-3	0.0126	0.012	mg/kg wwt	0.0126	.002-.022	mg/kg wwt		ü	Tissue	Metals
CRM	Boron (B)-Total	804300	WG2702663-3	11.5	9.24	mg/kg	124.4	70-130	%		ü	Tissue	Metals
CRM	Boron (B)-Total	805064	WG2703646-3	10.4	9.24	mg/kg	112.3	70-130	%		ü	Tissue	Metals
CRM	Boron (B)-Total	805430	WG2704091-3	9.2	9.24	mg/kg	99.2	70-130	%		ü	Tissue	Metals
CRM	Boron (B)-Total	805445	WG2704117-7	11.2	9.24	mg/kg	120.8	70-130	%		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
CRM	Boron (B)-Total	805430	WG2704091-3	9.17	9.24	mg/kg wwt	99.2	70-130	%		ü	Tissue	Metals
CRM	Cadmium (Cd)-Total	804300	WG2702663-3	0.331	0.299	mg/kg	110.6	70-130	%		ü	Tissue	Metals
CRM	Cadmium (Cd)-Total	805064	WG2703646-3	0.320	0.299	mg/kg	107.0	70-130	%		ü	Tissue	Metals
CRM	Cadmium (Cd)-Total	805430	WG2704091-3	0.302	0.299	mg/kg	101.0	70-130	%		ü	Tissue	Metals
CRM	Cadmium (Cd)-Total	805445	WG2704117-7	0.301	0.299	mg/kg	100.7	70-130	%		ü	Tissue	Metals
CRM	Cadmium (Cd)-Total	805430	WG2704091-3	0.302	0.299	mg/kg wwt	101.0	70-130	%		ü	Tissue	Metals
CRM	Calcium (Ca)-Total	804300	WG2702663-3	2770	2360	mg/kg	117.5	70-130	%		ü	Tissue	Metals
CRM	Calcium (Ca)-Total	805064	WG2703646-3	2000	2360	mg/kg	84.8	70-130	%		ü	Tissue	Metals
CRM	Calcium (Ca)-Total	805430	WG2704091-3	2420	2360	mg/kg	102.7	70-130	%		ü	Tissue	Metals
CRM	Calcium (Ca)-Total	805445	WG2704117-7	2300	2360	mg/kg	97.6	70-130	%		ü	Tissue	Metals
CRM	Calcium (Ca)-Total	805430	WG2704091-3	2420	2360	mg/kg wwt	102.7	70-130	%		ü	Tissue	Metals
CRM	Cesium (Cs)-Total	805430	WG2704091-3	0.0813	0.078	mg/kg	104.2	70-130	%		ü	Tissue	Metals
CRM	Cesium (Cs)-Total	805430	WG2704091-3	0.0813	0.078	mg/kg wwt	104.2	70-130	%		ü	Tissue	Metals
CRM	Chromium (Cr)-Total	804300	WG2702663-3	1.62	1.58	mg/kg	102.4	70-130	%		ü	Tissue	Metals
CRM	Chromium (Cr)-Total	805064	WG2703646-3	1.41	1.58	mg/kg	89.0	70-130	%		ü	Tissue	Metals
CRM	Chromium (Cr)-Total	805430	WG2704091-3	1.53	1.58	mg/kg	96.9	70-130	%		ü	Tissue	Metals
CRM	Chromium (Cr)-Total	805445	WG2704117-7	1.42	1.58	mg/kg	90.0	70-130	%		ü	Tissue	Metals
CRM	Chromium (Cr)-Total	805430	WG2704091-3	1.53	1.58	mg/kg wwt	96.9	70-130	%		ü	Tissue	Metals
CRM	Cobalt (Co)-Total	804300	WG2702663-3	0.222	0.25	mg/kg	89.0	70-130	%		ü	Tissue	Metals
CRM	Cobalt (Co)-Total	805064	WG2703646-3	0.202	0.25	mg/kg	80.8	70-130	%		ü	Tissue	Metals
CRM	Cobalt (Co)-Total	805430	WG2704091-3	0.255	0.25	mg/kg	102.0	70-130	%		ü	Tissue	Metals
CRM	Cobalt (Co)-Total	805445	WG2704117-7	0.253	0.25	mg/kg	101.4	70-130	%		ü	Tissue	Metals
CRM	Cobalt (Co)-Total	805430	WG2704091-3	0.255	0.25	mg/kg wwt	102.0	70-130	%		ü	Tissue	Metals
CRM	Copper (Cu)-Total	804300	WG2702663-3	16.7	15.7	mg/kg	106.5	70-130	%		ü	Tissue	Metals
CRM	Copper (Cu)-Total	805064	WG2703646-3	14.9	15.7	mg/kg	95.0	70-130	%		ü	Tissue	Metals
CRM	Copper (Cu)-Total	805430	WG2704091-3	15.4	15.7	mg/kg	98.0	70-130	%		ü	Tissue	Metals
CRM	Copper (Cu)-Total	805445	WG2704117-7	15.8	15.7	mg/kg	100.7	70-130	%		ü	Tissue	Metals
CRM	Copper (Cu)-Total	805430	WG2704091-3	15.4	15.7	mg/kg wwt	98.0	70-130	%		ü	Tissue	Metals
CRM	Iron (Fe)-Total	804300	WG2702663-3	298	318	mg/kg	93.6	70-130	%		ü	Tissue	Metals
CRM	Iron (Fe)-Total	805064	WG2703646-3	245	318	mg/kg	77.1	70-130	%		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
CRM	Iron (Fe)-Total	805430	WG2704091-3	324	318	mg/kg	102.0	70-130	%		ü	Tissue	Metals
CRM	Iron (Fe)-Total	805445	WG2704117-7	341	318	mg/kg	107.1	70-130	%		ü	Tissue	Metals
CRM	Iron (Fe)-Total	805430	WG2704091-3	324	318	mg/kg wwt	102.0	70-130	%		ü	Tissue	Metals
CRM	Lead (Pb)-Total	804300	WG2702663-3	0.300	0.231	mg/kg	129.8	70-130	%		ü	Tissue	Metals
CRM	Lead (Pb)-Total	805064	WG2703646-3	0.254	0.231	mg/kg	109.9	70-130	%		ü	Tissue	Metals
CRM	Lead (Pb)-Total	805430	WG2704091-3	0.303	0.231	mg/kg	131.2	70-130	%	MES	û	Tissue	Metals
CRM	Lead (Pb)-Total	805445	WG2704117-7	0.230	0.231	mg/kg	99.4	70-130	%		ü	Tissue	Metals
CRM	Lead (Pb)-Total	805430	WG2704091-3	0.303	0.231	mg/kg wwt	131.2	70-130	%	MES	û	Tissue	Metals
CRM	Lithium (Li)-Total	804300	WG2702663-3	1.32	1.21	mg/kg	1.32	.71-1.71	mg/kg		ü	Tissue	Metals
CRM	Lithium (Li)-Total	805064	WG2703646-3	1.36	1.21	mg/kg	1.36	.71-1.71	mg/kg		ü	Tissue	Metals
CRM	Lithium (Li)-Total	805430	WG2704091-3	1.10	1.21	mg/kg	1.10	.71-1.71	mg/kg		ü	Tissue	Metals
CRM	Lithium (Li)-Total	805445	WG2704117-7	1.33	1.21	mg/kg	1.33	.71-1.71	mg/kg		ü	Tissue	Metals
CRM	Lithium (Li)-Total	805430	WG2704091-3	1.10	1.21	mg/kg wwt	1.10	.71-1.71	mg/kg wwt		ü	Tissue	Metals
CRM	Magnesium (Mg)-Total	804300	WG2702663-3	823	910	mg/kg	90.4	70-130	%		ü	Tissue	Metals
CRM	Magnesium (Mg)-Total	805064	WG2703646-3	770	910	mg/kg	84.6	70-130	%		ü	Tissue	Metals
CRM	Magnesium (Mg)-Total	805430	WG2704091-3	906	910	mg/kg	99.5	70-130	%		ü	Tissue	Metals
CRM	Magnesium (Mg)-Total	805445	WG2704117-7	905	910	mg/kg	99.5	70-130	%		ü	Tissue	Metals
CRM	Magnesium (Mg)-Total	805430	WG2704091-3	906	910	mg/kg wwt	99.5	70-130	%		ü	Tissue	Metals
CRM	Manganese (Mn)-Total	804300	WG2702663-3	3.35	3.17	mg/kg	105.6	70-130	%		ü	Tissue	Metals
CRM	Manganese (Mn)-Total	805064	WG2703646-3	2.98	3.17	mg/kg	93.9	70-130	%		ü	Tissue	Metals
CRM	Manganese (Mn)-Total	805430	WG2704091-3	2.84	3.17	mg/kg	89.6	70-130	%		ü	Tissue	Metals
CRM	Manganese (Mn)-Total	805445	WG2704117-7	3.36	3.17	mg/kg	105.9	70-130	%		ü	Tissue	Metals
CRM	Manganese (Mn)-Total	805430	WG2704091-3	2.84	3.17	mg/kg wwt	89.6	70-130	%		ü	Tissue	Metals
CRM	Mercury (Hg)-Total	804300	WG2702663-3	0.386	0.322	mg/kg	119.8	70-130	%		ü	Tissue	Metals
CRM	Mercury (Hg)-Total	805064	WG2703646-3	0.313	0.322	mg/kg	97.3	70-130	%		ü	Tissue	Metals
CRM	Mercury (Hg)-Total	805430	WG2704091-3	0.344	0.322	mg/kg	106.9	70-130	%		ü	Tissue	Metals
CRM	Mercury (Hg)-Total	805445	WG2704117-7	0.327	0.322	mg/kg	101.4	70-130	%		ü	Tissue	Metals
CRM	Mercury (Hg)-Total	804300	WG2702663-3	0.386	0.322	mg/kg wwt	119.8	70-130	%		ü	Tissue	Metals
CRM	Mercury (Hg)-Total	805064	WG2703646-3	0.313	0.322	mg/kg wwt	97.3	70-130	%		ü	Tissue	Metals
CRM	Mercury (Hg)-Total	805430	WG2704091-3	0.344	0.322	mg/kg wwt	106.9	70-130	%		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
CRM	Mercury (Hg)-Total	805445	WG2704117-7	0.327	0.322	mg/kg wwt	101.4	70-130	%		ü	Tissue	Metals
CRM	Molybdenum (Mo)-Tota	804300	WG2702663-3	0.296	0.29	mg/kg	101.9	70-130	%		ü	Tissue	Metals
CRM	Molybdenum (Mo)-Tota	805064	WG2703646-3	0.286	0.29	mg/kg	98.5	70-130	%		ü	Tissue	Metals
CRM	Molybdenum (Mo)-Tota	805430	WG2704091-3	0.295	0.29	mg/kg	101.8	70-130	%		ü	Tissue	Metals
CRM	Molybdenum (Mo)-Tota	805445	WG2704117-7	0.273	0.29	mg/kg	94.3	70-130	%		ü	Tissue	Metals
CRM	Molybdenum (Mo)-Tota	805430	WG2704091-3	0.295	0.29	mg/kg wwt	101.8	70-130	%		ü	Tissue	Metals
CRM	Nickel (Ni)-Total	804300	WG2702663-3	1.22	1.34	mg/kg	90.7	70-130	%		ü	Tissue	Metals
CRM	Nickel (Ni)-Total	805064	WG2703646-3	1.20	1.34	mg/kg	89.3	70-130	%		ü	Tissue	Metals
CRM	Nickel (Ni)-Total	805430	WG2704091-3	1.28	1.34	mg/kg	95.2	70-130	%		ü	Tissue	Metals
CRM	Nickel (Ni)-Total	805445	WG2704117-7	1.16	1.34	mg/kg	86.5	70-130	%		ü	Tissue	Metals
CRM	Nickel (Ni)-Total	805430	WG2704091-3	1.28	1.34	mg/kg wwt	95.2	70-130	%		ü	Tissue	Metals
CRM	Phosphorus (P)-Total	804300	WG2702663-3	7020	8000	mg/kg	87.7	70-130	%		ü	Tissue	Metals
CRM	Phosphorus (P)-Total	805064	WG2703646-3	6560	8000	mg/kg	82.0	70-130	%		ü	Tissue	Metals
CRM	Phosphorus (P)-Total	805430	WG2704091-3	7670	8000	mg/kg	95.9	70-130	%		ü	Tissue	Metals
CRM	Phosphorus (P)-Total	805445	WG2704117-7	7540	8000	mg/kg	94.2	70-130	%		ü	Tissue	Metals
CRM	Phosphorus (P)-Total	805430	WG2704091-3	7670	8000	mg/kg wwt	95.9	70-130	%		ü	Tissue	Metals
CRM	Potassium (K)-Total	804300	WG2702663-3	13200	12800	mg/kg	102.8	70-130	%		ü	Tissue	Metals
CRM	Potassium (K)-Total	805064	WG2703646-3	11900	12800	mg/kg	92.9	70-130	%		ü	Tissue	Metals
CRM	Potassium (K)-Total	805430	WG2704091-3	12800	12800	mg/kg	100.0	70-130	%		ü	Tissue	Metals
CRM	Potassium (K)-Total	805445	WG2704117-7	12700	12800	mg/kg	98.8	70-130	%		ü	Tissue	Metals
CRM	Potassium (K)-Total	805430	WG2704091-3	12800	12800	mg/kg wwt	100.0	70-130	%		ü	Tissue	Metals
CRM	Rubidium (Rb)-Total	804300	WG2702663-3	5.90	5.59	mg/kg	105.6	70-130	%		ü	Tissue	Metals
CRM	Rubidium (Rb)-Total	805064	WG2703646-3	5.51	5.59	mg/kg	98.6	70-130	%		ü	Tissue	Metals
CRM	Rubidium (Rb)-Total	805430	WG2704091-3	5.87	5.59	mg/kg	104.9	70-130	%		ü	Tissue	Metals
CRM	Rubidium (Rb)-Total	805445	WG2704117-7	5.43	5.59	mg/kg	97.2	70-130	%		ü	Tissue	Metals
CRM	Rubidium (Rb)-Total	805430	WG2704091-3	5.87	5.59	mg/kg wwt	104.9	70-130	%		ü	Tissue	Metals
CRM	Selenium (Se)-Total	804300	WG2702663-3	3.79	3.45	mg/kg	109.7	70-130	%		ü	Tissue	Metals
CRM	Selenium (Se)-Total	805064	WG2703646-3	3.12	3.45	mg/kg	90.3	70-130	%		ü	Tissue	Metals
CRM	Selenium (Se)-Total	805430	WG2704091-3	3.64	3.45	mg/kg	105.4	70-130	%		ü	Tissue	Metals
CRM	Selenium (Se)-Total	805445	WG2704117-7	3.13	3.45	mg/kg	90.6	70-130	%		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
CRM	Selenium (Se)-Total	805430	WG2704091-3	3.64	3.45	mg/kg wwt	105.4	70-130	%		ü	Tissue	Metals
CRM	Silver (Ag)-Total	805430	WG2704091-3	0.0272	0.0252	mg/kg	107.9	70-130	%		ü	Tissue	Metals
CRM	Silver (Ag)-Total	804300	WG2702663-3	0.0282	0.0252	mg/kg wwt	111.8	70-130	%		ü	Tissue	Metals
CRM	Silver (Ag)-Total	805064	WG2703646-3	0.0271	0.0252	mg/kg wwt	107.7	70-130	%		ü	Tissue	Metals
CRM	Silver (Ag)-Total	805430	WG2704091-3	0.0272	0.0252	mg/kg wwt	107.9	70-130	%		ü	Tissue	Metals
CRM	Silver (Ag)-Total	805445	WG2704117-7	0.0268	0.0252	mg/kg wwt	106.5	70-130	%		ü	Tissue	Metals
CRM	Sodium (Na)-Total	804300	WG2702663-3	14500	14000	mg/kg	103.3	70-130	%		ü	Tissue	Metals
CRM	Sodium (Na)-Total	805064	WG2703646-3	12200	14000	mg/kg	86.8	70-130	%		ü	Tissue	Metals
CRM	Sodium (Na)-Total	805430	WG2704091-3	13800	14000	mg/kg	98.5	70-130	%		ü	Tissue	Metals
CRM	Sodium (Na)-Total	805445	WG2704117-7	13800	14000	mg/kg	98.4	70-130	%		ü	Tissue	Metals
CRM	Sodium (Na)-Total	805430	WG2704091-3	13800	14000	mg/kg wwt	98.5	70-130	%		ü	Tissue	Metals
CRM	Strontium (Sr)-Total	804300	WG2702663-3	11.3	10.1	mg/kg	111.7	70-130	%		ü	Tissue	Metals
CRM	Strontium (Sr)-Total	805064	WG2703646-3	8.50	10.1	mg/kg	84.2	70-130	%		ü	Tissue	Metals
CRM	Strontium (Sr)-Total	805430	WG2704091-3	9.83	10.1	mg/kg	97.4	70-130	%		ü	Tissue	Metals
CRM	Strontium (Sr)-Total	805445	WG2704117-7	9.49	10.1	mg/kg	94.0	70-130	%		ü	Tissue	Metals
CRM	Strontium (Sr)-Total	805430	WG2704091-3	9.83	10.1	mg/kg wwt	97.4	70-130	%		ü	Tissue	Metals
CRM	Thallium (Tl)-Total	804300	WG2702663-3	0.0113	0.009	mg/kg	125.3	70-130	%		ü	Tissue	Metals
CRM	Thallium (Tl)-Total	805064	WG2703646-3	0.0109	0.009	mg/kg	120.7	70-130	%		ü	Tissue	Metals
CRM	Thallium (Tl)-Total	805430	WG2704091-3	0.0111	0.009	mg/kg	123.5	70-130	%		ü	Tissue	Metals
