From: Neil Struthers
To: Eric de Waal; Jamie Hanson
Subject: FW: [External email] Regina Aquatic Centre - Soil Testing Results
Date: Monday, May 2, 2022 11:32:58 AM
Attachments: CCME Soils Table_Regina Aquatic Center_TH22-02 (PHC, BTEX, and Metals).xls
RG2200255_0_COA - Merged.pdf
RG2200255_0_XLR.xlsx
Discovery Report_Aquatics Centre_04_22.pdf

Hey guys,

KGS has sent me the attached contaminated soil test results from the Lawson/IAF Geotech drilling. This is all fairly Greek to me, but KGS suggests we meet to review further with them and see how we end up reporting this to the Province. Either the City can do it directly, or KGS can do it on our behalf but it has to get reported. It might also be worth pulling the City's Environmental Services team into this for assistance as well. Let's chat about this tomorrow.

Thanks,
Neil

From: Sean Bayer <sbayer@kgsgroup.com>
Sent: Friday, April 29, 2022 8:30 AM
To: Neil Struthers <NSTRUTHE@regina.ca>
Cc: Lee Peters <lpeters@kgsgroup.com>; Megan Castillo <mcastillo@kgsgroup.com>
Subject: [External email] Regina Aquatic Centre - Soil Testing Results

Neil further to our conversation yesterday ...it was good catching up.

Attached are the summarized results for the soil samples Jenae collected at the Lawson Aquatic Center. Using Tier 1 Commercial Land Use Criterial for Fine Soils, we have five (5) PHC/BTEX exceedances for S1, two (2) PHC/BTEX exceedances for S2, as well as two (2) exceedances for S100 which is a QAQC of S2. For metals, S1 also has a Lead exceedance and S3 has a Chromium exceedance. The exceedances have to be reported as a Discovery as they exceed Table 2 criteria of the Sask code, however as for remediation it is not likely you would have exceedances as we can likely remove the potable water pathway based on the location of the site. To that end we have attached the required Discovery Report that can be submitted on the City's behalf or by the City directly through the Ministry of Environment Portal.

To discuss next steps perhaps the best approach would be to set up a phone call with our Head of Environmental/Geotech Services here in Sask - Lee Peters....let me know what works for you...and I will see if she is available next week.

Regards

Sean

PRINT CLEAR

Ministry of Environment

Saskatchewan

Historical Discovery Report

2021 | CSB | CSB21006

A. Reporting Requirements

What do I report? This report requires the person reporting to have detailed information about the discovery, including the following:

- Site location
- Responsible party
- Substances involved in the occurrence
- Surrounding land use
- Laboratory Certificate of Analysis, documenting Discharge and Discovery Reporting Standard exceedances or documentation of adverse effects.

What happens next? Once the report is submitted, the ministry reviews it to determine its acceptability, in some cases in consultation with individuals involved in the discharge/discovery, and may include other agencies and impacted landowners. If the report is not acceptable, the ministry identifies deficiencies and requests that it be improved. There are numerous ways to obtain closure and the user should consult the **Guidance Document: Impacted Sites**.

How do I submit the report? You can submit this application to the Ministry of Environment using our online services or by mailing a hard copy.

- **Web:** the preferred method is to sign in to our **Online Services** and submit it through your company's business portal. In the portal you can apply for and receive permission, fill out forms and submit documents online, review documents, and track your interactions with the ministry. Please visit saskatchewan.ca.
- **Mail:** you can complete the report, save and print it, and mail the hard copy to:
  Environmental Protection Branch
  Hazmat and Impacted Sites Unit
  102 - 112 Research Drive
  Saskatoon, SK S7N 3R3

What if I have questions? For assistance completing this application or for more information, please contact our Client Service Office:
Email: centre.inquiry@gov.sk.ca
Tel (toll free in North America): 1-800-567-4224
Tel (Regina): 306-787-2584

B. Person Reporting

Company Name	KGS Group				
Last Name	Wells				
First Name	Kelsey	Middle Name	Marie		
Address	Suite 200				
Address	4561 Parliament Ave				
City	Regina	Province	Saskatchewan	Postal Code	S4W 0G3

Mailing Address Same as above ☑ Different from above: ☐

Address					
Address					
City		Province		Postal Code	

Contact Details

Phone (main)		Phone (work)	306-757-9681
Phone (mobile)	306-630-1661	Email	kwells@kgsgroup.com

Preferred Method of Contact ☑ Phone ☑ Email ☐ Mail

Work completed on behalf of third party? ☑ Yes ☐ No

Third Party Contact Information:

Company Name	HCMA				
Last Name	Henderson				
First Name	Michael	Middle Name			
Address	400—675 W Hastings St				
Address					
City	Vancouver	Province	British Columbia	Postal Code	V6B 1N2

Contact Details

Phone (main)		Phone (work)	(604) 732-6620
Phone (mobile)		Email	m.henderson@hcma.ca

Preferred Method of Contact Phone ☑ Email ☑ Mail ☐

C. Responsible Party

Is the Responsible Party Known? Yes ☐ No ☑

If no, identify potential responsible parties or sources of concern in the area.

Last Name	City of Regina				
First Name					
Address	2476 Victoria Avenue				
Address	PO Box 1790				
City	Regina	Province	Saskatchewan	Postal Code	S4P 3C8

Contact Details

Phone (main)		Phone (work)	306-777-7000
Phone (mobile)		Email	

Preferred Method of Contact Phone ☑ Email ☐ Mail ☐

D. Fixed/Storage Facility Information *(if applicable)*

Name of Industrial or Solid Waste Facility			
Facility Code		Operation Identification	

E. Discovery Material Details

Affected Media: Soil ☑ Groundwater ☐ Surface Water ☐

Substances Discovered: Ethylbenzene, Xylenes, F1, F2, F3, lead.

Approximate Area of Discovery: 650 m2

F. Discovery Location

Enter the Latitude/Longitude for center of the site in degrees, minutes, seconds.

Latitude:				Longitude:			
Deg: 50	Min: 27	Sec: 2		Deg: 104	Min: 37	Sec: 44	

Address	1717 Elphinstone Street				
Address					
City	Regina	Province	Saskatchewan	Postal Code	S4T 3N2

G. Distances and Direction to:

	Name	Direction	Distance
Nearest Community	Regina	N/A	0 m
Nearest Well	Regina #011619	West	Approx 500 m
Nearest Surface Water Body	Wascana Creek	South	1.2 km
Nearest Occupied Building	City of Regina Fieldhouse	west	50 m

Surrounding Land Use (within 500 m of discharge location)

Check all that apply ☑ Industrial ☑ Commercial ☑ Residential/Parkland ☐ Agricultural

H. Conditions for Submission

If reporting by regular mail, please make sure all related documents are included or attached as part of the submission.

☑ A Laboratory Certificate of Analysis, documenting Discharge and Discovery exceedances or documentation of adverse effects has been attached or;

☐ An Environmental Site Assessment has been attached.

I have read and I fully understand that these conditions must be met before the Ministry of Environment can accept, assess and process my report, and

I have read and I fully understand the requirements of this report, and wish to continue with my report, and

I certify that the information I have provided in this report is true and accurate in every respect.

☑ By checking this box, I accept these conditions.

