



Quality Control Report

Workorder: L1933582

Report Date: 08-JUN-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-LEACH-IC-VA	Soil							
Batch	R3742263							
WG2541620-1	MB							
Sulfate (SO4)			<10		mg/kg		10	06-JUN-17

Quality Control Report

Workorder: L1933582

Report Date: 08-JUN-17

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 27-JUN-17
Report Date: 07-JUL-17 16:15 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1949570
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

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ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1949570-1	TL6-26JUN17							
Sampled By:	KC/JI on 26-JUN-17 @ 16:00							
Matrix:	WASTE							
Metals in Soil (CCME) with Extra Metals								
Mercury in Soil by CVAFS								
Mercury (Hg)	<0.0050			0.0050	mg/kg	04-JUL-17	05-JUL-17	R3765798
Metals in Soil by CRC ICPMS								
Aluminum (Al)	8800			50	mg/kg	04-JUL-17	06-JUL-17	R3766824
Antimony (Sb)	<0.10			0.10	mg/kg	04-JUL-17	06-JUL-17	R3766824
Arsenic (As)	7.23			0.10	mg/kg	04-JUL-17	06-JUL-17	R3766824
Barium (Ba)	10.7			0.50	mg/kg	04-JUL-17	06-JUL-17	R3766824
Beryllium (Be)	<0.10			0.10	mg/kg	04-JUL-17	06-JUL-17	R3766824
Bismuth (Bi)	<0.20			0.20	mg/kg	04-JUL-17	06-JUL-17	R3766824
Boron (B)	12.2			5.0	mg/kg	04-JUL-17	06-JUL-17	R3766824
Cadmium (Cd)	0.088			0.020	mg/kg	04-JUL-17	06-JUL-17	R3766824
Calcium (Ca)	20600			50	mg/kg	04-JUL-17	06-JUL-17	R3766824
Chromium (Cr)	21.5			0.50	mg/kg	04-JUL-17	06-JUL-17	R3766824
Cobalt (Co)	11.0			0.10	mg/kg	04-JUL-17	06-JUL-17	R3766824
Copper (Cu)	24.7			0.50	mg/kg	04-JUL-17	06-JUL-17	R3766824
Iron (Fe)	33500			50	mg/kg	04-JUL-17	06-JUL-17	R3766824
Lead (Pb)	5.43			0.50	mg/kg	04-JUL-17	06-JUL-17	R3766824
Lithium (Li)	13.7			2.0	mg/kg	04-JUL-17	06-JUL-17	R3766824
Magnesium (Mg)	11300			20	mg/kg	04-JUL-17	06-JUL-17	R3766824
Manganese (Mn)	779			1.0	mg/kg	04-JUL-17	06-JUL-17	R3766824
Molybdenum (Mo)	0.17			0.10	mg/kg	04-JUL-17	06-JUL-17	R3766824
Nickel (Ni)	19.2			0.50	mg/kg	04-JUL-17	06-JUL-17	R3766824
Phosphorus (P)	275			50	mg/kg	04-JUL-17	06-JUL-17	R3766824
Potassium (K)	860			100	mg/kg	04-JUL-17	06-JUL-17	R3766824
Selenium (Se)	<0.20			0.20	mg/kg	04-JUL-17	06-JUL-17	R3766824
Silver (Ag)	0.28			0.10	mg/kg	04-JUL-17	06-JUL-17	R3766824
Sodium (Na)	462			50	mg/kg	04-JUL-17	06-JUL-17	R3766824
Strontium (Sr)	10.4			0.50	mg/kg	04-JUL-17	06-JUL-17	R3766824
Sulfur (S)	<1000			1000	mg/kg	04-JUL-17	06-JUL-17	R3766824
Thallium (Tl)	<0.050			0.050	mg/kg	04-JUL-17	06-JUL-17	R3766824
Tin (Sn)	<2.0			2.0	mg/kg	04-JUL-17	06-JUL-17	R3766824
Titanium (Ti)	607			1.0	mg/kg	04-JUL-17	06-JUL-17	R3766824
Tungsten (W)	<0.50			0.50	mg/kg	04-JUL-17	06-JUL-17	R3766824
Uranium (U)	<0.050			0.050	mg/kg	04-JUL-17	06-JUL-17	R3766824
Vanadium (V)	44.7			0.20	mg/kg	04-JUL-17	06-JUL-17	R3766824
Zinc (Zn)	46.8			2.0	mg/kg	04-JUL-17	06-JUL-17	R3766824
Zirconium (Zr)	1.3			1.0	mg/kg	04-JUL-17	06-JUL-17	R3766824
pH in Soil (1:2 Soil:Water Extraction)								
pH (1:2 soil:water)	9.05			0.10	pH		05-JUL-17	R3765632
Miscellaneous Parameters								
Inorganic Carbon (as CaCO3 Equivalent)	4.52			0.40	%		05-JUL-17	
Moisture	20.5			0.25	%		03-JUL-17	R3760565
Sulfate (SO4)	370			10	mg/kg	03-JUL-17	04-JUL-17	R3767541
Inorganic Carbon	0.543			0.050	%		05-JUL-17	R3765639
Sulfur (S)-Total	700			500	mg/kg	04-JUL-17	04-JUL-17	R3765494

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** 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
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

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

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.



Quality Control Report

Workorder: L1949570

Report Date: 07-JUL-17

Page 1 of 6

Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK								
Soil								
Batch	R3765639							
WG2559209-2	LCS							
Inorganic Carbon			97.1		%		80-120	05-JUL-17
WG2559209-3	MB							
Inorganic Carbon			<0.050		%		0.05	05-JUL-17
HG-200.2-CVAF-VA								
Soil								
Batch	R3765798							
WG2562785-4	CRM	VA-CANMET-TILL1						
Mercury (Hg)			95.8		%		70-130	05-JUL-17
WG2562785-3	LCS							
Mercury (Hg)			99.3		%		70-130	05-JUL-17
WG2562785-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	05-JUL-17
MET-200.2-CCMS-VA								
Soil								
Batch	R3766824							
WG2562785-4	CRM	VA-CANMET-TILL1						
Aluminum (Al)			92.6		%		70-130	06-JUL-17
Antimony (Sb)			100.2		%		70-130	06-JUL-17
Arsenic (As)			87.8		%		70-130	06-JUL-17
Barium (Ba)			93.9		%		70-130	06-JUL-17
Beryllium (Be)			0.41		mg/kg		0.34-0.74	06-JUL-17
Bismuth (Bi)			92.8		%		70-130	06-JUL-17
Boron (B)			2.7		mg/kg		0-8.2	06-JUL-17
Cadmium (Cd)			92.3		%		70-130	06-JUL-17
Calcium (Ca)			89.3		%		70-130	06-JUL-17
Chromium (Cr)			93.3		%		70-130	06-JUL-17
Cobalt (Co)			87.0		%		70-130	06-JUL-17
Copper (Cu)			86.5		%		70-130	06-JUL-17
Iron (Fe)			90.3		%		70-130	06-JUL-17
Lead (Pb)			95.5		%		70-130	06-JUL-17
Lithium (Li)			72.2		%		70-130	06-JUL-17
Magnesium (Mg)			91.1		%		70-130	06-JUL-17
Manganese (Mn)			87.0		%		70-130	06-JUL-17
Nickel (Ni)			88.4		%		70-130	06-JUL-17
Potassium (K)			102.5		%		70-130	06-JUL-17
Selenium (Se)			0.30		mg/kg		0.11-0.51	06-JUL-17
Silver (Ag)			0.22		mg/kg		0.13-0.33	06-JUL-17



Quality Control Report

Workorder: L1949570

Report Date: 07-JUL-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3766824							
WG2562785-4	CRM	VA-CANMET-TILL1						
Sodium (Na)			99.5		%		70-130	06-JUL-17
Strontium (Sr)			86.2		%		70-130	06-JUL-17
Sulfur (S)			0		mg/kg		0-1200	06-JUL-17
Thallium (Tl)			0.126		mg/kg		0.077-0.18	06-JUL-17
Tin (Sn)			1.1		mg/kg		0-3	06-JUL-17
Titanium (Ti)			111.0		%		70-130	06-JUL-17
Tungsten (W)			0.17		mg/kg		0-0.66	06-JUL-17
Uranium (U)			102.0		%		70-130	06-JUL-17
Vanadium (V)			92.8		%		70-130	06-JUL-17
Zinc (Zn)			87.9		%		70-130	06-JUL-17
Zirconium (Zr)			0.6		mg/kg		0-1.8	06-JUL-17
WG2562785-3	LCS							
Aluminum (Al)			109.6		%		80-120	06-JUL-17
Antimony (Sb)			113.0		%		80-120	06-JUL-17
Arsenic (As)			107.9		%		80-120	06-JUL-17
Barium (Ba)			106.5		%		80-120	06-JUL-17
Beryllium (Be)			109.6		%		80-120	06-JUL-17
Bismuth (Bi)			105.1		%		80-120	06-JUL-17
Boron (B)			100.5		%		80-120	06-JUL-17
Cadmium (Cd)			105.2		%		80-120	06-JUL-17
Calcium (Ca)			112.5		%		80-120	06-JUL-17
Chromium (Cr)			105.9		%		80-120	06-JUL-17
Cobalt (Co)			102.4		%		80-120	06-JUL-17
Copper (Cu)			102.5		%		80-120	06-JUL-17
Iron (Fe)			107.3		%		80-120	06-JUL-17
Lead (Pb)			106.7		%		80-120	06-JUL-17
Lithium (Li)			106.0		%		80-120	06-JUL-17
Magnesium (Mg)			105.8		%		80-120	06-JUL-17
Manganese (Mn)			105.1		%		80-120	06-JUL-17
Molybdenum (Mo)			112.3		%		80-120	06-JUL-17
Nickel (Ni)			103.7		%		80-120	06-JUL-17
Phosphorus (P)			111.4		%		80-120	06-JUL-17
Potassium (K)			108.2		%		80-120	06-JUL-17
Selenium (Se)			105.2		%		80-120	06-JUL-17



Quality Control Report

Workorder: L1949570

Report Date: 07-JUL-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3766824							
WG2562785-3	LCS							
Silver (Ag)			102.6		%		80-120	06-JUL-17
Sodium (Na)			105.9		%		80-120	06-JUL-17
Strontium (Sr)			112.6		%		80-120	06-JUL-17
Sulfur (S)			104.6		%		80-120	06-JUL-17
Thallium (Tl)			104.6		%		80-120	06-JUL-17
Tin (Sn)			107.4		%		80-120	06-JUL-17
Titanium (Ti)			101.5		%		80-120	06-JUL-17
Tungsten (W)			104.2		%		80-120	06-JUL-17
Uranium (U)			104.2		%		80-120	06-JUL-17
Vanadium (V)			107.9		%		80-120	06-JUL-17
Zinc (Zn)			97.2		%		80-120	06-JUL-17
Zirconium (Zr)			107.9		%		70-130	06-JUL-17
WG2562785-1	MB							
Aluminum (Al)			<50		mg/kg		50	06-JUL-17
Antimony (Sb)			<0.10		mg/kg		0.1	06-JUL-17
Arsenic (As)			<0.10		mg/kg		0.1	06-JUL-17
Barium (Ba)			<0.50		mg/kg		0.5	06-JUL-17
Beryllium (Be)			<0.10		mg/kg		0.1	06-JUL-17
Bismuth (Bi)			<0.20		mg/kg		0.2	06-JUL-17
Boron (B)			<5.0		mg/kg		5	06-JUL-17
Cadmium (Cd)			<0.020		mg/kg		0.02	06-JUL-17
Calcium (Ca)			<50		mg/kg		50	06-JUL-17
Chromium (Cr)			<0.50		mg/kg		0.5	06-JUL-17
Cobalt (Co)			<0.10		mg/kg		0.1	06-JUL-17
Copper (Cu)			<0.50		mg/kg		0.5	06-JUL-17
Iron (Fe)			<50		mg/kg		50	06-JUL-17
Lead (Pb)			<0.50		mg/kg		0.5	06-JUL-17
Lithium (Li)			<2.0		mg/kg		2	06-JUL-17
Magnesium (Mg)			<20		mg/kg		20	06-JUL-17
Manganese (Mn)			<1.0		mg/kg		1	06-JUL-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	06-JUL-17
Nickel (Ni)			<0.50		mg/kg		0.5	06-JUL-17
Phosphorus (P)			<50		mg/kg		50	06-JUL-17
Potassium (K)			<100		mg/kg		100	06-JUL-17



Quality Control Report

Workorder: L1949570

Report Date: 07-JUL-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	Soil							
Batch	R3766824							
WG2562785-1 MB								
Selenium (Se)			<0.20		mg/kg		0.2	06-JUL-17
Silver (Ag)			<0.10		mg/kg		0.1	06-JUL-17
Sodium (Na)			<50		mg/kg		50	06-JUL-17
Strontium (Sr)			<0.50		mg/kg		0.5	06-JUL-17
Sulfur (S)			<1000		mg/kg		1000	06-JUL-17
Thallium (Tl)			<0.050		mg/kg		0.05	06-JUL-17
Tin (Sn)			<2.0		mg/kg		2	06-JUL-17
Titanium (Ti)			<1.0		mg/kg		1	06-JUL-17
Tungsten (W)			<0.50		mg/kg		0.5	06-JUL-17
Uranium (U)			<0.050		mg/kg		0.05	06-JUL-17
Vanadium (V)			<0.20		mg/kg		0.2	06-JUL-17
Zinc (Zn)			<2.0		mg/kg		2	06-JUL-17
Zirconium (Zr)			<1.0		mg/kg		1	06-JUL-17
MOISTURE-VA	Soil							
Batch	R3760565							
WG2561589-3 DUP		L1949570-1						
Moisture		20.5	20.5		%	0.2	20	03-JUL-17
WG2561589-2 LCS								
Moisture			99.5		%		90-110	03-JUL-17
WG2561589-1 MB								
Moisture			<0.25		%		0.25	03-JUL-17
PH-1:2-VA	Soil							
Batch	R3765632							
WG2562785-5 IRM		VA-ALP-SRS1507						
pH (1:2 soil:water)			6.64		pH		6.2-6.8	05-JUL-17
S-TOT-LECO-SK	Soil							
Batch	R3765494							
WG2561448-1 DUP		L1949570-1						
Sulfur (S)-Total		700	800		mg/kg	13	30	04-JUL-17
WG2561448-2 IRM		1646A_SOIL						
Sulfur (S)-Total			3400		mg/kg		2500-4600	04-JUL-17
WG2561448-3 MB								
Sulfur (S)-Total			<500		mg/kg		500	04-JUL-17
SO4-LEACH-IC-VA	Soil							



Quality Control Report

Workorder: L1949570

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-LEACH-IC-VA	Soil							
Batch	R3767541							
WG2561530-2	LCS							
Sulfate (SO4)			102.4		%		70-130	04-JUL-17
WG2561530-1	MB							
Sulfate (SO4)			<10		mg/kg		10	04-JUL-17

Quality Control Report

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 02-AUG-17
Report Date: 16-AUG-17 15:10 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1968371
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1968371-1 TL6-31JUL17A Sampled By: SW/SO on 31-JUL-17 @ 18:45 Matrix: WATER Metals in Soil (CCME) with Extra Metals Mercury in Soil by CVAFS Mercury (Hg)	<0.0050		0.0050	mg/kg	09-AUG-17	10-AUG-17	R3794956
Metals in Soil by CRC ICPMS Aluminum (Al)	13800		50	mg/kg	09-AUG-17	11-AUG-17	R3796060
Antimony (Sb)	<0.10		0.10	mg/kg	09-AUG-17	11-AUG-17	R3796060
Arsenic (As)	9.21		0.10	mg/kg	09-AUG-17	11-AUG-17	R3796060
Barium (Ba)	17.3		0.50	mg/kg	09-AUG-17	11-AUG-17	R3796060
Beryllium (Be)	0.12		0.10	mg/kg	09-AUG-17	11-AUG-17	R3796060
Bismuth (Bi)	<0.20		0.20	mg/kg	09-AUG-17	11-AUG-17	R3796060
Boron (B)	40.7		5.0	mg/kg	09-AUG-17	11-AUG-17	R3796060
Cadmium (Cd)	0.064		0.020	mg/kg	09-AUG-17	11-AUG-17	R3796060
Calcium (Ca)	29000		50	mg/kg	09-AUG-17	11-AUG-17	R3796060
Chromium (Cr)	33.0		0.50	mg/kg	09-AUG-17	11-AUG-17	R3796060
Cobalt (Co)	15.7		0.10	mg/kg	09-AUG-17	11-AUG-17	R3796060
Copper (Cu)	52.4		0.50	mg/kg	09-AUG-17	11-AUG-17	R3796060
Iron (Fe)	43400		50	mg/kg	09-AUG-17	11-AUG-17	R3796060
Lead (Pb)	9.13		0.50	mg/kg	09-AUG-17	11-AUG-17	R3796060
Lithium (Li)	31.2		2.0	mg/kg	09-AUG-17	11-AUG-17	R3796060
Magnesium (Mg)	14600		20	mg/kg	09-AUG-17	11-AUG-17	R3796060
Manganese (Mn)	945		1.0	mg/kg	09-AUG-17	11-AUG-17	R3796060
Molybdenum (Mo)	0.22		0.10	mg/kg	09-AUG-17	11-AUG-17	R3796060
Nickel (Ni)	26.5		0.50	mg/kg	09-AUG-17	11-AUG-17	R3796060
Phosphorus (P)	348		50	mg/kg	09-AUG-17	11-AUG-17	R3796060
Potassium (K)	1420		100	mg/kg	09-AUG-17	11-AUG-17	R3796060
Selenium (Se)	<0.20		0.20	mg/kg	09-AUG-17	11-AUG-17	R3796060
Silver (Ag)	0.21		0.10	mg/kg	09-AUG-17	11-AUG-17	R3796060
Sodium (Na)	899		50	mg/kg	09-AUG-17	11-AUG-17	R3796060
Strontium (Sr)	17.8		0.50	mg/kg	09-AUG-17	11-AUG-17	R3796060
Sulfur (S)	1100		1000	mg/kg	09-AUG-17	11-AUG-17	R3796060
Thallium (Tl)	<0.050		0.050	mg/kg	09-AUG-17	11-AUG-17	R3796060
Tin (Sn)	<2.0		2.0	mg/kg	09-AUG-17	11-AUG-17	R3796060
Titanium (Ti)	1130		1.0	mg/kg	09-AUG-17	11-AUG-17	R3796060
Tungsten (W)	0.56		0.50	mg/kg	09-AUG-17	11-AUG-17	R3796060
Uranium (U)	<0.050		0.050	mg/kg	09-AUG-17	11-AUG-17	R3796060
Vanadium (V)	69.6		0.20	mg/kg	09-AUG-17	11-AUG-17	R3796060
Zinc (Zn)	48.2		2.0	mg/kg	09-AUG-17	11-AUG-17	R3796060
Zirconium (Zr)	2.2		1.0	mg/kg	09-AUG-17	11-AUG-17	R3796060
pH in Soil (1:2 Soil:Water Extraction) pH (1:2 soil:water)	9.26		0.10	pH		10-AUG-17	R3794820
Miscellaneous Parameters Inorganic Carbon (as CaCO3 Equivalent)	5.49		0.40	%		09-AUG-17	
Moisture	22.9		0.25	%		09-AUG-17	R3794405
Sulfate (SO4)	643		10	mg/kg	11-AUG-17	11-AUG-17	R3796202
Inorganic Carbon	0.659		0.050	%		09-AUG-17	R3793763
Sulfur (S)-Total	700		500	mg/kg	09-AUG-17	09-AUG-17	R3795065
L1968371-2 TL6-31JUL17B Sampled By: SW/SO on 31-JUL-17 @ 18:45 Matrix: WATER Metals in Soil (CCME) with Extra Metals Mercury in Soil by CVAFS Mercury (Hg)	<0.0050		0.0050	mg/kg	09-AUG-17	10-AUG-17	R3794956

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1968371-2 TL6-31JUL17B Sampled By: SW/SO on 31-JUL-17 @ 18:45 Matrix: WATER							
Metals in Soil by CRC ICPMS							
Aluminum (Al)	14000		50	mg/kg	09-AUG-17	10-AUG-17	R3795904
Antimony (Sb)	<0.10		0.10	mg/kg	09-AUG-17	10-AUG-17	R3795904
Arsenic (As)	7.38		0.10	mg/kg	09-AUG-17	10-AUG-17	R3795904
Barium (Ba)	17.2		0.50	mg/kg	09-AUG-17	10-AUG-17	R3795904
Beryllium (Be)	0.13		0.10	mg/kg	09-AUG-17	10-AUG-17	R3795904
Bismuth (Bi)	<0.20		0.20	mg/kg	09-AUG-17	10-AUG-17	R3795904
Boron (B)	38.3		5.0	mg/kg	09-AUG-17	10-AUG-17	R3795904
Cadmium (Cd)	0.057		0.020	mg/kg	09-AUG-17	10-AUG-17	R3795904
Calcium (Ca)	29100		50	mg/kg	09-AUG-17	10-AUG-17	R3795904
Chromium (Cr)	33.9		0.50	mg/kg	09-AUG-17	10-AUG-17	R3795904
Cobalt (Co)	14.9		0.10	mg/kg	09-AUG-17	10-AUG-17	R3795904
Copper (Cu)	51.5		0.50	mg/kg	09-AUG-17	10-AUG-17	R3795904
Iron (Fe)	44700		50	mg/kg	09-AUG-17	10-AUG-17	R3795904
Lead (Pb)	6.03		0.50	mg/kg	09-AUG-17	10-AUG-17	R3795904
Lithium (Li)	31.4		2.0	mg/kg	09-AUG-17	10-AUG-17	R3795904
Magnesium (Mg)	14900		20	mg/kg	09-AUG-17	10-AUG-17	R3795904
Manganese (Mn)	978		1.0	mg/kg	09-AUG-17	10-AUG-17	R3795904
Molybdenum (Mo)	0.37		0.10	mg/kg	09-AUG-17	10-AUG-17	R3795904
Nickel (Ni)	26.3		0.50	mg/kg	09-AUG-17	10-AUG-17	R3795904
Phosphorus (P)	354		50	mg/kg	09-AUG-17	10-AUG-17	R3795904
Potassium (K)	1430		100	mg/kg	09-AUG-17	10-AUG-17	R3795904
Selenium (Se)	<0.20		0.20	mg/kg	09-AUG-17	10-AUG-17	R3795904
Silver (Ag)	0.25		0.10	mg/kg	09-AUG-17	10-AUG-17	R3795904
Sodium (Na)	1030		50	mg/kg	09-AUG-17	10-AUG-17	R3795904
Strontium (Sr)	17.5		0.50	mg/kg	09-AUG-17	10-AUG-17	R3795904
Sulfur (S)	1300		1000	mg/kg	09-AUG-17	10-AUG-17	R3795904
Thallium (Tl)	<0.050		0.050	mg/kg	09-AUG-17	10-AUG-17	R3795904
Tin (Sn)	<2.0		2.0	mg/kg	09-AUG-17	10-AUG-17	R3795904
Titanium (Ti)	902		1.0	mg/kg	09-AUG-17	10-AUG-17	R3795904
Tungsten (W)	<0.50		0.50	mg/kg	09-AUG-17	10-AUG-17	R3795904
Uranium (U)	<0.050		0.050	mg/kg	09-AUG-17	10-AUG-17	R3795904
Vanadium (V)	68.9		0.20	mg/kg	09-AUG-17	10-AUG-17	R3795904
Zinc (Zn)	47.4		2.0	mg/kg	09-AUG-17	10-AUG-17	R3795904
Zirconium (Zr)	2.1		1.0	mg/kg	09-AUG-17	10-AUG-17	R3795904
pH in Soil (1:2 Soil:Water Extraction)							
pH (1:2 soil:water)	9.22		0.10	pH		10-AUG-17	R3794820
Miscellaneous Parameters							
Inorganic Carbon (as CaCO3 Equivalent)	5.26		0.40	%		09-AUG-17	
Moisture	21.0		0.25	%		09-AUG-17	R3794405
Sulfate (SO4)	541		10	mg/kg	11-AUG-17	11-AUG-17	R3796202
Inorganic Carbon	0.631		0.050	%		09-AUG-17	R3793763
Sulfur (S)-Total	600		500	mg/kg	09-AUG-17	09-AUG-17	R3795065

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** 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
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

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

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.



Quality Control Report

Workorder: L1968371

Report Date: 16-AUG-17

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Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK		Soil						
Batch	R3793763							
WG2585720-2	LCS							
Inorganic Carbon			97.5		%		80-120	09-AUG-17
WG2585720-3	MB							
Inorganic Carbon			<0.050		%		0.05	09-AUG-17
HG-200.2-CVAF-VA		Soil						
Batch	R3794956							
WG2588506-4	CRM	VA-CANMET-TILL1						
Mercury (Hg)			94.9		%		70-130	10-AUG-17
WG2588506-3	LCS							
Mercury (Hg)			99.4		%		70-130	10-AUG-17
WG2588506-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	10-AUG-17
MET-200.2-CCMS-VA		Soil						
Batch	R3795904							
WG2588506-4	CRM	VA-CANMET-TILL1						
Aluminum (Al)			103.5		%		70-130	10-AUG-17
Antimony (Sb)			106.0		%		70-130	10-AUG-17
Arsenic (As)			103.2		%		70-130	10-AUG-17
Barium (Ba)			100.1		%		70-130	10-AUG-17
Beryllium (Be)			0.55		mg/kg		0.34-0.74	10-AUG-17
Bismuth (Bi)			99.7		%		70-130	10-AUG-17
Boron (B)			3.0		mg/kg		0-8.2	10-AUG-17
Cadmium (Cd)			102.2		%		70-130	10-AUG-17
Calcium (Ca)			110.3		%		70-130	10-AUG-17
Chromium (Cr)			106.6		%		70-130	10-AUG-17
Cobalt (Co)			106.2		%		70-130	10-AUG-17
Copper (Cu)			104.2		%		70-130	10-AUG-17
Iron (Fe)			105.7		%		70-130	10-AUG-17
Lead (Pb)			101.8		%		70-130	10-AUG-17
Lithium (Li)			106.7		%		70-130	10-AUG-17
Magnesium (Mg)			104.7		%		70-130	10-AUG-17
Manganese (Mn)			102.6		%		70-130	10-AUG-17
Nickel (Ni)			104.6		%		70-130	10-AUG-17
Potassium (K)			116.1		%		70-130	10-AUG-17
Selenium (Se)			0.31		mg/kg		0.11-0.51	10-AUG-17
Silver (Ag)			0.24		mg/kg		0.13-0.33	10-AUG-17



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Report Date: 16-AUG-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3795904							
WG2588506-4	CRM	VA-CANMET-TILL1						
Sodium (Na)			116.8		%		70-130	10-AUG-17
Strontium (Sr)			108.0		%		70-130	10-AUG-17
Thallium (Tl)			0.128		mg/kg		0.077-0.18	10-AUG-17
Tin (Sn)			1.1		mg/kg		0-3	10-AUG-17
Titanium (Ti)			109.7		%		70-130	10-AUG-17
Tungsten (W)			0.16		mg/kg		0-0.66	10-AUG-17
Uranium (U)			102.1		%		70-130	10-AUG-17
Vanadium (V)			107.8		%		70-130	10-AUG-17
Zinc (Zn)			103.7		%		70-130	10-AUG-17
Zirconium (Zr)			0.7		mg/kg		0-1.8	10-AUG-17
WG2588506-3	LCS							
Aluminum (Al)			99.3		%		80-120	10-AUG-17
Antimony (Sb)			102.8		%		80-120	10-AUG-17
Arsenic (As)			100.9		%		80-120	10-AUG-17
Barium (Ba)			102.0		%		80-120	10-AUG-17
Beryllium (Be)			99.9		%		80-120	10-AUG-17
Bismuth (Bi)			97.2		%		80-120	10-AUG-17
Boron (B)			93.7		%		80-120	10-AUG-17
Cadmium (Cd)			98.7		%		80-120	10-AUG-17
Calcium (Ca)			98.8		%		80-120	10-AUG-17
Chromium (Cr)			99.6		%		80-120	10-AUG-17
Cobalt (Co)			99.5		%		80-120	10-AUG-17
Copper (Cu)			97.6		%		80-120	10-AUG-17
Iron (Fe)			99.2		%		80-120	10-AUG-17
Lead (Pb)			98.2		%		80-120	10-AUG-17
Lithium (Li)			98.9		%		80-120	10-AUG-17
Magnesium (Mg)			97.5		%		80-120	10-AUG-17
Manganese (Mn)			101.0		%		80-120	10-AUG-17
Molybdenum (Mo)			95.8		%		80-120	10-AUG-17
Nickel (Ni)			97.7		%		80-120	10-AUG-17
Phosphorus (P)			105.7		%		80-120	10-AUG-17
Potassium (K)			101.8		%		80-120	10-AUG-17
Selenium (Se)			96.4		%		80-120	10-AUG-17
Silver (Ag)			101.4		%		80-120	10-AUG-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3795904							
WG2588506-3	LCS							
Sodium (Na)			102.9		%		80-120	10-AUG-17
Strontium (Sr)			98.5		%		80-120	10-AUG-17
Sulfur (S)			100.2		%		80-120	10-AUG-17
Thallium (Tl)			98.9		%		80-120	10-AUG-17
Tin (Sn)			100.3		%		80-120	10-AUG-17
Titanium (Ti)			88.1		%		80-120	10-AUG-17
Tungsten (W)			100.4		%		80-120	10-AUG-17
Uranium (U)			96.7		%		80-120	10-AUG-17
Vanadium (V)			101.3		%		80-120	10-AUG-17
Zinc (Zn)			93.8		%		80-120	10-AUG-17
Zirconium (Zr)			95.1		%		70-130	10-AUG-17
WG2588506-1	MB							
Aluminum (Al)			<50		mg/kg		50	10-AUG-17
Antimony (Sb)			<0.10		mg/kg		0.1	10-AUG-17
Arsenic (As)			<0.10		mg/kg		0.1	10-AUG-17
Barium (Ba)			<0.50		mg/kg		0.5	10-AUG-17
Beryllium (Be)			<0.10		mg/kg		0.1	10-AUG-17
Bismuth (Bi)			<0.20		mg/kg		0.2	10-AUG-17
Boron (B)			<5.0		mg/kg		5	10-AUG-17
Cadmium (Cd)			<0.020		mg/kg		0.02	10-AUG-17
Calcium (Ca)			<50		mg/kg		50	10-AUG-17
Chromium (Cr)			<0.50		mg/kg		0.5	10-AUG-17
Cobalt (Co)			<0.10		mg/kg		0.1	10-AUG-17
Copper (Cu)			<0.50		mg/kg		0.5	10-AUG-17
Iron (Fe)			<50		mg/kg		50	10-AUG-17
Lead (Pb)			<0.50		mg/kg		0.5	10-AUG-17
Lithium (Li)			<2.0		mg/kg		2	10-AUG-17
Magnesium (Mg)			<20		mg/kg		20	10-AUG-17
Manganese (Mn)			<1.0		mg/kg		1	10-AUG-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	10-AUG-17
Nickel (Ni)			<0.50		mg/kg		0.5	10-AUG-17
Phosphorus (P)			<50		mg/kg		50	10-AUG-17
Potassium (K)			<100		mg/kg		100	10-AUG-17
Selenium (Se)			<0.20		mg/kg		0.2	10-AUG-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	Soil							
Batch	R3795904							
WG2588506-1	MB							
Silver (Ag)			<0.10		mg/kg		0.1	10-AUG-17
Sodium (Na)			<50		mg/kg		50	10-AUG-17
Strontium (Sr)			<0.50		mg/kg		0.5	10-AUG-17
Sulfur (S)			<1000		mg/kg		1000	10-AUG-17
Thallium (Tl)			<0.050		mg/kg		0.05	10-AUG-17
Tin (Sn)			<2.0		mg/kg		2	10-AUG-17
Titanium (Ti)			<1.0		mg/kg		1	10-AUG-17
Tungsten (W)			<0.50		mg/kg		0.5	10-AUG-17
Uranium (U)			<0.050		mg/kg		0.05	10-AUG-17
Vanadium (V)			<0.20		mg/kg		0.2	10-AUG-17
Zinc (Zn)			<2.0		mg/kg		2	10-AUG-17
Zirconium (Zr)			<1.0		mg/kg		1	10-AUG-17
MOISTURE-VA	Soil							
Batch	R3794405							
WG2588511-2	LCS							
Moisture			100.1		%		90-110	09-AUG-17
WG2588511-6	LCS							
Moisture			100.4		%		90-110	09-AUG-17
WG2588511-1	MB							
Moisture			<0.25		%		0.25	09-AUG-17
WG2588511-5	MB							
Moisture			<0.25		%		0.25	09-AUG-17
PH-1:2-VA	Soil							
Batch	R3794820							
WG2588506-5	IRM	VA-ALP-SRS1507						
pH (1:2 soil:water)			6.63		pH		6.2-6.8	10-AUG-17
S-TOT-LECO-SK	Soil							
Batch	R3795065							
WG2587231-2	DUP	L1968371-2						
Sulfur (S)-Total		600	600		mg/kg	6.7	30	09-AUG-17
WG2587231-4	IRM	1646A_SOIL						
Sulfur (S)-Total			3300		mg/kg		2500-4600	09-AUG-17
WG2587231-5	MB							
Sulfur (S)-Total			<500		mg/kg		500	09-AUG-17
SO4-LEACH-IC-VA	Soil							



Quality Control Report

Workorder: L1968371

Report Date: 16-AUG-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-LEACH-IC-VA	Soil							
Batch	R3796202							
WG2589876-4	DUP	L1968371-1						
Sulfate (SO4)		643	617		mg/kg	4.1	20	11-AUG-17
WG2589876-3	LCS							
Sulfate (SO4)			105.0		%		70-130	11-AUG-17
WG2589876-1	MB							
Sulfate (SO4)			<10		mg/kg		10	11-AUG-17

Quality Control Report

Workorder: L1968371

Report Date: 16-AUG-17

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

GENF 18.01 Front



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 29-AUG-17
Report Date: 13-SEP-17 14:02 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1982926
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1982926-1	TL6-29AUG17							
Sampled By:	SW on 29-AUG-17 @ 08:35							
Matrix:	WATER							
Metals in Soil (CCME) with Extra Metals								
Mercury in Soil by CVAFS								
Mercury (Hg)	<0.0050			0.0050	mg/kg	07-SEP-17	08-SEP-17	R3822577
Metals in Soil by CRC ICPMS								
Aluminum (Al)	13400			50	mg/kg	10-SEP-17	11-SEP-17	R3824084
Antimony (Sb)	<0.10			0.10	mg/kg	10-SEP-17	11-SEP-17	R3824084
Arsenic (As)	9.11			0.10	mg/kg	10-SEP-17	11-SEP-17	R3824084
Barium (Ba)	12.9			0.50	mg/kg	10-SEP-17	11-SEP-17	R3824084
Beryllium (Be)	0.12			0.10	mg/kg	10-SEP-17	11-SEP-17	R3824084
Bismuth (Bi)	<0.20			0.20	mg/kg	10-SEP-17	11-SEP-17	R3824084
Boron (B)	15.9			5.0	mg/kg	10-SEP-17	11-SEP-17	R3824084
Cadmium (Cd)	0.061			0.020	mg/kg	10-SEP-17	11-SEP-17	R3824084
Calcium (Ca)	36900			50	mg/kg	10-SEP-17	11-SEP-17	R3824084
Chromium (Cr)	33.3			0.50	mg/kg	10-SEP-17	11-SEP-17	R3824084
Cobalt (Co)	15.0			0.10	mg/kg	10-SEP-17	11-SEP-17	R3824084
Copper (Cu)	28.4			0.50	mg/kg	10-SEP-17	11-SEP-17	R3824084
Iron (Fe)	50300			50	mg/kg	10-SEP-17	11-SEP-17	R3824084
Lead (Pb)	9.00			0.50	mg/kg	10-SEP-17	11-SEP-17	R3824084
Lithium (Li)	23.4			2.0	mg/kg	10-SEP-17	11-SEP-17	R3824084
Magnesium (Mg)	17200			20	mg/kg	10-SEP-17	11-SEP-17	R3824084
Manganese (Mn)	1200			1.0	mg/kg	10-SEP-17	11-SEP-17	R3824084
Molybdenum (Mo)	0.23			0.10	mg/kg	10-SEP-17	11-SEP-17	R3824084
Nickel (Ni)	29.5			0.50	mg/kg	10-SEP-17	11-SEP-17	R3824084
Phosphorus (P)	356			50	mg/kg	10-SEP-17	11-SEP-17	R3824084
Potassium (K)	1130			100	mg/kg	10-SEP-17	11-SEP-17	R3824084
Selenium (Se)	<0.20			0.20	mg/kg	10-SEP-17	11-SEP-17	R3824084
Silver (Ag)	0.20			0.10	mg/kg	10-SEP-17	11-SEP-17	R3824084
Sodium (Na)	716			50	mg/kg	10-SEP-17	11-SEP-17	R3824084
Strontium (Sr)	18.4			0.50	mg/kg	10-SEP-17	11-SEP-17	R3824084
Sulfur (S)	1100			1000	mg/kg	10-SEP-17	11-SEP-17	R3824084
Thallium (Tl)	<0.050			0.050	mg/kg	10-SEP-17	11-SEP-17	R3824084
Tin (Sn)	<2.0			2.0	mg/kg	10-SEP-17	11-SEP-17	R3824084
Titanium (Ti)	821			1.0	mg/kg	10-SEP-17	11-SEP-17	R3824084
Tungsten (W)	<0.50			0.50	mg/kg	10-SEP-17	11-SEP-17	R3824084
Uranium (U)	<0.050			0.050	mg/kg	10-SEP-17	11-SEP-17	R3824084
Vanadium (V)	60.5			0.20	mg/kg	10-SEP-17	11-SEP-17	R3824084
Zinc (Zn)	48.5			2.0	mg/kg	10-SEP-17	11-SEP-17	R3824084
Zirconium (Zr)	2.0			1.0	mg/kg	10-SEP-17	11-SEP-17	R3824084
pH in Soil (1:2 Soil:Water Extraction)								
pH (1:2 soil:water)	8.88			0.10	pH		08-SEP-17	R3822729
Miscellaneous Parameters								
Inorganic Carbon (as CaCO3 Equivalent)	7.51			0.40	%		09-SEP-17	
Moisture	24.3			0.25	%		08-SEP-17	R3822163
Sulfate (SO4)	533			10	mg/kg	07-SEP-17	07-SEP-17	R3822413
Inorganic Carbon	0.901			0.050	%		09-SEP-17	R3822919
Sulfur (S)-Total	<500			500	mg/kg	08-SEP-17	08-SEP-17	R3822735

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** 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
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

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

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.



Quality Control Report

Workorder: L1982926

Report Date: 13-SEP-17

Page 1 of 7

Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK								
Soil								
Batch	R3822919							
WG2607804-2	LCS							
Inorganic Carbon			97.4		%		80-120	09-SEP-17
WG2607804-3	MB							
Inorganic Carbon			<0.050		%		0.05	09-SEP-17
HG-200.2-CVAF-VA								
Soil								
Batch	R3822577							
WG2610932-4	CRM	VA-CANMET-TILL1						
Mercury (Hg)			91.4		%		70-130	08-SEP-17
WG2610932-2	DUP	L1982926-1						
Mercury (Hg)		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	40	08-SEP-17
WG2610932-3	LCS							
Mercury (Hg)			103.9		%		70-130	08-SEP-17
WG2610932-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	08-SEP-17
MET-200.2-CCMS-VA								
Soil								
Batch	R3824084							
WG2612583-4	CRM	VA-CANMET-TILL1						
Aluminum (Al)			102.1		%		70-130	11-SEP-17
Antimony (Sb)			106.3		%		70-130	11-SEP-17
Arsenic (As)			103.7		%		70-130	11-SEP-17
Barium (Ba)			98.0		%		70-130	11-SEP-17
Beryllium (Be)			0.54		mg/kg		0.34-0.74	11-SEP-17
Bismuth (Bi)			102.9		%		70-130	11-SEP-17
Boron (B)			3.1		mg/kg		0-8.2	11-SEP-17
Cadmium (Cd)			99.5		%		70-130	11-SEP-17
Calcium (Ca)			108.7		%		70-130	11-SEP-17
Chromium (Cr)			103.1		%		70-130	11-SEP-17
Cobalt (Co)			102.0		%		70-130	11-SEP-17
Copper (Cu)			102.7		%		70-130	11-SEP-17
Iron (Fe)			103.9		%		70-130	11-SEP-17
Lead (Pb)			102.9		%		70-130	11-SEP-17
Lithium (Li)			107.3		%		70-130	11-SEP-17
Magnesium (Mg)			103.4		%		70-130	11-SEP-17
Manganese (Mn)			102.6		%		70-130	11-SEP-17
Nickel (Ni)			103.3		%		70-130	11-SEP-17
Potassium (K)			113.0		%		70-130	11-SEP-17



Quality Control Report

Workorder: L1982926

Report Date: 13-SEP-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3824084							
WG2612583-4	CRM	VA-CANMET-TILL1						
Selenium (Se)			0.32		mg/kg		0.11-0.51	11-SEP-17
Silver (Ag)			0.23		mg/kg		0.13-0.33	11-SEP-17
Sodium (Na)			114.3		%		70-130	11-SEP-17
Strontium (Sr)			107.6		%		70-130	11-SEP-17
Thallium (Tl)			0.138		mg/kg		0.077-0.18	11-SEP-17
Tin (Sn)			1.1		mg/kg		0-3	11-SEP-17
Titanium (Ti)			123.4		%		70-130	11-SEP-17
Tungsten (W)			0.17		mg/kg		0-0.66	11-SEP-17
Uranium (U)			106.1		%		70-130	11-SEP-17
Vanadium (V)			102.9		%		70-130	11-SEP-17
Zinc (Zn)			105.5		%		70-130	11-SEP-17
Zirconium (Zr)			0.7		mg/kg		0-1.8	11-SEP-17
WG2612583-8	DUP	L1982926-1						
Aluminum (Al)		13400	13900		mg/kg	3.7	40	11-SEP-17
Antimony (Sb)		<0.10	<0.10	RPD-NA	mg/kg	N/A	30	11-SEP-17
Arsenic (As)		9.11	8.30		mg/kg	9.3	30	11-SEP-17
Barium (Ba)		12.9	14.3		mg/kg	10	40	11-SEP-17
Beryllium (Be)		0.12	0.13		mg/kg	8.3	30	11-SEP-17
Bismuth (Bi)		<0.20	<0.20	RPD-NA	mg/kg	N/A	30	11-SEP-17
Boron (B)		15.9	16.4		mg/kg	3.4	30	11-SEP-17
Cadmium (Cd)		0.061	0.063		mg/kg	3.6	30	11-SEP-17
Calcium (Ca)		36900	38400		mg/kg	4.1	30	11-SEP-17
Chromium (Cr)		33.3	35.9		mg/kg	7.5	30	11-SEP-17
Cobalt (Co)		15.0	14.8		mg/kg	1.6	30	11-SEP-17
Copper (Cu)		28.4	29.4		mg/kg	3.6	30	11-SEP-17
Iron (Fe)		50300	51200		mg/kg	1.8	30	11-SEP-17
Lead (Pb)		9.00	6.82		mg/kg	28	40	11-SEP-17
Lithium (Li)		23.4	24.2		mg/kg	3.3	30	11-SEP-17
Magnesium (Mg)		17200	17600		mg/kg	2.5	30	11-SEP-17
Manganese (Mn)		1200	1230		mg/kg	2.1	30	11-SEP-17
Molybdenum (Mo)		0.23	0.32		mg/kg	34	40	11-SEP-17
Nickel (Ni)		29.5	30.6		mg/kg	3.6	30	11-SEP-17
Phosphorus (P)		356	361		mg/kg	1.2	30	11-SEP-17
Potassium (K)		1130	1190		mg/kg	4.6	40	11-SEP-17



Quality Control Report

Workorder: L1982926

Report Date: 13-SEP-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3824084							
WG2612583-8	DUP	L1982926-1						
Selenium (Se)		<0.20	<0.20	RPD-NA	mg/kg	N/A	30	11-SEP-17
Silver (Ag)		0.20	0.23		mg/kg	10	40	11-SEP-17
Sodium (Na)		716	714		mg/kg	0.2	40	11-SEP-17
Strontium (Sr)		18.4	19.0		mg/kg	3.3	40	11-SEP-17
Sulfur (S)		1100	<1000	RPD-NA	mg/kg	N/A	30	11-SEP-17
Thallium (Tl)		<0.050	<0.050	RPD-NA	mg/kg	N/A	30	11-SEP-17
Tin (Sn)		<2.0	<2.0	RPD-NA	mg/kg	N/A	40	11-SEP-17
Titanium (Ti)		821	843		mg/kg	2.6	40	11-SEP-17
Tungsten (W)		<0.50	<0.50	RPD-NA	mg/kg	N/A	30	11-SEP-17
Uranium (U)		<0.050	<0.050	RPD-NA	mg/kg	N/A	30	11-SEP-17
Vanadium (V)		60.5	63.0		mg/kg	4.1	30	11-SEP-17
Zinc (Zn)		48.5	50.9		mg/kg	4.8	30	11-SEP-17
Zirconium (Zr)		2.0	1.9		mg/kg	6.6	30	11-SEP-17
WG2612583-3	LCS							
Aluminum (Al)			101.5		%		80-120	11-SEP-17
Antimony (Sb)			107.6		%		80-120	11-SEP-17
Arsenic (As)			104.2		%		80-120	11-SEP-17
Barium (Ba)			101.9		%		80-120	11-SEP-17
Beryllium (Be)			97.2		%		80-120	11-SEP-17
Bismuth (Bi)			103.6		%		80-120	11-SEP-17
Boron (B)			92.7		%		80-120	11-SEP-17
Cadmium (Cd)			100.8		%		80-120	11-SEP-17
Calcium (Ca)			100.8		%		80-120	11-SEP-17
Chromium (Cr)			101.5		%		80-120	11-SEP-17
Cobalt (Co)			100.3		%		80-120	11-SEP-17
Copper (Cu)			101.1		%		80-120	11-SEP-17
Iron (Fe)			99.1		%		80-120	11-SEP-17
Lead (Pb)			104.5		%		80-120	11-SEP-17
Lithium (Li)			96.2		%		80-120	11-SEP-17
Magnesium (Mg)			101.7		%		80-120	11-SEP-17
Manganese (Mn)			105.0		%		80-120	11-SEP-17
Molybdenum (Mo)			101.2		%		80-120	11-SEP-17
Nickel (Ni)			101.2		%		80-120	11-SEP-17
Phosphorus (P)			104.4		%		80-120	11-SEP-17



Quality Control Report

Workorder: L1982926

Report Date: 13-SEP-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3824084							
WG2612583-3	LCS							
Potassium (K)			104.8		%		80-120	11-SEP-17
Selenium (Se)			104.6		%		80-120	11-SEP-17
Silver (Ag)			100.5		%		80-120	11-SEP-17
Sodium (Na)			103.8		%		80-120	11-SEP-17
Strontium (Sr)			100.6		%		80-120	11-SEP-17
Sulfur (S)			108.4		%		80-120	11-SEP-17
Thallium (Tl)			105.0		%		80-120	11-SEP-17
Tin (Sn)			104.1		%		80-120	11-SEP-17
Titanium (Ti)			102.2		%		80-120	11-SEP-17
Tungsten (W)			103.2		%		80-120	11-SEP-17
Uranium (U)			103.7		%		80-120	11-SEP-17
Vanadium (V)			103.0		%		80-120	11-SEP-17
Zinc (Zn)			96.1		%		80-120	11-SEP-17
Zirconium (Zr)			100.9		%		70-130	11-SEP-17
WG2612583-1	MB							
Aluminum (Al)			<50		mg/kg		50	11-SEP-17
Antimony (Sb)			<0.10		mg/kg		0.1	11-SEP-17
Arsenic (As)			<0.10		mg/kg		0.1	11-SEP-17
Barium (Ba)			<0.50		mg/kg		0.5	11-SEP-17
Beryllium (Be)			<0.10		mg/kg		0.1	11-SEP-17
Bismuth (Bi)			<0.20		mg/kg		0.2	11-SEP-17
Boron (B)			<5.0		mg/kg		5	11-SEP-17
Cadmium (Cd)			<0.020		mg/kg		0.02	11-SEP-17
Calcium (Ca)			<50		mg/kg		50	11-SEP-17
Chromium (Cr)			<0.50		mg/kg		0.5	11-SEP-17
Cobalt (Co)			<0.10		mg/kg		0.1	11-SEP-17
Copper (Cu)			<0.50		mg/kg		0.5	11-SEP-17
Iron (Fe)			<50		mg/kg		50	11-SEP-17
Lead (Pb)			<0.50		mg/kg		0.5	11-SEP-17
Lithium (Li)			<2.0		mg/kg		2	11-SEP-17
Magnesium (Mg)			<20		mg/kg		20	11-SEP-17
Manganese (Mn)			<1.0		mg/kg		1	11-SEP-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	11-SEP-17
Nickel (Ni)			<0.50		mg/kg		0.5	11-SEP-17



Quality Control Report

Workorder: L1982926

Report Date: 13-SEP-17

Page 6 of 7

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
S-TOT-LECO-SK								
Soil								
Batch	R3822735							
WG2609988-1	DUP	L1982926-1						
Sulfur (S)-Total		<500	<500	RPD-NA	mg/kg	N/A	30	08-SEP-17
WG2609988-2	IRM	1646A_SOIL						
Sulfur (S)-Total			3600		mg/kg		2500-4600	08-SEP-17
WG2609988-3	MB							
Sulfur (S)-Total			<500		mg/kg		500	08-SEP-17
SO4-LEACH-IC-VA								
Soil								
Batch	R3822413							
WG2610590-3	DUP	L1982926-1						
Sulfate (SO4)		533	539		mg/kg	1.0	20	07-SEP-17
WG2610590-2	LCS							
Sulfate (SO4)			101.3		%		70-130	07-SEP-17
WG2610590-1	MB							
Sulfate (SO4)			<10		mg/kg		10	07-SEP-17

Quality Control Report

Workorder: L1982926

Report Date: 13-SEP-17

Page 7 of 7

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

10, 14



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 26-SEP-17
Report Date: 05-OCT-17 15:31 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1997619
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1997619-1 TL6-25SEP17								
Sampled By: SW on 25-SEP-17 @ 18:50								
Matrix: WATER								
Metals in Soil (CCME) with Extra Metals								
Mercury in Soil by CVAFS								
Mercury (Hg)		<0.0050		0.0050	mg/kg	02-OCT-17	03-OCT-17	R3845844
Metals in Soil by CRC ICPMS								
Aluminum (Al)		9010		50	mg/kg	02-OCT-17	03-OCT-17	R3845842
Antimony (Sb)		<0.10		0.10	mg/kg	02-OCT-17	03-OCT-17	R3845842
Arsenic (As)		7.56		0.10	mg/kg	02-OCT-17	03-OCT-17	R3845842
Barium (Ba)		7.67		0.50	mg/kg	02-OCT-17	03-OCT-17	R3845842
Beryllium (Be)		<0.10		0.10	mg/kg	02-OCT-17	03-OCT-17	R3845842
Bismuth (Bi)		<0.20		0.20	mg/kg	02-OCT-17	03-OCT-17	R3845842
Boron (B)		8.0		5.0	mg/kg	02-OCT-17	03-OCT-17	R3845842
Cadmium (Cd)		0.083		0.020	mg/kg	02-OCT-17	03-OCT-17	R3845842
Calcium (Ca)		27400		50	mg/kg	02-OCT-17	03-OCT-17	R3845842
Chromium (Cr)		21.0		0.50	mg/kg	02-OCT-17	03-OCT-17	R3845842
Cobalt (Co)		9.77		0.10	mg/kg	02-OCT-17	03-OCT-17	R3845842
Copper (Cu)		33.3		0.50	mg/kg	02-OCT-17	03-OCT-17	R3845842
Iron (Fe)		33400		50	mg/kg	02-OCT-17	03-OCT-17	R3845842
Lead (Pb)		4.10		0.50	mg/kg	02-OCT-17	03-OCT-17	R3845842
Lithium (Li)		16.8		2.0	mg/kg	02-OCT-17	03-OCT-17	R3845842
Magnesium (Mg)		12400		20	mg/kg	02-OCT-17	03-OCT-17	R3845842
Manganese (Mn)		805		1.0	mg/kg	02-OCT-17	03-OCT-17	R3845842
Molybdenum (Mo)		0.20		0.10	mg/kg	02-OCT-17	03-OCT-17	R3845842
Nickel (Ni)		17.8		0.50	mg/kg	02-OCT-17	03-OCT-17	R3845842
Phosphorus (P)		293		50	mg/kg	02-OCT-17	03-OCT-17	R3845842
Potassium (K)		580		100	mg/kg	02-OCT-17	03-OCT-17	R3845842
Selenium (Se)		<0.20		0.20	mg/kg	02-OCT-17	03-OCT-17	R3845842
Silver (Ag)		0.17		0.10	mg/kg	02-OCT-17	03-OCT-17	R3845842
Sodium (Na)		633		50	mg/kg	02-OCT-17	03-OCT-17	R3845842
Strontium (Sr)		12.8		0.50	mg/kg	02-OCT-17	03-OCT-17	R3845842
Sulfur (S)		<1000		1000	mg/kg	02-OCT-17	03-OCT-17	R3845842
Thallium (Tl)		<0.050		0.050	mg/kg	02-OCT-17	03-OCT-17	R3845842
Tin (Sn)		<2.0		2.0	mg/kg	02-OCT-17	03-OCT-17	R3845842
Titanium (Ti)		434		1.0	mg/kg	02-OCT-17	03-OCT-17	R3845842
Tungsten (W)		<0.50		0.50	mg/kg	02-OCT-17	03-OCT-17	R3845842
Uranium (U)		<0.050		0.050	mg/kg	02-OCT-17	03-OCT-17	R3845842
Vanadium (V)		35.8		0.20	mg/kg	02-OCT-17	03-OCT-17	R3845842
Zinc (Zn)		46.5		2.0	mg/kg	02-OCT-17	03-OCT-17	R3845842
Zirconium (Zr)		1.5		1.0	mg/kg	02-OCT-17	03-OCT-17	R3845842
pH in Soil (1:2 Soil:Water Extraction)								
pH (1:2 soil:water)		9.19		0.10	pH		03-OCT-17	R3844072
Miscellaneous Parameters								
Inorganic Carbon (as CaCO3 Equivalent)		7.35		0.40	%		04-OCT-17	
Moisture		24.6		0.25	%		01-OCT-17	R3842491
Sulfate (SO4)		656		10	mg/kg	02-OCT-17	02-OCT-17	R3846421
Inorganic Carbon		0.883		0.050	%		04-OCT-17	R3846433
Sulfur (S)-Total		500		500	mg/kg	03-OCT-17	03-OCT-17	R3844807

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** 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
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

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

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.



Quality Control Report

Workorder: L1997619

Report Date: 05-OCT-17

Page 1 of 6

Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK								
Soil								
Batch	R3846433							
WG2628913-2	LCS							
Inorganic Carbon			99.0		%		80-120	04-OCT-17
WG2628913-3	MB							
Inorganic Carbon			<0.050		%		0.05	04-OCT-17
HG-200.2-CVAF-VA								
Soil								
Batch	R3845844							
WG2630433-4	CRM	VA-CANMET-TILL1						
Mercury (Hg)			87.8		%		70-130	03-OCT-17
WG2630433-3	LCS							
Mercury (Hg)			100.5		%		70-130	03-OCT-17
WG2630433-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	03-OCT-17
MET-200.2-CCMS-VA								
Soil								
Batch	R3845567							
WG2630433-4	CRM	VA-CANMET-TILL1						
Aluminum (Al)			94.4		%		70-130	03-OCT-17
Antimony (Sb)			100.4		%		70-130	03-OCT-17
Arsenic (As)			95.0		%		70-130	03-OCT-17
Barium (Ba)			89.1		%		70-130	03-OCT-17
Beryllium (Be)			0.49		mg/kg		0.34-0.74	03-OCT-17
Bismuth (Bi)			92.2		%		70-130	03-OCT-17
Boron (B)			2.9		mg/kg		0-8.2	03-OCT-17
Cadmium (Cd)			97.6		%		70-130	03-OCT-17
Calcium (Ca)			99.4		%		70-130	03-OCT-17
Chromium (Cr)			95.9		%		70-130	03-OCT-17
Cobalt (Co)			95.3		%		70-130	03-OCT-17
Copper (Cu)			94.9		%		70-130	03-OCT-17
Iron (Fe)			95.8		%		70-130	03-OCT-17
Lead (Pb)			100.4		%		70-130	03-OCT-17
Lithium (Li)			101.2		%		70-130	03-OCT-17
Magnesium (Mg)			97.1		%		70-130	03-OCT-17
Manganese (Mn)			91.8		%		70-130	03-OCT-17
Molybdenum (Mo)			89.1		%		70-130	03-OCT-17
Nickel (Ni)			95.7		%		70-130	03-OCT-17
Potassium (K)			101.3		%		70-130	03-OCT-17
Selenium (Se)			0.27		mg/kg		0.11-0.51	03-OCT-17



Quality Control Report

Workorder: L1997619

Report Date: 05-OCT-17

Page 2 of 6

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3845567							
WG2630433-4	CRM	VA-CANMET-TILL1						
Silver (Ag)			0.23		mg/kg		0.13-0.33	03-OCT-17
Sodium (Na)			103.1		%		70-130	03-OCT-17
Strontium (Sr)			96.5		%		70-130	03-OCT-17
Thallium (Tl)			0.120		mg/kg		0.077-0.18	03-OCT-17
Tin (Sn)			1.0		mg/kg		0-3	03-OCT-17
Titanium (Ti)			113.9		%		70-130	03-OCT-17
Tungsten (W)			0.15		mg/kg		0-0.66	03-OCT-17
Uranium (U)			92.3		%		70-130	03-OCT-17
Vanadium (V)			96.6		%		70-130	03-OCT-17
Zinc (Zn)			98.8		%		70-130	03-OCT-17
Zirconium (Zr)			0.6		mg/kg		0-1.8	03-OCT-17
WG2630433-3	LCS							
Aluminum (Al)			105.8		%		80-120	03-OCT-17
Antimony (Sb)			108.5		%		80-120	03-OCT-17
Arsenic (As)			105.5		%		80-120	03-OCT-17
Barium (Ba)			104.8		%		80-120	03-OCT-17
Beryllium (Be)			100.5		%		80-120	03-OCT-17
Bismuth (Bi)			99.7		%		80-120	03-OCT-17
Boron (B)			93.4		%		80-120	03-OCT-17
Cadmium (Cd)			105.2		%		80-120	03-OCT-17
Calcium (Ca)			102.0		%		80-120	03-OCT-17
Chromium (Cr)			101.7		%		80-120	03-OCT-17
Cobalt (Co)			102.3		%		80-120	03-OCT-17
Copper (Cu)			101.8		%		80-120	03-OCT-17
Iron (Fe)			103.4		%		80-120	03-OCT-17
Lead (Pb)			103.3		%		80-120	03-OCT-17
Lithium (Li)			102.9		%		80-120	03-OCT-17
Magnesium (Mg)			106.8		%		80-120	03-OCT-17
Manganese (Mn)			99.99		%		80-120	03-OCT-17
Molybdenum (Mo)			103.9		%		80-120	03-OCT-17
Nickel (Ni)			104.1		%		80-120	03-OCT-17
Phosphorus (P)			107.9		%		80-120	03-OCT-17
Potassium (K)			104.7		%		80-120	03-OCT-17
Selenium (Se)			100.3		%		80-120	03-OCT-17



Quality Control Report

Workorder: L1997619

Report Date: 05-OCT-17

Page 3 of 6

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3845567							
WG2630433-3	LCS							
Silver (Ag)			104.4		%		80-120	03-OCT-17
Sodium (Na)			105.1		%		80-120	03-OCT-17
Strontium (Sr)			100.9		%		80-120	03-OCT-17
Sulfur (S)			103.5		%		80-120	03-OCT-17
Thallium (Tl)			102.4		%		80-120	03-OCT-17
Tin (Sn)			103.0		%		80-120	03-OCT-17
Titanium (Ti)			109.5		%		80-120	03-OCT-17
Tungsten (W)			107.3		%		80-120	03-OCT-17
Uranium (U)			102.0		%		80-120	03-OCT-17
Vanadium (V)			105.2		%		80-120	03-OCT-17
Zinc (Zn)			98.5		%		80-120	03-OCT-17
Zirconium (Zr)			102.4		%		70-130	03-OCT-17
WG2630433-1	MB							
Aluminum (Al)			<50		mg/kg		50	03-OCT-17
Antimony (Sb)			<0.10		mg/kg		0.1	03-OCT-17
Arsenic (As)			<0.10		mg/kg		0.1	03-OCT-17
Barium (Ba)			<0.50		mg/kg		0.5	03-OCT-17
Beryllium (Be)			<0.10		mg/kg		0.1	03-OCT-17
Bismuth (Bi)			<0.20		mg/kg		0.2	03-OCT-17
Boron (B)			<5.0		mg/kg		5	03-OCT-17
Cadmium (Cd)			<0.020		mg/kg		0.02	03-OCT-17
Calcium (Ca)			<50		mg/kg		50	03-OCT-17
Chromium (Cr)			<0.50		mg/kg		0.5	03-OCT-17
Cobalt (Co)			<0.10		mg/kg		0.1	03-OCT-17
Copper (Cu)			<0.50		mg/kg		0.5	03-OCT-17
Iron (Fe)			<50		mg/kg		50	03-OCT-17
Lead (Pb)			<0.50		mg/kg		0.5	03-OCT-17
Lithium (Li)			<2.0		mg/kg		2	03-OCT-17
Magnesium (Mg)			<20		mg/kg		20	03-OCT-17
Manganese (Mn)			<1.0		mg/kg		1	03-OCT-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	03-OCT-17
Nickel (Ni)			<0.50		mg/kg		0.5	03-OCT-17
Phosphorus (P)			<50		mg/kg		50	03-OCT-17
Potassium (K)			<100		mg/kg		100	03-OCT-17



Quality Control Report

Workorder: L1997619

Report Date: 05-OCT-17

Page 5 of 6

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-LEACH-IC-VA	Soil							
Batch	R3846421							
WG2629723-3	DUP	L1997619-1						
Sulfate (SO4)		656	647		mg/kg	1.3	20	02-OCT-17
WG2629723-2	LCS							
Sulfate (SO4)			99.0		%		70-130	02-OCT-17
WG2629723-1	MB							
Sulfate (SO4)			<10		mg/kg		10	02-OCT-17

Quality Control Report

Workorder: L1997619

Report Date: 05-OCT-17

Page 6 of 6

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

[illegible]

GENF 18.01 Front

LAURIE SEP 28/17 10:25 A.M. 10, 10, 12, 20, 19.



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 01-NOV-17
Report Date: 09-NOV-17 13:43 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L2016924
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2016924-1 TL6-29OCT17								
Sampled By: SW/LW on 29-OCT-17 @ 16:30								
Matrix: Water								
Metals in Soil (CCME) with Extra Metals								
Mercury in Soil by CVAFS								
Mercury (Hg)		<0.0050		0.0050	mg/kg	03-NOV-17	05-NOV-17	R3875281
Metals in Soil by CRC ICPMS								
Aluminum (Al)		10700		50	mg/kg	03-NOV-17	05-NOV-17	R3875567
Antimony (Sb)		<0.10		0.10	mg/kg	03-NOV-17	05-NOV-17	R3875567
Arsenic (As)		7.49		0.10	mg/kg	03-NOV-17	05-NOV-17	R3875567
Barium (Ba)		15.2		0.50	mg/kg	03-NOV-17	05-NOV-17	R3875567
Beryllium (Be)		0.12		0.10	mg/kg	03-NOV-17	05-NOV-17	R3875567
Bismuth (Bi)		<0.20		0.20	mg/kg	03-NOV-17	05-NOV-17	R3875567
Boron (B)		16.1		5.0	mg/kg	03-NOV-17	05-NOV-17	R3875567
Cadmium (Cd)		0.120		0.020	mg/kg	03-NOV-17	05-NOV-17	R3875567
Calcium (Ca)		25000		50	mg/kg	03-NOV-17	05-NOV-17	R3875567
Chromium (Cr)		31.1		0.50	mg/kg	03-NOV-17	05-NOV-17	R3875567
Cobalt (Co)		10.6		0.10	mg/kg	03-NOV-17	05-NOV-17	R3875567
Copper (Cu)		26.5		0.50	mg/kg	03-NOV-17	05-NOV-17	R3875567
Iron (Fe)		38600		50	mg/kg	03-NOV-17	05-NOV-17	R3875567
Lead (Pb)		5.62		0.50	mg/kg	03-NOV-17	05-NOV-17	R3875567
Lithium (Li)		24.5		2.0	mg/kg	03-NOV-17	05-NOV-17	R3875567
Magnesium (Mg)		13400		20	mg/kg	03-NOV-17	05-NOV-17	R3875567
Manganese (Mn)		827		1.0	mg/kg	03-NOV-17	05-NOV-17	R3875567
Molybdenum (Mo)		0.21		0.10	mg/kg	03-NOV-17	05-NOV-17	R3875567
Nickel (Ni)		20.9		0.50	mg/kg	03-NOV-17	05-NOV-17	R3875567
Phosphorus (P)		247		50	mg/kg	03-NOV-17	05-NOV-17	R3875567
Potassium (K)		1270		100	mg/kg	03-NOV-17	05-NOV-17	R3875567
Selenium (Se)		<0.20		0.20	mg/kg	03-NOV-17	05-NOV-17	R3875567
Silver (Ag)		0.24		0.10	mg/kg	03-NOV-17	05-NOV-17	R3875567
Sodium (Na)		643		50	mg/kg	03-NOV-17	05-NOV-17	R3875567
Strontium (Sr)		14.0		0.50	mg/kg	03-NOV-17	05-NOV-17	R3875567
Sulfur (S)		<1000		1000	mg/kg	03-NOV-17	05-NOV-17	R3875567
Thallium (Tl)		<0.050		0.050	mg/kg	03-NOV-17	05-NOV-17	R3875567
Tin (Sn)		<2.0		2.0	mg/kg	03-NOV-17	05-NOV-17	R3875567
Titanium (Ti)		699		1.0	mg/kg	03-NOV-17	05-NOV-17	R3875567
Tungsten (W)		<0.50		0.50	mg/kg	03-NOV-17	05-NOV-17	R3875567
Uranium (U)		<0.050		0.050	mg/kg	03-NOV-17	05-NOV-17	R3875567
Vanadium (V)		49.6		0.20	mg/kg	03-NOV-17	05-NOV-17	R3875567
Zinc (Zn)		63.2		2.0	mg/kg	03-NOV-17	05-NOV-17	R3875567
Zirconium (Zr)		1.6		1.0	mg/kg	03-NOV-17	05-NOV-17	R3875567
pH in Soil (1:2 Soil:Water Extraction)								
pH (1:2 soil:water)		9.08		0.10	pH		06-NOV-17	R3875956
Miscellaneous Parameters								
Inorganic Carbon (as CaCO3 Equivalent)		6.32		0.40	%		07-NOV-17	
Moisture		23.3		0.25	%		02-NOV-17	R3873554
Sulfate (SO4)		476		10	mg/kg	07-NOV-17	08-NOV-17	R3879690
Inorganic Carbon		0.758		0.050	%		07-NOV-17	R3877709
Sulfur (S)-Total		<500		500	mg/kg	06-NOV-17	06-NOV-17	R3877276

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** 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
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

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

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.