CRM	Thallium (Tl)-Total	805445	WG2704117-7	0.0093	0.009	mg/kg	103.0	70-130	%		ü	Tissue	Metals
CRM	Thallium (Tl)-Total	805430	WG2704091-3	0.0111	0.009	mg/kg wwt	123.5	70-130	%		ü	Tissue	Metals
CRM	Uranium (U)-Total	804300	WG2702663-3	0.0507	0.0481	mg/kg	105.4	70-130	%		ü	Tissue	Metals
CRM	Uranium (U)-Total	805064	WG2703646-3	0.0466	0.0481	mg/kg	96.8	70-130	%		ü	Tissue	Metals
CRM	Uranium (U)-Total	805430	WG2704091-3	0.0560	0.0481	mg/kg	116.4	70-130	%		ü	Tissue	Metals
CRM	Uranium (U)-Total	805445	WG2704117-7	0.0485	0.0481	mg/kg	100.8	70-130	%		ü	Tissue	Metals
CRM	Uranium (U)-Total	805430	WG2704091-3	0.0560	0.0481	mg/kg wwt	116.4	70-130	%		ü	Tissue	Metals
CRM	Vanadium (V)-Total	804300	WG2702663-3	1.35	1.48	mg/kg	91.5	70-130	%		ü	Tissue	Metals
CRM	Vanadium (V)-Total	805064	WG2703646-3	1.24	1.48	mg/kg	83.7	70-130	%		ü	Tissue	Metals
CRM	Vanadium (V)-Total	805430	WG2704091-3	1.45	1.48	mg/kg	98.2	70-130	%		ü	Tissue	Metals
CRM	Vanadium (V)-Total	805445	WG2704117-7	1.40	1.48	mg/kg	94.3	70-130	%		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
CRM	Vanadium (V)-Total	805430	WG2704091-3	1.45	1.48	mg/kg wwt	98.2	70-130	%		ü	Tissue	Metals
CRM	Zinc (Zn)-Total	804300	WG2702663-3	48.7	46.2	mg/kg	105.3	70-130	%		ü	Tissue	Metals
CRM	Zinc (Zn)-Total	805064	WG2703646-3	40.8	46.2	mg/kg	88.2	70-130	%		ü	Tissue	Metals
CRM	Zinc (Zn)-Total	805430	WG2704091-3	47.0	46.2	mg/kg	101.6	70-130	%		ü	Tissue	Metals
CRM	Zinc (Zn)-Total	805445	WG2704117-7	48.1	46.2	mg/kg	104.2	70-130	%		ü	Tissue	Metals
CRM	Zinc (Zn)-Total	805430	WG2704091-3	47.0	46.2	mg/kg wwt	101.6	70-130	%		ü	Tissue	Metals
CRM	Zirconium (Zr)-Total	804300	WG2702663-3	0.31	0.254	mg/kg	0.31	.05-.45	mg/kg		ü	Tissue	Metals
CRM	Zirconium (Zr)-Total	805064	WG2703646-3	0.23	0.254	mg/kg	0.23	.05-.45	mg/kg		ü	Tissue	Metals
CRM	Zirconium (Zr)-Total	805430	WG2704091-3	0.48	0.254	mg/kg	0.48	.05-.45	mg/kg	MES	û	Tissue	Metals
CRM	Zirconium (Zr)-Total	805445	WG2704117-7	0.25	0.254	mg/kg	0.25	.05-.45	mg/kg		ü	Tissue	Metals
CRM	Zirconium (Zr)-Total	805430	WG2704091-3	0.475	0.254	mg/kg wwt	0.475	.054-.454	mg/kg wwt	MES	û	Tissue	Metals
Physical Tests (Tissue)													
LCS	% Moisture	804318	WG2702677-2	100	100	%	100.1	90-110	%		ü	Tissue	Physical Tests
LCS	% Moisture	805082	WG2703661-2	100	100	%	100.1	90-110	%		ü	Tissue	Physical Tests
LCS	% Moisture	805438	WG2704113-2	50.3	50	%	100.5	90-110	%		ü	Tissue	Physical Tests
LCS	% Moisture	805446	WG2704125-2	100	100	%	100.2	90-110	%		ü	Tissue	Physical Tests
Metals (Tissue)													
LCS	Aluminum (Al)-Total	804300	WG2702663-4	93.1	100	mg/kg	93.1	70-130	%		ü	Tissue	Metals
LCS	Aluminum (Al)-Total	805064	WG2703646-4	104	100	mg/kg	103.9	70-130	%		ü	Tissue	Metals
LCS	Aluminum (Al)-Total	805430	WG2704091-4	98.7	100	mg/kg	98.7	70-130	%		ü	Tissue	Metals
LCS	Aluminum (Al)-Total	805445	WG2704117-8	86.2	100	mg/kg	86.2	70-130	%		ü	Tissue	Metals
LCS	Aluminum (Al)-Total	804300	WG2702663-4	18.6	20	mg/kg wwt	93.1	70-130	%		ü	Tissue	Metals
LCS	Aluminum (Al)-Total	805064	WG2703646-4	20.8	20	mg/kg wwt	103.9	70-130	%		ü	Tissue	Metals
LCS	Aluminum (Al)-Total	805430	WG2704091-4	19.7	20	mg/kg wwt	98.7	70-130	%		ü	Tissue	Metals
LCS	Aluminum (Al)-Total	805445	WG2704117-8	17.2	20	mg/kg wwt	86.2	70-130	%		ü	Tissue	Metals
LCS	Antimony (Sb)-Total	804300	WG2702663-4	39.3	50	mg/kg	78.6	70-130	%		ü	Tissue	Metals
LCS	Antimony (Sb)-Total	805064	WG2703646-4	43.2	50	mg/kg	86.4	70-130	%		ü	Tissue	Metals
LCS	Antimony (Sb)-Total	805430	WG2704091-4	54.4	50	mg/kg	108.9	70-130	%		ü	Tissue	Metals
LCS	Antimony (Sb)-Total	805445	WG2704117-8	41.1	50	mg/kg	82.1	70-130	%		ü	Tissue	Metals
LCS	Antimony (Sb)-Total	804300	WG2702663-4	7.86	10	mg/kg wwt	78.6	70-130	%		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
LCS	Antimony (Sb)-Total	805064	WG2703646-4	8.64	10	mg/kg wwt	86.4	70-130	%		ü	Tissue	Metals
LCS	Antimony (Sb)-Total	805430	WG2704091-4	10.9	10	mg/kg wwt	108.9	70-130	%		ü	Tissue	Metals
LCS	Antimony (Sb)-Total	805445	WG2704117-8	8.21	10	mg/kg wwt	82.1	70-130	%		ü	Tissue	Metals
LCS	Arsenic (As)-Total	804300	WG2702663-4	44.0	50	mg/kg	88.0	70-130	%		ü	Tissue	Metals
LCS	Arsenic (As)-Total	805064	WG2703646-4	56.6	50	mg/kg	113.1	70-130	%		ü	Tissue	Metals
LCS	Arsenic (As)-Total	805430	WG2704091-4	49.0	50	mg/kg	98.1	70-130	%		ü	Tissue	Metals
LCS	Arsenic (As)-Total	805445	WG2704117-8	48.7	50	mg/kg	97.4	70-130	%		ü	Tissue	Metals
LCS	Arsenic (As)-Total	804300	WG2702663-4	8.80	10	mg/kg wwt	88.0	70-130	%		ü	Tissue	Metals
LCS	Arsenic (As)-Total	805064	WG2703646-4	11.3	10	mg/kg wwt	113.1	70-130	%		ü	Tissue	Metals
LCS	Arsenic (As)-Total	805430	WG2704091-4	9.81	10	mg/kg wwt	98.1	70-130	%		ü	Tissue	Metals
LCS	Arsenic (As)-Total	805445	WG2704117-8	9.74	10	mg/kg wwt	97.4	70-130	%		ü	Tissue	Metals
LCS	Barium (Ba)-Total	804300	WG2702663-4	13.0	12.5	mg/kg	104.0	70-130	%		ü	Tissue	Metals
LCS	Barium (Ba)-Total	805064	WG2703646-4	12.9	12.5	mg/kg	103.5	70-130	%		ü	Tissue	Metals
LCS	Barium (Ba)-Total	805430	WG2704091-4	12.6	12.5	mg/kg	100.7	70-130	%		ü	Tissue	Metals
LCS	Barium (Ba)-Total	805445	WG2704117-8	12.3	12.5	mg/kg	98.4	70-130	%		ü	Tissue	Metals
LCS	Barium (Ba)-Total	804300	WG2702663-4	2.60	2.5	mg/kg wwt	104.0	70-130	%		ü	Tissue	Metals
LCS	Barium (Ba)-Total	805064	WG2703646-4	2.59	2.5	mg/kg wwt	103.5	70-130	%		ü	Tissue	Metals
LCS	Barium (Ba)-Total	805430	WG2704091-4	2.52	2.5	mg/kg wwt	100.7	70-130	%		ü	Tissue	Metals
LCS	Barium (Ba)-Total	805445	WG2704117-8	2.46	2.5	mg/kg wwt	98.4	70-130	%		ü	Tissue	Metals
LCS	Beryllium (Be)-Total	804300	WG2702663-4	5.55	5	mg/kg	111.0	70-130	%		ü	Tissue	Metals
LCS	Beryllium (Be)-Total	805064	WG2703646-4	5.91	5	mg/kg	118.3	70-130	%		ü	Tissue	Metals
LCS	Beryllium (Be)-Total	805430	WG2704091-4	5.09	5	mg/kg	101.8	70-130	%		ü	Tissue	Metals
LCS	Beryllium (Be)-Total	805445	WG2704117-8	4.51	5	mg/kg	90.1	70-130	%		ü	Tissue	Metals
LCS	Beryllium (Be)-Total	804300	WG2702663-4	1.11	1	mg/kg wwt	111.0	70-130	%		ü	Tissue	Metals
LCS	Beryllium (Be)-Total	805064	WG2703646-4	1.18	1	mg/kg wwt	118.3	70-130	%		ü	Tissue	Metals
LCS	Beryllium (Be)-Total	805430	WG2704091-4	1.02	1	mg/kg wwt	101.8	70-130	%		ü	Tissue	Metals
LCS	Beryllium (Be)-Total	805445	WG2704117-8	0.901	1	mg/kg wwt	90.1	70-130	%		ü	Tissue	Metals
LCS	Bismuth (Bi)-Total	804300	WG2702663-4	48.8	50	mg/kg	97.6	70-130	%		ü	Tissue	Metals
LCS	Bismuth (Bi)-Total	805064	WG2703646-4	51.2	50	mg/kg	102.3	70-130	%		ü	Tissue	Metals
LCS	Bismuth (Bi)-Total	805430	WG2704091-4	51.9	50	mg/kg	103.9	70-130	%		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
LCS	Bismuth (Bi)-Total	805445	WG2704117-8	50.8	50	mg/kg	101.7	70-130	%		ü	Tissue	Metals
LCS	Bismuth (Bi)-Total	804300	WG2702663-4	9.76	10	mg/kg wwt	97.6	70-130	%		ü	Tissue	Metals
LCS	Bismuth (Bi)-Total	805064	WG2703646-4	10.2	10	mg/kg wwt	102.3	70-130	%		ü	Tissue	Metals
LCS	Bismuth (Bi)-Total	805430	WG2704091-4	10.4	10	mg/kg wwt	103.9	70-130	%		ü	Tissue	Metals
LCS	Bismuth (Bi)-Total	805445	WG2704117-8	10.2	10	mg/kg wwt	101.7	70-130	%		ü	Tissue	Metals
LCS	Boron (B)-Total	804300	WG2702663-4	44.4	50	mg/kg	88.9	70-130	%		ü	Tissue	Metals
LCS	Boron (B)-Total	805064	WG2703646-4	49.5	50	mg/kg	99.0	70-130	%		ü	Tissue	Metals
LCS	Boron (B)-Total	805430	WG2704091-4	47.8	50	mg/kg	95.5	70-130	%		ü	Tissue	Metals
LCS	Boron (B)-Total	805445	WG2704117-8	43.6	50	mg/kg	87.2	70-130	%		ü	Tissue	Metals
LCS	Boron (B)-Total	804300	WG2702663-4	8.89	10	mg/kg wwt	88.9	70-130	%		ü	Tissue	Metals
LCS	Boron (B)-Total	805064	WG2703646-4	9.90	10	mg/kg wwt	99.0	70-130	%		ü	Tissue	Metals
LCS	Boron (B)-Total	805430	WG2704091-4	9.55	10	mg/kg wwt	95.5	70-130	%		ü	Tissue	Metals
LCS	Boron (B)-Total	805445	WG2704117-8	8.72	10	mg/kg wwt	87.2	70-130	%		ü	Tissue	Metals
LCS	Cadmium (Cd)-Total	804300	WG2702663-4	5.47	5	mg/kg	109.4	70-130	%		ü	Tissue	Metals
LCS	Cadmium (Cd)-Total	805064	WG2703646-4	5.59	5	mg/kg	111.9	70-130	%		ü	Tissue	Metals
LCS	Cadmium (Cd)-Total	805430	WG2704091-4	4.96	5	mg/kg	99.2	70-130	%		ü	Tissue	Metals
LCS	Cadmium (Cd)-Total	805445	WG2704117-8	4.84	5	mg/kg	96.9	70-130	%		ü	Tissue	Metals
LCS	Cadmium (Cd)-Total	804300	WG2702663-4	1.09	1	mg/kg wwt	109.4	70-130	%		ü	Tissue	Metals
LCS	Cadmium (Cd)-Total	805064	WG2703646-4	1.12	1	mg/kg wwt	111.9	70-130	%		ü	Tissue	Metals
LCS	Cadmium (Cd)-Total	805430	WG2704091-4	0.992	1	mg/kg wwt	99.2	70-130	%		ü	Tissue	Metals
LCS	Cadmium (Cd)-Total	805445	WG2704117-8	0.969	1	mg/kg wwt	96.9	70-130	%		ü	Tissue	Metals
LCS	Calcium (Ca)-Total	804300	WG2702663-4	2670	2500	mg/kg	106.9	70-130	%		ü	Tissue	Metals
LCS	Calcium (Ca)-Total	805064	WG2703646-4	2640	2500	mg/kg	105.4	70-130	%		ü	Tissue	Metals
LCS	Calcium (Ca)-Total	805430	WG2704091-4	2550	2500	mg/kg	102.1	70-130	%		ü	Tissue	Metals
LCS	Calcium (Ca)-Total	805445	WG2704117-8	2440	2500	mg/kg	97.6	70-130	%		ü	Tissue	Metals
LCS	Calcium (Ca)-Total	804300	WG2702663-4	534	500	mg/kg wwt	106.9	70-130	%		ü	Tissue	Metals
LCS	Calcium (Ca)-Total	805064	WG2703646-4	527	500	mg/kg wwt	105.4	70-130	%		ü	Tissue	Metals
LCS	Calcium (Ca)-Total	805430	WG2704091-4	511	500	mg/kg wwt	102.1	70-130	%		ü	Tissue	Metals
LCS	Calcium (Ca)-Total	805445	WG2704117-8	488	500	mg/kg wwt	97.6	70-130	%		ü	Tissue	Metals
LCS	Cesium (Cs)-Total	804300	WG2702663-4	2.21	2.5	mg/kg	88.4	70-130	%		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
LCS	Cesium (Cs)-Total	805064	WG2703646-4	2.29	2.5	mg/kg	91.6	70-130	%		ü	Tissue	Metals
LCS	Cesium (Cs)-Total	805430	WG2704091-4	2.60	2.5	mg/kg	104.2	70-130	%		ü	Tissue	Metals
LCS	Cesium (Cs)-Total	805445	WG2704117-8	2.37	2.5	mg/kg	94.6	70-130	%		ü	Tissue	Metals
LCS	Cesium (Cs)-Total	804300	WG2702663-4	0.442	0.5	mg/kg wwt	88.4	70-130	%		ü	Tissue	Metals
LCS	Cesium (Cs)-Total	805064	WG2703646-4	0.458	0.5	mg/kg wwt	91.6	70-130	%		ü	Tissue	Metals
LCS	Cesium (Cs)-Total	805430	WG2704091-4	0.521	0.5	mg/kg wwt	104.2	70-130	%		ü	Tissue	Metals
LCS	Cesium (Cs)-Total	805445	WG2704117-8	0.473	0.5	mg/kg wwt	94.6	70-130	%		ü	Tissue	Metals
LCS	Chromium (Cr)-Total	804300	WG2702663-4	12.6	12.5	mg/kg	100.8	70-130	%		ü	Tissue	Metals
LCS	Chromium (Cr)-Total	805064	WG2703646-4	12.9	12.5	mg/kg	102.8	70-130	%		ü	Tissue	Metals
LCS	Chromium (Cr)-Total	805430	WG2704091-4	11.9	12.5	mg/kg	95.5	70-130	%		ü	Tissue	Metals
LCS	Chromium (Cr)-Total	805445	WG2704117-8	11.8	12.5	mg/kg	94.4	70-130	%		ü	Tissue	Metals
LCS	Chromium (Cr)-Total	804300	WG2702663-4	2.52	2.5	mg/kg wwt	100.8	70-130	%		ü	Tissue	Metals
LCS	Chromium (Cr)-Total	805064	WG2703646-4	2.57	2.5	mg/kg wwt	102.8	70-130	%		ü	Tissue	Metals
LCS	Chromium (Cr)-Total	805430	WG2704091-4	2.39	2.5	mg/kg wwt	95.5	70-130	%		ü	Tissue	Metals
LCS	Chromium (Cr)-Total	805445	WG2704117-8	2.36	2.5	mg/kg wwt	94.4	70-130	%		ü	Tissue	Metals
LCS	Cobalt (Co)-Total	804300	WG2702663-4	13.2	12.5	mg/kg	105.6	70-130	%		ü	Tissue	Metals