Date of Report

April 13, 2022

Signature of Reporter

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **RG2200255**	Page	: 1 of 5
Client	: **KGS Group**	Laboratory	: Regina - Environmental
Contact	: Michael Badger	Account Manager	: Brian Morgan
Address	: Suite 200 4561 Parliament Avenue Regina SK Canada S4W 0G3	Address	: 1119 Osler Street Regina SK Canada S4R 8N5
Telephone	: ----	Telephone	: 1 306 221 7147
Project	: 21-3931-001	Date Samples Received	: 29-Mar-2022 12:02
PO	: ----	Date Analysis Commenced	: 30-Mar-2022
C-O-C number	: ----	Issue Date	: 05-Apr-2022 08:36
Sampler	: ----		
Site	: ----		
Quote number	: SK2022KGSG1000003		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Colby Bingham	Quality Systems Coordinator	Inorganics, Saskatoon, Saskatchewan
Colby Bingham	Quality Systems Coordinator	Metals, Saskatoon, Saskatchewan
Ivan Yip	Laboratory Analyst	Organics, Saskatoon, Saskatchewan
Jwan Abdalla	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan
Jwan Abdalla	Laboratory Analyst	Metals, Saskatoon, Saskatchewan
Lian Nesbitt	Laboratory Analyst	Metals, Saskatoon, Saskatchewan
Maria Painchaud	Laboratory Assistant	Inorganics, Saskatoon, Saskatchewan

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
dS/m	decisiemens per metre
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
pH units	pH units
t/ha	tonnes per hectare

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
SMI	*Surrogate recovery could not be measured due to sample matrix interference.*

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: TH22-02 S1	TH22-02 S2	TH22-02 S3	TH22-02 S100	----
Client sampling date / time					26-Mar-2022 12:16	26-Mar-2022 12:16	26-Mar-2022 12:16	26-Mar-2022 12:16	----
					RG2200255-001	RG2200255-002	RG2200255-003	RG2200255-004	--------
					Result	Result	Result	Result	----
Physical Tests									
moisture	----	E144	0.25	%	24.1	22.9	25.0	23.0	----
Saturated Paste Extractables									
conductivity, saturated paste	----	E102	0.010	dS/m	1.11	1.69	4.66	1.49	----
sodium adsorption ratio [SAR]	----	EC102	0.10	-	4.96	6.53	3.02	5.81	----
pH, saturated paste	----	E114	0.10	pH units	8.06	7.80	7.87	7.76	----
TGR (brine)	----	EC106	0.10	t/ha	<0.10	<0.10	<0.10	<0.10	----
TGR (sodic)	----	EC106	0.10	t/ha	<0.10	<0.10	<0.10	<0.10	----
% saturation	----	E141	1.0	%	133	57.4	105	57.8	----
calcium, soluble ion content	7440-70-2	EC485	5.0	mg/kg	49.7	36.3	670	33.1	----
calcium, soluble ion content	7440-70-2	E485	5.0	mg/L	37.4	63.2	638	57.2	----
magnesium, soluble ion content	7439-95-4	EC485	5.0	mg/kg	35.9	21.5	309	20.9	----
magnesium, soluble ion content	7439-95-4	E485	5.0	mg/L	27.0	37.5	294	36.1	----
potassium, soluble ion content	7440-09-7	EC485	5.0	mg/kg	24.9	15.9	32.6	15.5	----
potassium, soluble ion content	7440-09-7	E485	5.0	mg/L	18.7	27.7	31.0	26.9	----
sodium, soluble ion content	17341-25-2	EC485	5.0	mg/kg	217	152	385	132	----
sodium, soluble ion content	17341-25-2	E485	5.0	mg/L	163	265	367	228	----
sulfur (as SO4), soluble ion content	14808-79-8	EC485	8.0	mg/kg	431	218	3420	199	----
sulfur (as SO4), soluble ion content	14808-79-8	E485	6.0	mg/L	324	380	3260	344	----
chloride, soluble ion content	16887-00-6	EC266A.Cl	10	mg/kg	411	188	160	132	----
chloride, soluble ion content	16887-00-6	E266.Cl	20	mg/L	309	327	152	229	----
Metals									
aluminum	7429-90-5	E440	50	mg/kg	9010	15300	18500	13800	----
antimony	7440-36-0	E440	0.10	mg/kg	1.15	0.48	0.48	0.46	----
arsenic	7440-38-2	E440	0.10	mg/kg	5.94	7.27	9.88	7.07	----
barium	7440-39-3	E440	0.50	mg/kg	232	269	218	360	----
beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.64	0.99	0.58	----
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0.26	<0.20	----
boron	7440-42-8	E440	5.0	mg/kg	35.2	32.5	11.6	28.1	----
cadmium	7440-43-9	E440	0.020	mg/kg	0.370	0.305	0.287	0.667	----
calcium	7440-70-2	E440	50	mg/kg	43100	39000	29600	43700	----

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	TH22-02 S1	TH22-02 S2	TH22-02 S3	TH22-02 S100	----
					Client sampling date / time	26-Mar-2022 12:16	26-Mar-2022 12:16	26-Mar-2022 12:16	26-Mar-2022 12:16	----
						RG2200255-001	RG2200255-002	RG2200255-003	RG2200255-004	--------
						Result	Result	Result	Result	----
Metals										
chromium	7440-47-3	E440	0.50	mg/kg		76.6	73.7	106	69.1	----
cobalt	7440-48-4	E440	0.10	mg/kg		5.87	8.44	12.9	8.21	----
copper	7440-50-8	E440	0.50	mg/kg		18.2	18.8	29.9	17.2	----
iron	7439-89-6	E440	50	mg/kg		16000	20200	27800	19300	----
lead	7439-92-1	E440	0.50	mg/kg		323	26.4	13.3	24.5	----
lithium	7439-93-2	E440	2.0	mg/kg		10.6	19.3	25.2	14.4	----
magnesium	7439-95-4	E440	20	mg/kg		9910	11900	11700	15700	----
manganese	7439-96-5	E440	1.0	mg/kg		358	468	483	898	----
mercury	7439-97-6	E510	0.0050	mg/kg		0.114	0.0428	0.0402	0.0418	----
molybdenum	7439-98-7	E440	0.10	mg/kg		1.94	2.10	3.17	1.90	----
nickel	7440-02-0	E440	0.50	mg/kg		39.7	42.6	43.0	40.6	----
phosphorus	7723-14-0	E440	50	mg/kg		414	852	450	528	----
potassium	7440-09-7	E440	100	mg/kg		1710	3220	2630	2810	----
selenium	7782-49-2	E440	0.20	mg/kg		0.26	0.30	0.48	0.29	----
silver	7440-22-4	E440	0.10	mg/kg		<0.10	<0.10	0.11	<0.10	----
sodium	7440-23-5	E440	50	mg/kg		688	560	722	520	----
strontium	7440-24-6	E440	0.50	mg/kg		137	118	94.5	125	----
sulfur	7704-34-9	E440	1000	mg/kg		2000	<1000	3600	<1000	----
thallium	7440-28-0	E440	0.050	mg/kg		0.173	0.203	0.239	0.201	----
tin	7440-31-5	E440	2.0	mg/kg		3.2	<2.0	<2.0	<2.0	----
titanium	7440-32-6	E440	1.0	mg/kg		152	157	60.8	137	----
tungsten	7440-33-7	E440	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	----
uranium	7440-61-1	E440	0.050	mg/kg		0.677	0.846	2.56	0.778	----
vanadium	7440-62-2	E440	0.20	mg/kg		29.2	41.6	47.4	38.7	----
zinc	7440-66-6	E440	2.0	mg/kg		180	78.7	78.5	77.6	----
zirconium	7440-67-7	E440	1.0	mg/kg		8.4	9.5	10.5	8.7	----
Volatile Organic Compounds [BTEXS+MTBE]										
benzene	71-43-2	E611A	0.0050	mg/kg		0.0232	0.0198	<0.0050	0.0160	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg		0.557	0.234	<0.015	0.176	----
toluene	108-88-3	E611A	0.050	mg/kg		0.096	0.052	<0.050	<0.050	----
xylene, m+p-	179601-23-1	E611A	0.050	mg/kg		1.38	0.452	<0.050	0.322	----