Quality Control Report

Workorder: L2016924

Report Date: 09-NOV-17

Page 1 of 6

Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK								
Soil								
Batch	R3877709							
WG2656306-2	LCS							
Inorganic Carbon			96.3		%		80-120	07-NOV-17
WG2656306-3	MB							
Inorganic Carbon			<0.050		%		0.05	07-NOV-17
HG-200.2-CVAF-VA								
Soil								
Batch	R3875281							
WG2655514-4	CRM	VA-CANMET-TILL1						
Mercury (Hg)			105.7		%		70-130	05-NOV-17
WG2655514-3	LCS							
Mercury (Hg)			115.4		%		70-130	05-NOV-17
WG2655514-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	05-NOV-17
MET-200.2-CCMS-VA								
Soil								
Batch	R3875567							
WG2655514-3	LCS							
Aluminum (Al)			99.1		%		80-120	05-NOV-17
Antimony (Sb)			102.1		%		80-120	05-NOV-17
Arsenic (As)			100.5		%		80-120	05-NOV-17
Barium (Ba)			103.7		%		80-120	05-NOV-17
Beryllium (Be)			95.2		%		80-120	05-NOV-17
Bismuth (Bi)			92.8		%		80-120	05-NOV-17
Boron (B)			94.8		%		80-120	05-NOV-17
Cadmium (Cd)			104.1		%		80-120	05-NOV-17
Calcium (Ca)			96.9		%		80-120	05-NOV-17
Chromium (Cr)			93.8		%		80-120	05-NOV-17
Cobalt (Co)			97.8		%		80-120	05-NOV-17
Copper (Cu)			99.0		%		80-120	05-NOV-17
Iron (Fe)			99.5		%		80-120	05-NOV-17
Lead (Pb)			94.1		%		80-120	05-NOV-17
Lithium (Li)			92.6		%		80-120	05-NOV-17
Magnesium (Mg)			98.9		%		80-120	05-NOV-17
Manganese (Mn)			96.3		%		80-120	05-NOV-17
Molybdenum (Mo)			92.5		%		80-120	05-NOV-17
Nickel (Ni)			97.7		%		80-120	05-NOV-17
Phosphorus (P)			99.9		%		80-120	05-NOV-17
Potassium (K)			100.2		%		80-120	05-NOV-17



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Workorder: L2016924

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3875567							
WG2655514-3	LCS							
Selenium (Se)			99.6		%		80-120	05-NOV-17
Silver (Ag)			96.8		%		80-120	05-NOV-17
Sodium (Na)			100.9		%		80-120	05-NOV-17
Strontium (Sr)			94.5		%		80-120	05-NOV-17
Sulfur (S)			99.1		%		80-120	05-NOV-17
Thallium (Tl)			92.8		%		80-120	05-NOV-17
Tin (Sn)			97.1		%		80-120	05-NOV-17
Titanium (Ti)			92.1		%		80-120	05-NOV-17
Tungsten (W)			95.8		%		80-120	05-NOV-17
Uranium (U)			99.9		%		80-120	05-NOV-17
Vanadium (V)			100.3		%		80-120	05-NOV-17
Zinc (Zn)			96.8		%		80-120	05-NOV-17
Zirconium (Zr)			91.6		%		70-130	05-NOV-17
WG2655514-1	MB							
Aluminum (Al)			<50		mg/kg		50	05-NOV-17
Antimony (Sb)			<0.10		mg/kg		0.1	05-NOV-17
Arsenic (As)			<0.10		mg/kg		0.1	05-NOV-17
Barium (Ba)			<0.50		mg/kg		0.5	05-NOV-17
Beryllium (Be)			<0.10		mg/kg		0.1	05-NOV-17
Bismuth (Bi)			<0.20		mg/kg		0.2	05-NOV-17
Boron (B)			<5.0		mg/kg		5	05-NOV-17
Cadmium (Cd)			<0.020		mg/kg		0.02	05-NOV-17
Calcium (Ca)			<50		mg/kg		50	05-NOV-17
Chromium (Cr)			<0.50		mg/kg		0.5	05-NOV-17
Cobalt (Co)			<0.10		mg/kg		0.1	05-NOV-17
Copper (Cu)			<0.50		mg/kg		0.5	05-NOV-17
Iron (Fe)			<50		mg/kg		50	05-NOV-17
Lead (Pb)			<0.50		mg/kg		0.5	05-NOV-17
Lithium (Li)			<2.0		mg/kg		2	05-NOV-17
Magnesium (Mg)			<20		mg/kg		20	05-NOV-17
Manganese (Mn)			<1.0		mg/kg		1	05-NOV-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	05-NOV-17
Nickel (Ni)			<0.50		mg/kg		0.5	05-NOV-17
Phosphorus (P)			<50		mg/kg		50	05-NOV-17



Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch R3875567								
WG2655514-1 MB								
Potassium (K)			<100		mg/kg		100	05-NOV-17
Selenium (Se)			<0.20		mg/kg		0.2	05-NOV-17
Silver (Ag)			<0.10		mg/kg		0.1	05-NOV-17
Sodium (Na)			<50		mg/kg		50	05-NOV-17
Strontium (Sr)			<0.50		mg/kg		0.5	05-NOV-17
Sulfur (S)			<1000		mg/kg		1000	05-NOV-17
Thallium (Tl)			<0.050		mg/kg		0.05	05-NOV-17
Tin (Sn)			<2.0		mg/kg		2	05-NOV-17
Titanium (Ti)			<1.0		mg/kg		1	05-NOV-17
Tungsten (W)			<0.50		mg/kg		0.5	05-NOV-17
Uranium (U)			<0.050		mg/kg		0.05	05-NOV-17
Vanadium (V)			<0.20		mg/kg		0.2	05-NOV-17
Zinc (Zn)			<2.0		mg/kg		2	05-NOV-17
Zirconium (Zr)			<1.0		mg/kg		1	05-NOV-17
Batch R3877568								
WG2655514-4 CRM		VA-CANMET-TILL1						
Aluminum (Al)			109.0		%		70-130	06-NOV-17
Antimony (Sb)			107.0		%		70-130	06-NOV-17
Arsenic (As)			109.0		%		70-130	06-NOV-17
Barium (Ba)			107.2		%		70-130	06-NOV-17
Beryllium (Be)			0.57		mg/kg		0.34-0.74	06-NOV-17
Bismuth (Bi)			111.1		%		70-130	06-NOV-17
Boron (B)			2.9		mg/kg		0-8.2	06-NOV-17
Cadmium (Cd)			108.8		%		70-130	06-NOV-17
Calcium (Ca)			104.3		%		70-130	06-NOV-17
Chromium (Cr)			107.1		%		70-130	06-NOV-17
Cobalt (Co)			109.2		%		70-130	06-NOV-17
Copper (Cu)			108.9		%		70-130	06-NOV-17
Iron (Fe)			106.1		%		70-130	06-NOV-17
Lead (Pb)			109.8		%		70-130	06-NOV-17
Lithium (Li)			116.4		%		70-130	06-NOV-17
Magnesium (Mg)			109.3		%		70-130	06-NOV-17
Manganese (Mn)			108.2		%		70-130	06-NOV-17
Molybdenum (Mo)			106.0		%		70-130	06-NOV-17



Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
S-TOT-LECO-SK	Soil							
Batch	R3877276							
WG2655040-3	MB							
Sulfur (S)-Total			<500		mg/kg		500	06-NOV-17
SO4-LEACH-IC-VA	Soil							
Batch	R3879690							
WG2658499-2	DUP	L2016924-1						
Sulfate (SO4)		476	483		mg/kg	1.6	20	08-NOV-17
WG2658499-3	LCS							
Sulfate (SO4)			102.2		%		70-130	08-NOV-17
WG2658499-1	MB							
Sulfate (SO4)			<10		mg/kg		10	08-NOV-17

Quality Control Report

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 05-DEC-17
Report Date: 14-DEC-17 12:36 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L2031040
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2031040-1 TL6-27NOV17 Sampled By: SW/LW on 27-NOV-17 @ 17:40 Matrix: water Metals in Soil (CCME) with Extra Metals Mercury in Soil by CVAAS Mercury (Hg)	<0.0050		0.0050	mg/kg	08-DEC-17	11-DEC-17	R3910027
Metals in Soil by CRC ICPMS Aluminum (Al)	12600		50	mg/kg	08-DEC-17	10-DEC-17	R3910687
Antimony (Sb)	<0.10		0.10	mg/kg	08-DEC-17	10-DEC-17	R3910687
Arsenic (As)	5.98		0.10	mg/kg	08-DEC-17	10-DEC-17	R3910687
Barium (Ba)	16.6		0.50	mg/kg	08-DEC-17	10-DEC-17	R3910687
Beryllium (Be)	0.14		0.10	mg/kg	08-DEC-17	10-DEC-17	R3910687
Bismuth (Bi)	<0.20		0.20	mg/kg	08-DEC-17	10-DEC-17	R3910687
Boron (B)	11.3		5.0	mg/kg	08-DEC-17	10-DEC-17	R3910687
Cadmium (Cd)	0.122		0.020	mg/kg	08-DEC-17	10-DEC-17	R3910687
Calcium (Ca)	28000		50	mg/kg	08-DEC-17	10-DEC-17	R3910687
Chromium (Cr)	27.4		0.50	mg/kg	08-DEC-17	10-DEC-17	R3910687
Cobalt (Co)	11.4		0.10	mg/kg	08-DEC-17	10-DEC-17	R3910687
Copper (Cu)	24.7		0.50	mg/kg	08-DEC-17	10-DEC-17	R3910687
Iron (Fe)	42500		50	mg/kg	08-DEC-17	10-DEC-17	R3910687
Lead (Pb)	6.17		0.50	mg/kg	08-DEC-17	10-DEC-17	R3910687
Lithium (Li)	26.9		2.0	mg/kg	08-DEC-17	10-DEC-17	R3910687
Magnesium (Mg)	13900		20	mg/kg	08-DEC-17	10-DEC-17	R3910687
Manganese (Mn)	930		1.0	mg/kg	08-DEC-17	10-DEC-17	R3910687
Molybdenum (Mo)	0.26		0.10	mg/kg	08-DEC-17	10-DEC-17	R3910687
Nickel (Ni)	19.0		0.50	mg/kg	08-DEC-17	10-DEC-17	R3910687
Phosphorus (P)	353		50	mg/kg	08-DEC-17	10-DEC-17	R3910687
Potassium (K)	1350		100	mg/kg	08-DEC-17	10-DEC-17	R3910687
Selenium (Se)	<0.20		0.20	mg/kg	08-DEC-17	10-DEC-17	R3910687
Silver (Ag)	0.31		0.10	mg/kg	08-DEC-17	10-DEC-17	R3910687
Sodium (Na)	733		50	mg/kg	08-DEC-17	10-DEC-17	R3910687
Strontium (Sr)	14.7		0.50	mg/kg	08-DEC-17	10-DEC-17	R3910687
Sulfur (S)	1000		1000	mg/kg	08-DEC-17	10-DEC-17	R3910687
Thallium (Tl)	<0.050		0.050	mg/kg	08-DEC-17	10-DEC-17	R3910687
Tin (Sn)	<2.0		2.0	mg/kg	08-DEC-17	10-DEC-17	R3910687
Titanium (Ti)	852		1.0	mg/kg	08-DEC-17	10-DEC-17	R3910687
Tungsten (W)	0.56		0.50	mg/kg	08-DEC-17	10-DEC-17	R3910687
Uranium (U)	<0.050		0.050	mg/kg	08-DEC-17	10-DEC-17	R3910687
Vanadium (V)	54.3		0.20	mg/kg	08-DEC-17	10-DEC-17	R3910687
Zinc (Zn)	60.5		2.0	mg/kg	08-DEC-17	10-DEC-17	R3910687
Zirconium (Zr)	2.3		1.0	mg/kg	08-DEC-17	10-DEC-17	R3910687
pH in Soil (1:2 Soil:Water Extraction) pH (1:2 soil:water)	9.24		0.10	pH		12-DEC-17	R3910788
Miscellaneous Parameters Inorganic Carbon (as CaCO3 Equivalent)	5.22		0.40	%		14-DEC-17	
Moisture	22.0		0.25	%		08-DEC-17	R3908308
Sulfate (SO4)	636		10	mg/kg	12-DEC-17	12-DEC-17	R3912715
Inorganic Carbon	0.627		0.050	%		14-DEC-17	R3913194
Sulfur (S)-Total	600		500	mg/kg	13-DEC-17	13-DEC-17	R3912696

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)
Soil samples are digested with hot nitric and hydrochloric acids, followed by CVAAS analysis. This method is fully compliant with the BC SALM strong acid leachable metals digestion method.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** 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
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

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

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.



Quality Control Report

Workorder: L2031040

Report Date: 14-DEC-17

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Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK		Soil						
Batch	R3913194							
WG2682661-2	LCS							
Inorganic Carbon			93.8		%		80-120	14-DEC-17
WG2682661-3	MB							
Inorganic Carbon			<0.050		%		0.05	14-DEC-17
HG-200.2-CVAF-VA		Soil						
Batch	R3910027							
WG2680921-4	CRM	VA-CANMET-TILL1						
Mercury (Hg)			94.7		%		70-130	11-DEC-17
WG2680921-3	LCS							
Mercury (Hg)			105.3		%		70-130	11-DEC-17
WG2680921-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	11-DEC-17
MET-200.2-CCMS-VA		Soil						
Batch	R3910687							
WG2680921-4	CRM	VA-CANMET-TILL1						
Aluminum (Al)			92.8		%		70-130	10-DEC-17
Antimony (Sb)			102.2		%		70-130	10-DEC-17
Arsenic (As)			93.8		%		70-130	10-DEC-17
Barium (Ba)			94.3		%		70-130	10-DEC-17
Beryllium (Be)			0.51		mg/kg		0.34-0.74	10-DEC-17
Bismuth (Bi)			94.4		%		70-130	10-DEC-17
Boron (B)			3.1		mg/kg		0-8.2	10-DEC-17
Cadmium (Cd)			96.6		%		70-130	10-DEC-17
Calcium (Ca)			96.4		%		70-130	10-DEC-17
Chromium (Cr)			93.8		%		70-130	10-DEC-17
Cobalt (Co)			94.7		%		70-130	10-DEC-17
Copper (Cu)			92.7		%		70-130	10-DEC-17
Iron (Fe)			95.6		%		70-130	10-DEC-17
Lead (Pb)			92.7		%		70-130	10-DEC-17
Lithium (Li)			99.6		%		70-130	10-DEC-17
Magnesium (Mg)			93.6		%		70-130	10-DEC-17
Manganese (Mn)			94.3		%		70-130	10-DEC-17
Molybdenum (Mo)			95.7		%		70-130	10-DEC-17
Nickel (Ni)			93.7		%		70-130	10-DEC-17
Potassium (K)			105.0		%		70-130	10-DEC-17
Selenium (Se)			0.31		mg/kg		0.11-0.51	10-DEC-17



Quality Control Report

Workorder: L2031040

Report Date: 14-DEC-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3910687							
WG2680921-4	CRM	VA-CANMET-TILL1						
Silver (Ag)			0.23		mg/kg		0.13-0.33	10-DEC-17
Sodium (Na)			102.0		%		70-130	10-DEC-17
Strontium (Sr)			100.7		%		70-130	10-DEC-17
Thallium (Tl)			0.129		mg/kg		0.077-0.18	10-DEC-17
Tin (Sn)			1.0		mg/kg		0-3	10-DEC-17
Titanium (Ti)			108.4		%		70-130	10-DEC-17
Tungsten (W)			0.27		mg/kg		0-0.66	10-DEC-17
Uranium (U)			98.0		%		70-130	10-DEC-17
Vanadium (V)			93.7		%		70-130	10-DEC-17
Zinc (Zn)			96.8		%		70-130	10-DEC-17
Zirconium (Zr)			0.7		mg/kg		0-1.8	10-DEC-17
WG2680921-3	LCS							
Aluminum (Al)			98.4		%		80-120	10-DEC-17
Antimony (Sb)			108.3		%		80-120	10-DEC-17
Arsenic (As)			98.5		%		80-120	10-DEC-17
Barium (Ba)			102.4		%		80-120	10-DEC-17
Beryllium (Be)			103.1		%		80-120	10-DEC-17
Bismuth (Bi)			103.1		%		80-120	10-DEC-17
Boron (B)			92.9		%		80-120	10-DEC-17
Cadmium (Cd)			105.2		%		80-120	10-DEC-17
Calcium (Ca)			97.7		%		80-120	10-DEC-17
Chromium (Cr)			93.6		%		80-120	10-DEC-17
Cobalt (Co)			96.4		%		80-120	10-DEC-17
Copper (Cu)			96.6		%		80-120	10-DEC-17
Iron (Fe)			97.5		%		80-120	10-DEC-17
Lead (Pb)			101.2		%		80-120	10-DEC-17
Lithium (Li)			99.3		%		80-120	10-DEC-17
Magnesium (Mg)			97.7		%		80-120	10-DEC-17
Manganese (Mn)			97.9		%		80-120	10-DEC-17
Molybdenum (Mo)			99.8		%		80-120	10-DEC-17
Nickel (Ni)			95.9		%		80-120	10-DEC-17
Phosphorus (P)			97.3		%		80-120	10-DEC-17
Potassium (K)			103.9		%		80-120	10-DEC-17
Selenium (Se)			106.8		%		80-120	10-DEC-17



Quality Control Report

Workorder: L2031040

Report Date: 14-DEC-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3910687							
WG2680921-3	LCS							
Silver (Ag)			105.9		%		80-120	10-DEC-17
Sodium (Na)			99.0		%		80-120	10-DEC-17
Strontium (Sr)			103.1		%		80-120	10-DEC-17
Sulfur (S)			107.1		%		80-120	10-DEC-17
Thallium (Tl)			102.7		%		80-120	10-DEC-17
Tin (Sn)			99.1		%		80-120	10-DEC-17
Titanium (Ti)			93.1		%		80-120	10-DEC-17
Tungsten (W)			102.2		%		80-120	10-DEC-17
Uranium (U)			103.4		%		80-120	10-DEC-17
Vanadium (V)			97.8		%		80-120	10-DEC-17
Zinc (Zn)			96.2		%		80-120	10-DEC-17
Zirconium (Zr)			96.5		%		70-130	10-DEC-17
WG2680921-1	MB							
Aluminum (Al)			<50		mg/kg		50	10-DEC-17
Antimony (Sb)			<0.10		mg/kg		0.1	10-DEC-17
Arsenic (As)			<0.10		mg/kg		0.1	10-DEC-17
Barium (Ba)			<0.50		mg/kg		0.5	10-DEC-17
Beryllium (Be)			<0.10		mg/kg		0.1	10-DEC-17
Bismuth (Bi)			<0.20		mg/kg		0.2	10-DEC-17
Boron (B)			<5.0		mg/kg		5	10-DEC-17
Cadmium (Cd)			<0.020		mg/kg		0.02	10-DEC-17
Calcium (Ca)			<50		mg/kg		50	10-DEC-17
Chromium (Cr)			<0.50		mg/kg		0.5	10-DEC-17
Cobalt (Co)			<0.10		mg/kg		0.1	10-DEC-17
Copper (Cu)			<0.50		mg/kg		0.5	10-DEC-17
Iron (Fe)			<50		mg/kg		50	10-DEC-17
Lead (Pb)			<0.50		mg/kg		0.5	10-DEC-17
Lithium (Li)			<2.0		mg/kg		2	10-DEC-17
Magnesium (Mg)			<20		mg/kg		20	10-DEC-17
Manganese (Mn)			<1.0		mg/kg		1	10-DEC-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	10-DEC-17
Nickel (Ni)			<0.50		mg/kg		0.5	10-DEC-17
Phosphorus (P)			<50		mg/kg		50	10-DEC-17
Potassium (K)			<100		mg/kg		100	10-DEC-17



Quality Control Report

Workorder: L2031040

Report Date: 14-DEC-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-LEACH-IC-VA	Soil							
Batch	R3912715							
WG2682632-3	LCS							
Sulfate (SO4)			100.1		%		70-130	12-DEC-17
WG2682632-1	MB							
Sulfate (SO4)			<10		mg/kg		10	12-DEC-17

Quality Control Report

Workorder: L2031040

Report Date: 14-DEC-17

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 02-JAN-18
Report Date: 10-JAN-18 15:54 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L2040730
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2040730-1	TL6-31DEC17							
Sampled By:	JI on 31-DEC-17 @ 17:30							
Matrix:	WATER							
Metals in Soil (CCME) with Extra Metals								
Mercury in Soil by CVAAS								
Mercury (Hg)		<0.0050		0.0050	mg/kg	08-JAN-18	09-JAN-18	R3931887
Metals in Soil by CRC ICPMS								
Aluminum (Al)		9840		50	mg/kg	08-JAN-18	09-JAN-18	R3932523
Antimony (Sb)		<0.10		0.10	mg/kg	08-JAN-18	09-JAN-18	R3932523
Arsenic (As)		10.6		0.10	mg/kg	08-JAN-18	09-JAN-18	R3932523
Barium (Ba)		10.4		0.50	mg/kg	08-JAN-18	09-JAN-18	R3932523
Beryllium (Be)		0.10		0.10	mg/kg	08-JAN-18	09-JAN-18	R3932523
Bismuth (Bi)		<0.20		0.20	mg/kg	08-JAN-18	09-JAN-18	R3932523
Boron (B)		18.1		5.0	mg/kg	08-JAN-18	09-JAN-18	R3932523
Cadmium (Cd)		0.071		0.020	mg/kg	08-JAN-18	09-JAN-18	R3932523
Calcium (Ca)		32400		50	mg/kg	08-JAN-18	09-JAN-18	R3932523
Chromium (Cr)		20.8		0.50	mg/kg	08-JAN-18	09-JAN-18	R3932523
Cobalt (Co)		13.3		0.10	mg/kg	08-JAN-18	09-JAN-18	R3932523
Copper (Cu)		78.2		0.50	mg/kg	08-JAN-18	09-JAN-18	R3932523
Iron (Fe)		40400		50	mg/kg	08-JAN-18	09-JAN-18	R3932523
Lead (Pb)		7.90		0.50	mg/kg	08-JAN-18	09-JAN-18	R3932523
Lithium (Li)		20.3		2.0	mg/kg	08-JAN-18	09-JAN-18	R3932523
Magnesium (Mg)		13900		20	mg/kg	08-JAN-18	09-JAN-18	R3932523
Manganese (Mn)		999		1.0	mg/kg	08-JAN-18	09-JAN-18	R3932523
Molybdenum (Mo)		0.28		0.10	mg/kg	08-JAN-18	09-JAN-18	R3932523
Nickel (Ni)		21.1		0.50	mg/kg	08-JAN-18	09-JAN-18	R3932523
Phosphorus (P)		300		50	mg/kg	08-JAN-18	09-JAN-18	R3932523
Potassium (K)		940		100	mg/kg	08-JAN-18	09-JAN-18	R3932523
Selenium (Se)		<0.20		0.20	mg/kg	08-JAN-18	09-JAN-18	R3932523
Silver (Ag)		0.63		0.10	mg/kg	08-JAN-18	09-JAN-18	R3932523
Sodium (Na)		479		50	mg/kg	08-JAN-18	09-JAN-18	R3932523
Strontium (Sr)		15.5		0.50	mg/kg	08-JAN-18	09-JAN-18	R3932523
Sulfur (S)		1500		1000	mg/kg	08-JAN-18	09-JAN-18	R3932523
Thallium (Tl)		<0.050		0.050	mg/kg	08-JAN-18	09-JAN-18	R3932523
Tin (Sn)		<2.0		2.0	mg/kg	08-JAN-18	09-JAN-18	R3932523
Titanium (Ti)		617		1.0	mg/kg	08-JAN-18	09-JAN-18	R3932523
Tungsten (W)		0.52		0.50	mg/kg	08-JAN-18	09-JAN-18	R3932523
Uranium (U)		<0.050		0.050	mg/kg	08-JAN-18	09-JAN-18	R3932523
Vanadium (V)		44.8		0.20	mg/kg	08-JAN-18	09-JAN-18	R3932523
Zinc (Zn)		49.8		2.0	mg/kg	08-JAN-18	09-JAN-18	R3932523
Zirconium (Zr)		1.7		1.0	mg/kg	08-JAN-18	09-JAN-18	R3932523
pH in Soil (1:2 Soil:Water Extraction)								
pH (1:2 soil:water)		9.00		0.10	pH		09-JAN-18	R3932217
Miscellaneous Parameters								
Inorganic Carbon (as CaCO3 Equivalent)		6.63		0.40	%		10-JAN-18	
Moisture		24.3		0.25	%		07-JAN-18	R3929888
Sulfate (SO4)		387		10	mg/kg	08-JAN-18	08-JAN-18	R3932031
Inorganic Carbon		0.796		0.050	%		10-JAN-18	R3932638
Sulfur (S)-Total		600		500	mg/kg	09-JAN-18	09-JAN-18	R3932639

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)
Soil samples are digested with hot nitric and hydrochloric acids, followed by CVAAS analysis. This method is fully compliant with the BC SALM strong acid leachable metals digestion method.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** 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
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

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

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.



Quality Control Report

Workorder: L2040730

Report Date: 10-JAN-18

Page 1 of 6

Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK								
Soil								
Batch	R3932638							
WG2695672-1	DUP	L2040730-1						
Inorganic Carbon		0.796	0.800		%	0.4	20	10-JAN-18
WG2695672-2	LCS							
Inorganic Carbon			98.7		%		80-120	10-JAN-18
WG2695672-3	MB							
Inorganic Carbon			<0.050		%		0.05	10-JAN-18
HG-200.2-CVAF-VA								
Soil								
Batch	R3931887							
WG2694962-4	CRM	VA-CANMET-TILL1						
Mercury (Hg)			97.5		%		70-130	09-JAN-18
WG2694962-3	LCS							
Mercury (Hg)			102.8		%		70-130	09-JAN-18
WG2694962-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	09-JAN-18
MET-200.2-CCMS-VA								
Soil								
Batch	R3932523							
WG2694962-4	CRM	VA-CANMET-TILL1						
Aluminum (Al)			97.6		%		70-130	09-JAN-18
Antimony (Sb)			98.8		%		70-130	09-JAN-18
Arsenic (As)			92.4		%		70-130	09-JAN-18
Barium (Ba)			86.3		%		70-130	09-JAN-18
Beryllium (Be)			0.54		mg/kg		0.34-0.74	09-JAN-18
Bismuth (Bi)			97.0		%		70-130	09-JAN-18
Boron (B)			3.9		mg/kg		0-8.2	09-JAN-18
Cadmium (Cd)			93.1		%		70-130	09-JAN-18
Calcium (Ca)			103.7		%		70-130	09-JAN-18
Chromium (Cr)			86.1		%		70-130	09-JAN-18
Cobalt (Co)			96.5		%		70-130	09-JAN-18
Copper (Cu)			93.0		%		70-130	09-JAN-18
Iron (Fe)			96.5		%		70-130	09-JAN-18
Lead (Pb)			99.9		%		70-130	09-JAN-18
Lithium (Li)			103.4		%		70-130	09-JAN-18
Magnesium (Mg)			103.7		%		70-130	09-JAN-18
Manganese (Mn)			99.4		%		70-130	09-JAN-18
Molybdenum (Mo)			97.1		%		70-130	09-JAN-18
Nickel (Ni)			94.9		%		70-130	09-JAN-18



Quality Control Report

Workorder: L2040730

Report Date: 10-JAN-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3932523							
WG2694962-4	CRM	VA-CANMET-TILL1						
Potassium (K)			103.9		%		70-130	09-JAN-18
Selenium (Se)			0.30		mg/kg		0.11-0.51	09-JAN-18
Silver (Ag)			0.22		mg/kg		0.13-0.33	09-JAN-18
Sodium (Na)			104.3		%		70-130	09-JAN-18
Strontium (Sr)			104.4		%		70-130	09-JAN-18
Thallium (Tl)			0.126		mg/kg		0.077-0.18	09-JAN-18
Tin (Sn)			1.0		mg/kg		0-3	09-JAN-18
Titanium (Ti)			105.9		%		70-130	09-JAN-18
Tungsten (W)			0.16		mg/kg		0-0.66	09-JAN-18
Uranium (U)			105.7		%		70-130	09-JAN-18
Vanadium (V)			95.8		%		70-130	09-JAN-18
Zinc (Zn)			94.2		%		70-130	09-JAN-18
Zirconium (Zr)			0.7		mg/kg		0-1.8	09-JAN-18
WG2694962-3	LCS							
Aluminum (Al)			92.6		%		80-120	09-JAN-18
Antimony (Sb)			108.8		%		80-120	09-JAN-18
Arsenic (As)			92.2		%		80-120	09-JAN-18
Barium (Ba)			93.4		%		80-120	09-JAN-18
Beryllium (Be)			101.0		%		80-120	09-JAN-18
Bismuth (Bi)			97.8		%		80-120	09-JAN-18
Boron (B)			97.1		%		80-120	09-JAN-18
Cadmium (Cd)			93.1		%		80-120	09-JAN-18
Calcium (Ca)			95.6		%		80-120	09-JAN-18
Chromium (Cr)			82.7		%		80-120	09-JAN-18
Cobalt (Co)			94.4		%		80-120	09-JAN-18
Copper (Cu)			92.7		%		80-120	09-JAN-18
Iron (Fe)			91.2		%		80-120	09-JAN-18
Lead (Pb)			100.4		%		80-120	09-JAN-18
Lithium (Li)			98.1		%		80-120	09-JAN-18
Magnesium (Mg)			101.7		%		80-120	09-JAN-18
Manganese (Mn)			95.0		%		80-120	09-JAN-18
Molybdenum (Mo)			96.3		%		80-120	09-JAN-18
Nickel (Ni)			93.0		%		80-120	09-JAN-18
Phosphorus (P)			100.3		%		80-120	09-JAN-18

Quality Control Report

Workorder: L2040730

Report Date: 10-JAN-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3932523							
WG2694962-3	LCS							
Potassium (K)			94.2		%		80-120	09-JAN-18
Selenium (Se)			92.1		%		80-120	09-JAN-18
Silver (Ag)			93.2		%		80-120	09-JAN-18
Sodium (Na)			98.6		%		80-120	09-JAN-18
Strontium (Sr)			103.8		%		80-120	09-JAN-18
Sulfur (S)			96.1		%		80-120	09-JAN-18
Thallium (Tl)			102.8		%		80-120	09-JAN-18
Tin (Sn)			92.6		%		80-120	09-JAN-18
Titanium (Ti)			88.5		%		80-120	09-JAN-18
Tungsten (W)			100.3		%		80-120	09-JAN-18
Uranium (U)			97.4		%		80-120	09-JAN-18
Vanadium (V)			94.1		%		80-120	09-JAN-18
Zinc (Zn)			88.4		%		80-120	09-JAN-18
Zirconium (Zr)			101.5		%		70-130	09-JAN-18
WG2694962-1	MB							
Aluminum (Al)			<50		mg/kg		50	09-JAN-18
Antimony (Sb)			<0.10		mg/kg		0.1	09-JAN-18
Arsenic (As)			<0.10		mg/kg		0.1	09-JAN-18
Barium (Ba)			<0.50		mg/kg		0.5	09-JAN-18
Beryllium (Be)			<0.10		mg/kg		0.1	09-JAN-18
Bismuth (Bi)			<0.20		mg/kg		0.2	09-JAN-18
Boron (B)			<5.0		mg/kg		5	09-JAN-18
Cadmium (Cd)			<0.020		mg/kg		0.02	09-JAN-18
Calcium (Ca)			<50		mg/kg		50	09-JAN-18
Chromium (Cr)			<0.50		mg/kg		0.5	09-JAN-18
Cobalt (Co)			<0.10		mg/kg		0.1	09-JAN-18
Copper (Cu)			<0.50		mg/kg		0.5	09-JAN-18
Iron (Fe)			<50		mg/kg		50	09-JAN-18
Lead (Pb)			<0.50		mg/kg		0.5	09-JAN-18
Lithium (Li)			<2.0		mg/kg		2	09-JAN-18
Magnesium (Mg)			<20		mg/kg		20	09-JAN-18
Manganese (Mn)			<1.0		mg/kg		1	09-JAN-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	09-JAN-18
Nickel (Ni)			<0.50		mg/kg		0.5	09-JAN-18



Quality Control Report

Workorder: L2040730

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	Soil							
Batch	R3932523							
WG2694962-1 MB								
Phosphorus (P)			<50		mg/kg		50	09-JAN-18
Potassium (K)			<100		mg/kg		100	09-JAN-18
Selenium (Se)			<0.20		mg/kg		0.2	09-JAN-18
Silver (Ag)			<0.10		mg/kg		0.1	09-JAN-18
Sodium (Na)			<50		mg/kg		50	09-JAN-18
Strontium (Sr)			<0.50		mg/kg		0.5	09-JAN-18
Sulfur (S)			<1000		mg/kg		1000	09-JAN-18
Thallium (Tl)			<0.050		mg/kg		0.05	09-JAN-18
Tin (Sn)			<2.0		mg/kg		2	09-JAN-18
Titanium (Ti)			<1.0		mg/kg		1	09-JAN-18
Tungsten (W)			<0.50		mg/kg		0.5	09-JAN-18
Uranium (U)			<0.050		mg/kg		0.05	09-JAN-18
Vanadium (V)			<0.20		mg/kg		0.2	09-JAN-18
Zinc (Zn)			<2.0		mg/kg		2	09-JAN-18
Zirconium (Zr)			<1.0		mg/kg		1	09-JAN-18
MOISTURE-VA	Soil							
Batch	R3929888							
WG2694953-2 LCS								
Moisture			99.9		%		90-110	07-JAN-18
WG2694953-1 MB								
Moisture			<0.25		%		0.25	07-JAN-18
PH-1:2-VA	Soil							
Batch	R3932217							
WG2694962-5 IRM		VA-ALP-SRS1507						
pH (1:2 soil:water)			6.44		pH		6.2-6.8	09-JAN-18
S-TOT-LECO-SK	Soil							
Batch	R3932639							
WG2694580-1 DUP		L2040730-1						
Sulfur (S)-Total		600	700		mg/kg	18	30	09-JAN-18
WG2694580-6 IRM		1646A_SOIL						
Sulfur (S)-Total			3600		mg/kg		2500-4600	09-JAN-18
WG2694580-4 MB								
Sulfur (S)-Total			<500		mg/kg		500	09-JAN-18
SO4-LEACH-IC-VA	Soil							



Quality Control Report

Workorder: L2040730

Report Date: 10-JAN-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-LEACH-IC-VA	Soil							
Batch	R3932031							
WG2695076-3	DUP	L2040730-1						
Sulfate (SO4)		387	383		mg/kg	1.1	20	08-JAN-18
WG2695076-2	LCS							
Sulfate (SO4)			101.4		%		70-130	08-JAN-18
WG2695076-1	MB							
Sulfate (SO4)			<10		mg/kg		10	08-JAN-18

Quality Control Report

Workorder: L2040730

Report Date: 10-JAN-18

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



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COC #

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GENF 18.01 Front

PAUL JAN 4 11:30 3,6,8,3°C

Attachment 2 – TL-7 Laboratory Certificates of Analysis



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 21-FEB-17
Report Date: 05-APR-17 18:56 (MT)
Version: FINAL REV. 2

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1892828
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 31-MAR-17 15:29 - Free Cyanide was added to this report.

Amber Springer, B.Sc
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1892828-1 TL7-19FEB17 Sampled By: SW on 19-FEB-17 @ 13:00 Matrix: SEDIMENT Metals in Soil (CCME) with Extra Metals Mercury in Soil by CVAFS Mercury (Hg) 0.0530 Metals in Soil by CRC ICPMS Aluminum (Al) 9590 Antimony (Sb) 0.64 Arsenic (As) 244 Barium (Ba) 14.1 Beryllium (Be) 0.11 Bismuth (Bi) 0.79 Boron (B) 8.7 Cadmium (Cd) 0.739 Calcium (Ca) 47800 Chromium (Cr) 61.0 Cobalt (Co) 128 Copper (Cu) 2930 Iron (Fe) 84200 Lead (Pb) 76.0 Lithium (Li) 15.4 Magnesium (Mg) 16200 Manganese (Mn) 1200 Molybdenum (Mo) 0.91 Nickel (Ni) 119 Phosphorus (P) 275 Potassium (K) 770 Selenium (Se) 3.52 Silver (Ag) 0.88 Sodium (Na) 1170 Strontium (Sr) 23.0 Thallium (Tl) 0.556 Tin (Sn) <2.0 Titanium (Ti) 430 Uranium (U) <0.050 Vanadium (V) 47.5 Zinc (Zn) 334 Zirconium (Zr) 2.2 pH in Soil (1:2 Soil:Water Extraction) pH (1:2 soil:water) 8.95 Miscellaneous Parameters Cyanide, Free <10 Inorganic Carbon (as CaCO3 Equivalent) 7.74 Moisture 27.4 Sulfate (SO4) 1660 Cyanide, Total 234 Inorganic Carbon 0.929 Sulfur (S)-Total 24200 Cyanide, Weak Acid Diss <10	0.0530		0.0050	mg/kg	28-FEB-17	01-MAR-17	R3665032
			50	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.10	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.10	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.50	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.10	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.20	mg/kg	28-FEB-17	01-MAR-17	R3665198
			5.0	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.020	mg/kg	28-FEB-17	01-MAR-17	R3665198
			50	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.50	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.10	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.50	mg/kg	28-FEB-17	01-MAR-17	R3665198
			50	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.50	mg/kg	28-FEB-17	01-MAR-17	R3665198
			2.0	mg/kg	28-FEB-17	01-MAR-17	R3665198
			20	mg/kg	28-FEB-17	01-MAR-17	R3665198
			1.0	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.10	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.50	mg/kg	28-FEB-17	01-MAR-17	R3665198
			50	mg/kg	28-FEB-17	01-MAR-17	R3665198
			100	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.20	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.10	mg/kg	28-FEB-17	01-MAR-17	R3665198
			50	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.50	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.050	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.20	mg/kg	28-FEB-17	01-MAR-17	R3665198
			2.0	mg/kg	28-FEB-17	01-MAR-17	R3665198
			1.0	mg/kg	28-FEB-17	01-MAR-17	R3665198
			0.10	pH		01-MAR-17	R3664955
		DLM	10	mg/kg	26-FEB-17	28-FEB-17	R3665049
			0.40	%		28-FEB-17	
			0.25	%		26-FEB-17	R3662026
			10	mg/kg	27-FEB-17	28-FEB-17	R3665126
			10	mg/kg	26-FEB-17	28-FEB-17	R3665049
			0.050	%		28-FEB-17	R3663226
			500	mg/kg	27-FEB-17	27-FEB-17	R3663207
		DLM	10	mg/kg	26-FEB-17	28-FEB-17	R3665049

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
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.
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**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
CN-FREE-NAOH-CFA-VA	Soil	Free Cyanide in soil by CFA	BC-MOE/ASTM 7237
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
CN-T-NAOH-CFA-VA	Soil	Total Cyanide in soil by CFA	BC-MOE/ISO 14403:2002
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line UV digestion along with sample distillation and final determination by colourimetric analysis.			
CN-WAD-NAOH-CFA-VA	Soil	Weak Acid Diss. Cyanide in soil by CFA	BC-MOE/APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line sample distillation with final determination by colourimetric analysis.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CRC ICPMS.			
Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. This method does not dissolve all silicate materials and may result in a partial extraction. depending on the sample matrix, for some metals, including, but not limited to Al, Ba, Be, Cr, Sr, Ti, Tl, and V.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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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
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg ww - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.



Quality Control Report

Workorder: L1892828

Report Date: 05-APR-17

Page 1 of 6

Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK								
Soil								
Batch	R3663226							
WG2484705-2	LCS							
Inorganic Carbon			99.9		%		80-120	28-FEB-17
WG2484705-3	MB							
Inorganic Carbon			<0.050		%		0.05	28-FEB-17
CN-FREE-NAOH-CFA-VA								
Soil								
Batch	R3665049							
WG2485505-3	DUP	L1892828-1						
Cyanide, Free		<10	<10	RPD-NA	mg/kg	N/A	35	28-FEB-17
WG2485505-2	LCS							
Cyanide, Free			87.4		%		80-120	28-FEB-17
WG2485505-1	MB							
Cyanide, Free			<0.050		mg/kg		0.05	28-FEB-17
CN-T-NAOH-CFA-VA								
Soil								
Batch	R3665049							
WG2485505-3	DUP	L1892828-1						
Cyanide, Total		234	237		mg/kg	1.4	35	28-FEB-17
WG2485505-2	LCS							
Cyanide, Total			88.6		%		80-120	28-FEB-17
WG2485505-1	MB							
Cyanide, Total			<0.050		mg/kg		0.05	28-FEB-17
WG2485505-4	MS	L1892828-1						
Cyanide, Total			N/A	MS-B	%		-	28-FEB-17
CN-WAD-NAOH-CFA-VA								
Soil								
Batch	R3665049							
WG2485505-3	DUP	L1892828-1						
Cyanide, Weak Acid Diss		<10	<10	RPD-NA	mg/kg	N/A	35	28-FEB-17
WG2485505-2	LCS							
Cyanide, Weak Acid Diss			97.2		%		80-120	28-FEB-17
WG2485505-1	MB							
Cyanide, Weak Acid Diss			<0.050		mg/kg		0.05	28-FEB-17
HG-200.2-CVAF-VA								
Soil								
Batch	R3665032							
WG2486514-4	CRM	VA-NRC-STSD-3						
Mercury (Hg)			79.7		%		70-130	01-MAR-17
WG2486514-3	LCS							
Mercury (Hg)			96.5		%		70-130	01-MAR-17
WG2486514-1	MB							



Quality Control Report

Workorder: L1892828

Report Date: 05-APR-17

Page 2 of 6

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAF-VA	Soil							
Batch	R3665032							
WG2486514-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	01-MAR-17
MET-200.2-CCMS-VA	Soil							
Batch	R3665172							
WG2486514-4 CRM		VA-NRC-STSD-3						
Aluminum (Al)			95.1		%		70-130	01-MAR-17
Antimony (Sb)			101.6		%		70-130	01-MAR-17
Arsenic (As)			81.9		%		70-130	01-MAR-17
Barium (Ba)			95.1		%		70-130	01-MAR-17
Beryllium (Be)			99.8		%		70-130	01-MAR-17
Bismuth (Bi)			93.9		%		70-130	01-MAR-17
Boron (B)			100.3		%		70-130	01-MAR-17
Cadmium (Cd)			104.4		%		70-130	01-MAR-17
Calcium (Ca)			99.0		%		70-130	01-MAR-17
Chromium (Cr)			96.5		%		70-130	01-MAR-17
Cobalt (Co)			91.2		%		70-130	01-MAR-17
Copper (Cu)			85.2		%		70-130	01-MAR-17
Iron (Fe)			88.3		%		70-130	01-MAR-17
Lead (Pb)			96.3		%		70-130	01-MAR-17
Lithium (Li)			98.4		%		70-130	01-MAR-17
Magnesium (Mg)			93.0		%		70-130	01-MAR-17
Manganese (Mn)			80.1		%		70-130	01-MAR-17
Molybdenum (Mo)			97.7		%		70-130	01-MAR-17
Nickel (Ni)			86.3		%		70-130	01-MAR-17
Phosphorus (P)			95.6		%		70-130	01-MAR-17
Potassium (K)			96.9		%		70-130	01-MAR-17
Selenium (Se)			107.3		%		70-130	01-MAR-17
Silver (Ag)			93.0		%		70-130	01-MAR-17
Sodium (Na)			96.1		%		70-130	01-MAR-17
Strontium (Sr)			97.7		%		70-130	01-MAR-17
Thallium (Tl)			100.8		%		70-130	01-MAR-17
Titanium (Ti)			105.0		%		70-130	01-MAR-17
Uranium (U)			102.8		%		70-130	01-MAR-17
Vanadium (V)			94.6		%		70-130	01-MAR-17



Quality Control Report

Workorder: L1892828

Report Date: 05-APR-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	Soil							
Batch	R3665172							
WG2486514-1 MB								
Aluminum (Al)			<50		mg/kg		50	01-MAR-17
Antimony (Sb)			<0.10		mg/kg		0.1	01-MAR-17
Arsenic (As)			<0.10		mg/kg		0.1	01-MAR-17
Barium (Ba)			<0.50		mg/kg		0.5	01-MAR-17
Beryllium (Be)			<0.10		mg/kg		0.1	01-MAR-17
Bismuth (Bi)			<0.20		mg/kg		0.2	01-MAR-17
Boron (B)			<5.0		mg/kg		5	01-MAR-17
Cadmium (Cd)			<0.020		mg/kg		0.02	01-MAR-17
Calcium (Ca)			<50		mg/kg		50	01-MAR-17
Chromium (Cr)			<0.50		mg/kg		0.5	01-MAR-17
Cobalt (Co)			<0.10		mg/kg		0.1	01-MAR-17
Copper (Cu)			<0.50		mg/kg		0.5	01-MAR-17
Iron (Fe)			<50		mg/kg		50	01-MAR-17
Lead (Pb)			<0.50		mg/kg		0.5	01-MAR-17
Lithium (Li)			<2.0		mg/kg		2	01-MAR-17
Magnesium (Mg)			<20		mg/kg		20	01-MAR-17
Manganese (Mn)			<1.0		mg/kg		1	01-MAR-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	01-MAR-17
Nickel (Ni)			<0.50		mg/kg		0.5	01-MAR-17
Phosphorus (P)			<50		mg/kg		50	01-MAR-17
Potassium (K)			<100		mg/kg		100	01-MAR-17
Selenium (Se)			<0.20		mg/kg		0.2	01-MAR-17
Silver (Ag)			<0.10		mg/kg		0.1	01-MAR-17
Sodium (Na)			<50		mg/kg		50	01-MAR-17
Strontium (Sr)			<0.50		mg/kg		0.5	01-MAR-17
Thallium (Tl)			<0.050		mg/kg		0.05	01-MAR-17
Tin (Sn)			<2.0		mg/kg		2	01-MAR-17
Titanium (Ti)			<1.0		mg/kg		1	01-MAR-17
Uranium (U)			<0.050		mg/kg		0.05	01-MAR-17
Vanadium (V)			<0.20		mg/kg		0.2	01-MAR-17
Zinc (Zn)			<2.0		mg/kg		2	01-MAR-17
Zirconium (Zr)			<1.0		mg/kg		1	01-MAR-17
MOISTURE-VA	Soil							



Quality Control Report

Workorder: L1892828

Report Date: 05-APR-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-VA		Soil						
Batch	R3662026							
WG2485521-2	LCS							
Moisture			99.7		%		90-110	26-FEB-17
WG2485521-6	LCS							
Moisture			99.7		%		90-110	26-FEB-17
WG2485521-1	MB							
Moisture			<0.25		%		0.25	26-FEB-17
WG2485521-5	MB							
Moisture			<0.25		%		0.25	26-FEB-17
PH-1:2-VA		Soil						
Batch	R3664955							
WG2486514-5	IRM	VA-ALP-SRS1507						
pH (1:2 soil:water)			6.49		pH		6.2-6.8	01-MAR-17
S-TOT-LECO-SK		Soil						
Batch	R3663207							
WG2484697-1	DUP	L1892828-1						
Sulfur (S)-Total		24200	26300		mg/kg	8.4	30	27-FEB-17
WG2484697-4	IRM	1646A_SOIL						
Sulfur (S)-Total			2700		mg/kg		2500-4600	27-FEB-17
WG2484697-5	MB							
Sulfur (S)-Total			<500		mg/kg		500	27-FEB-17
SO4-LEACH-IC-VA		Soil						
Batch	R3665126							
WG2485806-4	DUP	L1892828-1						
Sulfate (SO4)		1660	1660		mg/kg	0.2	20	28-FEB-17
WG2485806-2	LCS							
Sulfate (SO4)			107.3		%		70-130	28-FEB-17
WG2485806-1	MB							
Sulfate (SO4)			<10		mg/kg		10	28-FEB-17

Quality Control Report

Workorder: L1892828

Report Date: 05-APR-17

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

GENF 18.01 Front



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 21-MAR-17
Report Date: 30-MAR-17 18:51 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1903520
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 30-MAR-17 18:48
ADDITIONAL 30-MAR-17 14:26

Amber Springer, B.Sc
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1903520-1	TL7-20MAR17							
Sampled By:	SW on 20-MAR-17 @ 13:10							
Matrix:	WATER							
Metals in Soil (CCME) with Extra Metals								
Mercury in Soil by CVAFS								
Mercury (Hg)		0.0802		0.0050	mg/kg	25-MAR-17	28-MAR-17	R3686537
Metals in Soil by CRC ICPMS								
Aluminum (Al)		9200		50	mg/kg	25-MAR-17	28-MAR-17	R3686846
Antimony (Sb)		1.44		0.10	mg/kg	25-MAR-17	28-MAR-17	R3686846
Arsenic (As)		645		0.10	mg/kg	25-MAR-17	28-MAR-17	R3686846
Barium (Ba)		14.1		0.50	mg/kg	25-MAR-17	28-MAR-17	R3686846
Beryllium (Be)		0.11		0.10	mg/kg	25-MAR-17	28-MAR-17	R3686846
Bismuth (Bi)		1.72		0.20	mg/kg	25-MAR-17	28-MAR-17	R3686846
Boron (B)		7.8		5.0	mg/kg	25-MAR-17	28-MAR-17	R3686846
Cadmium (Cd)		3.16		0.020	mg/kg	25-MAR-17	28-MAR-17	R3686846
Calcium (Ca)		38900		50	mg/kg	25-MAR-17	28-MAR-17	R3686846
Chromium (Cr)		54.4		0.50	mg/kg	25-MAR-17	28-MAR-17	R3686846
Cobalt (Co)		335		0.10	mg/kg	25-MAR-17	28-MAR-17	R3686846
Copper (Cu)		3520		0.50	mg/kg	25-MAR-17	28-MAR-17	R3686846
Iron (Fe)		142000		50	mg/kg	25-MAR-17	28-MAR-17	R3686846
Lead (Pb)		384		0.50	mg/kg	25-MAR-17	28-MAR-17	R3686846
Lithium (Li)		17.0		2.0	mg/kg	25-MAR-17	28-MAR-17	R3686846
Magnesium (Mg)		14600		20	mg/kg	25-MAR-17	28-MAR-17	R3686846
Manganese (Mn)		1170		1.0	mg/kg	25-MAR-17	28-MAR-17	R3686846
Molybdenum (Mo)		1.46		0.10	mg/kg	25-MAR-17	28-MAR-17	R3686846
Nickel (Ni)		277		0.50	mg/kg	25-MAR-17	28-MAR-17	R3686846
Phosphorus (P)		294		50	mg/kg	25-MAR-17	28-MAR-17	R3686846
Potassium (K)		850		100	mg/kg	25-MAR-17	28-MAR-17	R3686846
Selenium (Se)		9.15		0.20	mg/kg	25-MAR-17	28-MAR-17	R3686846
Silver (Ag)		22.4		0.10	mg/kg	25-MAR-17	28-MAR-17	R3686846
Sodium (Na)		1360		50	mg/kg	25-MAR-17	28-MAR-17	R3686846
Strontium (Sr)		19.7		0.50	mg/kg	25-MAR-17	28-MAR-17	R3686846
Thallium (Tl)		1.31		0.050	mg/kg	25-MAR-17	28-MAR-17	R3686846
Tin (Sn)		<2.0		2.0	mg/kg	25-MAR-17	28-MAR-17	R3686846
Titanium (Ti)		393		1.0	mg/kg	25-MAR-17	28-MAR-17	R3686846
Uranium (U)		<0.050		0.050	mg/kg	25-MAR-17	28-MAR-17	R3686846
Vanadium (V)		45.9		0.20	mg/kg	25-MAR-17	28-MAR-17	R3686846
Zinc (Zn)		1360		2.0	mg/kg	25-MAR-17	28-MAR-17	R3686846
Zirconium (Zr)		2.4		1.0	mg/kg	25-MAR-17	28-MAR-17	R3686846
pH in Soil (1:2 Soil:Water Extraction)								
pH (1:2 soil:water)		8.35		0.10	pH		29-MAR-17	R3687336
Miscellaneous Parameters								
Cyanide, Free		<0.050		0.050	mg/kg	26-MAR-17	28-MAR-17	R3686662
Inorganic Carbon (as CaCO3 Equivalent)		7.62		0.40	%		28-MAR-17	
Moisture		20.1		0.25	%		25-MAR-17	R3685415
Sulfate (SO4)		1770		10	mg/kg	27-MAR-17	27-MAR-17	R3686261
Cyanide, Total		632		20	mg/kg	26-MAR-17	29-MAR-17	R3686662
Inorganic Carbon		0.915		0.050	%		28-MAR-17	R3686332
Sulfur (S)-Total		60500		500	mg/kg	27-MAR-17	27-MAR-17	R3686014
Cyanide, Weak Acid Diss		0.106		0.050	mg/kg	26-MAR-17	28-MAR-17	R3686662

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
CN-FREE-NAOH-CFA-VA	Soil	Free Cyanide in soil by CFA	BC-MOE/ASTM 7237
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
CN-T-NAOH-CFA-VA	Soil	Total Cyanide in soil by CFA	BC-MOE/ISO 14403:2002
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line UV digestion along with sample distillation and final determination by colourimetric analysis.			
CN-WAD-NAOH-CFA-VA	Soil	Weak Acid Diss. Cyanide in soil by CFA	BC-MOE/APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line sample distillation with final determination by colourimetric analysis.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CRC ICPMS.			
Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. This method does not dissolve all silicate materials and may result in a partial extraction. depending on the sample matrix, for some metals, including, but not limited to Al, Ba, Be, Cr, Sr, Ti, Tl, and V.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			
** 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
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

- mg/kg - milligrams per kilogram based on dry weight of sample
- mg/kg ww - milligrams per kilogram based on wet weight of sample
- mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
- mg/L - unit of concentration based on volume, parts per million.
- < - Less than.

D.L. - The reporting limit.
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.



Quality Control Report

Workorder: L1903520

Report Date: 30-MAR-17

Page 1 of 6

Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK								
Soil								
Batch	R3686332							
WG2500583-2	LCS							
Inorganic Carbon			103.9		%		80-120	28-MAR-17
WG2500583-3	MB							
Inorganic Carbon			<0.050		%		0.05	28-MAR-17
CN-FREE-NAOH-CFA-VA								
Soil								
Batch	R3686662							
WG2500402-2	LCS							
Cyanide, Free			86.9		%		80-120	28-MAR-17
WG2500402-1	MB							
Cyanide, Free			<0.050		mg/kg		0.05	28-MAR-17
CN-T-NAOH-CFA-VA								
Soil								
Batch	R3686662							
WG2500402-2	LCS							
Cyanide, Total			86.1		%		80-120	28-MAR-17
WG2500402-1	MB							
Cyanide, Total			<0.050		mg/kg		0.05	28-MAR-17
CN-WAD-NAOH-CFA-VA								
Soil								
Batch	R3686662							
WG2500402-2	LCS							
Cyanide, Weak Acid Diss			97.1		%		80-120	28-MAR-17
WG2500402-1	MB							
Cyanide, Weak Acid Diss			<0.050		mg/kg		0.05	28-MAR-17
HG-200.2-CVAF-VA								
Soil								
Batch	R3686537							
WG2500276-4	CRM	VA-NRC-STSD-3						
Mercury (Hg)			94.5		%		70-130	28-MAR-17
WG2500276-3	LCS							
Mercury (Hg)			100.8		%		70-130	28-MAR-17
WG2500276-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	28-MAR-17
MET-200.2-CCMS-VA								
Soil								
Batch	R3686846							
WG2500276-4	CRM	VA-NRC-STSD-3						
Aluminum (Al)			104.8		%		70-130	28-MAR-17
Antimony (Sb)			109.3		%		70-130	28-MAR-17
Arsenic (As)			91.5		%		70-130	28-MAR-17
Barium (Ba)			105.4		%		70-130	28-MAR-17



Quality Control Report

Workorder: L1903520

Report Date: 30-MAR-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3686846							
WG2500276-4	CRM	VA-NRC-STSD-3						
Beryllium (Be)			107.6		%		70-130	28-MAR-17
Bismuth (Bi)			108.0		%		70-130	28-MAR-17
Boron (B)			115.7		%		70-130	28-MAR-17
Cadmium (Cd)			112.4		%		70-130	28-MAR-17
Calcium (Ca)			109.2		%		70-130	28-MAR-17
Chromium (Cr)			103.7		%		70-130	28-MAR-17
Cobalt (Co)			99.5		%		70-130	28-MAR-17
Copper (Cu)			95.5		%		70-130	28-MAR-17
Iron (Fe)			98.4		%		70-130	28-MAR-17
Lead (Pb)			109.5		%		70-130	28-MAR-17
Lithium (Li)			111.1		%		70-130	28-MAR-17
Magnesium (Mg)			106.2		%		70-130	28-MAR-17
Manganese (Mn)			94.2		%		70-130	28-MAR-17
Molybdenum (Mo)			104.8		%		70-130	28-MAR-17
Nickel (Ni)			95.5		%		70-130	28-MAR-17
Phosphorus (P)			106.8		%		70-130	28-MAR-17
Potassium (K)			110.0		%		70-130	28-MAR-17
Selenium (Se)			99.4		%		70-130	28-MAR-17
Silver (Ag)			100.4		%		70-130	28-MAR-17
Sodium (Na)			105.7		%		70-130	28-MAR-17
Strontium (Sr)			112.4		%		70-130	28-MAR-17
Thallium (Tl)			111.8		%		70-130	28-MAR-17
Titanium (Ti)			122.2		%		70-130	28-MAR-17
Uranium (U)			106.0		%		70-130	28-MAR-17
Vanadium (V)			106.6		%		70-130	28-MAR-17
Zinc (Zn)			96.5		%		70-130	28-MAR-17
WG2500276-3	LCS							
Aluminum (Al)			90.4		%		80-120	28-MAR-17
Antimony (Sb)			97.9		%		80-120	28-MAR-17
Arsenic (As)			93.5		%		80-120	28-MAR-17
Barium (Ba)			98.3		%		80-120	28-MAR-17
Beryllium (Be)			94.6		%		80-120	28-MAR-17
Bismuth (Bi)			99.8		%		80-120	28-MAR-17
Boron (B)			89.8		%		80-120	28-MAR-17



Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3686846							
WG2500276-3	LCS							
Cadmium (Cd)			95.6		%		80-120	28-MAR-17
Calcium (Ca)			94.5		%		80-120	28-MAR-17
Chromium (Cr)			92.6		%		80-120	28-MAR-17
Cobalt (Co)			90.7		%		80-120	28-MAR-17
Copper (Cu)			90.5		%		80-120	28-MAR-17
Iron (Fe)			94.1		%		80-120	28-MAR-17
Lead (Pb)			99.2		%		80-120	28-MAR-17
Lithium (Li)			97.3		%		80-120	28-MAR-17
Magnesium (Mg)			90.5		%		80-120	28-MAR-17
Manganese (Mn)			94.1		%		80-120	28-MAR-17
Molybdenum (Mo)			94.5		%		80-120	28-MAR-17
Nickel (Ni)			91.5		%		80-120	28-MAR-17
Phosphorus (P)			91.7		%		80-120	28-MAR-17
Potassium (K)			95.7		%		80-120	28-MAR-17
Selenium (Se)			92.7		%		80-120	28-MAR-17
Silver (Ag)			92.8		%		80-120	28-MAR-17
Sodium (Na)			92.0		%		80-120	28-MAR-17
Strontium (Sr)			105.6		%		80-120	28-MAR-17
Thallium (Tl)			97.4		%		80-120	28-MAR-17
Tin (Sn)			93.3		%		80-120	28-MAR-17
Titanium (Ti)			88.5		%		80-120	28-MAR-17
Uranium (U)			100.5		%		80-120	28-MAR-17
Vanadium (V)			93.3		%		80-120	28-MAR-17
Zinc (Zn)			89.3		%		80-120	28-MAR-17
Zirconium (Zr)			91.3		%		70-130	28-MAR-17
WG2500276-1	MB							
Aluminum (Al)			<50		mg/kg		50	28-MAR-17
Antimony (Sb)			<0.10		mg/kg		0.1	28-MAR-17
Arsenic (As)			<0.10		mg/kg		0.1	28-MAR-17
Barium (Ba)			<0.50		mg/kg		0.5	28-MAR-17
Beryllium (Be)			<0.10		mg/kg		0.1	28-MAR-17
Bismuth (Bi)			<0.20		mg/kg		0.2	28-MAR-17
Boron (B)			<5.0		mg/kg		5	28-MAR-17
Cadmium (Cd)			<0.020		mg/kg		0.02	28-MAR-17



Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-1:2-VA	Soil							
Batch	R3687336							
WG2500276-5	IRM	VA-ALP-SRS1507						
pH (1:2 soil:water)			6.51		pH		6.2-6.8	29-MAR-17
S-TOT-LECO-SK	Soil							
Batch	R3686014							
WG2500020-2	DUP	L1903520-1						
Sulfur (S)-Total		60500	65700		mg/kg	8.1	30	27-MAR-17
WG2500020-4	IRM	1646A_SOIL						
Sulfur (S)-Total			4300		mg/kg		2500-4600	27-MAR-17
WG2500020-5	MB							
Sulfur (S)-Total			<500		mg/kg		500	27-MAR-17
SO4-LEACH-IC-VA	Soil							
Batch	R3686261							
WG2500796-2	LCS							
Sulfate (SO4)			103.1		%		70-130	27-MAR-17
WG2500796-1	MB							
Sulfate (SO4)			<10		mg/kg		10	27-MAR-17

Quality Control Report

Workorder: L1903520

Report Date: 30-MAR-17

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 25-APR-17
Report Date: 08-MAY-17 17:47 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1917001
Project P.O. #: 45000002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1917001-1	TL7-23APR17							
Sampled By:	KC on 23-APR-17 @ 16:30							
Matrix:	waste							
Metals in Soil (CCME) with Extra Metals								
Mercury in Soil by CVAFS								
Mercury (Hg)		0.112		0.0050	mg/kg	28-APR-17	30-APR-17	R3710567
Metals in Soil by CRC ICPMS								
Aluminum (Al)		11200		50	mg/kg	28-APR-17	30-APR-17	R3710902
Antimony (Sb)		2.55		0.10	mg/kg	28-APR-17	30-APR-17	R3710902
Arsenic (As)		729		0.10	mg/kg	28-APR-17	30-APR-17	R3710902
Barium (Ba)		21.2		0.50	mg/kg	28-APR-17	30-APR-17	R3710902
Beryllium (Be)		0.14		0.10	mg/kg	28-APR-17	30-APR-17	R3710902
Bismuth (Bi)		4.42		0.20	mg/kg	28-APR-17	30-APR-17	R3710902
Boron (B)		24.4		5.0	mg/kg	28-APR-17	30-APR-17	R3710902
Cadmium (Cd)		12.5		0.020	mg/kg	28-APR-17	30-APR-17	R3710902
Calcium (Ca)		30500		50	mg/kg	28-APR-17	30-APR-17	R3710902
Chromium (Cr)		71.3		0.50	mg/kg	28-APR-17	30-APR-17	R3710902
Cobalt (Co)		513		0.10	mg/kg	28-APR-17	30-APR-17	R3710902
Copper (Cu)		5410		0.50	mg/kg	28-APR-17	30-APR-17	R3710902
Iron (Fe)		200000		50	mg/kg	28-APR-17	30-APR-17	R3710902
Lead (Pb)		1540		0.50	mg/kg	28-APR-17	30-APR-17	R3710902
Lithium (Li)		23.6		2.0	mg/kg	28-APR-17	30-APR-17	R3710902
Magnesium (Mg)		14600		20	mg/kg	28-APR-17	30-APR-17	R3710902
Manganese (Mn)		1120		1.0	mg/kg	28-APR-17	30-APR-17	R3710902
Molybdenum (Mo)		3.13		0.10	mg/kg	28-APR-17	30-APR-17	R3710902
Nickel (Ni)		348		0.50	mg/kg	28-APR-17	30-APR-17	R3710902
Phosphorus (P)		304		50	mg/kg	28-APR-17	30-APR-17	R3710902
Potassium (K)		1250		100	mg/kg	28-APR-17	30-APR-17	R3710902
Selenium (Se)		17.7		0.20	mg/kg	28-APR-17	30-APR-17	R3710902
Sodium (Na)		2040		50	mg/kg	28-APR-17	30-APR-17	R3710902
Strontium (Sr)		16.7		0.50	mg/kg	28-APR-17	30-APR-17	R3710902
Sulfur (S)		183000		1000	mg/kg	28-APR-17	30-APR-17	R3710902
Thallium (Tl)		2.80		0.050	mg/kg	28-APR-17	30-APR-17	R3710902
Tin (Sn)		<2.0		2.0	mg/kg	28-APR-17	30-APR-17	R3710902
Titanium (Ti)		726		1.0	mg/kg	28-APR-17	30-APR-17	R3710902
Tungsten (W)		1.31		0.50	mg/kg	28-APR-17	30-APR-17	R3710902
Uranium (U)		<0.050		0.050	mg/kg	28-APR-17	30-APR-17	R3710902
Vanadium (V)		63.2		0.20	mg/kg	28-APR-17	30-APR-17	R3710902
Zinc (Zn)		6060		2.0	mg/kg	28-APR-17	30-APR-17	R3710902
Zirconium (Zr)		4.1		1.0	mg/kg	28-APR-17	30-APR-17	R3710902
pH in Soil (1:2 Soil:Water Extraction)								
pH (1:2 soil:water)		8.31		0.10	pH		30-APR-17	R3710500
Miscellaneous Parameters								
Silver (Ag)		48.7		0.40	mg/kg	28-APR-17	02-MAY-17	R3713781
Cyanide, Free		<2.0	DLM	2.0	mg/kg	02-MAY-17	04-MAY-17	R3715130
Inorganic Carbon (as CaCO3 Equivalent)		4.82		0.40	%		05-MAY-17	
Moisture		20.6		0.25	%		29-APR-17	R3710256
Sulfate (SO4)		2460		50	mg/kg	01-MAY-17	02-MAY-17	R3713964
Cyanide, Total		392		2.0	mg/kg	02-MAY-17	04-MAY-17	R3715130
Inorganic Carbon		0.578		0.050	%		05-MAY-17	R3715649
Sulfur (S)-Total		147000		500	mg/kg	05-MAY-17	05-MAY-17	R3715865
Cyanide, Weak Acid Diss		<2.0	DLM	2.0	mg/kg	02-MAY-17	04-MAY-17	R3715130

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
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.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
AG-200.2-A-CCMS-VA	Soil	Elevated Ag in Soil by CRC ICPMS	EPA 200.2/6020A
This method uses a heated strong acid digestion with HNO ₃ and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
CN-FREE-NAOH-CFA-VA	Soil	Free Cyanide in soil by CFA	BC-MOE/ASTM 7237
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
CN-T-NAOH-CFA-VA	Soil	Total Cyanide in soil by CFA	BC-MOE/ISO 14403:2002
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line UV digestion along with sample distillation and final determination by colourimetric analysis.			
CN-WAD-NAOH-CFA-VA	Soil	Weak Acid Diss. Cyanide in soil by CFA	BC-MOE/APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line sample distillation with final determination by colourimetric analysis.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO ₃ Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO ₃ and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO ₂ gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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** 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
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg ww - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.



Quality Control Report

Workorder: L1917001

Report Date: 08-MAY-17

Page 1 of 7

Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
AG-200.2-A-CCMS-VA								
Soil								
Batch	R3713781							
WG2520335-3	CRM	VA-NRC-STSD-3						
Silver (Ag)			120.3		%		70-130	02-MAY-17
WG2520335-2	LCS							
Silver (Ag)			108.0		%		70-130	02-MAY-17
WG2520335-1	MB							
Silver (Ag)			<0.10		mg/kg		0.1	02-MAY-17
C-TIC-PCT-SK								
Soil								
Batch	R3715649							
WG2520675-2	LCS							
Inorganic Carbon			100.3		%		80-120	05-MAY-17
WG2520675-3	MB							
Inorganic Carbon			<0.050		%		0.05	05-MAY-17
CN-FREE-NAOH-CFA-VA								
Soil								
Batch	R3715130							
WG2521044-3	DUP	L1917001-1						
Cyanide, Free		<2.0	<2.0	RPD-NA	mg/kg	N/A	35	04-MAY-17
WG2521044-2	LCS							
Cyanide, Free			90.1		%		80-120	04-MAY-17
WG2521044-1	MB							
Cyanide, Free			<0.050		mg/kg		0.05	04-MAY-17
CN-T-NAOH-CFA-VA								
Soil								
Batch	R3715130							
WG2521044-3	DUP	L1917001-1						
Cyanide, Total		392	412		mg/kg	5.2	35	04-MAY-17
WG2521044-2	LCS							
Cyanide, Total			84.8		%		80-120	04-MAY-17
WG2521044-1	MB							
Cyanide, Total			<0.050		mg/kg		0.05	04-MAY-17
CN-WAD-NAOH-CFA-VA								
Soil								
Batch	R3715130							
WG2521044-3	DUP	L1917001-1						
Cyanide, Weak Acid Diss		<2.0	<2.0	RPD-NA	mg/kg	N/A	35	04-MAY-17
WG2521044-2	LCS							
Cyanide, Weak Acid Diss			93.6		%		80-120	04-MAY-17
WG2521044-1	MB							
Cyanide, Weak Acid Diss			<0.050		mg/kg		0.05	04-MAY-17
HG-200.2-CVAF-VA								
Soil								



Quality Control Report

Workorder: L1917001

Report Date: 08-MAY-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAF-VA		Soil						
Batch	R3710567							
WG2519193-4	CRM	VA-NRC-STSD-3						
Mercury (Hg)			95.1		%		70-130	30-APR-17
WG2519193-2	DUP	L1917001-1						
Mercury (Hg)		0.112	0.103		mg/kg	8.2	40	30-APR-17
WG2519193-3	LCS							
Mercury (Hg)			101.3		%		70-130	30-APR-17
WG2519193-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	30-APR-17
MET-200.2-CCMS-VA		Soil						
Batch	R3710902							
WG2519193-4	CRM	VA-NRC-STSD-3						
Aluminum (Al)			105.4		%		70-130	30-APR-17
Antimony (Sb)			106.0		%		70-130	30-APR-17
Arsenic (As)			90.9		%		70-130	30-APR-17
Barium (Ba)			98.4		%		70-130	30-APR-17
Beryllium (Be)			106.2		%		70-130	30-APR-17
Bismuth (Bi)			107.2		%		70-130	30-APR-17
Boron (B)			108.7		%		70-130	30-APR-17
Cadmium (Cd)			111.8		%		70-130	30-APR-17
Calcium (Ca)			104.5		%		70-130	30-APR-17
Chromium (Cr)			102.2		%		70-130	30-APR-17
Cobalt (Co)			97.6		%		70-130	30-APR-17
Copper (Cu)			93.5		%		70-130	30-APR-17
Iron (Fe)			96.1		%		70-130	30-APR-17
Lead (Pb)			104.8		%		70-130	30-APR-17
Lithium (Li)			103.6		%		70-130	30-APR-17
Magnesium (Mg)			106.4		%		70-130	30-APR-17
Manganese (Mn)			93.1		%		70-130	30-APR-17
Molybdenum (Mo)			102.7		%		70-130	30-APR-17
Nickel (Ni)			94.2		%		70-130	30-APR-17
Phosphorus (P)			107.3		%		70-130	30-APR-17
Potassium (K)			108.9		%		70-130	30-APR-17
Selenium (Se)			103.0		%		70-130	30-APR-17
Sodium (Na)			106.3		%		70-130	30-APR-17
Strontium (Sr)			107.6		%		70-130	30-APR-17
Thallium (Tl)			110.0		%		70-130	30-APR-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3710902							
WG2519193-4	CRM	VA-NRC-STSD-3						
Titanium (Ti)			122.0		%		70-130	30-APR-17
Uranium (U)			105.8		%		70-130	30-APR-17
Vanadium (V)			104.9		%		70-130	30-APR-17
Zinc (Zn)			95.3		%		70-130	30-APR-17
WG2519193-2	DUP	L1917001-1						
Aluminum (Al)		11200	10800		mg/kg	3.3	40	30-APR-17
Antimony (Sb)		2.55	2.51		mg/kg	1.9	30	30-APR-17
Arsenic (As)		729	710		mg/kg	2.6	30	30-APR-17
Barium (Ba)		21.2	20.0		mg/kg	5.8	40	30-APR-17
Beryllium (Be)		0.14	0.14		mg/kg	3.0	30	30-APR-17
Bismuth (Bi)		4.42	4.36		mg/kg	1.4	30	30-APR-17
Boron (B)		24.4	23.7		mg/kg	2.9	30	30-APR-17
Cadmium (Cd)		12.5	12.4		mg/kg	0.7	30	30-APR-17
Calcium (Ca)		30500	29800		mg/kg	2.4	30	30-APR-17
Chromium (Cr)		71.3	70.0		mg/kg	1.8	30	30-APR-17
Cobalt (Co)		513	507		mg/kg	1.3	30	30-APR-17
Copper (Cu)		5410	5390		mg/kg	0.4	30	30-APR-17
Iron (Fe)		200000	197000		mg/kg	1.5	30	30-APR-17
Lead (Pb)		1540	1510		mg/kg	2.1	40	30-APR-17
Lithium (Li)		23.6	22.0		mg/kg	7.1	30	30-APR-17
Magnesium (Mg)		14600	14400		mg/kg	1.5	30	30-APR-17
Manganese (Mn)		1120	1100		mg/kg	2.0	30	30-APR-17
Molybdenum (Mo)		3.13	2.94		mg/kg	6.4	40	30-APR-17
Nickel (Ni)		348	343		mg/kg	1.4	30	30-APR-17
Phosphorus (P)		304	276		mg/kg	9.7	30	30-APR-17
Potassium (K)		1250	1200		mg/kg	3.5	40	30-APR-17
Selenium (Se)		17.7	17.7		mg/kg	0.2	30	30-APR-17
Sodium (Na)		2040	1820		mg/kg	11	40	30-APR-17
Strontium (Sr)		16.7	16.4		mg/kg	2.1	40	30-APR-17
Sulfur (S)		183000	178000		mg/kg	2.8	30	30-APR-17
Thallium (Tl)		2.80	2.72		mg/kg	2.8	30	30-APR-17
Tin (Sn)		<2.0	<2.0	RPD-NA	mg/kg	N/A	40	30-APR-17
Titanium (Ti)		726	688		mg/kg	5.4	40	30-APR-17
Tungsten (W)		1.31	1.30		mg/kg	0.4	30	30-APR-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3710902							
WG2519193-2	DUP	L1917001-1						
Uranium (U)		<0.050	<0.050	RPD-NA	mg/kg	N/A	30	30-APR-17
Vanadium (V)		63.2	62.3		mg/kg	1.5	30	30-APR-17
Zinc (Zn)		6060	6050		mg/kg	0.1	30	30-APR-17
Zirconium (Zr)		4.1	4.1		mg/kg	0.8	30	30-APR-17
WG2519193-3	LCS							
Aluminum (Al)			101.7		%		80-120	30-APR-17
Antimony (Sb)			100.7		%		80-120	30-APR-17
Arsenic (As)			103.5		%		80-120	30-APR-17
Barium (Ba)			98.2		%		80-120	30-APR-17
Beryllium (Be)			99.4		%		80-120	30-APR-17
Bismuth (Bi)			99.9		%		80-120	30-APR-17
Boron (B)			88.4		%		80-120	30-APR-17
Cadmium (Cd)			100.5		%		80-120	30-APR-17
Calcium (Ca)			97.8		%		80-120	30-APR-17
Chromium (Cr)			98.3		%		80-120	30-APR-17
Cobalt (Co)			97.7		%		80-120	30-APR-17
Copper (Cu)			96.3		%		80-120	30-APR-17
Iron (Fe)			97.8		%		80-120	30-APR-17
Lead (Pb)			100.3		%		80-120	30-APR-17
Lithium (Li)			98.6		%		80-120	30-APR-17
Magnesium (Mg)			101.3		%		80-120	30-APR-17
Manganese (Mn)			103.4		%		80-120	30-APR-17
Molybdenum (Mo)			99.7		%		80-120	30-APR-17
Nickel (Ni)			99.5		%		80-120	30-APR-17
Phosphorus (P)			102.3		%		80-120	30-APR-17
Potassium (K)			100.7		%		80-120	30-APR-17
Selenium (Se)			101.5		%		80-120	30-APR-17
Sodium (Na)			101.3		%		80-120	30-APR-17
Strontium (Sr)			99.5		%		80-120	30-APR-17
Sulfur (S)			104.9		%		80-120	30-APR-17
Thallium (Tl)			100.3		%		80-120	30-APR-17
Tin (Sn)			97.7		%		80-120	30-APR-17
Titanium (Ti)			95.3		%		80-120	30-APR-17
Tungsten (W)			100.8		%		80-120	30-APR-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3710902							
WG2519193-3	LCS							
Uranium (U)			100.8		%		80-120	30-APR-17
Vanadium (V)			99.8		%		80-120	30-APR-17
Zinc (Zn)			96.1		%		80-120	30-APR-17
Zirconium (Zr)			96.7		%		70-130	30-APR-17
WG2519193-1	MB							
Aluminum (Al)			<50		mg/kg		50	30-APR-17
Antimony (Sb)			<0.10		mg/kg		0.1	30-APR-17
Arsenic (As)			<0.10		mg/kg		0.1	30-APR-17
Barium (Ba)			<0.50		mg/kg		0.5	30-APR-17
Beryllium (Be)			<0.10		mg/kg		0.1	30-APR-17
Bismuth (Bi)			<0.20		mg/kg		0.2	30-APR-17
Boron (B)			<5.0		mg/kg		5	30-APR-17
Cadmium (Cd)			<0.020		mg/kg		0.02	30-APR-17
Calcium (Ca)			<50		mg/kg		50	30-APR-17
Chromium (Cr)			<0.50		mg/kg		0.5	30-APR-17
Cobalt (Co)			<0.10		mg/kg		0.1	30-APR-17
Copper (Cu)			<0.50		mg/kg		0.5	30-APR-17
Iron (Fe)			<50		mg/kg		50	30-APR-17
Lead (Pb)			<0.50		mg/kg		0.5	30-APR-17
Lithium (Li)			<2.0		mg/kg		2	30-APR-17
Magnesium (Mg)			<20		mg/kg		20	30-APR-17
Manganese (Mn)			<1.0		mg/kg		1	30-APR-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	30-APR-17
Nickel (Ni)			<0.50		mg/kg		0.5	30-APR-17
Phosphorus (P)			<50		mg/kg		50	30-APR-17
Potassium (K)			<100		mg/kg		100	30-APR-17
Selenium (Se)			<0.20		mg/kg		0.2	30-APR-17
Sodium (Na)			<50		mg/kg		50	30-APR-17
Strontium (Sr)			<0.50		mg/kg		0.5	30-APR-17
Sulfur (S)			<1000		mg/kg		1000	30-APR-17
Thallium (Tl)			<0.050		mg/kg		0.05	30-APR-17
Tin (Sn)			<2.0		mg/kg		2	30-APR-17
Titanium (Ti)			<1.0		mg/kg		1	30-APR-17
Tungsten (W)			<0.50		mg/kg		0.5	30-APR-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA								
Soil								
Batch R3710902								
WG2519193-1	MB							
Uranium (U)			<0.050		mg/kg		0.05	30-APR-17
Vanadium (V)			<0.20		mg/kg		0.2	30-APR-17
Zinc (Zn)			<2.0		mg/kg		2	30-APR-17
Zirconium (Zr)			<1.0		mg/kg		1	30-APR-17
MOISTURE-VA								
Soil								
Batch R3710256								
WG2519195-2	LCS							
Moisture			98.0		%		90-110	29-APR-17
WG2519195-6	LCS							
Moisture			98.4		%		90-110	29-APR-17
WG2519195-1	MB							
Moisture			<0.25		%		0.25	29-APR-17
WG2519195-5	MB							
Moisture			<0.25		%		0.25	29-APR-17
PH-1:2-VA								
Soil								
Batch R3710500								
WG2519193-2	DUP	L1917001-1						
pH (1:2 soil:water)		8.31	8.32	J	pH	0.01	0.2	30-APR-17
WG2519193-5	IRM	VA-ALP-SRS1507						
pH (1:2 soil:water)			6.56		pH		6.2-6.8	30-APR-17
S-TOT-LECO-SK								
Soil								
Batch R3715865								
WG2521387-1	DUP	L1917001-1						
Sulfur (S)-Total		147000	152000		mg/kg	3.5	30	05-MAY-17
WG2521387-4	IRM	1646A SOIL						
Sulfur (S)-Total			3400		mg/kg		2500-4600	05-MAY-17
WG2521387-5	MB							
Sulfur (S)-Total			<500		mg/kg		500	05-MAY-17
SO4-LEACH-IC-VA								
Soil								
Batch R3713964								
WG2519603-3	DUP	L1917001-1						
Sulfate (SO4)		2460	2450		mg/kg	0.4	20	02-MAY-17
WG2519603-2	LCS							
Sulfate (SO4)			101.3		%		70-130	02-MAY-17
WG2519603-1	MB							
Sulfate (SO4)			<10		mg/kg		10	02-MAY-17

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 16-MAY-17
Report Date: 29-MAY-17 18:16 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1926981
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1926981-1	TL7-15MAY17							
Sampled By:	SW on 15-MAY-17 @ 17:05							
Matrix:	SOIL							
Metals in Soil (CCME) with Extra Metals								
Mercury in Soil by CVAFS								
Mercury (Hg)		0.100		0.0050	mg/kg	19-MAY-17	23-MAY-17	R3729643
Metals in Soil by CRC ICPMS								
Aluminum (Al)		9310		50	mg/kg	19-MAY-17	20-MAY-17	R3729645
Antimony (Sb)		1.64		0.10	mg/kg	19-MAY-17	20-MAY-17	R3729645
Arsenic (As)		684		0.10	mg/kg	19-MAY-17	20-MAY-17	R3729645
Barium (Ba)		17.0		0.50	mg/kg	19-MAY-17	20-MAY-17	R3729645
Beryllium (Be)		0.13		0.10	mg/kg	19-MAY-17	20-MAY-17	R3729645
Bismuth (Bi)		2.81		0.20	mg/kg	19-MAY-17	20-MAY-17	R3729645
Boron (B)		21.2		5.0	mg/kg	19-MAY-17	20-MAY-17	R3729645
Cadmium (Cd)		6.56		0.020	mg/kg	19-MAY-17	20-MAY-17	R3729645
Calcium (Ca)		22900		50	mg/kg	19-MAY-17	20-MAY-17	R3729645
Chromium (Cr)		59.1		0.50	mg/kg	19-MAY-17	20-MAY-17	R3729645
Cobalt (Co)		406		0.10	mg/kg	19-MAY-17	20-MAY-17	R3729645
Copper (Cu)		4990		0.50	mg/kg	19-MAY-17	20-MAY-17	R3729645
Iron (Fe)		222000		50	mg/kg	19-MAY-17	20-MAY-17	R3729645
Lead (Pb)		601		0.50	mg/kg	19-MAY-17	20-MAY-17	R3729645
Lithium (Li)		18.5		2.0	mg/kg	19-MAY-17	20-MAY-17	R3729645
Magnesium (Mg)		12600		20	mg/kg	19-MAY-17	20-MAY-17	R3729645
Manganese (Mn)		947		1.0	mg/kg	19-MAY-17	20-MAY-17	R3729645
Molybdenum (Mo)		3.38		0.10	mg/kg	19-MAY-17	20-MAY-17	R3729645
Nickel (Ni)		301		0.50	mg/kg	19-MAY-17	20-MAY-17	R3729645
Phosphorus (P)		319		50	mg/kg	19-MAY-17	20-MAY-17	R3729645
Potassium (K)		980		100	mg/kg	19-MAY-17	20-MAY-17	R3729645
Selenium (Se)		15.6		0.20	mg/kg	19-MAY-17	20-MAY-17	R3729645
Silver (Ag)		20.7		0.10	mg/kg	19-MAY-17	20-MAY-17	R3729645
Sodium (Na)		1880		50	mg/kg	19-MAY-17	20-MAY-17	R3729645
Strontium (Sr)		15.6		0.50	mg/kg	19-MAY-17	20-MAY-17	R3729645
Sulfur (S)		225000		1000	mg/kg	19-MAY-17	20-MAY-17	R3729645
Thallium (Tl)		1.57		0.050	mg/kg	19-MAY-17	20-MAY-17	R3729645
Tin (Sn)		<2.0		2.0	mg/kg	19-MAY-17	20-MAY-17	R3729645
Titanium (Ti)		551		1.0	mg/kg	19-MAY-17	20-MAY-17	R3729645
Tungsten (W)		1.67		0.50	mg/kg	19-MAY-17	20-MAY-17	R3729645
Uranium (U)		0.079		0.050	mg/kg	19-MAY-17	20-MAY-17	R3729645
Vanadium (V)		49.7		0.20	mg/kg	19-MAY-17	20-MAY-17	R3729645
Zinc (Zn)		2950		2.0	mg/kg	19-MAY-17	20-MAY-17	R3729645
Zirconium (Zr)		5.3		1.0	mg/kg	19-MAY-17	20-MAY-17	R3729645
pH in Soil (1:2 Soil:Water Extraction)								
pH (1:2 soil:water)		7.89		0.10	pH		21-MAY-17	R3728305
Miscellaneous Parameters								
Cyanide, Free		<2.0	DLM	2.0	mg/kg	19-MAY-17	28-MAY-17	R3732602
Inorganic Carbon (as CaCO3 Equivalent)		5.37		0.40	%		25-MAY-17	
Moisture		24.7		0.25	%		20-MAY-17	R3727932
Sulfate (SO4)		2820		50	mg/kg	21-MAY-17	23-MAY-17	R3730807
Cyanide, Total		853		10	mg/kg	19-MAY-17	29-MAY-17	R3732602
Inorganic Carbon		0.644		0.050	%		25-MAY-17	R3731477
Sulfur (S)-Total		194000		500	mg/kg	25-MAY-17	25-MAY-17	R3731726
Cyanide, Weak Acid Diss		<2.0	DLM	2.0	mg/kg	19-MAY-17	28-MAY-17	R3732602

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
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**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
CN-FREE-NAOH-CFA-VA	Soil	Free Cyanide in soil by CFA	BC-MOE/ASTM 7237
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
CN-T-NAOH-CFA-VA	Soil	Total Cyanide in soil by CFA	BC-MOE/ISO 14403:2002
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line UV digestion along with sample distillation and final determination by colourimetric analysis.			
CN-WAD-NAOH-CFA-VA	Soil	Weak Acid Diss. Cyanide in soil by CFA	BC-MOE/APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line sample distillation with final determination by colourimetric analysis.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** 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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
Laboratory Definition Code	Laboratory Location		
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA		
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA		

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

- mg/kg - milligrams per kilogram based on dry weight of sample
- mg/kg ww - milligrams per kilogram based on wet weight of sample
- mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
- mg/L - unit of concentration based on volume, parts per million.
- < - Less than.
- D.L. - The reporting limit.
- 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.