LCS	Cobalt (Co)-Total	805064	WG2703646-4	11.4	12.5	mg/kg	91.2	70-130	%		ü	Tissue	Metals
LCS	Cobalt (Co)-Total	805430	WG2704091-4	12.2	12.5	mg/kg	97.4	70-130	%		ü	Tissue	Metals
LCS	Cobalt (Co)-Total	805445	WG2704117-8	13.2	12.5	mg/kg	105.6	70-130	%		ü	Tissue	Metals
LCS	Cobalt (Co)-Total	804300	WG2702663-4	2.64	2.5	mg/kg wwt	105.6	70-130	%		ü	Tissue	Metals
LCS	Cobalt (Co)-Total	805064	WG2703646-4	2.28	2.5	mg/kg wwt	91.2	70-130	%		ü	Tissue	Metals
LCS	Cobalt (Co)-Total	805430	WG2704091-4	2.44	2.5	mg/kg wwt	97.4	70-130	%		ü	Tissue	Metals
LCS	Cobalt (Co)-Total	805445	WG2704117-8	2.64	2.5	mg/kg wwt	105.6	70-130	%		ü	Tissue	Metals
LCS	Copper (Cu)-Total	804300	WG2702663-4	13.3	12.5	mg/kg	106.1	70-130	%		ü	Tissue	Metals
LCS	Copper (Cu)-Total	805064	WG2703646-4	12.7	12.5	mg/kg	101.6	70-130	%		ü	Tissue	Metals
LCS	Copper (Cu)-Total	805430	WG2704091-4	12.1	12.5	mg/kg	96.5	70-130	%		ü	Tissue	Metals
LCS	Copper (Cu)-Total	805445	WG2704117-8	12.2	12.5	mg/kg	97.4	70-130	%		ü	Tissue	Metals
LCS	Copper (Cu)-Total	804300	WG2702663-4	2.65	2.5	mg/kg wwt	106.1	70-130	%		ü	Tissue	Metals
LCS	Copper (Cu)-Total	805064	WG2703646-4	2.54	2.5	mg/kg wwt	101.6	70-130	%		ü	Tissue	Metals
LCS	Copper (Cu)-Total	805430	WG2704091-4	2.41	2.5	mg/kg wwt	96.5	70-130	%		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
LCS	Copper (Cu)-Total	805445	WG2704117-8	2.43	2.5	mg/kg wwt	97.4	70-130	%		ü	Tissue	Metals
LCS	Iron (Fe)-Total	804300	WG2702663-4	51.7	50	mg/kg	103.3	70-130	%		ü	Tissue	Metals
LCS	Iron (Fe)-Total	805064	WG2703646-4	51.9	50	mg/kg	103.8	70-130	%		ü	Tissue	Metals
LCS	Iron (Fe)-Total	805430	WG2704091-4	49.4	50	mg/kg	98.8	70-130	%		ü	Tissue	Metals
LCS	Iron (Fe)-Total	805445	WG2704117-8	49.2	50	mg/kg	98.4	70-130	%		ü	Tissue	Metals
LCS	Iron (Fe)-Total	804300	WG2702663-4	10.3	10	mg/kg wwt	103.3	70-130	%		ü	Tissue	Metals
LCS	Iron (Fe)-Total	805064	WG2703646-4	10.4	10	mg/kg wwt	103.8	70-130	%		ü	Tissue	Metals
LCS	Iron (Fe)-Total	805430	WG2704091-4	9.88	10	mg/kg wwt	98.8	70-130	%		ü	Tissue	Metals
LCS	Iron (Fe)-Total	805445	WG2704117-8	9.84	10	mg/kg wwt	98.4	70-130	%		ü	Tissue	Metals
LCS	Lead (Pb)-Total	804300	WG2702663-4	22.0	25	mg/kg	87.8	70-130	%		ü	Tissue	Metals
LCS	Lead (Pb)-Total	805064	WG2703646-4	25.0	25	mg/kg	100.2	70-130	%		ü	Tissue	Metals
LCS	Lead (Pb)-Total	805430	WG2704091-4	26.2	25	mg/kg	104.8	70-130	%		ü	Tissue	Metals
LCS	Lead (Pb)-Total	805445	WG2704117-8	24.2	25	mg/kg	96.8	70-130	%		ü	Tissue	Metals
LCS	Lead (Pb)-Total	804300	WG2702663-4	4.39	5	mg/kg wwt	87.8	70-130	%		ü	Tissue	Metals
LCS	Lead (Pb)-Total	805064	WG2703646-4	5.01	5	mg/kg wwt	100.2	70-130	%		ü	Tissue	Metals
LCS	Lead (Pb)-Total	805430	WG2704091-4	5.24	5	mg/kg wwt	104.8	70-130	%		ü	Tissue	Metals
LCS	Lead (Pb)-Total	805445	WG2704117-8	4.84	5	mg/kg wwt	96.8	70-130	%		ü	Tissue	Metals
LCS	Lithium (Li)-Total	804300	WG2702663-4	12.0	12.5	mg/kg	96.2	70-130	%		ü	Tissue	Metals
LCS	Lithium (Li)-Total	805064	WG2703646-4	14.4	12.5	mg/kg	115.0	70-130	%		ü	Tissue	Metals
LCS	Lithium (Li)-Total	805430	WG2704091-4	12.7	12.5	mg/kg	101.8	70-130	%		ü	Tissue	Metals
LCS	Lithium (Li)-Total	805445	WG2704117-8	12.2	12.5	mg/kg	97.6	70-130	%		ü	Tissue	Metals
LCS	Lithium (Li)-Total	804300	WG2702663-4	2.40	2.5	mg/kg wwt	96.2	70-130	%		ü	Tissue	Metals
LCS	Lithium (Li)-Total	805064	WG2703646-4	2.88	2.5	mg/kg wwt	115.0	70-130	%		ü	Tissue	Metals
LCS	Lithium (Li)-Total	805430	WG2704091-4	2.55	2.5	mg/kg wwt	101.8	70-130	%		ü	Tissue	Metals
LCS	Lithium (Li)-Total	805445	WG2704117-8	2.44	2.5	mg/kg wwt	97.6	70-130	%		ü	Tissue	Metals
LCS	Magnesium (Mg)-Total	804300	WG2702663-4	2470	2500	mg/kg	98.7	70-130	%		ü	Tissue	Metals
LCS	Magnesium (Mg)-Total	805064	WG2703646-4	2500	2500	mg/kg	99.9	70-130	%		ü	Tissue	Metals
LCS	Magnesium (Mg)-Total	805430	WG2704091-4	2350	2500	mg/kg	94.1	70-130	%		ü	Tissue	Metals
LCS	Magnesium (Mg)-Total	805445	WG2704117-8	2420	2500	mg/kg	96.9	70-130	%		ü	Tissue	Metals
LCS	Magnesium (Mg)-Total	804300	WG2702663-4	494	500	mg/kg wwt	98.7	70-130	%		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
LCS	Magnesium (Mg)-Total	805064	WG2703646-4	499	500	mg/kg wwt	99.9	70-130	%		ü	Tissue	Metals
LCS	Magnesium (Mg)-Total	805430	WG2704091-4	471	500	mg/kg wwt	94.1	70-130	%		ü	Tissue	Metals
LCS	Magnesium (Mg)-Total	805445	WG2704117-8	485	500	mg/kg wwt	96.9	70-130	%		ü	Tissue	Metals
LCS	Manganese (Mn)-Total	804300	WG2702663-4	14.6	12.5	mg/kg	116.5	70-130	%		ü	Tissue	Metals
LCS	Manganese (Mn)-Total	805064	WG2703646-4	13.6	12.5	mg/kg	108.4	70-130	%		ü	Tissue	Metals
LCS	Manganese (Mn)-Total	805430	WG2704091-4	12.3	12.5	mg/kg	98.3	70-130	%		ü	Tissue	Metals
LCS	Manganese (Mn)-Total	805445	WG2704117-8	13.7	12.5	mg/kg	109.6	70-130	%		ü	Tissue	Metals
LCS	Manganese (Mn)-Total	804300	WG2702663-4	2.91	2.5	mg/kg wwt	116.5	70-130	%		ü	Tissue	Metals
LCS	Manganese (Mn)-Total	805064	WG2703646-4	2.71	2.5	mg/kg wwt	108.4	70-130	%		ü	Tissue	Metals
LCS	Manganese (Mn)-Total	805430	WG2704091-4	2.46	2.5	mg/kg wwt	98.3	70-130	%		ü	Tissue	Metals
LCS	Manganese (Mn)-Total	805445	WG2704117-8	2.74	2.5	mg/kg wwt	109.6	70-130	%		ü	Tissue	Metals
LCS	Mercury (Hg)-Total	804300	WG2702663-4	0.107	0.1	mg/kg	107.2	70-130	%		ü	Tissue	Metals
LCS	Mercury (Hg)-Total	805064	WG2703646-4	0.0970	0.1	mg/kg	97.0	70-130	%		ü	Tissue	Metals
LCS	Mercury (Hg)-Total	805430	WG2704091-4	0.103	0.1	mg/kg	103.4	70-130	%		ü	Tissue	Metals
LCS	Mercury (Hg)-Total	805445	WG2704117-8	0.101	0.1	mg/kg	101.1	70-130	%		ü	Tissue	Metals
LCS	Mercury (Hg)-Total	804300	WG2702663-4	0.0214	0.02	mg/kg wwt	107.2	70-130	%		ü	Tissue	Metals
LCS	Mercury (Hg)-Total	805064	WG2703646-4	0.0194	0.02	mg/kg wwt	97.0	70-130	%		ü	Tissue	Metals
LCS	Mercury (Hg)-Total	805430	WG2704091-4	0.0207	0.02	mg/kg wwt	103.4	70-130	%		ü	Tissue	Metals
LCS	Mercury (Hg)-Total	805445	WG2704117-8	0.0202	0.02	mg/kg wwt	101.1	70-130	%		ü	Tissue	Metals
LCS	Molybdenum (Mo)-Tota	804300	WG2702663-4	10.8	12.5	mg/kg	86.1	70-130	%		ü	Tissue	Metals
LCS	Molybdenum (Mo)-Tota	805064	WG2703646-4	11.3	12.5	mg/kg	90.1	70-130	%		ü	Tissue	Metals
LCS	Molybdenum (Mo)-Tota	805430	WG2704091-4	13.4	12.5	mg/kg	106.9	70-130	%		ü	Tissue	Metals
LCS	Molybdenum (Mo)-Tota	805445	WG2704117-8	10.1	12.5	mg/kg	80.4	70-130	%		ü	Tissue	Metals
LCS	Molybdenum (Mo)-Tota	804300	WG2702663-4	2.15	2.5	mg/kg wwt	86.1	70-130	%		ü	Tissue	Metals
LCS	Molybdenum (Mo)-Tota	805064	WG2703646-4	2.25	2.5	mg/kg wwt	90.1	70-130	%		ü	Tissue	Metals
LCS	Molybdenum (Mo)-Tota	805430	WG2704091-4	2.67	2.5	mg/kg wwt	106.9	70-130	%		ü	Tissue	Metals
LCS	Molybdenum (Mo)-Tota	805445	WG2704117-8	2.01	2.5	mg/kg wwt	80.4	70-130	%		ü	Tissue	Metals
LCS	Nickel (Ni)-Total	804300	WG2702663-4	28.3	25	mg/kg	113.0	70-130	%		ü	Tissue	Metals
LCS	Nickel (Ni)-Total	805064	WG2703646-4	26.9	25	mg/kg	107.7	70-130	%		ü	Tissue	Metals
LCS	Nickel (Ni)-Total	805430	WG2704091-4	24.1	25	mg/kg	96.3	70-130	%		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
LCS	Nickel (Ni)-Total	805445	WG2704117-8	25.7	25	mg/kg	102.8	70-130	%		ü	Tissue	Metals
LCS	Nickel (Ni)-Total	804300	WG2702663-4	5.65	5	mg/kg wwt	113.0	70-130	%		ü	Tissue	Metals
LCS	Nickel (Ni)-Total	805064	WG2703646-4	5.38	5	mg/kg wwt	107.7	70-130	%		ü	Tissue	Metals
LCS	Nickel (Ni)-Total	805430	WG2704091-4	4.81	5	mg/kg wwt	96.3	70-130	%		ü	Tissue	Metals
LCS	Nickel (Ni)-Total	805445	WG2704117-8	5.14	5	mg/kg wwt	102.8	70-130	%		ü	Tissue	Metals
LCS	Potassium (K)-Total	804300	WG2702663-4	2440	2500	mg/kg	97.7	70-130	%		ü	Tissue	Metals
LCS	Potassium (K)-Total	805064	WG2703646-4	2690	2500	mg/kg	107.7	70-130	%		ü	Tissue	Metals
LCS	Potassium (K)-Total	805430	WG2704091-4	2420	2500	mg/kg	96.9	70-130	%		ü	Tissue	Metals
LCS	Potassium (K)-Total	805445	WG2704117-8	2500	2500	mg/kg	100.1	70-130	%		ü	Tissue	Metals
LCS	Potassium (K)-Total	804300	WG2702663-4	489	500	mg/kg wwt	97.7	70-130	%		ü	Tissue	Metals
LCS	Potassium (K)-Total	805064	WG2703646-4	539	500	mg/kg wwt	107.7	70-130	%		ü	Tissue	Metals
LCS	Potassium (K)-Total	805430	WG2704091-4	484	500	mg/kg wwt	96.9	70-130	%		ü	Tissue	Metals
LCS	Potassium (K)-Total	805445	WG2704117-8	501	500	mg/kg wwt	100.1	70-130	%		ü	Tissue	Metals
LCS	Rubidium (Rb)-Total	804300	WG2702663-4	4.57	5	mg/kg	91.3	70-130	%		ü	Tissue	Metals
LCS	Rubidium (Rb)-Total	805064	WG2703646-4	4.77	5	mg/kg	95.3	70-130	%		ü	Tissue	Metals
LCS	Rubidium (Rb)-Total	805430	WG2704091-4	5.23	5	mg/kg	104.5	70-130	%		ü	Tissue	Metals
LCS	Rubidium (Rb)-Total	805445	WG2704117-8	4.39	5	mg/kg	87.8	70-130	%		ü	Tissue	Metals
LCS	Rubidium (Rb)-Total	804300	WG2702663-4	0.913	1	mg/kg wwt	91.3	70-130	%		ü	Tissue	Metals
LCS	Rubidium (Rb)-Total	805064	WG2703646-4	0.953	1	mg/kg wwt	95.3	70-130	%		ü	Tissue	Metals
LCS	Rubidium (Rb)-Total	805430	WG2704091-4	1.05	1	mg/kg wwt	104.5	70-130	%		ü	Tissue	Metals
LCS	Rubidium (Rb)-Total	805445	WG2704117-8	0.878	1	mg/kg wwt	87.8	70-130	%		ü	Tissue	Metals
LCS	Selenium (Se)-Total	804300	WG2702663-4	49.1	50	mg/kg	98.2	70-130	%		ü	Tissue	Metals
LCS	Selenium (Se)-Total	805064	WG2703646-4	50.9	50	mg/kg	101.7	70-130	%		ü	Tissue	Metals
LCS	Selenium (Se)-Total	805430	WG2704091-4	51.3	50	mg/kg	102.5	70-130	%		ü	Tissue	Metals
LCS	Selenium (Se)-Total	805445	WG2704117-8	42.8	50	mg/kg	85.6	70-130	%		ü	Tissue	Metals
LCS	Selenium (Se)-Total	804300	WG2702663-4	9.82	10	mg/kg wwt	98.2	70-130	%		ü	Tissue	Metals
LCS	Selenium (Se)-Total	805064	WG2703646-4	10.2	10	mg/kg wwt	101.7	70-130	%		ü	Tissue	Metals
LCS	Selenium (Se)-Total	805430	WG2704091-4	10.3	10	mg/kg wwt	102.5	70-130	%		ü	Tissue	Metals
LCS	Selenium (Se)-Total	805445	WG2704117-8	8.56	10	mg/kg wwt	85.6	70-130	%		ü	Tissue	Metals
LCS	Silver (Ag)-Total	804300	WG2702663-4	4.00	5	mg/kg	80.1	70-130	%		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
LCS	Silver (Ag)-Total	805064	WG2703646-4	4.12	5	mg/kg	82.4	70-130	%		ü	Tissue	Metals
LCS	Silver (Ag)-Total	805430	WG2704091-4	4.91	5	mg/kg	98.2	70-130	%		ü	Tissue	Metals
LCS	Silver (Ag)-Total	805445	WG2704117-8	4.15	5	mg/kg	83.1	70-130	%		ü	Tissue	Metals
LCS	Silver (Ag)-Total	804300	WG2702663-4	0.801	1	mg/kg wwt	80.1	70-130	%		ü	Tissue	Metals
LCS	Silver (Ag)-Total	805064	WG2703646-4	0.824	1	mg/kg wwt	82.4	70-130	%		ü	Tissue	Metals
LCS	Silver (Ag)-Total	805430	WG2704091-4	0.982	1	mg/kg wwt	98.2	70-130	%		ü	Tissue	Metals
LCS	Silver (Ag)-Total	805445	WG2704117-8	0.831	1	mg/kg wwt	83.1	70-130	%		ü	Tissue	Metals
LCS	Sodium (Na)-Total	804300	WG2702663-4	2410	2500	mg/kg	96.3	70-130	%		ü	Tissue	Metals
LCS	Sodium (Na)-Total	805064	WG2703646-4	2520	2500	mg/kg	101.0	70-130	%		ü	Tissue	Metals
LCS	Sodium (Na)-Total	805430	WG2704091-4	2440	2500	mg/kg	97.7	70-130	%		ü	Tissue	Metals
LCS	Sodium (Na)-Total	805445	WG2704117-8	2400	2500	mg/kg	95.9	70-130	%		ü	Tissue	Metals
LCS	Sodium (Na)-Total	804300	WG2702663-4	482	500	mg/kg wwt	96.3	70-130	%		ü	Tissue	Metals