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	TH22-02 S1	TH22-02 S2	TH22-02 S3	TH22-02 S100	----
					Client sampling date / time	26-Mar-2022 12:16	26-Mar-2022 12:16	26-Mar-2022 12:16	26-Mar-2022 12:16	----
						RG2200255-001	RG2200255-002	RG2200255-003	RG2200255-004	--------
						Result	Result	Result	Result	----
Volatile Organic Compounds [BTEXS+MTBE]										
xylene, o-	95-47-6	E611A	0.050	mg/kg		0.902	0.334	<0.050	0.244	----
xylenes, total	1330-20-7	E611A	0.075	mg/kg		2.28	0.786	<0.075	0.566	----
BTEX, total	----	E611A	0.10	mg/kg		2.96	1.09	<0.10	0.76	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	0.10	%		96.7	85.7	98.5	86.6	----
difluorobenzene, 1,4-	540-36-3	E611A	0.10	%		94.1	75.5	85.1	76.2	----
Hydrocarbons										
F1 (C6-C10)	----	E581.F1	5.0	mg/kg		403	18.5	<5.0	9.8	----
F1-BTEX	----	EC580	5.0	mg/kg		400	17.4	<5.0	9.0	----
F4G-sg	----	E601.F4G	500	mg/kg		2110	----	----	880	----
F2 (C10-C16)	----	E601.SG	25	mg/kg		787	<25	<25	<25	----
F3 (C16-C34)	----	E601.SG	50	mg/kg		491	169	<50	138	----
F4 (C34-C50)	----	E601.SG	50	mg/kg		495	210	<50	252	----
chromatogram to baseline at nC50	n/a	E601.SG	-	-		No	Yes	Yes	No	----
hydrocarbons, total (C6-C50)	----	EC581	80	mg/kg		2180	398	<80	400	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601.SG	1.0	%		77.5	71.9	69.1	68.9	----
dichlorotoluene, 3,4-	97-75-0	E581.F1	1.0	%		254 SMI	92.5	103	80.0	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **RG2200255**	Page	: 1 of 14
Client	: **KGS Group**	Laboratory	: Regina - Environmental
Contact	: Michael Badger	Account Manager	: Brian Morgan
Address	: Suite 200 4561 Parliament Avenue Regina SK Canada S4W 0G3	Address	: 1119 Osler Street Regina, Saskatchewan Canada S4R 8N5
Telephone	: ----	Telephone	: 1 306 221 7147
Project	: 21-3931-001	Date Samples Received	: 29-Mar-2022 12:02
PO	: ----	Issue Date	: 05-Apr-2022 08:36
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: SK2022KGSG1000003		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Test sample Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Regular Sample Surrogates

Sub-Matrix: **Soil**

Analyte Group	Laboratory sample ID	Client/Ref Sample D	Analyte	CAS Number	Result	Limits	Comment
Samples Submitted							
Hydrocarbons Surrogates	RG2200255-001	TH22-02 S1	dichlorotoluene, 3,4-	97-75-0	254 %	70.0-130 %	Recovery greater than upper data quality objective