Quality Control Report

Workorder: L1926981

Report Date: 29-MAY-17

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Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK Soil								
Batch	R3731477							
WG2533787-1	DUP	L1926981-1						
Inorganic Carbon		0.644	0.670		%	3.9	20	25-MAY-17
WG2533787-2	LCS							
Inorganic Carbon			98.2		%		80-120	25-MAY-17
WG2533787-3	MB							
Inorganic Carbon			<0.050		%		0.05	25-MAY-17
CN-FREE-NAOH-CFA-VA Soil								
Batch	R3732602							
WG2531774-3	DUP	L1926981-1						
Cyanide, Free		<2.0	<2.0	RPD-NA	mg/kg	N/A	35	28-MAY-17
WG2531774-2	LCS							
Cyanide, Free			86.7		%		80-120	25-MAY-17
WG2531774-1	MB							
Cyanide, Free			<0.050		mg/kg		0.05	25-MAY-17
CN-T-NAOH-CFA-VA Soil								
Batch	R3732602							
WG2531774-3	DUP	L1926981-1						
Cyanide, Total		853	942		mg/kg	9.9	35	29-MAY-17
WG2531774-2	LCS							
Cyanide, Total			85.8		%		80-120	25-MAY-17
WG2531774-1	MB							
Cyanide, Total			<0.050		mg/kg		0.05	25-MAY-17
WG2531774-4	MS	L1926981-1						
Cyanide, Total			N/A	MS-B	%		-	29-MAY-17
CN-WAD-NAOH-CFA-VA Soil								
Batch	R3732602							
WG2531774-3	DUP	L1926981-1						
Cyanide, Weak Acid Diss		<2.0	<2.0	RPD-NA	mg/kg	N/A	35	28-MAY-17
WG2531774-2	LCS							
Cyanide, Weak Acid Diss			90.9		%		80-120	25-MAY-17
WG2531774-1	MB							
Cyanide, Weak Acid Diss			<0.050		mg/kg		0.05	25-MAY-17
HG-200.2-CVAF-VA Soil								
Batch	R3729643							
WG2531819-4	CRM	VA-NRC-STSD-3						
Mercury (Hg)			100.9		%		70-130	23-MAY-17
WG2531819-3	LCS							



Quality Control Report

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Report Date: 29-MAY-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAF-VA	Soil							
Batch	R3729643							
WG2531819-3	LCS							
Mercury (Hg)			110.1		%		70-130	23-MAY-17
WG2531819-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	23-MAY-17
MET-200.2-CCMS-VA	Soil							
Batch	R3729645							
WG2531819-4	CRM	VA-NRC-STSD-3						
Aluminum (Al)			111.0		%		70-130	20-MAY-17
Antimony (Sb)			114.5		%		70-130	20-MAY-17
Arsenic (As)			97.8		%		70-130	20-MAY-17
Barium (Ba)			104.5		%		70-130	20-MAY-17
Beryllium (Be)			117.8		%		70-130	20-MAY-17
Bismuth (Bi)			111.9		%		70-130	20-MAY-17
Boron (B)			123.8		%		70-130	20-MAY-17
Cadmium (Cd)			119.0		%		70-130	20-MAY-17
Calcium (Ca)			115.2		%		70-130	20-MAY-17
Chromium (Cr)			110.5		%		70-130	20-MAY-17
Cobalt (Co)			105.3		%		70-130	20-MAY-17
Copper (Cu)			100.9		%		70-130	20-MAY-17
Iron (Fe)			103.7		%		70-130	20-MAY-17
Lead (Pb)			112.4		%		70-130	20-MAY-17
Lithium (Li)			118.1		%		70-130	20-MAY-17
Magnesium (Mg)			115.0		%		70-130	20-MAY-17
Manganese (Mn)			100.0		%		70-130	20-MAY-17
Molybdenum (Mo)			109.2		%		70-130	20-MAY-17
Nickel (Ni)			99.4		%		70-130	20-MAY-17
Phosphorus (P)			112.8		%		70-130	20-MAY-17
Potassium (K)			119.3		%		70-130	20-MAY-17
Selenium (Se)			111.5		%		70-130	20-MAY-17
Silver (Ag)			113.1		%		70-130	20-MAY-17
Sodium (Na)			113.9		%		70-130	20-MAY-17
Strontium (Sr)			117.5		%		70-130	20-MAY-17
Thallium (Tl)			119.9		%		70-130	20-MAY-17
Titanium (Ti)			127.7		%		70-130	20-MAY-17
Uranium (U)			114.2		%		70-130	20-MAY-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3729645							
WG2531819-4	CRM	VA-NRC-STSD-3						
Vanadium (V)			111.9		%		70-130	20-MAY-17
Zinc (Zn)			102.4		%		70-130	20-MAY-17
WG2531819-3	LCS							
Aluminum (Al)			97.2		%		80-120	20-MAY-17
Antimony (Sb)			105.5		%		80-120	20-MAY-17
Arsenic (As)			100.9		%		80-120	20-MAY-17
Barium (Ba)			99.9		%		80-120	20-MAY-17
Beryllium (Be)			100.4		%		80-120	20-MAY-17
Bismuth (Bi)			98.9		%		80-120	20-MAY-17
Boron (B)			97.2		%		80-120	20-MAY-17
Cadmium (Cd)			98.1		%		80-120	20-MAY-17
Calcium (Ca)			99.2		%		80-120	20-MAY-17
Chromium (Cr)			96.6		%		80-120	20-MAY-17
Cobalt (Co)			96.5		%		80-120	20-MAY-17
Copper (Cu)			92.9		%		80-120	20-MAY-17
Iron (Fe)			96.5		%		80-120	20-MAY-17
Lead (Pb)			98.8		%		80-120	20-MAY-17
Lithium (Li)			105.0		%		80-120	20-MAY-17
Magnesium (Mg)			98.8		%		80-120	20-MAY-17
Manganese (Mn)			101.1		%		80-120	20-MAY-17
Molybdenum (Mo)			99.3		%		80-120	20-MAY-17
Nickel (Ni)			95.1		%		80-120	20-MAY-17
Phosphorus (P)			107.4		%		80-120	20-MAY-17
Potassium (K)			100.9		%		80-120	20-MAY-17
Selenium (Se)			97.0		%		80-120	20-MAY-17
Silver (Ag)			99.8		%		80-120	20-MAY-17
Sodium (Na)			97.7		%		80-120	20-MAY-17
Strontium (Sr)			100.4		%		80-120	20-MAY-17
Sulfur (S)			98.7		%		80-120	20-MAY-17
Thallium (Tl)			99.9		%		80-120	20-MAY-17
Tin (Sn)			96.7		%		80-120	20-MAY-17
Titanium (Ti)			92.0		%		80-120	20-MAY-17
Tungsten (W)			101.2		%		80-120	20-MAY-17
Uranium (U)			101.1		%		80-120	20-MAY-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3729645							
WG2531819-3	LCS							
Vanadium (V)			98.5		%		80-120	20-MAY-17
Zinc (Zn)			94.0		%		80-120	20-MAY-17
Zirconium (Zr)			96.1		%		70-130	20-MAY-17
WG2531819-1	MB							
Aluminum (Al)			<50		mg/kg		50	20-MAY-17
Antimony (Sb)			<0.10		mg/kg		0.1	20-MAY-17
Arsenic (As)			<0.10		mg/kg		0.1	20-MAY-17
Barium (Ba)			<0.50		mg/kg		0.5	20-MAY-17
Beryllium (Be)			<0.10		mg/kg		0.1	20-MAY-17
Bismuth (Bi)			<0.20		mg/kg		0.2	20-MAY-17
Boron (B)			<5.0		mg/kg		5	20-MAY-17
Cadmium (Cd)			<0.020		mg/kg		0.02	20-MAY-17
Calcium (Ca)			<50		mg/kg		50	20-MAY-17
Chromium (Cr)			<0.50		mg/kg		0.5	20-MAY-17
Cobalt (Co)			<0.10		mg/kg		0.1	20-MAY-17
Copper (Cu)			<0.50		mg/kg		0.5	20-MAY-17
Iron (Fe)			<50		mg/kg		50	20-MAY-17
Lead (Pb)			<0.50		mg/kg		0.5	20-MAY-17
Lithium (Li)			<2.0		mg/kg		2	20-MAY-17
Magnesium (Mg)			<20		mg/kg		20	20-MAY-17
Manganese (Mn)			<1.0		mg/kg		1	20-MAY-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	20-MAY-17
Nickel (Ni)			<0.50		mg/kg		0.5	20-MAY-17
Phosphorus (P)			<50		mg/kg		50	20-MAY-17
Potassium (K)			<100		mg/kg		100	20-MAY-17
Selenium (Se)			<0.20		mg/kg		0.2	20-MAY-17
Silver (Ag)			<0.10		mg/kg		0.1	20-MAY-17
Sodium (Na)			<50		mg/kg		50	20-MAY-17
Strontium (Sr)			<0.50		mg/kg		0.5	20-MAY-17
Sulfur (S)			<1000		mg/kg		1000	20-MAY-17
Thallium (Tl)			<0.050		mg/kg		0.05	20-MAY-17
Tin (Sn)			<2.0		mg/kg		2	20-MAY-17
Titanium (Ti)			<1.0		mg/kg		1	20-MAY-17
Tungsten (W)			<0.50		mg/kg		0.5	20-MAY-17



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Workorder: L1926981

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	Soil							
Batch	R3729645							
WG2531819-1 MB								
Uranium (U)			<0.050		mg/kg		0.05	20-MAY-17
Vanadium (V)			<0.20		mg/kg		0.2	20-MAY-17
Zinc (Zn)			<2.0		mg/kg		2	20-MAY-17
Zirconium (Zr)			<1.0		mg/kg		1	20-MAY-17
MOISTURE-VA	Soil							
Batch	R3727932							
WG2531831-3 DUP		L1926981-1						
Moisture		24.7	24.5		%	0.8	20	20-MAY-17
WG2531831-2 LCS								
Moisture			99.6		%		90-110	20-MAY-17
WG2531831-1 MB								
Moisture			<0.25		%		0.25	20-MAY-17
PH-1:2-VA	Soil							
Batch	R3728305							
WG2531819-5 IRM		VA-ALP-SRS1507						
pH (1:2 soil:water)			6.53		pH		6.2-6.8	21-MAY-17
S-TOT-LECO-SK	Soil							
Batch	R3731726							
WG2533641-3 IRM		1646A_SOIL						
Sulfur (S)-Total			2700		mg/kg		2500-4600	25-MAY-17
WG2533641-4 MB								
Sulfur (S)-Total			<500		mg/kg		500	25-MAY-17
SO4-LEACH-IC-VA	Soil							
Batch	R3730807							
WG2532394-2 LCS								
Sulfate (SO4)			102.0		%		70-130	23-MAY-17
WG2532394-1 MB								
Sulfate (SO4)			<10		mg/kg		10	23-MAY-17

Quality Control Report

Workorder: L1926981

Report Date: 29-MAY-17

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



COC #

[illegible]



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 20-JUN-17
Report Date: 10-JUL-17 11:20 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1945625
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1945625-1	TL7-19JUN17							
Sampled By:	KC/JI on 19-JUN-17 @ 09:25							
Matrix:	SOIL							
Metals in Soil (CCME) with Extra Metals								
Mercury in Soil by CVAFS								
Mercury (Hg)		0.0987		0.0050	mg/kg	26-JUN-17	28-JUN-17	R3758142
Metals in Soil by CRC ICPMS								
Aluminum (Al)		9280		50	mg/kg	26-JUN-17	28-JUN-17	R3758773
Antimony (Sb)		1.81		0.10	mg/kg	26-JUN-17	28-JUN-17	R3758773
Arsenic (As)		537		0.10	mg/kg	26-JUN-17	28-JUN-17	R3758773
Barium (Ba)		17.5		0.50	mg/kg	26-JUN-17	28-JUN-17	R3758773
Beryllium (Be)		0.13		0.10	mg/kg	26-JUN-17	28-JUN-17	R3758773
Bismuth (Bi)		2.25		0.20	mg/kg	26-JUN-17	28-JUN-17	R3758773
Boron (B)		12.5		5.0	mg/kg	26-JUN-17	28-JUN-17	R3758773
Cadmium (Cd)		5.74		0.020	mg/kg	26-JUN-17	28-JUN-17	R3758773
Calcium (Ca)		28800		50	mg/kg	26-JUN-17	28-JUN-17	R3758773
Chromium (Cr)		55.5		0.50	mg/kg	26-JUN-17	28-JUN-17	R3758773
Cobalt (Co)		336		0.10	mg/kg	26-JUN-17	28-JUN-17	R3758773
Copper (Cu)		9570	RRV	0.50	mg/kg	26-JUN-17	28-JUN-17	R3758773
Iron (Fe)		169000	RRV	50	mg/kg	26-JUN-17	28-JUN-17	R3758773
Lead (Pb)		632		0.50	mg/kg	26-JUN-17	28-JUN-17	R3758773
Lithium (Li)		18.1		2.0	mg/kg	26-JUN-17	28-JUN-17	R3758773
Magnesium (Mg)		13300		20	mg/kg	26-JUN-17	28-JUN-17	R3758773
Manganese (Mn)		1050		1.0	mg/kg	26-JUN-17	28-JUN-17	R3758773
Molybdenum (Mo)		2.14		0.10	mg/kg	26-JUN-17	28-JUN-17	R3758773
Nickel (Ni)		270		0.50	mg/kg	26-JUN-17	28-JUN-17	R3758773
Phosphorus (P)		273		50	mg/kg	26-JUN-17	28-JUN-17	R3758773
Potassium (K)		1010		100	mg/kg	26-JUN-17	28-JUN-17	R3758773
Selenium (Se)		11.9		0.20	mg/kg	26-JUN-17	28-JUN-17	R3758773
Sodium (Na)		2040		50	mg/kg	26-JUN-17	28-JUN-17	R3758773
Strontium (Sr)		15.7		0.50	mg/kg	26-JUN-17	28-JUN-17	R3758773
Sulfur (S)		150000		1000	mg/kg	26-JUN-17	28-JUN-17	R3758773
Thallium (Tl)		1.28		0.050	mg/kg	26-JUN-17	28-JUN-17	R3758773
Tin (Sn)		<2.0		2.0	mg/kg	26-JUN-17	28-JUN-17	R3758773
Titanium (Ti)		624		1.0	mg/kg	26-JUN-17	28-JUN-17	R3758773
Tungsten (W)		2.75		0.50	mg/kg	26-JUN-17	28-JUN-17	R3758773
Uranium (U)		0.212		0.050	mg/kg	26-JUN-17	28-JUN-17	R3758773
Vanadium (V)		61.8		0.20	mg/kg	26-JUN-17	28-JUN-17	R3758773
Zinc (Zn)		3060		2.0	mg/kg	26-JUN-17	28-JUN-17	R3758773
Zirconium (Zr)		3.7		1.0	mg/kg	26-JUN-17	28-JUN-17	R3758773
pH in Soil (1:2 Soil:Water Extraction)								
pH (1:2 soil:water)		8.33		0.10	pH		28-JUN-17	R3757769
Miscellaneous Parameters								
Silver (Ag)		33.3		0.10	mg/kg	26-JUN-17	30-JUN-17	R3759966
Cyanide, Free		<10	DLM	10	mg/kg	25-JUN-17	29-JUN-17	R3759198
Inorganic Carbon (as CaCO3 Equivalent)		7.49		0.40	%		08-JUL-17	
Moisture		22.6		0.25	%		25-JUN-17	R3755929
Sulfate (SO4)		2870		50	mg/kg	26-JUN-17	27-JUN-17	R3759713
Cyanide, Total		523		10	mg/kg	25-JUN-17	29-JUN-17	R3759198
Inorganic Carbon		0.899		0.050	%		08-JUL-17	R3767965
Sulfur (S)-Total		86800		500	mg/kg	07-JUL-17	07-JUL-17	R3767606
Cyanide, Weak Acid Diss		<10	DLM	10	mg/kg	25-JUN-17	29-JUN-17	R3759198

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
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.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
AG-200.2-A-CCMS-VA	Soil	Elevated Ag in Soil by CRC ICPMS	EPA 200.2/6020A
This method uses a heated strong acid digestion with HNO ₃ and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
CN-FREE-NAOH-CFA-VA	Soil	Free Cyanide in soil by CFA	BC-MOE/ASTM 7237
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
CN-T-NAOH-CFA-VA	Soil	Total Cyanide in soil by CFA	BC-MOE/ISO 14403:2002
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line UV digestion along with sample distillation and final determination by colourimetric analysis.			
CN-WAD-NAOH-CFA-VA	Soil	Weak Acid Diss. Cyanide in soil by CFA	BC-MOE/APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line sample distillation with final determination by colourimetric analysis.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO ₃ Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO ₃ and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO ₂ gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography			

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.

** 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
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg ww - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.



Quality Control Report

Workorder: L1945625

Report Date: 10-JUL-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAF-VA	Soil							
Batch	R3758142							
WG2557322-3	LCS							
Mercury (Hg)			98.5		%		70-130	28-JUN-17
WG2557322-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	28-JUN-17
MET-200.2-CCMS-VA	Soil							
Batch	R3758750							
WG2557322-4	CRM	VA-CANMET-TILL1						
Aluminum (Al)			92.9		%		70-130	28-JUN-17
Antimony (Sb)			97.8		%		70-130	28-JUN-17
Arsenic (As)			92.3		%		70-130	28-JUN-17
Barium (Ba)			93.8		%		70-130	28-JUN-17
Beryllium (Be)			0.49		mg/kg		0.34-0.74	28-JUN-17
Bismuth (Bi)			95.7		%		70-130	28-JUN-17
Boron (B)			3.2		mg/kg		0-8.2	28-JUN-17
Cadmium (Cd)			94.0		%		70-130	28-JUN-17
Calcium (Ca)			99.9		%		70-130	28-JUN-17
Chromium (Cr)			98.9		%		70-130	28-JUN-17
Cobalt (Co)			94.7		%		70-130	28-JUN-17
Copper (Cu)			92.4		%		70-130	28-JUN-17
Iron (Fe)			96.7		%		70-130	28-JUN-17
Lead (Pb)			93.3		%		70-130	28-JUN-17
Lithium (Li)			100.4		%		70-130	28-JUN-17
Magnesium (Mg)			99.8		%		70-130	28-JUN-17
Manganese (Mn)			92.6		%		70-130	28-JUN-17
Nickel (Ni)			94.9		%		70-130	28-JUN-17
Potassium (K)			100.7		%		70-130	28-JUN-17
Selenium (Se)			0.30		mg/kg		0.11-0.51	28-JUN-17
Silver (Ag)			0.23		mg/kg		0.13-0.33	28-JUN-17
Sodium (Na)			100.7		%		70-130	28-JUN-17
Strontium (Sr)			102.0		%		70-130	28-JUN-17
Sulfur (S)			200		mg/kg		0-1200	28-JUN-17
Thallium (Tl)			0.128		mg/kg		0.077-0.18	28-JUN-17
Tin (Sn)			1.1		mg/kg		0-3	28-JUN-17
Titanium (Ti)			102.8		%		70-130	28-JUN-17
Tungsten (W)			0.16		mg/kg		0-0.66	28-JUN-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3758750							
WG2557322-4	CRM	VA-CANMET-TILL1						
Uranium (U)			101.6		%		70-130	28-JUN-17
Vanadium (V)			97.2		%		70-130	28-JUN-17
Zinc (Zn)			96.0		%		70-130	28-JUN-17
Zirconium (Zr)			0.7		mg/kg		0-1.8	28-JUN-17
Batch	R3758773							
WG2557322-3	LCS							
Aluminum (Al)			103.6		%		80-120	28-JUN-17
Antimony (Sb)			109.2		%		80-120	28-JUN-17
Arsenic (As)			106.5		%		80-120	28-JUN-17
Barium (Ba)			106.9		%		80-120	28-JUN-17
Beryllium (Be)			103.2		%		80-120	28-JUN-17
Bismuth (Bi)			105.4		%		80-120	28-JUN-17
Boron (B)			98.2		%		80-120	28-JUN-17
Cadmium (Cd)			105.8		%		80-120	28-JUN-17
Calcium (Ca)			105.2		%		80-120	28-JUN-17
Chromium (Cr)			102.0		%		80-120	28-JUN-17
Cobalt (Co)			104.0		%		80-120	28-JUN-17
Copper (Cu)			99.9		%		80-120	28-JUN-17
Iron (Fe)			100.2		%		80-120	28-JUN-17
Lead (Pb)			102.7		%		80-120	28-JUN-17
Lithium (Li)			105.9		%		80-120	28-JUN-17
Magnesium (Mg)			105.1		%		80-120	28-JUN-17
Manganese (Mn)			107.9		%		80-120	28-JUN-17
Molybdenum (Mo)			105.8		%		80-120	28-JUN-17
Nickel (Ni)			102.5		%		80-120	28-JUN-17
Phosphorus (P)			112.1		%		80-120	28-JUN-17
Potassium (K)			105.1		%		80-120	28-JUN-17
Selenium (Se)			105.7		%		80-120	28-JUN-17
Silver (Ag)			104.8		%		80-120	28-JUN-17
Sodium (Na)			106.1		%		80-120	28-JUN-17
Strontium (Sr)			104.3		%		80-120	28-JUN-17
Sulfur (S)			101.6		%		80-120	28-JUN-17
Thallium (Tl)			102.1		%		80-120	28-JUN-17
Tin (Sn)			105.9		%		80-120	28-JUN-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3758773							
WG2557322-3	LCS							
Titanium (Ti)			105.0		%		80-120	28-JUN-17
Tungsten (W)			104.2		%		80-120	28-JUN-17
Uranium (U)			103.9		%		80-120	28-JUN-17
Vanadium (V)			106.0		%		80-120	28-JUN-17
Zinc (Zn)			96.0		%		80-120	28-JUN-17
Zirconium (Zr)			102.8		%		70-130	28-JUN-17
WG2557322-1	MB							
Aluminum (Al)			<50		mg/kg		50	28-JUN-17
Antimony (Sb)			<0.10		mg/kg		0.1	28-JUN-17
Arsenic (As)			<0.10		mg/kg		0.1	28-JUN-17
Barium (Ba)			<0.50		mg/kg		0.5	28-JUN-17
Beryllium (Be)			<0.10		mg/kg		0.1	28-JUN-17
Bismuth (Bi)			<0.20		mg/kg		0.2	28-JUN-17
Boron (B)			<5.0		mg/kg		5	28-JUN-17
Cadmium (Cd)			<0.020		mg/kg		0.02	28-JUN-17
Calcium (Ca)			<50		mg/kg		50	28-JUN-17
Chromium (Cr)			<0.50		mg/kg		0.5	28-JUN-17
Cobalt (Co)			<0.10		mg/kg		0.1	28-JUN-17
Copper (Cu)			<0.50		mg/kg		0.5	28-JUN-17
Iron (Fe)			<50		mg/kg		50	28-JUN-17
Lead (Pb)			<0.50		mg/kg		0.5	28-JUN-17
Lithium (Li)			<2.0		mg/kg		2	28-JUN-17
Magnesium (Mg)			<20		mg/kg		20	28-JUN-17
Manganese (Mn)			<1.0		mg/kg		1	28-JUN-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	28-JUN-17
Nickel (Ni)			<0.50		mg/kg		0.5	28-JUN-17
Phosphorus (P)			<50		mg/kg		50	28-JUN-17
Potassium (K)			<100		mg/kg		100	28-JUN-17
Selenium (Se)			<0.20		mg/kg		0.2	28-JUN-17
Silver (Ag)			<0.10		mg/kg		0.1	28-JUN-17
Sodium (Na)			<50		mg/kg		50	28-JUN-17
Strontium (Sr)			<0.50		mg/kg		0.5	28-JUN-17
Sulfur (S)			<1000		mg/kg		1000	28-JUN-17
Thallium (Tl)			<0.050		mg/kg		0.05	28-JUN-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	Soil							
Batch	R3758773							
WG2557322-1 MB								
Tin (Sn)			<2.0		mg/kg		2	28-JUN-17
Titanium (Ti)			<1.0		mg/kg		1	28-JUN-17
Tungsten (W)			<0.50		mg/kg		0.5	28-JUN-17
Uranium (U)			<0.050		mg/kg		0.05	28-JUN-17
Vanadium (V)			<0.20		mg/kg		0.2	28-JUN-17
Zinc (Zn)			<2.0		mg/kg		2	28-JUN-17
Zirconium (Zr)			<1.0		mg/kg		1	28-JUN-17
MOISTURE-VA	Soil							
Batch	R3755929							
WG2556503-2 LCS								
Moisture			99.8		%		90-110	25-JUN-17
WG2556503-6 LCS								
Moisture			99.7		%		90-110	25-JUN-17
WG2556503-1 MB								
Moisture			<0.25		%		0.25	25-JUN-17
WG2556503-5 MB								
Moisture			<0.25		%		0.25	25-JUN-17
PH-1:2-VA	Soil							
Batch	R3757769							
WG2557322-5 IRM		VA-ALP-SRS1507						
pH (1:2 soil:water)			6.63		pH		6.2-6.8	28-JUN-17
S-TOT-LECO-SK	Soil							
Batch	R3767606							
WG2563700-5 IRM		1646A SOIL						
Sulfur (S)-Total			4100		mg/kg		2500-4600	07-JUL-17
WG2563700-3 MB								
Sulfur (S)-Total			<500		mg/kg		500	07-JUL-17
SO4-LEACH-IC-VA	Soil							
Batch	R3759713							
WG2557094-3 DUP		L1945625-1						
Sulfate (SO4)		2870	3110		mg/kg	7.9	20	27-JUN-17
WG2557094-2 LCS								
Sulfate (SO4)			102.2		%		70-130	27-JUN-17
WG2557094-1 MB								
Sulfate (SO4)			<10		mg/kg		10	27-JUN-17

Quality Control Report

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 25-JUL-17
Report Date: 08-AUG-17 13:25 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1964325
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

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ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1964325-1	TL7-23JUL17							
Sampled By: KC on 23-JUL-17 @ 13:50								
Matrix: SOIL								
Metals in Soil (CCME) with Extra Metals								
Mercury in Soil by CVAFS								
Mercury (Hg)	0.188			0.0050	mg/kg	01-AUG-17	02-AUG-17	R3788403
Metals in Soil by CRC ICPMS								
Aluminum (Al)	11800			50	mg/kg	01-AUG-17	02-AUG-17	R3789305
Antimony (Sb)	2.00			0.10	mg/kg	01-AUG-17	02-AUG-17	R3789305
Arsenic (As)	597			0.10	mg/kg	01-AUG-17	02-AUG-17	R3789305
Barium (Ba)	19.9			0.50	mg/kg	01-AUG-17	02-AUG-17	R3789305
Beryllium (Be)	0.15			0.10	mg/kg	01-AUG-17	02-AUG-17	R3789305
Bismuth (Bi)	2.74			0.20	mg/kg	01-AUG-17	02-AUG-17	R3789305
Boron (B)	23.6			5.0	mg/kg	01-AUG-17	02-AUG-17	R3789305
Cadmium (Cd)	6.83			0.020	mg/kg	01-AUG-17	02-AUG-17	R3789305
Calcium (Ca)	30700			50	mg/kg	01-AUG-17	02-AUG-17	R3789305
Chromium (Cr)	88.8			0.50	mg/kg	01-AUG-17	02-AUG-17	R3789305
Cobalt (Co)	401			0.10	mg/kg	01-AUG-17	02-AUG-17	R3789305
Copper (Cu)	19700			0.50	mg/kg	01-AUG-17	02-AUG-17	R3789305
Iron (Fe)	193000			50	mg/kg	01-AUG-17	02-AUG-17	R3789305
Lead (Pb)	645			0.50	mg/kg	01-AUG-17	02-AUG-17	R3789305
Lithium (Li)	22.1			2.0	mg/kg	01-AUG-17	02-AUG-17	R3789305
Magnesium (Mg)	13000			20	mg/kg	01-AUG-17	02-AUG-17	R3789305
Manganese (Mn)	1050			1.0	mg/kg	01-AUG-17	02-AUG-17	R3789305
Molybdenum (Mo)	2.78			0.10	mg/kg	01-AUG-17	02-AUG-17	R3789305
Nickel (Ni)	291			0.50	mg/kg	01-AUG-17	02-AUG-17	R3789305
Phosphorus (P)	346			50	mg/kg	01-AUG-17	02-AUG-17	R3789305
Potassium (K)	1220			100	mg/kg	01-AUG-17	02-AUG-17	R3789305
Selenium (Se)	13.8			0.20	mg/kg	01-AUG-17	02-AUG-17	R3789305
Sodium (Na)	2400			50	mg/kg	01-AUG-17	02-AUG-17	R3789305
Strontium (Sr)	19.5			0.50	mg/kg	01-AUG-17	02-AUG-17	R3789305
Sulfur (S)	169000			1000	mg/kg	01-AUG-17	02-AUG-17	R3789305
Thallium (Tl)	1.91			0.050	mg/kg	01-AUG-17	02-AUG-17	R3789305
Tin (Sn)	<2.0			2.0	mg/kg	01-AUG-17	02-AUG-17	R3789305
Titanium (Ti)	1230			1.0	mg/kg	01-AUG-17	02-AUG-17	R3789305
Tungsten (W)	3.05			0.50	mg/kg	01-AUG-17	02-AUG-17	R3789305
Uranium (U)	0.087			0.050	mg/kg	01-AUG-17	02-AUG-17	R3789305
Vanadium (V)	110			0.20	mg/kg	01-AUG-17	02-AUG-17	R3789305
Zinc (Zn)	3490			2.0	mg/kg	01-AUG-17	02-AUG-17	R3789305
Zirconium (Zr)	5.0			1.0	mg/kg	01-AUG-17	02-AUG-17	R3789305
pH in Soil (1:2 Soil:Water Extraction)								
pH (1:2 soil:water)	8.40			0.10	pH		02-AUG-17	R3788607
Miscellaneous Parameters								
Silver (Ag)	51.2			0.10	mg/kg	01-AUG-17	03-AUG-17	R3791051
Cyanide, Free	<2.0	DLM		2.0	mg/kg	31-JUL-17	03-AUG-17	R3790003
Inorganic Carbon (as CaCO3 Equivalent)	7.88			0.40	%		02-AUG-17	
Moisture	24.1			0.25	%		30-JUL-17	R3785544
Sulfate (SO4)	2940			50	mg/kg	31-JUL-17	01-AUG-17	R3788611
Cyanide, Total	1090			2.0	mg/kg	31-JUL-17	03-AUG-17	R3790003
Inorganic Carbon	0.946			0.050	%		02-AUG-17	R3788096
Sulfur (S)-Total	135000			500	mg/kg	01-AUG-17	01-AUG-17	R3788066
Cyanide, Weak Acid Diss	<2.0	DLM		2.0	mg/kg	31-JUL-17	03-AUG-17	R3790003

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
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.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
AG-200.2-A-CCMS-VA	Soil	Elevated Ag in Soil by CRC ICPMS	EPA 200.2/6020A
This method uses a heated strong acid digestion with HNO ₃ and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
CN-FREE-NAOH-CFA-VA	Soil	Free Cyanide in soil by CFA	BC-MOE/ASTM 7237
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
CN-T-NAOH-CFA-VA	Soil	Total Cyanide in soil by CFA	BC-MOE/ISO 14403:2002
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line UV digestion along with sample distillation and final determination by colourimetric analysis.			
CN-WAD-NAOH-CFA-VA	Soil	Weak Acid Diss. Cyanide in soil by CFA	BC-MOE/APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line sample distillation with final determination by colourimetric analysis.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO ₃ Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO ₃ and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO ₂ gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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** 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
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg ww - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.



Quality Control Report

Workorder: L1964325

Report Date: 08-AUG-17

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Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
AG-200.2-A-CCMS-VA								
Batch R3791051								
WG2584252-3 CRM		VA-CANMET-TILL1						
Silver (Ag)			0.24		mg/kg		0.13-0.33	03-AUG-17
WG2584252-2 LCS								
Silver (Ag)			102.8		%		70-130	03-AUG-17
WG2584252-1 MB								
Silver (Ag)			<0.10		mg/kg		0.1	03-AUG-17
C-TIC-PCT-SK								
Batch R3788096								
WG2580839-2 LCS								
Inorganic Carbon			98.6		%		80-120	02-AUG-17
WG2580839-3 MB								
Inorganic Carbon			<0.050		%		0.05	02-AUG-17
CN-FREE-NAOH-CFA-VA								
Batch R3790003								
WG2579221-2 LCS								
Cyanide, Free			90.2		%		80-120	02-AUG-17
WG2579221-1 MB								
Cyanide, Free			<0.050		mg/kg		0.05	02-AUG-17
CN-T-NAOH-CFA-VA								
Batch R3790003								
WG2579221-2 LCS								
Cyanide, Total			85.2		%		80-120	02-AUG-17
WG2579221-1 MB								
Cyanide, Total			<0.050		mg/kg		0.05	02-AUG-17
CN-WAD-NAOH-CFA-VA								
Batch R3790003								
WG2579221-2 LCS								
Cyanide, Weak Acid Diss			93.8		%		80-120	02-AUG-17
WG2579221-1 MB								
Cyanide, Weak Acid Diss			<0.050		mg/kg		0.05	02-AUG-17
HG-200.2-CVAF-VA								
Batch R3788403								
WG2583138-4 CRM		VA-CANMET-TILL1						
Mercury (Hg)			108.4		%		70-130	02-AUG-17
WG2583138-3 LCS								
Mercury (Hg)			109.3		%		70-130	02-AUG-17
WG2583138-1 MB								



Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAF-VA	Soil							
Batch	R3788403							
WG2583138-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	02-AUG-17
MET-200.2-CCMS-VA	Soil							
Batch	R3789305							
WG2583138-4	CRM	VA-CANMET-TILL1						
Aluminum (Al)			94.3		%		70-130	02-AUG-17
Antimony (Sb)			104.5		%		70-130	02-AUG-17
Arsenic (As)			95.2		%		70-130	02-AUG-17
Barium (Ba)			88.3		%		70-130	02-AUG-17
Beryllium (Be)			0.47		mg/kg		0.34-0.74	02-AUG-17
Bismuth (Bi)			97.1		%		70-130	02-AUG-17
Boron (B)			3.8		mg/kg		0-8.2	02-AUG-17
Cadmium (Cd)			97.5		%		70-130	02-AUG-17
Calcium (Ca)			104.1		%		70-130	02-AUG-17
Chromium (Cr)			99.4		%		70-130	02-AUG-17
Cobalt (Co)			96.7		%		70-130	02-AUG-17
Copper (Cu)			97.0		%		70-130	02-AUG-17
Iron (Fe)			99.0		%		70-130	02-AUG-17
Lead (Pb)			98.9		%		70-130	02-AUG-17
Lithium (Li)			106.2		%		70-130	02-AUG-17
Magnesium (Mg)			96.0		%		70-130	02-AUG-17
Manganese (Mn)			96.1		%		70-130	02-AUG-17
Nickel (Ni)			98.4		%		70-130	02-AUG-17
Potassium (K)			109.2		%		70-130	02-AUG-17
Selenium (Se)			0.29		mg/kg		0.11-0.51	02-AUG-17
Silver (Ag)			0.23		mg/kg		0.13-0.33	02-AUG-17
Sodium (Na)			107.5		%		70-130	02-AUG-17
Strontium (Sr)			101.3		%		70-130	02-AUG-17
Thallium (Tl)			0.125		mg/kg		0.077-0.18	02-AUG-17
Tin (Sn)			1.0		mg/kg		0-3	02-AUG-17
Titanium (Ti)			109.6		%		70-130	02-AUG-17
Tungsten (W)			0.16		mg/kg		0-0.66	02-AUG-17
Uranium (U)			99.6		%		70-130	02-AUG-17
Vanadium (V)			99.4		%		70-130	02-AUG-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3789305							
WG2583138-4	CRM	VA-CANMET-TILL1						
Zinc (Zn)			96.3		%		70-130	02-AUG-17
Zirconium (Zr)			0.7		mg/kg		0-1.8	02-AUG-17
WG2583138-3	LCS							
Aluminum (Al)			99.6		%		80-120	02-AUG-17
Antimony (Sb)			119.1		%		80-120	02-AUG-17
Arsenic (As)			106.1		%		80-120	02-AUG-17
Barium (Ba)			104.4		%		80-120	02-AUG-17
Beryllium (Be)			110.1		%		80-120	02-AUG-17
Bismuth (Bi)			109.6		%		80-120	02-AUG-17
Boron (B)			109.3		%		80-120	02-AUG-17
Cadmium (Cd)			106.1		%		80-120	02-AUG-17
Calcium (Ca)			108.9		%		80-120	02-AUG-17
Chromium (Cr)			105.5		%		80-120	02-AUG-17
Cobalt (Co)			103.0		%		80-120	02-AUG-17
Copper (Cu)			102.4		%		80-120	02-AUG-17
Iron (Fe)			100.7		%		80-120	02-AUG-17
Lead (Pb)			110.3		%		80-120	02-AUG-17
Lithium (Li)			111.1		%		80-120	02-AUG-17
Magnesium (Mg)			102.5		%		80-120	02-AUG-17
Manganese (Mn)			108.2		%		80-120	02-AUG-17
Molybdenum (Mo)			112.4		%		80-120	02-AUG-17
Nickel (Ni)			104.3		%		80-120	02-AUG-17
Phosphorus (P)			109.0		%		80-120	02-AUG-17
Potassium (K)			108.9		%		80-120	02-AUG-17
Selenium (Se)			105.6		%		80-120	02-AUG-17
Silver (Ag)			109.8		%		80-120	02-AUG-17
Sodium (Na)			107.3		%		80-120	02-AUG-17
Strontium (Sr)			108.9		%		80-120	02-AUG-17
Sulfur (S)			106.4		%		80-120	02-AUG-17
Thallium (Tl)			110.7		%		80-120	02-AUG-17
Tin (Sn)			108.2		%		80-120	02-AUG-17
Titanium (Ti)			103.4		%		80-120	02-AUG-17
Tungsten (W)			112.0		%		80-120	02-AUG-17
Uranium (U)			109.1		%		80-120	02-AUG-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	Soil							
Batch	R3789305							
WG2583138-3	LCS							
Vanadium (V)			106.4		%		80-120	02-AUG-17
Zinc (Zn)			97.2		%		80-120	02-AUG-17
Zirconium (Zr)			108.5		%		70-130	02-AUG-17
WG2583138-1	MB							
Aluminum (Al)			<50		mg/kg		50	02-AUG-17
Antimony (Sb)			<0.10		mg/kg		0.1	02-AUG-17
Arsenic (As)			<0.10		mg/kg		0.1	02-AUG-17
Barium (Ba)			<0.50		mg/kg		0.5	02-AUG-17
Beryllium (Be)			<0.10		mg/kg		0.1	02-AUG-17
Bismuth (Bi)			<0.20		mg/kg		0.2	02-AUG-17
Boron (B)			<5.0		mg/kg		5	02-AUG-17
Cadmium (Cd)			<0.020		mg/kg		0.02	02-AUG-17
Calcium (Ca)			<50		mg/kg		50	02-AUG-17
Chromium (Cr)			<0.50		mg/kg		0.5	02-AUG-17
Cobalt (Co)			<0.10		mg/kg		0.1	02-AUG-17
Copper (Cu)			<0.50		mg/kg		0.5	02-AUG-17
Iron (Fe)			<50		mg/kg		50	02-AUG-17
Lead (Pb)			<0.50		mg/kg		0.5	02-AUG-17
Lithium (Li)			<2.0		mg/kg		2	02-AUG-17
Magnesium (Mg)			<20		mg/kg		20	02-AUG-17
Manganese (Mn)			<1.0		mg/kg		1	02-AUG-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	02-AUG-17
Nickel (Ni)			<0.50		mg/kg		0.5	02-AUG-17
Phosphorus (P)			<50		mg/kg		50	02-AUG-17
Potassium (K)			<100		mg/kg		100	02-AUG-17
Selenium (Se)			<0.20		mg/kg		0.2	02-AUG-17
Silver (Ag)			<0.10		mg/kg		0.1	02-AUG-17
Sodium (Na)			<50		mg/kg		50	02-AUG-17
Strontium (Sr)			<0.50		mg/kg		0.5	02-AUG-17
Sulfur (S)			<1000		mg/kg		1000	02-AUG-17
Thallium (Tl)			<0.050		mg/kg		0.05	02-AUG-17
Tin (Sn)			<2.0		mg/kg		2	02-AUG-17
Titanium (Ti)			<1.0		mg/kg		1	02-AUG-17
Tungsten (W)			<0.50		mg/kg		0.5	02-AUG-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	Soil							
Batch	R3789305							
WG2583138-1 MB								
Uranium (U)			<0.050		mg/kg		0.05	02-AUG-17
Vanadium (V)			<0.20		mg/kg		0.2	02-AUG-17
Zinc (Zn)			<2.0		mg/kg		2	02-AUG-17
Zirconium (Zr)			<1.0		mg/kg		1	02-AUG-17
MOISTURE-VA	Soil							
Batch	R3785544							
WG2581447-2 LCS								
Moisture			99.5		%		90-110	30-JUL-17
WG2581447-1 MB								
Moisture			<0.25		%		0.25	30-JUL-17
PH-1:2-VA	Soil							
Batch	R3788607							
WG2583138-5 IRM		VA-ALP-SRS1507						
pH (1:2 soil:water)			6.68		pH		6.2-6.8	02-AUG-17
S-TOT-LECO-SK	Soil							
Batch	R3788066							
WG2582800-1 DUP		L1964325-1						
Sulfur (S)-Total		135000	133000		mg/kg	1.1	30	01-AUG-17
WG2582800-2 IRM		1646A_SOIL						
Sulfur (S)-Total			3700		mg/kg		2500-4600	01-AUG-17
WG2582800-3 MB								
Sulfur (S)-Total			<500		mg/kg		500	01-AUG-17
SO4-LEACH-IC-VA	Soil							
Batch	R3788611							
WG2581833-3 DUP		L1964325-1						
Sulfate (SO4)		2940	3010		mg/kg	2.3	20	01-AUG-17
WG2581833-2 LCS								
Sulfate (SO4)			104.8		%		70-130	01-AUG-17
WG2581833-1 MB								
Sulfate (SO4)			<10		mg/kg		10	01-AUG-17

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



Canada Toll Free: 1 800 668 9878

www.alsglobal.com

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L1964325-COFC

Number of Containers

GENF 18.01 From:



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 22-AUG-17
Report Date: 31-AUG-17 15:32 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1979029
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

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Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1979029-1 TL7-20AUG17 Sampled By: KC on 20-AUG-17 @ 11:20 Matrix: SOIL Metals in Soil (CCME) with Extra Metals Mercury in Soil by CVAFS Mercury (Hg)0.08780.0050mg/kg25-AUG-1729-AUG-17R3814141 Metals in Soil by CRC ICPMS Aluminum (Al)1170050mg/kg25-AUG-1729-AUG-17R3814785 Antimony (Sb)1.140.10mg/kg25-AUG-1729-AUG-17R3814785 Arsenic (As)4120.10mg/kg25-AUG-1729-AUG-17R3814785 Barium (Ba)15.00.50mg/kg25-AUG-1729-AUG-17R3814785 Beryllium (Be)0.120.10mg/kg25-AUG-1729-AUG-17R3814785 Bismuth (Bi)1.300.20mg/kg25-AUG-1729-AUG-17R3814785 Boron (B)16.85.0mg/kg25-AUG-1729-AUG-17R3814785 Cadmium (Cd)2.990.020mg/kg25-AUG-1729-AUG-17R3814785 Calcium (Ca)3840050mg/kg25-AUG-1729-AUG-17R3814785 Chromium (Cr)50.30.50mg/kg25-AUG-1729-AUG-17R3814785 Cobalt (Co)2550.10mg/kg25-AUG-1729-AUG-17R3814785 Copper (Cu)81600.50mg/kg25-AUG-1729-AUG-17R3814785 Iron (Fe)13200050mg/kg25-AUG-1729-AUG-17R3814785 Lead (Pb)3480.50mg/kg25-AUG-1729-AUG-17R3814785 Lithium (Li)18.92.0mg/kg25-AUG-1729-AUG-17R3814785 Magnesium (Mg)1520020mg/kg25-AUG-1729-AUG-17R3814785 Manganese (Mn)11901.0mg/kg25-AUG-1729-AUG-17R3814785 Molybdenum (Mo)1.810.10mg/kg25-AUG-1729-AUG-17R3814785 Nickel (Ni)1910.50mg/kg25-AUG-1729-AUG-17R3814785 Phosphorus (P)36050mg/kg25-AUG-1729-AUG-17R3814785 Potassium (K)950100mg/kg25-AUG-1729-AUG-17R3814785 Selenium (Se)8.190.20mg/kg25-AUG-1729-AUG-17R3814785 Silver (Ag)21.80.10mg/kg25-AUG-1729-AUG-17R3814785 Sodium (Na)153050mg/kg25-AUG-1729-AUG-17R3814785 Strontium (Sr)21.40.50mg/kg25-AUG-1729-AUG-17R3814785 Sulfur (S)991001000mg/kg25-AUG-1729-AUG-17R3814785 Thallium (Tl)0.8910.050mg/kg25-AUG-1729-AUG-17R3814785 Tin (Sn)<2.02.0mg/kg25-AUG-1729-AUG-17R3814785 Titanium (Ti)7831.0mg/kg25-AUG-1729-AUG-17R3814785 Tungsten (W)1.440.50mg/kg25-AUG-1729-AUG-17R3814785 Uranium (U)0.0760.050mg/kg25-AUG-1729-AUG-17R3814785 Vanadium (V)75.30.20mg/kg25-AUG-1729-AUG-17R3814785 Zinc (Zn)15002.0mg/kg25-AUG-1729-AUG-17R3814785 Zirconium (Zr)3.11.0mg/kg25-AUG-1729-AUG-17R3814785 pH in Soil (1:2 Soil:Water Extraction) pH (1:2 soil:water)8.310.10pH30-AUG-17R3814932 Miscellaneous Parameters Cyanide, Free<4.0DLM4.0mg/kg29-AUG-1730-AUG-17R3815996 Inorganic Carbon (as CaCO3 Equivalent)7.640.40%29-AUG-17 Moisture24.90.25%26-AUG-17R3812326 Sulfate (SO4)202010mg/kg28-AUG-1728-AUG-17R3814981 Cyanide, Total6814.0mg/kg29-AUG-1730-AUG-17R3815996 Inorganic Carbon0.9170.050%29-AUG-17R3814210 Sulfur (S)-Total66900500mg/kg29-AUG-1729-AUG-17R3814347 Cyanide, Weak Acid Diss<4.0DLM4.0mg/kg29-AUG-1730-AUG-17R3815996							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
CN-FREE-NAOH-CFA-VA	Soil	Free Cyanide in soil by CFA	BC-MOE/ASTM 7237
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
CN-T-NAOH-CFA-VA	Soil	Total Cyanide in soil by CFA	BC-MOE/ISO 14403:2002
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line UV digestion along with sample distillation and final determination by colourimetric analysis.			
CN-WAD-NAOH-CFA-VA	Soil	Weak Acid Diss. Cyanide in soil by CFA	BC-MOE/APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line sample distillation with final determination by colourimetric analysis.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** 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
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Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
SK		ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA	
VA		ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA	

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg ww - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.



Quality Control Report

Workorder: L1979029

Report Date: 31-AUG-17

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Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK								
Soil								
Batch	R3814210							
WG2602724-2	LCS							
Inorganic Carbon			97.1		%		80-120	29-AUG-17
WG2602724-3	MB							
Inorganic Carbon			<0.050		%		0.05	29-AUG-17
CN-FREE-NAOH-CFA-VA								
Soil								
Batch	R3815996							
WG2603099-2	LCS							
Cyanide, Free			94.7		%		80-120	30-AUG-17
WG2603099-1	MB							
Cyanide, Free			<0.050		mg/kg		0.05	30-AUG-17
CN-T-NAOH-CFA-VA								
Soil								
Batch	R3815996							
WG2603099-2	LCS							
Cyanide, Total			90.9		%		80-120	30-AUG-17
WG2603099-1	MB							
Cyanide, Total			<0.050		mg/kg		0.05	30-AUG-17
CN-WAD-NAOH-CFA-VA								
Soil								
Batch	R3815996							
WG2603099-2	LCS							
Cyanide, Weak Acid Diss			105.0		%		80-120	30-AUG-17
WG2603099-1	MB							
Cyanide, Weak Acid Diss			<0.050		mg/kg		0.05	30-AUG-17
HG-200.2-CVAF-VA								
Soil								
Batch	R3814141							
WG2601853-4	CRM	VA-CANMET-TILL1						
Mercury (Hg)			97.0		%		70-130	29-AUG-17
WG2601853-2	DUP	L1979029-1						
Mercury (Hg)		0.0878	0.0833		mg/kg	5.3	40	29-AUG-17
WG2601853-3	LCS							
Mercury (Hg)			101.2		%		70-130	29-AUG-17
WG2601853-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	29-AUG-17
MET-200.2-CCMS-VA								
Soil								
Batch	R3814785							
WG2601853-4	CRM	VA-CANMET-TILL1						
Aluminum (Al)			94.5		%		70-130	29-AUG-17
Antimony (Sb)			101.0		%		70-130	29-AUG-17



Quality Control Report

Workorder: L1979029

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3814785							
WG2601853-4	CRM	VA-CANMET-TILL1						
Arsenic (As)			96.1		%		70-130	29-AUG-17
Barium (Ba)			91.6		%		70-130	29-AUG-17
Beryllium (Be)			0.50		mg/kg		0.34-0.74	29-AUG-17
Bismuth (Bi)			94.4		%		70-130	29-AUG-17
Boron (B)			2.8		mg/kg		0-8.2	29-AUG-17
Cadmium (Cd)			99.5		%		70-130	29-AUG-17
Calcium (Ca)			104.3		%		70-130	29-AUG-17
Chromium (Cr)			98.9		%		70-130	29-AUG-17
Cobalt (Co)			96.3		%		70-130	29-AUG-17
Copper (Cu)			95.0		%		70-130	29-AUG-17
Iron (Fe)			97.4		%		70-130	29-AUG-17
Lead (Pb)			96.4		%		70-130	29-AUG-17
Lithium (Li)			103.0		%		70-130	29-AUG-17
Magnesium (Mg)			97.0		%		70-130	29-AUG-17
Manganese (Mn)			94.8		%		70-130	29-AUG-17
Nickel (Ni)			96.8		%		70-130	29-AUG-17
Potassium (K)			101.6		%		70-130	29-AUG-17
Selenium (Se)			0.30		mg/kg		0.11-0.51	29-AUG-17
Silver (Ag)			0.22		mg/kg		0.13-0.33	29-AUG-17
Sodium (Na)			102.2		%		70-130	29-AUG-17
Strontium (Sr)			99.0		%		70-130	29-AUG-17
Thallium (Tl)			0.119		mg/kg		0.077-0.18	29-AUG-17
Tin (Sn)			1.0		mg/kg		0-3	29-AUG-17
Titanium (Ti)			110.6		%		70-130	29-AUG-17
Tungsten (W)			0.16		mg/kg		0-0.66	29-AUG-17
Uranium (U)			98.0		%		70-130	29-AUG-17
Vanadium (V)			98.3		%		70-130	29-AUG-17
Zinc (Zn)			98.1		%		70-130	29-AUG-17
Zirconium (Zr)			0.6		mg/kg		0-1.8	29-AUG-17
WG2601853-2	DUP	L1979029-1						
Aluminum (Al)		11700	11800		mg/kg	0.8	40	29-AUG-17
Antimony (Sb)		1.14	1.13		mg/kg	0.8	30	29-AUG-17
Arsenic (As)		412	421		mg/kg	2.3	30	29-AUG-17
Barium (Ba)		15.0	15.3		mg/kg	1.7	40	29-AUG-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3814785							
WG2601853-2	DUP	L1979029-1						
Beryllium (Be)		0.12	0.12		mg/kg	0.4	30	29-AUG-17
Bismuth (Bi)		1.30	1.32		mg/kg	1.5	30	29-AUG-17
Boron (B)		16.8	16.8		mg/kg	0.4	30	29-AUG-17
Cadmium (Cd)		2.99	3.23		mg/kg	8.0	30	29-AUG-17
Calcium (Ca)		38400	37300		mg/kg	2.8	30	29-AUG-17
Chromium (Cr)		50.3	51.9		mg/kg	3.1	30	29-AUG-17
Cobalt (Co)		255	264		mg/kg	3.2	30	29-AUG-17
Copper (Cu)		8160	8600		mg/kg	5.2	30	29-AUG-17
Iron (Fe)		132000	134000		mg/kg	2.0	30	29-AUG-17
Lead (Pb)		348	344		mg/kg	1.1	40	29-AUG-17
Lithium (Li)		18.9	18.6		mg/kg	1.5	30	29-AUG-17
Magnesium (Mg)		15200	15300		mg/kg	0.1	30	29-AUG-17
Manganese (Mn)		1190	1170		mg/kg	1.0	30	29-AUG-17
Molybdenum (Mo)		1.81	1.72		mg/kg	5.1	40	29-AUG-17
Nickel (Ni)		191	196		mg/kg	2.3	30	29-AUG-17
Phosphorus (P)		360	364		mg/kg	1.2	30	29-AUG-17
Potassium (K)		950	960		mg/kg	0.7	40	29-AUG-17
Selenium (Se)		8.19	8.25		mg/kg	0.7	30	29-AUG-17
Silver (Ag)		21.8	22.4		mg/kg	3.0	40	29-AUG-17
Sodium (Na)		1530	1440		mg/kg	5.5	40	29-AUG-17
Strontium (Sr)		21.4	20.8		mg/kg	2.8	40	29-AUG-17
Sulfur (S)		99100	98700		mg/kg	0.4	30	29-AUG-17
Thallium (Tl)		0.891	0.913		mg/kg	2.4	30	29-AUG-17
Tin (Sn)		<2.0	<2.0	RPD-NA	mg/kg	N/A	40	29-AUG-17
Titanium (Ti)		783	804		mg/kg	2.6	40	29-AUG-17
Tungsten (W)		1.44	1.38		mg/kg	4.4	30	29-AUG-17
Uranium (U)		0.076	<0.050	RPD-NA	mg/kg	N/A	30	29-AUG-17
Vanadium (V)		75.3	76.4		mg/kg	1.5	30	29-AUG-17
Zinc (Zn)		1500	1590		mg/kg	6.0	30	29-AUG-17
Zirconium (Zr)		3.1	3.2		mg/kg	3.6	30	29-AUG-17
WG2601853-3	LCS							
Aluminum (Al)			100.6		%		80-120	29-AUG-17
Antimony (Sb)			105.0		%		80-120	29-AUG-17
Arsenic (As)			102.5		%		80-120	29-AUG-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3814785							
WG2601853-3	LCS							
Barium (Ba)			100.4		%		80-120	29-AUG-17
Beryllium (Be)			99.4		%		80-120	29-AUG-17
Bismuth (Bi)			97.7		%		80-120	29-AUG-17
Boron (B)			94.5		%		80-120	29-AUG-17
Cadmium (Cd)			101.0		%		80-120	29-AUG-17
Calcium (Ca)			101.4		%		80-120	29-AUG-17
Chromium (Cr)			101.9		%		80-120	29-AUG-17
Cobalt (Co)			98.9		%		80-120	29-AUG-17
Copper (Cu)			97.6		%		80-120	29-AUG-17
Iron (Fe)			100.3		%		80-120	29-AUG-17
Lead (Pb)			97.3		%		80-120	29-AUG-17
Lithium (Li)			97.2		%		80-120	29-AUG-17
Magnesium (Mg)			100.5		%		80-120	29-AUG-17
Manganese (Mn)			101.8		%		80-120	29-AUG-17
Molybdenum (Mo)			97.2		%		80-120	29-AUG-17
Nickel (Ni)			98.7		%		80-120	29-AUG-17
Phosphorus (P)			106.0		%		80-120	29-AUG-17
Potassium (K)			102.2		%		80-120	29-AUG-17
Selenium (Se)			99.4		%		80-120	29-AUG-17
Silver (Ag)			99.2		%		80-120	29-AUG-17
Sodium (Na)			103.8		%		80-120	29-AUG-17
Strontium (Sr)			98.0		%		80-120	29-AUG-17
Sulfur (S)			101.6		%		80-120	29-AUG-17
Thallium (Tl)			97.5		%		80-120	29-AUG-17
Tin (Sn)			100.5		%		80-120	29-AUG-17
Titanium (Ti)			102.6		%		80-120	29-AUG-17
Tungsten (W)			99.8		%		80-120	29-AUG-17
Uranium (U)			100.4		%		80-120	29-AUG-17
Vanadium (V)			101.9		%		80-120	29-AUG-17
Zinc (Zn)			97.6		%		80-120	29-AUG-17
Zirconium (Zr)			96.2		%		70-130	29-AUG-17
WG2601853-1	MB							
Aluminum (Al)			<50		mg/kg		50	29-AUG-17
Antimony (Sb)			<0.10		mg/kg		0.1	29-AUG-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-VA		Soil						
Batch	R3812326							
WG2601895-2	LCS							
Moisture			100.2		%		90-110	26-AUG-17
WG2601895-6	LCS							
Moisture			99.97		%		90-110	26-AUG-17
WG2601895-1	MB							
Moisture			<0.25		%		0.25	26-AUG-17
WG2601895-5	MB							
Moisture			<0.25		%		0.25	26-AUG-17
PH-1:2-VA		Soil						
Batch	R3814932							
WG2601853-2	DUP	L1979029-1						
pH (1:2 soil:water)		8.31	8.36	J	pH	0.05	0.2	30-AUG-17
WG2601853-5	IRM	VA-ALP-SRS1507						
pH (1:2 soil:water)			6.41		pH		6.2-6.8	30-AUG-17
S-TOT-LECO-SK		Soil						
Batch	R3814347							
WG2600661-3	IRM	1646A_SOIL						
Sulfur (S)-Total			3600		mg/kg		2500-4600	29-AUG-17
WG2600661-4	MB							
Sulfur (S)-Total			<500		mg/kg		500	29-AUG-17
SO4-LEACH-IC-VA		Soil						
Batch	R3814981							
WG2602457-2	LCS							
Sulfate (SO4)			104.3		%		70-130	28-AUG-17
WG2602457-1	MB							
Sulfate (SO4)			<10		mg/kg		10	28-AUG-17

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

6.6, 3.3, 13.1, 7.4



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 19-SEP-17
Report Date: 29-SEP-17 18:12 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1993856
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1993856-1 TL7-18SEP17A								
Sampled By: KC on 19-SEP-17 @ 04:45								
Matrix: SOIL								
Metals in Soil (CCME) with Extra Metals								
Mercury in Soil by CVAFS								
Mercury (Hg)		0.0305		0.0050	mg/kg	22-SEP-17	26-SEP-17	R3838189
Metals in Soil by CRC ICPMS								
Aluminum (Al)		13700		50	mg/kg	22-SEP-17	25-SEP-17	R3838317
Antimony (Sb)		1.28		0.10	mg/kg	22-SEP-17	25-SEP-17	R3838317
Arsenic (As)		386		0.10	mg/kg	22-SEP-17	25-SEP-17	R3838317
Barium (Ba)		16.2		0.50	mg/kg	22-SEP-17	25-SEP-17	R3838317
Beryllium (Be)		0.15		0.10	mg/kg	22-SEP-17	25-SEP-17	R3838317
Bismuth (Bi)		1.70		0.20	mg/kg	22-SEP-17	25-SEP-17	R3838317
Boron (B)		9.0		5.0	mg/kg	22-SEP-17	25-SEP-17	R3838317
Cadmium (Cd)		4.42		0.020	mg/kg	22-SEP-17	25-SEP-17	R3838317
Calcium (Ca)		35800		50	mg/kg	22-SEP-17	25-SEP-17	R3838317
Chromium (Cr)		59.7		0.50	mg/kg	22-SEP-17	25-SEP-17	R3838317
Cobalt (Co)		196		0.10	mg/kg	22-SEP-17	25-SEP-17	R3838317
Copper (Cu)		9010		0.50	mg/kg	22-SEP-17	25-SEP-17	R3838317
Iron (Fe)		142000		50	mg/kg	22-SEP-17	25-SEP-17	R3838317
Lead (Pb)		312		0.50	mg/kg	22-SEP-17	25-SEP-17	R3838317
Lithium (Li)		20.3		2.0	mg/kg	22-SEP-17	25-SEP-17	R3838317
Magnesium (Mg)		16500		20	mg/kg	22-SEP-17	25-SEP-17	R3838317
Manganese (Mn)		1220		1.0	mg/kg	22-SEP-17	25-SEP-17	R3838317
Molybdenum (Mo)		1.85		0.10	mg/kg	22-SEP-17	25-SEP-17	R3838317
Nickel (Ni)		131		0.50	mg/kg	22-SEP-17	25-SEP-17	R3838317
Phosphorus (P)		421		50	mg/kg	22-SEP-17	25-SEP-17	R3838317
Potassium (K)		950		100	mg/kg	22-SEP-17	25-SEP-17	R3838317
Selenium (Se)		8.12		0.20	mg/kg	22-SEP-17	25-SEP-17	R3838317
Silver (Ag)		20.6		0.10	mg/kg	22-SEP-17	25-SEP-17	R3838317
Sodium (Na)		3100		50	mg/kg	22-SEP-17	25-SEP-17	R3838317
Strontium (Sr)		19.7		0.50	mg/kg	22-SEP-17	25-SEP-17	R3838317
Sulfur (S)		95500		1000	mg/kg	22-SEP-17	25-SEP-17	R3838317
Thallium (Tl)		0.946		0.050	mg/kg	22-SEP-17	25-SEP-17	R3838317
Tin (Sn)		<2.0		2.0	mg/kg	22-SEP-17	25-SEP-17	R3838317
Titanium (Ti)		583		1.0	mg/kg	22-SEP-17	25-SEP-17	R3838317
Tungsten (W)		1.41		0.50	mg/kg	22-SEP-17	25-SEP-17	R3838317
Uranium (U)		0.123		0.050	mg/kg	22-SEP-17	25-SEP-17	R3838317
Vanadium (V)		66.3		0.20	mg/kg	22-SEP-17	25-SEP-17	R3838317
Zinc (Zn)		1880		2.0	mg/kg	22-SEP-17	25-SEP-17	R3838317
Zirconium (Zr)		4.7		1.0	mg/kg	22-SEP-17	25-SEP-17	R3838317
pH in Soil (1:2 Soil:Water Extraction)								
pH (1:2 soil:water)		9.36		0.10	pH		26-SEP-17	R3838398
Miscellaneous Parameters								
Cyanide, Free		<20		20	mg/kg	25-SEP-17	28-SEP-17	R3841461
Inorganic Carbon (as CaCO3 Equivalent)		8.24		0.40	%		28-SEP-17	
Moisture		24.1		0.25	%		22-SEP-17	R3836502
Sulfate (SO4)		3590		50	mg/kg	25-SEP-17	26-SEP-17	R3839541
Cyanide, Total		6230		20	mg/kg	25-SEP-17	28-SEP-17	R3841461
Inorganic Carbon		0.989		0.050	%		28-SEP-17	R3840391
Sulfur (S)-Total		78600		500	mg/kg	28-SEP-17	28-SEP-17	R3841413
Cyanide, Weak Acid Diss		<20		20	mg/kg	25-SEP-17	28-SEP-17	R3841461
L1993856-2 TL7-18SEP17B								
Sampled By: KC on 19-SEP-17 @ 04:45								
Matrix: SOIL								

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1993856-2	TL7-18SEP17B							
Sampled By:	KC on 19-SEP-17 @ 04:45							
Matrix:	SOIL							
Metals in Soil (CCME) with Extra Metals								
Mercury in Soil by CVAFS								
Mercury (Hg)		0.0311		0.0050	mg/kg	22-SEP-17	26-SEP-17	R3838189
Metals in Soil by CRC ICPMS								
Aluminum (Al)		12600		50	mg/kg	22-SEP-17	27-SEP-17	R3840491
Antimony (Sb)		1.20		0.10	mg/kg	22-SEP-17	27-SEP-17	R3840491
Arsenic (As)		354		0.10	mg/kg	22-SEP-17	27-SEP-17	R3840491
Barium (Ba)		15.1		0.50	mg/kg	22-SEP-17	27-SEP-17	R3840491
Beryllium (Be)		0.15		0.10	mg/kg	22-SEP-17	27-SEP-17	R3840491
Bismuth (Bi)		1.66		0.20	mg/kg	22-SEP-17	27-SEP-17	R3840491
Boron (B)		9.0		5.0	mg/kg	22-SEP-17	27-SEP-17	R3840491
Cadmium (Cd)		4.10		0.020	mg/kg	22-SEP-17	27-SEP-17	R3840491
Calcium (Ca)		36500		50	mg/kg	22-SEP-17	27-SEP-17	R3840491
Chromium (Cr)		53.8		0.50	mg/kg	22-SEP-17	27-SEP-17	R3840491
Cobalt (Co)		189		0.10	mg/kg	22-SEP-17	27-SEP-17	R3840491
Copper (Cu)		7840		0.50	mg/kg	22-SEP-17	27-SEP-17	R3840491
Iron (Fe)		124000		50	mg/kg	22-SEP-17	27-SEP-17	R3840491
Lead (Pb)		330		0.50	mg/kg	22-SEP-17	27-SEP-17	R3840491
Lithium (Li)		23.9		2.0	mg/kg	22-SEP-17	27-SEP-17	R3840491
Magnesium (Mg)		14500		20	mg/kg	22-SEP-17	27-SEP-17	R3840491
Manganese (Mn)		1100		1.0	mg/kg	22-SEP-17	27-SEP-17	R3840491
Molybdenum (Mo)		2.03		0.10	mg/kg	22-SEP-17	27-SEP-17	R3840491
Nickel (Ni)		124		0.50	mg/kg	22-SEP-17	27-SEP-17	R3840491
Phosphorus (P)		381		50	mg/kg	22-SEP-17	27-SEP-17	R3840491
Potassium (K)		840		100	mg/kg	22-SEP-17	27-SEP-17	R3840491
Selenium (Se)		7.81		0.20	mg/kg	22-SEP-17	27-SEP-17	R3840491
Silver (Ag)		20.7		0.10	mg/kg	22-SEP-17	27-SEP-17	R3840491
Sodium (Na)		3290		50	mg/kg	22-SEP-17	27-SEP-17	R3840491
Strontium (Sr)		20.1		0.50	mg/kg	22-SEP-17	27-SEP-17	R3840491
Sulfur (S)		97600		1000	mg/kg	22-SEP-17	27-SEP-17	R3840491
Thallium (Tl)		0.889		0.050	mg/kg	22-SEP-17	27-SEP-17	R3840491
Tin (Sn)		<2.0		2.0	mg/kg	22-SEP-17	27-SEP-17	R3840491
Titanium (Ti)		480		1.0	mg/kg	22-SEP-17	27-SEP-17	R3840491
Tungsten (W)		1.47		0.50	mg/kg	22-SEP-17	27-SEP-17	R3840491
Uranium (U)		0.105		0.050	mg/kg	22-SEP-17	27-SEP-17	R3840491
Vanadium (V)		56.7		0.20	mg/kg	22-SEP-17	27-SEP-17	R3840491
Zinc (Zn)		1690		2.0	mg/kg	22-SEP-17	27-SEP-17	R3840491
Zirconium (Zr)		4.5		1.0	mg/kg	22-SEP-17	27-SEP-17	R3840491
pH in Soil (1:2 Soil:Water Extraction)								
pH (1:2 soil:water)		9.33		0.10	pH		26-SEP-17	R3838398
Miscellaneous Parameters								
Cyanide, Free		<20		20	mg/kg	25-SEP-17	28-SEP-17	R3841461
Inorganic Carbon (as CaCO3 Equivalent)		7.69		0.40	%		28-SEP-17	
Moisture		23.6		0.25	%		22-SEP-17	R3836502
Sulfate (SO4)		3130		50	mg/kg	25-SEP-17	26-SEP-17	R3839541
Cyanide, Total		5940		20	mg/kg	25-SEP-17	28-SEP-17	R3841461
Inorganic Carbon		0.924		0.050	%		28-SEP-17	R3840391
Sulfur (S)-Total		88400		500	mg/kg	28-SEP-17	28-SEP-17	R3841413
Cyanide, Weak Acid Diss		<20		20	mg/kg	25-SEP-17	28-SEP-17	R3841461

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
CN-FREE-NAOH-CFA-VA	Soil	Free Cyanide in soil by CFA	BC-MOE/ASTM 7237
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
CN-T-NAOH-CFA-VA	Soil	Total Cyanide in soil by CFA	BC-MOE/ISO 14403:2002
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line UV digestion along with sample distillation and final determination by colourimetric analysis.			
CN-WAD-NAOH-CFA-VA	Soil	Weak Acid Diss. Cyanide in soil by CFA	BC-MOE/APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line sample distillation with final determination by colourimetric analysis.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** 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
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.