LCS	Sodium (Na)-Total	805064	WG2703646-4	505	500	mg/kg wwt	101.0	70-130	%		ü	Tissue	Metals
LCS	Sodium (Na)-Total	805430	WG2704091-4	488	500	mg/kg wwt	97.7	70-130	%		ü	Tissue	Metals
LCS	Sodium (Na)-Total	805445	WG2704117-8	480	500	mg/kg wwt	95.9	70-130	%		ü	Tissue	Metals
LCS	Strontium (Sr)-Total	804300	WG2702663-4	12.4	12.5	mg/kg	99.2	70-130	%		ü	Tissue	Metals
LCS	Strontium (Sr)-Total	805064	WG2703646-4	11.4	12.5	mg/kg	91.6	70-130	%		ü	Tissue	Metals
LCS	Strontium (Sr)-Total	805430	WG2704091-4	13.0	12.5	mg/kg	104.0	70-130	%		ü	Tissue	Metals
LCS	Strontium (Sr)-Total	805445	WG2704117-8	11.8	12.5	mg/kg	94.1	70-130	%		ü	Tissue	Metals
LCS	Strontium (Sr)-Total	804300	WG2702663-4	2.48	2.5	mg/kg wwt	99.2	70-130	%		ü	Tissue	Metals
LCS	Strontium (Sr)-Total	805064	WG2703646-4	2.29	2.5	mg/kg wwt	91.6	70-130	%		ü	Tissue	Metals
LCS	Strontium (Sr)-Total	805430	WG2704091-4	2.60	2.5	mg/kg wwt	104.0	70-130	%		ü	Tissue	Metals
LCS	Strontium (Sr)-Total	805445	WG2704117-8	2.35	2.5	mg/kg wwt	94.1	70-130	%		ü	Tissue	Metals
LCS	Tellurium (Te)-Total	804300	WG2702663-4	4.73	5	mg/kg	94.6	70-130	%		ü	Tissue	Metals
LCS	Tellurium (Te)-Total	805064	WG2703646-4	5.58	5	mg/kg	111.6	70-130	%		ü	Tissue	Metals
LCS	Tellurium (Te)-Total	805430	WG2704091-4	5.41	5	mg/kg	108.3	70-130	%		ü	Tissue	Metals
LCS	Tellurium (Te)-Total	805445	WG2704117-8	4.80	5	mg/kg	96.0	70-130	%		ü	Tissue	Metals
LCS	Tellurium (Te)-Total	804300	WG2702663-4	0.946	1	mg/kg wwt	94.6	70-130	%		ü	Tissue	Metals
LCS	Tellurium (Te)-Total	805064	WG2703646-4	1.12	1	mg/kg wwt	111.6	70-130	%		ü	Tissue	Metals
LCS	Tellurium (Te)-Total	805430	WG2704091-4	1.08	1	mg/kg wwt	108.3	70-130	%		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
LCS	Tellurium (Te)-Total	805445	WG2704117-8	0.960	1	mg/kg wwt	96.0	70-130	%		ü	Tissue	Metals
LCS	Thallium (Tl)-Total	804300	WG2702663-4	45.3	50	mg/kg	90.5	70-130	%		ü	Tissue	Metals
LCS	Thallium (Tl)-Total	805064	WG2703646-4	48.6	50	mg/kg	97.2	70-130	%		ü	Tissue	Metals
LCS	Thallium (Tl)-Total	805430	WG2704091-4	48.9	50	mg/kg	97.8	70-130	%		ü	Tissue	Metals
LCS	Thallium (Tl)-Total	805445	WG2704117-8	44.4	50	mg/kg	88.8	70-130	%		ü	Tissue	Metals
LCS	Thallium (Tl)-Total	804300	WG2702663-4	9.05	10	mg/kg wwt	90.5	70-130	%		ü	Tissue	Metals
LCS	Thallium (Tl)-Total	805064	WG2703646-4	9.72	10	mg/kg wwt	97.2	70-130	%		ü	Tissue	Metals
LCS	Thallium (Tl)-Total	805430	WG2704091-4	9.78	10	mg/kg wwt	97.8	70-130	%		ü	Tissue	Metals
LCS	Thallium (Tl)-Total	805445	WG2704117-8	8.88	10	mg/kg wwt	88.8	70-130	%		ü	Tissue	Metals
LCS	Tin (Sn)-Total	804300	WG2702663-4	20.1	25	mg/kg	80.3	70-130	%		ü	Tissue	Metals
LCS	Tin (Sn)-Total	805064	WG2703646-4	23.4	25	mg/kg	93.6	70-130	%		ü	Tissue	Metals
LCS	Tin (Sn)-Total	805430	WG2704091-4	24.4	25	mg/kg	97.7	70-130	%		ü	Tissue	Metals
LCS	Tin (Sn)-Total	805445	WG2704117-8	20.4	25	mg/kg	81.5	70-130	%		ü	Tissue	Metals
LCS	Tin (Sn)-Total	804300	WG2702663-4	4.02	5	mg/kg wwt	80.3	70-130	%		ü	Tissue	Metals
LCS	Tin (Sn)-Total	805064	WG2703646-4	4.68	5	mg/kg wwt	93.6	70-130	%		ü	Tissue	Metals
LCS	Tin (Sn)-Total	805430	WG2704091-4	4.89	5	mg/kg wwt	97.7	70-130	%		ü	Tissue	Metals
LCS	Tin (Sn)-Total	805445	WG2704117-8	4.07	5	mg/kg wwt	81.5	70-130	%		ü	Tissue	Metals
LCS	Uranium (U)-Total	804300	WG2702663-4	0.293	0.25	mg/kg	117.0	70-130	%		ü	Tissue	Metals
LCS	Uranium (U)-Total	805064	WG2703646-4	0.293	0.25	mg/kg	117.0	70-130	%		ü	Tissue	Metals
LCS	Uranium (U)-Total	805430	WG2704091-4	0.273	0.25	mg/kg	109.2	70-130	%		ü	Tissue	Metals
LCS	Uranium (U)-Total	805445	WG2704117-8	0.280	0.25	mg/kg	111.9	70-130	%		ü	Tissue	Metals
LCS	Uranium (U)-Total	804300	WG2702663-4	0.0585	0.05	mg/kg wwt	117.0	70-130	%		ü	Tissue	Metals
LCS	Uranium (U)-Total	805064	WG2703646-4	0.0585	0.05	mg/kg wwt	117.0	70-130	%		ü	Tissue	Metals
LCS	Uranium (U)-Total	805430	WG2704091-4	0.0546	0.05	mg/kg wwt	109.2	70-130	%		ü	Tissue	Metals
LCS	Uranium (U)-Total	805445	WG2704117-8	0.0559	0.05	mg/kg wwt	111.9	70-130	%		ü	Tissue	Metals
LCS	Vanadium (V)-Total	804300	WG2702663-4	23.8	25	mg/kg	95.2	70-130	%		ü	Tissue	Metals
LCS	Vanadium (V)-Total	805064	WG2703646-4	24.3	25	mg/kg	97.2	70-130	%		ü	Tissue	Metals
LCS	Vanadium (V)-Total	805430	WG2704091-4	24.6	25	mg/kg	98.2	70-130	%		ü	Tissue	Metals
LCS	Vanadium (V)-Total	805445	WG2704117-8	25.1	25	mg/kg	100.4	70-130	%		ü	Tissue	Metals
LCS	Vanadium (V)-Total	804300	WG2702663-4	4.76	5	mg/kg wwt	95.2	70-130	%		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
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Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
LCS	Vanadium (V)-Total	805064	WG2703646-4	4.86	5	mg/kg wwt	97.2	70-130	%		ü	Tissue	Metals
LCS	Vanadium (V)-Total	805430	WG2704091-4	4.91	5	mg/kg wwt	98.2	70-130	%		ü	Tissue	Metals
LCS	Vanadium (V)-Total	805445	WG2704117-8	5.02	5	mg/kg wwt	100.4	70-130	%		ü	Tissue	Metals
LCS	Zinc (Zn)-Total	804300	WG2702663-4	23.9	25	mg/kg	95.7	70-130	%		ü	Tissue	Metals
LCS	Zinc (Zn)-Total	805064	WG2703646-4	24.1	25	mg/kg	96.5	70-130	%		ü	Tissue	Metals
LCS	Zinc (Zn)-Total	805430	WG2704091-4	23.8	25	mg/kg	95.1	70-130	%		ü	Tissue	Metals
LCS	Zinc (Zn)-Total	805445	WG2704117-8	21.8	25	mg/kg	87.1	70-130	%		ü	Tissue	Metals
LCS	Zinc (Zn)-Total	804300	WG2702663-4	4.79	5	mg/kg wwt	95.7	70-130	%		ü	Tissue	Metals
LCS	Zinc (Zn)-Total	805064	WG2703646-4	4.82	5	mg/kg wwt	96.5	70-130	%		ü	Tissue	Metals
LCS	Zinc (Zn)-Total	805430	WG2704091-4	4.75	5	mg/kg wwt	95.1	70-130	%		ü	Tissue	Metals
LCS	Zinc (Zn)-Total	805445	WG2704117-8	4.35	5	mg/kg wwt	87.1	70-130	%		ü	Tissue	Metals
LCS	Zirconium (Zr)-Total	804300	WG2702663-4	4.80	5	mg/kg	95.9	70-130	%		ü	Tissue	Metals
LCS	Zirconium (Zr)-Total	805064	WG2703646-4	4.91	5	mg/kg	98.2	70-130	%		ü	Tissue	Metals
LCS	Zirconium (Zr)-Total	805430	WG2704091-4	4.90	5	mg/kg	98.1	70-130	%		ü	Tissue	Metals
LCS	Zirconium (Zr)-Total	805445	WG2704117-8	4.51	5	mg/kg	90.1	70-130	%		ü	Tissue	Metals
LCS	Zirconium (Zr)-Total	804300	WG2702663-4	0.959	1	mg/kg wwt	95.9	70-130	%		ü	Tissue	Metals
LCS	Zirconium (Zr)-Total	805064	WG2703646-4	0.982	1	mg/kg wwt	98.2	70-130	%		ü	Tissue	Metals
LCS	Zirconium (Zr)-Total	805430	WG2704091-4	0.981	1	mg/kg wwt	98.1	70-130	%		ü	Tissue	Metals
LCS	Zirconium (Zr)-Total	805445	WG2704117-8	0.901	1	mg/kg wwt	90.1	70-130	%		ü	Tissue	Metals
Physical Tests (Tissue)													
MB	% Moisture	804318	WG2702677-1	<2.0		%	-	<2.0	%		ü	Tissue	Physical Tests
MB	% Moisture	805082	WG2703661-1	<2.0		%	-	<2.0	%		ü	Tissue	Physical Tests
MB	% Moisture	805438	WG2704113-1	<0.50		%	-	<0.50	%		ü	Tissue	Physical Tests
MB	% Moisture	805446	WG2704125-1	<2.0		%	-	<2.0	%		ü	Tissue	Physical Tests
Metals (Tissue)													
MB	Aluminum (Al)-Total	804300	WG2702663-1	<5.0		mg/kg	-	<5.0	mg/kg		ü	Tissue	Metals
MB	Aluminum (Al)-Total	805064	WG2703646-1	<5.0		mg/kg	-	<5.0	mg/kg		ü	Tissue	Metals
MB	Aluminum (Al)-Total	805430	WG2704091-1	<2.0		mg/kg	-	<2.0	mg/kg		ü	Tissue	Metals
MB	Aluminum (Al)-Total	805445	WG2704117-5	<5.0		mg/kg	-	<5.0	mg/kg		ü	Tissue	Metals
MB	Aluminum (Al)-Total	804300	WG2702663-1	<1.0		mg/kg wwt	-	<1.0	mg/kg wwt		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
MB	Aluminum (Al)-Total	805064	WG2703646-1	<1.0		mg/kg wwt	-	<1.0	mg/kg wwt		ü	Tissue	Metals
MB	Aluminum (Al)-Total	805430	WG2704091-1	<0.40		mg/kg wwt	-	<0.40	mg/kg wwt		ü	Tissue	Metals
MB	Aluminum (Al)-Total	805445	WG2704117-5	<1.0		mg/kg wwt	-	<1.0	mg/kg wwt		ü	Tissue	Metals
MB	Antimony (Sb)-Total	804300	WG2702663-1	<0.010		mg/kg	-	<0.010	mg/kg		ü	Tissue	Metals
MB	Antimony (Sb)-Total	805064	WG2703646-1	<0.010		mg/kg	-	<0.010	mg/kg		ü	Tissue	Metals
MB	Antimony (Sb)-Total	805430	WG2704091-1	<0.010		mg/kg	-	<0.010	mg/kg		ü	Tissue	Metals
MB	Antimony (Sb)-Total	805445	WG2704117-5	<0.010		mg/kg	-	<0.010	mg/kg		ü	Tissue	Metals
MB	Antimony (Sb)-Total	804300	WG2702663-1	<0.0020		mg/kg wwt	-	<0.0020	mg/kg wwt		ü	Tissue	Metals
MB	Antimony (Sb)-Total	805064	WG2703646-1	<0.0020		mg/kg wwt	-	<0.0020	mg/kg wwt		ü	Tissue	Metals
MB	Antimony (Sb)-Total	805430	WG2704091-1	<0.0020		mg/kg wwt	-	<0.0020	mg/kg wwt		ü	Tissue	Metals
MB	Antimony (Sb)-Total	805445	WG2704117-5	<0.0020		mg/kg wwt	-	<0.0020	mg/kg wwt		ü	Tissue	Metals
MB	Arsenic (As)-Total	804300	WG2702663-1	<0.030		mg/kg	-	<0.030	mg/kg		ü	Tissue	Metals
MB	Arsenic (As)-Total	805064	WG2703646-1	<0.030		mg/kg	-	<0.030	mg/kg		ü	Tissue	Metals
MB	Arsenic (As)-Total	805430	WG2704091-1	<0.020		mg/kg	-	<0.020	mg/kg		ü	Tissue	Metals
MB	Arsenic (As)-Total	805445	WG2704117-5	<0.030		mg/kg	-	<0.030	mg/kg		ü	Tissue	Metals
MB	Arsenic (As)-Total	804300	WG2702663-1	<0.0060		mg/kg wwt	-	<0.0060	mg/kg wwt		ü	Tissue	Metals
MB	Arsenic (As)-Total	805064	WG2703646-1	<0.0060		mg/kg wwt	-	<0.0060	mg/kg wwt		ü	Tissue	Metals
MB	Arsenic (As)-Total	805430	WG2704091-1	<0.0040		mg/kg wwt	-	<0.0040	mg/kg wwt		ü	Tissue	Metals
MB	Arsenic (As)-Total	805445	WG2704117-5	<0.0060		mg/kg wwt	-	<0.0060	mg/kg wwt		ü	Tissue	Metals
MB	Barium (Ba)-Total	804300	WG2702663-1	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Barium (Ba)-Total	805064	WG2703646-1	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Barium (Ba)-Total	805430	WG2704091-1	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Barium (Ba)-Total	805445	WG2704117-5	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Barium (Ba)-Total	804300	WG2702663-1	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Barium (Ba)-Total	805064	WG2703646-1	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Barium (Ba)-Total	805430	WG2704091-1	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Barium (Ba)-Total	805445	WG2704117-5	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Beryllium (Be)-Total	804300	WG2702663-1	<0.010		mg/kg	-	<0.010	mg/kg		ü	Tissue	Metals
MB	Beryllium (Be)-Total	805064	WG2703646-1	<0.010		mg/kg	-	<0.010	mg/kg		ü	Tissue	Metals
MB	Beryllium (Be)-Total	805430	WG2704091-1	<0.010		mg/kg	-	<0.010	mg/kg		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
MB	Beryllium (Be)-Total	805445	WG2704117-5	<0.010		mg/kg	-	<0.010	mg/kg		ü	Tissue	Metals
MB	Beryllium (Be)-Total	804300	WG2702663-1	<0.0020		mg/kg wwt	-	<0.0020	mg/kg wwt		ü	Tissue	Metals
MB	Beryllium (Be)-Total	805064	WG2703646-1	<0.0020		mg/kg wwt	-	<0.0020	mg/kg wwt		ü	Tissue	Metals
MB	Beryllium (Be)-Total	805430	WG2704091-1	<0.0020		mg/kg wwt	-	<0.0020	mg/kg wwt		ü	Tissue	Metals
MB	Beryllium (Be)-Total	805445	WG2704117-5	<0.0020		mg/kg wwt	-	<0.0020	mg/kg wwt		ü	Tissue	Metals
MB	Bismuth (Bi)-Total	804300	WG2702663-1	<0.010		mg/kg	-	<0.010	mg/kg		ü	Tissue	Metals
MB	Bismuth (Bi)-Total	805064	WG2703646-1	<0.010		mg/kg	-	<0.010	mg/kg		ü	Tissue	Metals
MB	Bismuth (Bi)-Total	805430	WG2704091-1	<0.010		mg/kg	-	<0.010	mg/kg		ü	Tissue	Metals
MB	Bismuth (Bi)-Total	805445	WG2704117-5	<0.010		mg/kg	-	<0.010	mg/kg		ü	Tissue	Metals