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID										
Glass soil methanol vial TH22-02 S1	E581.F1	26-Mar-2022	30-Mar-2022	----	----		30-Mar-2022	40 days	4 days	✓
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID										
Glass soil methanol vial TH22-02 S100	E581.F1	26-Mar-2022	30-Mar-2022	----	----		30-Mar-2022	40 days	4 days	✓
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID										
Glass soil methanol vial TH22-02 S2	E581.F1	26-Mar-2022	30-Mar-2022	----	----		30-Mar-2022	40 days	4 days	✓
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID										
Glass soil methanol vial TH22-02 S3	E581.F1	26-Mar-2022	30-Mar-2022	----	----		30-Mar-2022	40 days	4 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap TH22-02 S1	E601.SG	26-Mar-2022	30-Mar-2022	14 days	4 days	✓	30-Mar-2022	40 days	0 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap TH22-02 S100	E601.SG	26-Mar-2022	30-Mar-2022	14 days	4 days	✓	30-Mar-2022	40 days	0 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap TH22-02 S2	E601.SG	26-Mar-2022	30-Mar-2022	14 days	4 days	✓	30-Mar-2022	40 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap TH22-02 S3	E601.SG	26-Mar-2022	30-Mar-2022	14 days	4 days	✓	30-Mar-2022	40 days	0 days	✓
Hydrocarbons : CCME PHCs - F4G by Gravimetry										
Glass soil jar/Teflon lined cap TH22-02 S1	E601.F4G	26-Mar-2022	31-Mar-2022	14 days	5 days	✓	31-Mar-2022	40 days	0 days	✓
Hydrocarbons : CCME PHCs - F4G by Gravimetry										
Glass soil jar/Teflon lined cap TH22-02 S100	E601.F4G	26-Mar-2022	31-Mar-2022	14 days	5 days	✓	31-Mar-2022	40 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag TH22-02 S1	E510	26-Mar-2022	31-Mar-2022	----	----		31-Mar-2022	28 days	5 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag TH22-02 S100	E510	26-Mar-2022	31-Mar-2022	----	----		31-Mar-2022	28 days	5 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag TH22-02 S2	E510	26-Mar-2022	31-Mar-2022	----	----		31-Mar-2022	28 days	5 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag TH22-02 S3	E510	26-Mar-2022	31-Mar-2022	----	----		31-Mar-2022	28 days	5 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag TH22-02 S1	E440	26-Mar-2022	31-Mar-2022	----	----		31-Mar-2022	180 days	5 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag TH22-02 S100	E440	26-Mar-2022	31-Mar-2022	----	----		31-Mar-2022	180 days	5 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag TH22-02 S2	E440	26-Mar-2022	31-Mar-2022	----	----		31-Mar-2022	180 days	5 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag TH22-02 S3	E440	26-Mar-2022	31-Mar-2022	----	----		31-Mar-2022	180 days	5 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap TH22-02 S1	E144	26-Mar-2022	----	----	----		30-Mar-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap TH22-02 S100	E144	26-Mar-2022	----	----	----		30-Mar-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap TH22-02 S2	E144	26-Mar-2022	----	----	----		30-Mar-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap TH22-02 S3	E144	26-Mar-2022	----	----	----		30-Mar-2022	----	----	
Saturated Paste Extractables : Ca, K, Mg, Na, B and S by ICPOES (Saturated Paste)										
LDPE bag TH22-02 S1	E485	26-Mar-2022	----	----	----		01-Apr-2022	180 days	6 days	✓
Saturated Paste Extractables : Ca, K, Mg, Na, B and S by ICPOES (Saturated Paste)										
LDPE bag TH22-02 S100	E485	26-Mar-2022	----	----	----		01-Apr-2022	180 days	6 days	✓
Saturated Paste Extractables : Ca, K, Mg, Na, B and S by ICPOES (Saturated Paste)										
LDPE bag TH22-02 S2	E485	26-Mar-2022	----	----	----		01-Apr-2022	180 days	6 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Saturated Paste Extractables : Ca, K, Mg, Na, B and S by ICPOES (Saturated Paste)										
LDPE bag TH22-02 S3	E485	26-Mar-2022	----	----	----		01-Apr-2022	180 days	6 days	✓
Saturated Paste Extractables : Chloride by Colourimetry (Saturated Paste)										
LDPE bag TH22-02 S1	E266.Cl	26-Mar-2022	----	----	----		01-Apr-2022	365 days	6 days	✓
Saturated Paste Extractables : Chloride by Colourimetry (Saturated Paste)										
LDPE bag TH22-02 S100	E266.Cl	26-Mar-2022	----	----	----		01-Apr-2022	365 days	6 days	✓
Saturated Paste Extractables : Chloride by Colourimetry (Saturated Paste)										
LDPE bag TH22-02 S2	E266.Cl	26-Mar-2022	----	----	----		01-Apr-2022	365 days	6 days	✓
Saturated Paste Extractables : Chloride by Colourimetry (Saturated Paste)										
LDPE bag TH22-02 S3	E266.Cl	26-Mar-2022	----	----	----		01-Apr-2022	365 days	6 days	✓
Saturated Paste Extractables : Conductivity in Soil (Saturated Paste)										
LDPE bag TH22-02 S1	E102	26-Mar-2022	----	----	----		31-Mar-2022	365 days	5 days	✓
Saturated Paste Extractables : Conductivity in Soil (Saturated Paste)										
LDPE bag TH22-02 S100	E102	26-Mar-2022	----	----	----		31-Mar-2022	365 days	5 days	✓
Saturated Paste Extractables : Conductivity in Soil (Saturated Paste)										
LDPE bag TH22-02 S2	E102	26-Mar-2022	----	----	----		31-Mar-2022	365 days	5 days	✓
Saturated Paste Extractables : Conductivity in Soil (Saturated Paste)										
LDPE bag TH22-02 S3	E102	26-Mar-2022	----	----	----		31-Mar-2022	365 days	5 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Saturated Paste Extractables : pH by Meter (Saturated Paste)										
LDPE bag TH22-02 S1	E114	26-Mar-2022	----	----	----		31-Mar-2022	365 days	5 days	✓
Saturated Paste Extractables : pH by Meter (Saturated Paste)										
LDPE bag TH22-02 S100	E114	26-Mar-2022	----	----	----		31-Mar-2022	365 days	5 days	✓
Saturated Paste Extractables : pH by Meter (Saturated Paste)										
LDPE bag TH22-02 S2	E114	26-Mar-2022	----	----	----		31-Mar-2022	365 days	5 days	✓
Saturated Paste Extractables : pH by Meter (Saturated Paste)										
LDPE bag TH22-02 S3	E114	26-Mar-2022	----	----	----		31-Mar-2022	365 days	5 days	✓
Saturated Paste Extractables : Saturation Percentage										
LDPE bag TH22-02 S1	E141	26-Mar-2022	----	----	----		31-Mar-2022	----	0 days	
Saturated Paste Extractables : Saturation Percentage										
LDPE bag TH22-02 S100	E141	26-Mar-2022	----	----	----		31-Mar-2022	----	0 days	
Saturated Paste Extractables : Saturation Percentage										
LDPE bag TH22-02 S2	E141	26-Mar-2022	----	----	----		31-Mar-2022	----	0 days	
Saturated Paste Extractables : Saturation Percentage										
LDPE bag TH22-02 S3	E141	26-Mar-2022	----	----	----		31-Mar-2022	----	0 days	
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass soil methanol vial TH22-02 S1	E611A	26-Mar-2022	30-Mar-2022	----	----		30-Mar-2022	40 days	4 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass soil methanol vial										
TH22-02 S100	E611A	26-Mar-2022	30-Mar-2022	----	----		30-Mar-2022	40 days	4 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass soil methanol vial										
TH22-02 S2	E611A	26-Mar-2022	30-Mar-2022	----	----		30-Mar-2022	40 days	4 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass soil methanol vial										
TH22-02 S3	E611A	26-Mar-2022	30-Mar-2022	----	----		30-Mar-2022	40 days	4 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
BTEX by Headspace GC-MS	E611A	445859	1	10	10.0	5.0	✓
Ca, K, Mg, Na, B and S by ICPOES (Saturated Paste)	E485	446479	1	5	20.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	445860	1	10	10.0	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601.SG	445856	1	10	10.0	5.0	✓
CCME PHCs - F4G by Gravimetry	E601.F4G	447547	1	2	50.0	5.0	✓
Chloride by Colourimetry (Saturated Paste)	E266.Cl	446483	1	5	20.0	5.0	✓
Conductivity in Soil (Saturated Paste)	E102	446482	1	5	20.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	446782	1	18	5.5	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	446783	1	18	5.5	5.0	✓
Moisture Content by Gravimetry	E144	445868	1	14	7.1	5.0	✓
pH by Meter (Saturated Paste)	E114	446481	1	5	20.0	5.0	✓
Saturation Percentage	E141	446480	1	5	20.0	5.0	✓
Laboratory Control Samples (LCS)							
BTEX by Headspace GC-MS	E611A	445859	1	10	10.0	5.0	✓
Ca, K, Mg, Na, B and S by ICPOES (Saturated Paste)	E485	446479	2	5	40.0	10.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	445860	1	10	10.0	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601.SG	445856	2	10	20.0	10.0	✓
CCME PHCs - F4G by Gravimetry	E601.F4G	447547	2	2	100.0	10.0	✓
Chloride by Colourimetry (Saturated Paste)	E266.Cl	446483	2	5	40.0	10.0	✓
Conductivity in Soil (Saturated Paste)	E102	446482	2	5	40.0	10.0	✓
Mercury in Soil/Solid by CVAAS	E510	446782	2	18	11.1	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	446783	2	18	11.1	10.0	✓
Moisture Content by Gravimetry	E144	445868	1	14	7.1	5.0	✓
pH by Meter (Saturated Paste)	E114	446481	2	5	40.0	10.0	✓
Saturation Percentage	E141	446480	2	5	40.0	10.0	✓
Method Blanks (MB)							
BTEX by Headspace GC-MS	E611A	445859	1	10	10.0	5.0	✓
Ca, K, Mg, Na, B and S by ICPOES (Saturated Paste)	E485	446479	1	5	20.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	445860	1	10	10.0	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601.SG	445856	1	10	10.0	5.0	✓
CCME PHCs - F4G by Gravimetry	E601.F4G	447547	1	2	50.0	5.0	✓
Chloride by Colourimetry (Saturated Paste)	E266.Cl	446483	1	5	20.0	5.0	✓
Conductivity in Soil (Saturated Paste)	E102	446482	1	5	20.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	446782	1	18	5.5	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	446783	1	18	5.5	5.0	✓
Moisture Content by Gravimetry	E144	445868	1	14	7.1	5.0	✓
Matrix Spikes (MS)							