< - Less than.
D.L. - The reporting limit.
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.



Quality Control Report

Workorder: L1993856

Report Date: 29-SEP-17

Page 1 of 7

Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK								
Soil								
Batch	R3840391							
WG2625843-1	DUP	L1993856-1						
Inorganic Carbon		0.989	0.976		%	1.3	20	28-SEP-17
WG2625843-2	LCS							
Inorganic Carbon			94.3		%		80-120	28-SEP-17
WG2625843-3	MB							
Inorganic Carbon			<0.050		%		0.05	28-SEP-17
CN-FREE-NAOH-CFA-VA								
Soil								
Batch	R3841461							
WG2624691-3	DUP	L1993856-1						
Cyanide, Free		<20	<20	RPD-NA	mg/kg	N/A	35	28-SEP-17
WG2624691-2	LCS							
Cyanide, Free			83.3		%		80-120	28-SEP-17
WG2624691-1	MB							
Cyanide, Free			<0.050		mg/kg		0.05	28-SEP-17
CN-T-NAOH-CFA-VA								
Soil								
Batch	R3841461							
WG2624691-2	LCS							
Cyanide, Total			81.1		%		80-120	28-SEP-17
WG2624691-1	MB							
Cyanide, Total			<0.050		mg/kg		0.05	28-SEP-17
CN-WAD-NAOH-CFA-VA								
Soil								
Batch	R3841461							
WG2624691-3	DUP	L1993856-1						
Cyanide, Weak Acid Diss		<20	<20	RPD-NA	mg/kg	N/A	35	28-SEP-17
WG2624691-2	LCS							
Cyanide, Weak Acid Diss			83.9		%		80-120	28-SEP-17
WG2624691-1	MB							
Cyanide, Weak Acid Diss			<0.050		mg/kg		0.05	28-SEP-17
HG-200.2-CVAF-VA								
Soil								
Batch	R3838189							
WG2623256-4	CRM	VA-CANMET-TILL1						
Mercury (Hg)			94.4		%		70-130	26-SEP-17
WG2623256-2	DUP	L1993856-1						
Mercury (Hg)		0.0305	0.0313		mg/kg	2.4	40	26-SEP-17
WG2623256-3	LCS							
Mercury (Hg)			99.3		%		70-130	26-SEP-17
WG2623256-1	MB							

Quality Control Report

Workorder: L1993856

Report Date: 29-SEP-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAF-VA	Soil							
Batch	R3838189							
WG2623256-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	26-SEP-17
MET-200.2-CCMS-VA	Soil							
Batch	R3838317							
WG2623256-4	CRM	VA-CANMET-TILL1						
Aluminum (Al)			106.5		%		70-130	25-SEP-17
Antimony (Sb)			101.3		%		70-130	25-SEP-17
Arsenic (As)			102.0		%		70-130	25-SEP-17
Barium (Ba)			100.3		%		70-130	25-SEP-17
Beryllium (Be)			0.53		mg/kg		0.34-0.74	25-SEP-17
Bismuth (Bi)			101.1		%		70-130	25-SEP-17
Boron (B)			3.2		mg/kg		0-8.2	25-SEP-17
Cadmium (Cd)			112.3		%		70-130	25-SEP-17
Calcium (Ca)			106.7		%		70-130	25-SEP-17
Chromium (Cr)			108.4		%		70-130	25-SEP-17
Cobalt (Co)			106.6		%		70-130	25-SEP-17
Copper (Cu)			101.3		%		70-130	25-SEP-17
Iron (Fe)			108.1		%		70-130	25-SEP-17
Lead (Pb)			108.0		%		70-130	25-SEP-17
Lithium (Li)			106.1		%		70-130	25-SEP-17
Magnesium (Mg)			110.0		%		70-130	25-SEP-17
Manganese (Mn)			106.4		%		70-130	25-SEP-17
Molybdenum (Mo)			98.9		%		70-130	25-SEP-17
Nickel (Ni)			103.6		%		70-130	25-SEP-17
Potassium (K)			116.6		%		70-130	25-SEP-17
Selenium (Se)			0.29		mg/kg		0.11-0.51	25-SEP-17
Silver (Ag)			0.22		mg/kg		0.13-0.33	25-SEP-17
Sodium (Na)			119.1		%		70-130	25-SEP-17
Strontium (Sr)			107.0		%		70-130	25-SEP-17
Thallium (Tl)			0.126		mg/kg		0.077-0.18	25-SEP-17
Tin (Sn)			1.1		mg/kg		0-3	25-SEP-17
Titanium (Ti)			117.8		%		70-130	25-SEP-17
Tungsten (W)			0.15		mg/kg		0-0.66	25-SEP-17
Uranium (U)			103.4		%		70-130	25-SEP-17



Quality Control Report

Workorder: L1993856

Report Date: 29-SEP-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3838317							
WG2623256-4	CRM	VA-CANMET-TILL1						
Vanadium (V)			105.6		%		70-130	25-SEP-17
Zinc (Zn)			102.2		%		70-130	25-SEP-17
Zirconium (Zr)			0.9		mg/kg		0-1.8	25-SEP-17
WG2623256-2	DUP	L1993856-1						
Aluminum (Al)		13700	12600		mg/kg	8.5	40	25-SEP-17
Antimony (Sb)		1.28	1.13		mg/kg	13	30	25-SEP-17
Arsenic (As)		386	338		mg/kg	13	30	25-SEP-17
Barium (Ba)		16.2	15.4		mg/kg	4.9	40	25-SEP-17
Beryllium (Be)		0.15	0.14		mg/kg	6.4	30	25-SEP-17
Bismuth (Bi)		1.70	1.71		mg/kg	0.4	30	25-SEP-17
Boron (B)		9.0	8.5		mg/kg	5.5	30	25-SEP-17
Cadmium (Cd)		4.42	4.19		mg/kg	5.4	30	25-SEP-17
Calcium (Ca)		35800	35200		mg/kg	1.7	30	25-SEP-17
Chromium (Cr)		59.7	55.3		mg/kg	7.7	30	25-SEP-17
Cobalt (Co)		196	179		mg/kg	9.0	30	25-SEP-17
Copper (Cu)		9010	8690		mg/kg	3.6	30	25-SEP-17
Iron (Fe)		142000	125000		mg/kg	12	30	25-SEP-17
Lead (Pb)		312	305		mg/kg	2.5	40	25-SEP-17
Lithium (Li)		20.3	19.9		mg/kg	1.7	30	25-SEP-17
Magnesium (Mg)		16500	15000		mg/kg	9.5	30	25-SEP-17
Manganese (Mn)		1220	1110		mg/kg	9.0	30	25-SEP-17
Molybdenum (Mo)		1.85	1.90		mg/kg	2.9	40	25-SEP-17
Nickel (Ni)		131	116		mg/kg	12	30	25-SEP-17
Phosphorus (P)		421	380		mg/kg	10	30	25-SEP-17
Potassium (K)		950	860		mg/kg	11	40	25-SEP-17
Selenium (Se)		8.12	7.41		mg/kg	9.2	30	25-SEP-17
Silver (Ag)		20.6	20.3		mg/kg	1.2	40	25-SEP-17
Sodium (Na)		3100	2800		mg/kg	10	40	25-SEP-17
Strontium (Sr)		19.7	19.6		mg/kg	0.7	40	25-SEP-17
Sulfur (S)		95500	84300		mg/kg	12	30	25-SEP-17
Thallium (Tl)		0.946	0.893		mg/kg	5.7	30	25-SEP-17
Tin (Sn)		<2.0	<2.0	RPD-NA	mg/kg	N/A	40	25-SEP-17
Titanium (Ti)		583	480		mg/kg	19	40	25-SEP-17
Tungsten (W)		1.41	1.50		mg/kg	6.1	30	25-SEP-17



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Report Date: 29-SEP-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3838317							
WG2623256-2	DUP	L1993856-1						
Uranium (U)		0.123	0.140		mg/kg	13	30	25-SEP-17
Vanadium (V)		66.3	56.9		mg/kg	15	30	25-SEP-17
Zinc (Zn)		1880	1760		mg/kg	6.6	30	25-SEP-17
Zirconium (Zr)		4.7	4.7		mg/kg	0.0	30	25-SEP-17
WG2623256-3	LCS							
Aluminum (Al)			101.7		%		80-120	25-SEP-17
Antimony (Sb)			104.1		%		80-120	25-SEP-17
Arsenic (As)			100.6		%		80-120	25-SEP-17
Barium (Ba)			100.4		%		80-120	25-SEP-17
Beryllium (Be)			98.1		%		80-120	25-SEP-17
Bismuth (Bi)			100.5		%		80-120	25-SEP-17
Boron (B)			92.2		%		80-120	25-SEP-17
Cadmium (Cd)			103.9		%		80-120	25-SEP-17
Calcium (Ca)			98.1		%		80-120	25-SEP-17
Chromium (Cr)			101.1		%		80-120	25-SEP-17
Cobalt (Co)			99.8		%		80-120	25-SEP-17
Copper (Cu)			97.4		%		80-120	25-SEP-17
Iron (Fe)			99.9		%		80-120	25-SEP-17
Lead (Pb)			100.5		%		80-120	25-SEP-17
Lithium (Li)			95.7		%		80-120	25-SEP-17
Magnesium (Mg)			103.6		%		80-120	25-SEP-17
Manganese (Mn)			101.4		%		80-120	25-SEP-17
Molybdenum (Mo)			98.4		%		80-120	25-SEP-17
Nickel (Ni)			98.1		%		80-120	25-SEP-17
Phosphorus (P)			100.2		%		80-120	25-SEP-17
Potassium (K)			100.4		%		80-120	25-SEP-17
Selenium (Se)			94.4		%		80-120	25-SEP-17
Silver (Ag)			97.0		%		80-120	25-SEP-17
Sodium (Na)			103.8		%		80-120	25-SEP-17
Strontium (Sr)			98.2		%		80-120	25-SEP-17
Sulfur (S)			98.0		%		80-120	25-SEP-17
Thallium (Tl)			99.96		%		80-120	25-SEP-17
Tin (Sn)			101.5		%		80-120	25-SEP-17
Titanium (Ti)			97.4		%		80-120	25-SEP-17



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Workorder: L1993856

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3838317							
WG2623256-3	LCS							
Tungsten (W)			98.8		%		80-120	25-SEP-17
Uranium (U)			99.8		%		80-120	25-SEP-17
Vanadium (V)			101.6		%		80-120	25-SEP-17
Zinc (Zn)			94.7		%		80-120	25-SEP-17
Zirconium (Zr)			98.0		%		70-130	25-SEP-17
WG2623256-1	MB							
Aluminum (Al)			<50		mg/kg		50	25-SEP-17
Antimony (Sb)			<0.10		mg/kg		0.1	25-SEP-17
Arsenic (As)			<0.10		mg/kg		0.1	25-SEP-17
Barium (Ba)			<0.50		mg/kg		0.5	25-SEP-17
Beryllium (Be)			<0.10		mg/kg		0.1	25-SEP-17
Bismuth (Bi)			<0.20		mg/kg		0.2	25-SEP-17
Boron (B)			<5.0		mg/kg		5	25-SEP-17
Cadmium (Cd)			<0.020		mg/kg		0.02	25-SEP-17
Calcium (Ca)			<50		mg/kg		50	25-SEP-17
Chromium (Cr)			<0.50		mg/kg		0.5	25-SEP-17
Cobalt (Co)			<0.10		mg/kg		0.1	25-SEP-17
Copper (Cu)			<0.50		mg/kg		0.5	25-SEP-17
Iron (Fe)			<50		mg/kg		50	25-SEP-17
Lead (Pb)			<0.50		mg/kg		0.5	25-SEP-17
Lithium (Li)			<2.0		mg/kg		2	25-SEP-17
Magnesium (Mg)			<20		mg/kg		20	25-SEP-17
Manganese (Mn)			<1.0		mg/kg		1	25-SEP-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	25-SEP-17
Nickel (Ni)			<0.50		mg/kg		0.5	25-SEP-17
Phosphorus (P)			<50		mg/kg		50	25-SEP-17
Potassium (K)			<100		mg/kg		100	25-SEP-17
Selenium (Se)			<0.20		mg/kg		0.2	25-SEP-17
Silver (Ag)			<0.10		mg/kg		0.1	25-SEP-17
Sodium (Na)			<50		mg/kg		50	25-SEP-17
Strontium (Sr)			<0.50		mg/kg		0.5	25-SEP-17
Sulfur (S)			<1000		mg/kg		1000	25-SEP-17
Thallium (Tl)			<0.050		mg/kg		0.05	25-SEP-17
Tin (Sn)			<2.0		mg/kg		2	25-SEP-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch R3838317								
WG2623256-1	MB							
Titanium (Ti)			<1.0		mg/kg		1	25-SEP-17
Tungsten (W)			<0.50		mg/kg		0.5	25-SEP-17
Uranium (U)			<0.050		mg/kg		0.05	25-SEP-17
Vanadium (V)			<0.20		mg/kg		0.2	25-SEP-17
Zinc (Zn)			<2.0		mg/kg		2	25-SEP-17
Zirconium (Zr)			<1.0		mg/kg		1	25-SEP-17
MOISTURE-VA		Soil						
Batch R3836502								
WG2623247-9	DUP	L1993856-2						
Moisture		23.6	23.3		%	1.3	20	22-SEP-17
WG2623247-8	LCS							
Moisture			100.4		%		90-110	22-SEP-17
WG2623247-7	MB							
Moisture			<0.25		%		0.25	22-SEP-17
PH-1:2-VA		Soil						
Batch R3838398								
WG2623256-2	DUP	L1993856-1						
pH (1:2 soil:water)		9.36	9.39	J	pH	0.03	0.2	26-SEP-17
WG2623256-5	IRM	VA-ALP-SRS1507						
pH (1:2 soil:water)			6.37		pH		6.2-6.8	26-SEP-17
S-TOT-LECO-SK		Soil						
Batch R3841413								
WG2619877-3	IRM	1646A_SOIL						
Sulfur (S)-Total			3300		mg/kg		2500-4600	28-SEP-17
WG2619877-4	MB							
Sulfur (S)-Total			<500		mg/kg		500	28-SEP-17
SO4-LEACH-IC-VA		Soil						
Batch R3839541								
WG2624010-3	DUP	L1993856-2						
Sulfate (SO4)		3130	3640		mg/kg	15	20	26-SEP-17
WG2624010-2	LCS							
Sulfate (SO4)			100.4		%		70-130	26-SEP-17
WG2624010-1	MB							
Sulfate (SO4)			<10		mg/kg		10	26-SEP-17

Quality Control Report

Workorder: L1993856

Report Date: 29-SEP-17

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

GENF 18.01 Front

8,8,6°C



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 17-OCT-17
Report Date: 30-OCT-17 13:17 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L2008550
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

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ALS CANADA LTD Part of the ALS Group An ALS Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2008550-1	TL7-16OCT17							
Sampled By:	KC on 16-OCT-17 @ 17:30							
Matrix:	SOIL							
Metals in Soil (CCME) with Extra Metals								
Mercury in Soil by CVAFS								
Mercury (Hg)		0.0684		0.0050	mg/kg	22-OCT-17	25-OCT-17	R3865872
Metals in Soil by CRC ICPMS								
Aluminum (Al)		11800		50	mg/kg	22-OCT-17	24-OCT-17	R3865968
Antimony (Sb)		1.81		0.10	mg/kg	22-OCT-17	24-OCT-17	R3865968
Arsenic (As)		386		0.10	mg/kg	22-OCT-17	24-OCT-17	R3865968
Barium (Ba)		18.0		0.50	mg/kg	22-OCT-17	24-OCT-17	R3865968
Beryllium (Be)		0.15		0.10	mg/kg	22-OCT-17	24-OCT-17	R3865968
Bismuth (Bi)		2.19		0.20	mg/kg	22-OCT-17	24-OCT-17	R3865968
Boron (B)		11.7		5.0	mg/kg	22-OCT-17	24-OCT-17	R3865968
Cadmium (Cd)		11.6		0.020	mg/kg	22-OCT-17	24-OCT-17	R3865968
Calcium (Ca)		29000		50	mg/kg	22-OCT-17	24-OCT-17	R3865968
Chromium (Cr)		65.5		0.50	mg/kg	22-OCT-17	24-OCT-17	R3865968
Cobalt (Co)		275		0.10	mg/kg	22-OCT-17	24-OCT-17	R3865968
Copper (Cu)		11900		0.50	mg/kg	22-OCT-17	24-OCT-17	R3865968
Iron (Fe)		129000		50	mg/kg	22-OCT-17	24-OCT-17	R3865968
Lead (Pb)		550		0.50	mg/kg	22-OCT-17	24-OCT-17	R3865968
Lithium (Li)		27.1		2.0	mg/kg	22-OCT-17	24-OCT-17	R3865968
Magnesium (Mg)		14000		20	mg/kg	22-OCT-17	24-OCT-17	R3865968
Manganese (Mn)		931		1.0	mg/kg	22-OCT-17	24-OCT-17	R3865968
Molybdenum (Mo)		1.85		0.10	mg/kg	22-OCT-17	24-OCT-17	R3865968
Nickel (Ni)		223		0.50	mg/kg	22-OCT-17	24-OCT-17	R3865968
Phosphorus (P)		295		50	mg/kg	22-OCT-17	24-OCT-17	R3865968
Potassium (K)		1160		100	mg/kg	22-OCT-17	24-OCT-17	R3865968
Selenium (Se)		8.23		0.20	mg/kg	22-OCT-17	24-OCT-17	R3865968
Silver (Ag)		15.4		0.10	mg/kg	22-OCT-17	24-OCT-17	R3865968
Sodium (Na)		3080		50	mg/kg	22-OCT-17	24-OCT-17	R3865968
Strontium (Sr)		16.2		0.50	mg/kg	22-OCT-17	24-OCT-17	R3865968
Sulfur (S)		99500		1000	mg/kg	22-OCT-17	24-OCT-17	R3865968
Thallium (Tl)		1.81		0.050	mg/kg	22-OCT-17	24-OCT-17	R3865968
Tin (Sn)		<2.0		2.0	mg/kg	22-OCT-17	24-OCT-17	R3865968
Titanium (Ti)		634		1.0	mg/kg	22-OCT-17	24-OCT-17	R3865968
Tungsten (W)		3.16		0.50	mg/kg	22-OCT-17	24-OCT-17	R3865968
Uranium (U)		0.050		0.050	mg/kg	22-OCT-17	24-OCT-17	R3865968
Vanadium (V)		63.0		0.20	mg/kg	22-OCT-17	24-OCT-17	R3865968
Zinc (Zn)		4220		2.0	mg/kg	22-OCT-17	24-OCT-17	R3865968
Zirconium (Zr)		3.1		1.0	mg/kg	22-OCT-17	24-OCT-17	R3865968
pH in Soil (1:2 Soil:Water Extraction)								
pH (1:2 soil:water)		8.70		0.10	pH		24-OCT-17	R3864651
Miscellaneous Parameters								
Cyanide, Free		<20	DLHC	20	mg/kg	25-OCT-17	27-OCT-17	R3868393
Inorganic Carbon (as CaCO3 Equivalent)		6.90		0.40	%		26-OCT-17	
Moisture		23.9		0.25	%		22-OCT-17	R3863332
Sulfate (SO4)		4260		50	mg/kg	24-OCT-17	26-OCT-17	R3868003
Cyanide, Total		2240		20	mg/kg	25-OCT-17	27-OCT-17	R3868393
Inorganic Carbon		0.828		0.050	%		26-OCT-17	R3866831
Sulfur (S)-Total		81800		500	mg/kg	25-OCT-17	25-OCT-17	R3866568
Cyanide, Weak Acid Diss		<20	DLHC	20	mg/kg	25-OCT-17	27-OCT-17	R3868393

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
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**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
CN-FREE-NAOH-CFA-VA	Soil	Free Cyanide in soil by CFA	BC-MOE/ASTM 7237
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
CN-T-NAOH-CFA-VA	Soil	Total Cyanide in soil by CFA	BC-MOE/ISO 14403:2002
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line UV digestion along with sample distillation and final determination by colourimetric analysis.			
CN-WAD-NAOH-CFA-VA	Soil	Weak Acid Diss. Cyanide in soil by CFA	BC-MOE/APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line sample distillation with final determination by colourimetric analysis.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** 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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
Laboratory Definition Code	Laboratory Location		
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA		
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA		

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg ww - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.



Quality Control Report

Workorder: L2008550

Report Date: 30-OCT-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAF-VA		Soil						
Batch	R3865872							
WG2645776-4	CRM	VA-CANMET-TILL1						
Mercury (Hg)			94.5		%		70-130	25-OCT-17
WG2645776-3	LCS							
Mercury (Hg)			97.6		%		70-130	25-OCT-17
WG2645776-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	25-OCT-17
MET-200.2-CCMS-VA		Soil						
Batch	R3865968							
WG2645776-4	CRM	VA-CANMET-TILL1						
Aluminum (Al)			104.4		%		70-130	24-OCT-17
Antimony (Sb)			101.7		%		70-130	24-OCT-17
Arsenic (As)			103.5		%		70-130	24-OCT-17
Barium (Ba)			96.9		%		70-130	24-OCT-17
Beryllium (Be)			0.53		mg/kg		0.34-0.74	24-OCT-17
Bismuth (Bi)			101.2		%		70-130	24-OCT-17
Boron (B)			3.4		mg/kg		0-8.2	24-OCT-17
Cadmium (Cd)			101.6		%		70-130	24-OCT-17
Calcium (Ca)			107.1		%		70-130	24-OCT-17
Chromium (Cr)			107.1		%		70-130	24-OCT-17
Cobalt (Co)			105.3		%		70-130	24-OCT-17
Copper (Cu)			102.4		%		70-130	24-OCT-17
Iron (Fe)			106.6		%		70-130	24-OCT-17
Lead (Pb)			100.1		%		70-130	24-OCT-17
Lithium (Li)			111.6		%		70-130	24-OCT-17
Magnesium (Mg)			106.4		%		70-130	24-OCT-17
Manganese (Mn)			102.8		%		70-130	24-OCT-17
Molybdenum (Mo)			99.9		%		70-130	24-OCT-17
Nickel (Ni)			105.3		%		70-130	24-OCT-17
Potassium (K)			111.8		%		70-130	24-OCT-17
Selenium (Se)			0.31		mg/kg		0.11-0.51	24-OCT-17
Silver (Ag)			0.23		mg/kg		0.13-0.33	24-OCT-17
Sodium (Na)			109.6		%		70-130	24-OCT-17
Strontium (Sr)			104.9		%		70-130	24-OCT-17
Thallium (Tl)			0.107		mg/kg		0.077-0.18	24-OCT-17
Tin (Sn)			1.0		mg/kg		0-3	24-OCT-17
Titanium (Ti)			117.1		%		70-130	24-OCT-17



Quality Control Report

Workorder: L2008550

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3865968							
WG2645776-4	CRM	VA-CANMET-TILL1						
Tungsten (W)			0.18		mg/kg		0-0.66	24-OCT-17
Uranium (U)			103.6		%		70-130	24-OCT-17
Vanadium (V)			106.7		%		70-130	24-OCT-17
Zinc (Zn)			103.2		%		70-130	24-OCT-17
Zirconium (Zr)			0.7		mg/kg		0-1.8	24-OCT-17
WG2645776-3	LCS							
Aluminum (Al)			99.7		%		80-120	24-OCT-17
Antimony (Sb)			105.4		%		80-120	24-OCT-17
Arsenic (As)			103.5		%		80-120	24-OCT-17
Barium (Ba)			99.3		%		80-120	24-OCT-17
Beryllium (Be)			99.0		%		80-120	24-OCT-17
Bismuth (Bi)			96.8		%		80-120	24-OCT-17
Boron (B)			101.3		%		80-120	24-OCT-17
Cadmium (Cd)			95.9		%		80-120	24-OCT-17
Calcium (Ca)			96.9		%		80-120	24-OCT-17
Chromium (Cr)			99.1		%		80-120	24-OCT-17
Cobalt (Co)			98.3		%		80-120	24-OCT-17
Copper (Cu)			97.0		%		80-120	24-OCT-17
Iron (Fe)			98.6		%		80-120	24-OCT-17
Lead (Pb)			97.1		%		80-120	24-OCT-17
Lithium (Li)			98.0		%		80-120	24-OCT-17
Magnesium (Mg)			99.9		%		80-120	24-OCT-17
Manganese (Mn)			98.7		%		80-120	24-OCT-17
Molybdenum (Mo)			100.3		%		80-120	24-OCT-17
Nickel (Ni)			98.5		%		80-120	24-OCT-17
Phosphorus (P)			109.7		%		80-120	24-OCT-17
Potassium (K)			101.3		%		80-120	24-OCT-17
Selenium (Se)			98.3		%		80-120	24-OCT-17
Silver (Ag)			95.7		%		80-120	24-OCT-17
Sodium (Na)			100.7		%		80-120	24-OCT-17
Strontium (Sr)			95.9		%		80-120	24-OCT-17
Sulfur (S)			99.99		%		80-120	24-OCT-17
Thallium (Tl)			95.2		%		80-120	24-OCT-17
Tin (Sn)			102.0		%		80-120	24-OCT-17



Quality Control Report

Workorder: L2008550

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3865968							
WG2645776-3	LCS							
Titanium (Ti)			100.8		%		80-120	24-OCT-17
Tungsten (W)			100.9		%		80-120	24-OCT-17
Uranium (U)			98.2		%		80-120	24-OCT-17
Vanadium (V)			101.7		%		80-120	24-OCT-17
Zinc (Zn)			96.1		%		80-120	24-OCT-17
Zirconium (Zr)			100.2		%		70-130	24-OCT-17
WG2645776-1	MB							
Aluminum (Al)			<50		mg/kg		50	24-OCT-17
Antimony (Sb)			<0.10		mg/kg		0.1	24-OCT-17
Arsenic (As)			<0.10		mg/kg		0.1	24-OCT-17
Barium (Ba)			<0.50		mg/kg		0.5	24-OCT-17
Beryllium (Be)			<0.10		mg/kg		0.1	24-OCT-17
Bismuth (Bi)			<0.20		mg/kg		0.2	24-OCT-17
Boron (B)			<5.0		mg/kg		5	24-OCT-17
Cadmium (Cd)			<0.020		mg/kg		0.02	24-OCT-17
Calcium (Ca)			<50		mg/kg		50	24-OCT-17
Chromium (Cr)			<0.50		mg/kg		0.5	24-OCT-17
Cobalt (Co)			<0.10		mg/kg		0.1	24-OCT-17
Copper (Cu)			<0.50		mg/kg		0.5	24-OCT-17
Iron (Fe)			<50		mg/kg		50	24-OCT-17
Lead (Pb)			<0.50		mg/kg		0.5	24-OCT-17
Lithium (Li)			<2.0		mg/kg		2	24-OCT-17
Magnesium (Mg)			<20		mg/kg		20	24-OCT-17
Manganese (Mn)			<1.0		mg/kg		1	24-OCT-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	24-OCT-17
Nickel (Ni)			<0.50		mg/kg		0.5	24-OCT-17
Phosphorus (P)			<50		mg/kg		50	24-OCT-17
Potassium (K)			<100		mg/kg		100	24-OCT-17
Selenium (Se)			<0.20		mg/kg		0.2	24-OCT-17
Silver (Ag)			<0.10		mg/kg		0.1	24-OCT-17
Sodium (Na)			<50		mg/kg		50	24-OCT-17
Strontium (Sr)			<0.50		mg/kg		0.5	24-OCT-17
Sulfur (S)			<1000		mg/kg		1000	24-OCT-17
Thallium (Tl)			<0.050		mg/kg		0.05	24-OCT-17



Quality Control Report

Workorder: L2008550

Report Date: 30-OCT-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	Soil							
Batch	R3865968							
WG2645776-1 MB								
Tin (Sn)			<2.0		mg/kg		2	24-OCT-17
Titanium (Ti)			<1.0		mg/kg		1	24-OCT-17
Tungsten (W)			<0.50		mg/kg		0.5	24-OCT-17
Uranium (U)			<0.050		mg/kg		0.05	24-OCT-17
Vanadium (V)			<0.20		mg/kg		0.2	24-OCT-17
Zinc (Zn)			<2.0		mg/kg		2	24-OCT-17
Zirconium (Zr)			<1.0		mg/kg		1	24-OCT-17
MOISTURE-VA	Soil							
Batch	R3863332							
WG2645782-2 LCS								
Moisture			99.7		%		90-110	22-OCT-17
WG2645782-1 MB								
Moisture			<0.25		%		0.25	22-OCT-17
PH-1:2-VA	Soil							
Batch	R3864651							
WG2645776-5 IRM		VA-ALP-SRS1507						
pH (1:2 soil:water)			6.48		pH		6.2-6.8	24-OCT-17
S-TOT-LECO-SK	Soil							
Batch	R3866568							
WG2647070-3 IRM		1646A_SOIL						
Sulfur (S)-Total			3200		mg/kg		2500-4600	25-OCT-17
WG2647070-4 MB								
Sulfur (S)-Total			<500		mg/kg		500	25-OCT-17
SO4-LEACH-IC-VA	Soil							
Batch	R3868003							
WG2646881-3 DUP		L2008550-1						
Sulfate (SO4)		4260	4410		mg/kg	3.5	20	26-OCT-17
WG2646881-2 LCS								
Sulfate (SO4)			102.9		%		70-130	26-OCT-17
WG2646881-1 MB								
Sulfate (SO4)			<10		mg/kg		10	26-OCT-17

Quality Control Report

Workorder: L2008550

Report Date: 30-OCT-17

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

GENE 18.01 Front



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 14-NOV-17
Report Date: 24-NOV-17 11:12 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L2022531
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2022531-1 TL7-13NOV17								
Sampled By: JI on 13-NOV-17 @ 13:10								
Matrix: soil								
Metals in Soil (CCME) with Extra Metals								
Mercury in Soil by CVAFS								
Mercury (Hg)	0.0762			0.0050	mg/kg	19-NOV-17	21-NOV-17	R3891811
Metals in Soil by CRC ICPMS								
Aluminum (Al)	11600			50	mg/kg	19-NOV-17	21-NOV-17	R3892594
Antimony (Sb)	1.25			0.10	mg/kg	19-NOV-17	21-NOV-17	R3892594
Arsenic (As)	274			0.10	mg/kg	19-NOV-17	21-NOV-17	R3892594
Barium (Ba)	14.9			0.50	mg/kg	19-NOV-17	21-NOV-17	R3892594
Beryllium (Be)	0.13			0.10	mg/kg	19-NOV-17	21-NOV-17	R3892594
Bismuth (Bi)	1.42			0.20	mg/kg	19-NOV-17	21-NOV-17	R3892594
Boron (B)	9.9			5.0	mg/kg	19-NOV-17	21-NOV-17	R3892594
Cadmium (Cd)	7.32			0.020	mg/kg	19-NOV-17	21-NOV-17	R3892594
Calcium (Ca)	32300			50	mg/kg	19-NOV-17	21-NOV-17	R3892594
Chromium (Cr)	47.2			0.50	mg/kg	19-NOV-17	21-NOV-17	R3892594
Cobalt (Co)	163			0.10	mg/kg	19-NOV-17	21-NOV-17	R3892594
Copper (Cu)	4370			0.50	mg/kg	19-NOV-17	21-NOV-17	R3892594
Iron (Fe)	109000			50	mg/kg	19-NOV-17	21-NOV-17	R3892594
Lead (Pb)	290			0.50	mg/kg	19-NOV-17	21-NOV-17	R3892594
Lithium (Li)	23.5			2.0	mg/kg	19-NOV-17	21-NOV-17	R3892594
Magnesium (Mg)	14600			20	mg/kg	19-NOV-17	21-NOV-17	R3892594
Manganese (Mn)	1040			1.0	mg/kg	19-NOV-17	21-NOV-17	R3892594
Molybdenum (Mo)	1.33			0.10	mg/kg	19-NOV-17	21-NOV-17	R3892594
Nickel (Ni)	137			0.50	mg/kg	19-NOV-17	21-NOV-17	R3892594
Phosphorus (P)	314			50	mg/kg	19-NOV-17	21-NOV-17	R3892594
Potassium (K)	1070			100	mg/kg	19-NOV-17	21-NOV-17	R3892594
Selenium (Se)	5.93			0.20	mg/kg	19-NOV-17	21-NOV-17	R3892594
Silver (Ag)	12.1			0.10	mg/kg	19-NOV-17	21-NOV-17	R3892594
Sodium (Na)	2470			50	mg/kg	19-NOV-17	21-NOV-17	R3892594
Strontium (Sr)	17.2			0.50	mg/kg	19-NOV-17	21-NOV-17	R3892594
Sulfur (S)	76600			1000	mg/kg	19-NOV-17	21-NOV-17	R3892594
Thallium (Tl)	1.16			0.050	mg/kg	19-NOV-17	21-NOV-17	R3892594
Tin (Sn)	<2.0			2.0	mg/kg	19-NOV-17	21-NOV-17	R3892594
Titanium (Ti)	540			1.0	mg/kg	19-NOV-17	21-NOV-17	R3892594
Tungsten (W)	1.63			0.50	mg/kg	19-NOV-17	21-NOV-17	R3892594
Uranium (U)	0.073			0.050	mg/kg	19-NOV-17	21-NOV-17	R3892594
Vanadium (V)	58.1			0.20	mg/kg	19-NOV-17	21-NOV-17	R3892594
Zinc (Zn)	2750			2.0	mg/kg	19-NOV-17	21-NOV-17	R3892594
Zirconium (Zr)	2.5			1.0	mg/kg	19-NOV-17	21-NOV-17	R3892594
pH in Soil (1:2 Soil:Water Extraction)								
pH (1:2 soil:water)	9.04			0.10	pH		20-NOV-17	R3890867
Miscellaneous Parameters								
Cyanide, Free	<20			20	mg/kg	19-NOV-17	21-NOV-17	R3892183
Inorganic Carbon (as CaCO3 Equivalent)	6.50			0.40	%		23-NOV-17	
Moisture	21.8			0.25	%		19-NOV-17	R3888628
Sulfate (SO4)	3600			50	mg/kg	21-NOV-17	22-NOV-17	R3893403
Cyanide, Total	3060			20	mg/kg	19-NOV-17	21-NOV-17	R3892183
Inorganic Carbon	0.781			0.050	%		23-NOV-17	R3893314
Sulfur (S)-Total	34500			500	mg/kg	22-NOV-17	22-NOV-17	R3893166
Cyanide, Weak Acid Diss	<20			20	mg/kg	19-NOV-17	21-NOV-17	R3892183

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
CN-FREE-NAOH-CFA-VA	Soil	Free Cyanide in soil by CFA	BC-MOE/ASTM 7237
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
CN-T-NAOH-CFA-VA	Soil	Total Cyanide in soil by CFA	BC-MOE/ISO 14403:2002
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line UV digestion along with sample distillation and final determination by colourimetric analysis.			
CN-WAD-NAOH-CFA-VA	Soil	Weak Acid Diss. Cyanide in soil by CFA	BC-MOE/APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line sample distillation with final determination by colourimetric analysis.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** 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
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg ww - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.

< - Less than.
D.L. - The reporting limit.
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.



Quality Control Report

Workorder: L2022531

Report Date: 24-NOV-17

Page 1 of 6

Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK								
Soil								
Batch R3893314								
WG2668927-2	LCS							
Inorganic Carbon			94.9		%		80-120	23-NOV-17
WG2668927-3	MB							
Inorganic Carbon			<0.050		%		0.05	23-NOV-17
CN-FREE-NAOH-CFA-VA								
Soil								
Batch R3892183								
WG2666964-2	LCS							
Cyanide, Free			91.5		%		80-120	21-NOV-17
WG2666964-1	MB							
Cyanide, Free			<0.050		mg/kg		0.05	21-NOV-17
CN-T-NAOH-CFA-VA								
Soil								
Batch R3892183								
WG2666964-2	LCS							
Cyanide, Total			85.8		%		80-120	21-NOV-17
WG2666964-1	MB							
Cyanide, Total			<0.050		mg/kg		0.05	21-NOV-17
WG2666964-4	MS	L2022531-1						
Cyanide, Total			N/A	MS-B	%		-	21-NOV-17
CN-WAD-NAOH-CFA-VA								
Soil								
Batch R3892183								
WG2666964-2	LCS							
Cyanide, Weak Acid Diss			95.2		%		80-120	21-NOV-17
WG2666964-1	MB							
Cyanide, Weak Acid Diss			<0.050		mg/kg		0.05	21-NOV-17
HG-200.2-CVAF-VA								
Soil								
Batch R3891811								
WG2666980-4	CRM	VA-CANMET-TILL1						
Mercury (Hg)			95.7		%		70-130	21-NOV-17
WG2666980-3	LCS							
Mercury (Hg)			100.0		%		70-130	21-NOV-17
WG2666980-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	21-NOV-17
MET-200.2-CCMS-VA								
Soil								
Batch R3892594								
WG2666980-4	CRM	VA-CANMET-TILL1						
Aluminum (Al)			103.5		%		70-130	21-NOV-17
Antimony (Sb)			110.5		%		70-130	21-NOV-17



Quality Control Report

Workorder: L2022531

Report Date: 24-NOV-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3892594							
WG2666980-4	CRM	VA-CANMET-TILL1						
Arsenic (As)			101.9		%		70-130	21-NOV-17
Barium (Ba)			101.5		%		70-130	21-NOV-17
Beryllium (Be)			0.56		mg/kg		0.34-0.74	21-NOV-17
Bismuth (Bi)			102.3		%		70-130	21-NOV-17
Boron (B)			3.7		mg/kg		0-8.2	21-NOV-17
Cadmium (Cd)			103.3		%		70-130	21-NOV-17
Calcium (Ca)			113.0		%		70-130	21-NOV-17
Chromium (Cr)			105.4		%		70-130	21-NOV-17
Cobalt (Co)			102.7		%		70-130	21-NOV-17
Copper (Cu)			100.7		%		70-130	21-NOV-17
Iron (Fe)			104.1		%		70-130	21-NOV-17
Lead (Pb)			103.2		%		70-130	21-NOV-17
Lithium (Li)			118.5		%		70-130	21-NOV-17
Magnesium (Mg)			103.1		%		70-130	21-NOV-17
Manganese (Mn)			102.2		%		70-130	21-NOV-17
Molybdenum (Mo)			104.7		%		70-130	21-NOV-17
Nickel (Ni)			102.4		%		70-130	21-NOV-17
Potassium (K)			112.0		%		70-130	21-NOV-17
Selenium (Se)			0.33		mg/kg		0.11-0.51	21-NOV-17
Silver (Ag)			0.27		mg/kg		0.13-0.33	21-NOV-17
Sodium (Na)			113.0		%		70-130	21-NOV-17
Strontium (Sr)			109.6		%		70-130	21-NOV-17
Thallium (Tl)			0.137		mg/kg		0.077-0.18	21-NOV-17
Tin (Sn)			1.2		mg/kg		0-3	21-NOV-17
Titanium (Ti)			112.9		%		70-130	21-NOV-17
Tungsten (W)			0.17		mg/kg		0-0.66	21-NOV-17
Uranium (U)			107.8		%		70-130	21-NOV-17
Vanadium (V)			105.3		%		70-130	21-NOV-17
Zinc (Zn)			104.9		%		70-130	21-NOV-17
Zirconium (Zr)			0.8		mg/kg		0-1.8	21-NOV-17
WG2666980-3	LCS							
Aluminum (Al)			95.9		%		80-120	21-NOV-17
Antimony (Sb)			101.0		%		80-120	21-NOV-17
Arsenic (As)			96.0		%		80-120	21-NOV-17



Quality Control Report

Workorder: L2022531

Report Date: 24-NOV-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3892594							
WG2666980-3	LCS							
Barium (Ba)			97.7		%		80-120	21-NOV-17
Beryllium (Be)			96.6		%		80-120	21-NOV-17
Bismuth (Bi)			95.9		%		80-120	21-NOV-17
Boron (B)			98.2		%		80-120	21-NOV-17
Cadmium (Cd)			97.2		%		80-120	21-NOV-17
Calcium (Ca)			99.5		%		80-120	21-NOV-17
Chromium (Cr)			95.0		%		80-120	21-NOV-17
Cobalt (Co)			94.9		%		80-120	21-NOV-17
Copper (Cu)			92.1		%		80-120	21-NOV-17
Iron (Fe)			96.5		%		80-120	21-NOV-17
Lead (Pb)			95.0		%		80-120	21-NOV-17
Lithium (Li)			97.5		%		80-120	21-NOV-17
Magnesium (Mg)			95.5		%		80-120	21-NOV-17
Manganese (Mn)			97.1		%		80-120	21-NOV-17
Molybdenum (Mo)			97.9		%		80-120	21-NOV-17
Nickel (Ni)			95.6		%		80-120	21-NOV-17
Phosphorus (P)			94.5		%		80-120	21-NOV-17
Potassium (K)			96.5		%		80-120	21-NOV-17
Selenium (Se)			96.3		%		80-120	21-NOV-17
Silver (Ag)			96.1		%		80-120	21-NOV-17
Sodium (Na)			96.8		%		80-120	21-NOV-17
Strontium (Sr)			96.4		%		80-120	21-NOV-17
Sulfur (S)			91.3		%		80-120	21-NOV-17
Thallium (Tl)			97.0		%		80-120	21-NOV-17
Tin (Sn)			95.6		%		80-120	21-NOV-17
Titanium (Ti)			88.5		%		80-120	21-NOV-17
Tungsten (W)			100.6		%		80-120	21-NOV-17
Uranium (U)			100.3		%		80-120	21-NOV-17
Vanadium (V)			98.5		%		80-120	21-NOV-17
Zinc (Zn)			92.2		%		80-120	21-NOV-17
Zirconium (Zr)			99.0		%		70-130	21-NOV-17
WG2666980-1	MB							
Aluminum (Al)			<50		mg/kg		50	21-NOV-17
Antimony (Sb)			<0.10		mg/kg		0.1	21-NOV-17



Quality Control Report

Workorder: L2022531

Report Date: 24-NOV-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-VA		Soil						
Batch	R3888628							
WG2666974-2	LCS							
Moisture			99.7		%		90-110	19-NOV-17
WG2666974-6	LCS							
Moisture			99.3		%		90-110	19-NOV-17
WG2666974-1	MB							
Moisture			<0.25		%		0.25	19-NOV-17
WG2666974-5	MB							
Moisture			<0.25		%		0.25	19-NOV-17
PH-1:2-VA		Soil						
Batch	R3890867							
WG2666980-5	IRM	VA-ALP-SRS1507						
pH (1:2 soil:water)			6.39		pH		6.2-6.8	20-NOV-17
S-TOT-LECO-SK		Soil						
Batch	R3893166							
WG2668300-1	DUP	L2022531-1						
Sulfur (S)-Total		34500	32300		mg/kg	6.5	30	22-NOV-17
WG2668300-2	IRM	1646A_SOIL						
Sulfur (S)-Total			3200		mg/kg		2500-4600	22-NOV-17
WG2668300-3	MB							
Sulfur (S)-Total			<500		mg/kg		500	22-NOV-17
SO4-LEACH-IC-VA		Soil						
Batch	R3893403							
WG2668147-2	LCS							
Sulfate (SO4)			101.7		%		70-130	22-NOV-17
WG2668147-1	MB							
Sulfate (SO4)			<10		mg/kg		10	22-NOV-17

Quality Control Report

Workorder: L2022531

Report Date: 24-NOV-17

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

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

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



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GENE 18.01 Front

1505523



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 13-DEC-17
Report Date: 22-DEC-17 14:19 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L2034814
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2034814-1 TL7-10DEC17								
Sampled By: JI on 10-DEC-17 @ 09:00								
Matrix: soil								
Metals in Soil (CCME) with Extra Metals								
Mercury in Soil by CVAAS								
Mercury (Hg)	0.0532			0.0050	mg/kg	18-DEC-17	20-DEC-17	R3916651
Metals in Soil by CRC ICPMS								
Aluminum (Al)	12500			50	mg/kg	18-DEC-17	19-DEC-17	R3916903
Antimony (Sb)	1.26			0.10	mg/kg	18-DEC-17	19-DEC-17	R3916903
Arsenic (As)	343			0.10	mg/kg	18-DEC-17	19-DEC-17	R3916903
Barium (Ba)	17.9			0.50	mg/kg	18-DEC-17	19-DEC-17	R3916903
Beryllium (Be)	0.14			0.10	mg/kg	18-DEC-17	19-DEC-17	R3916903
Bismuth (Bi)	2.27			0.20	mg/kg	18-DEC-17	19-DEC-17	R3916903
Boron (B)	17.1			5.0	mg/kg	18-DEC-17	19-DEC-17	R3916903
Cadmium (Cd)	3.81			0.020	mg/kg	18-DEC-17	19-DEC-17	R3916903
Calcium (Ca)	31800			50	mg/kg	18-DEC-17	19-DEC-17	R3916903
Chromium (Cr)	51.1			0.50	mg/kg	18-DEC-17	19-DEC-17	R3916903
Cobalt (Co)	215			0.10	mg/kg	18-DEC-17	19-DEC-17	R3916903
Copper (Cu)	2770			0.50	mg/kg	18-DEC-17	19-DEC-17	R3916903
Iron (Fe)	128000			50	mg/kg	18-DEC-17	19-DEC-17	R3916903
Lead (Pb)	360			0.50	mg/kg	18-DEC-17	19-DEC-17	R3916903
Lithium (Li)	19.8			2.0	mg/kg	18-DEC-17	19-DEC-17	R3916903
Magnesium (Mg)	14800			20	mg/kg	18-DEC-17	19-DEC-17	R3916903
Manganese (Mn)	1110			1.0	mg/kg	18-DEC-17	19-DEC-17	R3916903
Molybdenum (Mo)	1.82			0.10	mg/kg	18-DEC-17	19-DEC-17	R3916903
Nickel (Ni)	172			0.50	mg/kg	18-DEC-17	19-DEC-17	R3916903
Phosphorus (P)	325			50	mg/kg	18-DEC-17	19-DEC-17	R3916903
Potassium (K)	1350			100	mg/kg	18-DEC-17	19-DEC-17	R3916903
Selenium (Se)	8.17			0.20	mg/kg	18-DEC-17	19-DEC-17	R3916903
Silver (Ag)	14.9			0.10	mg/kg	18-DEC-17	19-DEC-17	R3916903
Sodium (Na)	1770			50	mg/kg	18-DEC-17	19-DEC-17	R3916903
Strontium (Sr)	16.7			0.50	mg/kg	18-DEC-17	19-DEC-17	R3916903
Sulfur (S)	89400			1000	mg/kg	18-DEC-17	19-DEC-17	R3916903
Thallium (Tl)	0.939			0.050	mg/kg	18-DEC-17	19-DEC-17	R3916903
Tin (Sn)	<2.0			2.0	mg/kg	18-DEC-17	19-DEC-17	R3916903
Titanium (Ti)	914			1.0	mg/kg	18-DEC-17	19-DEC-17	R3916903
Tungsten (W)	1.71			0.50	mg/kg	18-DEC-17	19-DEC-17	R3916903
Uranium (U)	0.050			0.050	mg/kg	18-DEC-17	19-DEC-17	R3916903
Vanadium (V)	69.5			0.20	mg/kg	18-DEC-17	19-DEC-17	R3916903
Zinc (Zn)	2000			2.0	mg/kg	18-DEC-17	19-DEC-17	R3916903
Zirconium (Zr)	3.5			1.0	mg/kg	18-DEC-17	19-DEC-17	R3916903
pH in Soil (1:2 Soil:Water Extraction)								
pH (1:2 soil:water)	8.73			0.10	pH		19-DEC-17	R3916197
Miscellaneous Parameters								
Cyanide, Free	<20	DLHC		20	mg/kg	18-DEC-17	20-DEC-17	R3916980
Inorganic Carbon (as CaCO3 Equivalent)	6.77			0.40	%		21-DEC-17	
Moisture	21.6			0.25	%		18-DEC-17	R3915704
Sulfate (SO4)	1440			10	mg/kg	20-DEC-17	20-DEC-17	R3917672
Cyanide, Total	1120			20	mg/kg	18-DEC-17	20-DEC-17	R3916980
Inorganic Carbon	0.813			0.050	%		21-DEC-17	R3917149
Sulfur (S)-Total	68600			500	mg/kg	19-DEC-17	19-DEC-17	R3916390
Cyanide, Weak Acid Diss	<20	DLHC		20	mg/kg	18-DEC-17	20-DEC-17	R3916980

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
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**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
CN-FREE-NAOH-CFA-VA	Soil	Free Cyanide in soil by CFA	BC-MOE/ASTM 7237
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
CN-T-NAOH-CFA-VA	Soil	Total Cyanide in soil by CFA	BC-MOE/ISO 14403:2002
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line UV digestion along with sample distillation and final determination by colourimetric analysis.			
CN-WAD-NAOH-CFA-VA	Soil	Weak Acid Diss. Cyanide in soil by CFA	BC-MOE/APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from the Canadian Council of Ministers of the Environment (CCME), Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume IV: Compendium of Analytical Methods for Contaminated Sites and EPA Method 9013A "Cyanide Extraction Procedure for Solids and Oils" and APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by rotary extraction of the soil with 0.04M Sodium Hydroxide, followed by in-line sample distillation with final determination by colourimetric analysis.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)
Soil samples are digested with hot nitric and hydrochloric acids, followed by CVAAS analysis. This method is fully compliant with the BC SALM strong acid leachable metals digestion method.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** 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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
Laboratory Definition Code	Laboratory Location		
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA		
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA		

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

- mg/kg - milligrams per kilogram based on dry weight of sample
- mg/kg ww - milligrams per kilogram based on wet weight of sample
- mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
- mg/L - unit of concentration based on volume, parts per million.
- < - Less than.
- D.L. - The reporting limit.
- 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.



Quality Control Report

Workorder: L2034814

Report Date: 22-DEC-17

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Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK								
Soil								
Batch	R3917149							
WG2687076-2	LCS							
Inorganic Carbon			94.6		%		80-120	21-DEC-17
WG2687076-3	MB							
Inorganic Carbon			<0.050		%		0.05	21-DEC-17
CN-FREE-NAOH-CFA-VA								
Soil								
Batch	R3916980							
WG2686286-3	DUP	L2034814-1						
Cyanide, Free		<20	<20	RPD-NA	mg/kg	N/A	35	20-DEC-17
WG2686286-2	LCS							
Cyanide, Free			93.6		%		80-120	20-DEC-17
WG2686286-1	MB							
Cyanide, Free			<0.050		mg/kg		0.05	20-DEC-17
WG2686286-4	MS	L2034814-1						
Cyanide, Free			N/A	MS-B	%		-	20-DEC-17
CN-T-NAOH-CFA-VA								
Soil								
Batch	R3916980							
WG2686286-3	DUP	L2034814-1						
Cyanide, Total		1120	1230		mg/kg	9.0	35	20-DEC-17
WG2686286-2	LCS							
Cyanide, Total			87.8		%		80-120	20-DEC-17
WG2686286-1	MB							
Cyanide, Total			<0.050		mg/kg		0.05	20-DEC-17
WG2686286-4	MS	L2034814-1						
Cyanide, Total			N/A	MS-B	%		-	20-DEC-17
CN-WAD-NAOH-CFA-VA								
Soil								
Batch	R3916980							
WG2686286-3	DUP	L2034814-1						
Cyanide, Weak Acid Diss		<20	<20	RPD-NA	mg/kg	N/A	35	20-DEC-17
WG2686286-2	LCS							
Cyanide, Weak Acid Diss			97.6		%		80-120	20-DEC-17
WG2686286-1	MB							
Cyanide, Weak Acid Diss			<0.050		mg/kg		0.05	20-DEC-17
HG-200.2-CVAF-VA								
Soil								
Batch	R3916651							
WG2686275-4	CRM	VA-CANMET-TILL1						
Mercury (Hg)			93.3		%		70-130	20-DEC-17
WG2686275-3	LCS							



Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAF-VA								
Soil								
Batch	R3916651							
WG2686275-3	LCS							
Mercury (Hg)			104.3		%		70-130	20-DEC-17
WG2686275-1	MB							
Mercury (Hg)			<0.0050		mg/kg		0.005	20-DEC-17
MET-200.2-CCMS-VA								
Soil								
Batch	R3916903							
WG2686275-4	CRM	VA-CANMET-TILL1						
Aluminum (Al)			101.1		%		70-130	19-DEC-17
Antimony (Sb)			105.3		%		70-130	19-DEC-17
Arsenic (As)			100.8		%		70-130	19-DEC-17
Barium (Ba)			99.1		%		70-130	19-DEC-17
Beryllium (Be)			0.52		mg/kg		0.34-0.74	19-DEC-17
Bismuth (Bi)			102.2		%		70-130	19-DEC-17
Boron (B)			3.5		mg/kg		0-8.2	19-DEC-17
Cadmium (Cd)			101.9		%		70-130	19-DEC-17
Calcium (Ca)			111.4		%		70-130	19-DEC-17
Chromium (Cr)			101.8		%		70-130	19-DEC-17
Cobalt (Co)			102.6		%		70-130	19-DEC-17
Copper (Cu)			99.9		%		70-130	19-DEC-17
Iron (Fe)			104.4		%		70-130	19-DEC-17
Lead (Pb)			100.3		%		70-130	19-DEC-17
Lithium (Li)			97.3		%		70-130	19-DEC-17
Magnesium (Mg)			103.3		%		70-130	19-DEC-17
Manganese (Mn)			98.2		%		70-130	19-DEC-17
Molybdenum (Mo)			107.4		%		70-130	19-DEC-17
Nickel (Ni)			100.7		%		70-130	19-DEC-17
Potassium (K)			118.5		%		70-130	19-DEC-17
Selenium (Se)			0.31		mg/kg		0.11-0.51	19-DEC-17
Silver (Ag)			0.24		mg/kg		0.13-0.33	19-DEC-17
Sodium (Na)			117.8		%		70-130	19-DEC-17
Strontium (Sr)			112.8		%		70-130	19-DEC-17
Thallium (Tl)			0.128		mg/kg		0.077-0.18	19-DEC-17
Tin (Sn)			1.1		mg/kg		0-3	19-DEC-17
Titanium (Ti)			120.9		%		70-130	19-DEC-17
Tungsten (W)			0.21		mg/kg		0-0.66	19-DEC-17



Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3916903							
WG2686275-4	CRM	VA-CANMET-TILL1						
Uranium (U)			103.7		%		70-130	19-DEC-17
Vanadium (V)			105.0		%		70-130	19-DEC-17
Zinc (Zn)			102.0		%		70-130	19-DEC-17
Zirconium (Zr)			0.9		mg/kg		0-1.8	19-DEC-17
WG2686275-3	LCS							
Aluminum (Al)			101.0		%		80-120	19-DEC-17
Antimony (Sb)			99.1		%		80-120	19-DEC-17
Arsenic (As)			99.6		%		80-120	19-DEC-17
Barium (Ba)			98.8		%		80-120	19-DEC-17
Beryllium (Be)			98.5		%		80-120	19-DEC-17
Bismuth (Bi)			100.7		%		80-120	19-DEC-17
Boron (B)			91.7		%		80-120	19-DEC-17
Cadmium (Cd)			100.0		%		80-120	19-DEC-17
Calcium (Ca)			99.3		%		80-120	19-DEC-17
Chromium (Cr)			93.5		%		80-120	19-DEC-17
Cobalt (Co)			98.3		%		80-120	19-DEC-17
Copper (Cu)			96.4		%		80-120	19-DEC-17
Iron (Fe)			105.7		%		80-120	19-DEC-17
Lead (Pb)			99.2		%		80-120	19-DEC-17
Lithium (Li)			94.4		%		80-120	19-DEC-17
Magnesium (Mg)			100.5		%		80-120	19-DEC-17
Manganese (Mn)			99.0		%		80-120	19-DEC-17
Molybdenum (Mo)			100.8		%		80-120	19-DEC-17
Nickel (Ni)			96.6		%		80-120	19-DEC-17
Phosphorus (P)			97.8		%		80-120	19-DEC-17
Potassium (K)			103.9		%		80-120	19-DEC-17
Selenium (Se)			99.1		%		80-120	19-DEC-17
Silver (Ag)			100.1		%		80-120	19-DEC-17
Sodium (Na)			102.0		%		80-120	19-DEC-17
Strontium (Sr)			96.8		%		80-120	19-DEC-17
Sulfur (S)			97.6		%		80-120	19-DEC-17
Thallium (Tl)			99.2		%		80-120	19-DEC-17
Tin (Sn)			100.5		%		80-120	19-DEC-17
Titanium (Ti)			100.6		%		80-120	19-DEC-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R3916903							
WG2686275-3	LCS							
Tungsten (W)			99.9		%		80-120	19-DEC-17
Uranium (U)			102.4		%		80-120	19-DEC-17
Vanadium (V)			100.6		%		80-120	19-DEC-17
Zinc (Zn)			93.4		%		80-120	19-DEC-17
Zirconium (Zr)			100.2		%		70-130	19-DEC-17
WG2686275-1	MB							
Aluminum (Al)			<50		mg/kg		50	19-DEC-17
Antimony (Sb)			<0.10		mg/kg		0.1	19-DEC-17
Arsenic (As)			<0.10		mg/kg		0.1	19-DEC-17
Barium (Ba)			<0.50		mg/kg		0.5	19-DEC-17
Beryllium (Be)			<0.10		mg/kg		0.1	19-DEC-17
Bismuth (Bi)			<0.20		mg/kg		0.2	19-DEC-17
Boron (B)			<5.0		mg/kg		5	19-DEC-17
Cadmium (Cd)			<0.020		mg/kg		0.02	19-DEC-17
Calcium (Ca)			<50		mg/kg		50	19-DEC-17
Chromium (Cr)			<0.50		mg/kg		0.5	19-DEC-17
Cobalt (Co)			<0.10		mg/kg		0.1	19-DEC-17
Copper (Cu)			<0.50		mg/kg		0.5	19-DEC-17
Iron (Fe)			<50		mg/kg		50	19-DEC-17
Lead (Pb)			<0.50		mg/kg		0.5	19-DEC-17
Lithium (Li)			<2.0		mg/kg		2	19-DEC-17
Magnesium (Mg)			<20		mg/kg		20	19-DEC-17
Manganese (Mn)			<1.0		mg/kg		1	19-DEC-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	19-DEC-17
Nickel (Ni)			<0.50		mg/kg		0.5	19-DEC-17
Phosphorus (P)			<50		mg/kg		50	19-DEC-17
Potassium (K)			<100		mg/kg		100	19-DEC-17
Selenium (Se)			<0.20		mg/kg		0.2	19-DEC-17
Silver (Ag)			<0.10		mg/kg		0.1	19-DEC-17
Sodium (Na)			<50		mg/kg		50	19-DEC-17
Strontium (Sr)			<0.50		mg/kg		0.5	19-DEC-17
Sulfur (S)			<1000		mg/kg		1000	19-DEC-17
Thallium (Tl)			<0.050		mg/kg		0.05	19-DEC-17
Tin (Sn)			<2.0		mg/kg		2	19-DEC-17



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Report Date: 22-DEC-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-LEACH-IC-VA	Soil							
Batch	R3917672							
WG2687935-1	MB							
Sulfate (SO4)			<10		mg/kg		10	20-DEC-17

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Report Date: 22-DEC-17

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

GENF 18.01 Front

Attachment 3 – TL-11 Certificates of Analysis



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 09-AUG-17
Report Date: 18-AUG-17 10:33 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1971638
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1971638-1 TL11-06AUG17								
Sampled By: SW on 06-AUG-17 @ 15:15								
Matrix: WATER								
Total Metals in Water + Hg (CCME/BCWQG)								
Hardness								
Hardness (as CaCO3)		42200		13	mg/L		16-AUG-17	
Total Metals in Water by CRC ICPMS								
Aluminum (Al)-Total		7.48		0.30	mg/L		16-AUG-17	R3801959
Antimony (Sb)-Total		<0.010	DLA	0.010	mg/L		16-AUG-17	R3801959
Arsenic (As)-Total		<0.010	DLA	0.010	mg/L		16-AUG-17	R3801959
Barium (Ba)-Total		0.437		0.020	mg/L		16-AUG-17	R3801959
Beryllium (Be)-Total		<0.010	DLA	0.010	mg/L		16-AUG-17	R3801959
Boron (B)-Total		1.8		1.0	mg/L		16-AUG-17	R3801959
Cadmium (Cd)-Total		0.0259		0.00050	mg/L		16-AUG-17	R3801959
Calcium (Ca)-Total		13800		5.0	mg/L		16-AUG-17	R3801959
Chromium (Cr)-Total		0.021		0.010	mg/L		16-AUG-17	R3801959
Cobalt (Co)-Total		0.154		0.010	mg/L		16-AUG-17	R3801959
Copper (Cu)-Total		0.345		0.050	mg/L		16-AUG-17	R3801959
Iron (Fe)-Total		17.2		1.0	mg/L		16-AUG-17	R3801959
Lead (Pb)-Total		0.0427		0.0050	mg/L		16-AUG-17	R3801959
Lithium (Li)-Total		0.42		0.10	mg/L		16-AUG-17	R3801959
Magnesium (Mg)-Total		1000		0.50	mg/L		16-AUG-17	R3801959
Manganese (Mn)-Total		7.37		0.010	mg/L		16-AUG-17	R3801959
Molybdenum (Mo)-Total		0.0230		0.0050	mg/L		16-AUG-17	R3801959
Nickel (Ni)-Total		0.419		0.050	mg/L		16-AUG-17	R3801959
Potassium (K)-Total		450		5.0	mg/L		16-AUG-17	R3801959
Selenium (Se)-Total		0.0140		0.0050	mg/L		16-AUG-17	R3801959
Silver (Ag)-Total		0.0377		0.0010	mg/L		16-AUG-17	R3801959
Sodium (Na)-Total		6570		5.0	mg/L		16-AUG-17	R3801959
Thallium (Tl)-Total		0.0012		0.0010	mg/L		16-AUG-17	R3801959
Tin (Sn)-Total		<0.010	DLA	0.010	mg/L		16-AUG-17	R3801959
Titanium (Ti)-Total		0.341		0.030	mg/L		16-AUG-17	R3801959
Uranium (U)-Total		0.0022		0.0010	mg/L		16-AUG-17	R3801959
Vanadium (V)-Total		<0.050	DLA	0.050	mg/L		16-AUG-17	R3801959
Zinc (Zn)-Total		0.71		0.30	mg/L		16-AUG-17	R3801959
Miscellaneous Parameters								
Ammonia, Total (as N)		392		5.0	mg/L		12-AUG-17	R3796296
Chloride (Cl)		42200		50	mg/L		14-AUG-17	R3798504
Cyanide, Free		0.0261		0.0050	mg/L		16-AUG-17	R3801947
Cyanide, Total		0.0798		0.0050	mg/L		16-AUG-17	R3801947
Total Dissolved Solids		117000		400	mg/L		11-AUG-17	R3798145
Total Suspended Solids		623		3.0	mg/L		12-AUG-17	R3797419
pH		6.71		0.10	pH		11-AUG-17	R3795774
Dissolved Metals in Water by CRC ICPMS								
Dissolved Metals Filtration Location		FIELD					13-AUG-17	R3796581
Aluminum (Al)-Dissolved		<0.10	DLA	0.10	mg/L	13-AUG-17	16-AUG-17	R3801959
Antimony (Sb)-Dissolved		<0.010	DLA	0.010	mg/L	13-AUG-17	16-AUG-17	R3801959
Arsenic (As)-Dissolved		<0.010	DLA	0.010	mg/L	13-AUG-17	16-AUG-17	R3801959
Barium (Ba)-Dissolved		0.461		0.0050	mg/L	13-AUG-17	16-AUG-17	R3801959
Beryllium (Be)-Dissolved		<0.010	DLA	0.010	mg/L	13-AUG-17	16-AUG-17	R3801959
Bismuth (Bi)-Dissolved		<0.0050	DLA	0.0050	mg/L	13-AUG-17	16-AUG-17	R3801959
Boron (B)-Dissolved		1.9		1.0	mg/L	13-AUG-17	16-AUG-17	R3801959
Cadmium (Cd)-Dissolved		0.0296		0.00050	mg/L	13-AUG-17	16-AUG-17	R3801959
Calcium (Ca)-Dissolved		15100		5.0	mg/L	13-AUG-17	16-AUG-17	R3801959
Cesium (Cs)-Dissolved		0.0072		0.0010	mg/L	13-AUG-17	16-AUG-17	R3801959

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1971638-1	TL11-06AUG17							
Sampled By:	SW on 06-AUG-17 @ 15:15							
Matrix:	WATER							
Dissolved Metals in Water by CRC ICPMS								
Chromium (Cr)-Dissolved	<0.010	DLA	0.010	mg/L	13-AUG-17	16-AUG-17	R3801959	
Cobalt (Co)-Dissolved	0.154		0.010	mg/L	13-AUG-17	16-AUG-17	R3801959	
Copper (Cu)-Dissolved	0.187		0.020	mg/L	13-AUG-17	16-AUG-17	R3801959	
Iron (Fe)-Dissolved	<1.0	DLA	1.0	mg/L	13-AUG-17	16-AUG-17	R3801959	
Lead (Pb)-Dissolved	0.0071		0.0050	mg/L	13-AUG-17	16-AUG-17	R3801959	
Lithium (Li)-Dissolved	0.46		0.10	mg/L	13-AUG-17	16-AUG-17	R3801959	
Magnesium (Mg)-Dissolved	1110		0.50	mg/L	13-AUG-17	16-AUG-17	R3801959	
Manganese (Mn)-Dissolved	7.83		0.010	mg/L	13-AUG-17	16-AUG-17	R3801959	
Molybdenum (Mo)-Dissolved	0.0264		0.0050	mg/L	13-AUG-17	16-AUG-17	R3801959	
Nickel (Ni)-Dissolved	0.437		0.050	mg/L	13-AUG-17	16-AUG-17	R3801959	
Phosphorus (P)-Dissolved	<5.0	DLA	5.0	mg/L	13-AUG-17	16-AUG-17	R3801959	
Potassium (K)-Dissolved	492		5.0	mg/L	13-AUG-17	16-AUG-17	R3801959	
Rubidium (Rb)-Dissolved	0.422		0.020	mg/L	13-AUG-17	16-AUG-17	R3801959	
Selenium (Se)-Dissolved	0.0139		0.0050	mg/L	13-AUG-17	16-AUG-17	R3801959	
Silicon (Si)-Dissolved	<5.0	DLA	5.0	mg/L	13-AUG-17	16-AUG-17	R3801959	
Silver (Ag)-Dissolved	0.0407		0.0010	mg/L	13-AUG-17	16-AUG-17	R3801959	
Sodium (Na)-Dissolved	7230		5.0	mg/L	13-AUG-17	16-AUG-17	R3801959	
Strontium (Sr)-Dissolved	28.8		0.020	mg/L	13-AUG-17	16-AUG-17	R3801959	
Sulfur (S)-Dissolved	583		50	mg/L	13-AUG-17	16-AUG-17	R3801959	
Tellurium (Te)-Dissolved	<0.020	DLA	0.020	mg/L	13-AUG-17	16-AUG-17	R3801959	
Thallium (Tl)-Dissolved	0.0014		0.0010	mg/L	13-AUG-17	16-AUG-17	R3801959	
Thorium (Th)-Dissolved	<0.010	DLA	0.010	mg/L	13-AUG-17	16-AUG-17	R3801959	
Tin (Sn)-Dissolved	<0.010	DLA	0.010	mg/L	13-AUG-17	16-AUG-17	R3801959	
Titanium (Ti)-Dissolved	<0.030	DLA	0.030	mg/L	13-AUG-17	16-AUG-17	R3801959	
Tungsten (W)-Dissolved	<0.010	DLA	0.010	mg/L	13-AUG-17	16-AUG-17	R3801959	
Uranium (U)-Dissolved	0.0023		0.0010	mg/L	13-AUG-17	16-AUG-17	R3801959	
Vanadium (V)-Dissolved	<0.050	DLA	0.050	mg/L	13-AUG-17	16-AUG-17	R3801959	
Zinc (Zn)-Dissolved	0.56		0.10	mg/L	13-AUG-17	16-AUG-17	R3801959	
Zirconium (Zr)-Dissolved	<0.0060	DLA	0.0060	mg/L	13-AUG-17	16-AUG-17	R3801959	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
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**
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.			
CN-FREE-CFA-VA	Water	Free Cyanide in water by CFA	ASTM 7237
This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
CN-T-CFA-VA	Water	Total Cyanide in water by CFA	ISO 14403:2002
This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.			
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.			
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.			
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.			
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.			
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.			
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.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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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:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg ww - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.