MB	Bismuth (Bi)-Total	804300	WG2702663-1	<0.0020		mg/kg wwt	-	<0.0020	mg/kg wwt		ü	Tissue	Metals
MB	Bismuth (Bi)-Total	805064	WG2703646-1	<0.0020		mg/kg wwt	-	<0.0020	mg/kg wwt		ü	Tissue	Metals
MB	Bismuth (Bi)-Total	805430	WG2704091-1	<0.0020		mg/kg wwt	-	<0.0020	mg/kg wwt		ü	Tissue	Metals
MB	Bismuth (Bi)-Total	805445	WG2704117-5	<0.0020		mg/kg wwt	-	<0.0020	mg/kg wwt		ü	Tissue	Metals
MB	Boron (B)-Total	804300	WG2702663-1	<1.0		mg/kg	-	<1.0	mg/kg		ü	Tissue	Metals
MB	Boron (B)-Total	805064	WG2703646-1	<1.0		mg/kg	-	<1.0	mg/kg		ü	Tissue	Metals
MB	Boron (B)-Total	805430	WG2704091-1	<1.0		mg/kg	-	<1.0	mg/kg		ü	Tissue	Metals
MB	Boron (B)-Total	805445	WG2704117-5	<1.0		mg/kg	-	<1.0	mg/kg		ü	Tissue	Metals
MB	Boron (B)-Total	804300	WG2702663-1	<0.20		mg/kg wwt	-	<0.20	mg/kg wwt		ü	Tissue	Metals
MB	Boron (B)-Total	805064	WG2703646-1	<0.20		mg/kg wwt	-	<0.20	mg/kg wwt		ü	Tissue	Metals
MB	Boron (B)-Total	805430	WG2704091-1	<0.20		mg/kg wwt	-	<0.20	mg/kg wwt		ü	Tissue	Metals
MB	Boron (B)-Total	805445	WG2704117-5	<0.20		mg/kg wwt	-	<0.20	mg/kg wwt		ü	Tissue	Metals
MB	Cadmium (Cd)-Total	804300	WG2702663-1	<0.010		mg/kg	-	<0.010	mg/kg		ü	Tissue	Metals
MB	Cadmium (Cd)-Total	805064	WG2703646-1	<0.010		mg/kg	-	<0.010	mg/kg		ü	Tissue	Metals
MB	Cadmium (Cd)-Total	805430	WG2704091-1	<0.0050		mg/kg	-	<0.0050	mg/kg		ü	Tissue	Metals
MB	Cadmium (Cd)-Total	805445	WG2704117-5	<0.010		mg/kg	-	<0.010	mg/kg		ü	Tissue	Metals
MB	Cadmium (Cd)-Total	804300	WG2702663-1	<0.0020		mg/kg wwt	-	<0.0020	mg/kg wwt		ü	Tissue	Metals
MB	Cadmium (Cd)-Total	805064	WG2703646-1	<0.0020		mg/kg wwt	-	<0.0020	mg/kg wwt		ü	Tissue	Metals
MB	Cadmium (Cd)-Total	805430	WG2704091-1	<0.0010		mg/kg wwt	-	<0.0010	mg/kg wwt		ü	Tissue	Metals
MB	Cadmium (Cd)-Total	805445	WG2704117-5	<0.0020		mg/kg wwt	-	<0.0020	mg/kg wwt		ü	Tissue	Metals
MB	Calcium (Ca)-Total	804300	WG2702663-1	<20		mg/kg	-	<20	mg/kg		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
MB	Calcium (Ca)-Total	805064	WG2703646-1	<20		mg/kg	-	<20	mg/kg		ü	Tissue	Metals
MB	Calcium (Ca)-Total	805430	WG2704091-1	<20		mg/kg	-	<20	mg/kg		ü	Tissue	Metals
MB	Calcium (Ca)-Total	805445	WG2704117-5	<20		mg/kg	-	<20	mg/kg		ü	Tissue	Metals
MB	Calcium (Ca)-Total	804300	WG2702663-1	<4.0		mg/kg wwt	-	<4.0	mg/kg wwt		ü	Tissue	Metals
MB	Calcium (Ca)-Total	805064	WG2703646-1	<4.0		mg/kg wwt	-	<4.0	mg/kg wwt		ü	Tissue	Metals
MB	Calcium (Ca)-Total	805430	WG2704091-1	<4.0		mg/kg wwt	-	<4.0	mg/kg wwt		ü	Tissue	Metals
MB	Calcium (Ca)-Total	805445	WG2704117-5	<4.0		mg/kg wwt	-	<4.0	mg/kg wwt		ü	Tissue	Metals
MB	Cesium (Cs)-Total	804300	WG2702663-1	<0.0050		mg/kg	-	<0.0050	mg/kg		ü	Tissue	Metals
MB	Cesium (Cs)-Total	805064	WG2703646-1	<0.0050		mg/kg	-	<0.0050	mg/kg		ü	Tissue	Metals
MB	Cesium (Cs)-Total	805430	WG2704091-1	<0.0050		mg/kg	-	<0.0050	mg/kg		ü	Tissue	Metals
MB	Cesium (Cs)-Total	805445	WG2704117-5	<0.0050		mg/kg	-	<0.0050	mg/kg		ü	Tissue	Metals
MB	Cesium (Cs)-Total	804300	WG2702663-1	<0.0010		mg/kg wwt	-	<0.0010	mg/kg wwt		ü	Tissue	Metals
MB	Cesium (Cs)-Total	805064	WG2703646-1	<0.0010		mg/kg wwt	-	<0.0010	mg/kg wwt		ü	Tissue	Metals
MB	Cesium (Cs)-Total	805430	WG2704091-1	<0.0010		mg/kg wwt	-	<0.0010	mg/kg wwt		ü	Tissue	Metals
MB	Cesium (Cs)-Total	805445	WG2704117-5	<0.0010		mg/kg wwt	-	<0.0010	mg/kg wwt		ü	Tissue	Metals
MB	Chromium (Cr)-Total	804300	WG2702663-1	<0.20		mg/kg	-	<0.20	mg/kg		ü	Tissue	Metals
MB	Chromium (Cr)-Total	805064	WG2703646-1	<0.20		mg/kg	-	<0.20	mg/kg		ü	Tissue	Metals
MB	Chromium (Cr)-Total	805430	WG2704091-1	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Chromium (Cr)-Total	805445	WG2704117-5	<0.20		mg/kg	-	<0.20	mg/kg		ü	Tissue	Metals
MB	Chromium (Cr)-Total	804300	WG2702663-1	<0.040		mg/kg wwt	-	<0.040	mg/kg wwt		ü	Tissue	Metals
MB	Chromium (Cr)-Total	805064	WG2703646-1	<0.040		mg/kg wwt	-	<0.040	mg/kg wwt		ü	Tissue	Metals
MB	Chromium (Cr)-Total	805430	WG2704091-1	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Chromium (Cr)-Total	805445	WG2704117-5	<0.040		mg/kg wwt	-	<0.040	mg/kg wwt		ü	Tissue	Metals
MB	Cobalt (Co)-Total	804300	WG2702663-1	<0.020		mg/kg	-	<0.020	mg/kg		ü	Tissue	Metals
MB	Cobalt (Co)-Total	805064	WG2703646-1	<0.020		mg/kg	-	<0.020	mg/kg		ü	Tissue	Metals
MB	Cobalt (Co)-Total	805430	WG2704091-1	<0.020		mg/kg	-	<0.020	mg/kg		ü	Tissue	Metals
MB	Cobalt (Co)-Total	805445	WG2704117-5	<0.020		mg/kg	-	<0.020	mg/kg		ü	Tissue	Metals
MB	Cobalt (Co)-Total	804300	WG2702663-1	<0.0040		mg/kg wwt	-	<0.0040	mg/kg wwt		ü	Tissue	Metals
MB	Cobalt (Co)-Total	805064	WG2703646-1	<0.0040		mg/kg wwt	-	<0.0040	mg/kg wwt		ü	Tissue	Metals
MB	Cobalt (Co)-Total	805430	WG2704091-1	<0.0040		mg/kg wwt	-	<0.0040	mg/kg wwt		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
MB	Cobalt (Co)-Total	805445	WG2704117-5	<0.0040		mg/kg wwt	-	<0.0040	mg/kg wwt		ü	Tissue	Metals
MB	Copper (Cu)-Total	804300	WG2702663-1	<0.20		mg/kg	-	<0.20	mg/kg		ü	Tissue	Metals
MB	Copper (Cu)-Total	805064	WG2703646-1	<0.20		mg/kg	-	<0.20	mg/kg		ü	Tissue	Metals
MB	Copper (Cu)-Total	805430	WG2704091-1	<0.10		mg/kg	-	<0.10	mg/kg		ü	Tissue	Metals
MB	Copper (Cu)-Total	805445	WG2704117-5	<0.20		mg/kg	-	<0.20	mg/kg		ü	Tissue	Metals
MB	Copper (Cu)-Total	804300	WG2702663-1	<0.040		mg/kg wwt	-	<0.040	mg/kg wwt		ü	Tissue	Metals
MB	Copper (Cu)-Total	805064	WG2703646-1	<0.040		mg/kg wwt	-	<0.040	mg/kg wwt		ü	Tissue	Metals
MB	Copper (Cu)-Total	805430	WG2704091-1	<0.020		mg/kg wwt	-	<0.020	mg/kg wwt		ü	Tissue	Metals
MB	Copper (Cu)-Total	805445	WG2704117-5	<0.040		mg/kg wwt	-	<0.040	mg/kg wwt		ü	Tissue	Metals
MB	Iron (Fe)-Total	804300	WG2702663-1	<5.0		mg/kg	-	<5.0	mg/kg		ü	Tissue	Metals
MB	Iron (Fe)-Total	805064	WG2703646-1	<5.0		mg/kg	-	<5.0	mg/kg		ü	Tissue	Metals
MB	Iron (Fe)-Total	805430	WG2704091-1	<3.0		mg/kg	-	<3.0	mg/kg		ü	Tissue	Metals
MB	Iron (Fe)-Total	805445	WG2704117-5	<5.0		mg/kg	-	<5.0	mg/kg		ü	Tissue	Metals
MB	Iron (Fe)-Total	804300	WG2702663-1	<1.0		mg/kg wwt	-	<1.0	mg/kg wwt		ü	Tissue	Metals
MB	Iron (Fe)-Total	805064	WG2703646-1	<1.0		mg/kg wwt	-	<1.0	mg/kg wwt		ü	Tissue	Metals
MB	Iron (Fe)-Total	805430	WG2704091-1	<0.60		mg/kg wwt	-	<0.60	mg/kg wwt		ü	Tissue	Metals
MB	Iron (Fe)-Total	805445	WG2704117-5	<1.0		mg/kg wwt	-	<1.0	mg/kg wwt		ü	Tissue	Metals
MB	Lead (Pb)-Total	804300	WG2702663-1	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Lead (Pb)-Total	805064	WG2703646-1	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Lead (Pb)-Total	805430	WG2704091-1	<0.020		mg/kg	-	<0.020	mg/kg		ü	Tissue	Metals
MB	Lead (Pb)-Total	805445	WG2704117-5	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Lead (Pb)-Total	804300	WG2702663-1	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Lead (Pb)-Total	805064	WG2703646-1	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Lead (Pb)-Total	805430	WG2704091-1	<0.0040		mg/kg wwt	-	<0.0040	mg/kg wwt		ü	Tissue	Metals
MB	Lead (Pb)-Total	805445	WG2704117-5	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Lithium (Li)-Total	804300	WG2702663-1	<0.50		mg/kg	-	<0.50	mg/kg		ü	Tissue	Metals
MB	Lithium (Li)-Total	805064	WG2703646-1	<0.50		mg/kg	-	<0.50	mg/kg		ü	Tissue	Metals
MB	Lithium (Li)-Total	805430	WG2704091-1	<0.50		mg/kg	-	<0.50	mg/kg		ü	Tissue	Metals
MB	Lithium (Li)-Total	805445	WG2704117-5	<0.50		mg/kg	-	<0.50	mg/kg		ü	Tissue	Metals
MB	Lithium (Li)-Total	804300	WG2702663-1	<0.10		mg/kg wwt	-	<0.10	mg/kg wwt		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
MB	Lithium (Li)-Total	805064	WG2703646-1	<0.10		mg/kg wwt	-	<0.10	mg/kg wwt		ü	Tissue	Metals
MB	Lithium (Li)-Total	805430	WG2704091-1	<0.10		mg/kg wwt	-	<0.10	mg/kg wwt		ü	Tissue	Metals
MB	Lithium (Li)-Total	805445	WG2704117-5	<0.10		mg/kg wwt	-	<0.10	mg/kg wwt		ü	Tissue	Metals
MB	Magnesium (Mg)-Total	804300	WG2702663-1	<2.0		mg/kg	-	<2.0	mg/kg		ü	Tissue	Metals
MB	Magnesium (Mg)-Total	805064	WG2703646-1	<2.0		mg/kg	-	<2.0	mg/kg		ü	Tissue	Metals
MB	Magnesium (Mg)-Total	805430	WG2704091-1	<2.0		mg/kg	-	<2.0	mg/kg		ü	Tissue	Metals
MB	Magnesium (Mg)-Total	805445	WG2704117-5	<2.0		mg/kg	-	<2.0	mg/kg		ü	Tissue	Metals
MB	Magnesium (Mg)-Total	804300	WG2702663-1	<0.40		mg/kg wwt	-	<0.40	mg/kg wwt		ü	Tissue	Metals
MB	Magnesium (Mg)-Total	805064	WG2703646-1	<0.40		mg/kg wwt	-	<0.40	mg/kg wwt		ü	Tissue	Metals
MB	Magnesium (Mg)-Total	805430	WG2704091-1	<0.40		mg/kg wwt	-	<0.40	mg/kg wwt		ü	Tissue	Metals
MB	Magnesium (Mg)-Total	805445	WG2704117-5	<0.40		mg/kg wwt	-	<0.40	mg/kg wwt		ü	Tissue	Metals
MB	Manganese (Mn)-Total	804300	WG2702663-1	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Manganese (Mn)-Total	805064	WG2703646-1	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Manganese (Mn)-Total	805430	WG2704091-1	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Manganese (Mn)-Total	805445	WG2704117-5	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Manganese (Mn)-Total	804300	WG2702663-1	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Manganese (Mn)-Total	805064	WG2703646-1	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Manganese (Mn)-Total	805430	WG2704091-1	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Manganese (Mn)-Total	805445	WG2704117-5	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Mercury (Hg)-Total	804300	WG2702663-1	<0.0050		mg/kg	-	<0.0050	mg/kg		ü	Tissue	Metals
MB	Mercury (Hg)-Total	805064	WG2703646-1	<0.0050		mg/kg	-	<0.0050	mg/kg		ü	Tissue	Metals
MB	Mercury (Hg)-Total	805430	WG2704091-1	<0.0050		mg/kg	-	<0.0050	mg/kg		ü	Tissue	Metals
MB	Mercury (Hg)-Total	805445	WG2704117-5	<0.0050		mg/kg	-	<0.0050	mg/kg		ü	Tissue	Metals
MB	Mercury (Hg)-Total	804300	WG2702663-1	<0.0010		mg/kg wwt	-	<0.0010	mg/kg wwt		ü	Tissue	Metals
MB	Mercury (Hg)-Total	805064	WG2703646-1	<0.0010		mg/kg wwt	-	<0.0010	mg/kg wwt		ü	Tissue	Metals
MB	Mercury (Hg)-Total	805430	WG2704091-1	<0.0010		mg/kg wwt	-	<0.0010	mg/kg wwt		ü	Tissue	Metals
MB	Mercury (Hg)-Total	805445	WG2704117-5	<0.0010		mg/kg wwt	-	<0.0010	mg/kg wwt		ü	Tissue	Metals
MB	Molybdenum (Mo)-Tota	804300	WG2702663-1	<0.040		mg/kg	-	<0.040	mg/kg		ü	Tissue	Metals
MB	Molybdenum (Mo)-Tota	805064	WG2703646-1	<0.040		mg/kg	-	<0.040	mg/kg		ü	Tissue	Metals
MB	Molybdenum (Mo)-Tota	805430	WG2704091-1	<0.020		mg/kg	-	<0.020	mg/kg		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
MB	Molybdenum (Mo)-Tota	805445	WG2704117-5	<0.040		mg/kg	-	<0.040	mg/kg		ü	Tissue	Metals
MB	Molybdenum (Mo)-Tota	804300	WG2702663-1	<0.0080		mg/kg wwt	-	<0.0080	mg/kg wwt		ü	Tissue	Metals
MB	Molybdenum (Mo)-Tota	805064	WG2703646-1	<0.0080		mg/kg wwt	-	<0.0080	mg/kg wwt		ü	Tissue	Metals
MB	Molybdenum (Mo)-Tota	805430	WG2704091-1	<0.0040		mg/kg wwt	-	<0.0040	mg/kg wwt		ü	Tissue	Metals
MB	Molybdenum (Mo)-Tota	805445	WG2704117-5	<0.0080		mg/kg wwt	-	<0.0080	mg/kg wwt		ü	Tissue	Metals