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
BTEX by Headspace GC-MS	E611A	445859	1	10	10.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Soil (Saturated Paste)	E102 Saskatoon - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/APHA 2510 (mod)/AER D50	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a filtered extract from a soil sample prepared using the saturated paste procedure. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter (Saturated Paste)	E114 Saskatoon - Environmental	Soil/Solid	Carter-CSSS / APHA 4500 H	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C) on a soil produced by the saturated paste extraction procedure.
Saturation Percentage	E141 Saskatoon - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/AER D50	Saturation Percentage (SP) is determined as the total volume of water present in a saturated paste (in mL) divided by the dry weight of the sample (in grams), expressed as a percentage.
Moisture Content by Gravimetry	E144 Saskatoon - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by he wet weight of the sample, expressed as a percentage.
Chloride by Colourimetry (Saturated Paste)	E266.Cl Saskatoon - Environmental	Soil/Solid	CSSS Ch. 15/APHA 4500-CL E (mod)/AER D50	Inorganic anions are analyzed by obtaining a soil extract produced by the saturated paste extraction procedure which is then analyzed by colourimetry using a discrete analyzer.
Metals in Soil/Solid by CRC ICPMS	E440 Saskatoon - Environmental	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
Ca, K, Mg, Na, B and S by ICPOES (Saturated Paste)	E485 Saskatoon - Environmental	Soil/Solid	CSSS CH15/EPA 6010B/AER D50	A soil extract produced by the saturated paste extraction procedure is analyzed for Calcium, Magnesium, Potassium, Sodium, Boron, and Sulfur (as SO4) by ICPOES.
Mercury in Soil/Solid by CVAAS	E510 Saskatoon - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
CCME PHC - F1 by Headspace GC-FID	E581.F1 Saskatoon - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHCs - F4G by Gravimetry	E601.F4G Saskatoon - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	A portion of the silica gel treated sample extract is filtered and dried at 105°C and the mass of the residual gravimetric heavy hydrocarbons (F4G) is determined gravimetrically.
CCME PHCs - F2-F4 by GC-FID	E601.SG Saskatoon - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Sample extracts are subjected to in-situ silica gel treatment prior to analysis by GC-FID for CCME hydrocarbon fractions (F2-F4).
BTEX by Headspace GC-MS	E611A Saskatoon - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Sodium Adsorption Ratio (SAR) Saturated Paste	EC102 Saskatoon - Environmental	Soil/Solid	CCME Sodium Adsorp ion Ratio (SAR)	The Sodium Adsorption Ratio (SAR) for a sample is calculated from the Sodium, Calcium, and Magnesium concentrations from sediment paste extract.
Theoretical Gypsum Requirements (TGR) Saturated Paste	EC106 Saskatoon - Environmental	Soil/Solid	J. Ashworth et al (1999)	Theoretical Gypsum Requirement is an estimate of the gypsum amendment required to remediate brine contaminated or sodic soils, and is provided in units of tonnes per hectare (t/ha) for a treatment depth of 15cm. TGR(brine), intended for brine-contaminated soils, is calculated using Method A from "A Comparison of Methods for Gypsum Requirement of Brine-Contaminated Soils", by J. Ashworth (Cdn J. of Soil Science, 1999), available at www.alsglobal.com. TGR(sodic), intended for naturally sodic soils, uses the Oster and Frenkel method (Method B) from he same paper. Reported TGR values are capped at 50 t/ha, considered the maximum practical gypsum amendment. To convert TGR from t/ha to tons/acre, multiply by 0.446. To determine a TGR value for an alternate treatment depth, multiply by [desired treatment depth (cm) / 15 cm].
Chloride by Colourimetry (Saturated Paste) (mg/kg)	EC266A.Cl Saskatoon - Environmental	Soil/Solid	CSSS Ch. 15/APHA 4500-CL E (mod)	Inorganic anions are analyzed by obtaining a soil extract produced by the saturated paste extraction procedure which is then analyzed by colourimetry using a discrete analyzer.
Ca, K, Mg, Na, B and S by ICPOES (Saturated Paste) (mg/kg)	EC485 Saskatoon - Environmental	Soil/Solid	CSSS CH15/EPA 6010B	A soil extract produced by the saturated paste extraction procedure is analyzed for Calcium, Magnesium, Potassium, Sodium, Boron, and Sulfur (as SO4) by ICPOES. Results are calculated in mg/kg using Saturation Percentage.
F1-BTEX	EC580 Saskatoon - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sum F1 to F4 (C6-C50)	EC581 Saskatoon - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Hydrocarbons, total (C6-C50) is the sum of CCME Fractions F1(C6-C10), F2(C10-C16), F3(C16-C34), and F4(C34-C50). F4G-sg is not used within this calculation due to overlap with other fractions.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Metals and Mercury	EP440 Saskatoon - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl. This method is intended to liberate metals that may be environmentally available.
VOCs Methanol Extraction for Headspace Analysis	EP581 Saskatoon - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601 Saskatoon - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.
Dry and Grind	EPP442 Saskatoon - Environmental	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60°C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 - 919383

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Environmental Division
Regina
Work Order Reference
RG2200255

Telephone : +1 306 525 0970

Report To	Contact and company name below will appear on the final report
Company:	KGS GROUP
Contact:	MICHAEL BADGER
Phone:	306-280-8084
	Company address below will appear on the final report
Street:	SUITE 200 4561 PARLIAMENT AVE.
City/Province:	REGINA, SK
Postal Code:	S4W 0G3
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	KGS GROUP
Contact:	KGS PAYABLES

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax MBADGER@KGSGROUP.COM
Email 2 LPETERS@KGSGROUP.COM
Email 3 JNIXON@KGSGROUP.COM

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax PAYABLES@KGSGROUP.COM
Email 2 LPETERS@KGSGROUP.COM

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge mi
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge m
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge m
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge m
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge may apply to rush requests on weekends, statutory holidays and

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, p

Analysi

Project Information

ALS Account # / Quote #:
Job #: 21-3931-001
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (ALS use only): **ALS Contact:** **Sampler:**

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below: BTEX & F1-F4 (P)	PHC (P)	Metals (F)	Detailed Salinity (P)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	TH22-02 S1	26-MAR-22	12:16	SOIL	4	X	X	X	X			
	TH22-02 S2	26-MAR-22	12:16	SOIL	4	X	X	X	X			
	TH22-02 S3	26-MAR-22	12:16	SOIL	4	X	X	X	X			
	TH22-02 S100	26-MAR-22	12:16	SOIL	4	X	X	X	X			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☐ NO
Are samples for human consumption/ use?
☐ YES ☐ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED
Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO
Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
12.2							

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
MICHAEL BADGER	29-MAR-22	11:50

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
TW	29-3-22	1150

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

TABLE 2
METALS IN SOIL
REGINA LAWSON CENTER PARKING LOT - TH22-02

Sample ID	Date	Parameter [1]																																	
		Aluminum	Antimony[5]	Arsenic	Barium[5]	Beryllium[5]	Bismuth	Boron (hot water soluble)	Cadmium	Calcium	Chloride	Chromium (Total)	Chromium (Hexavalent)	Cobalt[5]	Copper	Cyanide (free)	Fluoride	Iron	Lead	Magnesium	Manganese	Mercury	Molybdenum[5]	Nickel [6]	Phosphorus	Potassium	Selenium	Silver[5]	Sodium	Strontium	Thallium	Tin[5]	Titanium	Uranium	Vanadium	Zinc
TH22-02 S1	26-Mar-22	9010	1.15	5.94	232	0.4	<0.20	35.2	0.37	43100	-	76.6	-	5.87	18.2	-	-	16000	323	9910	358	0.114	1.94	39.7	414	1710	0.26	<0.10	688	137	0.173	3.2	152	0.677	29.2	180
TH22-02 S2	26-Mar-22	15300	0.48	7.27	269	0.64	<0.20	32.5	0.305	39000	-	73.7	-	8.44	18.8	-	-	20200	26.4	11900	468	0.0428	2.1	42.6	852	3220	0.3	<0.10	560	118	0.203	<2.0	157	0.846	41.6	78.7
TH22-02 S3	26-Mar-22	18500	0.48	9.88	218	0.99	0.26	11.6	0.287	29600	-	106	-	12.9	29.9	-	-	27800	13.3	11700	483	0.0402	3.17	43	450	2630	0.48	0.11	722	94.5	0.239	<2.0	60.8	2.56	47.4	78.5
TH22-02 S100	26-Mar-22	13800	0.46	7.07	360	0.58	<0.20	28.1	0.667	43700	-	69.1	-	8.21	17.2	-	-	19300	24.5	15700	898	0.0418	1.9	40.6	528	2810	0.29	<0.10	520	125	0.201	<2.0	137	0.778	38.7	77.6
Laboratory Detection Limit																																			
CCME - Canadian Soil Quality Guidelines [2] - Commercial Land Use																																			
TIER I GOVERNING OBJECTIVES GENERIC CRITERIA		-	40	12	2,000	8	-	-	22	-	-	87	1.4 [4]	300	91	8	2000	-	260	-	-	24	40	89	-	-	2.9	40	-	-	1 [4]	300	-	33	130	410
TIER I SITE SPECIFIC CRITERIA (For Pathways Applicable to Site)																																			
Human Health Guidelines																																			
SQG_{DH}		-	-	12	10,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	310	-	-	-	-	-	-	-	-	-	-	16,000
Direct contact guideline		-	-	-	10,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	310	-	-	-	-	-	-	-	-	-	-	16,000
Soil Ingestion Guideline [3]		-	-	12	NC	-	-	-	49	-	-	630	NC	-	4000	110	-	-	260	-	-	24	-	310	-	-	125	-	-	-	NC	-	-	33	NC	-
Inhalation of Indoor Air Check[3]		-	-	NC	NC	-	-	-	NC	-	-	NC	NC	-	NC	NC	-	-	NC	-	-	NC	-	-	-	-	NC	-	-	-	NC	-	-	NC	NC	NC
Off-site Migration Check		-	-	-	96,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2500	-	-	1135	-	-	-	-	-	-	-	-	140,000
Groundwater Check (Drinking Water)[3]		-	-	NC	NC	-	-	-	NC	-	-	NC	NC	-	NC	NC	-	-	NC	-	-	NC	-	NC	-	-	NC	-	-	-	NC	-	-	NC	NC	NC
Produce, meat, and milk Check		-	-	-	-	-	-	-	-	-	-	-	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Environmental Health Guidelines																																			
Soil Quality Guideline		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	410
Soil Contact Guideline		-	-	26	NC	-	-	-	22	-	-	87	NC	-	91	8	-	-	600	-	-	50	-	89	-	-	2.9	-	-	-	3.6	-	-	2000	130	450
Soil and Food Ingestion Guideline		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrient and Energy Cycling Check		-	-	NC	NC	-	-	-	195	-	-	NC	NC	-	350	NC	-	-	834	-	-	52	-	235	-	-	NC	-	-	-	NC	-	-	NC	255	410
Off-site Migration Check		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	287	-	-	5	-	-	-	-	-	-	-	-	2,900
Groundwater Check (Aquatic Life)[3]		-	-	NC	NC	-	-	-	NC	-	-	NC	NC	-	NC	NC	-	-	NC	-	-	NC	-	NC	-	-	NC	-	-	-	NC	-	-	NC	NC	NC
Livestock Watering		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NC	-	-	-	-	-	-	-	-	-
Irrigation Water		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NC	-	-	-	-	-	-	-	-	-