Quality Control Report

Workorder: L1971638

Report Date: 18-AUG-17

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Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-N-VA		Water						
Batch	R3798504							
WG2591354-13	LCS							
Chloride (Cl)			102.0		%		90-110	14-AUG-17
WG2591354-18	LCS							
Chloride (Cl)			101.9		%		90-110	14-AUG-17
WG2591354-2	LCS							
Chloride (Cl)			101.9		%		90-110	14-AUG-17
WG2591354-5	LCS							
Chloride (Cl)			101.7		%		90-110	14-AUG-17
WG2591354-9	LCS							
Chloride (Cl)			101.9		%		90-110	14-AUG-17
WG2591354-1	MB							
Chloride (Cl)			<0.50		mg/L		0.5	14-AUG-17
WG2591354-12	MB							
Chloride (Cl)			<0.50		mg/L		0.5	14-AUG-17
WG2591354-16	MB							
Chloride (Cl)			<0.50		mg/L		0.5	14-AUG-17
WG2591354-4	MB							
Chloride (Cl)			<0.50		mg/L		0.5	14-AUG-17
WG2591354-8	MB							
Chloride (Cl)			<0.50		mg/L		0.5	14-AUG-17
CN-FREE-CFA-VA		Water						
Batch	R3801947							
WG2593817-7	LCS							
Cyanide, Free			102.5		%		80-120	16-AUG-17
WG2593817-6	MB							
Cyanide, Free			<0.0050		mg/L		0.005	16-AUG-17
CN-T-CFA-VA		Water						
Batch	R3801947							
WG2593817-7	LCS							
Cyanide, Total			90.6		%		80-120	16-AUG-17
WG2593817-6	MB							
Cyanide, Total			<0.0050		mg/L		0.005	16-AUG-17
MET-D-CCMS-VA		Water						
Batch	R3798983							
WG2591177-2	LCS							
Aluminum (Al)-Dissolved			102.7		%		80-120	14-AUG-17
Antimony (Sb)-Dissolved			97.0		%		80-120	14-AUG-17
Arsenic (As)-Dissolved			101.3		%		80-120	14-AUG-17



Quality Control Report

Workorder: L1971638

Report Date: 18-AUG-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA		Water						
Batch	R3798983							
WG2591177-2	LCS							
Barium (Ba)-Dissolved			97.4		%		80-120	14-AUG-17
Beryllium (Be)-Dissolved			94.7		%		80-120	14-AUG-17
Bismuth (Bi)-Dissolved			98.0		%		80-120	14-AUG-17
Boron (B)-Dissolved			89.7		%		80-120	14-AUG-17
Cadmium (Cd)-Dissolved			99.3		%		80-120	14-AUG-17
Calcium (Ca)-Dissolved			98.7		%		80-120	14-AUG-17
Cesium (Cs)-Dissolved			97.0		%		80-120	14-AUG-17
Chromium (Cr)-Dissolved			100.3		%		80-120	14-AUG-17
Cobalt (Co)-Dissolved			99.0		%		80-120	14-AUG-17
Copper (Cu)-Dissolved			96.8		%		80-120	14-AUG-17
Iron (Fe)-Dissolved			92.9		%		80-120	14-AUG-17
Lead (Pb)-Dissolved			99.1		%		80-120	14-AUG-17
Lithium (Li)-Dissolved			97.0		%		80-120	14-AUG-17
Magnesium (Mg)-Dissolved			98.3		%		80-120	14-AUG-17
Manganese (Mn)-Dissolved			103.3		%		80-120	14-AUG-17
Molybdenum (Mo)-Dissolved			95.9		%		80-120	14-AUG-17
Nickel (Ni)-Dissolved			99.8		%		80-120	14-AUG-17
Phosphorus (P)-Dissolved			103.1		%		80-120	14-AUG-17
Potassium (K)-Dissolved			101.5		%		80-120	14-AUG-17
Rubidium (Rb)-Dissolved			102.4		%		80-120	14-AUG-17
Selenium (Se)-Dissolved			97.0		%		80-120	14-AUG-17
Silicon (Si)-Dissolved			99.2		%		80-120	14-AUG-17
Silver (Ag)-Dissolved			98.5		%		80-120	14-AUG-17
Sodium (Na)-Dissolved			101.5		%		80-120	14-AUG-17
Strontium (Sr)-Dissolved			97.9		%		80-120	14-AUG-17
Sulfur (S)-Dissolved			92.5		%		80-120	14-AUG-17
Tellurium (Te)-Dissolved			102.9		%		80-120	14-AUG-17
Thallium (Tl)-Dissolved			99.6		%		80-120	14-AUG-17
Thorium (Th)-Dissolved			94.0		%		80-120	14-AUG-17
Tin (Sn)-Dissolved			100.2		%		80-120	14-AUG-17
Titanium (Ti)-Dissolved			87.4		%		80-120	14-AUG-17
Tungsten (W)-Dissolved			98.1		%		80-120	14-AUG-17
Uranium (U)-Dissolved			97.2		%		80-120	14-AUG-17
Vanadium (V)-Dissolved			100.7		%		80-120	14-AUG-17



Quality Control Report

Workorder: L1971638

Report Date: 18-AUG-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA								
Water								
Batch	R3798983							
WG2591177-2	LCS							
Zinc (Zn)-Dissolved			93.5		%		80-120	14-AUG-17
Zirconium (Zr)-Dissolved			92.6		%		80-120	14-AUG-17
WG2591177-1	MB	NP						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	14-AUG-17
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	14-AUG-17
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	14-AUG-17
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	14-AUG-17
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	14-AUG-17
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	14-AUG-17
Boron (B)-Dissolved			<0.010		mg/L		0.01	14-AUG-17
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	14-AUG-17
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	14-AUG-17
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	14-AUG-17
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	14-AUG-17
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	14-AUG-17
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	14-AUG-17
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	14-AUG-17
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	14-AUG-17
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	14-AUG-17
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	14-AUG-17
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	14-AUG-17
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	14-AUG-17
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	14-AUG-17
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	14-AUG-17
Potassium (K)-Dissolved			<0.050		mg/L		0.05	14-AUG-17
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	14-AUG-17
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	14-AUG-17
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	14-AUG-17
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	14-AUG-17
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	14-AUG-17
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	14-AUG-17
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	14-AUG-17
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	14-AUG-17
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	14-AUG-17



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Workorder: L1971638

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA								
Water								
Batch	R3798983							
WG2591177-1 MB		NP						
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	14-AUG-17
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	14-AUG-17
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	14-AUG-17
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	14-AUG-17
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	14-AUG-17
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	14-AUG-17
Zirconium (Zr)-Dissolved			<0.000060		mg/L		0.00006	14-AUG-17
Batch	R3800920							
WG2591177-1 MB		NP						
Zinc (Zn)-Dissolved			0.0011	MB-LOR	mg/L		0.001	14-AUG-17
MET-T-CCMS-VA								
Water								
Batch	R3801860							
WG2592942-2 LCS								
Aluminum (Al)-Total			101.9		%		80-120	15-AUG-17
Antimony (Sb)-Total			111.1		%		80-120	15-AUG-17
Arsenic (As)-Total			109.4		%		80-120	15-AUG-17
Barium (Ba)-Total			105.2		%		80-120	15-AUG-17
Beryllium (Be)-Total			105.4		%		80-120	15-AUG-17
Boron (B)-Total			102.3		%		80-120	15-AUG-17
Cadmium (Cd)-Total			101.7		%		80-120	15-AUG-17
Calcium (Ca)-Total			105.9		%		80-120	15-AUG-17
Chromium (Cr)-Total			102.9		%		80-120	15-AUG-17
Cobalt (Co)-Total			101.3		%		80-120	15-AUG-17
Copper (Cu)-Total			99.5		%		80-120	15-AUG-17
Iron (Fe)-Total			96.1		%		80-120	15-AUG-17
Lead (Pb)-Total			102.9		%		80-120	15-AUG-17
Lithium (Li)-Total			104.2		%		80-120	15-AUG-17
Magnesium (Mg)-Total			94.8		%		80-120	15-AUG-17
Manganese (Mn)-Total			103.1		%		80-120	15-AUG-17
Molybdenum (Mo)-Total			102.7		%		80-120	15-AUG-17
Nickel (Ni)-Total			98.0		%		80-120	15-AUG-17
Potassium (K)-Total			103.5		%		80-120	15-AUG-17
Selenium (Se)-Total			104.4		%		80-120	15-AUG-17
Silver (Ag)-Total			100.9		%		80-120	15-AUG-17



Quality Control Report

Workorder: L1971638

Report Date: 18-AUG-17

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	Water							
Batch	R3801860							
WG2592942-2 LCS								
Sodium (Na)-Total			103.1		%		80-120	15-AUG-17
Thallium (Tl)-Total			103.0		%		80-120	15-AUG-17
Tin (Sn)-Total			103.0		%		80-120	15-AUG-17
Titanium (Ti)-Total			96.0		%		80-120	15-AUG-17
Uranium (U)-Total			100.4		%		80-120	15-AUG-17
Vanadium (V)-Total			104.6		%		80-120	15-AUG-17
Zinc (Zn)-Total			102.0		%		80-120	15-AUG-17
WG2592942-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	15-AUG-17
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	15-AUG-17
Arsenic (As)-Total			<0.00010		mg/L		0.0001	15-AUG-17
Barium (Ba)-Total			<0.000050		mg/L		0.00005	15-AUG-17
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	15-AUG-17
Boron (B)-Total			<0.010		mg/L		0.01	15-AUG-17
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	15-AUG-17
Calcium (Ca)-Total			<0.050		mg/L		0.05	15-AUG-17
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	15-AUG-17
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	15-AUG-17
Copper (Cu)-Total			<0.00050		mg/L		0.0005	15-AUG-17
Iron (Fe)-Total			<0.010		mg/L		0.01	15-AUG-17
Lead (Pb)-Total			<0.000050		mg/L		0.00005	15-AUG-17
Lithium (Li)-Total			<0.0010		mg/L		0.001	15-AUG-17
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	15-AUG-17
Potassium (K)-Total			<0.050		mg/L		0.05	15-AUG-17
Selenium (Se)-Total			<0.000050		mg/L		0.00005	15-AUG-17
Silver (Ag)-Total			<0.000010		mg/L		0.00001	15-AUG-17
Sodium (Na)-Total			<0.050		mg/L		0.05	15-AUG-17
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	15-AUG-17
Tin (Sn)-Total			<0.00010		mg/L		0.0001	15-AUG-17
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	15-AUG-17
Uranium (U)-Total			<0.000010		mg/L		0.00001	15-AUG-17
Vanadium (V)-Total			<0.00050		mg/L		0.0005	15-AUG-17
Zinc (Zn)-Total			<0.0030		mg/L		0.003	15-AUG-17



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Workorder: L1971638

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	Water							
Batch	R3802711							
WG2592942-1 MB								
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	16-AUG-17
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	16-AUG-17
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	16-AUG-17
NH3-F-VA	Water							
Batch	R3796296							
WG2590672-2 LCS								
Ammonia, Total (as N)			102.6		%		85-115	12-AUG-17
WG2590672-1 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	12-AUG-17
PH-PCT-VA	Water							
Batch	R3795774							
WG2589549-7 CRM		VA-PH7-BUF						
pH			6.99		pH		6.9-7.1	11-AUG-17
TDS-VA	Water							
Batch	R3798145							
WG2589741-2 LCS								
Total Dissolved Solids			100.5		%		85-115	11-AUG-17
WG2589741-1 MB								
Total Dissolved Solids			<10		mg/L		10	11-AUG-17
TSS-VA	Water							
Batch	R3797419							
WG2590675-2 LCS								
Total Suspended Solids			86.7		%		85-115	12-AUG-17
WG2590675-1 MB								
Total Suspended Solids			<3.0		mg/L		3	12-AUG-17

Quality Control Report

Workorder: L1971638

Report Date: 18-AUG-17

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.

Quality Control Report

Workorder: L1971638

Report Date: 18-AUG-17

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH by Meter (Automated)	1	06-AUG-17 15:15	11-AUG-17 14:59	0.25	120	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1971638 were received on 09-AUG-17 08:00.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



L1971638-COFC

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[illegible]

GENF 18.01 Front

13/11/11 10/12/11 GEN



TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Wellington St West
Toronto ON M5J 2N7

Date Received: 19-DEC-17
Report Date: 08-JAN-18 14:03 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L2037226
Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2037226-1 TL11-17DEC7A							
Sampled By: SW on 17-DEC-17 @ 13:30							
Matrix: WATER							
Total Alkalinity by Titration							
Alkalinity Species by Titration							
Alkalinity, Total (as CaCO3)	49.3		1.0	mg/L		27-DEC-17	R3920709
Miscellaneous Parameters							
Acidity (as CaCO3)	114		1.0	mg/L		28-DEC-17	R3924171
Ammonia, Total (as N)	280		5.0	mg/L		02-JAN-18	R3927793
Chloride (Cl)	48200		50	mg/L		21-DEC-17	R3917417
Conductivity	104000		2.0	uS/cm		27-DEC-17	R3920709
Cyanide, Free	0.0236		0.0050	mg/L		22-DEC-17	R3918811
Hardness (as CaCO3)	45900		13	mg/L		08-JAN-18	
Nitrate (as N)	594		0.50	mg/L		21-DEC-17	R3917417
Nitrite (as N)	6.79		0.10	mg/L		21-DEC-17	R3917417
Sulfate (SO4)	904		30	mg/L		21-DEC-17	R3917417
Cyanide, Total	0.0811	CNI	0.0050	mg/L		22-DEC-17	R3918811
Total Dissolved Solids	54700		80	mg/L		27-DEC-17	R3922667
Total Suspended Solids	1090		8.0	mg/L		22-DEC-17	R3920461
Cyanide, Weak Acid Diss	0.0282		0.0050	mg/L		22-DEC-17	R3918811
pH	6.70		0.10	pH		27-DEC-17	R3920709
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	6.73		0.30	mg/L		05-JAN-18	R3929475
Antimony (Sb)-Total	<0.010	DLA	0.010	mg/L		05-JAN-18	R3929475
Arsenic (As)-Total	0.025		0.010	mg/L		05-JAN-18	R3929475
Barium (Ba)-Total	0.579		0.0050	mg/L		05-JAN-18	R3929475
Beryllium (Be)-Total	<0.010	DLA	0.010	mg/L		05-JAN-18	R3929475
Bismuth (Bi)-Total	<0.0050	DLA	0.0050	mg/L		05-JAN-18	R3929475
Boron (B)-Total	2.3		1.0	mg/L		05-JAN-18	R3929475
Cadmium (Cd)-Total	0.0265		0.00050	mg/L		05-JAN-18	R3929475
Calcium (Ca)-Total	16300		5.0	mg/L		05-JAN-18	R3929475
Cesium (Cs)-Total	0.0056		0.0010	mg/L		05-JAN-18	R3929475
Chromium (Cr)-Total	<0.010	DLA	0.010	mg/L		05-JAN-18	R3929475
Cobalt (Co)-Total	0.209		0.010	mg/L		05-JAN-18	R3929475
Copper (Cu)-Total	1.33		0.050	mg/L		05-JAN-18	R3929475
Iron (Fe)-Total	21.5		1.0	mg/L		05-JAN-18	R3929475
Lead (Pb)-Total	0.263		0.0050	mg/L		05-JAN-18	R3929475
Lithium (Li)-Total	0.36		0.10	mg/L		05-JAN-18	R3929475
Magnesium (Mg)-Total	1090		0.50	mg/L		05-JAN-18	R3929475
Manganese (Mn)-Total	6.74		0.010	mg/L		05-JAN-18	R3929475
Molybdenum (Mo)-Total	0.0269		0.0050	mg/L		05-JAN-18	R3929475
Nickel (Ni)-Total	0.387		0.050	mg/L		05-JAN-18	R3929475
Phosphorus (P)-Total	<5.0	DLA	5.0	mg/L		05-JAN-18	R3929475
Potassium (K)-Total	487		5.0	mg/L		05-JAN-18	R3929475
Rubidium (Rb)-Total	0.378		0.020	mg/L		05-JAN-18	R3929475
Selenium (Se)-Total	0.0107		0.0050	mg/L		05-JAN-18	R3929475
Silicon (Si)-Total	14		10	mg/L		05-JAN-18	R3929475
Silver (Ag)-Total	0.0534		0.0010	mg/L		05-JAN-18	R3929475
Sodium (Na)-Total	7820		5.0	mg/L		05-JAN-18	R3929475
Strontium (Sr)-Total	31.9		0.020	mg/L		05-JAN-18	R3929475
Sulfur (S)-Total	416		50	mg/L		05-JAN-18	R3929475
Tellurium (Te)-Total	<0.020	DLA	0.020	mg/L		05-JAN-18	R3929475
Thallium (Tl)-Total	0.0013		0.0010	mg/L		05-JAN-18	R3929475
Thorium (Th)-Total	<0.010	DLA	0.010	mg/L		05-JAN-18	R3929475

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2037226-1 TL11-17DEC7A Sampled By: SW on 17-DEC-17 @ 13:30 Matrix: WATER							
Total Metals in Water by CRC ICPMS							
Tin (Sn)-Total	<0.010	DLA	0.010	mg/L		05-JAN-18	R3929475
Titanium (Ti)-Total	<0.30	DLM	0.30	mg/L		05-JAN-18	R3929475
Tungsten (W)-Total	<0.010	DLA	0.010	mg/L		05-JAN-18	R3929475
Uranium (U)-Total	0.0028		0.0010	mg/L		05-JAN-18	R3929475
Vanadium (V)-Total	<0.050	DLA	0.050	mg/L		05-JAN-18	R3929475
Zinc (Zn)-Total	1.81		0.30	mg/L		05-JAN-18	R3929475
Zirconium (Zr)-Total	<0.0060	DLA	0.0060	mg/L		05-JAN-18	R3929475
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					28-DEC-17	R3922789
Aluminum (Al)-Dissolved	<0.10	DLA	0.10	mg/L	28-DEC-17	04-JAN-18	R3929171
Antimony (Sb)-Dissolved	<0.010	DLA	0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Arsenic (As)-Dissolved	<0.010	DLA	0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Barium (Ba)-Dissolved	0.557		0.0050	mg/L	28-DEC-17	04-JAN-18	R3929171
Beryllium (Be)-Dissolved	<0.010	DLA	0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Bismuth (Bi)-Dissolved	<0.0050	DLA	0.0050	mg/L	28-DEC-17	04-JAN-18	R3929171
Boron (B)-Dissolved	2.4		1.0	mg/L	28-DEC-17	04-JAN-18	R3929171
Cadmium (Cd)-Dissolved	0.0263		0.00050	mg/L	28-DEC-17	04-JAN-18	R3929171
Calcium (Ca)-Dissolved	16700		5.0	mg/L	28-DEC-17	04-JAN-18	R3929171
Cesium (Cs)-Dissolved	0.0049		0.0010	mg/L	28-DEC-17	04-JAN-18	R3929171
Chromium (Cr)-Dissolved	<0.010	DLA	0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Cobalt (Co)-Dissolved	0.189		0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Copper (Cu)-Dissolved	0.563		0.020	mg/L	28-DEC-17	04-JAN-18	R3929171
Iron (Fe)-Dissolved	<1.0	DLA	1.0	mg/L	28-DEC-17	04-JAN-18	R3929171
Lead (Pb)-Dissolved	0.129		0.0050	mg/L	28-DEC-17	04-JAN-18	R3929171
Lithium (Li)-Dissolved	0.39		0.10	mg/L	28-DEC-17	04-JAN-18	R3929171
Magnesium (Mg)-Dissolved	1050		0.50	mg/L	28-DEC-17	04-JAN-18	R3929171
Manganese (Mn)-Dissolved	6.45		0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Molybdenum (Mo)-Dissolved	0.0269		0.0050	mg/L	28-DEC-17	04-JAN-18	R3929171
Nickel (Ni)-Dissolved	0.361		0.050	mg/L	28-DEC-17	04-JAN-18	R3929171
Phosphorus (P)-Dissolved	<5.0	DLA	5.0	mg/L	28-DEC-17	04-JAN-18	R3929171
Potassium (K)-Dissolved	492		5.0	mg/L	28-DEC-17	04-JAN-18	R3929171
Rubidium (Rb)-Dissolved	0.384		0.020	mg/L	28-DEC-17	04-JAN-18	R3929171
Selenium (Se)-Dissolved	0.0140		0.0050	mg/L	28-DEC-17	04-JAN-18	R3929171
Silicon (Si)-Dissolved	<5.0	DLA	5.0	mg/L	28-DEC-17	04-JAN-18	R3929171
Silver (Ag)-Dissolved	0.0521		0.0010	mg/L	28-DEC-17	04-JAN-18	R3929171
Sodium (Na)-Dissolved	7750		5.0	mg/L	28-DEC-17	04-JAN-18	R3929171
Strontium (Sr)-Dissolved	29.2		0.020	mg/L	28-DEC-17	04-JAN-18	R3929171
Sulfur (S)-Dissolved	393		50	mg/L	28-DEC-17	04-JAN-18	R3929171
Tellurium (Te)-Dissolved	<0.020	DLA	0.020	mg/L	28-DEC-17	04-JAN-18	R3929171
Thallium (Tl)-Dissolved	0.0015		0.0010	mg/L	28-DEC-17	04-JAN-18	R3929171
Thorium (Th)-Dissolved	<0.010	DLA	0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Tin (Sn)-Dissolved	<0.010	DLA	0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Titanium (Ti)-Dissolved	<0.030	DLA	0.030	mg/L	28-DEC-17	04-JAN-18	R3929171
Tungsten (W)-Dissolved	<0.010	DLA	0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Uranium (U)-Dissolved	0.0030		0.0010	mg/L	28-DEC-17	04-JAN-18	R3929171
Vanadium (V)-Dissolved	<0.050	DLA	0.050	mg/L	28-DEC-17	04-JAN-18	R3929171
Zinc (Zn)-Dissolved	1.59		0.10	mg/L	28-DEC-17	04-JAN-18	R3929171
Zirconium (Zr)-Dissolved	<0.0060	DLA	0.0060	mg/L	28-DEC-17	04-JAN-18	R3929171
L2037226-2 TL11-17DEC7B Sampled By: SW on 17-DEC-17 @ 13:30 Matrix: WATER							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2037226-2 TL11-17DEC7B							
Sampled By: SW on 17-DEC-17 @ 13:30							
Matrix: WATER							
Total Alkalinity by Titration							
Alkalinity Species by Titration							
Alkalinity, Total (as CaCO3)	45.4		1.0	mg/L		27-DEC-17	R3920709
Miscellaneous Parameters							
Acidity (as CaCO3)	118		1.0	mg/L		28-DEC-17	R3924171
Ammonia, Total (as N)	286		5.0	mg/L		02-JAN-18	R3927793
Chloride (Cl)	47700		50	mg/L		21-DEC-17	R3917417
Conductivity	105000		2.0	uS/cm		27-DEC-17	R3920709
Cyanide, Free	0.0215		0.0050	mg/L		27-DEC-17	R3922309
Hardness (as CaCO3)	49700		13	mg/L		08-JAN-18	
Nitrate (as N)	588		0.50	mg/L		21-DEC-17	R3917417
Nitrite (as N)	6.74		0.10	mg/L		21-DEC-17	R3917417
Sulfate (SO4)	894		30	mg/L		21-DEC-17	R3917417
Cyanide, Total	0.0588	CNI	0.0050	mg/L		27-DEC-17	R3922309
Total Dissolved Solids	60000		80	mg/L		27-DEC-17	R3922667
Total Suspended Solids	271		3.0	mg/L		22-DEC-17	R3920461
Cyanide, Weak Acid Diss	0.0228		0.0050	mg/L		27-DEC-17	R3922309
pH	6.70		0.10	pH		27-DEC-17	R3920709
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.43		0.30	mg/L		05-JAN-18	R3929475
Antimony (Sb)-Total	<0.010	DLA	0.010	mg/L		05-JAN-18	R3929475
Arsenic (As)-Total	<0.010	DLA	0.010	mg/L		05-JAN-18	R3929475
Barium (Ba)-Total	0.572		0.0050	mg/L		05-JAN-18	R3929475
Beryllium (Be)-Total	<0.010	DLA	0.010	mg/L		05-JAN-18	R3929475
Bismuth (Bi)-Total	<0.0050	DLA	0.0050	mg/L		05-JAN-18	R3929475
Boron (B)-Total	2.4		1.0	mg/L		05-JAN-18	R3929475
Cadmium (Cd)-Total	0.0268		0.00050	mg/L		05-JAN-18	R3929475
Calcium (Ca)-Total	16800		5.0	mg/L		05-JAN-18	R3929475
Cesium (Cs)-Total	0.0050		0.0010	mg/L		05-JAN-18	R3929475
Chromium (Cr)-Total	<0.010	DLA	0.010	mg/L		05-JAN-18	R3929475
Cobalt (Co)-Total	0.198		0.010	mg/L		05-JAN-18	R3929475
Copper (Cu)-Total	0.610		0.050	mg/L		05-JAN-18	R3929475
Iron (Fe)-Total	1.1		1.0	mg/L		05-JAN-18	R3929475
Lead (Pb)-Total	0.131		0.0050	mg/L		05-JAN-18	R3929475
Lithium (Li)-Total	0.38		0.10	mg/L		05-JAN-18	R3929475
Magnesium (Mg)-Total	1110		0.50	mg/L		05-JAN-18	R3929475
Manganese (Mn)-Total	6.54		0.010	mg/L		05-JAN-18	R3929475
Molybdenum (Mo)-Total	0.0285		0.0050	mg/L		05-JAN-18	R3929475
Nickel (Ni)-Total	0.364		0.050	mg/L		05-JAN-18	R3929475
Phosphorus (P)-Total	<5.0	DLA	5.0	mg/L		05-JAN-18	R3929475
Potassium (K)-Total	497		5.0	mg/L		05-JAN-18	R3929475
Rubidium (Rb)-Total	0.381		0.020	mg/L		05-JAN-18	R3929475
Selenium (Se)-Total	0.0112		0.0050	mg/L		05-JAN-18	R3929475
Silicon (Si)-Total	<10	DLA	10	mg/L		05-JAN-18	R3929475
Silver (Ag)-Total	0.0538		0.0010	mg/L		05-JAN-18	R3929475
Sodium (Na)-Total	8180		5.0	mg/L		05-JAN-18	R3929475
Strontium (Sr)-Total	32.1		0.020	mg/L		05-JAN-18	R3929475
Sulfur (S)-Total	443		50	mg/L		05-JAN-18	R3929475
Tellurium (Te)-Total	<0.020	DLA	0.020	mg/L		05-JAN-18	R3929475
Thallium (Tl)-Total	0.0012		0.0010	mg/L		05-JAN-18	R3929475
Thorium (Th)-Total	<0.010	DLA	0.010	mg/L		05-JAN-18	R3929475

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2037226-2 TL11-17DEC7B							
Sampled By: SW on 17-DEC-17 @ 13:30							
Matrix: WATER							
Total Metals in Water by CRC ICPMS							
Tin (Sn)-Total	<0.010	DLA	0.010	mg/L		05-JAN-18	R3929475
Titanium (Ti)-Total	<0.030	DLA	0.030	mg/L		05-JAN-18	R3929475
Tungsten (W)-Total	<0.010	DLA	0.010	mg/L		05-JAN-18	R3929475
Uranium (U)-Total	0.0026		0.0010	mg/L		05-JAN-18	R3929475
Vanadium (V)-Total	<0.050	DLA	0.050	mg/L		05-JAN-18	R3929475
Zinc (Zn)-Total	1.63		0.30	mg/L		05-JAN-18	R3929475
Zirconium (Zr)-Total	<0.0060	DLA	0.0060	mg/L		05-JAN-18	R3929475
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					28-DEC-17	R3922789
Aluminum (Al)-Dissolved	<0.10	DLA	0.10	mg/L	28-DEC-17	04-JAN-18	R3929171
Antimony (Sb)-Dissolved	<0.010	DLA	0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Arsenic (As)-Dissolved	<0.010	DLA	0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Barium (Ba)-Dissolved	0.623		0.0050	mg/L	28-DEC-17	04-JAN-18	R3929171
Beryllium (Be)-Dissolved	<0.010	DLA	0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Bismuth (Bi)-Dissolved	<0.0050	DLA	0.0050	mg/L	28-DEC-17	04-JAN-18	R3929171
Boron (B)-Dissolved	2.7		1.0	mg/L	28-DEC-17	04-JAN-18	R3929171
Cadmium (Cd)-Dissolved	0.0281		0.00050	mg/L	28-DEC-17	04-JAN-18	R3929171
Calcium (Ca)-Dissolved	18000		5.0	mg/L	28-DEC-17	04-JAN-18	R3929171
Cesium (Cs)-Dissolved	0.0054		0.0010	mg/L	28-DEC-17	04-JAN-18	R3929171
Chromium (Cr)-Dissolved	<0.010	DLA	0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Cobalt (Co)-Dissolved	0.211		0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Copper (Cu)-Dissolved	0.639		0.020	mg/L	28-DEC-17	04-JAN-18	R3929171
Iron (Fe)-Dissolved	<1.0	DLA	1.0	mg/L	28-DEC-17	04-JAN-18	R3929171
Lead (Pb)-Dissolved	0.140		0.0050	mg/L	28-DEC-17	04-JAN-18	R3929171
Lithium (Li)-Dissolved	0.43		0.10	mg/L	28-DEC-17	04-JAN-18	R3929171
Magnesium (Mg)-Dissolved	1180		0.50	mg/L	28-DEC-17	04-JAN-18	R3929171
Manganese (Mn)-Dissolved	7.29		0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Molybdenum (Mo)-Dissolved	0.0317		0.0050	mg/L	28-DEC-17	04-JAN-18	R3929171
Nickel (Ni)-Dissolved	0.397		0.050	mg/L	28-DEC-17	04-JAN-18	R3929171
Phosphorus (P)-Dissolved	<5.0	DLA	5.0	mg/L	28-DEC-17	04-JAN-18	R3929171
Potassium (K)-Dissolved	542		5.0	mg/L	28-DEC-17	04-JAN-18	R3929171
Rubidium (Rb)-Dissolved	0.433		0.020	mg/L	28-DEC-17	04-JAN-18	R3929171
Selenium (Se)-Dissolved	0.0131		0.0050	mg/L	28-DEC-17	04-JAN-18	R3929171
Silicon (Si)-Dissolved	<5.0	DLA	5.0	mg/L	28-DEC-17	04-JAN-18	R3929171
Silver (Ag)-Dissolved	0.0592		0.0010	mg/L	28-DEC-17	04-JAN-18	R3929171
Sodium (Na)-Dissolved	8880		5.0	mg/L	28-DEC-17	04-JAN-18	R3929171
Strontium (Sr)-Dissolved	32.3		0.020	mg/L	28-DEC-17	04-JAN-18	R3929171
Sulfur (S)-Dissolved	451		50	mg/L	28-DEC-17	04-JAN-18	R3929171
Tellurium (Te)-Dissolved	<0.020	DLA	0.020	mg/L	28-DEC-17	04-JAN-18	R3929171
Thallium (Tl)-Dissolved	0.0014		0.0010	mg/L	28-DEC-17	04-JAN-18	R3929171
Thorium (Th)-Dissolved	<0.010	DLA	0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Tin (Sn)-Dissolved	<0.010	DLA	0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Titanium (Ti)-Dissolved	<0.030	DLA	0.030	mg/L	28-DEC-17	04-JAN-18	R3929171
Tungsten (W)-Dissolved	<0.010	DLA	0.010	mg/L	28-DEC-17	04-JAN-18	R3929171
Uranium (U)-Dissolved	0.0032		0.0010	mg/L	28-DEC-17	04-JAN-18	R3929171
Vanadium (V)-Dissolved	<0.050	DLA	0.050	mg/L	28-DEC-17	04-JAN-18	R3929171
Zinc (Zn)-Dissolved	1.75		0.10	mg/L	28-DEC-17	04-JAN-18	R3929171
Zirconium (Zr)-Dissolved	<0.0060	DLA	0.0060	mg/L	28-DEC-17	04-JAN-18	R3929171

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
CNI	Test result for Total Cyanide may be biased high due to interference from high nitrite in this sample. Nitrite can cause false positives for T-CN at up to ~ 0.8% of the nitrite concentration. Interpret result as a maximum possible value.
DLA	Detection Limit adjusted for required dilution
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
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).
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**
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.			
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.			
CN-FREE-CFA-VA	Water	Free Cyanide in water by CFA	ASTM 7237
This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
CN-T-CFA-VA	Water	Total Cyanide in water by CFA	ISO 14403:2002
This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.			
CN-WAD-CFA-VA	Water	Weak Acid Diss. Cyanide in water by CFA	APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.			
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.			
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.			
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.			
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. Weston et			

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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.			
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.			

** 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:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

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

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.



Quality Control Report

Workorder: L2037226

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Client: TMAC Resources Inc
Hope Bay Project 95 Wellington St West
Toronto ON M5J 2N7

Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA Water								
Batch	R3924171							
WG2690854-3 CRM		VA-ACY-CONTROL						
Acidity (as CaCO3)			101.0		%		85-115	28-DEC-17
WG2690854-1 MB								
Acidity (as CaCO3)			1.6		mg/L		2	28-DEC-17
ALK-TITR-VA Water								
Batch	R3920709							
WG2690427-3 CRM		VA-ALK-TITR-CONTROL						
Alkalinity, Total (as CaCO3)			99.8		%		85-115	27-DEC-17
WG2690427-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	27-DEC-17
CL-IC-N-VA Water								
Batch	R3917417							
WG2688692-13 LCS								
Chloride (Cl)			101.3		%		90-110	21-DEC-17
WG2688692-18 LCS								
Chloride (Cl)			101.4		%		90-110	21-DEC-17
WG2688692-2 LCS								
Chloride (Cl)			101.4		%		90-110	21-DEC-17
WG2688692-5 LCS								
Chloride (Cl)			101.4		%		90-110	21-DEC-17
WG2688692-9 LCS								
Chloride (Cl)			101.8		%		90-110	21-DEC-17
WG2688692-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	21-DEC-17
WG2688692-12 MB								
Chloride (Cl)			<0.50		mg/L		0.5	21-DEC-17
WG2688692-16 MB								
Chloride (Cl)			<0.50		mg/L		0.5	21-DEC-17
WG2688692-4 MB								
Chloride (Cl)			<0.50		mg/L		0.5	21-DEC-17
WG2688692-8 MB								
Chloride (Cl)			<0.50		mg/L		0.5	21-DEC-17
CN-FREE-CFA-VA Water								
Batch	R3918811							
WG2689560-2 LCS								
Cyanide, Free			98.5		%		80-120	22-DEC-17
WG2689560-7 LCS								
Cyanide, Free			98.4		%		80-120	22-DEC-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-FREE-CFA-VA		Water						
Batch	R3918811							
WG2689560-1	MB							
Cyanide, Free			<0.0050		mg/L		0.005	22-DEC-17
WG2689560-6	MB							
Cyanide, Free			<0.0050		mg/L		0.005	22-DEC-17
Batch	R3922309							
WG2690562-7	LCS							
Cyanide, Free			98.6		%		80-120	27-DEC-17
WG2690562-6	MB							
Cyanide, Free			<0.0050		mg/L		0.005	27-DEC-17
CN-T-CFA-VA		Water						
Batch	R3918811							
WG2689560-2	LCS							
Cyanide, Total			90.6		%		80-120	22-DEC-17
WG2689560-7	LCS							
Cyanide, Total			90.6		%		80-120	22-DEC-17
WG2689560-1	MB							
Cyanide, Total			<0.0050		mg/L		0.005	22-DEC-17
WG2689560-6	MB							
Cyanide, Total			<0.0050		mg/L		0.005	22-DEC-17
Batch	R3922309							
WG2690562-7	LCS							
Cyanide, Total			85.3		%		80-120	27-DEC-17
WG2690562-6	MB							
Cyanide, Total			<0.0050		mg/L		0.005	27-DEC-17
CN-WAD-CFA-VA		Water						
Batch	R3918811							
WG2689560-2	LCS							
Cyanide, Weak Acid Diss			102.3		%		80-120	22-DEC-17
WG2689560-7	LCS							
Cyanide, Weak Acid Diss			101.4		%		80-120	22-DEC-17
WG2689560-1	MB							
Cyanide, Weak Acid Diss			<0.0050		mg/L		0.005	22-DEC-17
WG2689560-6	MB							
Cyanide, Weak Acid Diss			<0.0050		mg/L		0.005	22-DEC-17
Batch	R3922309							
WG2690562-7	LCS							
Cyanide, Weak Acid Diss			102.0		%		80-120	27-DEC-17
WG2690562-6	MB							



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-WAD-CFA-VA	Water							
Batch R3922309								
WG2690562-6 MB								
Cyanide, Weak Acid Diss			<0.0050		mg/L		0.005	27-DEC-17
EC-PCT-VA	Water							
Batch R3920709								
WG2690427-4 CRM		VA-EC-PCT-CONTROL						
Conductivity			100.8		%		90-110	27-DEC-17
WG2690427-1 MB								
Conductivity			<2.0		uS/cm		2	27-DEC-17
MET-D-CCMS-VA	Water							
Batch R3927699								
WG2691343-2 LCS								
Aluminum (Al)-Dissolved			112.2		%		80-120	29-DEC-17
Antimony (Sb)-Dissolved			95.2		%		80-120	29-DEC-17
Arsenic (As)-Dissolved			103.4		%		80-120	29-DEC-17
Barium (Ba)-Dissolved			99.9		%		80-120	29-DEC-17
Beryllium (Be)-Dissolved			99.1		%		80-120	29-DEC-17
Bismuth (Bi)-Dissolved			101.0		%		80-120	29-DEC-17
Boron (B)-Dissolved			95.2		%		80-120	29-DEC-17
Cadmium (Cd)-Dissolved			100.3		%		80-120	29-DEC-17
Calcium (Ca)-Dissolved			97.7		%		80-120	29-DEC-17
Cesium (Cs)-Dissolved			94.8		%		80-120	29-DEC-17
Chromium (Cr)-Dissolved			104.3		%		80-120	29-DEC-17
Cobalt (Co)-Dissolved			100.6		%		80-120	29-DEC-17
Copper (Cu)-Dissolved			101.0		%		80-120	29-DEC-17
Iron (Fe)-Dissolved			95.4		%		80-120	29-DEC-17
Lead (Pb)-Dissolved			95.5		%		80-120	29-DEC-17
Lithium (Li)-Dissolved			95.2		%		80-120	29-DEC-17
Magnesium (Mg)-Dissolved			110.3		%		80-120	29-DEC-17
Manganese (Mn)-Dissolved			105.2		%		80-120	29-DEC-17
Molybdenum (Mo)-Dissolved			100.3		%		80-120	29-DEC-17
Nickel (Ni)-Dissolved			100.7		%		80-120	29-DEC-17
Phosphorus (P)-Dissolved			122.7	MES	%		80-120	29-DEC-17
Potassium (K)-Dissolved			107.5		%		80-120	29-DEC-17
Rubidium (Rb)-Dissolved			107.7		%		80-120	29-DEC-17
Selenium (Se)-Dissolved			101.8		%		80-120	29-DEC-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	Water							
Batch	R3927699							
WG2691343-2 LCS								
Silicon (Si)-Dissolved			107.1		%		80-120	29-DEC-17
Silver (Ag)-Dissolved			88.4		%		80-120	29-DEC-17
Sodium (Na)-Dissolved			104.2		%		80-120	29-DEC-17
Strontium (Sr)-Dissolved			96.2		%		80-120	29-DEC-17
Sulfur (S)-Dissolved			90.5		%		80-120	29-DEC-17
Tellurium (Te)-Dissolved			100.2		%		80-120	29-DEC-17
Thallium (Tl)-Dissolved			92.6		%		80-120	29-DEC-17
Thorium (Th)-Dissolved			92.7		%		80-120	29-DEC-17
Tin (Sn)-Dissolved			96.6		%		80-120	29-DEC-17
Titanium (Ti)-Dissolved			102.6		%		80-120	29-DEC-17
Tungsten (W)-Dissolved			100.4		%		80-120	29-DEC-17
Uranium (U)-Dissolved			93.9		%		80-120	29-DEC-17
Vanadium (V)-Dissolved			105.9		%		80-120	29-DEC-17
Zinc (Zn)-Dissolved			92.3		%		80-120	29-DEC-17
Zirconium (Zr)-Dissolved			92.0		%		80-120	29-DEC-17
WG2691343-1 MB		NP						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	29-DEC-17
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	29-DEC-17
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	29-DEC-17
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	29-DEC-17
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	29-DEC-17
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	29-DEC-17
Boron (B)-Dissolved			<0.010		mg/L		0.01	29-DEC-17
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	29-DEC-17
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	29-DEC-17
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	29-DEC-17
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	29-DEC-17
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	29-DEC-17
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	29-DEC-17
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	29-DEC-17
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	29-DEC-17
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	29-DEC-17
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	29-DEC-17
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	29-DEC-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA		Water						
Batch	R3927699							
WG2691343-1	MB	NP						
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	29-DEC-17
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	29-DEC-17
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	29-DEC-17
Potassium (K)-Dissolved			<0.050		mg/L		0.05	29-DEC-17
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	29-DEC-17
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	29-DEC-17
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	29-DEC-17
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	29-DEC-17
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	29-DEC-17
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	29-DEC-17
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	29-DEC-17
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	29-DEC-17
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	29-DEC-17
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	29-DEC-17
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	29-DEC-17
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	29-DEC-17
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	29-DEC-17
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	29-DEC-17
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	29-DEC-17
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	29-DEC-17
Zirconium (Zr)-Dissolved			<0.000060		mg/L		0.00006	29-DEC-17
Batch	R3929171							
WG2691343-3	DUP	L2037226-2						
Aluminum (Al)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	04-JAN-18
Antimony (Sb)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-JAN-18
Arsenic (As)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-JAN-18
Barium (Ba)-Dissolved		0.623	0.596		mg/L	4.6	20	04-JAN-18
Beryllium (Be)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-JAN-18
Bismuth (Bi)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	04-JAN-18
Boron (B)-Dissolved		2.7	2.5		mg/L	5.9	20	04-JAN-18
Cadmium (Cd)-Dissolved		0.0281	0.0277		mg/L	1.6	20	04-JAN-18
Calcium (Ca)-Dissolved		18000	17400		mg/L	3.5	20	04-JAN-18
Cesium (Cs)-Dissolved		0.0054	0.0053		mg/L	3.1	20	04-JAN-18
Chromium (Cr)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-JAN-18



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA		Water						
Batch	R3929171							
WG2691343-3	DUP	L2037226-2						
Cobalt (Co)-Dissolved		0.211	0.197		mg/L	7.1	20	04-JAN-18
Copper (Cu)-Dissolved		0.639	0.606		mg/L	5.4	20	04-JAN-18
Iron (Fe)-Dissolved		<1.0	<1.0	RPD-NA	mg/L	N/A	20	04-JAN-18
Lead (Pb)-Dissolved		0.140	0.133		mg/L	5.7	20	04-JAN-18
Lithium (Li)-Dissolved		0.43	0.43		mg/L	1.1	20	04-JAN-18
Magnesium (Mg)-Dissolved		1180	1090		mg/L	7.4	20	04-JAN-18
Manganese (Mn)-Dissolved		7.29	6.85		mg/L	6.2	20	04-JAN-18
Molybdenum (Mo)-Dissolved		0.0317	0.0279		mg/L	13	20	04-JAN-18
Nickel (Ni)-Dissolved		0.397	0.365		mg/L	8.5	20	04-JAN-18
Phosphorus (P)-Dissolved		<5.0	<5.0	RPD-NA	mg/L	N/A	20	04-JAN-18
Potassium (K)-Dissolved		542	518		mg/L	4.5	20	04-JAN-18
Rubidium (Rb)-Dissolved		0.433	0.396		mg/L	9.0	20	04-JAN-18
Selenium (Se)-Dissolved		0.0131	0.0151		mg/L	14	20	04-JAN-18
Silicon (Si)-Dissolved		<5.0	<5.0	RPD-NA	mg/L	N/A	20	04-JAN-18
Silver (Ag)-Dissolved		0.0592	0.0560		mg/L	5.5	20	04-JAN-18
Sodium (Na)-Dissolved		8880	8130		mg/L	8.9	20	04-JAN-18
Strontium (Sr)-Dissolved		32.3	30.0		mg/L	7.6	20	04-JAN-18
Sulfur (S)-Dissolved		451	405		mg/L	11	20	04-JAN-18
Tellurium (Te)-Dissolved		<0.020	<0.020	RPD-NA	mg/L	N/A	20	04-JAN-18
Thallium (Tl)-Dissolved		0.0014	0.0011	J	mg/L	0.0003	0.002	04-JAN-18
Thorium (Th)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-JAN-18
Tin (Sn)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-JAN-18
Titanium (Ti)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	20	04-JAN-18
Tungsten (W)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-JAN-18
Uranium (U)-Dissolved		0.0032	0.0031		mg/L	2.7	20	04-JAN-18
Vanadium (V)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	04-JAN-18
Zinc (Zn)-Dissolved		1.75	1.67		mg/L	4.5	20	04-JAN-18
Zirconium (Zr)-Dissolved		<0.0060	<0.0060	RPD-NA	mg/L	N/A	20	04-JAN-18
MET-T-CCMS-VA		Water						
Batch	R3929475							
WG2692341-2	LCS							
Aluminum (Al)-Total			100.3		%		80-120	05-JAN-18
Antimony (Sb)-Total			100.2		%		80-120	05-JAN-18
Arsenic (As)-Total			95.6		%		80-120	05-JAN-18



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA		Water						
Batch	R3929475							
WG2692341-2	LCS							
Barium (Ba)-Total			98.8		%		80-120	05-JAN-18
Beryllium (Be)-Total			92.3		%		80-120	05-JAN-18
Bismuth (Bi)-Total			96.4		%		80-120	05-JAN-18
Boron (B)-Total			86.4		%		80-120	05-JAN-18
Cadmium (Cd)-Total			95.7		%		80-120	05-JAN-18
Calcium (Ca)-Total			94.2		%		80-120	05-JAN-18
Cesium (Cs)-Total			95.9		%		80-120	05-JAN-18
Chromium (Cr)-Total			94.4		%		80-120	05-JAN-18
Cobalt (Co)-Total			94.8		%		80-120	05-JAN-18
Copper (Cu)-Total			95.1		%		80-120	05-JAN-18
Iron (Fe)-Total			96.7		%		80-120	05-JAN-18
Lead (Pb)-Total			95.9		%		80-120	05-JAN-18
Lithium (Li)-Total			88.0		%		80-120	05-JAN-18
Magnesium (Mg)-Total			93.3		%		80-120	05-JAN-18
Manganese (Mn)-Total			91.9		%		80-120	05-JAN-18
Molybdenum (Mo)-Total			99.7		%		80-120	05-JAN-18
Nickel (Ni)-Total			95.8		%		80-120	05-JAN-18
Phosphorus (P)-Total			99.0		%		80-120	05-JAN-18
Potassium (K)-Total			98.2		%		80-120	05-JAN-18
Rubidium (Rb)-Total			101.2		%		80-120	05-JAN-18
Selenium (Se)-Total			97.4		%		80-120	05-JAN-18
Silicon (Si)-Total			96.7		%		80-120	05-JAN-18
Silver (Ag)-Total			93.8		%		80-120	05-JAN-18
Sodium (Na)-Total			100.6		%		80-120	05-JAN-18
Strontium (Sr)-Total			99.6		%		80-120	05-JAN-18
Sulfur (S)-Total			87.5		%		80-120	05-JAN-18
Tellurium (Te)-Total			93.8		%		80-120	05-JAN-18
Thallium (Tl)-Total			95.5		%		80-120	05-JAN-18
Thorium (Th)-Total			95.9		%		80-120	05-JAN-18
Tin (Sn)-Total			95.6		%		80-120	05-JAN-18
Titanium (Ti)-Total			88.6		%		80-120	05-JAN-18
Tungsten (W)-Total			100.3		%		80-120	05-JAN-18
Uranium (U)-Total			95.9		%		80-120	05-JAN-18
Vanadium (V)-Total			98.7		%		80-120	05-JAN-18



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA		Water						
Batch	R3929475							
WG2692341-2		LCS						
Zinc (Zn)-Total			89.0		%		80-120	05-JAN-18
Zirconium (Zr)-Total			98.8		%		80-120	05-JAN-18
WG2692341-1		MB						
Aluminum (Al)-Total			<0.0030		mg/L		0.003	05-JAN-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	05-JAN-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	05-JAN-18
Barium (Ba)-Total			<0.000050		mg/L		0.00005	05-JAN-18
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	05-JAN-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	05-JAN-18
Boron (B)-Total			<0.010		mg/L		0.01	05-JAN-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	05-JAN-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	05-JAN-18
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	05-JAN-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	05-JAN-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	05-JAN-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	05-JAN-18
Iron (Fe)-Total			<0.010		mg/L		0.01	05-JAN-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	05-JAN-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	05-JAN-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	05-JAN-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	05-JAN-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	05-JAN-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	05-JAN-18
Phosphorus (P)-Total			<0.050		mg/L		0.05	05-JAN-18
Potassium (K)-Total			<0.050		mg/L		0.05	05-JAN-18
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	05-JAN-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	05-JAN-18
Silicon (Si)-Total			<0.10		mg/L		0.1	05-JAN-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	05-JAN-18
Sodium (Na)-Total			<0.050		mg/L		0.05	05-JAN-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	05-JAN-18
Sulfur (S)-Total			<0.50		mg/L		0.5	05-JAN-18
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	05-JAN-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	05-JAN-18



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA		Water						
Batch	R3929475							
WG2692341-1 MB								
Thorium (Th)-Total			<0.00010		mg/L		0.0001	05-JAN-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	05-JAN-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	05-JAN-18
Tungsten (W)-Total			<0.00010		mg/L		0.0001	05-JAN-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	05-JAN-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	05-JAN-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	05-JAN-18
Zirconium (Zr)-Total			<0.000060		mg/L		0.00006	05-JAN-18
NH3-F-VA		Water						
Batch	R3927793							
WG2692214-2 LCS								
Ammonia, Total (as N)			90.4		%		85-115	02-JAN-18
WG2692214-1 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	02-JAN-18
NO2-L-IC-N-VA		Water						
Batch	R3917417							
WG2688692-13 LCS								
Nitrite (as N)			97.4		%		90-110	21-DEC-17
WG2688692-18 LCS								
Nitrite (as N)			98.3		%		90-110	21-DEC-17
WG2688692-2 LCS								
Nitrite (as N)			99.5		%		90-110	21-DEC-17
WG2688692-5 LCS								
Nitrite (as N)			97.8		%		90-110	21-DEC-17
WG2688692-9 LCS								
Nitrite (as N)			98.0		%		90-110	21-DEC-17
WG2688692-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	21-DEC-17
WG2688692-12 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	21-DEC-17
WG2688692-16 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	21-DEC-17
WG2688692-4 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	21-DEC-17
WG2688692-8 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	21-DEC-17



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-VA								
Batch R3917417								
WG2688692-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	21-DEC-17
WG2688692-12 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	21-DEC-17
WG2688692-16 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	21-DEC-17
WG2688692-4 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	21-DEC-17
WG2688692-8 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	21-DEC-17
TDS-VA								
Batch R3922667								
WG2690068-2 LCS								
Total Dissolved Solids			100.3		%		85-115	27-DEC-17
WG2690068-1 MB								
Total Dissolved Solids			<10		mg/L		10	27-DEC-17
TSS-VA								
Batch R3920461								
WG2689639-6 DUP		L2037226-1						
Total Suspended Solids		1090	1120		mg/L	3.3	20	22-DEC-17
WG2689639-5 LCS								
Total Suspended Solids			98.1		%		85-115	22-DEC-17
WG2689639-4 MB								
Total Suspended Solids			<3.0		mg/L		3	22-DEC-17

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
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).
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Total Dissolved Solids by Gravimetric							
	1	17-DEC-17 13:30	27-DEC-17 12:41	7	10	days	EHT
	2	17-DEC-17 13:30	27-DEC-17 12:41	7	10	days	EHT
pH by Meter (Automated)							
	1	17-DEC-17 13:30	27-DEC-17 11:07	0.25	238	hours	EHTR-FM
	2	17-DEC-17 13:30	27-DEC-17 11:07	0.25	238	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC (Low Level)							
	1	17-DEC-17 13:30	21-DEC-17 06:46	3	4	days	EHT
	2	17-DEC-17 13:30	21-DEC-17 06:46	3	4	days	EHT
Nitrite in Water by IC (Low Level)							
	1	17-DEC-17 13:30	21-DEC-17 06:46	3	4	days	EHT
	2	17-DEC-17 13:30	21-DEC-17 06:46	3	4	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

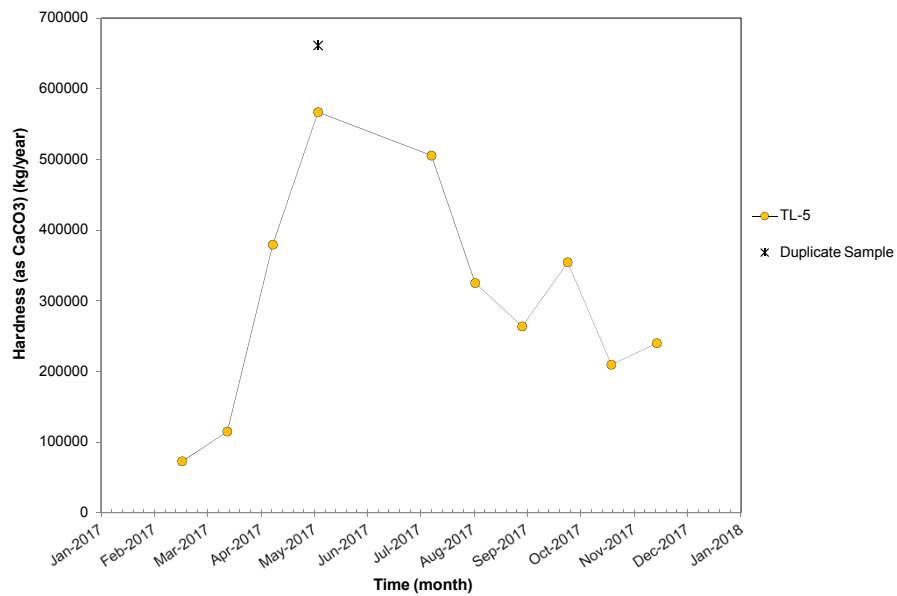
Notes*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2037226 were received on 19-DEC-17 13:50.

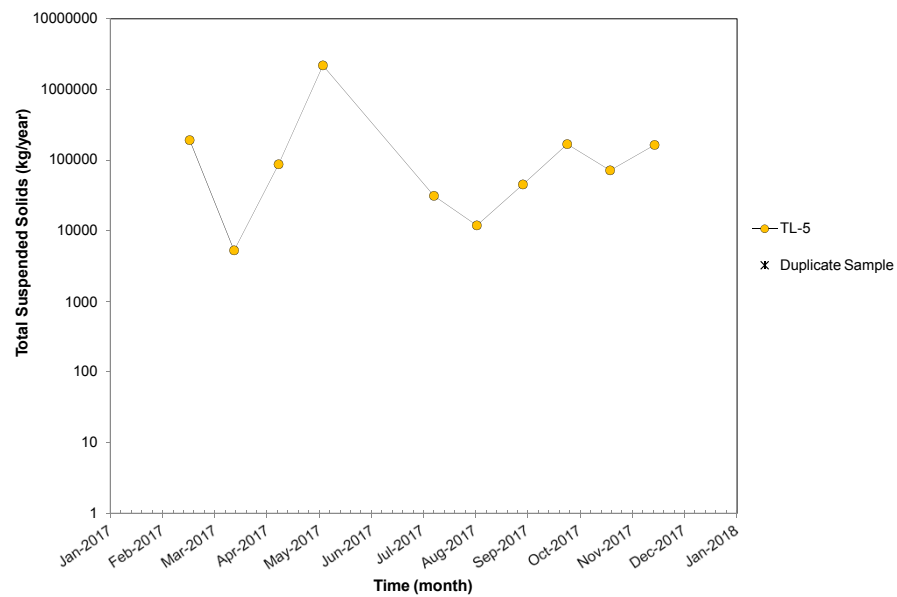
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