MB	Nickel (Ni)-Total	804300	WG2702663-1	<0.20		mg/kg	-	<0.20	mg/kg		ü	Tissue	Metals
MB	Nickel (Ni)-Total	805064	WG2703646-1	<0.20		mg/kg	-	<0.20	mg/kg		ü	Tissue	Metals
MB	Nickel (Ni)-Total	805430	WG2704091-1	<0.20		mg/kg	-	<0.20	mg/kg		ü	Tissue	Metals
MB	Nickel (Ni)-Total	805445	WG2704117-5	<0.20		mg/kg	-	<0.20	mg/kg		ü	Tissue	Metals
MB	Nickel (Ni)-Total	804300	WG2702663-1	<0.040		mg/kg wwt	-	<0.040	mg/kg wwt		ü	Tissue	Metals
MB	Nickel (Ni)-Total	805064	WG2703646-1	<0.040		mg/kg wwt	-	<0.040	mg/kg wwt		ü	Tissue	Metals
MB	Nickel (Ni)-Total	805430	WG2704091-1	<0.040		mg/kg wwt	-	<0.040	mg/kg wwt		ü	Tissue	Metals
MB	Nickel (Ni)-Total	805445	WG2704117-5	<0.040		mg/kg wwt	-	<0.040	mg/kg wwt		ü	Tissue	Metals
MB	Phosphorus (P)-Total	804300	WG2702663-1	<10		mg/kg	-	<10	mg/kg		ü	Tissue	Metals
MB	Phosphorus (P)-Total	805064	WG2703646-1	<10		mg/kg	-	<10	mg/kg		ü	Tissue	Metals
MB	Phosphorus (P)-Total	805430	WG2704091-1	<10		mg/kg	-	<10	mg/kg		ü	Tissue	Metals
MB	Phosphorus (P)-Total	805445	WG2704117-5	<10		mg/kg	-	<10	mg/kg		ü	Tissue	Metals
MB	Phosphorus (P)-Total	804300	WG2702663-1	<2.0		mg/kg wwt	-	<2.0	mg/kg wwt		ü	Tissue	Metals
MB	Phosphorus (P)-Total	805064	WG2703646-1	<2.0		mg/kg wwt	-	<2.0	mg/kg wwt		ü	Tissue	Metals
MB	Phosphorus (P)-Total	805430	WG2704091-1	<2.0		mg/kg wwt	-	<2.0	mg/kg wwt		ü	Tissue	Metals
MB	Phosphorus (P)-Total	805445	WG2704117-5	<2.0		mg/kg wwt	-	<2.0	mg/kg wwt		ü	Tissue	Metals
MB	Potassium (K)-Total	804300	WG2702663-1	<20		mg/kg	-	<20	mg/kg		ü	Tissue	Metals
MB	Potassium (K)-Total	805064	WG2703646-1	<20		mg/kg	-	<20	mg/kg		ü	Tissue	Metals
MB	Potassium (K)-Total	805430	WG2704091-1	<20		mg/kg	-	<20	mg/kg		ü	Tissue	Metals
MB	Potassium (K)-Total	805445	WG2704117-5	<20		mg/kg	-	<20	mg/kg		ü	Tissue	Metals
MB	Potassium (K)-Total	804300	WG2702663-1	<4.0		mg/kg wwt	-	<4.0	mg/kg wwt		ü	Tissue	Metals
MB	Potassium (K)-Total	805064	WG2703646-1	<4.0		mg/kg wwt	-	<4.0	mg/kg wwt		ü	Tissue	Metals
MB	Potassium (K)-Total	805430	WG2704091-1	<4.0		mg/kg wwt	-	<4.0	mg/kg wwt		ü	Tissue	Metals
MB	Potassium (K)-Total	805445	WG2704117-5	<4.0		mg/kg wwt	-	<4.0	mg/kg wwt		ü	Tissue	Metals
MB	Rubidium (Rb)-Total	804300	WG2702663-1	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
MB	Rubidium (Rb)-Total	805064	WG2703646-1	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Rubidium (Rb)-Total	805430	WG2704091-1	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Rubidium (Rb)-Total	805445	WG2704117-5	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Rubidium (Rb)-Total	804300	WG2702663-1	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Rubidium (Rb)-Total	805064	WG2703646-1	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Rubidium (Rb)-Total	805430	WG2704091-1	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Rubidium (Rb)-Total	805445	WG2704117-5	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Selenium (Se)-Total	804300	WG2702663-1	<0.10		mg/kg	-	<0.10	mg/kg		ü	Tissue	Metals
MB	Selenium (Se)-Total	805064	WG2703646-1	<0.10		mg/kg	-	<0.10	mg/kg		ü	Tissue	Metals
MB	Selenium (Se)-Total	805430	WG2704091-1	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Selenium (Se)-Total	805445	WG2704117-5	<0.10		mg/kg	-	<0.10	mg/kg		ü	Tissue	Metals
MB	Selenium (Se)-Total	804300	WG2702663-1	<0.020		mg/kg wwt	-	<0.020	mg/kg wwt		ü	Tissue	Metals
MB	Selenium (Se)-Total	805064	WG2703646-1	<0.020		mg/kg wwt	-	<0.020	mg/kg wwt		ü	Tissue	Metals
MB	Selenium (Se)-Total	805430	WG2704091-1	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Selenium (Se)-Total	805445	WG2704117-5	<0.020		mg/kg wwt	-	<0.020	mg/kg wwt		ü	Tissue	Metals
MB	Silver (Ag)-Total	804300	WG2702663-1	<0.0050		mg/kg	-	<0.0050	mg/kg		ü	Tissue	Metals
MB	Silver (Ag)-Total	805064	WG2703646-1	<0.0050		mg/kg	-	<0.0050	mg/kg		ü	Tissue	Metals
MB	Silver (Ag)-Total	805430	WG2704091-1	<0.0050		mg/kg	-	<0.0050	mg/kg		ü	Tissue	Metals
MB	Silver (Ag)-Total	805445	WG2704117-5	<0.0050		mg/kg	-	<0.0050	mg/kg		ü	Tissue	Metals
MB	Silver (Ag)-Total	804300	WG2702663-1	<0.0010		mg/kg wwt	-	<0.0010	mg/kg wwt		ü	Tissue	Metals
MB	Silver (Ag)-Total	805064	WG2703646-1	<0.0010		mg/kg wwt	-	<0.0010	mg/kg wwt		ü	Tissue	Metals
MB	Silver (Ag)-Total	805430	WG2704091-1	<0.0010		mg/kg wwt	-	<0.0010	mg/kg wwt		ü	Tissue	Metals
MB	Silver (Ag)-Total	805445	WG2704117-5	<0.0010		mg/kg wwt	-	<0.0010	mg/kg wwt		ü	Tissue	Metals
MB	Sodium (Na)-Total	804300	WG2702663-1	<20		mg/kg	-	<20	mg/kg		ü	Tissue	Metals
MB	Sodium (Na)-Total	805064	WG2703646-1	<20		mg/kg	-	<20	mg/kg		ü	Tissue	Metals
MB	Sodium (Na)-Total	805430	WG2704091-1	<20		mg/kg	-	<20	mg/kg		ü	Tissue	Metals
MB	Sodium (Na)-Total	805445	WG2704117-5	<20		mg/kg	-	<20	mg/kg		ü	Tissue	Metals
MB	Sodium (Na)-Total	804300	WG2702663-1	<4.0		mg/kg wwt	-	<4.0	mg/kg wwt		ü	Tissue	Metals
MB	Sodium (Na)-Total	805064	WG2703646-1	<4.0		mg/kg wwt	-	<4.0	mg/kg wwt		ü	Tissue	Metals
MB	Sodium (Na)-Total	805430	WG2704091-1	<4.0		mg/kg wwt	-	<4.0	mg/kg wwt		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
MB	Sodium (Na)-Total	805445	WG2704117-5	<4.0		mg/kg wwt	-	<4.0	mg/kg wwt		ü	Tissue	Metals
MB	Strontium (Sr)-Total	804300	WG2702663-1	<0.10		mg/kg	-	<0.10	mg/kg		ü	Tissue	Metals
MB	Strontium (Sr)-Total	805064	WG2703646-1	<0.10		mg/kg	-	<0.10	mg/kg		ü	Tissue	Metals
MB	Strontium (Sr)-Total	805430	WG2704091-1	<0.050		mg/kg	-	<0.050	mg/kg		ü	Tissue	Metals
MB	Strontium (Sr)-Total	805445	WG2704117-5	<0.10		mg/kg	-	<0.10	mg/kg		ü	Tissue	Metals
MB	Strontium (Sr)-Total	804300	WG2702663-1	<0.020		mg/kg wwt	-	<0.020	mg/kg wwt		ü	Tissue	Metals
MB	Strontium (Sr)-Total	805064	WG2703646-1	<0.020		mg/kg wwt	-	<0.020	mg/kg wwt		ü	Tissue	Metals
MB	Strontium (Sr)-Total	805430	WG2704091-1	<0.010		mg/kg wwt	-	<0.010	mg/kg wwt		ü	Tissue	Metals
MB	Strontium (Sr)-Total	805445	WG2704117-5	<0.020		mg/kg wwt	-	<0.020	mg/kg wwt		ü	Tissue	Metals
MB	Tellurium (Te)-Total	804300	WG2702663-1	<0.020		mg/kg	-	<0.020	mg/kg		ü	Tissue	Metals
MB	Tellurium (Te)-Total	805064	WG2703646-1	<0.020		mg/kg	-	<0.020	mg/kg		ü	Tissue	Metals
MB	Tellurium (Te)-Total	805430	WG2704091-1	<0.020		mg/kg	-	<0.020	mg/kg		ü	Tissue	Metals
MB	Tellurium (Te)-Total	805445	WG2704117-5	<0.020		mg/kg	-	<0.020	mg/kg		ü	Tissue	Metals
MB	Tellurium (Te)-Total	804300	WG2702663-1	<0.0040		mg/kg wwt	-	<0.0040	mg/kg wwt		ü	Tissue	Metals
MB	Tellurium (Te)-Total	805064	WG2703646-1	<0.0040		mg/kg wwt	-	<0.0040	mg/kg wwt		ü	Tissue	Metals
MB	Tellurium (Te)-Total	805430	WG2704091-1	<0.0040		mg/kg wwt	-	<0.0040	mg/kg wwt		ü	Tissue	Metals
MB	Tellurium (Te)-Total	805445	WG2704117-5	<0.0040		mg/kg wwt	-	<0.0040	mg/kg wwt		ü	Tissue	Metals
MB	Thallium (Tl)-Total	804300	WG2702663-1	<0.0020		mg/kg	-	<0.0020	mg/kg		ü	Tissue	Metals
MB	Thallium (Tl)-Total	805064	WG2703646-1	<0.0020		mg/kg	-	<0.0020	mg/kg		ü	Tissue	Metals
MB	Thallium (Tl)-Total	805430	WG2704091-1	<0.0020		mg/kg	-	<0.0020	mg/kg		ü	Tissue	Metals
MB	Thallium (Tl)-Total	805445	WG2704117-5	<0.0020		mg/kg	-	<0.0020	mg/kg		ü	Tissue	Metals
MB	Thallium (Tl)-Total	804300	WG2702663-1	<0.00040		mg/kg wwt	-	<0.00040	mg/kg wwt		ü	Tissue	Metals
MB	Thallium (Tl)-Total	805064	WG2703646-1	<0.00040		mg/kg wwt	-	<0.00040	mg/kg wwt		ü	Tissue	Metals
MB	Thallium (Tl)-Total	805430	WG2704091-1	<0.00040		mg/kg wwt	-	<0.00040	mg/kg wwt		ü	Tissue	Metals
MB	Thallium (Tl)-Total	805445	WG2704117-5	<0.00040		mg/kg wwt	-	<0.00040	mg/kg wwt		ü	Tissue	Metals
MB	Tin (Sn)-Total	804300	WG2702663-1	<0.10		mg/kg	-	<0.10	mg/kg		ü	Tissue	Metals
MB	Tin (Sn)-Total	805064	WG2703646-1	<0.10		mg/kg	-	<0.10	mg/kg		ü	Tissue	Metals
MB	Tin (Sn)-Total	805430	WG2704091-1	<0.10		mg/kg	-	<0.10	mg/kg		ü	Tissue	Metals
MB	Tin (Sn)-Total	805445	WG2704117-5	<0.10		mg/kg	-	<0.10	mg/kg		ü	Tissue	Metals
MB	Tin (Sn)-Total	804300	WG2702663-1	<0.020		mg/kg wwt	-	<0.020	mg/kg wwt		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
MB	Tin (Sn)-Total	805064	WG2703646-1	<0.020		mg/kg wwt	-	<0.020	mg/kg wwt		ü	Tissue	Metals
MB	Tin (Sn)-Total	805430	WG2704091-1	<0.020		mg/kg wwt	-	<0.020	mg/kg wwt		ü	Tissue	Metals
MB	Tin (Sn)-Total	805445	WG2704117-5	<0.020		mg/kg wwt	-	<0.020	mg/kg wwt		ü	Tissue	Metals
MB	Uranium (U)-Total	804300	WG2702663-1	<0.0020		mg/kg	-	<0.0020	mg/kg		ü	Tissue	Metals
MB	Uranium (U)-Total	805064	WG2703646-1	<0.0020		mg/kg	-	<0.0020	mg/kg		ü	Tissue	Metals
MB	Uranium (U)-Total	805430	WG2704091-1	<0.0020		mg/kg	-	<0.0020	mg/kg		ü	Tissue	Metals
MB	Uranium (U)-Total	805445	WG2704117-5	<0.0020		mg/kg	-	<0.0020	mg/kg		ü	Tissue	Metals
MB	Uranium (U)-Total	804300	WG2702663-1	<0.00040		mg/kg wwt	-	<0.00040	mg/kg wwt		ü	Tissue	Metals
MB	Uranium (U)-Total	805064	WG2703646-1	<0.00040		mg/kg wwt	-	<0.00040	mg/kg wwt		ü	Tissue	Metals
MB	Uranium (U)-Total	805430	WG2704091-1	<0.00040		mg/kg wwt	-	<0.00040	mg/kg wwt		ü	Tissue	Metals
MB	Uranium (U)-Total	805445	WG2704117-5	<0.00040		mg/kg wwt	-	<0.00040	mg/kg wwt		ü	Tissue	Metals
MB	Vanadium (V)-Total	804300	WG2702663-1	<0.10		mg/kg	-	<0.10	mg/kg		ü	Tissue	Metals
MB	Vanadium (V)-Total	805064	WG2703646-1	<0.10		mg/kg	-	<0.10	mg/kg		ü	Tissue	Metals
MB	Vanadium (V)-Total	805430	WG2704091-1	<0.10		mg/kg	-	<0.10	mg/kg		ü	Tissue	Metals
MB	Vanadium (V)-Total	805445	WG2704117-5	<0.10		mg/kg	-	<0.10	mg/kg		ü	Tissue	Metals
MB	Vanadium (V)-Total	804300	WG2702663-1	<0.020		mg/kg wwt	-	<0.020	mg/kg wwt		ü	Tissue	Metals
MB	Vanadium (V)-Total	805064	WG2703646-1	<0.020		mg/kg wwt	-	<0.020	mg/kg wwt		ü	Tissue	Metals
MB	Vanadium (V)-Total	805430	WG2704091-1	<0.020		mg/kg wwt	-	<0.020	mg/kg wwt		ü	Tissue	Metals
MB	Vanadium (V)-Total	805445	WG2704117-5	<0.020		mg/kg wwt	-	<0.020	mg/kg wwt		ü	Tissue	Metals
MB	Zinc (Zn)-Total	804300	WG2702663-1	<1.0		mg/kg	-	<1.0	mg/kg		ü	Tissue	Metals
MB	Zinc (Zn)-Total	805064	WG2703646-1	<1.0		mg/kg	-	<1.0	mg/kg		ü	Tissue	Metals
MB	Zinc (Zn)-Total	805430	WG2704091-1	<0.50		mg/kg	-	<0.50	mg/kg		ü	Tissue	Metals
MB	Zinc (Zn)-Total	805445	WG2704117-5	<1.0		mg/kg	-	<1.0	mg/kg		ü	Tissue	Metals
MB	Zinc (Zn)-Total	804300	WG2702663-1	<0.20		mg/kg wwt	-	<0.20	mg/kg wwt		ü	Tissue	Metals
MB	Zinc (Zn)-Total	805064	WG2703646-1	<0.20		mg/kg wwt	-	<0.20	mg/kg wwt		ü	Tissue	Metals
MB	Zinc (Zn)-Total	805430	WG2704091-1	<0.10		mg/kg wwt	-	<0.10	mg/kg wwt		ü	Tissue	Metals
MB	Zinc (Zn)-Total	805445	WG2704117-5	<0.20		mg/kg wwt	-	<0.20	mg/kg wwt		ü	Tissue	Metals
MB	Zirconium (Zr)-Total	804300	WG2702663-1	<0.20		mg/kg	-	<0.20	mg/kg		ü	Tissue	Metals
MB	Zirconium (Zr)-Total	805064	WG2703646-1	<0.20		mg/kg	-	<0.20	mg/kg		ü	Tissue	Metals
MB	Zirconium (Zr)-Total	805430	WG2704091-1	<0.20		mg/kg	-	<0.20	mg/kg		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Quality Control L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Qualifier Legend