TABLE 2
METALS IN SOIL
REGINA LAWSON CENTER PARKING LOT - TH22-02

Notes:
"-" No Data
NC Not Calculated

1. All values are expressed in milligrams per kilogram (mg/kg) unless otherwise specified.
2. CCME - Canadian Council of Ministers of the Environment - Canadian Environmental Quality Guidelines, 1999, Updated 7.0 - 2007. Updated July 2013, Zinc Updated 2018.
3. Selenium pathway names are from the new protocol (derived in 2006); however, some of the pathway names from the old guideline and the new guideline are interchangeable.
Use old pathway names instead of the new ones because all of the inorganics with the exception of Selenium use the old guideline pathway names. The interchangeable pathway names are as follows

Old Guideline	**New Guideline**
Soil Ingestion Guideline	Direct contact (SQG_{hh})
Inhalation of Indoor Air Check	Protection of Indoor Air Quality (Basement) Protection of Indoor Air Quality (Slab-on-Grade)
Groundwater Check (Drinking Water)	Protection of Potable Water
Groundwater Check (Aquatic Life)	Protection of Freshwater Life

4. Provisional guideline. (Hexavalent Chromium and Thallium)
5. Interim remediation criteria for soil (mg/kg) that have not yet been replaced by Canadian Soil Quality Guidelines.
6. CCME - Canadian Council of Ministers of the Environment - Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health - Nickel, 2015.

	- Exceedance of Tier I Generic Criteria
BOLD	- Exceedance of Tier I Site Specific Criteria

TABLE 1
PETROLEUM HYDROCARBONS IN SOIL
REGINA LAWSON AQUATIC CENTER PARKING LOT - TH22-02

Sample ID	Date	Depth (m)	Soil Type	Moisture Content (%)	Field Vapour Reading (ppm)	Parameter [1]								
						Benzene	Toluene	Ethylbenzene	Xylenes (o,-m,-p)	F1-BTEX (C_6 - C_{10})	F2 (C_{10} - C_{16})	F3 (C_{16} - C_{34})	F4 (C_{34} - C_{50})	Total Hydrocarbons (C_6 - C_{50})
TH22-02 S1	26-Mar-22	0.914	Fill - Sandy Clay	24.1	-	0.0232	0.0960	0.557	2.28	403	787	491	495	2110
TH22-02 S2	26-Mar-22	1.524	Fill - Sandy Clay	22.9	-	0.0198	0.052	0.234	0.786	18.5	<25	169	210	398
TH22-02 S3	26-Mar-22	1.829	Fill - Sandy Clay	25	-	<0.0050	<0.050	<0.015	<0.075	<5.0	<25	<50	<50	<80
TH22-02 S100	26-Mar-22	-	Fill - Sandy Clay	23	-	0.0160	<0.050	0.176	0.566	9.8	<25	138	252	400
Laboratory Detection Limits														
CCME Guidelines [2,3] - Commercial Land Use Criteria for Surface Soil (<1.5 m)														
Soil Type						**Fine**	**Fine**	**Fine**	**Fine**	**Fine**	**Fine**	**Fine**	**Fine**	**NA**
TIER I GOVERNING OBJECTIVES GENERIC CRITERIA						**0.0068**	**0.08**	**0.018**	**2.4**	**170** [4]	**230** [4]	**2,500**	**6,600**	-
TIER I SITE SPECIFIC CRITERIA (For Pathways Applicable to Site)														
Soil Ingestion Guideline						11	82,000	36,000	560,000	-	-	-	-	-
Soil Dermal Contact Guideline						25	790,000	210,000	NA	-	-	-	-	-
Soil Inhalation Guideline						NC	NC	NC	NC	-	-	-	-	-
Inhalation of Indoor Air Check (basement)						-	-	-	-	-	-	-	-	-
Inhalation of Indoor Air Check (slab on grade)						0.28	13,000	6,500	1,600	-	-	-	-	-
Groundwater Check (drinking water) [a]						0.0068	0.08	0.018	2.4	170	230	NA	NA	-
Produce, Meat and Milk Check						-	-	-	-	-	-	-	-	-
Soil Contact Guideline [b]						310	330	430	230	320	260	2,500	6,600	-
Soil and Food Ingestion Guideline						-	-	-	-	-	-	-	-	-
Nutrient and Energy Cycling Check						NC	NC	NC	NC	NC	NC	NC	NC	-
Groundwater Check (livestock) [c]						-	-	-	-	-	-	-	-	-
Groundwater Check (aquatic life) [d]						NC	NC	NC	NC	RES	RES	NA	NA	-
Direct Contact (Ingestion+Dermal Contact)						-	-	-	-	19,000	10,000	23,000	RES	-
Vapour Inhalation (indoor) [6]						-	-	-	-	4,600	23,000	NA	NA	-
Offsite Migration						-	-	-	-	NA	NA	19,000	RES	-
Management Limit [e]						-	-	-	-	800	1,000	5,000	10,000	-

TABLE 1
PETROLEUM HYDROCARBONS IN SOIL
REGINA LAWSON AQUATIC CENTER PARKING LOT - TH22-02

CCME Guidelines [2,3] - Commercial Land Use Criteria for Subsurface Soil (>1.5 m)									
Soil Type	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine	NA
TIER I GOVERNING OBJECTIVES GENERIC CRITERIA	**0.0068**	**0.08**	**0.018**	**2.4**	**170**	**230**	**5,000**	**10,000**	-
TIER I SITE SPECIFIC CRITERIA (For Pathways Applicable to Site)									
Soil Ingestion Guideline	NC	NC	NC	NC	-	-	-	-	-
Soil Dermal Contact Guideline	NC	NC	NC	NC	-	-	-	-	-
Soil Inhalation Guideline	NC	NC	NC	NC	-	-	-	-	-
Inhalation of Indoor Air Check (basement)	-	-	-	-	-	-	-	-	-
Inhalation of Indoor Air Check (slab on grade)	0.29	13,000	6,700	1,600	-	-	-	-	-
Groundwater Check (drinking water) [a]	0.0068	0.08	0.018	2.4	170	230	NA	NA	-
Produce, Meat and Milk Check	-	-	-	-	-	-	-	-	-
Soil Contact Guideline [b]	620	660	860	460	NA	NA	NA	NA	-
Soil and Food Ingestion Guideline	-	-	-	-	-	-	-	-	-
Nutrient and Energy Cycling Check	NC	NC	NC	NC	NC	NC	NC	NC	-
Off-site migration Check	-	-	-	-	NA	NA	19,000	NA	-
Groundwater Check (livestock) [c]	-	-	-	-	-	-	-	-	-
Groundwater Check (aquatic life) [d]	NC	NC	NC	NC	-	-	-	-	-
Direct Contact (Ingestion+Dermal Contact)	-	-	-	-	NA	NA	NA	NA	-
Vapour Inhalation (indoor) [6]	-	-	-	-	4,600	23,000	NA	NA	-
Management Limit [e]	-	-	-	-	800	1,000	5,000	10,000	-

TABLE 1
PETROLEUM HYDROCARBONS IN SOIL
REGINA LAWSON AQUATIC CENTER PARKING LOT - TH22-02

Notes:

"-" No Data
NA Not Applicable. For fine-grained soils, calculated value exceeds 1,000,000 mg/kg or pathway is excluded.
NC Not calculated. Insufficient data to allow derivation.
ND Not Determined
RES Residual PHC formation. Calculated value exceeds 30,000 mg/kg and solubility limit for PHC fraction.