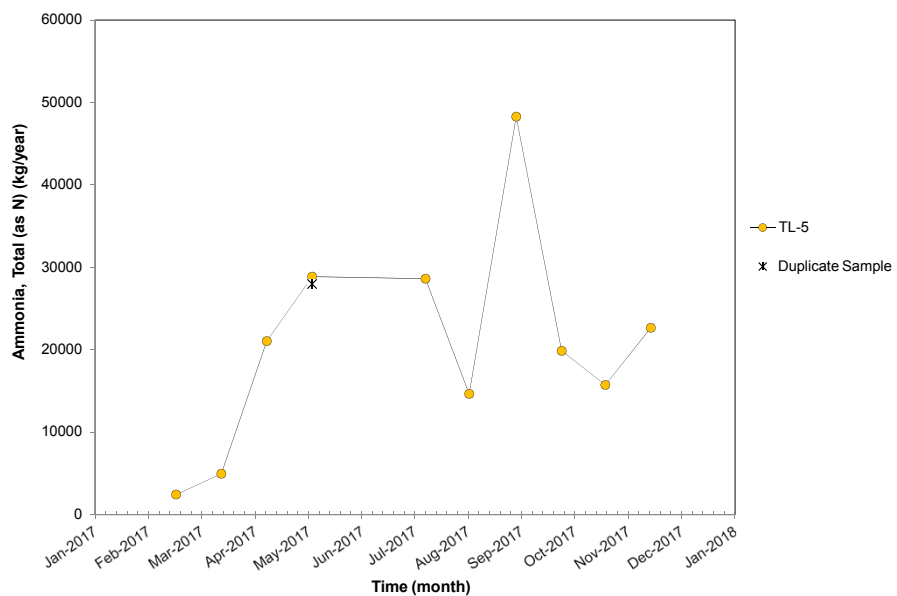
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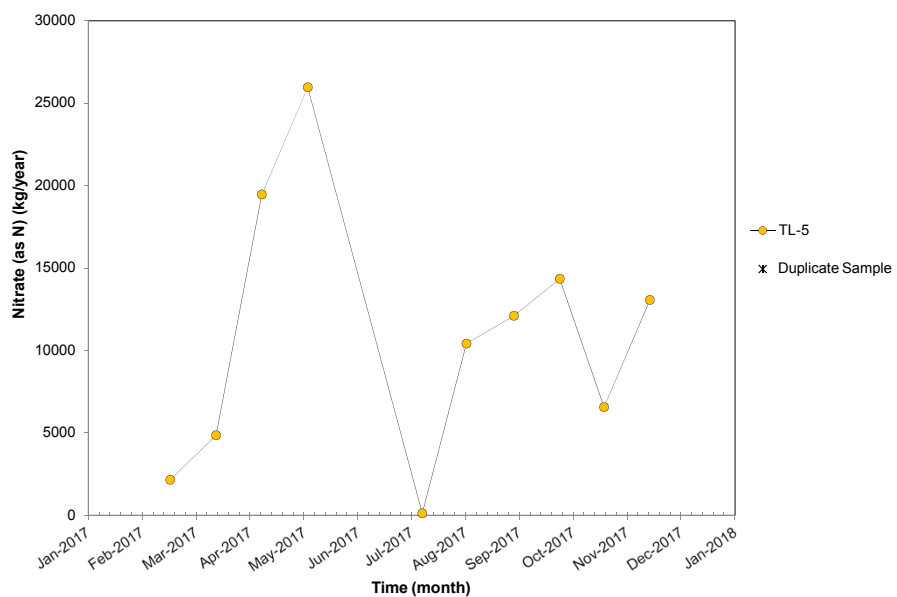
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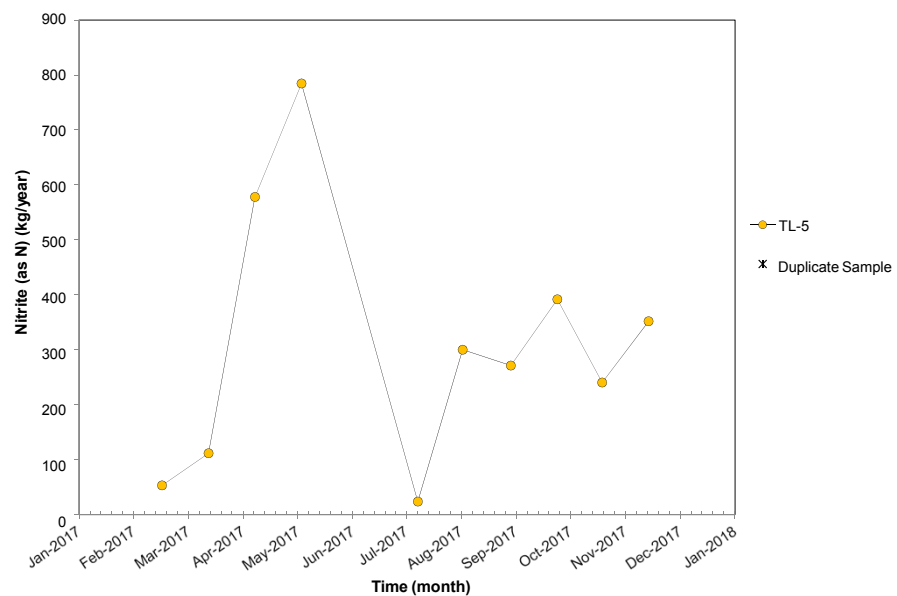
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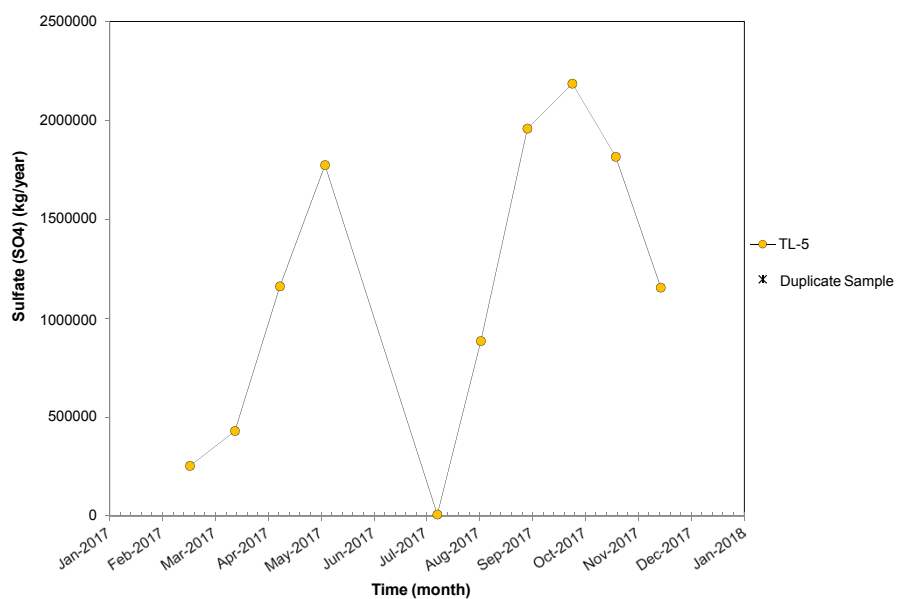
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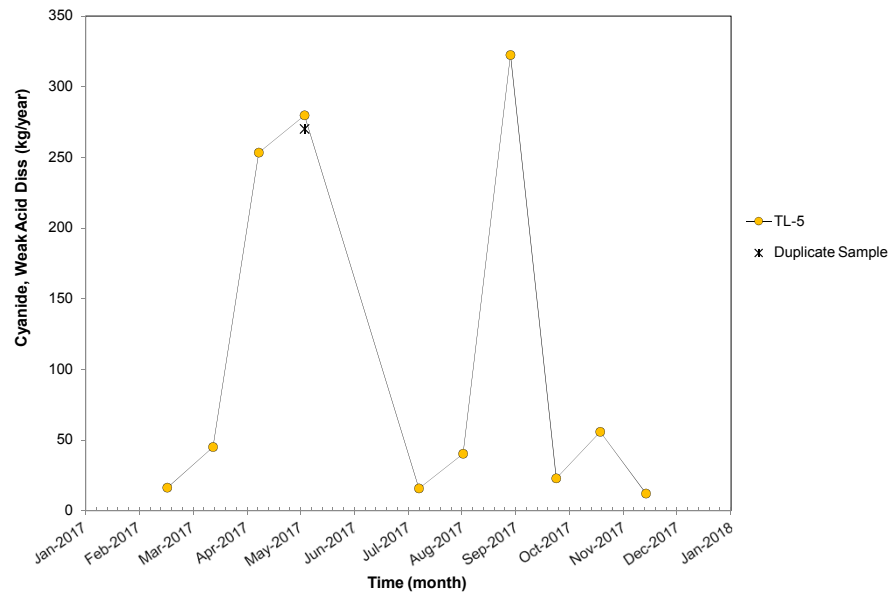
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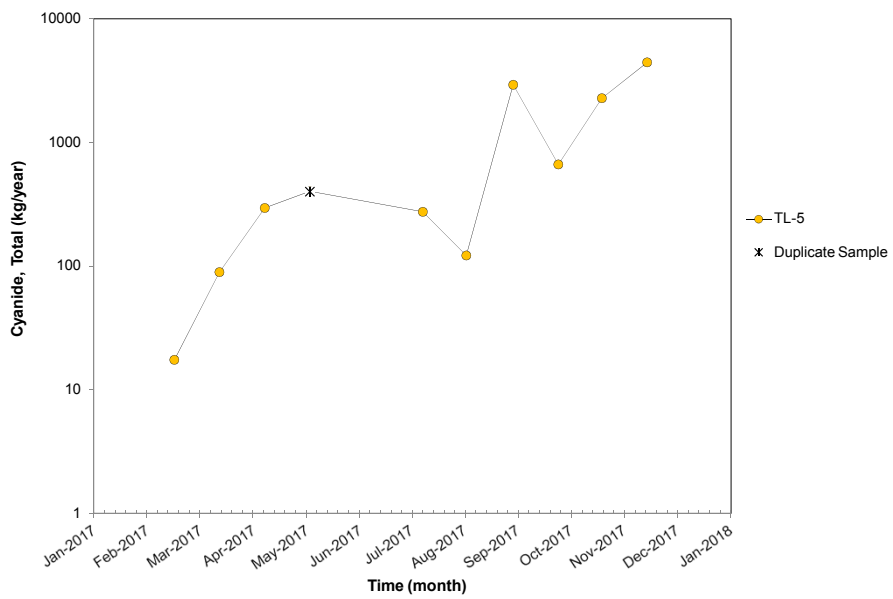
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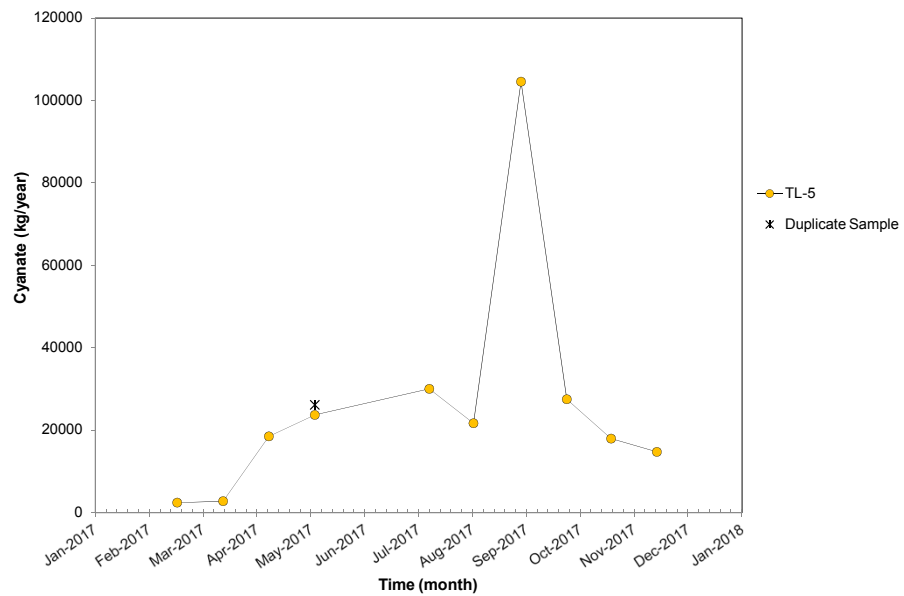
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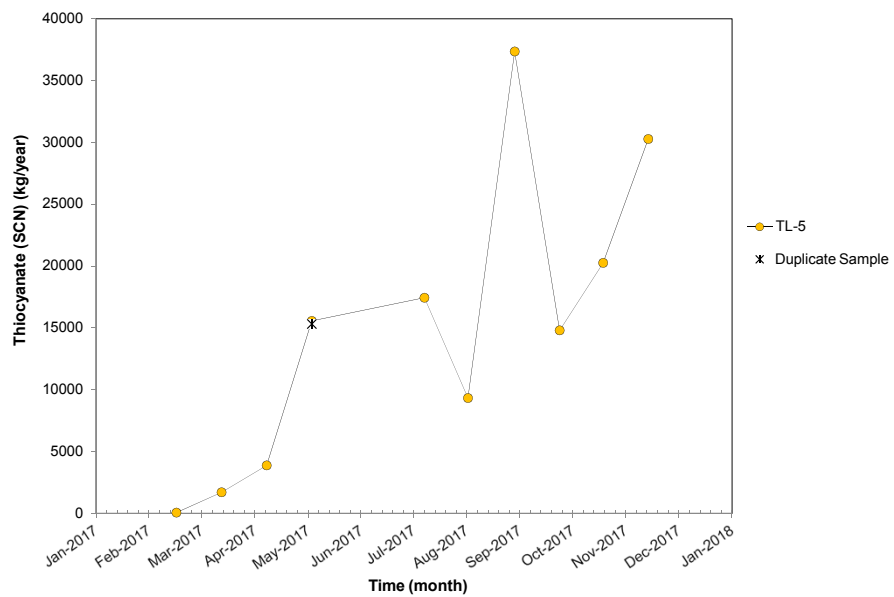
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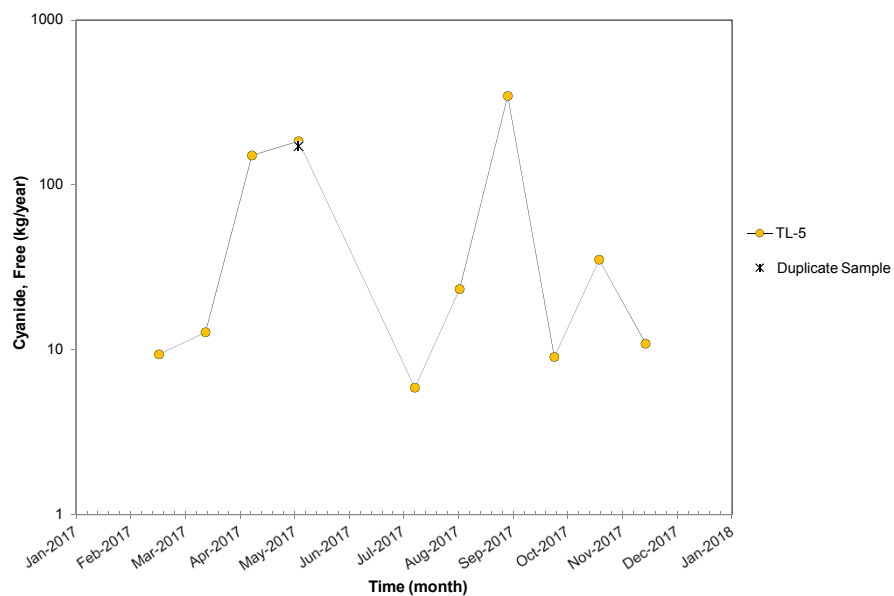
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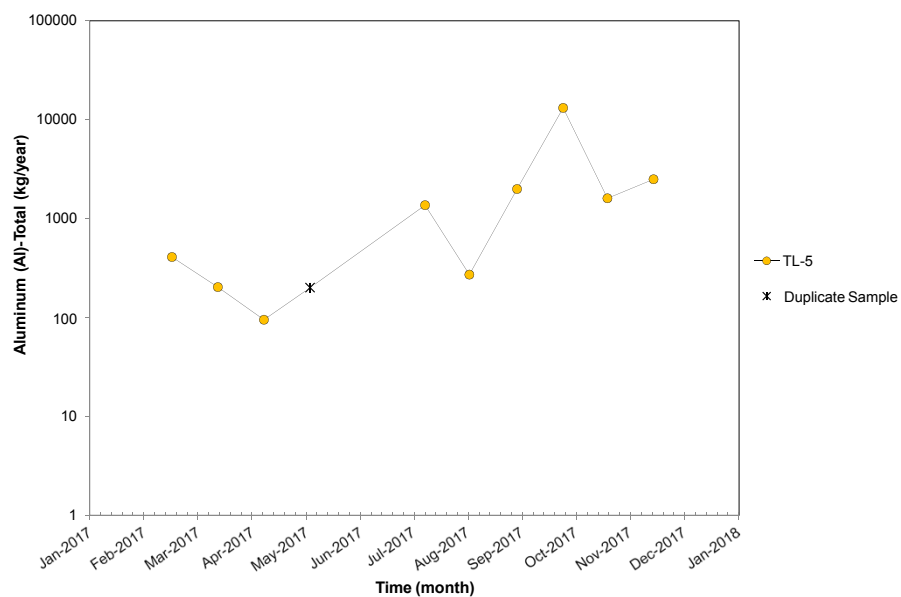
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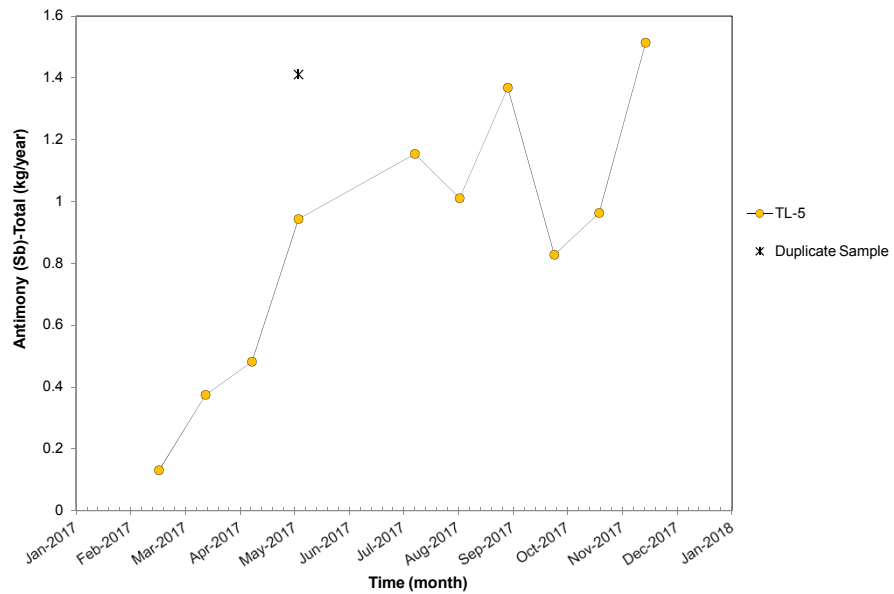
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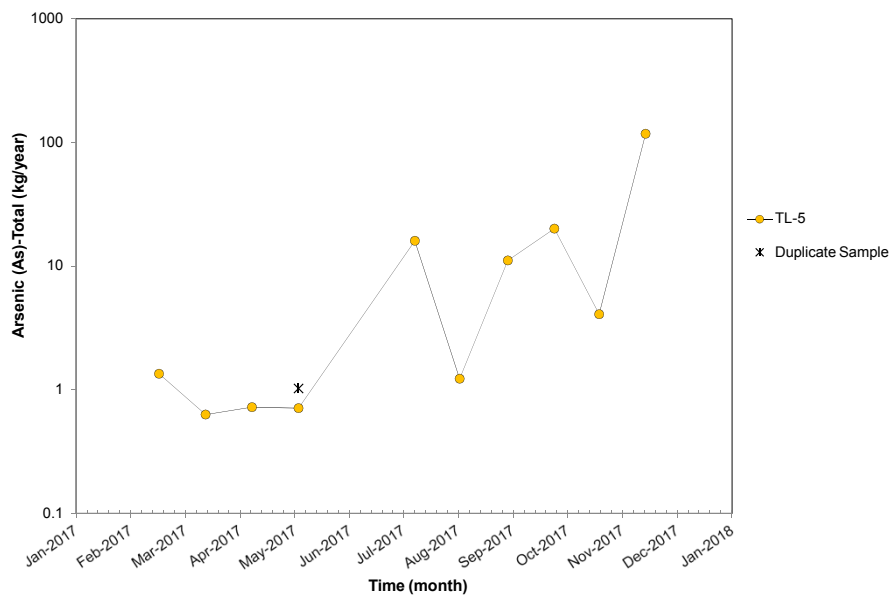
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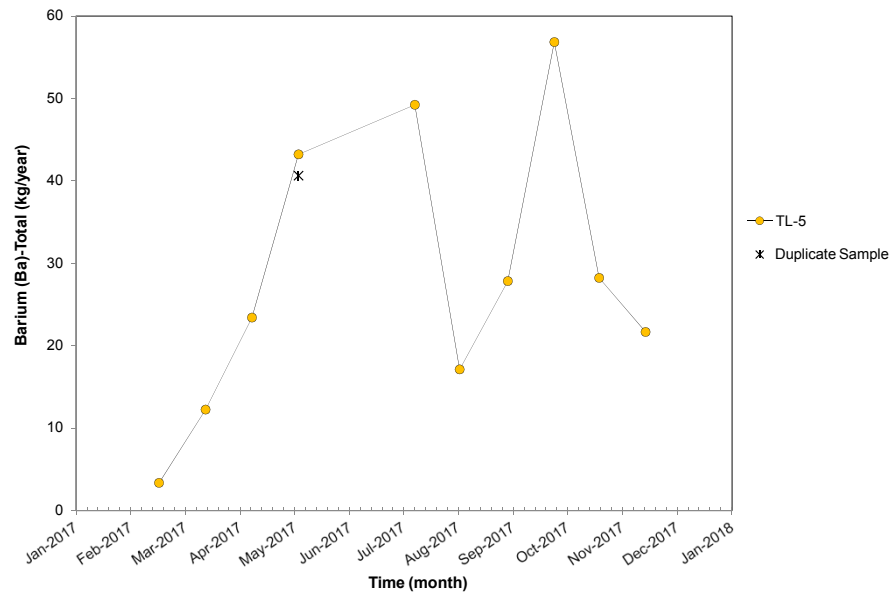
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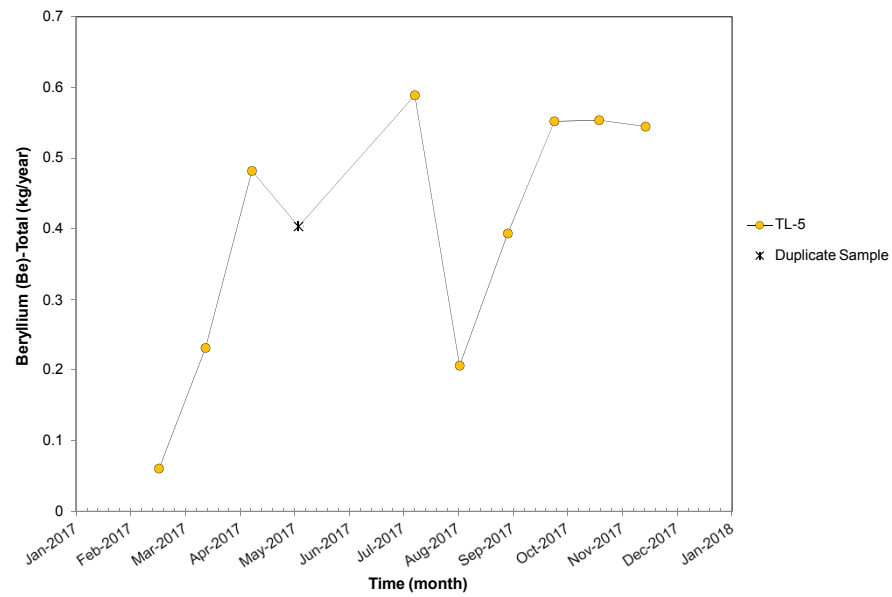
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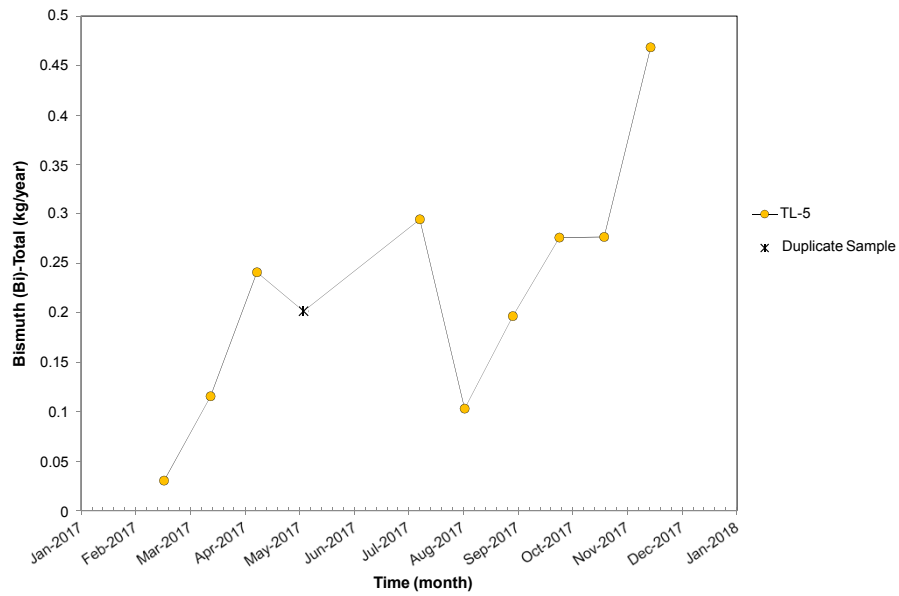
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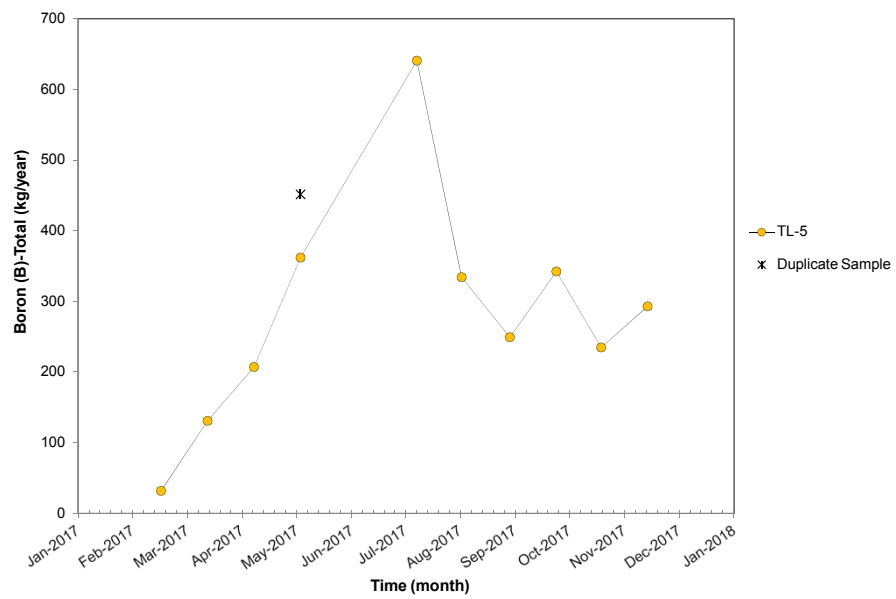
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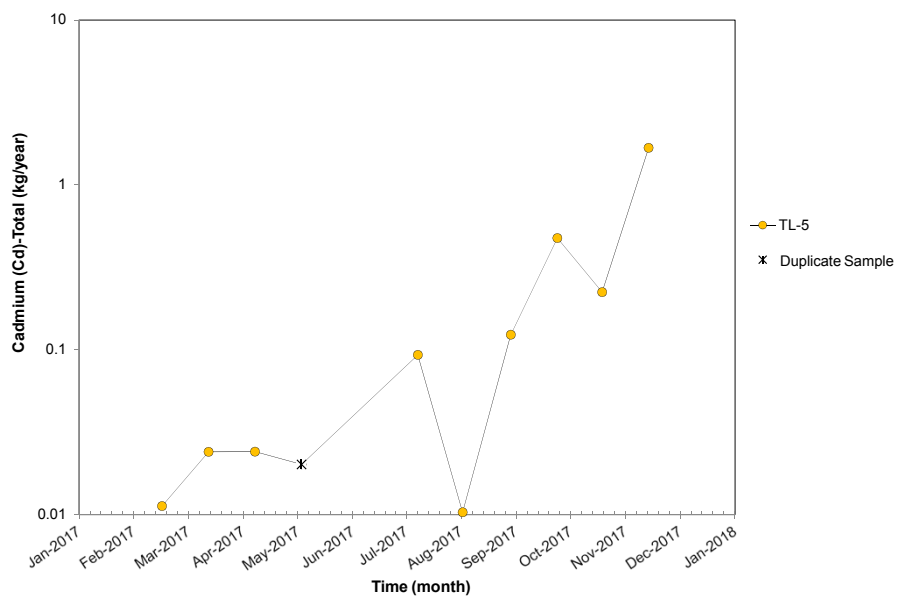
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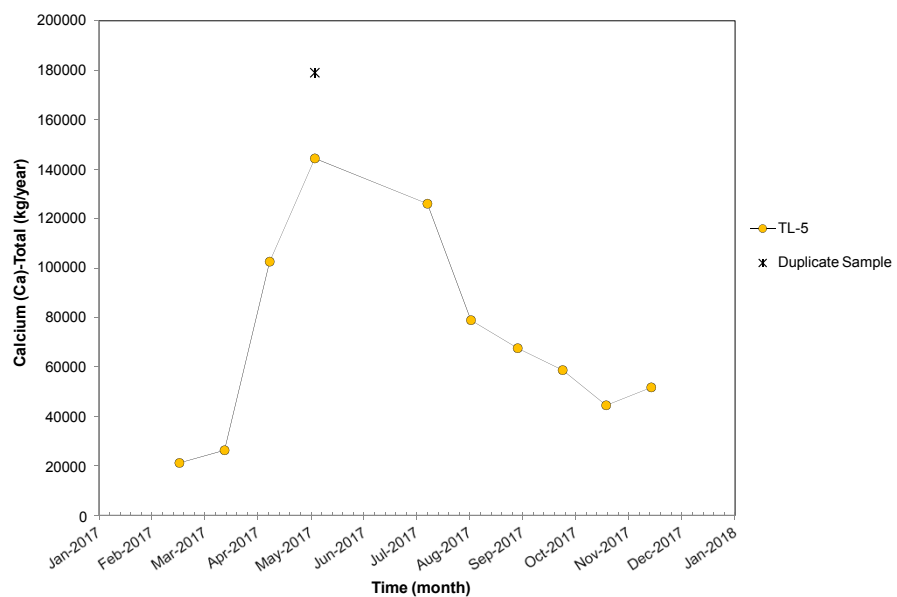
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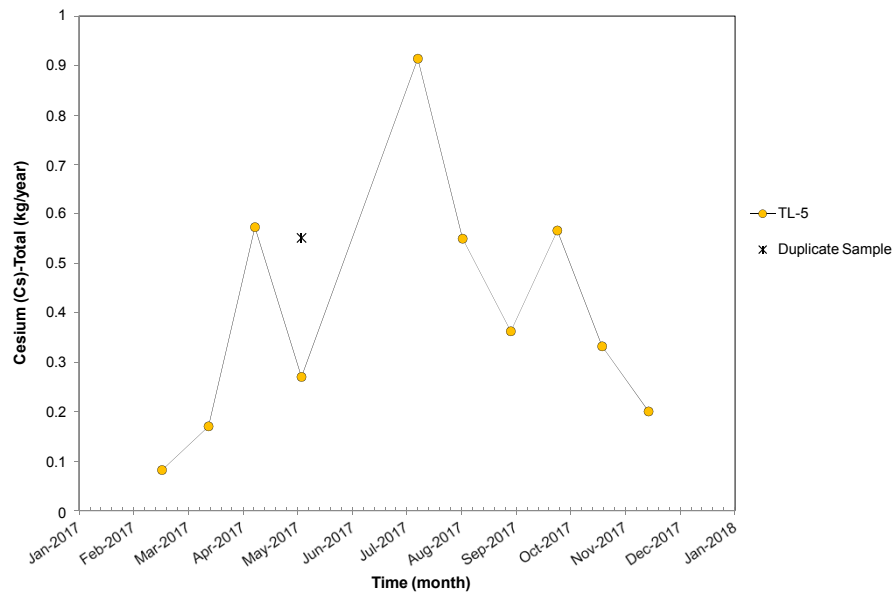
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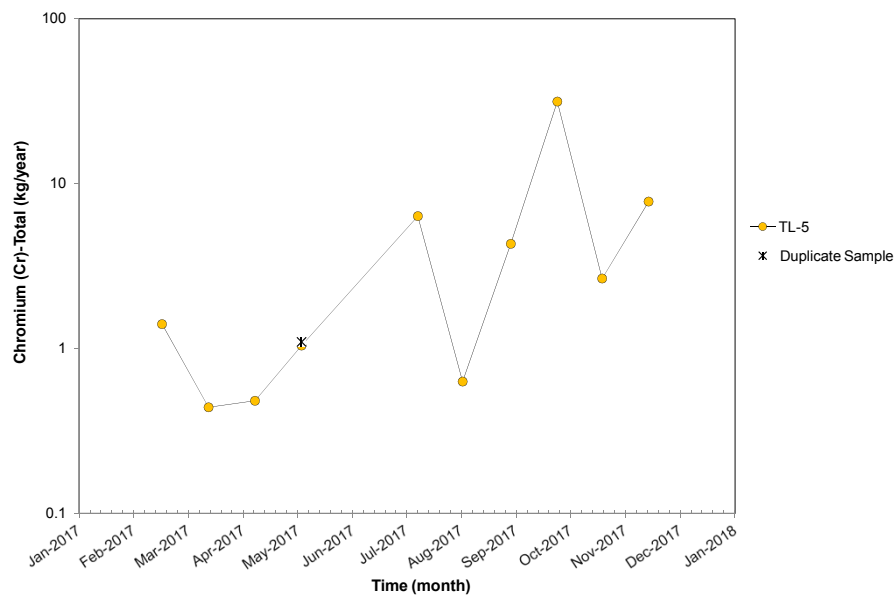
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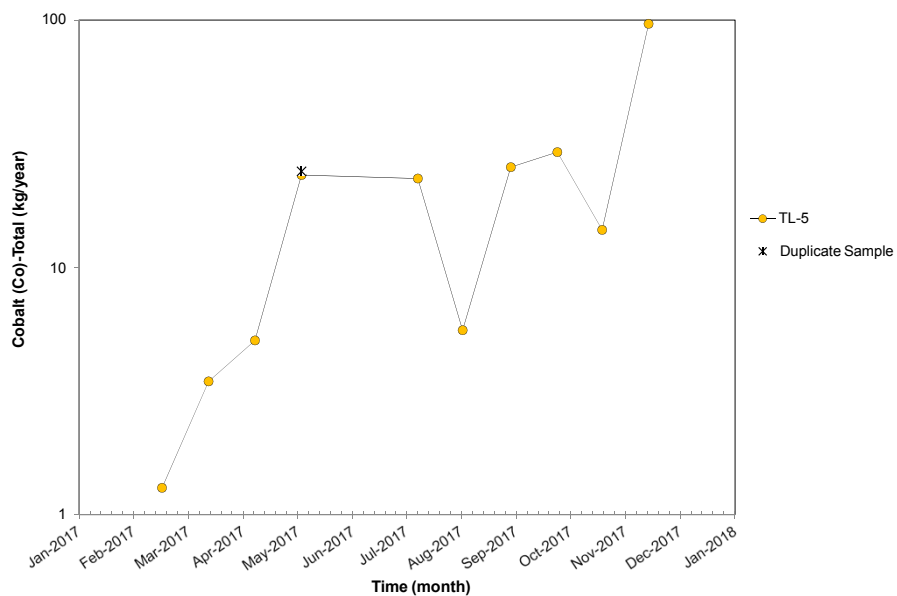
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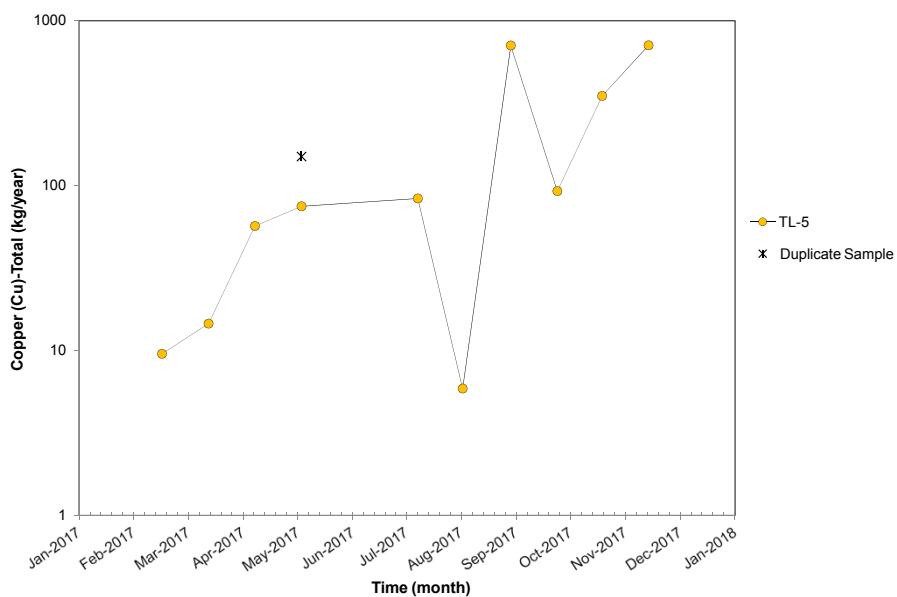
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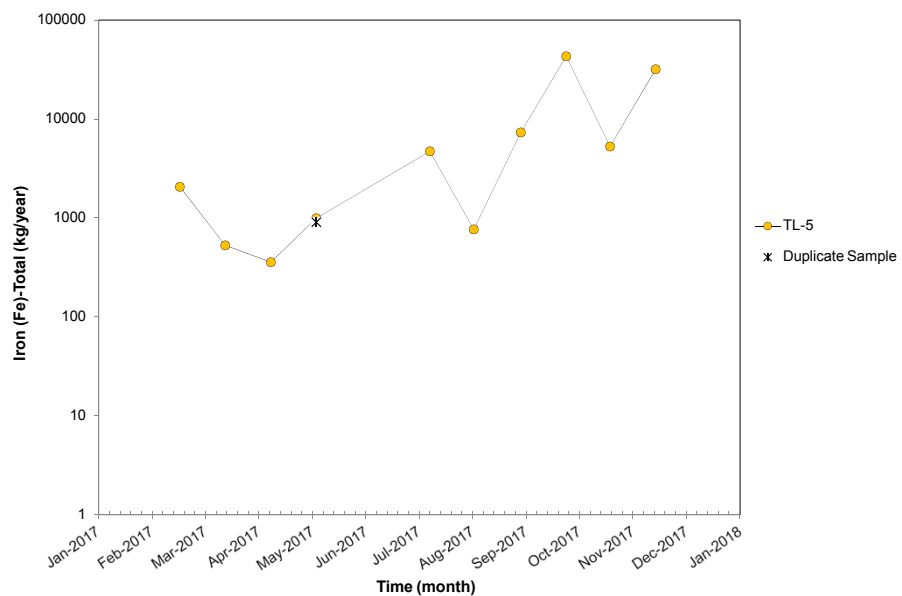
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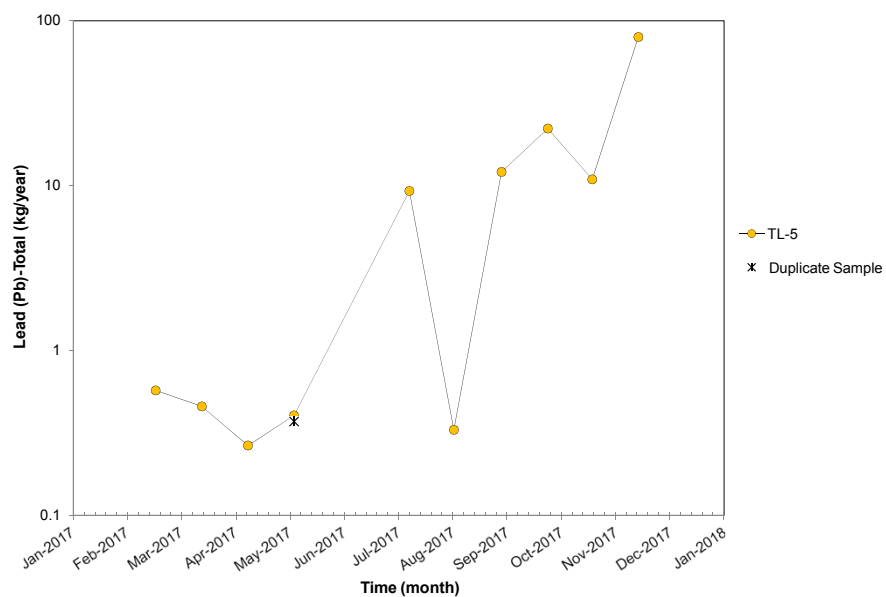
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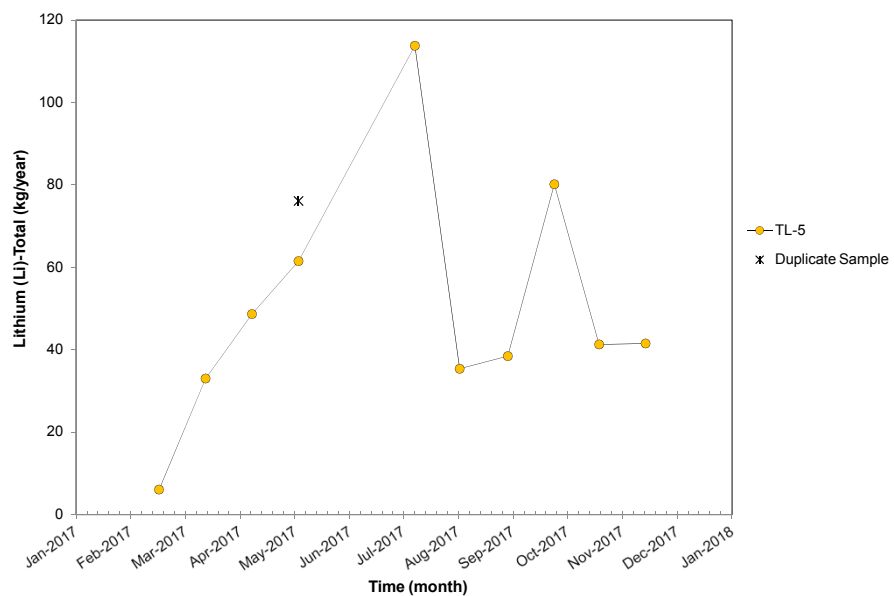
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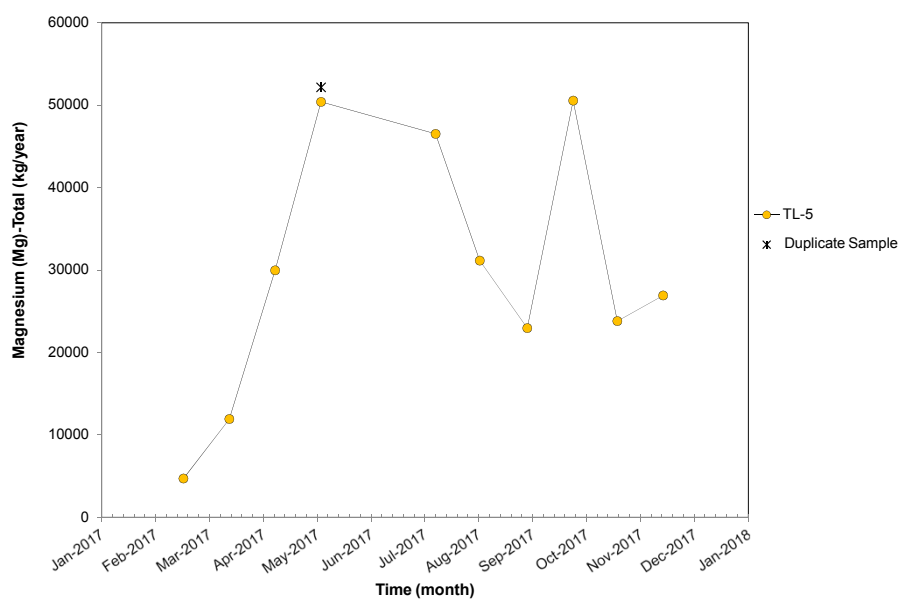
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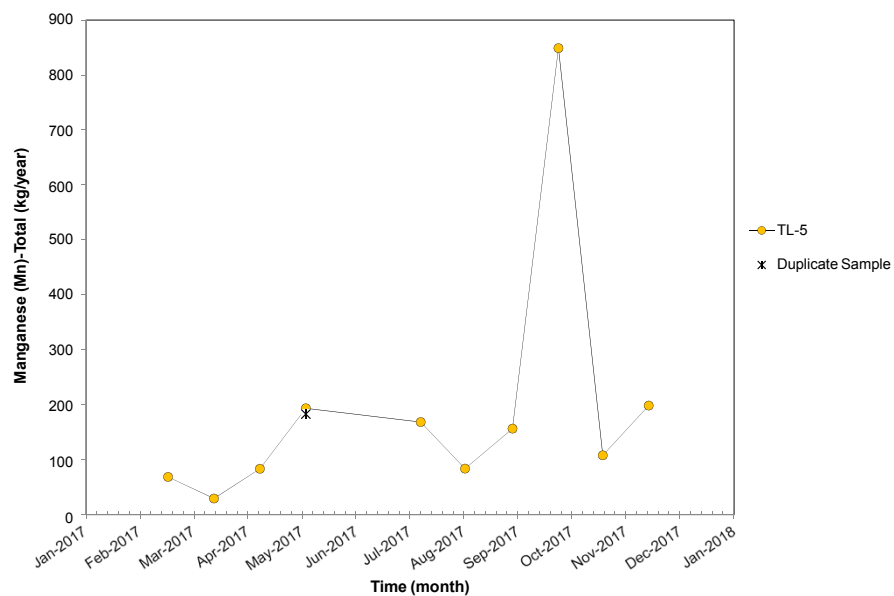
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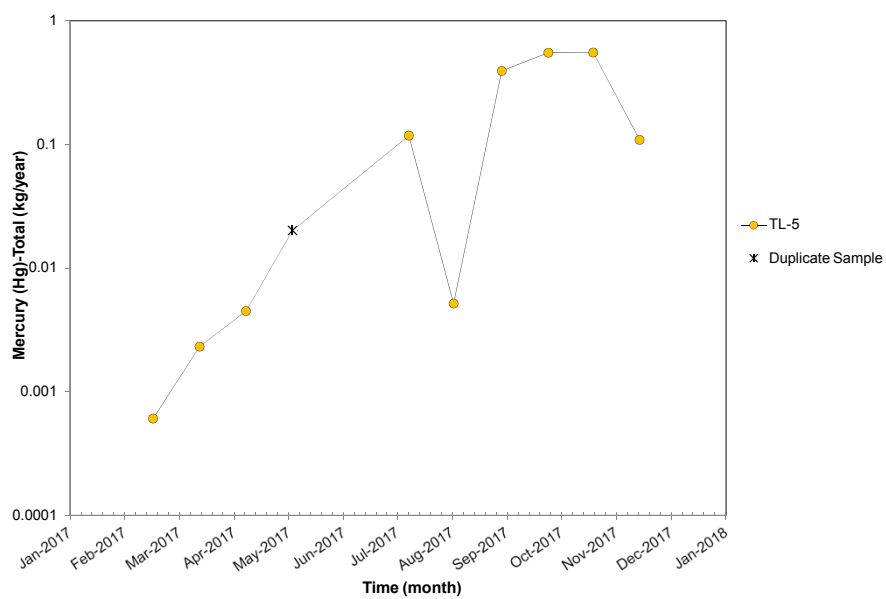
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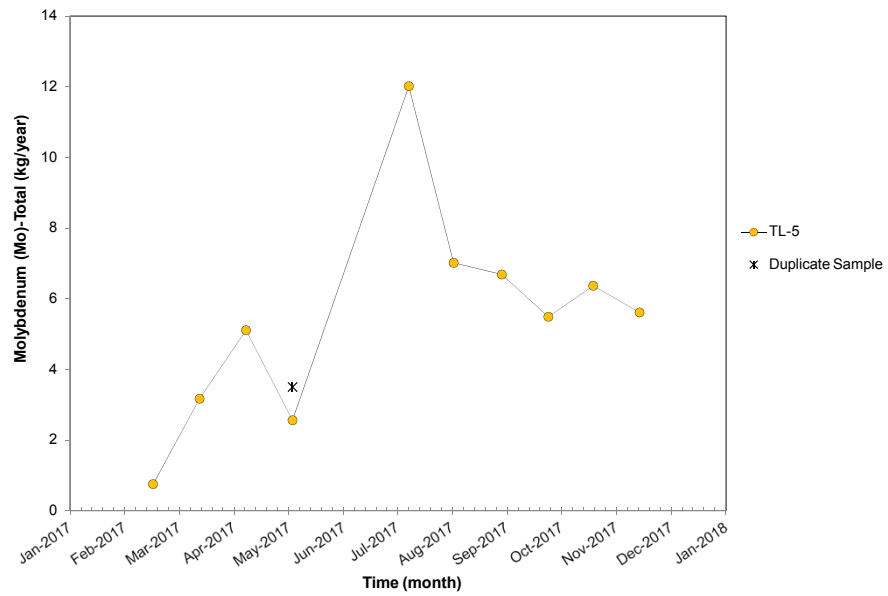
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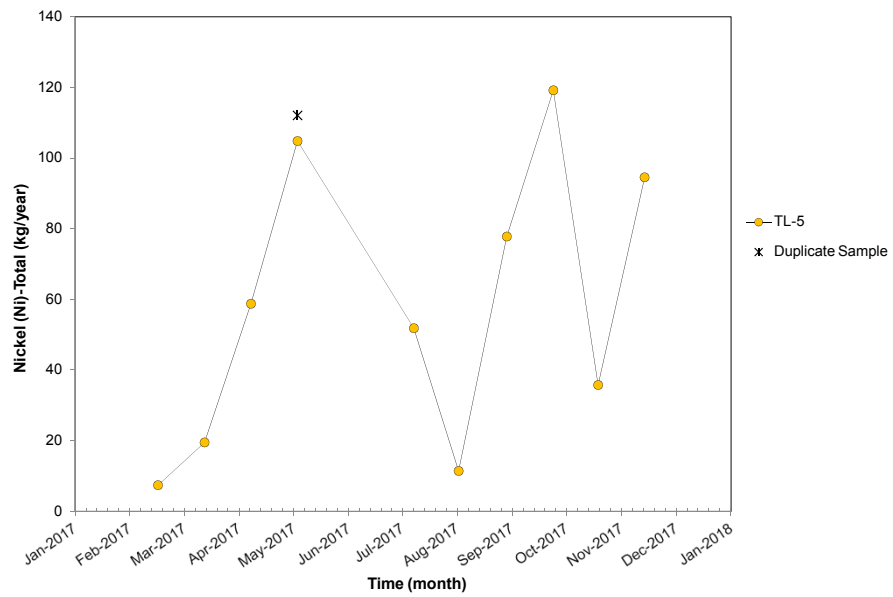
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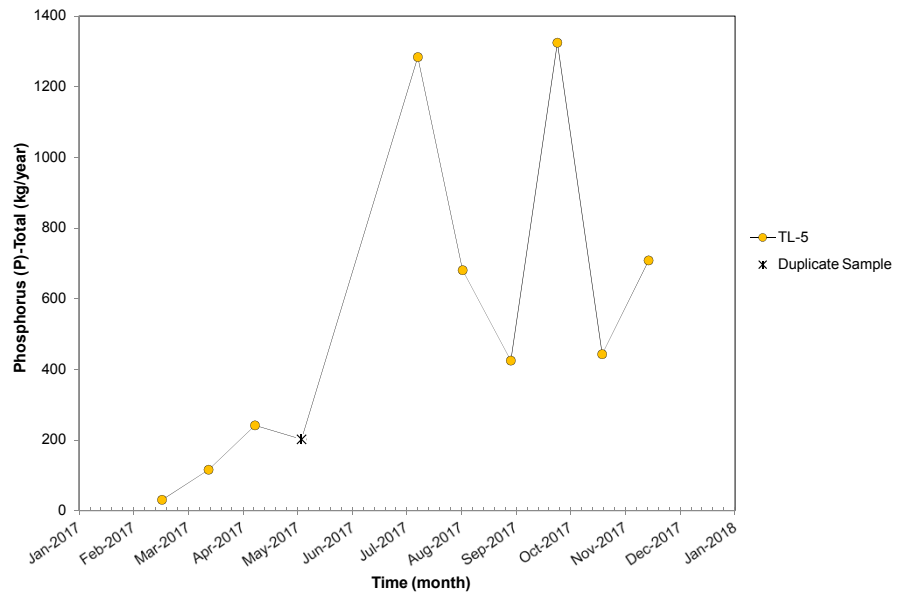
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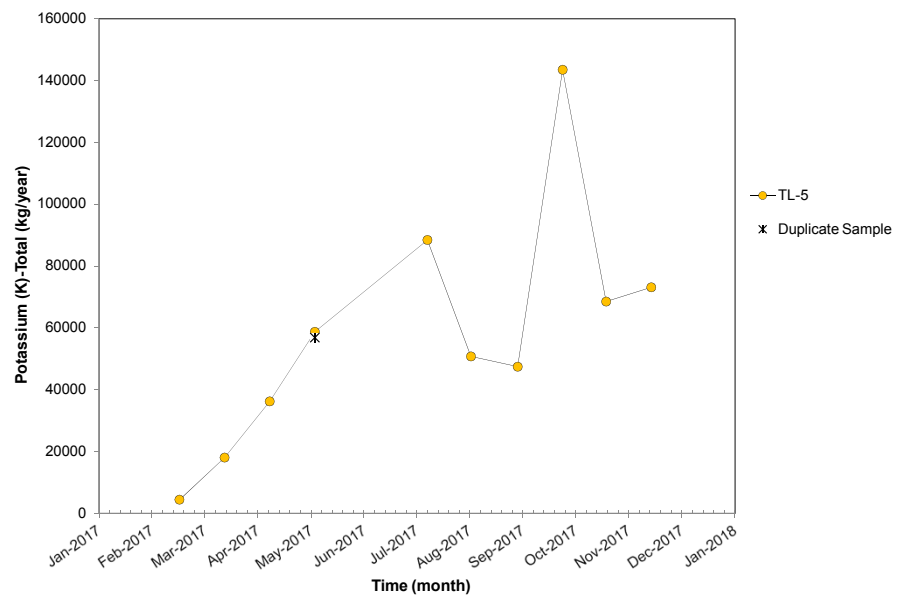
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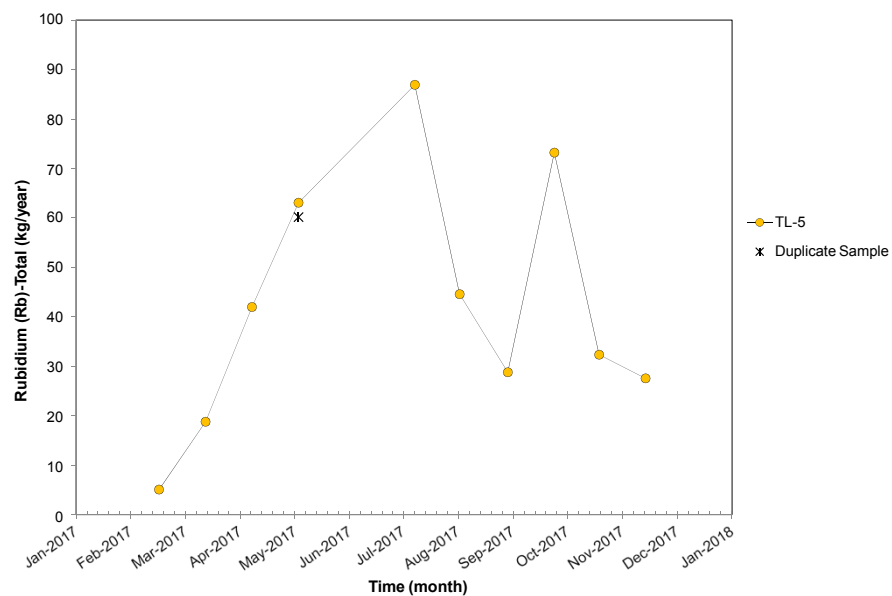
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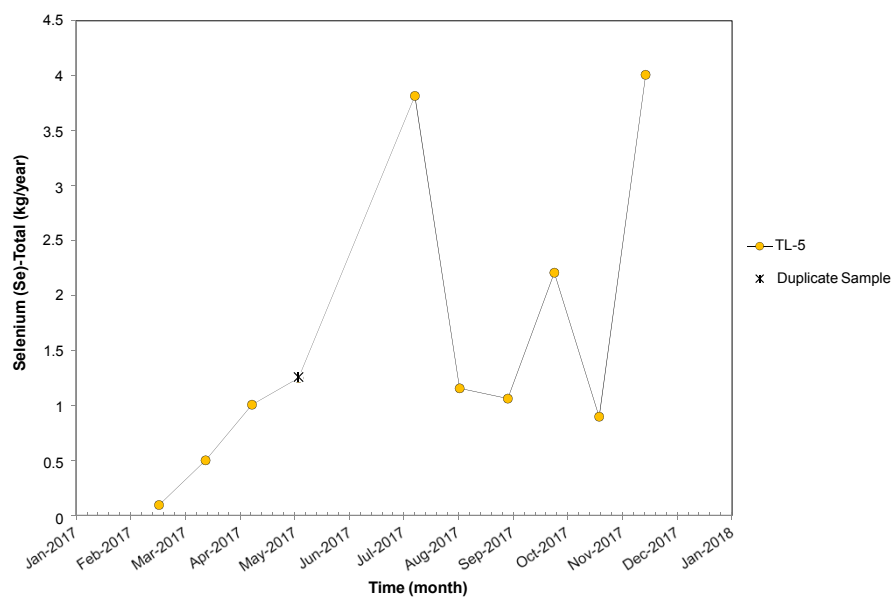
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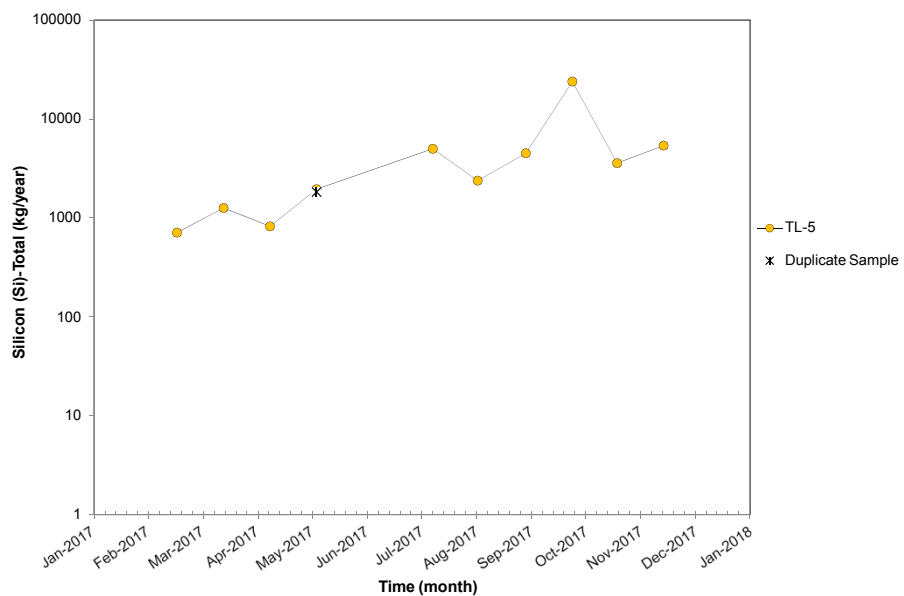
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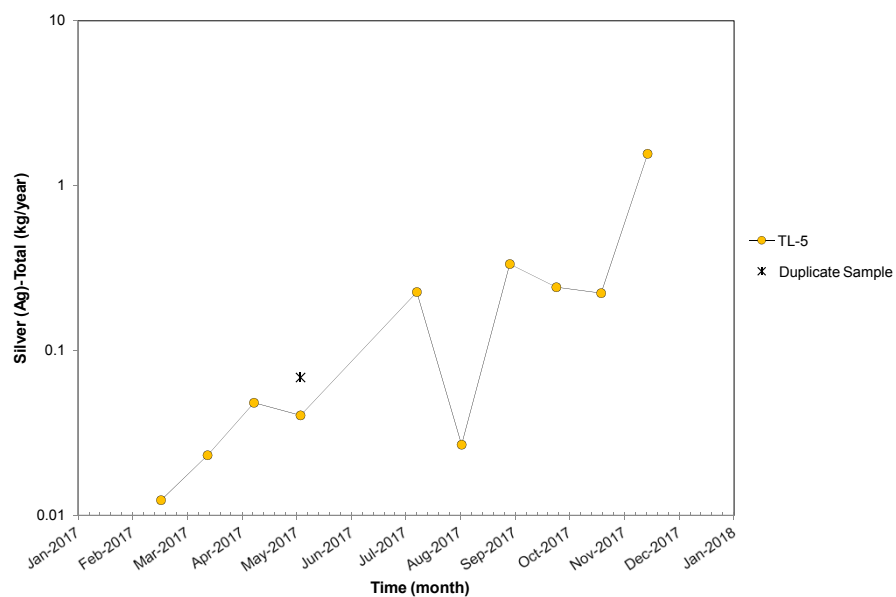
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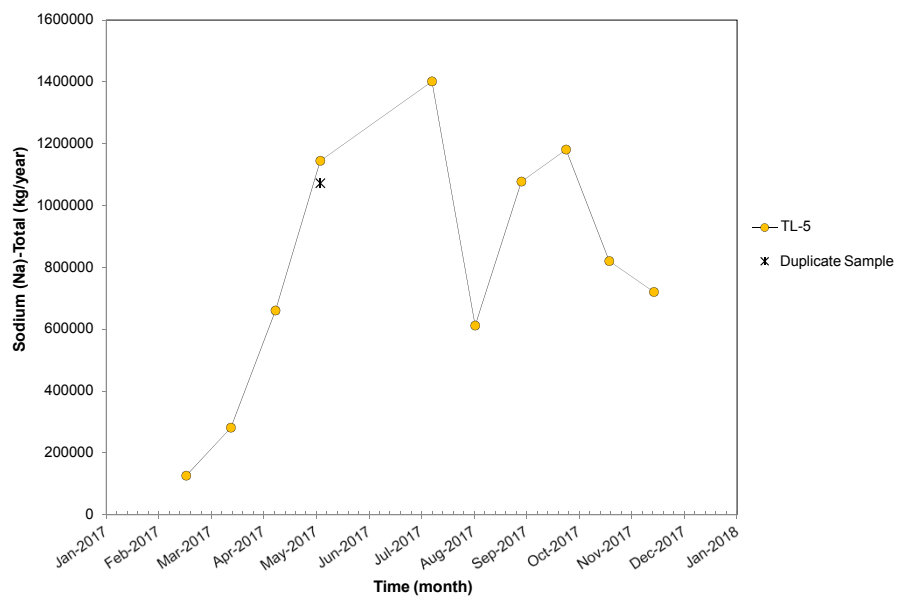
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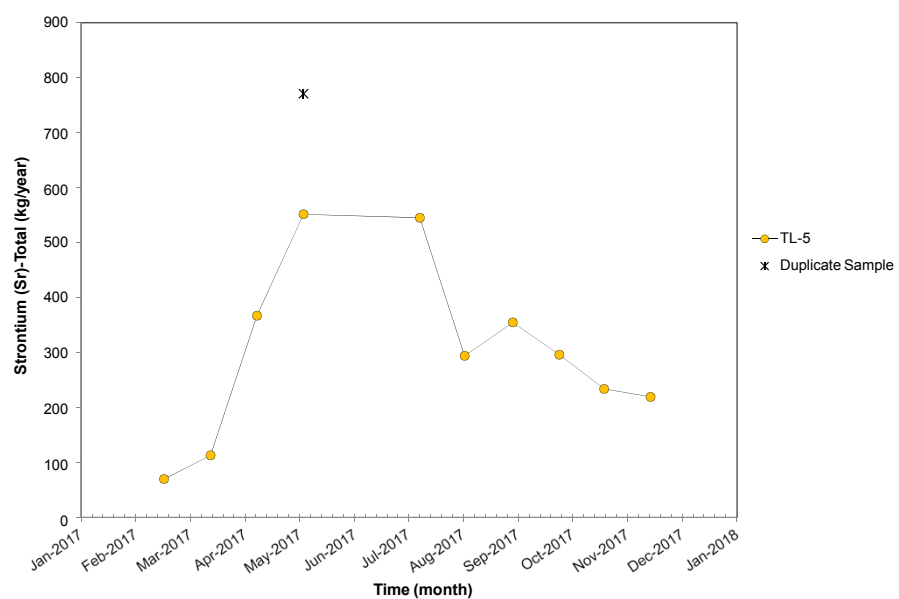
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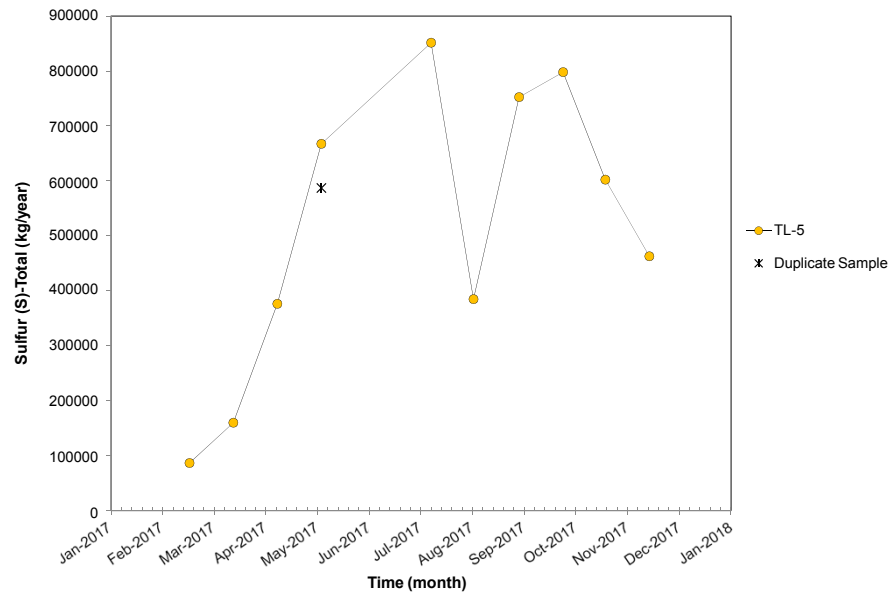
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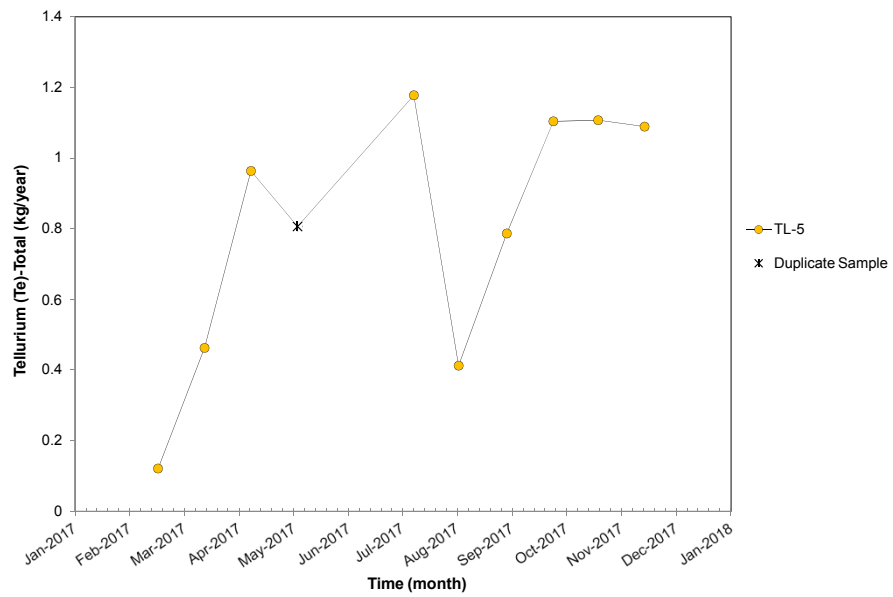
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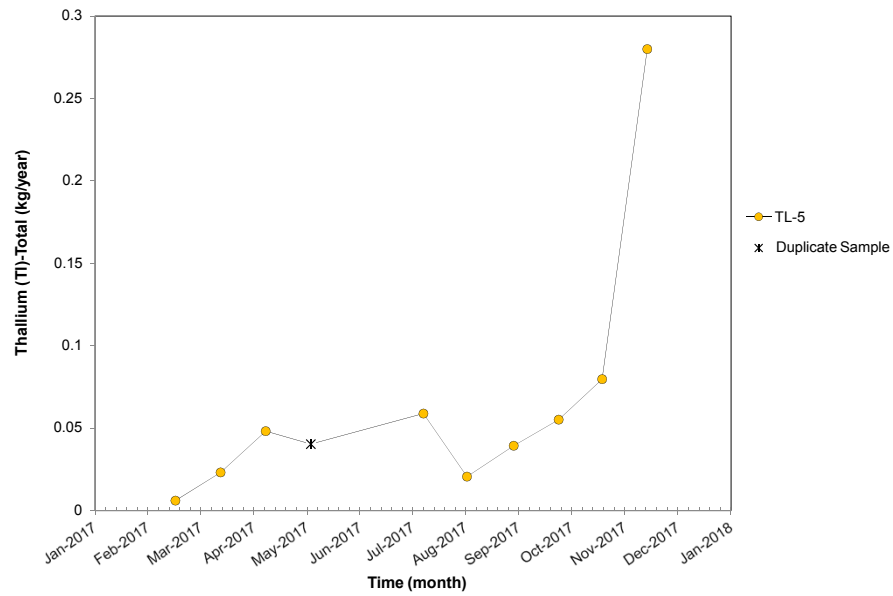
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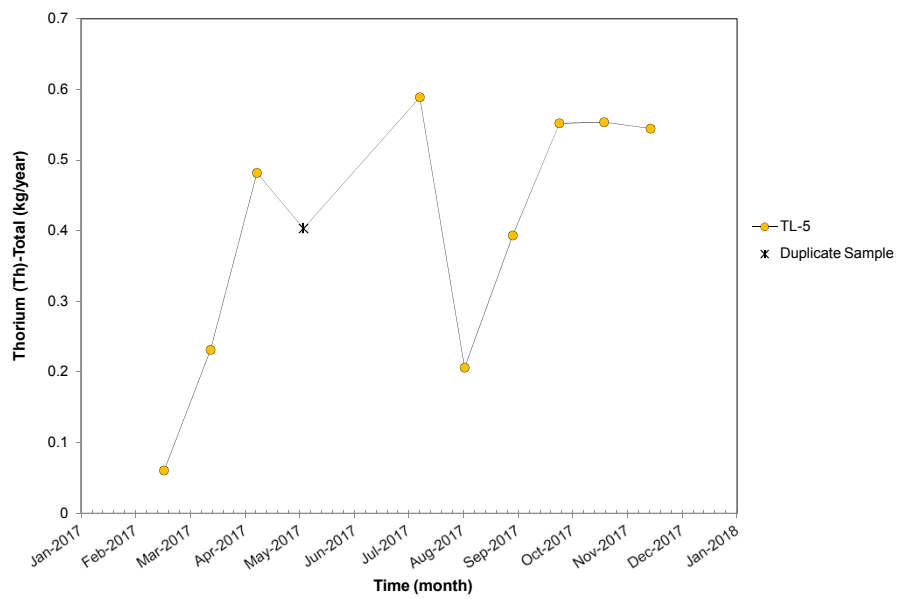
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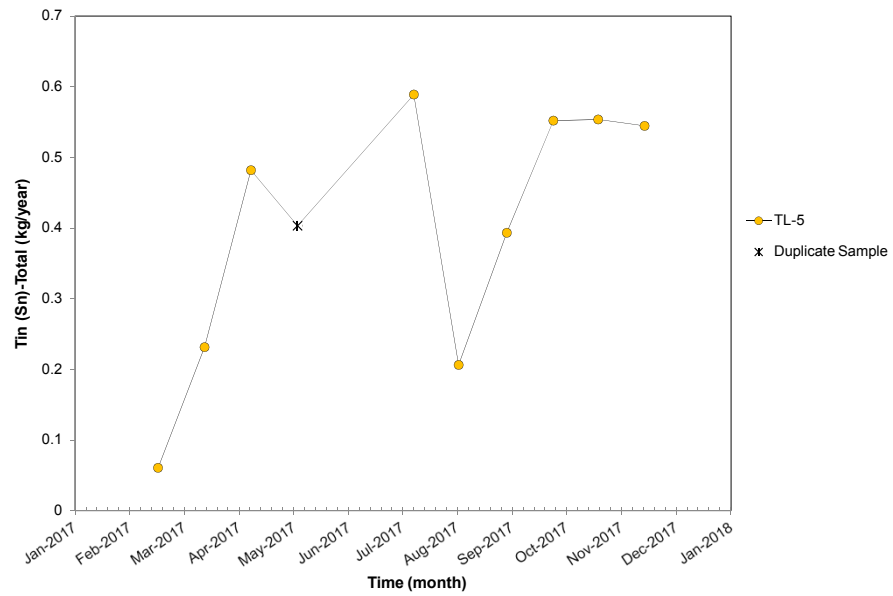
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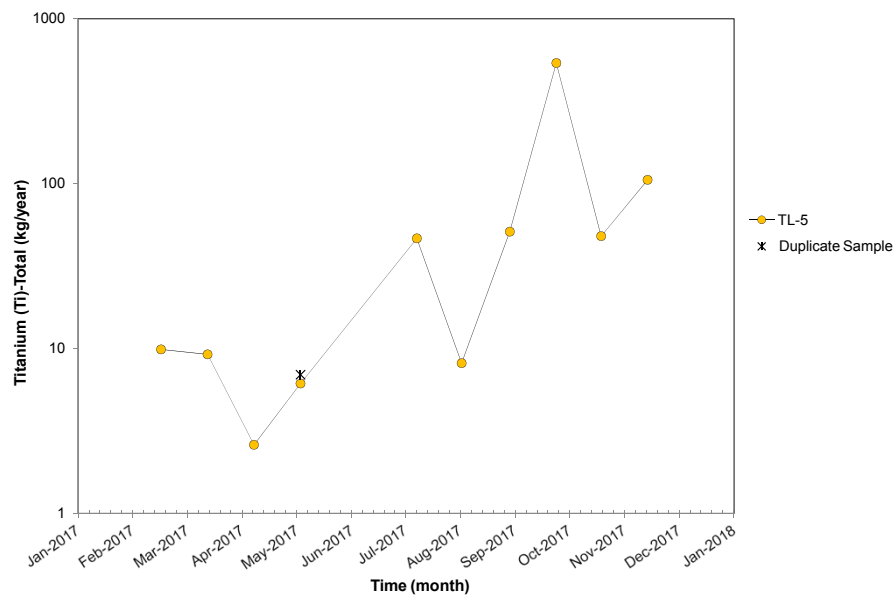
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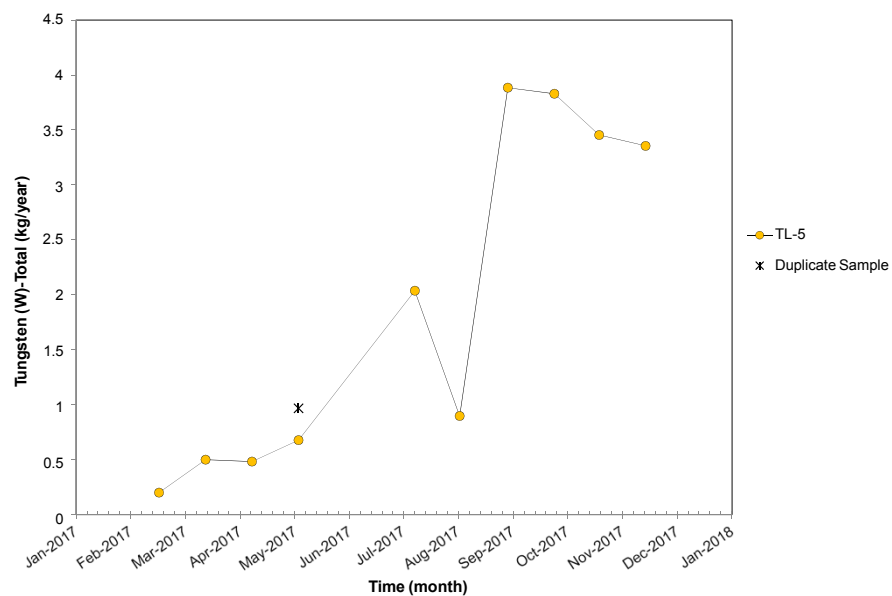
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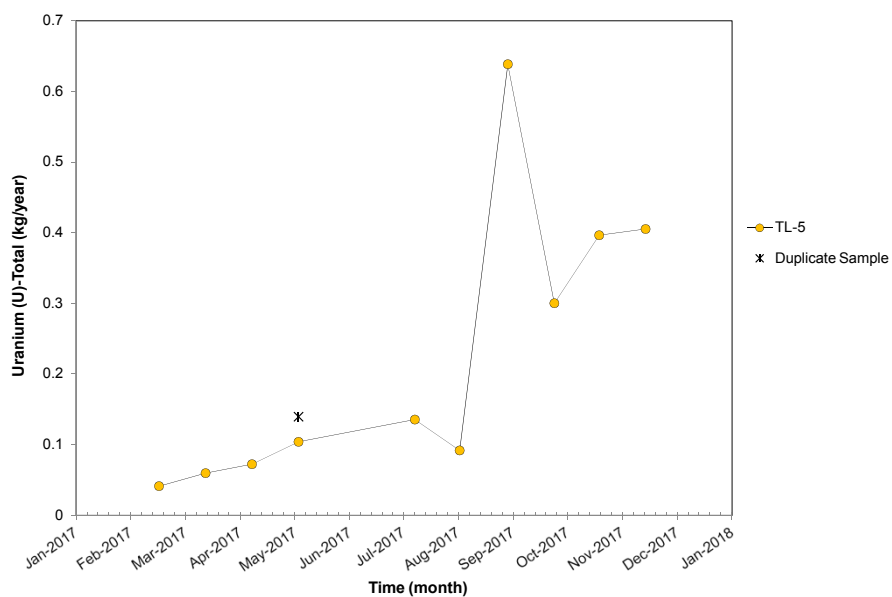
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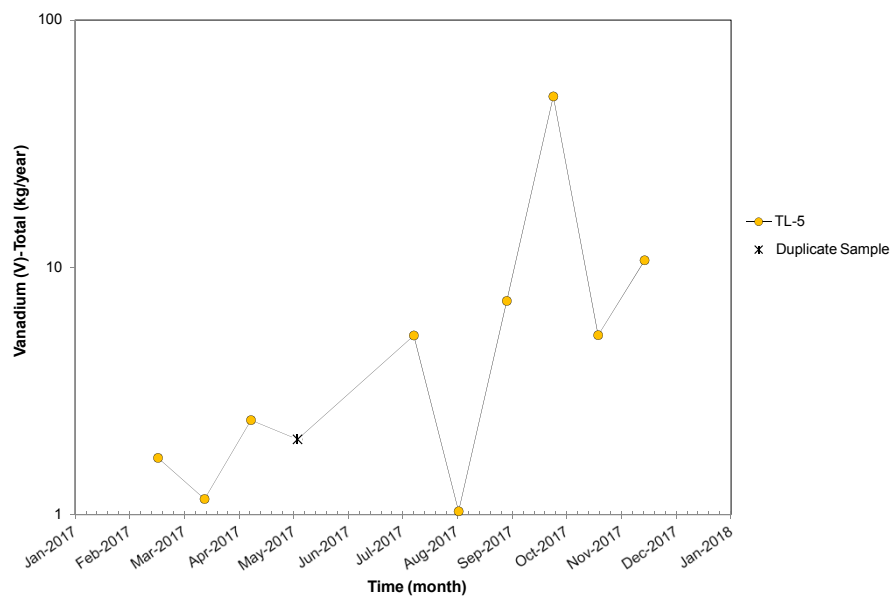
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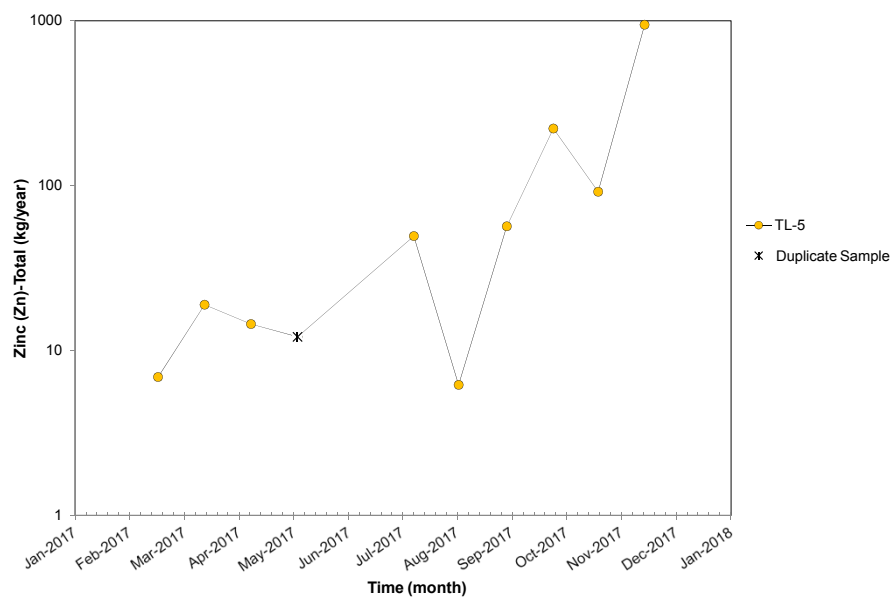
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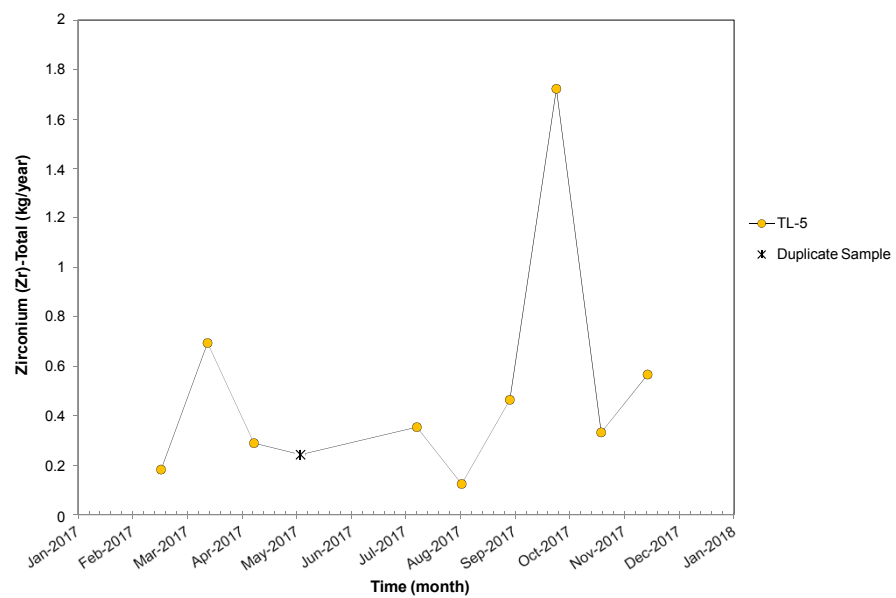
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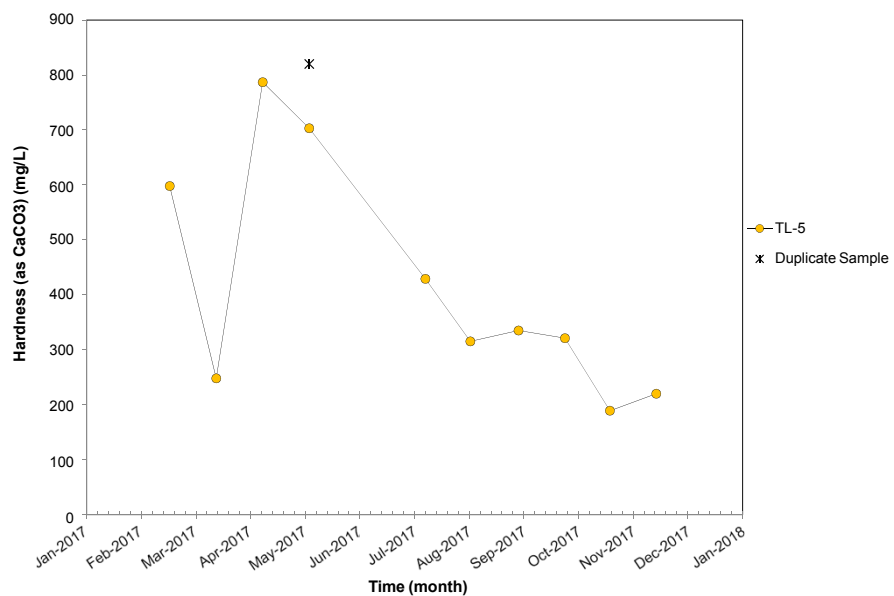
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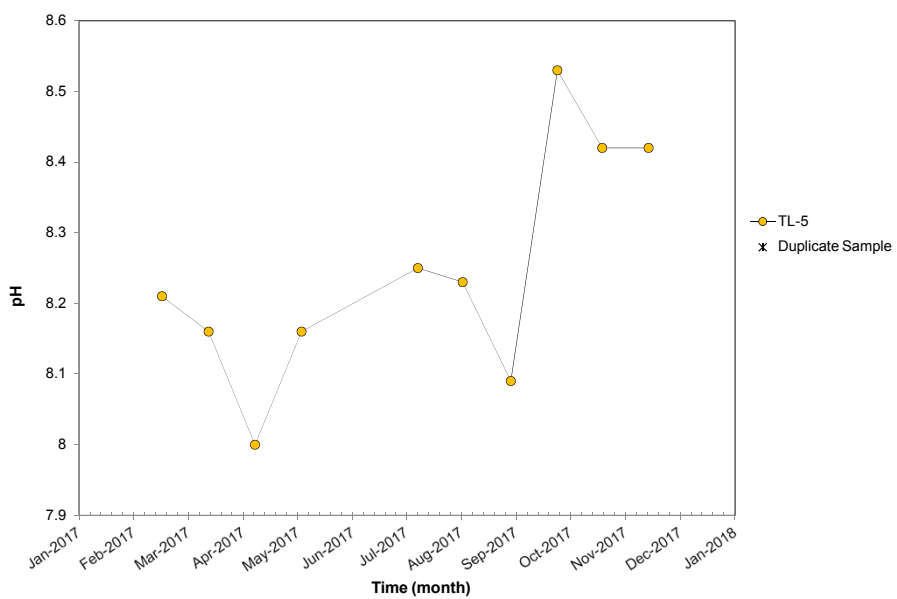