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

Evaluation Legend

ü QC Lot met ALS Data Quality Objectives
û QC Lot did not meet ALS Data Quality Objectives

QC Type	Analyte	QC Lot #	ALS QC ID	Result	Target	Units	%	Limit	Units	Qual	Eval	Matrix	Class
MB	Zirconium (Zr)-Total	805445	WG2704117-5	<0.20		mg/kg	-	<0.20	mg/kg		ü	Tissue	Metals
MB	Zirconium (Zr)-Total	804300	WG2702663-1	<0.040		mg/kg wwt	-	<0.040	mg/kg wwt		ü	Tissue	Metals
MB	Zirconium (Zr)-Total	805064	WG2703646-1	<0.040		mg/kg wwt	-	<0.040	mg/kg wwt		ü	Tissue	Metals
MB	Zirconium (Zr)-Total	805430	WG2704091-1	<0.040		mg/kg wwt	-	<0.040	mg/kg wwt		ü	Tissue	Metals
MB	Zirconium (Zr)-Total	805445	WG2704117-5	<0.040		mg/kg wwt	-	<0.040	mg/kg wwt		ü	Tissue	Metals

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Methodology L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

ALS Test Code	ALS Test Description	Lab Location	Matrix	Method Reference	Methodology Description
Physical Tests (Tissue)					
MOISTURE-MICR-VA	Moisture in Tissue	Vancouver	Tissue	Puget Sound WQ Authority, Apr 1997	This analysis is carried out gravimetrically by drying the sample at <60 deg. C.
MOISTURE-TISS-VA	% Moisture in Tissues	Vancouver	Tissue	Puget Sound WQ Authority, Apr 1997	This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.
Metals (Tissue)					
AG-DRY-CCMS-N-VA	Silver in Tissue by CRC ICPMS (DRY)	Vancouver	Tissue	EPA 200.3/6020A	This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A). Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
AG-DRY-MICR-HRMS-V	Silver in Tissue by HR-ICPMS Micro (DRY)	Vancouver	Tissue	EPA 200.3/200.8	Trace metals in tissue are analyzed by high resolution inductively coupled plasma mass spectrometry (HR-ICPMS) modified from US EPA Method 200.8, (Revision 5.5). The sample preparation procedure is modified from US EPA 200.3. Analytical results are reported on dry weight basis.
AG-WET-CCMS-N-VA	Silver in Tissue by CRC ICPMS (WET)	Vancouver	Tissue	EPA 200.3/6020A	This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A). Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Methodology L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

ALS Test Code	ALS Test Description	Lab Location	Matrix	Method Reference	Methodology Description
AG-WET-MICR-HRMS-V	Silver in Tissue by HR-ICPMS Micro (WET)	Vancouver	Tissue	EPA 200.3/200.8	Trace metals in tissue are analyzed by high resolution inductively coupled plasma mass spectrometry (HR-ICPMS) modified from US EPA Method 200.8, (Revision 5.5). The sample preparation procedure is modified from US EPA 200.3. Analytical results are reported on wet weight basis.
HG-DRY-CVAFS-N-VA	Mercury in Tissue by CVAFS (DRY)	Vancouver	Tissue	EPA 200.3, EPA 245.7	This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Analysis is by atomic fluorescence spectrophotometry or atomic absorption spectrophotometry, adapted from US EPA Method 245.7.
HG-DRY-MICR-CVAF-V	Mercury in Tissue by CVAFS Micro (DRY)	Vancouver	Tissue	EPA 200.3, EPA 245.7	This method is adapted from US EPA Method 200.3 "Sample Procedures for Spectrochemical Determination of Total Recoverable Elements in Biological Tissues" (1996). Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with repeated additions of hydrogen peroxide. Analysis is by atomic fluorescence spectrophotometry or atomic absorption spectrophotometry, adapted from US EPA Method 245.7.
HG-WET-CVAFS-N-VA	Mercury in Tissue by CVAFS (WET)	Vancouver	Tissue	EPA 200.3, EPA 245.7	This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Analysis is by atomic fluorescence spectrophotometry or atomic absorption spectrophotometry, adapted from US EPA Method 245.7.
HG-WET-MICR-CVAF-V	Mercury in Tissue by CVAFS Micro (WET)	Vancouver	Tissue	EPA 200.3, EPA 245.7	This method is adapted from US EPA Method 200.3 "Sample Procedures for Spectrochemical Determination of Total Recoverable Elements in Biological Tissues" (1996). Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with repeated additions of hydrogen peroxide. Analysis is by atomic fluorescence spectrophotometry or atomic absorption spectrophotometry, adapted from US EPA Method 245.7.

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Methodology L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

ALS Test Code	ALS Test Description	Lab Location	Matrix	Method Reference	Methodology Description
MET-DRY-CCMS-N-VA	Metals in Tissue by CRC ICPMS (DRY)	Vancouver	Tissue	EPA 200.3/6020A	This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A). Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
MET-DRY-MICR-HRMS-	Metals in Tissue by HR-ICPMS Micro (DRY)	Vancouver	Tissue	EPA 200.3/200.8	Trace metals in tissue are analyzed by high resolution inductively coupled plasma mass spectrometry (HR-ICPMS) modified from US EPA Method 200.8, (Revision 5.5). The sample preparation procedure is modified from US EPA 200.3. Analytical results are reported on dry weight basis. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
MET-WET-CCMS-N-VA	Metals in Tissue by CRC ICPMS (WET)	Vancouver	Tissue	EPA 200.3/6020A	This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A). Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Methodology L2019410

Job Reference	0403488-0008
Report To	Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received	7-Nov-2017 22:49
Report Date	31-Jan-2018 15:34
Report Version	1

ALS Test Code	ALS Test Description	Lab Location	Matrix	Method Reference	Methodology Description
MET-WET-MICR-HRMS	Metals in Tissue by HR-ICPMS Micro (WET)	Vancouver	Tissue	EPA 200.3/200.8	Trace metals in tissue are analyzed by high resolution inductively coupled plasma mass spectrometry (HR-ICPMS) modified from US EPA Method 200.8, (Revision 5.5). The sample preparation procedure is modified from US EPA 200.3. Analytical results are reported on wet weight basis. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Detection Limits L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
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Report Version 1

Client Sample ID		505-8	505-9	505-10	505-11	505-12	505-13	505-14	505-15	501-11	501-12	501-13	501-14	501-15	501-16	501-17	501-18	511-10
Date Sampled		11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017
Time Sampled		0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID		L2019410-1	L2019410-2	L2019410-3	L2019410-4	L2019410-5	L2019410-6	L2019410-7	L2019410-8	L2019410-9	L2019410-10	L2019410-11	L2019410-12	L2019410-13	L2019410-14	L2019410-15	L2019410-16	L2019410-17
Parameter	Units	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Physical Tests (Tissue)																		
% Moisture	%	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.50	2.0	2.0	0.50
Metals (Tissue)																		
Aluminum (Al)-Total	mg/kg	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	2.0	5.0	5.0	2.0
Aluminum (Al)-Total	mg/kg wwt	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.40	1.0	1.0	0.40
Antimony (Sb)-Total	mg/kg	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Antimony (Sb)-Total	mg/kg wwt	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Arsenic (As)-Total	mg/kg	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.020	0.030	0.030	0.020
Arsenic (As)-Total	mg/kg wwt	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0040	0.0060	0.0060	0.0040
Barium (Ba)-Total	mg/kg	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Barium (Ba)-Total	mg/kg wwt	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Beryllium (Be)-Total	mg/kg	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Beryllium (Be)-Total	mg/kg wwt	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Bismuth (Bi)-Total	mg/kg	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Bismuth (Bi)-Total	mg/kg wwt	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Boron (B)-Total	mg/kg	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Boron (B)-Total	mg/kg wwt	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Cadmium (Cd)-Total	mg/kg	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.0050	0.010	0.010	0.0050
Cadmium (Cd)-Total	mg/kg wwt	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0010	0.0020	0.0020	0.0010
Calcium (Ca)-Total	mg/kg	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Calcium (Ca)-Total	mg/kg wwt	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Cesium (Cs)-Total	mg/kg	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Cesium (Cs)-Total	mg/kg wwt	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Chromium (Cr)-Total	mg/kg	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.050	0.20	0.20	0.050
Chromium (Cr)-Total	mg/kg wwt	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.010	0.040	0.040	0.010
Cobalt (Co)-Total	mg/kg	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Cobalt (Co)-Total	mg/kg wwt	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040
Copper (Cu)-Total	mg/kg	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.20	0.20	0.10
Copper (Cu)-Total	mg/kg wwt	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.020	0.040	0.040	0.020
Iron (Fe)-Total	mg/kg	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0
Iron (Fe)-Total	mg/kg wwt	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.60	1.0	1.0	0.60
Lead (Pb)-Total	mg/kg	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.020	0.050	0.050	0.020
Lead (Pb)-Total	mg/kg wwt	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.0040	0.010	0.010	0.0040
Lithium (Li)-Total	mg/kg	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Lithium (Li)-Total	mg/kg wwt	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Magnesium (Mg)-Total	mg/kg	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Magnesium (Mg)-Total	mg/kg wwt	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Detection Limits L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Client Sample ID		511-11	511-12	511-13	511-14	511-15	511-16	511-17	508-5	508-6	508-7	508-8	508-9	508-10	508-11	508-12	509-6
Date Sampled		12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017
Time Sampled		0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID		L2019410-18	L2019410-19	L2019410-20	L2019410-21	L2019410-22	L2019410-23	L2019410-24	L2019410-25	L2019410-26	L2019410-27	L2019410-28	L2019410-29	L2019410-30	L2019410-31	L2019410-32	L2019410-33
Parameter	Units	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Physical Tests (Tissue)																	
% Moisture	%	0.50	2.0	2.0	2.0	2.0	2.0	0.50	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Metals (Tissue)																	
Aluminum (Al)-Total	mg/kg	2.0	5.0	5.0	5.0	5.0	5.0	2.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Aluminum (Al)-Total	mg/kg wwt	0.40	1.0	1.0	1.0	1.0	1.0	0.40	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Antimony (Sb)-Total	mg/kg	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Antimony (Sb)-Total	mg/kg wwt	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Arsenic (As)-Total	mg/kg	0.020	0.030	0.030	0.030	0.030	0.030	0.020	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
Arsenic (As)-Total	mg/kg wwt	0.0040	0.0060	0.0060	0.0060	0.0060	0.0060	0.0040	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
Barium (Ba)-Total	mg/kg	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Barium (Ba)-Total	mg/kg wwt	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Beryllium (Be)-Total	mg/kg	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Beryllium (Be)-Total	mg/kg wwt	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Bismuth (Bi)-Total	mg/kg	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Bismuth (Bi)-Total	mg/kg wwt	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Boron (B)-Total	mg/kg	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Boron (B)-Total	mg/kg wwt	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Cadmium (Cd)-Total	mg/kg	0.0050	0.010	0.010	0.010	0.010	0.010	0.0050	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Cadmium (Cd)-Total	mg/kg wwt	0.0010	0.0020	0.0020	0.0020	0.0020	0.0020	0.0010	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Calcium (Ca)-Total	mg/kg	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Calcium (Ca)-Total	mg/kg wwt	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Cesium (Cs)-Total	mg/kg	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Cesium (Cs)-Total	mg/kg wwt	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Chromium (Cr)-Total	mg/kg	0.050	0.20	0.20	0.20	0.20	0.20	0.050	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Chromium (Cr)-Total	mg/kg wwt	0.010	0.040	0.040	0.040	0.040	0.040	0.010	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
Cobalt (Co)-Total	mg/kg	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Cobalt (Co)-Total	mg/kg wwt	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040
Copper (Cu)-Total	mg/kg	0.10	0.20	0.20	0.20	0.20	0.20	0.10	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Copper (Cu)-Total	mg/kg wwt	0.020	0.040	0.040	0.040	0.040	0.040	0.020	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
Iron (Fe)-Total	mg/kg	3.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Iron (Fe)-Total	mg/kg wwt	0.60	1.0	1.0	1.0	1.0	1.0	0.60	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead (Pb)-Total	mg/kg	0.020	0.050	0.050	0.050	0.050	0.050	0.020	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Lead (Pb)-Total	mg/kg wwt	0.0040	0.010	0.010	0.010	0.010	0.010	0.0040	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Lithium (Li)-Total	mg/kg	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Lithium (Li)-Total	mg/kg wwt	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Magnesium (Mg)-Total	mg/kg	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Magnesium (Mg)-Total	mg/kg wwt	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Detection Limits L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Client Sample ID		509-7	509-8	509-9	509-10	509-11	509-12	509-13	502-10	502-11	502-12	502-13	502-14	502-15	502-16	502-17	512-6
Date Sampled		13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017
Time Sampled		0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID		L2019410-34	L2019410-35	L2019410-36	L2019410-37	L2019410-38	L2019410-39	L2019410-40	L2019410-41	L2019410-42	L2019410-43	L2019410-44	L2019410-45	L2019410-46	L2019410-47	L2019410-48	L2019410-49
Parameter	Units	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Physical Tests (Tissue)																	
% Moisture	%	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.50
Metals (Tissue)																	
Aluminum (Al)-Total	mg/kg	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	2.0
Aluminum (Al)-Total	mg/kg wwt	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.40
Antimony (Sb)-Total	mg/kg	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Antimony (Sb)-Total	mg/kg wwt	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Arsenic (As)-Total	mg/kg	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.020
Arsenic (As)-Total	mg/kg wwt	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0040
Barium (Ba)-Total	mg/kg	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Barium (Ba)-Total	mg/kg wwt	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Beryllium (Be)-Total	mg/kg	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Beryllium (Be)-Total	mg/kg wwt	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Bismuth (Bi)-Total	mg/kg	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Bismuth (Bi)-Total	mg/kg wwt	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Boron (B)-Total	mg/kg	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Boron (B)-Total	mg/kg wwt	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Cadmium (Cd)-Total	mg/kg	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.0050
Cadmium (Cd)-Total	mg/kg wwt	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0010
Calcium (Ca)-Total	mg/kg	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Calcium (Ca)-Total	mg/kg wwt	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Cesium (Cs)-Total	mg/kg	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Cesium (Cs)-Total	mg/kg wwt	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Chromium (Cr)-Total	mg/kg	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.050
Chromium (Cr)-Total	mg/kg wwt	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.010
Cobalt (Co)-Total	mg/kg	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Cobalt (Co)-Total	mg/kg wwt	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040
Copper (Cu)-Total	mg/kg	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10
Copper (Cu)-Total	mg/kg wwt	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.020
Iron (Fe)-Total	mg/kg	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	3.0
Iron (Fe)-Total	mg/kg wwt	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.60
Lead (Pb)-Total	mg/kg	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.020
Lead (Pb)-Total	mg/kg wwt	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.0040
Lithium (Li)-Total	mg/kg	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Lithium (Li)-Total	mg/kg wwt	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Magnesium (Mg)-Total	mg/kg	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Magnesium (Mg)-Total	mg/kg wwt	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Detection Limits L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Client Sample ID		512-7	512-8	512-9	512-10	512-11	512-12	512-13
Date Sampled		14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017
Time Sampled		0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID		L2019410-50	L2019410-51	L2019410-52	L2019410-53	L2019410-54	L2019410-55	L2019410-56
Parameter	Units	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Physical Tests (Tissue)								
% Moisture	%	2.0	2.0	2.0	2.0	2.0	0.50	0.50
Metals (Tissue)								
Aluminum (Al)-Total	mg/kg	5.0	5.0	5.0	5.0	5.0	2.0	2.0
Aluminum (Al)-Total	mg/kg wwt	1.0	1.0	1.0	1.0	1.0	0.40	0.40
Antimony (Sb)-Total	mg/kg	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Antimony (Sb)-Total	mg/kg wwt	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Arsenic (As)-Total	mg/kg	0.030	0.030	0.030	0.030	0.030	0.020	0.020
Arsenic (As)-Total	mg/kg wwt	0.0060	0.0060	0.0060	0.0060	0.0060	0.0040	0.0040
Barium (Ba)-Total	mg/kg	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Barium (Ba)-Total	mg/kg wwt	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Beryllium (Be)-Total	mg/kg	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Beryllium (Be)-Total	mg/kg wwt	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Bismuth (Bi)-Total	mg/kg	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Bismuth (Bi)-Total	mg/kg wwt	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Boron (B)-Total	mg/kg	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Boron (B)-Total	mg/kg wwt	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Cadmium (Cd)-Total	mg/kg	0.010	0.010	0.010	0.010	0.010	0.0050	0.0050
Cadmium (Cd)-Total	mg/kg wwt	0.0020	0.0020	0.0020	0.0020	0.0020	0.0010	0.0010
Calcium (Ca)-Total	mg/kg	20	20	20	20	20	20	20
Calcium (Ca)-Total	mg/kg wwt	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Cesium (Cs)-Total	mg/kg	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Cesium (Cs)-Total	mg/kg wwt	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Chromium (Cr)-Total	mg/kg	0.20	0.20	0.20	0.20	0.20	0.050	0.050
Chromium (Cr)-Total	mg/kg wwt	0.040	0.040	0.040	0.040	0.040	0.010	0.010
Cobalt (Co)-Total	mg/kg	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Cobalt (Co)-Total	mg/kg wwt	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040
Copper (Cu)-Total	mg/kg	0.20	0.20	0.20	0.20	0.20	0.10	0.10
Copper (Cu)-Total	mg/kg wwt	0.040	0.040	0.040	0.040	0.040	0.020	0.020
Iron (Fe)-Total	mg/kg	5.0	5.0	5.0	5.0	5.0	3.0	3.0
Iron (Fe)-Total	mg/kg wwt	1.0	1.0	1.0	1.0	1.0	0.60	0.60
Lead (Pb)-Total	mg/kg	0.050	0.050	0.050	0.050	0.050	0.020	0.020
Lead (Pb)-Total	mg/kg wwt	0.010	0.010	0.010	0.010	0.010	0.0040	0.0040
Lithium (Li)-Total	mg/kg	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Lithium (Li)-Total	mg/kg wwt	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Magnesium (Mg)-Total	mg/kg	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Magnesium (Mg)-Total	mg/kg wwt	0.40	0.40	0.40	0.40	0.40	0.40	0.40