1. All values are expressed in milligrams per kilogram (mg/kg) unless otherwise specified.
2. CCME - Canadian Council of Ministers of the Environment - Canadian Environmental Quality Guidelines, 1999. Update 2018
   Chapter 7 - Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health.
3. CCME - Canadian Council of Ministers of the Environment. Canada-Wide Standards for Petroleum Hydrocarbons (PHCs) in Soil, May 2001 - revised January 2008. Updated July 2012.
   a. Assumes site is underlain by groundwater of potable quality in sufficient yield (K of 10^{-4} cm/sec or greater).
   b. For depths between 0 and 1.5 meters below ground level, the terrestrial ecological pathway must be applied.
      A management limit has been developed for PHC that must be applied at all depths if the ecological pathway is removed.
      CCME does not specify for depths between 1.5 and 3 meters below ground level.
   c. Generally applicable for this land use as related to use of dugouts and wells for supply of livestock water.
   d. Assumes surface water body at 10 m from site.
   e. Includes additional considerations such as free phase formation, explosive hazards, and buried infrastructure effects.
4. Tier I value for the protection of potable groundwater.
5. Tier I value assumes contamination near residence.
6. Refer to Basement or Slab-on-Grade value. (Note For Residential Criteria Only)

	- Exceedance of Tier I Generic Criteria
BOLD	- Exceedance of Tier I Site Specific Criteria

Report To Michael Badger, KGS Group
Suite 200, 4561 Parliament Avenue

Regina, SK S4W 0G3, Canada

Client Phone 306 757 9681

Certificate of Analys

Lab Work Order #	RG2200255
Project PO #	
Project	21-3931-001
Legal Site Description	
C of C Numbers	

Comments

ALS standard storage times are as follows (from date of receipt at testing laboratory): 30 calendar days for soi
14 days for air samples or re-usable media; and 3 days for microbiological samples.
Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recogniz
Temperature is recorded in °C unless otherwise noted.

Temperature 12.2

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is condu

Signatories	*Position*	*Laboratory Departm*
Ivan Yip	Laboratory Analyst	Organics, Saskatoon
Jwan Abdalla	Laboratory Analyst	Metals, Saskatoon, S
Lian Nesbitt	Laboratory Analyst	Metals, Saskatoon, S
Jwan Abdalla	Laboratory Analyst	Inorganics, Saskatoo
Colby Bingham	Quality Systems Coordinator	Metals, Saskatoon, S
Maria Painchaud	Laboratory Assistant	Inorganics, Saskatoo
Colby Bingham	Quality Systems Coordinator	Inorganics, Saskatoo

Date Received	29-Mar-2022 12:02
Issue Date	05-Apr-2022 08:36
Amendment	0
Version	FINAL

sis

l and water samples; 6 months for tissue/biota samples;

zed international references.

ucted in accordance with US FDA 21 CFR Part 11.

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Sample Summary RG2200255

Project	21-3931-001
Report To	Michael Badger, KGS Group
Date Received	29-Mar-2022 12:02
Issue Date	05-Apr-2022 08:36
Amendment	0

Sample Details

ALS Sample ID	Client Sample ID	Matrix	Sub-Matrix	Date Sampled
RG2200255-001	TH22-02 S1	Soil/Solid	Soil	26-Mar-2022
RG2200255-002	TH22-02 S2	Soil/Solid	Soil	26-Mar-2022
RG2200255-003	TH22-02 S3	Soil/Solid	Soil	26-Mar-2022
RG2200255-004	TH22-02 S100	Soil/Solid	Soil	26-Mar-2022

Time Sampled
12:16
12:16
12:16
12:16

Results Summary RG2200255

Project	21-3931-001
Report To	Michael Badger, KGS Group
Date Received	29-Mar-2022 12:02
Issue Date	05-Apr-2022 08:36
Amendment	0

Client Sample ID			TH22-02 S1
Date Sampled			26-Mar-2022
Time Sampled			12:16
ALS Sample ID			RG2200255-001
Analyte	Lowest Detection Limit	Units	Sub-Matrix: Soil
Physical Tests (Matrix: Soil/Solid)			
moisture	0.25	%	24.1
Saturated Paste Extractables (Matrix: Soil/Solid)			
% saturation	1.0	%	133
TGR (brine)	0.10	t/ha	<0.10
TGR (sodic)	0.10	t/ha	<0.10
calcium, soluble ion content	5.0	mg/L	37.4
calcium, soluble ion content	5.0	mg/kg	49.7
chloride, soluble ion content	20	mg/L	309
chloride, soluble ion content	10	mg/kg	411
conductivity, saturated paste	0.010	dS/m	1.11
magnesium, soluble ion content	5.0	mg/L	27.0
magnesium, soluble ion content	5.0	mg/kg	35.9
pH, saturated paste	0.10	pH units	8.06
potassium, soluble ion content	5.0	mg/L	18.7
potassium, soluble ion content	5.0	mg/kg	24.9
sodium adsorption ratio [SAR]	0.10		4.96
sodium, soluble ion content	5.0	mg/L	163
sodium, soluble ion content	5.0	mg/kg	217
sulfur (as SO4), soluble ion content	6.0	mg/L	324
sulfur (as SO4), soluble ion content	8.0	mg/kg	431
Metals (Matrix: Soil/Solid)			
aluminum	50	mg/kg	9010
antimony	0.10	mg/kg	1.15
arsenic	0.10	mg/kg	5.94
barium	0.50	mg/kg	232
beryllium	0.10	mg/kg	0.40
bismuth	0.20	mg/kg	<0.20

boron	5.0	mg/kg	35.2
cadmium	0.020	mg/kg	0.370
calcium	50	mg/kg	43100
chromium	0.50	mg/kg	76.6
cobalt	0.10	mg/kg	5.87
copper	0.50	mg/kg	18.2
iron	50	mg/kg	16000
lead	0.50	mg/kg	323
lithium	2.0	mg/kg	10.6
magnesium	20	mg/kg	9910
manganese	1.0	mg/kg	358
mercury	0.0050	mg/kg	0.114
molybdenum	0.10	mg/kg	1.94
nickel	0.50	mg/kg	39.7
phosphorus	50	mg/kg	414
potassium	100	mg/kg	1710
selenium	0.20	mg/kg	0.26
silver	0.10	mg/kg	<0.10
sodium	50	mg/kg	688
strontium	0.50	mg/kg	137
sulfur	1000	mg/kg	2000
thallium	0.050	mg/kg	0.173
tin	2.0	mg/kg	3.2
titanium	1.0	mg/kg	152
tungsten	0.50	mg/kg	<0.50
uranium	0.050	mg/kg	0.677
vanadium	0.20	mg/kg	29.2
zinc	2.0	mg/kg	180
zirconium	1.0	mg/kg	8.4