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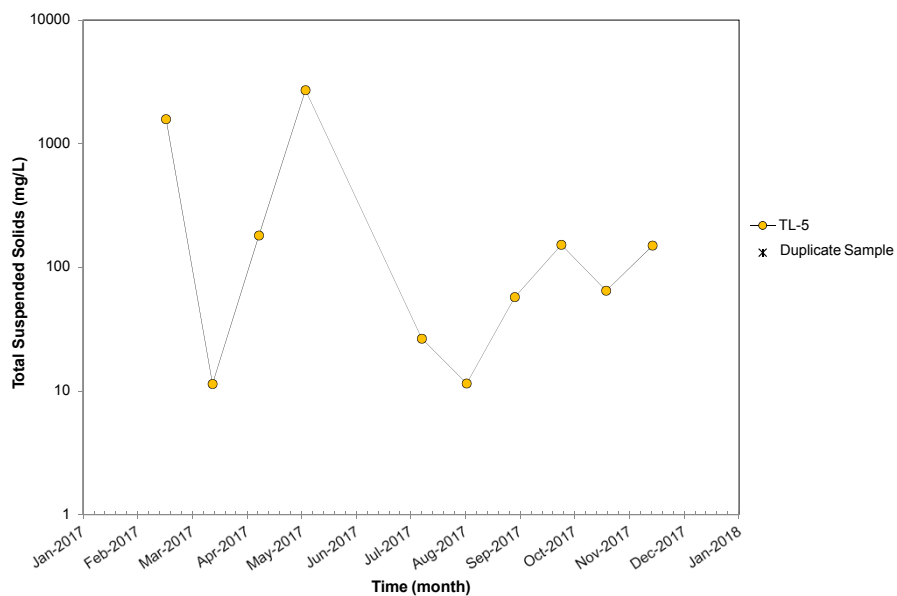
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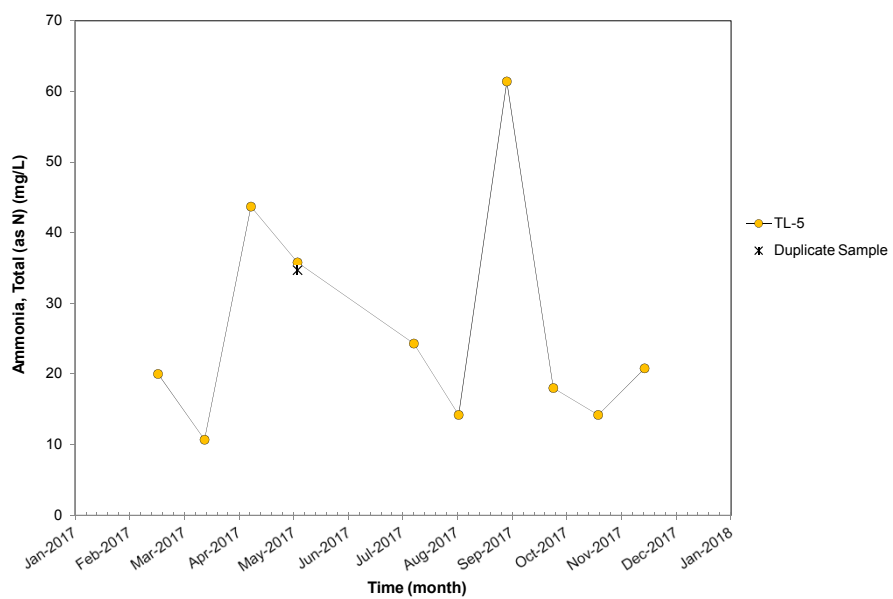
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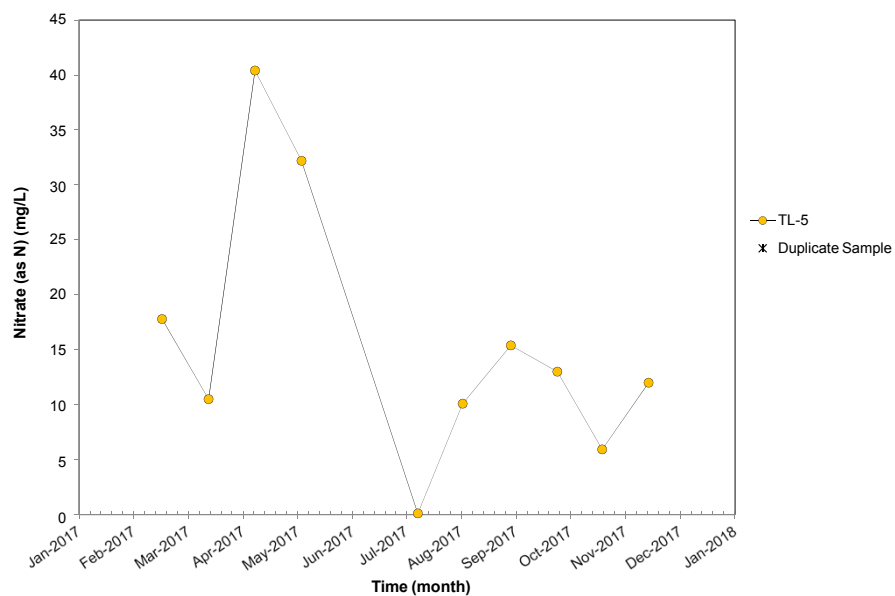
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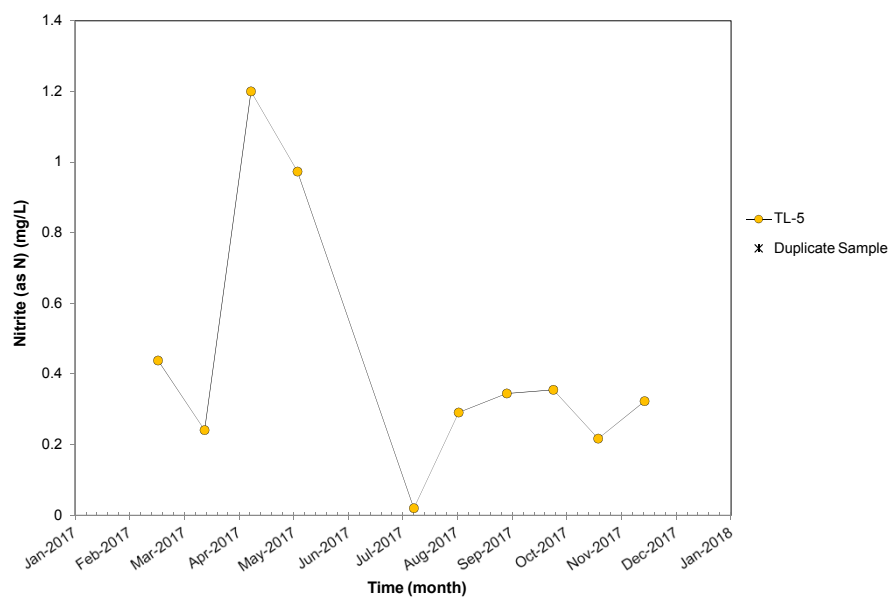
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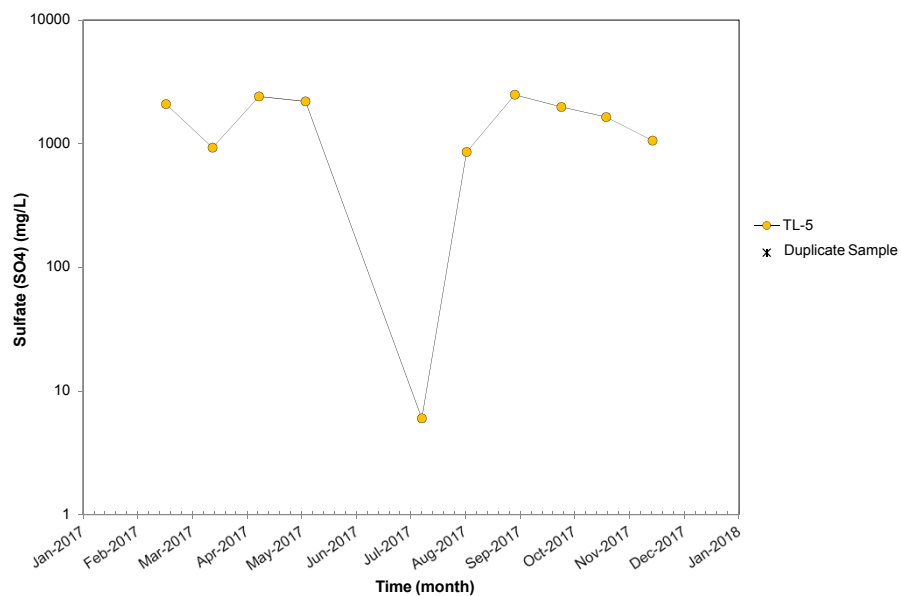
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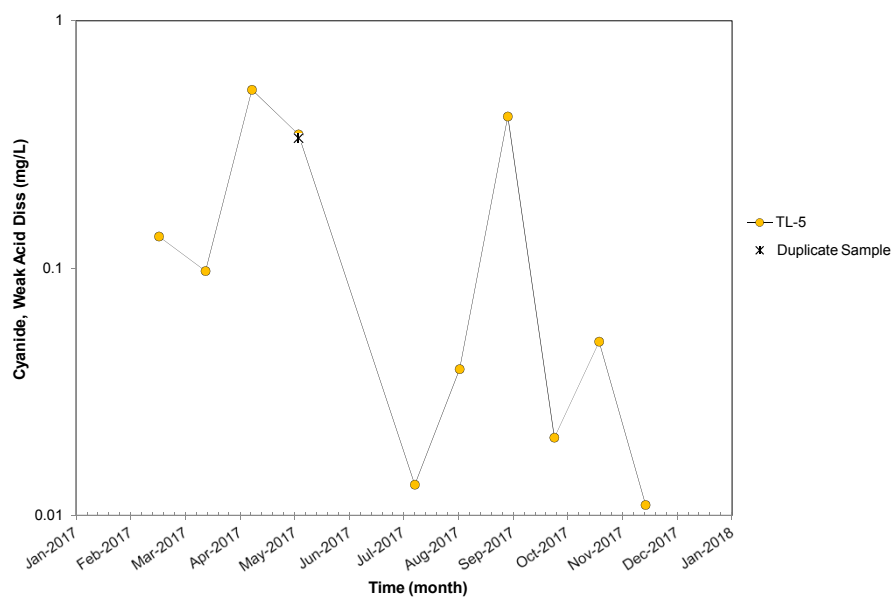
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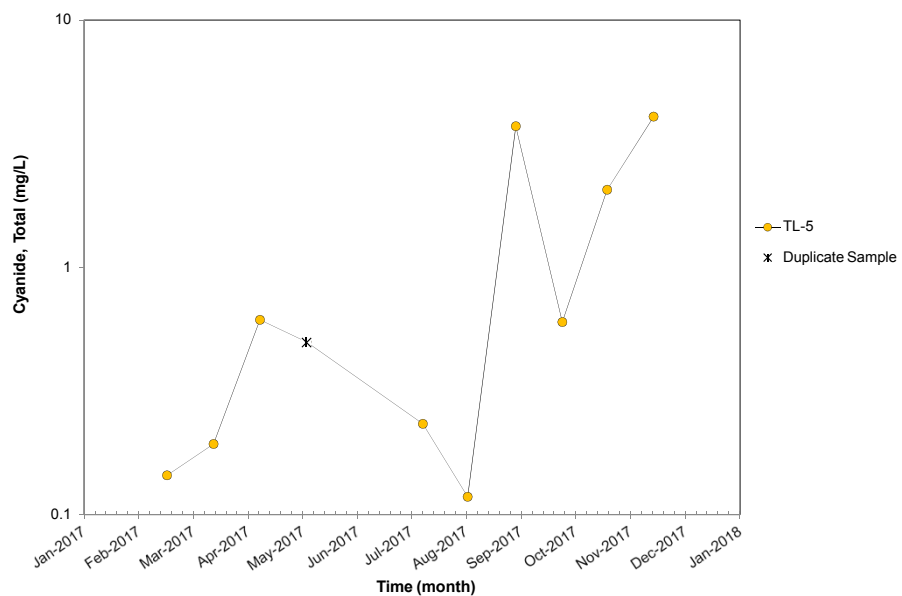
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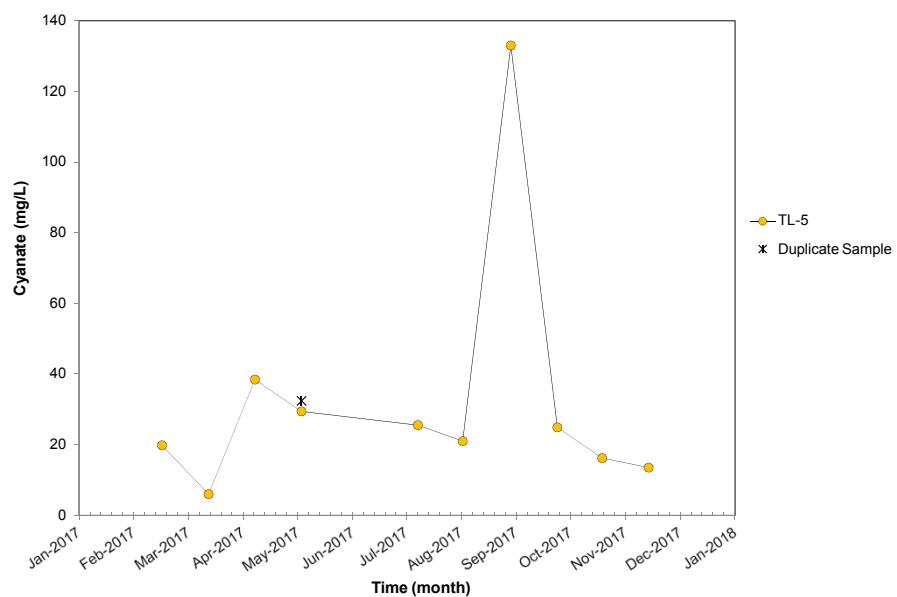
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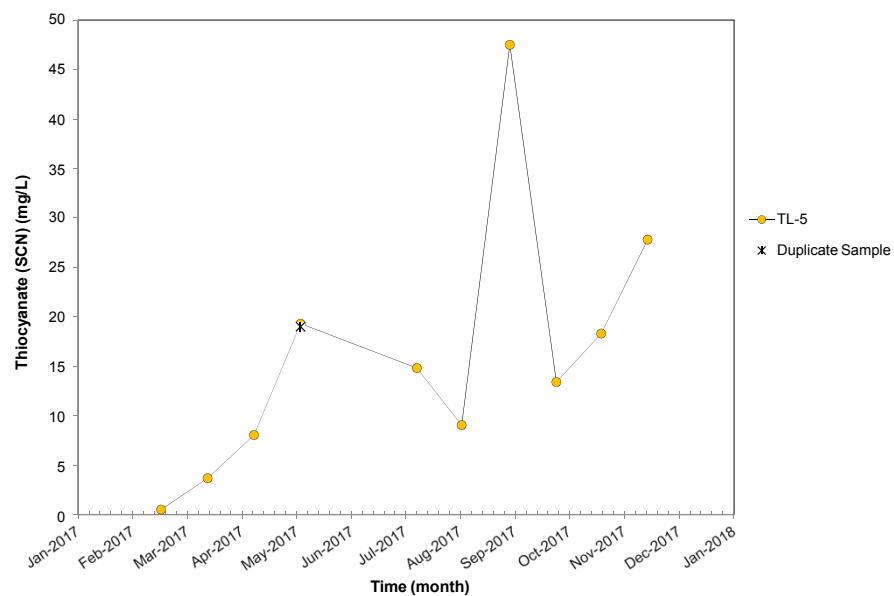
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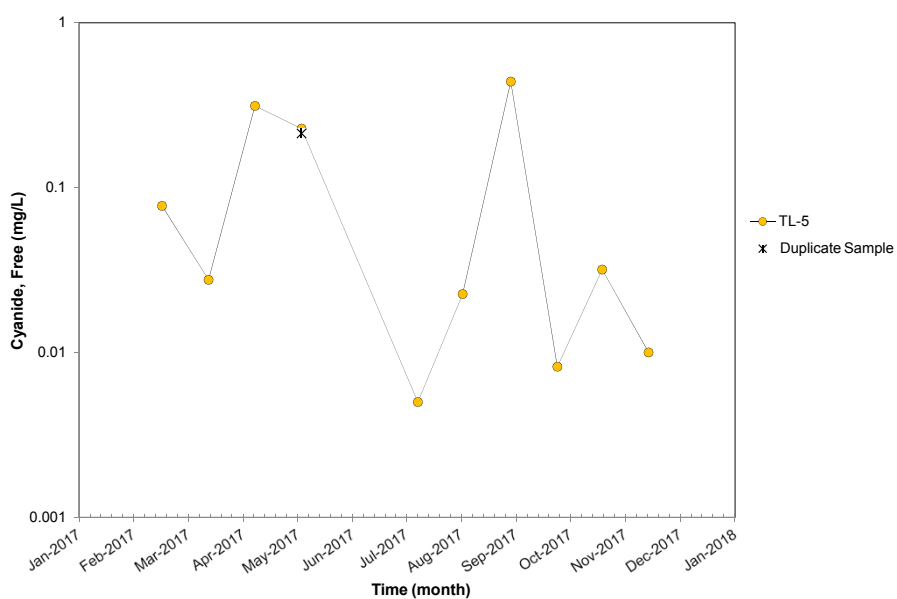
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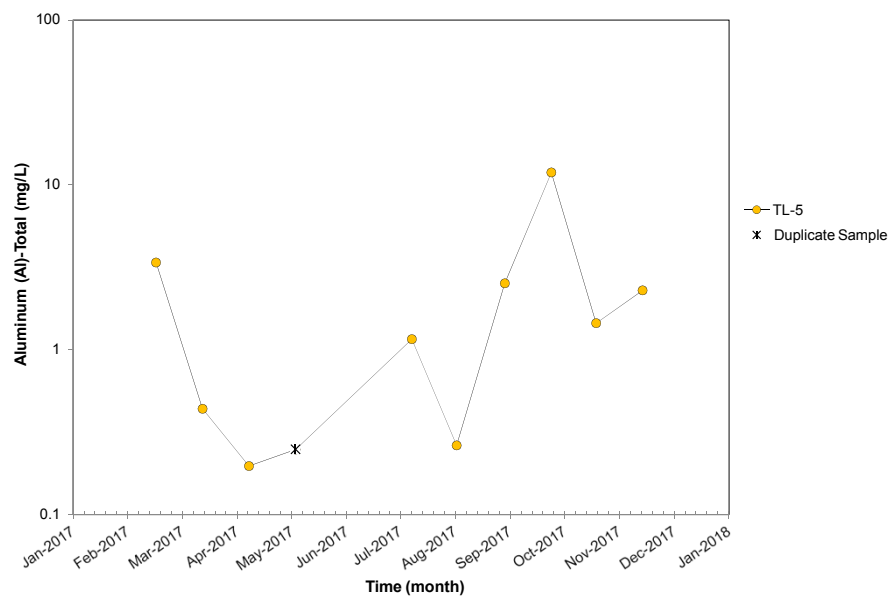
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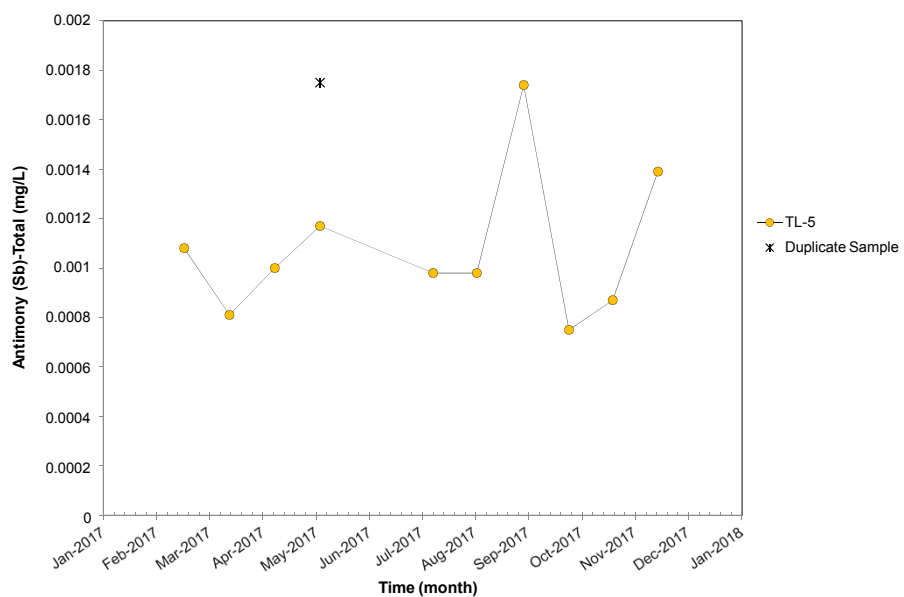
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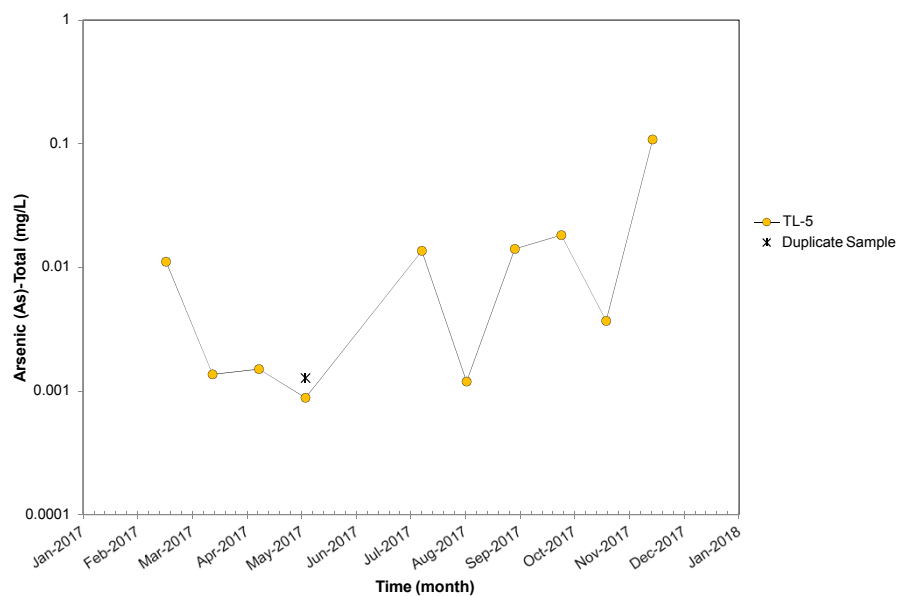
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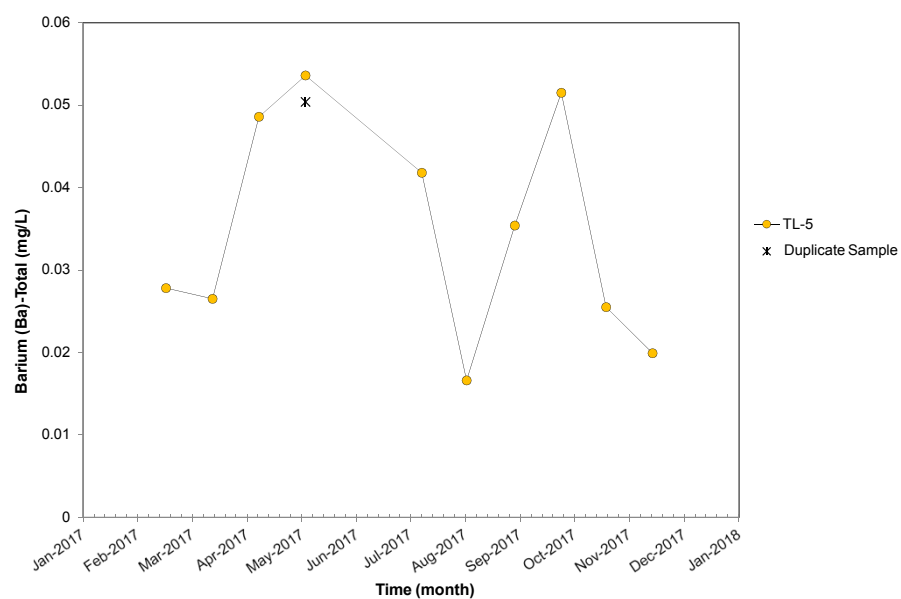
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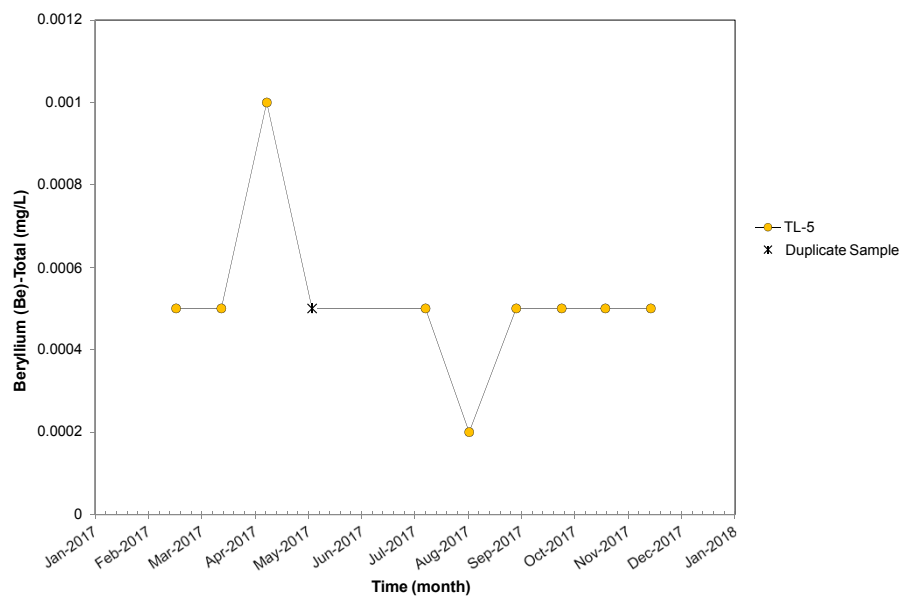
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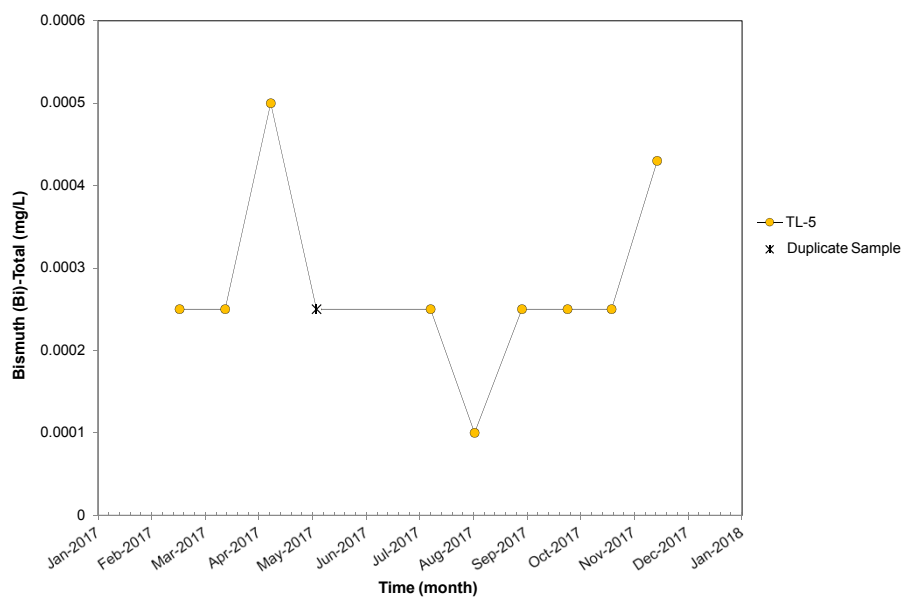
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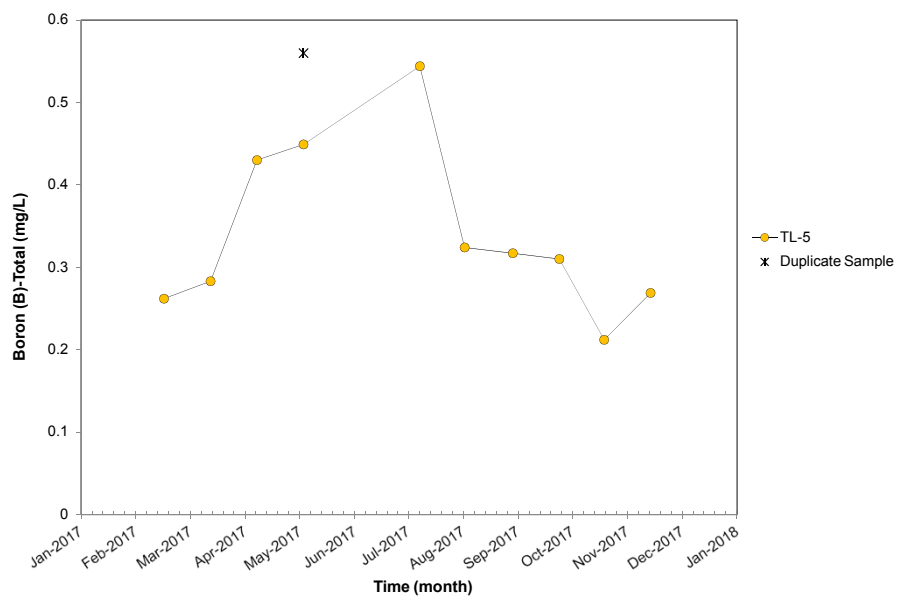
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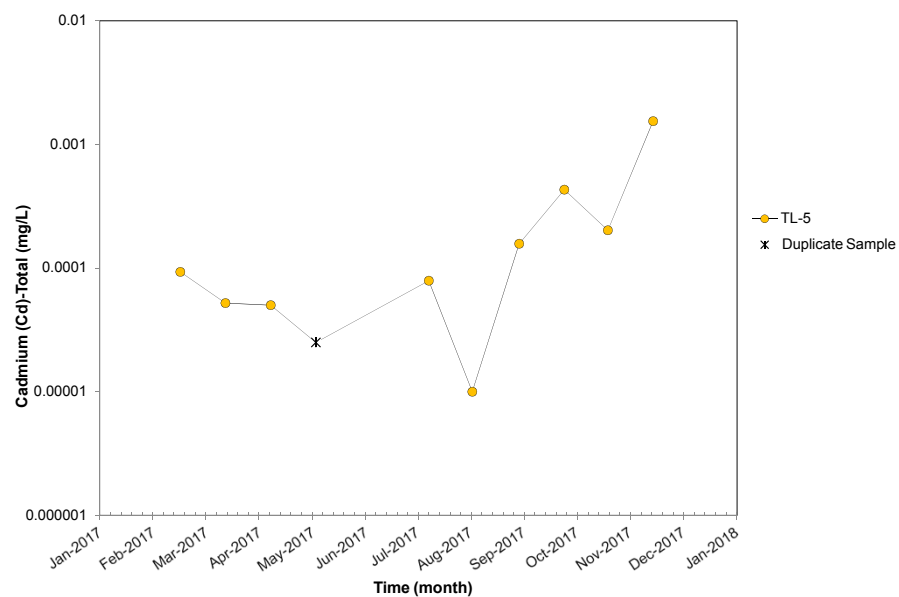
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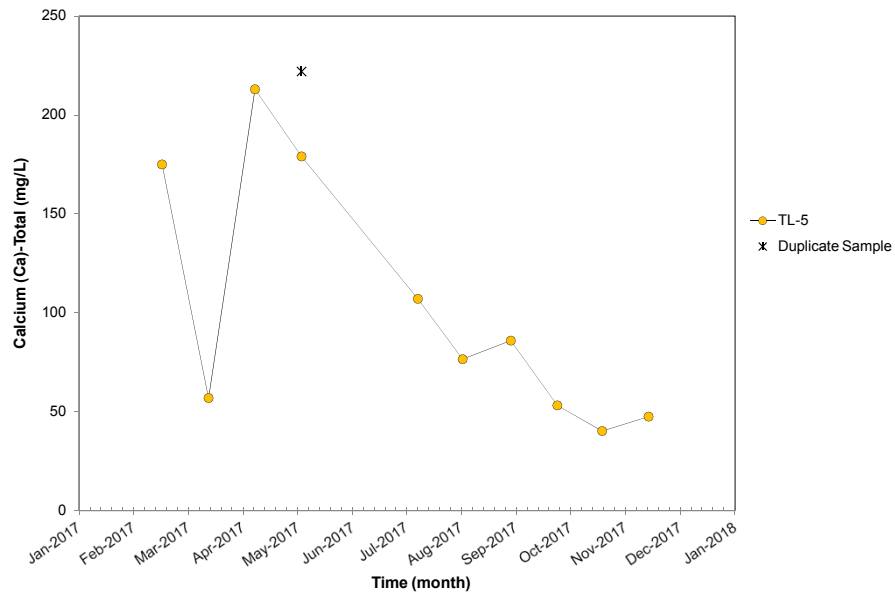
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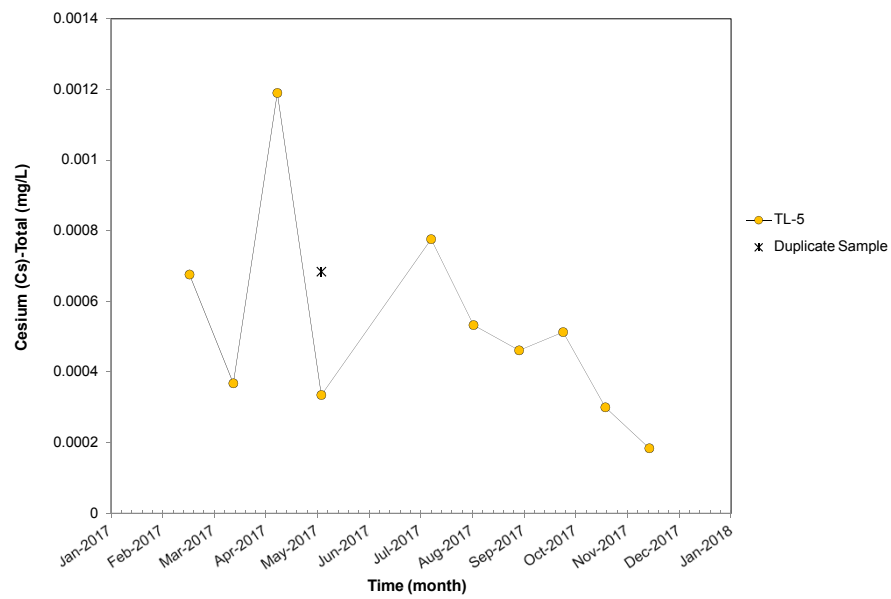
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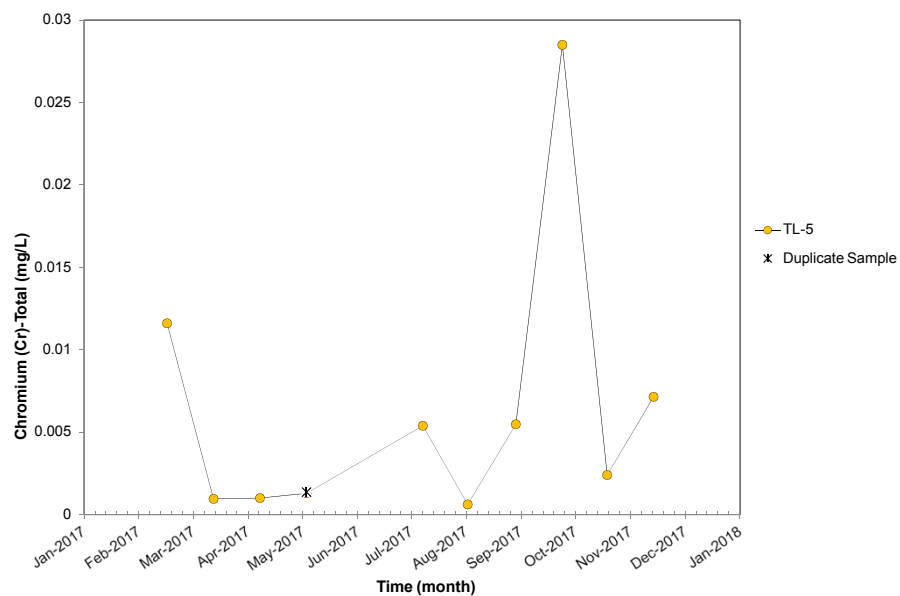
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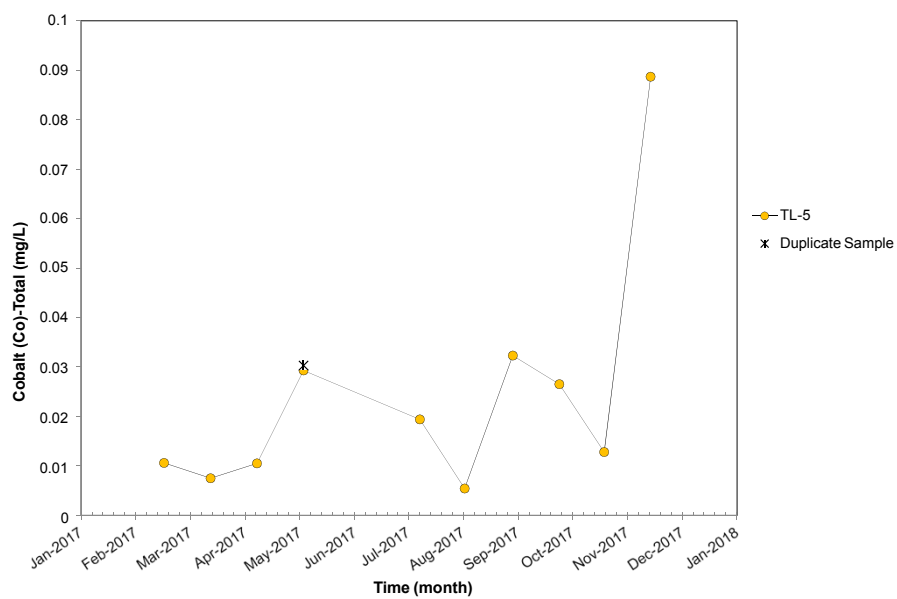
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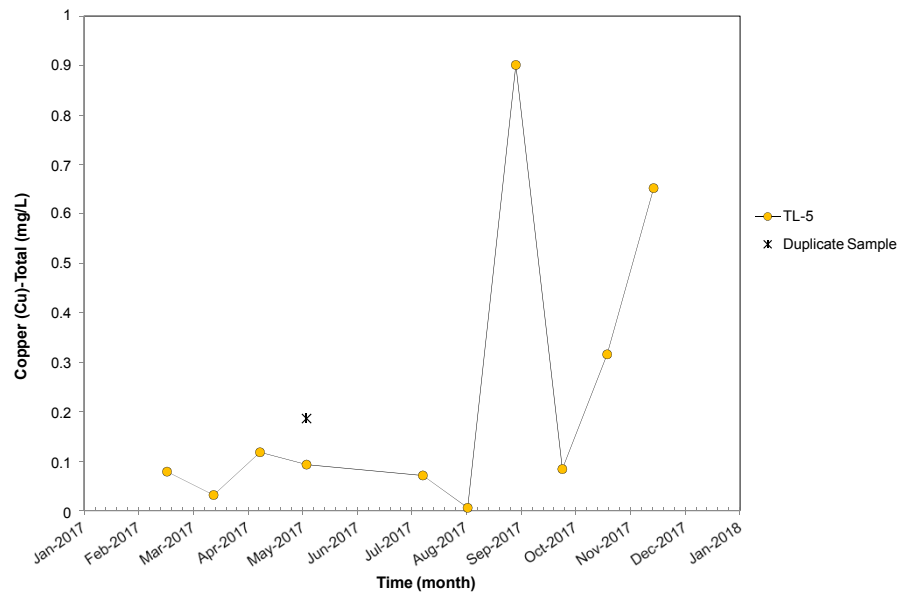
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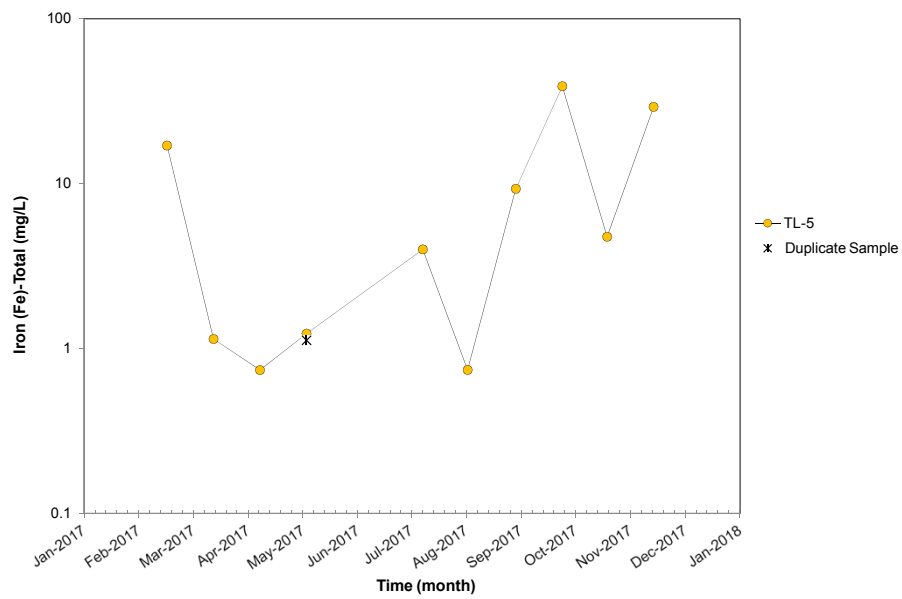
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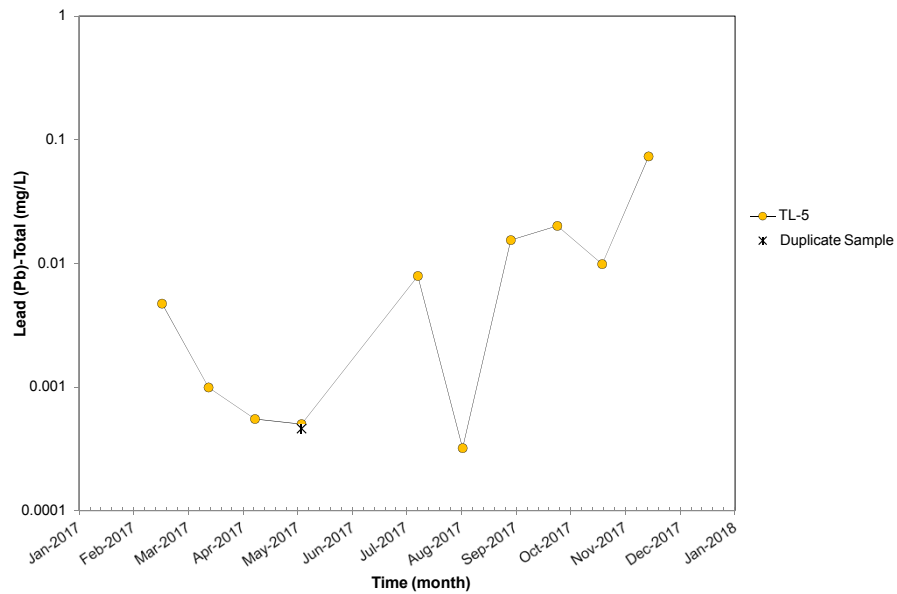
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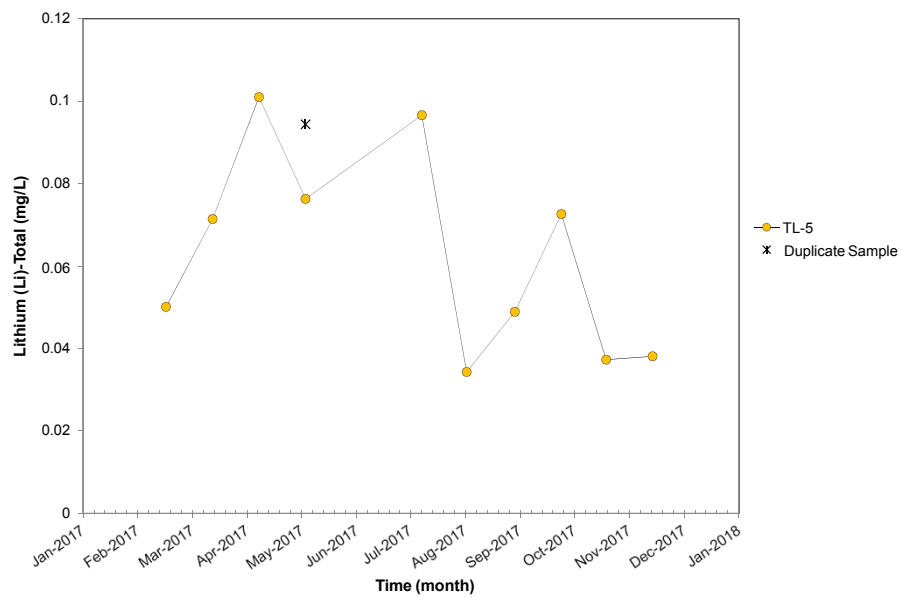
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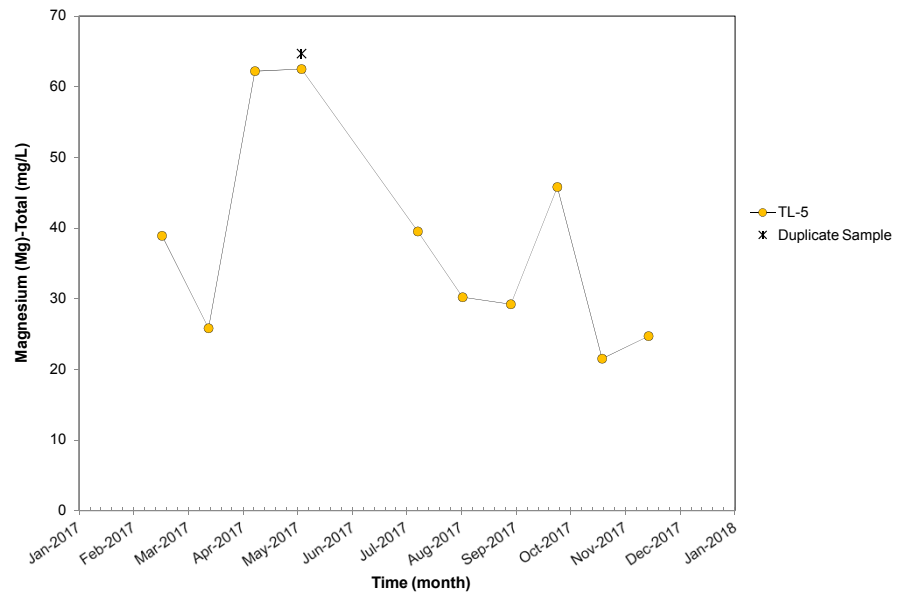
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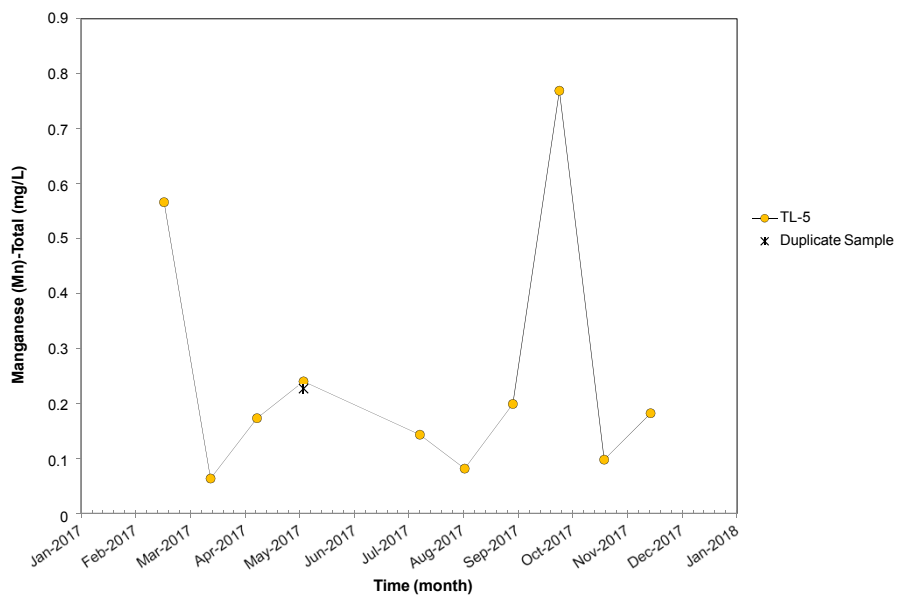
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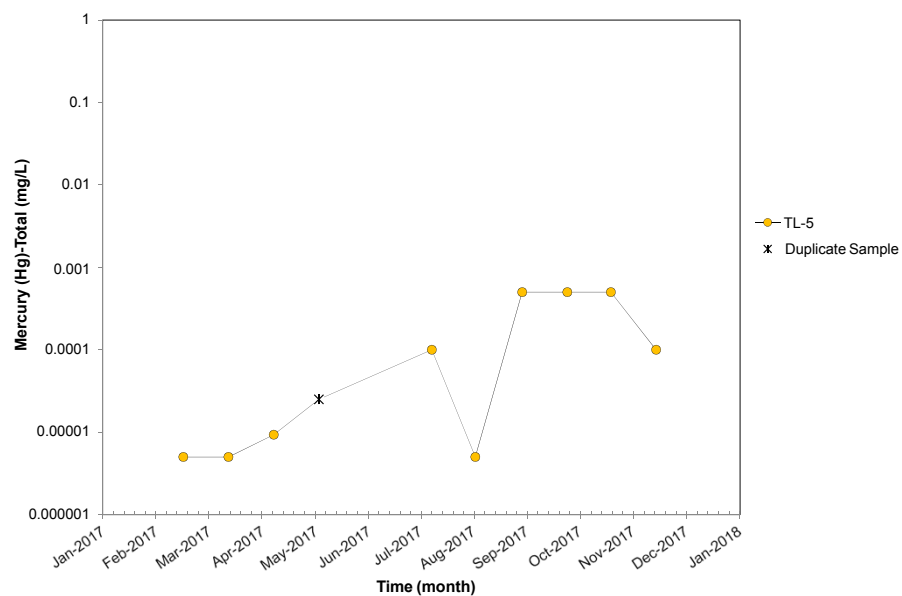
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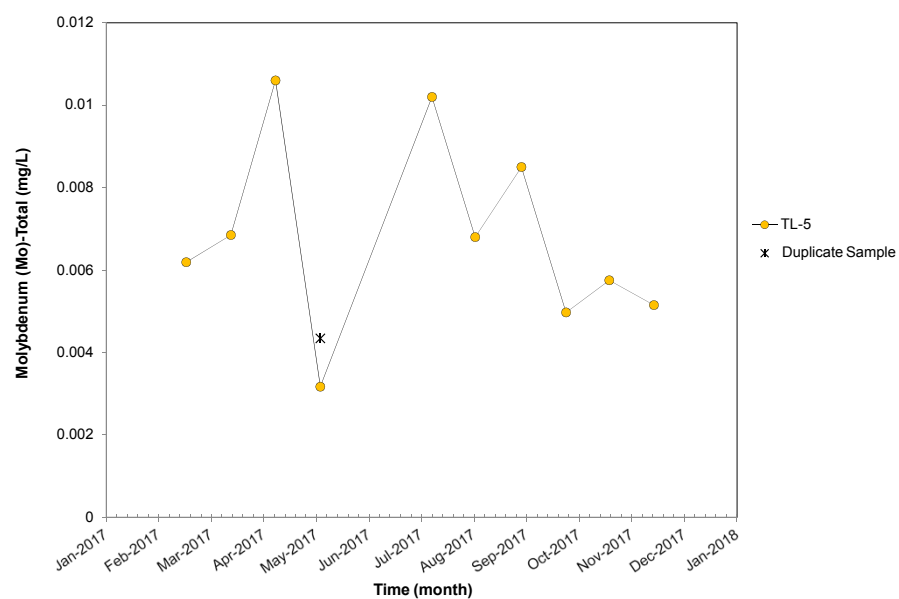
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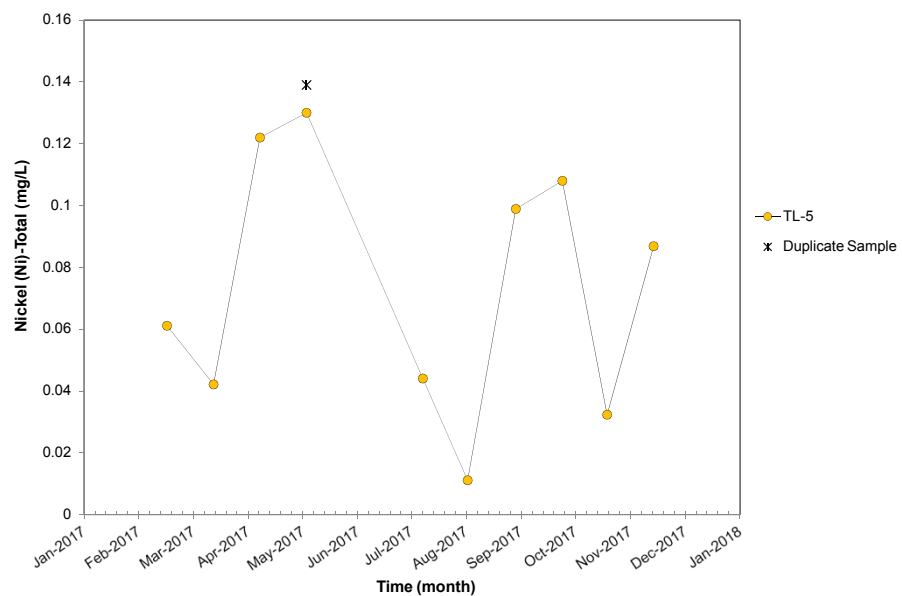
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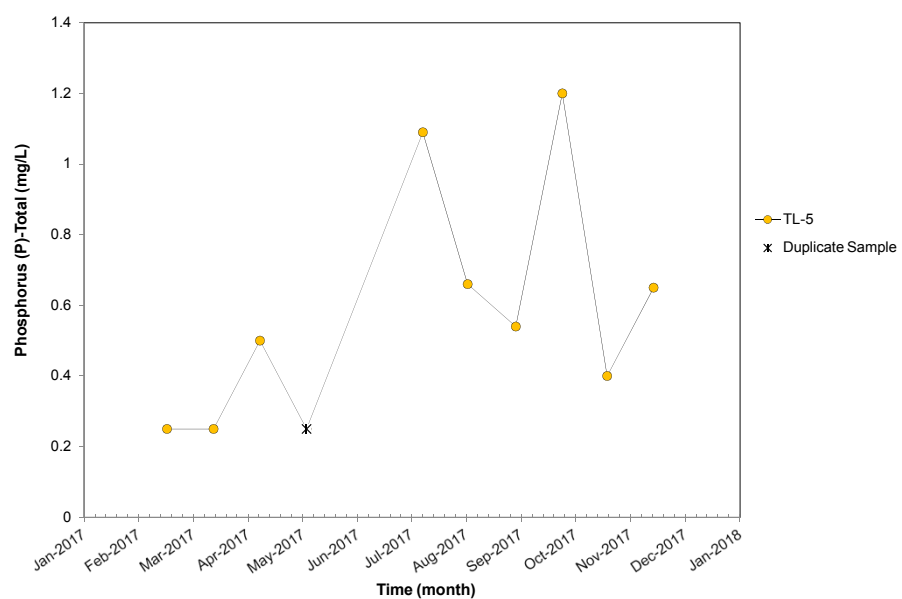
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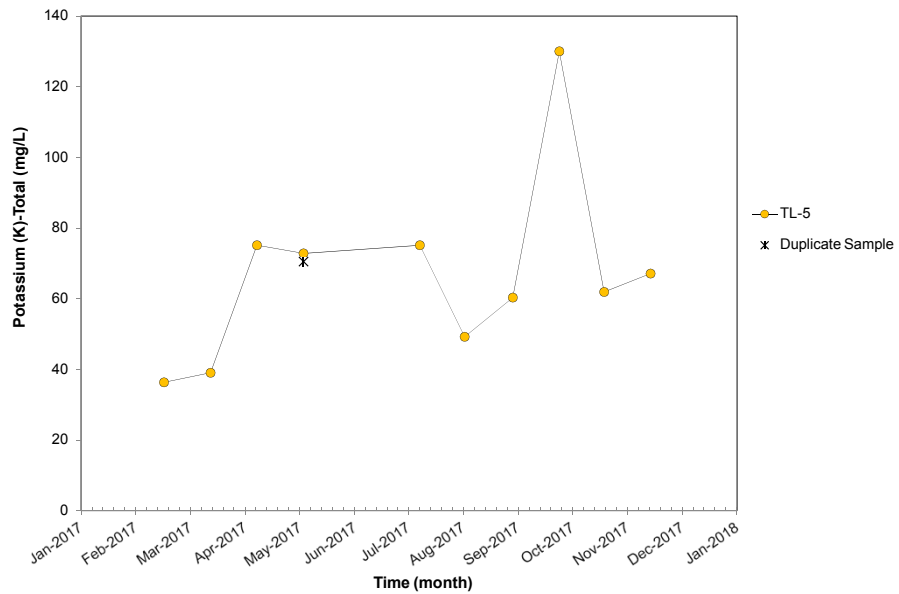
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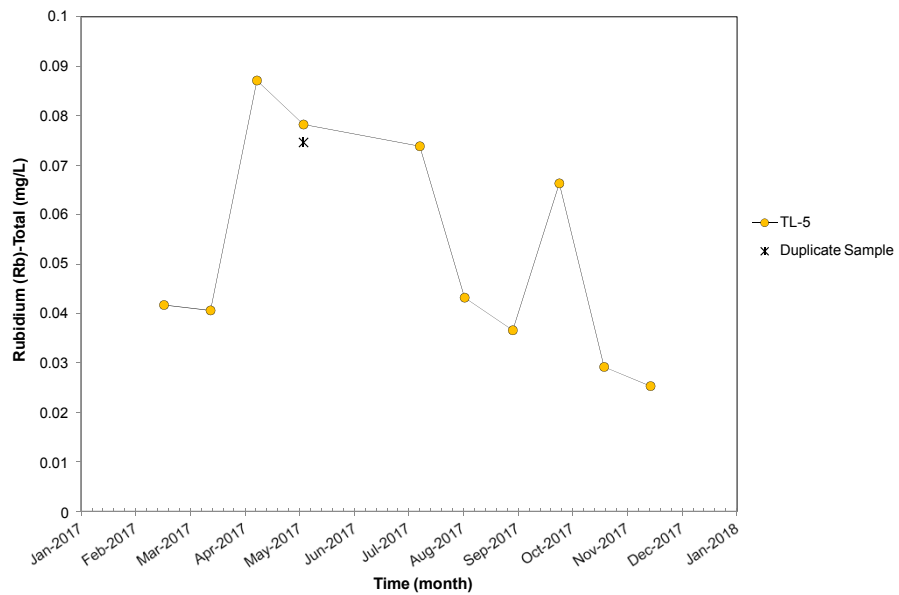
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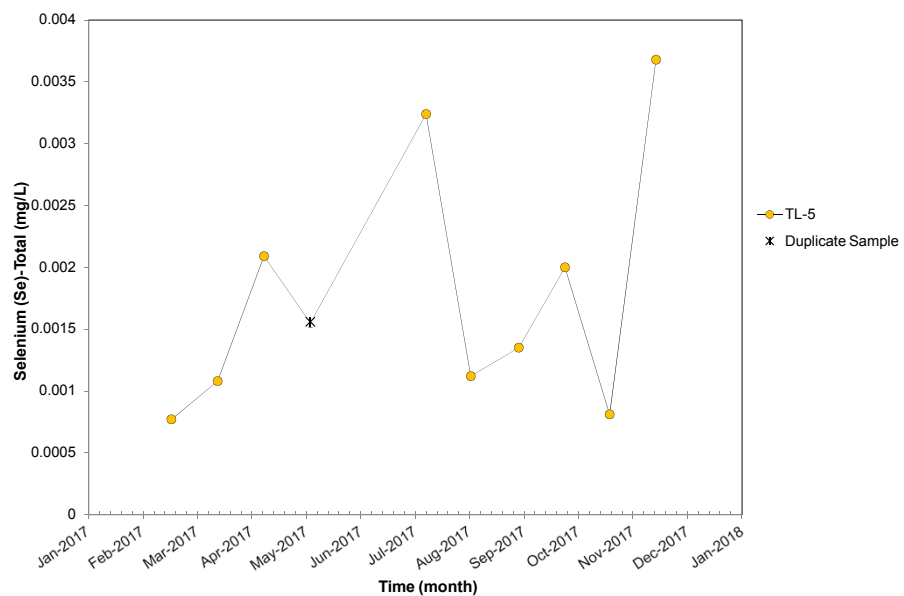
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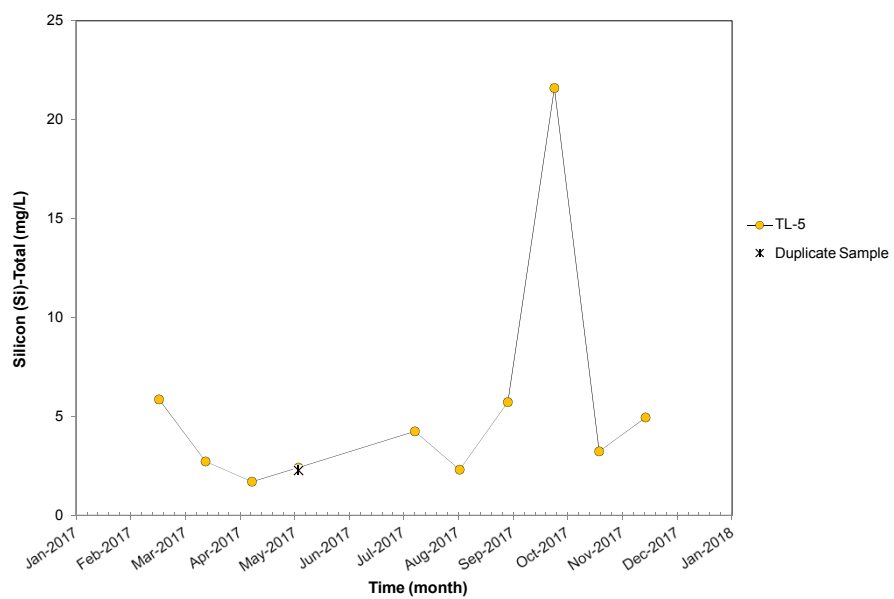
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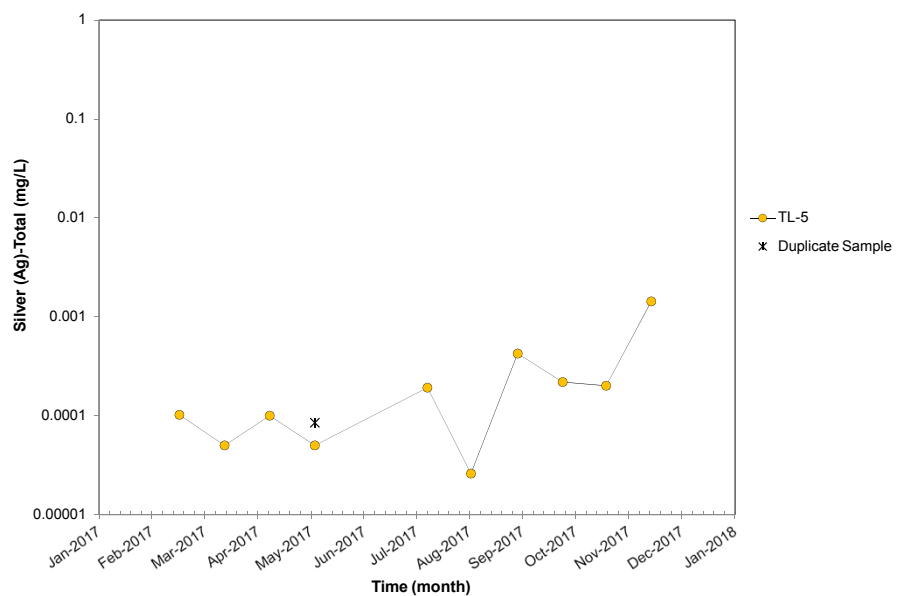
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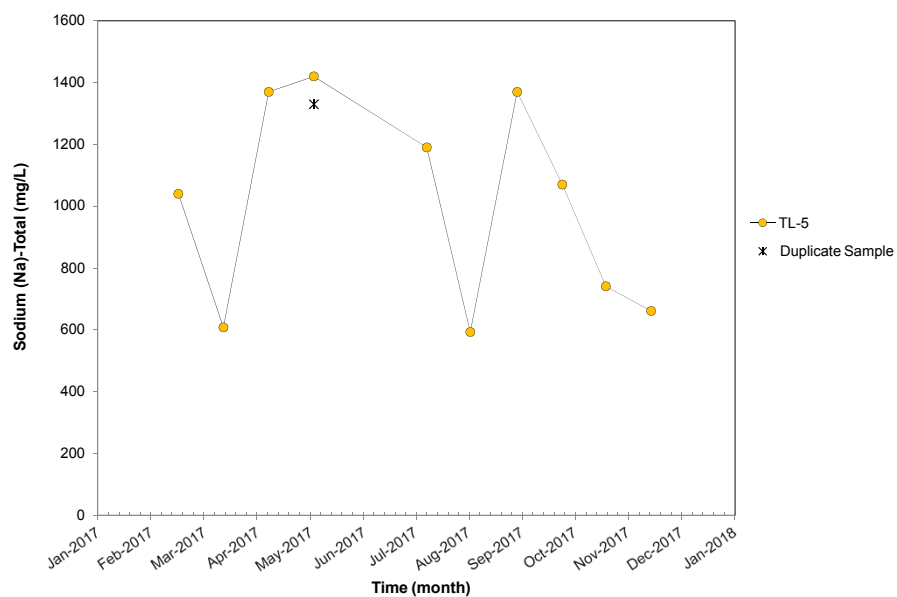
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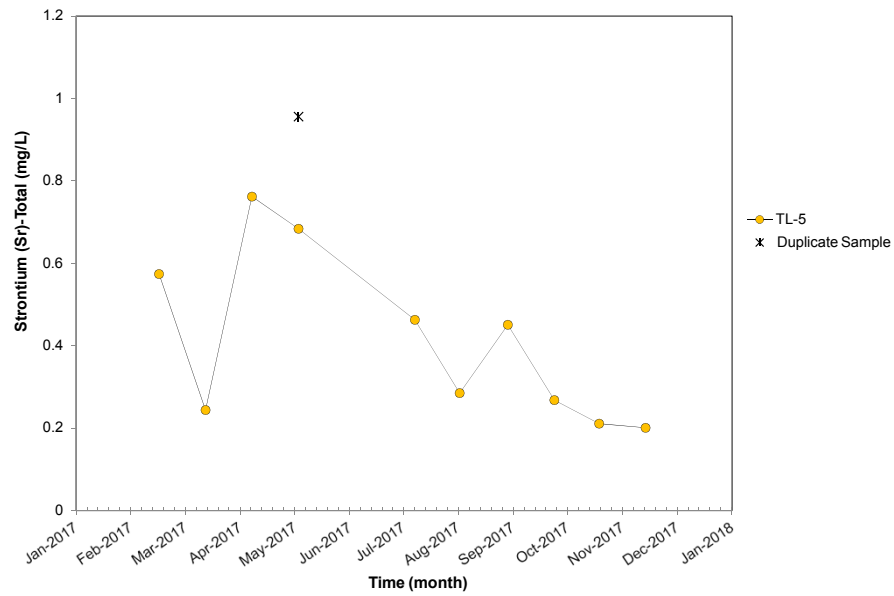
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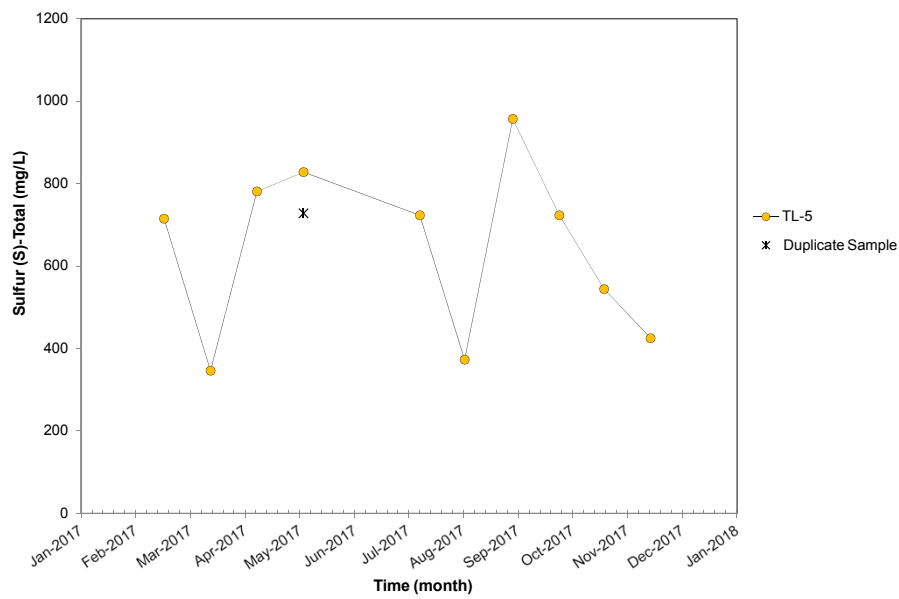
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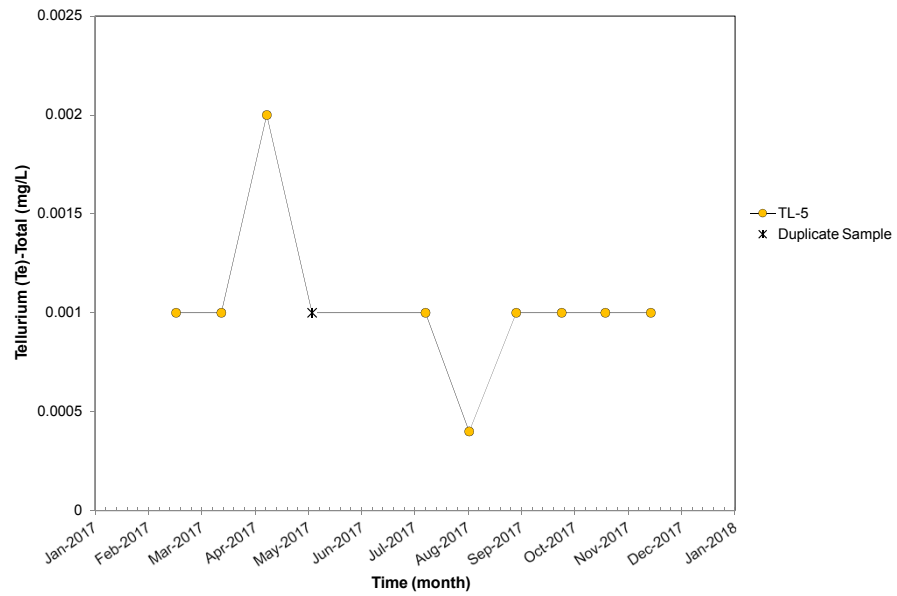
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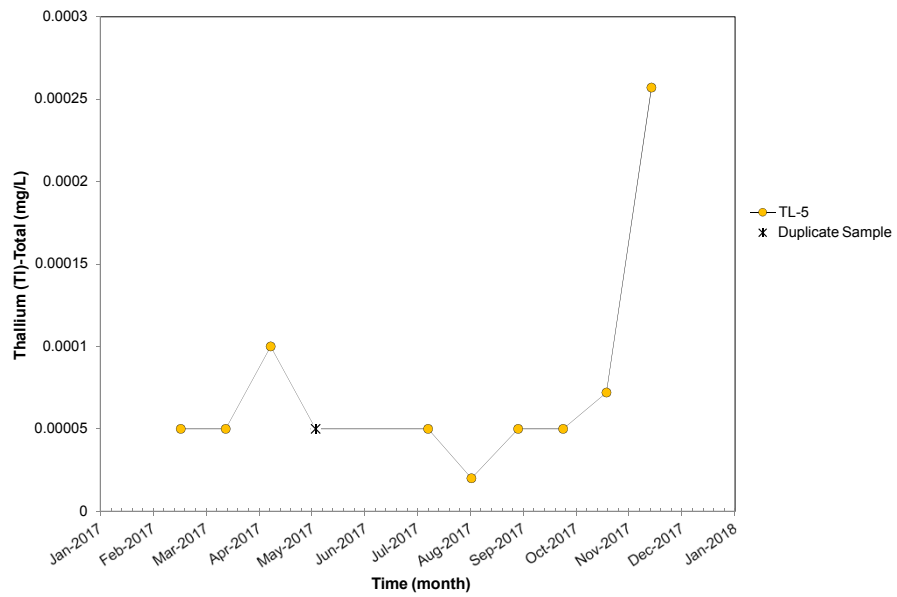
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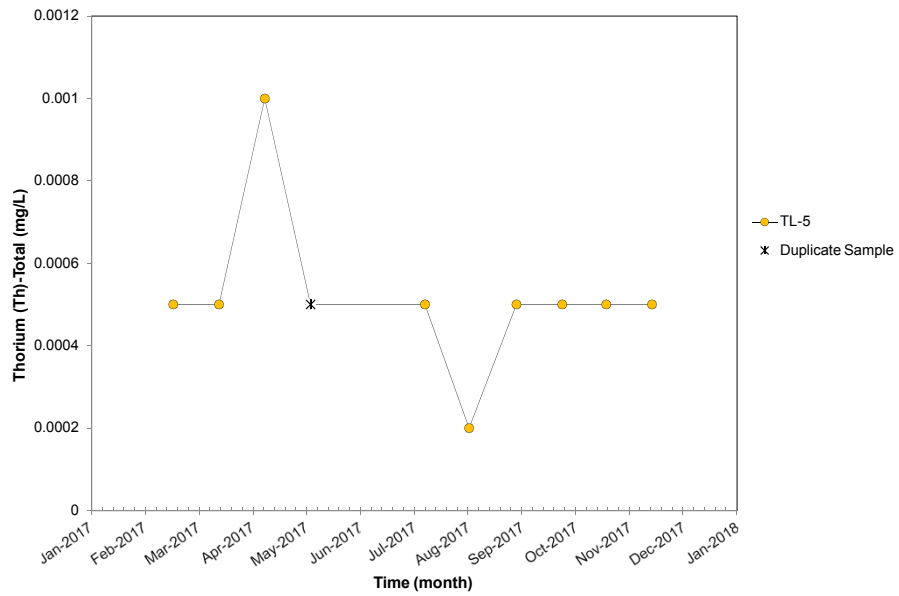
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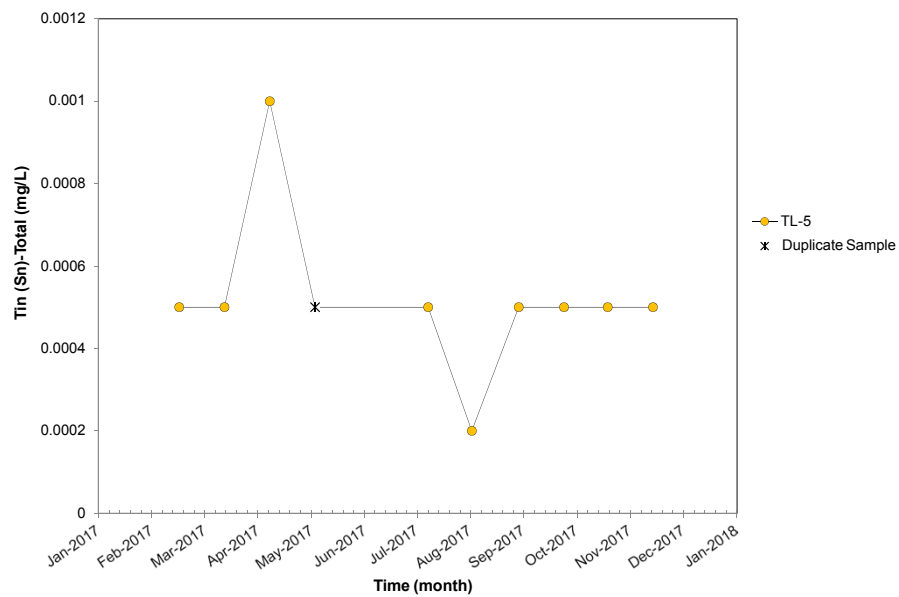
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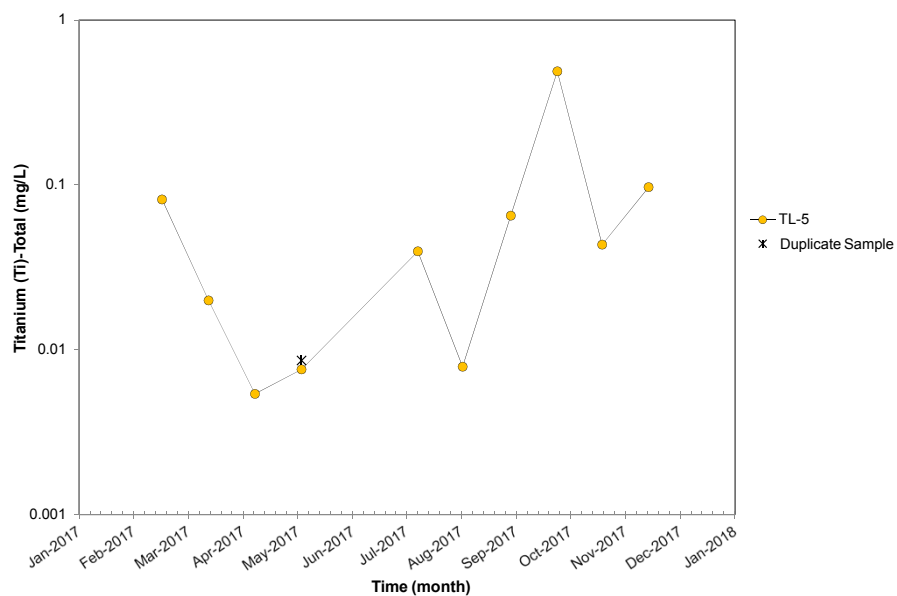
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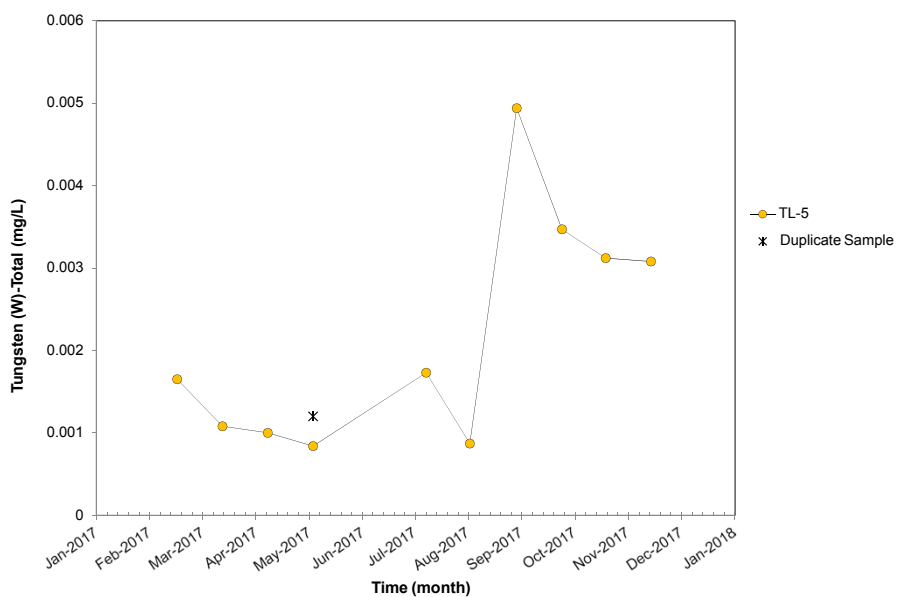
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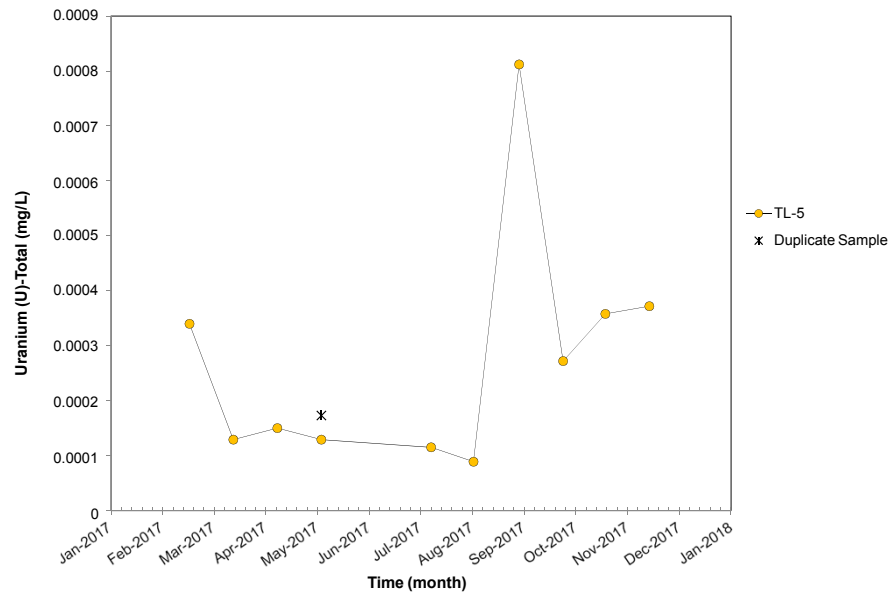
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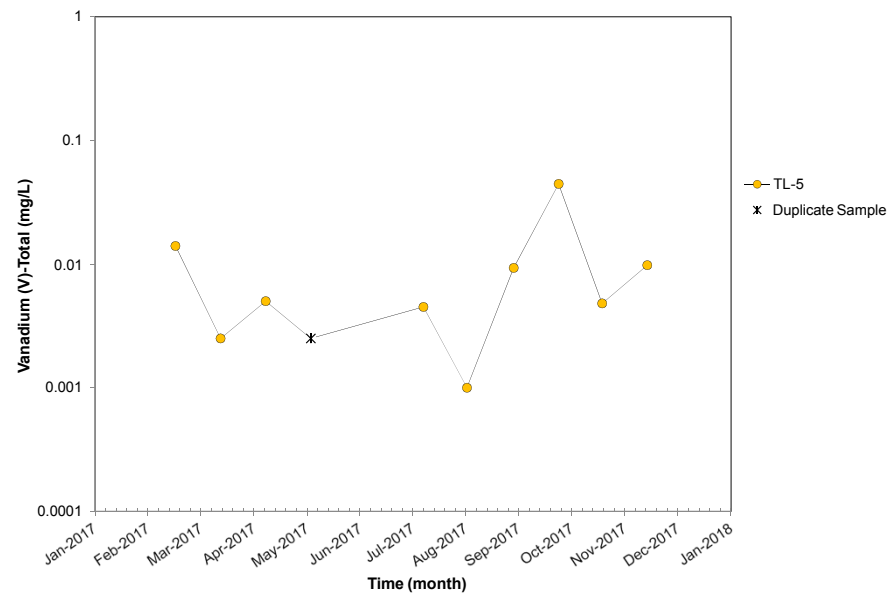
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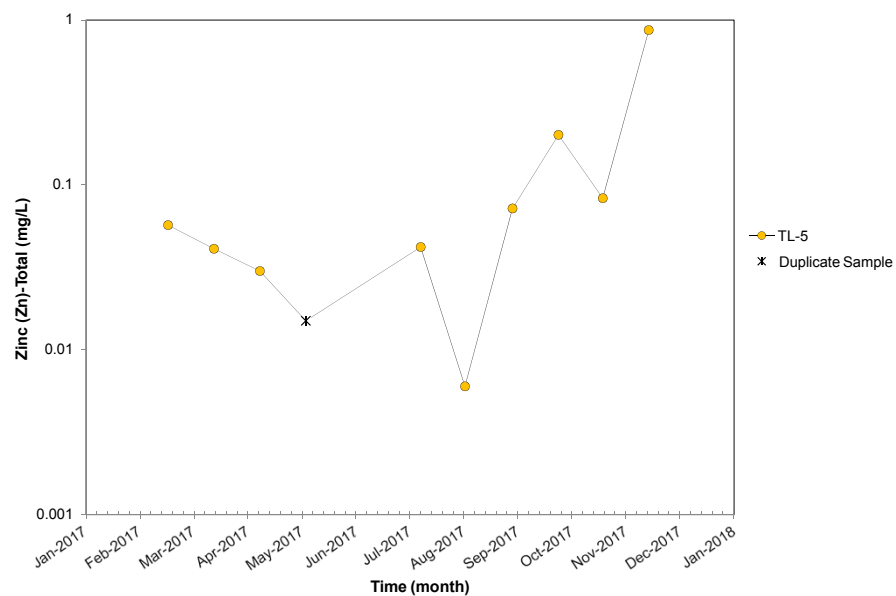
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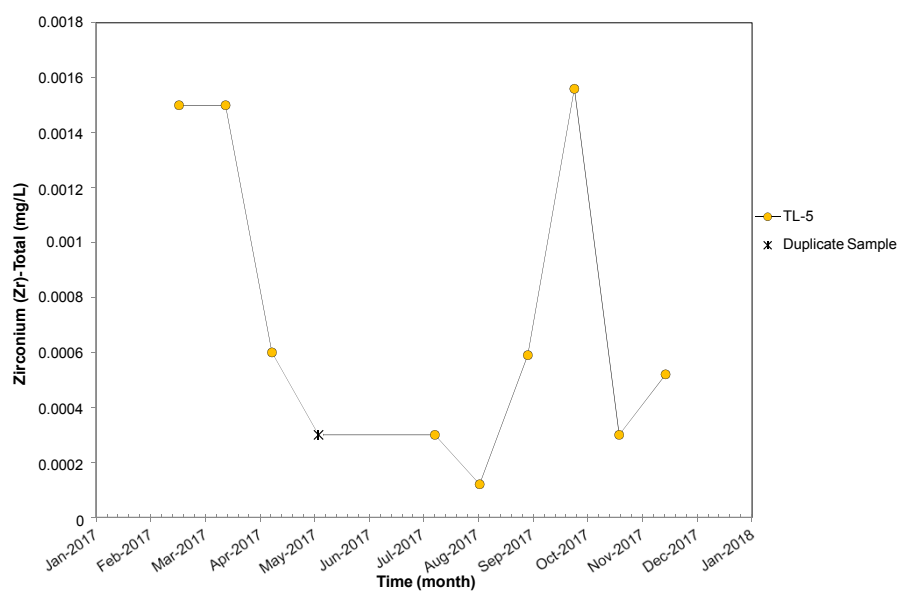
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Appendix G