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Detection Limits L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Client Sample ID		505-8	505-9	505-10	505-11	505-12	505-13	505-14	505-15	501-11	501-12	501-13	501-14	501-15	501-16	501-17	501-18	511-10
Date Sampled		11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	11-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017
Time Sampled		0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID		L2019410-1	L2019410-2	L2019410-3	L2019410-4	L2019410-5	L2019410-6	L2019410-7	L2019410-8	L2019410-9	L2019410-10	L2019410-11	L2019410-12	L2019410-13	L2019410-14	L2019410-15	L2019410-16	L2019410-17
Parameter	Units	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Manganese (Mn)-Total	mg/kg	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Manganese (Mn)-Total	mg/kg wwt	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Mercury (Hg)-Total	mg/kg	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Mercury (Hg)-Total	mg/kg wwt	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Molybdenum (Mo)-Total	mg/kg	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.020	0.040	0.040	0.020
Molybdenum (Mo)-Total	mg/kg wwt	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0040	0.0080	0.0080	0.0040
Nickel (Ni)-Total	mg/kg	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Nickel (Ni)-Total	mg/kg wwt	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
Phosphorus (P)-Total	mg/kg	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Phosphorus (P)-Total	mg/kg wwt	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Potassium (K)-Total	mg/kg	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Potassium (K)-Total	mg/kg wwt	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Rubidium (Rb)-Total	mg/kg	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Rubidium (Rb)-Total	mg/kg wwt	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Selenium (Se)-Total	mg/kg	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.050	0.10	0.10	0.050
Selenium (Se)-Total	mg/kg wwt	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.010	0.020	0.020	0.010
Silver (Ag)-Total	mg/kg	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Silver (Ag)-Total	mg/kg wwt	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Sodium (Na)-Total	mg/kg	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Sodium (Na)-Total	mg/kg wwt	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Strontium (Sr)-Total	mg/kg	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.050	0.10	0.10	0.050
Strontium (Sr)-Total	mg/kg wwt	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.010	0.020	0.020	0.010
Tellurium (Te)-Total	mg/kg	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Tellurium (Te)-Total	mg/kg wwt	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040
Thallium (Tl)-Total	mg/kg	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Thallium (Tl)-Total	mg/kg wwt	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040
Tin (Sn)-Total	mg/kg	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Tin (Sn)-Total	mg/kg wwt	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Uranium (U)-Total	mg/kg	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Uranium (U)-Total	mg/kg wwt	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040
Vanadium (V)-Total	mg/kg	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Vanadium (V)-Total	mg/kg wwt	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Zinc (Zn)-Total	mg/kg	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.50	1.0	1.0	0.50
Zinc (Zn)-Total	mg/kg wwt	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.20	0.20	0.10
Zirconium (Zr)-Total	mg/kg	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Zirconium (Zr)-Total	mg/kg wwt	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Detection Limits L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Client Sample ID		511-11	511-12	511-13	511-14	511-15	511-16	511-17	508-5	508-6	508-7	508-8	508-9	508-10	508-11	508-12	509-6
Date Sampled		12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	12-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017
Time Sampled		0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID		L2019410-18	L2019410-19	L2019410-20	L2019410-21	L2019410-22	L2019410-23	L2019410-24	L2019410-25	L2019410-26	L2019410-27	L2019410-28	L2019410-29	L2019410-30	L2019410-31	L2019410-32	L2019410-33
Parameter	Units	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Manganese (Mn)-Total	mg/kg	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Manganese (Mn)-Total	mg/kg wwt	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Mercury (Hg)-Total	mg/kg	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Mercury (Hg)-Total	mg/kg wwt	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Molybdenum (Mo)-Total	mg/kg	0.020	0.040	0.040	0.040	0.040	0.040	0.020	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
Molybdenum (Mo)-Total	mg/kg wwt	0.0040	0.0080	0.0080	0.0080	0.0080	0.0080	0.0040	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
Nickel (Ni)-Total	mg/kg	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Nickel (Ni)-Total	mg/kg wwt	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
Phosphorus (P)-Total	mg/kg	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Phosphorus (P)-Total	mg/kg wwt	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Potassium (K)-Total	mg/kg	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Potassium (K)-Total	mg/kg wwt	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Rubidium (Rb)-Total	mg/kg	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Rubidium (Rb)-Total	mg/kg wwt	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Selenium (Se)-Total	mg/kg	0.050	0.10	0.10	0.10	0.10	0.10	0.050	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Selenium (Se)-Total	mg/kg wwt	0.010	0.020	0.020	0.020	0.020	0.020	0.010	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Silver (Ag)-Total	mg/kg	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Silver (Ag)-Total	mg/kg wwt	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Sodium (Na)-Total	mg/kg	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Sodium (Na)-Total	mg/kg wwt	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Strontium (Sr)-Total	mg/kg	0.050	0.10	0.10	0.10	0.10	0.10	0.050	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Strontium (Sr)-Total	mg/kg wwt	0.010	0.020	0.020	0.020	0.020	0.020	0.010	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Tellurium (Te)-Total	mg/kg	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Tellurium (Te)-Total	mg/kg wwt	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040
Thallium (Tl)-Total	mg/kg	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Thallium (Tl)-Total	mg/kg wwt	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040
Tin (Sn)-Total	mg/kg	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Tin (Sn)-Total	mg/kg wwt	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Uranium (U)-Total	mg/kg	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Uranium (U)-Total	mg/kg wwt	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040
Vanadium (V)-Total	mg/kg	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Vanadium (V)-Total	mg/kg wwt	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Zinc (Zn)-Total	mg/kg	0.50	1.0	1.0	1.0	1.0	1.0	0.50	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Zinc (Zn)-Total	mg/kg wwt	0.10	0.20	0.20	0.20	0.20	0.20	0.10	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Zirconium (Zr)-Total	mg/kg	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Zirconium (Zr)-Total	mg/kg wwt	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Detection Limits L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Client Sample ID		509-7	509-8	509-9	509-10	509-11	509-12	509-13	502-10	502-11	502-12	502-13	502-14	502-15	502-16	502-17	512-6
Date Sampled		13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	13-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017
Time Sampled		0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID		L2019410-34	L2019410-35	L2019410-36	L2019410-37	L2019410-38	L2019410-39	L2019410-40	L2019410-41	L2019410-42	L2019410-43	L2019410-44	L2019410-45	L2019410-46	L2019410-47	L2019410-48	L2019410-49
Parameter	Units	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Manganese (Mn)-Total	mg/kg	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Manganese (Mn)-Total	mg/kg wwt	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Mercury (Hg)-Total	mg/kg	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Mercury (Hg)-Total	mg/kg wwt	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Molybdenum (Mo)-Total	mg/kg	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.020
Molybdenum (Mo)-Total	mg/kg wwt	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0040
Nickel (Ni)-Total	mg/kg	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Nickel (Ni)-Total	mg/kg wwt	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
Phosphorus (P)-Total	mg/kg	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Phosphorus (P)-Total	mg/kg wwt	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Potassium (K)-Total	mg/kg	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Potassium (K)-Total	mg/kg wwt	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Rubidium (Rb)-Total	mg/kg	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Rubidium (Rb)-Total	mg/kg wwt	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Selenium (Se)-Total	mg/kg	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.050
Selenium (Se)-Total	mg/kg wwt	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.010
Silver (Ag)-Total	mg/kg	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Silver (Ag)-Total	mg/kg wwt	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Sodium (Na)-Total	mg/kg	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Sodium (Na)-Total	mg/kg wwt	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Strontium (Sr)-Total	mg/kg	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.050
Strontium (Sr)-Total	mg/kg wwt	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.010
Tellurium (Te)-Total	mg/kg	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Tellurium (Te)-Total	mg/kg wwt	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040
Thallium (Tl)-Total	mg/kg	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Thallium (Tl)-Total	mg/kg wwt	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040
Tin (Sn)-Total	mg/kg	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Tin (Sn)-Total	mg/kg wwt	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Uranium (U)-Total	mg/kg	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Uranium (U)-Total	mg/kg wwt	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040
Vanadium (V)-Total	mg/kg	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Vanadium (V)-Total	mg/kg wwt	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Zinc (Zn)-Total	mg/kg	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.50
Zinc (Zn)-Total	mg/kg wwt	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10
Zirconium (Zr)-Total	mg/kg	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Zirconium (Zr)-Total	mg/kg wwt	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040

Appendix 11-D. Tissue Metals Analysis and Quality Assurance/Quality Control Results

Detection Limits L2019410

Job Reference 0403488-0008
Report To Genevieve Morinville, ERM Consultants Canada Ltd.
Date Received 7-Nov-2017 22:49
Report Date 31-Jan-2018 15:34
Report Version 1

Client Sample ID		512-7	512-8	512-9	512-10	512-11	512-12	512-13
Date Sampled		14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017	14-Oct-2017
Time Sampled		0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID		L2019410-50	L2019410-51	L2019410-52	L2019410-53	L2019410-54	L2019410-55	L2019410-56
Parameter	Units	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Manganese (Mn)-Total	mg/kg	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Manganese (Mn)-Total	mg/kg wwt	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Mercury (Hg)-Total	mg/kg	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Mercury (Hg)-Total	mg/kg wwt	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Molybdenum (Mo)-Total	mg/kg	0.040	0.040	0.040	0.040	0.040	0.020	0.020
Molybdenum (Mo)-Total	mg/kg wwt	0.0080	0.0080	0.0080	0.0080	0.0080	0.0040	0.0040
Nickel (Ni)-Total	mg/kg	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Nickel (Ni)-Total	mg/kg wwt	0.040	0.040	0.040	0.040	0.040	0.040	0.040
Phosphorus (P)-Total	mg/kg	10	10	10	10	10	10	10
Phosphorus (P)-Total	mg/kg wwt	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Potassium (K)-Total	mg/kg	20	20	20	20	20	20	20
Potassium (K)-Total	mg/kg wwt	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Rubidium (Rb)-Total	mg/kg	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Rubidium (Rb)-Total	mg/kg wwt	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Selenium (Se)-Total	mg/kg	0.10	0.10	0.10	0.10	0.10	0.050	0.050
Selenium (Se)-Total	mg/kg wwt	0.020	0.020	0.020	0.020	0.020	0.010	0.010
Silver (Ag)-Total	mg/kg	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Silver (Ag)-Total	mg/kg wwt	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Sodium (Na)-Total	mg/kg	20	20	20	20	20	20	20
Sodium (Na)-Total	mg/kg wwt	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Strontium (Sr)-Total	mg/kg	0.10	0.10	0.10	0.10	0.10	0.050	0.050
Strontium (Sr)-Total	mg/kg wwt	0.020	0.020	0.020	0.020	0.020	0.010	0.010
Tellurium (Te)-Total	mg/kg	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Tellurium (Te)-Total	mg/kg wwt	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040
Thallium (Tl)-Total	mg/kg	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Thallium (Tl)-Total	mg/kg wwt	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040
Tin (Sn)-Total	mg/kg	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Tin (Sn)-Total	mg/kg wwt	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Uranium (U)-Total	mg/kg	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Uranium (U)-Total	mg/kg wwt	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040	0.00040
Vanadium (V)-Total	mg/kg	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Vanadium (V)-Total	mg/kg wwt	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Zinc (Zn)-Total	mg/kg	1.0	1.0	1.0	1.0	1.0	0.50	0.50
Zinc (Zn)-Total	mg/kg wwt	0.20	0.20	0.20	0.20	0.20	0.10	0.10
Zirconium (Zr)-Total	mg/kg	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Zirconium (Zr)-Total	mg/kg wwt	0.040	0.040	0.040	0.040	0.040	0.040	0.040