2017 Waste Rock and Ore Monitoring Report,
Boston Camp, Hope Bay Project





2017 Waste Rock and Ore Monitoring Report, Boston Camp, Hope Bay Project

Prepared for

TMAC Resources Inc.



Prepared by



SRK Consulting (Canada) Inc.
1CT022.016
March 2018

2017 Waste Rock and Ore Monitoring Report, Boston Camp, Hope Bay Project

March 2018

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Appendices

Appendix A – 2017 Boston Seepage Monitoring

Appendix B – 2017 Boston Ephemeral Streams Monitoring

1 Introduction

At the Boston site, ore and waste rock were generated as part of a 1996-1997 BHP Billiton underground exploration program. The ore was placed in a number of stockpiles on the camp pad and the waste rock was used to construct a camp pad, roads, and an airstrip at Boston. Prior to TMAC's ownership, ore was subsequently used to resurface areas of the camp pad and airstrip. This practice does not continue under TMAC's ownership.

The seepage and ephemeral streams sampling programs are conducted annually in the context of the waste rock and ore management and Boston closure plans. This report presents results from the 2017 seepage and ephemeral streams monitoring at the Boston site and complies with Part J "Conditions applying to the Monitoring Program" Item 21 of Water Licence 2BB-BOS1727 (Nunavut Water Board 2017).

The report is organized as follows:

- A summary of the monitoring requirements is provided in Section 2.
- Results of the monitoring of seepage at the Boston site are summarized in Section 3
- Results of the monitoring of ephemeral streams are summarized in Section 4.
- Detailed technical memorandum on each of these subjects are provided in Appendices A and B.

2 Monitoring Requirements

2.1 Seepage Monitoring

The objective of the seepage monitoring is to provide an indication of water quality from the waste rock (camp pad) and ore stockpiles. There are two seepage monitoring programs, SNP seepage monitoring at station BOS8 and a freshet seepage survey along the north and east sides of the camp pad, and the southern end of the airstrip.

SNP seepage monitoring at station BOS8 is conducted in accordance with the conditions outlined in Part J "Conditions applying to the Monitoring Program" Item 12 of Water Licence 2BB-BOS1727 (Nunavut Water Board 2017). In summary, sampling of water quality station BOS-8 and any opportunistic seeps, is required initially during spring thaw and at a minimum frequency of monthly whenever flow is observed. Samples collected at BOS-8 are to be analysed for pH, electrical conductivity (EC), Total suspended solids (TSS), major anions (sulphate, chloride, ammonia), and total trace metals through an ICP scan.

A freshet seepage survey along the north and east sides of the camp pad and the southern end of the airstrip is to be completed in accordance with Section 5.2.1 of the Boston Water and Ore/Waste Rock Management Plan (SRK 2017). In summary, these areas of the pad are to be surveyed for seepage during freshet and samples collected opportunistically.

2.2 Ephemeral Streams

As outlined in the Water and Ore/Waste Rock Management Plan for the Boston Site, Hope Bay Project, Nunavut (SRK 2017), five ephemeral streams (A to E) within the catchments of the Boston camp pad are monitored during spring freshet. The objectives of the program are to monitor drainage from the Boston ore stockpiles and camp pad before entering Aimaokatalok Lake and the natural attenuation of the tundra.

3 Monitoring of Boston Seepage

Details of the 2017 seepage monitoring programs are presented in Appendix A.

3.1 Sampling and Testing Program

A total of five seepage opportunistic seepage samples were collected as part of the two seepage monitoring programs.

3.1.1 Airstrip and Camp Pad Seepage Survey

The freshet seep survey at Boston was conducted by TMAC Resources (TMAC) between June 4 and June 6, 2017. The survey included walking north and east sides of the camp pad and the full extent of the airstrip.

Three seeps were identified on the east side of the camp pad and sampled. No seepage was observed along the northern extent of the pad or along the airstrip. Field measurements of electrical conductivity (EC), pH, oxidation-reduction potential (ORP), temperature and flow rates (where possible) were measured at each of these locations.

The water quality samples were submitted by TMAC for laboratory testing at ALS Environmental (ALS) in Burnaby, British Columbia for pH, hardness, conductivity, total dissolved solids, alkalinity, anions (sulphate, chloride, fluoride, and bromide), nutrients (nitrate, ammonia, nitrite and phosphorus) and dissolved metals.

3.1.2 SNP Seepage Monitoring (BOS08)

Seepage samples collected in 2017 include one sample at BOS-8A in June and one at BOS-8D in July.

Field measurements of electrical conductivity (EC), pH, oxidation-reduction potential (ORP), temperature and flow rates (where possible) were measured at each of these locations.

Samples were collected from all stations for laboratory analysis. The water quality samples were submitted by TMAC for laboratory testing at ALS Environmental (ALS) in Burnaby, British Columbia for pH, hardness, conductivity, and total dissolved solids. The June sample was also analyzed for alkalinity, anions (bromide, chloride, fluoride, and sulphate), nutrients (ammonia, nitrate, nitrite, and phosphorus) and dissolved metals. The July sample was also analyzed for total metals.

3.2 Results

The results for samples taken as part of both the Airstrip and Camp Pad Seepage Survey (Section 3.1.1) and for the SNP Seepage Monitoring (Section 3.1.2) are presented in this section.

The five seepage samples were pH neutral to slightly alkaline with sulphate concentrations (310 to 620 mg/L) within the range of historic seepage monitoring samples. Arsenic and nickel concentrations (0.032 to 0.99 mg/L and 0.097 to 1.5 mg/L, respectively) were elevated for selected samples compared to the screening criteria, but were within the historical range of observed concentrations. In general, samples collected adjacent to the containment pond on the east side of the camp pad (17-BOS-02 and 17-BOS-03) had higher levels of sulphate, chloride, ammonia, nitrate, arsenic, selenium, and nickel than the other seepage samples.

4 Monitoring of Ephemeral Streams

Details of the 2017 Boston ephemeral streams monitoring program are presented in Appendix A.

4.1 Sampling and Testing Program

TMAC inspected ephemeral streams A to E for flow on June 17, 2017. Flow was observed at ephemeral streams A2 and C2 and samples collected for laboratory analysis. Field measurements included pH, electrical conductivity (EC), oxidation-reduction potential (ORP) and temperature. The water quality samples were submitted by TMAC for laboratory testing at ALS Environmental (ALS) in Burnaby, British Columbia for pH, hardness, conductivity, total dissolved solids, total alkalinity, anions (bromide, chloride, fluoride, and sulphate), nutrients (nitrate, nitrite, ammonia and phosphorus) and dissolved metals (field filtered).

4.2 Results

The pH of ephemeral streams A2 and C2 were slightly alkaline. The analysis of the water quality data for ephemeral streams A2 and C2 indicated that concentrations of the potential contaminants of concern (nitrate, sulphate, arsenic, copper, iron, nickel and selenium) as identified by the water and load balance (SRK 2009), are either decreasing or stable. The stable concentrations indicate that the tundra continues to effectively attenuate contaminants of concern and the breakthrough of the effectiveness of the attenuation process has not occurred. Sulphate and chloride levels are not attenuated by the tundra and the concentrations measured in 2017 validate the 2009 water and load balance and therefore there are no projected impacts to the receiving environment.

5 Conclusions

The seepage program monitors contact water from the camp pad and ore stockpiles while the ephemeral stream program monitors drainage from the Boston ore stockpiles and camp pad before entering Aimaokatalok Lake and the natural attenuation of the tundra. Contaminants of concern as identified by the 2009 water and load balance include nitrate, sulphate, arsenic, copper, iron, nickel and selenium.

In 2017, TMAC surveyed i) the northern and eastern edges of the camp pad and the full extent of the airstrip for opportunistic seepage samples and ii) the five ephemeral streams (A to E) within the catchment of the Boston camp pad. In total, TMAC collected five seepage samples along the eastern edge of the camp pad and two ephemeral streams samples from streams A2 and C2.

All seepage and ephemeral stream samples were pH neutral to slightly alkaline.

Monitoring of the seepage from the camp pad and the ore stockpiles indicates that water quality for the contaminants of concern are within the range of the historical data. In general, samples collected adjacent to the containment pond on the east side of the camp pad (17-BOS-02 and 17-BOS-03) had higher levels of sulphate, chloride, ammonia, nitrate, arsenic, selenium, and nickel than the other seepage samples collected in 2017.

The monitoring of the ephemeral streams A2 and C2 indicates that concentrations of the contaminants of concern are consistent with ephemeral streams monitoring that was initiated in 2009. The stable concentrations indicate that the tundra continues to effectively attenuate contaminants of concern and the breakthrough of the effectiveness of the attenuation process has not occurred. Sulphate and chloride levels are not attenuated by the tundra and the concentrations measured in 2017 validate the 2009 water and load balance and therefore there are no projected impacts to the receiving environment.

This report, 2017 Waste Rock and Quarry Monitoring Report, was prepared by

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Consultant

and reviewed by

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Lisa Barazzuol, PGeo (BC)
Senior Consultant

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The opinions expressed in this report have been based on the information available to SRK at the time of preparation. SRK has exercised all due care in reviewing information supplied by others for use on this project. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information, except to the extent that SRK was hired to verify the data.

6 References

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Appendix A – 2017 Boston Seepage Monitoring

Memo

To:	Shelley Potter, TMAC	Client:	TMAC Resources Inc.
From:	Marie-Christine Noel Lisa Barazzuol, PGeo	Project No:	1CT022.016
Cc:	Oliver Curran, TMAC	Date:	March 26, 2018
Subject:	Boston Seepage Monitoring Program 2017		

1 Introduction

At the Boston site, ore and waste rock were generated as part of a 1996-1997 BHP Billiton underground exploration program. The ore was placed in a number of stockpiles on the camp pad and the waste rock was used to construct a camp pad, roads, and an airstrip at Boston. Since that time, the site has been primarily in care and maintenance, with periodic use of the camp and airstrip in support of exploration activities.

2017 monitoring activities include:

- A freshet seepage survey along the north and east sides of the camp pad, and the southern end of the airstrip.
- SNP seepage monitoring at station BOS8.

This memo presents the results of all Boston seepage samples collected in 2017 and complies with Part J “Conditions applying to the Monitoring Program” Item 21 of Water Licence 2BB-BOS1727 (Nunavut Water Board 2017).

2 Methods

2.1 Sample Collection

2.1.1 Airstrip and Camp Pad Seepage Survey

The freshet seep survey at Boston was conducted between June 4 and June 6, 2017 by TMAC Resources (TMAC) with guidance from SRK. The survey included walking north and east sides of the camp pad and the full extent of the airstrip. Seep locations were established opportunistically by walking the toe of the camp pad and in areas of water was observed flowing out of the toe of the camp pad. Three seeps were identified and sampled on the east side of the camp pad (17-BOS-1 to 17-BOS-3, Figure 1). No seeps were observed along the airstrip or the northern extent of the camp pad. Field measurements of electrical conductivity (EC), pH, oxidation-reduction potential (ORP), temperature and flow rates (where possible) were measured at each of these locations.

Samples were collected by TMAC from all stations for laboratory analysis. The water quality samples were submitted by TMAC for laboratory testing at ALS Environmental (ALS) in Burnaby, British Columbia for pH, EC, total dissolved solids (TDS), alkalinity, anions (bromide, chloride, fluoride, and sulfate), nutrients (ammonia, nitrate, nitrite, and phosphorus) and dissolved metals. All samples were filtered and preserved in the field. In addition, one duplicate sample and one field blank were collected and submitted for laboratory analysis, and one travel blank was included in sample shipments as part of SRK's quality assurance/quality control (QA/QC) program.

2.1.2 SNP Seepage Monitoring (BOS-08)

As stipulated in Water License 2BB-BOS1727 (Nunavut Water Board 2017), TMAC monitors the seepage stations BOS-8A, BOS-8B, BOS-8C, and BOS-8D. At minimum, monthly samples are to be collected if flowing seepage is observed. Two samples were collected by TMAC in 2017 – one at BOS-8A (in June during the freshet seepage survey) and one at BOS-8D in July. Field measurements of EC, pH, ORP, temperature and flow rates (where possible) were measured at each of these locations.

Samples were collected from all stations for laboratory analysis. The water quality samples were submitted by TMAC for laboratory testing at ALS Environmental (ALS) in Burnaby, British Columbia. The analytical programs for the June and July samples differed. Both samples were analyzed for pH, hardness, conductivity, and total dissolved solids. In addition, the June sample was analyzed for alkalinity, anions (bromide, chloride, fluoride, and sulfate), nutrients (ammonia, nitrate, nitrite, and phosphorus) and dissolved metals. The July sample was also analyzed for total metals.

3 Quality Assurance and Control

3.1 2017 Data

SRK conducted a QA/QC review of all June seepage samples (including BOS-8A) including the duplicate, field blank and travel blank. SRK also reviewed the July data but comprehensive QA/QC checks were not possible because neither anions nor dissolved metals were analysed. Overall SRK concluded that these data were acceptable with some minor concerns over the data quality for the field blank but not the seepage samples.

Ion balances ranged from -1 to 1.9% for the seep samples. All samples complied with SRK's criteria of $\pm 10\%$. The dissolved barium concentration in the field blank sample failed the QA/QC criteria of being two times above the detection limit. A lab recheck confirmed the analysis results. All other parameters for the field blank were below detection limits. The dissolved barium concentrations measured for the seep samples were an order of magnitude lower than the field blank indicating that the elevated barium concentrations were observed in the field blank only.

The field duplicate results were within $\pm 30\%$ relative percent difference (RPD) for all parameters with measured concentrations above ten times the detection limit.

In addition, laboratory and field values of pH and electric conductivity (EC) were compared, as well as total dissolved solids (TDS) and lab conductivity. Conductivity values were near parity for all samples. Values of pH were similar between field and lab readings. For all samples, TDS demonstrated a strong positive correlation with lab conductivity.

3.2 Historic Data

The historic seepage data set is comprised of 45 samples collected between 2008 and 2016. SRK collected three seepage samples in 2008 and based on QA/QC screening concluded that the data were acceptable (SRK 2009). All other historic samples were collected by Hope Bay Mining Ltd (HBML) or TMAC as part of the SNP water licence monitoring program. SRK did not conduct QA/QC of the historic seepage data collected by HBML or TMAC because the limited analytical suite precluded the calculation of ion balances and other QA/QC checks. SRK accepted all SNP monitoring data as is.

4 Results

4.1 Field Observations

Field parameters for the five seeps sampled in 2017 are presented in Table 1. Field electrical conductivity varied from 619 to 1948 $\mu\text{S}/\text{cm}$, while the pH ranged from 7.1 to 7.9.

4.2 Laboratory Results

Table 2 and Table 3 compares the 2017 Boston seepage data with a statistical summary of historical Boston seepage samples (2008 to 2016). Table 2 presents general parameters, anions and nutrients, while Table 3 presents trace element data. When available, dissolved metals data are presented in Table 3, however total metals are also presented as they are analyzed as part of the seepage monitoring conducted as part of the Boston water licence.

The 2017 Boston seepage samples were compared to screening criteria based on ten times the CCME guideline for the preservation of aquatic life in fresh water (chronic concentrations). CCME guidelines are not directly applicable because the seep locations do not support aquatic life.

All samples were pH neutral to slightly alkaline (7.1 to 8.0). Sulphate concentrations were within the range of historical concentrations and ranged from 310 to 620 mg/L. Chloride concentrations ranged from 16 to 230 mg/L.

Concentrations of arsenic and nickel exceeded the screening criteria. Nickel concentrations (0.00071 to 0.0037 mg/L) fell within the historical range of seeps sampled. Dissolved arsenic concentrations (0.032 to 0.99 mg/L) were greater than the range of historical values, but within the range of the historical total arsenic values. Maximum arsenic and nickel concentrations observed in 2017 represent greater than 95th percentile concentrations of the overall historic data set. All other parameters were below the screening criteria and within the range of historical observed concentrations. Concentrations of sulphate, chloride, ammonia, nitrate, arsenic, selenium, and nickel at 17-BOS-02 and 17-BOS-03 were higher than the other sample collected in 2017.

5 Conclusions and Recommendations

Seepage surveys in 2017 at Boston included i) the freshet survey of the north and east sides of the camp pad and the southern end of the airstrip and ii) monthly surveys of SNP station BOS-8. This memo presents the results from both seepage surveys. In 2017, a total of five opportunistic seepage samples were collected: two from BOS-8 in June and July and three from the east side of the camp pad. No seepage was observed along the northern extent of the pad or along the airstrip.

All seepage samples were pH neutral to slightly alkaline with sulphate concentrations (310 to 620 mg/L) within the range of historic seepage monitoring samples. Arsenic and nickel concentrations (0.032 to 0.99 mg/L and 0.097 to 1.5 mg/L, respectively) were elevated for selected samples compared to the screening criteria, but were within the historical range of observed concentrations. In general, samples collected adjacent to the containment pond (17-BOS-02 and 17-BOS-03) had higher levels of sulphate, chloride, ammonia, nitrate, arsenic, selenium, and nickel than the other seepage samples. Continued monitoring will allow for the trends in the seepage to be established.

Regards,
SRK Consulting (Canada) Inc.

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Marie-Christine Noel
Consultant

Reviewed by

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Lisa Barazzuol, PGeo (BC)
Senior Consultant

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6 References

Nunavut Water Board, 2017. Water Licence No: 2BB-BOS1727. July 2017.

SRK Consulting (Canada) Inc., 2009. Geochemical Characterization of Historic Waste Rock and Ore Stockpiles at the Boston Deposit, Hope Bay Project, Nunavut. Report 1CH008.005 for Hope Bay Mining Ltd. April 2009.

SRK Consulting (Canada) Inc., 2017. Water and Ore/Waste Rock Management Plan for the Boston Site, Hope Bay Project, Nunavut. Report 1CH008.022 for TMAC Resources Inc. January 2017.



Legend
● 2017 Seepage

	pH 6.0 to 6.9	pH 7 to 7.9	pH 8 to 8.9
EC ≤ 500 µS/cm			
500µS/cm<EC<2000µS/cm			
EC>2000µS/cm			



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2017 Seepage Monitoring

Hope Bay Gold Project			
Seep Survey Locations Boston Area			
Date:	Approved:	Figure:	1
Mar 2018	MCN		

Table 1: 2017 Field Observations

Sample ID	Field pH <i>s.u.</i>	Field EC $\mu\text{S/cm}$	ORP <i>mV</i>	Temperature $^{\circ}\text{C}$	Flow <i>L/s</i>	Comments
BOS8A-04Jun17	7.9	840	204	4.2	--	NE side of camp pad. Very slow seep emanating from toe of pad. Leads to large pool. Low flow, not visible unless sediment is stirred or small piece of grass on top. Settled dirt particulates and algae at BOS8 station. Somewhat channelized (~30cm wide)
BOS8D-06JUL17	7.4	1681	255	2.4	-	
2017-BOS-001	7.1	619	165	4.5	0.01	East side of camp pad. Small seep from base of toe. Not channelized. Grass vegetated tundra surrounding. Very low volume, not visible unless sediment is disturbed.
17-BOS-02	7.9	1948	234.6	0.4	0.05	Toe at east side of camp pad. Small seep with apparent channel. Very shallow. Grass tundra. Sediment and algae growth present in channel. Seepage collected with syringe.
17-BOS-03	7.8	1792	210.2	0.5	0.06	Small seepage on east side of camp. Emanating at toe of containment ponds. Old matting present in area. Channel runs east of water body. A lot of sediment present in area. Seepage very shallow and non-channelized. Algae present downstream. Sample collected with syringe.

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Table 2: Summary of General Parameters, Anions and Nutrients, 2017 and Historical Seepage Samples

Sample ID	Conductivity µS/cm	pH s.u.	Alkalinity, Total mg/L as CaCO ₃	Ammonia mg/L as N	Nitrate mg/L as N	Chloride mg/L	Sulphate mg/L
Screening Criteria (10x CCME)		6.5-9		15.4	130	1200	
BOS8A-04Jun17	810	7.6	91	0.015	1.5	26	310
BOS8D-06JUL17	1600	7.8	-	0.0056	-		440
2017-BOS-001	580	7.1	61	0.027	0.98	16	210
17-BOS-02	1800	8.0	110	0.2	3.8	230	620
17-BOS-03	1700	8.0	110	0.12	3.2	190	570
Historical Seepage Data (2008 to 2016)							
5th percentile	410	6.9	30	0.0086	0.05	66	73
50 th percentile	1300	7.7	70	0.05	3.5	150	330
95 th percentile	2800	8.1	190	10	48	1400	720
number of samples (n)	45	45	22	43	21	21	45

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Table 3: Summary of Trace Elements, 2017 and Historical Seepage Samples

Sample ID	Dissolved Metals								
	Aluminum mg/L	Arsenic mg/L	Cadmium mg/L	Copper mg/L	Iron mg/L	Lead mg/L	Nickel mg/L	Selenium mg/L	Zinc mg/L
Screening Criteria (10x CCME¹)	1	0.05	0.0037	0.04	3	0.07	1.5	0.01	0.3
BOS8A-04Jun17	0.0047	<u>0.11</u>	0.000014	0.0051	<0.010	<0.000050	0.33	0.00078	0.0044
BOS8D-06JUL17	0.042*	<u>0.30*</u>	0.000036*	0.0034*	0.067*	<0.00050*	0.81*	0.0029*	0.0064*
2017-BOS-001	0.034	0.032	0.000037	0.0042	0.068	<0.000050	0.097	0.00071	0.0056
17-BOS-02	0.0025	<u>0.99</u>	0.000035	0.0035	<0.010	<0.000050	<u>1.5</u>	0.0037	0.0028
17-BOS-03	0.0042	<u>0.58</u>	0.00003	0.0041	<0.010	<0.000050	0.99	0.0031	0.041
Historic Seepage Data (2008 to 2016)									
Dissolved Metals									
5th percentile	0.006	0.037	0.00012	0.002	0.039	0.00012	0.14	0.0036	0.0025
50 th percentile	0.015	<u>0.052</u>	0.00025	0.0031	0.12	0.00025	0.61	<u>0.014</u>	0.0068
95 th percentile	0.022	<u>0.13</u>	0.00048	0.0071	0.24	0.00048	<u>1.6</u>	<u>0.037</u>	0.02
Maximum	0.023	<u>0.13</u>	0.0005	0.0076	0.25	0.0005	<u>1.8</u>	<u>0.04</u>	0.022
n	3	3	3	3	3	3	3	3	3
Total Metals									
5th percentile	0.015	0.0027	0.000015	0.0014	0.032	0.0001	0.0099	0.00039	0.004
50 th percentile	0.08	<u>0.11</u>	0.00005	0.0044	0.26	0.0005	0.13	0.0018	0.0057
95 th percentile	0.94	<u>0.76</u>	0.00096	0.011	<u>4.4</u>	0.0049	1.3	0.008	0.072
Maximum	6.9	<u>5.6</u>	0.002	0.045	<u>16</u>	0.022	4.0	0.017	0.1
n	41	40	42	42	42	42	42	40	41

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Note:

Values underlined and bolded exceed 10xCCME guidelines

1 CCME Guidelines assume an average pH of 8, a (conservative) estimate of temperature at 20°C, average hardness of 600 mg/L CaCO₃

*Represents total metals, not dissolved

Attachment A: 2016 Field Observations and Water Quality Results

Date	Time	Sampled	Station	Easting	Northing	Description	pH	Temperature	Conductivity	ORP	Photos	Flow	ALS Sample ID	Conductivity	Hardness (as CaCO3)	pH	Total Suspended Solids	Total Dissolved Solids	Acidity (as CaCO3)	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Alkalinity, Total (as CaCO3)	Ammonia, Total (as N)
Unit				UTM 13			pH units	°C	µS/cm	mV		L/s		uS/cm	mg/L	pH	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Lowest Detection Limit														2	0.5	0.1	3	1	1	1	1	1	1	0.005
04-Jun-17	14:05	Yes	BOS8A-04JUN	441232	7505521	NE side of camp pad. Very slow seep emanating from toe of pad. Leads to large pool. Low flow, not visible unless sediment is stirred or small piece of grass on top. Settled dirt particulates and algae at BOS8 station. Somewhat channelized (~30cm wide)	7.9	4.2	840	204		-	L1937709-1	810	-	7.6	<3.0	610	5.5	91	<1.0	<1.0	91	0.015
04-Jun-17	15:10	Yes	2017-BOS-001	441243	7505504	East side of camp pad. Small seep from base of toe. Not channelized. Grass veg tundra surrounding. Very low volume, not visible unless sediment disturbed.	7.1	4.5	619	165		0.01	L1937709-2	580	-	7.1	33	430	8.1	61	<1.0	<1.0	61	0.027
06-Jun-17	10:00	Yes	17-BOS-02	441331	7505409	Toe at east side of camp pad. Small seep with apparent channel. Very shallow. Grassy tundra. Sediment and algae growth present in channel. Seepage collected with syringe.	7.9	0.4	1948	234.6		0.05	L1945414-1	1800	970	8	6.7	1400	4.8	-	-	-	110	0.2
06-Jun-17	10:30	Yes	17-BOS-03	441350	7505380	Small seepage on East side of camp. Emanating at toe of containment ponds. Old matting present in area. Channel runs east to water body. A lot of sediment present in area. Seepage very shallow and non-channelized. Algae present downstream. Sample collected with syringe.	7.8	0.5	1792	210.2		0.06	L1945414-2	1700	900	8	12	1300	4.6	-	-	-	110	0.12
04-Jun-17	-	Yes	Duplicate of BOS8A-04Jun17	-	-	-	-	-	-	-	-	-	L1937709-3	780	-	7.7	12	620	4.9	93	<1.0	<1.0	93	0.012
04-Jun-17	-	Yes	Field Blank	-	-	-	-	-	-	-	-	-	L1937709-4	<2.0	-	5.5	<3.0	<10	1.8	<1.0	<1.0	<1.0	<1.0	<0.0050

Date	Time	Sampled	Station	Bromide (Br)	Fluoride (F)	Nitrate (as N)	Nitrite (as N)	Phosphorus (P)-Total	Sulfate (SO4)	Aluminum (Al)-Dissolved	Antimony (Sb)-Dissolved	Arsenic (As)-Dissolved	Barium (Ba)-Dissolved	Beryllium (Be)-Dissolved	Bismuth (Bi)-Dissolved	Boron (B)-Dissolved	Cadmium (Cd)-Dissolved	Calcium (Ca)-Dissolved	Chromium (Cr)-Dissolved	Cobalt (Co)-Dissolved	Copper (Cu)-Dissolved	Iron (Fe)-Dissolved	Lead (Pb)-Dissolved	Lithium (Li)-Dissolved	Magnesium (Mg)-Dissolved	Manganese (Mn)-Dissolved	Mercury (Hg)-Dissolved
Unit				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Lowest Detection Limit				0.05	0.02	0.005	0.001	0.002	0.3	0.001	0.0001	0.0001	0.00005	0.00002	0.00005	0.01	0.000005	0.05	0.0001	0.0001	0.0002	0.01	0.00005	0.001	0.1	0.0001	0.000005
04-Jun-17	14:05	Yes	BOS8A-04JUN	<0.25	<0.10	1.5	<0.0050	0.028	310	0.0047	0.0069	0.11	0.013	<0.00010	<0.000050	0.065	0.000014	94	0.00014	0.14	0.0051	<0.010	<0.000050	0.005	40	0.11	<0.0000050
04-Jun-17	15:10	Yes	2017-BOS-001	<0.050	0.032	0.98	0.0028	0.036	210	0.034	0.0041	0.032	0.011	<0.00010	<0.000050	0.087	0.000037	62	0.00015	0.072	0.0042	0.068	<0.000050	0.0012	28	0.29	<0.0000050
06-Jun-17	10:00	Yes	17-BOS-02	-	<0.20	3.8	<0.010	0.031	620	0.0025	0.036	0.99	0.019	<0.000020	<0.000050	0.2	0.000035	260	<0.00010	1.1	0.0035	<0.010	<0.000050	0.052	75	0.3	<0.0000050
06-Jun-17	10:30	Yes	17-BOS-03	-	<0.20	3.2	0.026	0.03	570	0.0042	0.027	0.58	0.026	<0.000020	<0.000050	0.21	0.00003	240	<0.00010	0.75	0.0041	<0.010	<0.000050	0.048	75	0.21	<0.0000050
04-Jun-17	-	Yes	Duplicate of BOS8A-04Jun17	<0.25	<0.10	1.4	<0.0050	0.031	310	0.0051	0.0067	0.1	0.013	<0.00010	<0.000050	0.068	0.00002	98	<0.00010	0.12	0.005	<0.010	<0.000050	0.0053	39	0.1	<0.0000050
04-Jun-17	-	Yes	Field Blank	<0.050	<0.020	<0.0050	<0.0010	<0.0020	<0.30	<0.0010	<0.00010	<0.00010	0.00028	<0.00010	<0.000050	<0.010	<0.0000050	<0.050	<0.00010	<0.00010	<0.00020	<0.010	<0.000050	<0.0010	<0.0050	<0.00010	<0.0000050

Date	Time	Sampled	Station	Molybdenum (Mo)-Dissolved	Nickel (Ni)-Dissolved	Phosphorus (P)-Dissolved	Potassium (K)-Dissolved	Selenium (Se)-Dissolved	Silicon (Si)-Dissolved	Silver (Ag)-Dissolved	Sodium (Na)-Dissolved	Strontium (Sr)-Dissolved	Sulfur (S)-Dissolved	Thallium (Tl)-Dissolved	Tin (Sn)-Dissolved	Titanium (Ti)-Dissolved	Uranium (U)-Dissolved	Vanadium (V)-Dissolved	Zinc (Zn)-Dissolved	Zirconium (Zr)-Dissolved
Unit				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Lowest Detection Limit				0.00005	0.0005	0.05	0.1	0.00005	0.05	0.00001	0.05	0.0002	0.5	0.00001	0.0001	0.0003	0.00001	0.0005	0.001	0.0003
04-Jun-17	14:05	Yes	BOS8A-04JUN	0.00087	0.33	<0.050	4.5	0.00078	1.4	<0.000010	14	0.25	110	<0.000010	<0.00010	<0.00030	0.00015	<0.00050	0.0044	<0.000060
04-Jun-17	15:10	Yes	2017-BOS-001	0.00074	0.097	<0.050	5.5	0.00071	1.6	<0.000010	11	0.22	75	<0.000010	<0.00010	0.00079	0.000033	<0.00050	0.0056	0.00016
06-Jun-17	10:00	Yes	17-BOS-02	0.0024	1.5	<0.050	14	0.0037	2.3	0.000014	39	1.6	220	<0.000010	<0.00010	<0.00030	0.00028	0.0014	0.0028	<0.00030
06-Jun-17	10:30	Yes	17-BOS-03	0.0029	0.99	<0.050	14	0.0031	2.4	0.000019	37	1.4	210	<0.000010	<0.00010	<0.00030	0.0003	0.00076	0.041	<0.00030
04-Jun-17	-	Yes	Duplicate of BOS8A-04Jun17	0.0009	0.29	<0.050	4.4	0.00065	1.3	<0.000010	14	0.26	110	<0.000010	<0.00010	<0.00030	0.00015	<0.00050	0.0039	0.000061
04-Jun-17	-	Yes	Field Blank	<0.000050	<0.00050	<0.050	<0.050	<0.000050	<0.050	<0.000010	<0.050	<0.00020	<0.50	<0.000010	<0.00010	<0.00030	<0.000010	<0.00050	<0.0010	<0.000060

Appendix B – 2017 Boston Ephemeral Streams Monitoring

Memo

To:	Shelley Potter, TMAC	Client:	TMAC Resources Inc.
From:	Marie-Christine Noel Lisa Barazzuol	Project No:	1CT022.016
Cc:	Oliver Curran, TMAC	Date:	March 26, 2018
Subject:	Boston Ephemeral Stream Monitoring 2017		

1 Introduction

At the Boston site, ore and waste rock were generated as part of a 1996-1997 BHP Billiton underground exploration program. The ore was placed in a number of stockpiles on the camp pad and the waste rock was used to construct a camp pad, roads, and an airstrip at Boston. The ore/waste rock and associated runoff are managed as part of Water License 2BB-BOS1727 (Nunavut Water Board (NWB) 2017), and the Water and Ore/Waste Rock Management Plan for the Boston Site (SRK 2017).

As recommended in the Water and Ore/Waste Rock Management Plan for the Boston Site, Hope Bay Project, Nunavut (SRK 2017), ephemeral streams downgradient of the waste rock pile have been monitored during spring freshet since 2009 to monitor the attenuation capacity of the tundra and to provide an indication of whether contaminants from the ore and waste rock piles are reaching the shoreline of Aimaokatalok Lake. This memo presents the results of the 2017 monitoring program.

2 Methods

2.1 Sample Collection

Five ephemeral streams have been identified in previous surveys at the site, as shown in Figure 1. Each of these sites was surveyed for flow by TMAC Resources (TMAC) in June 17, 2017. Flow was observed at stations A2 and C2 only. Field measurements included pH, electrical conductivity (EC), oxidation-reduction potential (ORP) and temperature. Samples were collected from station A2 and C2 for laboratory analysis. The water quality samples were submitted by TMAC for laboratory testing at ALS Environmental (ALS) in Burnaby, British Columbia for pH, hardness, conductivity, total dissolved solids, alkalinity and species, anions (bromide, chloride, fluoride, and sulphate), nutrients (nitrate, nitrite, ammonia and phosphorus) and dissolved metals (field filtered).

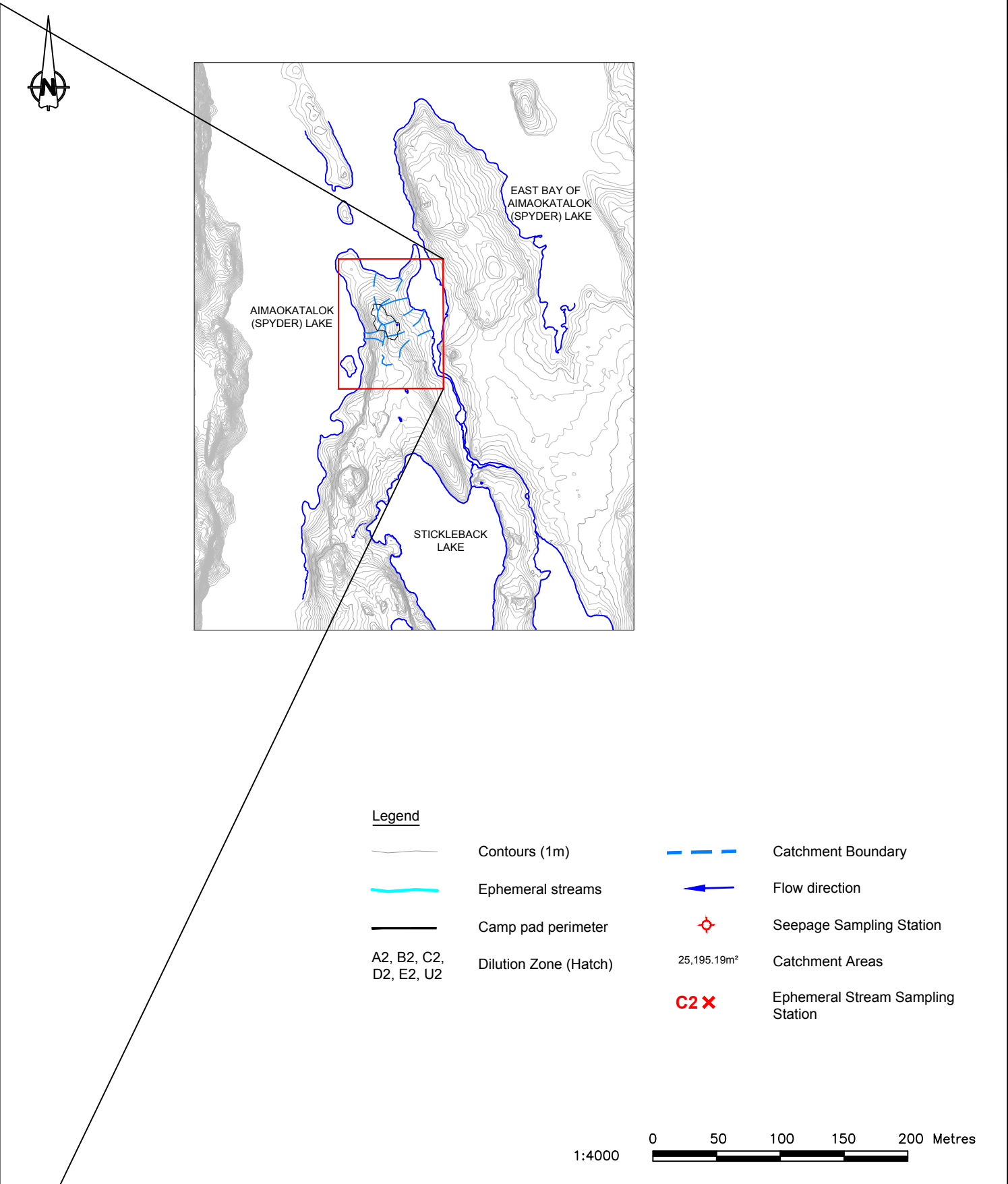
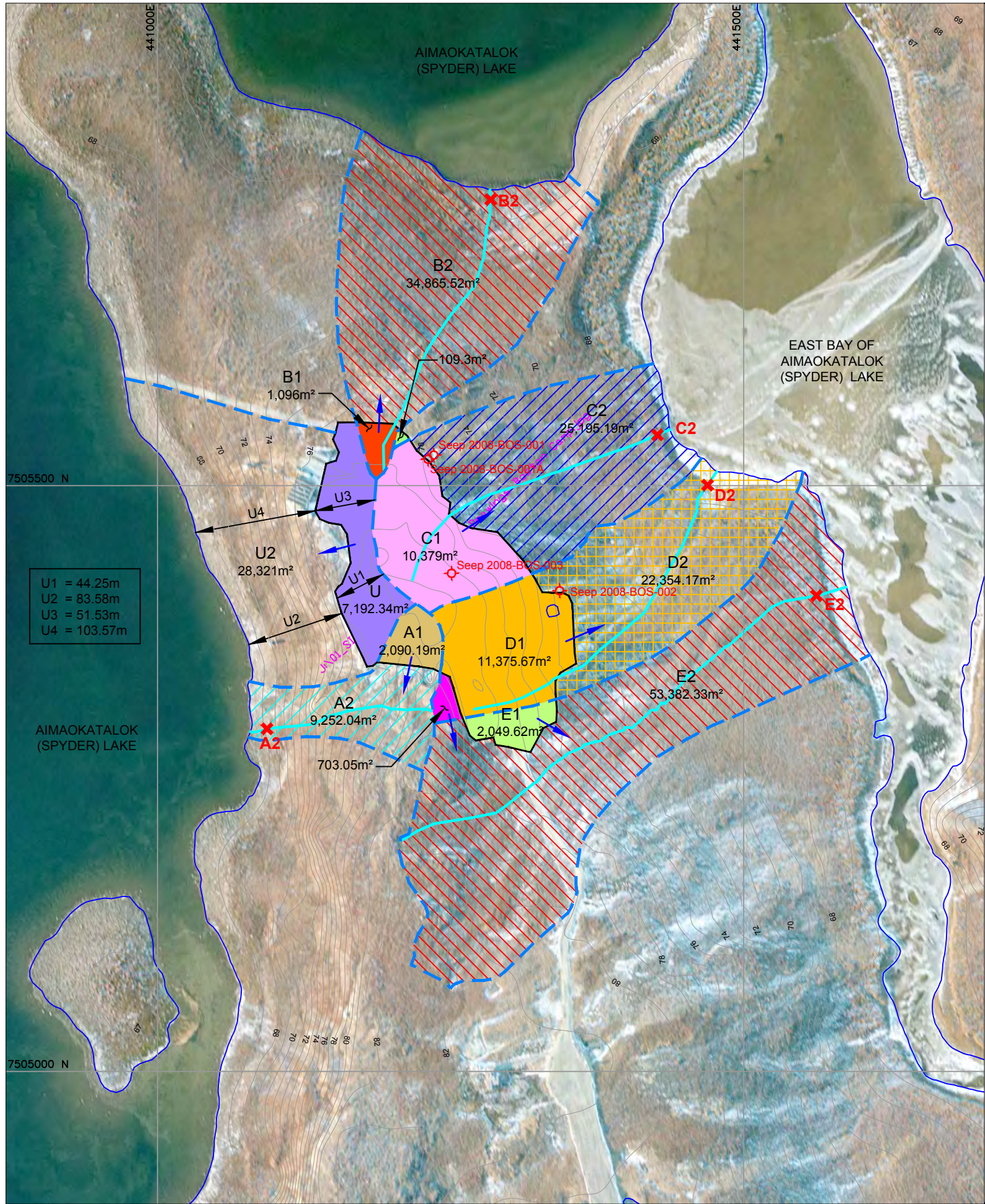
3 Quality Assurance and Control

One field duplicate and one field blank were collected as part of the quality assurance and control (QA/QC) program. The QA/QC review of all data was conducted by SRK and deemed acceptable. In addition, ALS carried out its own QA/QC checks which were also deemed acceptable.

Ion charge imbalances ranged from -2.5 to -0.7% for the two samples taken at A2 and C2 and the field duplicate. These were deemed acceptable as they comply with SRK's criteria of $\pm 10\%$.

The field duplicate (17-EPH-C2B) was taken at the sampling site C2 and compared to sample 17-EPH-C2A. As per SRK's criteria, less than 10% of the parameters (with concentrations above 10 times the detection limit) had relative percent difference (RPD) values of over 30%, indicating a high reproducibility of sampling and low heterogeneity in the stream.

Field blanks typically indicate field contamination either due to sampling or environmental influences such as dust and ambient water. Only acidity was measurable in the field blank, and was at low levels, and the field blank passed SRK's criteria.



- Legend**
- Contours (1m)
 - Ephemeral streams
 - Catchment Boundary
 - Flow direction
 - Camp pad perimeter
 - Seepage Sampling Station
 - A2, B2, C2, D2, E2, U2
 - Dilution Zone (Hatch)
 - Catchment Areas
 - Ephemeral Stream Sampling Station

	TMAC Resources		Boston Ephemeral Stream Monitoring		
	Hope Bay Project		Ephemeral Stream Monitoring Locations		
SRK JOB NO.: 1CT022.016			DATE: March 2018	APPROVED: MCN	FIGURE: 1
FILE NAME: Boston_Catchments_20160324.dwg					

4 Results

4.1 Field Observations

Field parameters for the two ephemeral streams sampled in 2017 are compared to the historical ranges of parameters from 2009 to 2016 (Table 1). EC levels in stream C2 are higher than A2. Field pH values were slightly alkaline and consistent with previous years. Flow at C2 was an order of magnitude lower than previously observed flow rates. All field parameters were within the historical range of observed values.

Table 1: Comparison of 2017 Field Observations to Historic Monitoring Data

Ephemeral Stream ID	Year Sampled	Sample ID	Field pH	Field EC	ORP	Temperature	Flow	Comments
			s.u.	$\mu\text{S/cm}$	mV	°C	L/s	
A2	2017	17-EPH-A2	8	267	152.	14	0.07	Sampled 20 m upstream from lake edge. Grassy tundra. Not a lot of flow. Wide channel and deep areas.
	2010 to 2016	P5	7.6	110	60	4.2	0.05	
		P50	7.8	300	150	5.1	0.05	
		P95	7.9	560	280	15	0.05	
		n	4	4	4	4	1	
C2	2017	17-EPH-C2	7.4	941	112.3	13.4	0.14	Sampled 20m upstream from lake edge. Grassy, shallow and fragmented channel.
	2009 to 2016	P5	6.9	95	70	2.2	1	
		P50	7.2	430	230	6.2	2	
		P95	7.4	1100	350	20	2.9	
		n	7	7	8	7	3	

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4.2 Laboratory Results

A summary of water quality results for 2017 is provided in Table 2. Full results of the 2017 water quality data are presented in Attachment 1. A summary of the 2017 water quality data is as follows:

- The sulphate concentration at A2 was within the historical range of concentrations observed since 2012. Sulphate concentrations at C2 were the highest concentration observed to date but are the same magnitude as other sulphate concentrations observed at this station and are considered consistent with previous trends.
- Alkalinity levels at both A2 and C2 were the same order of magnitude as previously observed values.

- Aluminum, chloride, copper, and zinc concentrations at A2 and C2 are within the range of historical data.
- The nitrate concentration at A2 was greater than the last observed concentration in 2015, but within the historical range of nitrate concentrations at this location. Nitrate was below analytical detection at C2 and lower than previous years.
- Concentrations of the remaining dissolved metals presented in Table 2 within the range of historical data.

Table 2: Summary of Water Quality Results for Stations A2 and C2, 2009 to 2017

Sample ID	Year	General Parameters		Anions and Nutrients					Dissolved Metals								
		pH	EC	Alkalinity, Total	Ammonia	Nitrate	Sulphate	Chloride	Aluminum	Arsenic	Cadmium	Copper	Iron	Lead	Nickel	Selenium	Zinc
		s.u.	µS/cm	mg/L as CaCO ₃	mg/L as N	mg/L as N	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
A2	2012	7.9	740	44	0.0077	0.31	43	180	0.0045	0.018	<0.00001	0.0009	<0.01	0.0001	0.004	<0.0001	0.0029
	2013	7.8	590	33	0.013	0.052	57	130	0.02	0.021	<0.00001	0.0014	0.052	0.000068	0.0047	<0.0001	0.0018
	2014	7.8	310	38	<0.005	<0.005	27	58	0.0027	0.036	<0.00001	0.0013	<0.01	<0.00005	0.018	<0.0001	0.0022
	2015	7.9	210	44	0.011	0.0083	24	22	0.0071	0.075	<0.000005	0.00099	<0.01	<0.00005	0.0039	<0.00005	0.0023
	2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2017	8	270	67	<0.0050	0.017	27	26	0.01	0.022	<0.0000050	0.0015	<0.010	<0.000050	0.015	0.000053	0.0017
C2	2009	7.1	--	42	<0.02	<0.005	48	170	0.014	<0.0015	<0.000017	0.0017	<0.03	<0.00005	0.003	<0.001	0.0014
	2010	--	--	44	0.083	3	220	200	0.011	0.0021	<0.00005	0.002	0.071	0.0002	0.0084	0.0018	0.0071
	2011	7.6	--	29	0.05	1.2	85	42	0.02	0.006	<0.00005	0.001	<0.03	<0.00005	0.0049	<0.001	<0.003
	2012	7.9	830	44	0.01	1.4	220	110	0.012	0.0017	0.000012	0.0016	0.033	<0.00005	0.006	0.00038	0.0021
	2013	7.7	1000	64	0.0093	1.5	300	140	0.014	0.0026	0.00002	0.002	0.035	<0.00005	0.0076	0.0004	0.0028
	2014	7.5	730	61	0.0078	0.46	230	66	0.016	0.0038	0.000013	0.0025	0.012	<0.00005	0.0097	0.00033	0.0025
	2015	7.8	810	53	0.014	0.42	270	61	0.014	0.0023	0.0000056	0.002	0.027	<0.00005	0.0079	0.00035	0.0022
	2016	7.6	160	40	0.0097	<0.005	12	16	0.021	0.00048	<0.000005	0.0018	0.12	<0.00005	0.0013	<0.00005	0.0023
	2017	7.8	940	66	<0.0050	<0.0050	340	62	0.014	0.002	0.00001	0.0018	0.017	<0.000050	0.0088	0.000079	0.0017

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5 Discussion

Seepage chemistry predictions were made as part of the Water and Ore/Waste Rock Management Plan (Supporting Document B of SRK 2009). The report calculated predicted and maximum predicted concentrations of sulphate, chloride, nitrate, arsenic, copper, iron, nickel and selenium that were expected to discharge from the ore stockpile. Table 3 presents these model predictions for the ephemeral streams compared to the 2017 reported concentrations of these parameters. A comparison of the 2017 data with the model predictions shows that all parameter concentrations were below both the predicted values and the maximum predicted values at streams A2 and C2 except for sulphate at C2 (340 mg/L). Sulphate concentrations at C2 are the same order of magnitude as predicted concentrations and are consistent with historical trends.

Table 3: Comparison of 2017 Water Quality Results to Model Predictions (SRK 2017)

Parameters	Units	Predicted Values		Max Predicted Value		2017	
		A2	C2	A2	C2	A2	C2
Nitrate (as N)	mg/L	3.4	5.4	9.2	15	0.017	<0.005
Sulphate	mg/L	70	110	120	190	27	340
Arsenic	mg/L	0.03	0.048	0.063	0.1	0.022	0.002
Copper	mg/L	0.0026	0.0026	0.0033	0.004	0.0015	0.0018
Iron	mg/L	0.41	0.43	0.89	1.2	<0.01	0.017
Nickel	mg/L	0.095	0.15	0.32	0.51	0.015	0.0088
Selenium	mg/L	0.0015	0.0021	0.0035	0.0053	0.000053	0.000079

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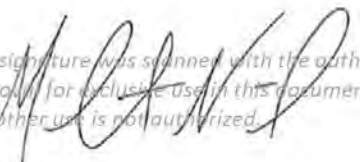
6 Conclusions and Recommendations

Monitoring of the ephemeral streams A2, B2, C2, D2 and E2 (Attachment A) was initiated in 2009. In 2017 flow was observed and samples collected from A2 and C2.

The analysis of the water quality data for ephemeral streams A2 and C2 indicated that concentrations of the potential contaminants of concern (nitrate, sulphate, arsenic, copper, iron, nickel and selenium) as identified by the water and load balance (SRK 2009) are either decreasing or stable. The stable concentrations indicate that the tundra continues to effectively attenuate contaminants of concern and the breakthrough of the effectiveness of the attenuation process has not occurred. Sulphate and chloride levels are not attenuated by the tundra and the concentrations measured in 2017 validate the 2009 water and load balance. Overall, the water quality from the ephemeral streams is stable. Ongoing monitoring is recommended for the routine ephemeral stream sampling sites.

Regards,
SRK Consulting (Canada) Inc.

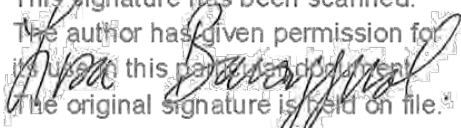
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Marie-Christine Noel
Consultant

Reviewed by

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Lisa Barazzuol, PGeo (BC)
Senior Consultant

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The opinions expressed in this report have been based on the information available to SRK at the time of preparation. SRK has exercised all due care in reviewing information supplied by others for use on this project. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information, except to the extent that SRK was hired to verify the data.

7 References

Nunavut Water Board, 2012. Water Licence No: 2BB-BOS1217. August 7, 2012.

SRK Consulting (Canada) Inc., 2009. Water and Ore/Waste Rock Management Plan for the Boston Site Hope Bay Project, Nunavut. Report 1CH008.022 for Hope Bay Mining Ltd. July 2009.

SRK Consulting (Canada) Inc., 2017. Water and Ore/Waste Rock Management Plan for the Boston Site, Hope Bay Project, Nunavut. Report 1CT022.009 for TMAC Resources Inc. January 2017.

Attachment 1: 2017 Water Quality Results

Date	Time	Sampled	Station	Easting	Northing	Description	pH	Temperature	Conductivity	ORP	Photos	Flow	ALS Sample ID	Conductivity	Hardness (as CaCO3)	pH	Total Suspended Solids	Total Dissolved Solids	Acidity (as CaCO3)	Alkalinity, Total (as CaCO3)	Ammonia, Total (as N)	Bromide (Br)	Chloride (Cl)	Fluoride (F)
Unit				UTM 13			pH units	°C	µS/cm	mV		L/s		uS/cm	mg/L	pH	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Lowest Detection Limit														2	0.5	0.1	3	1	1	1	0.005	0.05	0.5	0.02
17-Jun-17		Yes	17-EPH-A2	441131	7505307	Sampled 20m upstream from lake edge. Grassy tundra. Not a lot of flow. Wide channel and deep areas.	8	14.3	267	152.1	Yes	0.070180475	L1945396-1	270	110	8	<3.0	160	2.3	67	<0.0050	<0.050	26	0.02
17-Jun-17	14:50	No	17-EPH-B2	-	-	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-17	15:10	Yes	17-EPH-C2	441371	7505530	Sampled 20m upstream from lake edge. Grassy, shallow and fragmented channel.	7.4	13.4	941	112.3	Yes	0.141178266	L1945396-2	940	420	7.8	<3.0	720	6.1	66	<0.0050	<0.25	62	<0.10
17-Jun-17	15:15	No	17-EPH-D2	-	-	No flow, some pools, stagnant.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-17	15:40	No	17-EPH-E2	-	-	No flow, some pools, stagnant.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-17	15:50	Yes	Duplicate of 17-EPH-C2 (17-EPH-C2B)	-	-	-	-	-	-	-	-	-	L1945396-3	950	430	7.8	<3.0	670	6	66	<0.0050	<0.25	63	<0.10
17-Jun-17	-	Yes	Field Blank	-	-	-	-	-	-	-	-	-	L1945396-4	<2.0	<0.50	5.3	<3.0	<10	1.8	<1.0	<0.0050	<0.050	<0.50	<0.020

Date	Time	Sampled	Station	Nitrate (as N)	Nitrite (as N)	Phosphorus (P)-Total	Sulfate (SO4)	Aluminum (Al)-Dissolved	Antimony (Sb)-Dissolved	Arsenic (As)-Dissolved	Barium (Ba)-Dissolved	Beryllium (Be)-Dissolved	Bismuth (Bi)-Dissolved	Boron (B)-Dissolved	Cadmium (Cd)-Dissolved	Calcium (Ca)-Dissolved	Chromium (Cr)-Dissolved	Cobalt (Co)-Dissolved	Copper (Cu)-Dissolved	Iron (Fe)-Dissolved	Lead (Pb)-Dissolved	Lithium (Li)-Dissolved	Magnesium (Mg)-Dissolved	Manganese (Mn)-Dissolved	Mercury (Hg)-Dissolved	Molybdenum (Mo)-Dissolved
Unit				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Lowest Detection Limit				0.005	0.001	0.002	0.3	0.001	0.0001	0.0001	0.00005	0.00002	0.00005	0.01	0.000005	0.05	0.0001	0.0001	0.0002	0.01	0.00005	0.001	0.1	0.0001	0.000005	0.00005
17-Jun-17	14:50	Yes	17-EPH-A2	0.017	<0.0010	0.0064	27	0.01	0.00059	0.022	0.0073	<0.000020	<0.000050	0.036	<0.0000050	30	0.00012	0.00027	0.0015	<0.010	<0.000050	0.0056	8.8	0.0011	<0.0000050	0.0002
17-Jun-17		No	17-EPH-B2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-17	15:15	Yes	17-EPH-C2	<0.0050	<0.0050	0.0043	340	0.014	0.00079	0.002	0.035	<0.000020	<0.000050	0.066	0.00001	91	0.00016	0.00028	0.0018	0.017	<0.000050	0.0013	46	0.0063	<0.0000050	0.0003
17-Jun-17		No	17-EPH-D2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-17	15:50	No	17-EPH-E2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-17		Yes	Duplicate of 17-EPH-C2 (17-EPH-C2B)	<0.025	<0.0050	0.0044	340	0.014	0.0008	0.0021	0.038	<0.000020	<0.000050	0.068	0.000011	92	0.00017	0.00029	0.002	0.019	<0.000050	0.0014	49	0.0071	<0.0000050	0.0003
17-Jun-17	-	Yes	Field Blank	<0.0050	<0.0010	<0.0020	<0.30	<0.0010	<0.00010	<0.00010	<0.000050	<0.000020	<0.000050	<0.010	<0.0000050	<0.050	<0.00010	<0.00010	<0.00020	<0.010	<0.000050	<0.0010	<0.10	<0.00010	<0.0000050	<0.000050

Date	Time	Sampled	Station	Nickel (Ni)- Dissolved	Phosphorus (P)- Dissolved	Potassium (K)- Dissolved	Selenium (Se)- Dissolved	Silicon (Si)- Dissolved	Silver (Ag)- Dissolved	Sodium (Na)- Dissolved	Strontium (Sr)- Dissolved	Sulfur (S)- Dissolved	Thallium (Tl)- Dissolved	Tin (Sn)- Dissolved	Titanium (Ti)- Dissolved	Uranium (U)- Dissolved	Vanadium (V)- Dissolved	Zinc (Zn)- Dissolved	Zirconium (Zr)- Dissolved
Unit				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Lowest Detection Limit				0.0005	0.05	0.1	0.00005	0.05	0.00001	0.05	0.0002	0.5	0.00001	0.0001	0.0003	0.00001	0.0005	0.001	0.0003
17-Jun-17	14:50	Yes	17-EPH-A2	0.015	<0.050	1.5	0.000053	0.26	<0.000010	10	0.23	9.1	<0.000010	<0.00010	<0.00030	0.000027	<0.00050	0.0017	<0.00030
17-Jun-17	15:10	No	17-EPH-B2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-17	15:15	Yes	17-EPH-C2	0.0088	<0.050	6.8	0.000079	0.53	<0.000010	41	0.35	120	<0.000010	<0.00010	0.00039	0.000029	<0.00050	0.0017	<0.00030
17-Jun-17	15:40	No	17-EPH-D2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-17	15:50	No	17-EPH-E2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-17	-	Yes	Duplicate of 17-EPH-C2 (17-EPH-C2B)	0.0093	<0.050	7.3	0.000096	0.55	<0.000010	43	0.35	120	<0.000010	<0.00010	0.00032	0.000028	<0.00050	0.0017	<0.00030
17-Jun-17	-	Yes	Field Blank	<0.00050	<0.050	<0.10	<0.000050	<0.050	<0.000010	<0.050	<0.00020	<0.50	<0.000010	<0.00010	<0.00030	<0.000010	<0.00050	<0.0010	<0.00030

Appendix H

Hope Bay Project Spill Contingency Plan,
TMAC Resources Inc., December 2017