Volatile Organic Compounds Surrogates (Matrix: Soil/Solid)

bromofluorobenzene, 4-	0.10	%	96.7
difluorobenzene, 1,4-	0.10	%	94.1

Volatile Organic Compounds [BTEXS+MTBE] (Matrix: Soil/Solid)

benzene	0.0050	mg/kg	0.0232
ethylbenzene	0.015	mg/kg	0.557
toluene	0.050	mg/kg	0.096
xylene, m+p-	0.050	mg/kg	1.38
xylene, o-	0.050	mg/kg	0.902
xylenes, total	0.075	mg/kg	2.28
BTEX, total	0.10	mg/kg	2.96

Hydrocarbons (Matrix: Soil/Solid)

F1 (C6-C10)	5.0	mg/kg	403
F1-BTEX	5.0	mg/kg	400
F2 (C10-C16)	25	mg/kg	787
F3 (C16-C34)	50	mg/kg	491
F4 (C34-C50)	50	mg/kg	495
F4G-sg	500	mg/kg	2110
hydrocarbons, total (C6-C50)	80	mg/kg	2180
chromatogram to baseline at nC50			No

Hydrocarbons Surrogates (Matrix: Soil/Solid)

bromobenzotrifluoride, 2- (F2-F4 surr)	1.0	%	77.5
dichlorotoluene, 3,4-	1.0	%	254

Qualifier Legend

SMI	Surrogate recovery could not be measured due to sample matri

TH22-02 S2	TH22-02 S3	TH22-02 S100
26-Mar-2022	26-Mar-2022	26-Mar-2022
12:16	12:16	12:16
RG2200255-002 Sub-Matrix: Soil	RG2200255-003 Sub-Matrix: Soil	RG2200255-004 Sub-Matrix: Soil
22.9	25.0	23.0
57.4	105	57.8
<0.10	<0.10	<0.10
<0.10	<0.10	<0.10
63.2	638	57.2
36.3	670	33.1
327	152	229
188	160	132
1.69	4.66	1.49
37.5	294	36.1
21.5	309	20.9
7.80	7.87	7.76
27.7	31.0	26.9
15.9	32.6	15.5
6.53	3.02	5.81
265	367	228
152	385	132
380	3260	344
218	3420	199
15300	18500	13800
0.48	0.48	0.46
7.27	9.88	7.07
269	218	360
0.64	0.99	0.58
<0.20	0.26	<0.20

32.5	11.6	28.1
0.305	0.287	0.667
39000	29600	43700
73.7	106	69.1
8.44	12.9	8.21
18.8	29.9	17.2
20200	27800	19300
26.4	13.3	24.5
19.3	25.2	14.4
11900	11700	15700
468	483	898
0.0428	0.0402	0.0418
2.10	3.17	1.90
42.6	43.0	40.6
852	450	528
3220	2630	2810
0.30	0.48	0.29
<0.10	0.11	<0.10
560	722	520
118	94.5	125
<1000	3600	<1000
0.203	0.239	0.201
<2.0	<2.0	<2.0
157	60.8	137
<0.50	<0.50	<0.50
0.846	2.56	0.778
41.6	47.4	38.7
78.7	78.5	77.6
9.5	10.5	8.7

85.7	98.5	86.6
75.5	85.1	76.2

0.0198	<0.0050	0.0160
0.234	<0.015	0.176
0.052	<0.050	<0.050
0.452	<0.050	0.322
0.334	<0.050	0.244
0.786	<0.075	0.566
1.09	<0.10	0.76

18.5	<5.0	9.8
17.4	<5.0	9.0
<25	<25	<25
169	<50	138
210	<50	252
		880
398	<80	400
Yes	Yes	No

71.9	69.1	68.9
92.5	103	80.0

x interference.

Results of Analysis RG2200255

Project	21-3931-001
Report To	Michael Badger, KGS Group
Date Received	29-Mar-2022 12:02
Issue Date	05-Apr-2022 08:36
Amendment	0

Analyte	**ALS Sample ID**
Physical Tests (Matrix: Soil/Solid)	
moisture	RG2200255-001
Saturated Paste Extractables (Matrix: Soil/Solid)	
% saturation	RG2200255-001
TGR (brine)	RG2200255-001
TGR (sodic)	RG2200255-001
calcium, soluble ion content	RG2200255-001
calcium, soluble ion content	RG2200255-001
chloride, soluble ion content	RG2200255-001
chloride, soluble ion content	RG2200255-001
conductivity, saturated paste	RG2200255-001
magnesium, soluble ion content	RG2200255-001
magnesium, soluble ion content	RG2200255-001
pH, saturated paste	RG2200255-001
potassium, soluble ion content	RG2200255-001
potassium, soluble ion content	RG2200255-001
sodium adsorption ratio [SAR]	RG2200255-001
sodium, soluble ion content	RG2200255-001
sodium, soluble ion content	RG2200255-001
sulfur (as SO4), soluble ion content	RG2200255-001
sulfur (as SO4), soluble ion content	RG2200255-001
Metals (Matrix: Soil/Solid)	
aluminum	RG2200255-001
antimony	RG2200255-001
arsenic	RG2200255-001
barium	RG2200255-001
beryllium	RG2200255-001
bismuth	RG2200255-001
boron	RG2200255-001
cadmium	RG2200255-001
calcium	RG2200255-001
chromium	RG2200255-001

cobalt	RG2200255-001
copper	RG2200255-001
iron	RG2200255-001
lead	RG2200255-001
lithium	RG2200255-001
magnesium	RG2200255-001
manganese	RG2200255-001
mercury	RG2200255-001
molybdenum	RG2200255-001
nickel	RG2200255-001
phosphorus	RG2200255-001
potassium	RG2200255-001
selenium	RG2200255-001
silver	RG2200255-001
sodium	RG2200255-001
strontium	RG2200255-001
sulfur	RG2200255-001
thallium	RG2200255-001
tin	RG2200255-001
titanium	RG2200255-001
tungsten	RG2200255-001
uranium	RG2200255-001
vanadium	RG2200255-001
zinc	RG2200255-001
zirconium	RG2200255-001

Volatile Organic Compounds Surrogates (Matrix: Soil/Solid)

bromofluorobenzene, 4-	RG2200255-001
difluorobenzene, 1,4-	RG2200255-001

Volatile Organic Compounds [BTEXS+MTBE] (Matrix: Soil/Solid)

benzene	RG2200255-001
ethylbenzene	RG2200255-001
toluene	RG2200255-001
xylene, m+p-	RG2200255-001
xylene, o-	RG2200255-001
xylenes, total	RG2200255-001
BTEX, total	RG2200255-001

Hydrocarbons (Matrix: Soil/Solid)

F1 (C6-C10)	RG2200255-001
F1-BTEX	RG2200255-001
F2 (C10-C16)	RG2200255-001
F3 (C16-C34)	RG2200255-001

F4 (C34-C50)	RG2200255-001
F4G-sg	RG2200255-001
hydrocarbons, total (C6-C50)	RG2200255-001
chromatogram to baseline at nC50	RG2200255-001

Hydrocarbons Surrogates (Matrix: Soil/Solid)

bromobenzotrifluoride, 2- (F2-F4 surr)	RG2200255-001
dichlorotoluene, 3,4-	RG2200255-001

Physical Tests (Matrix: Soil/Solid)

moisture	RG2200255-002

Saturated Paste Extractables (Matrix: Soil/Solid)

% saturation	RG2200255-002
TGR (brine)	RG2200255-002
TGR (sodic)	RG2200255-002
calcium, soluble ion content	RG2200255-002
calcium, soluble ion content	RG2200255-002
chloride, soluble ion content	RG2200255-002
chloride, soluble ion content	RG2200255-002
conductivity, saturated paste	RG2200255-002
magnesium, soluble ion content	RG2200255-002
magnesium, soluble ion content	RG2200255-002
pH, saturated paste	RG2200255-002
potassium, soluble ion content	RG2200255-002
potassium, soluble ion content	RG2200255-002
sodium adsorption ratio [SAR]	RG2200255-002
sodium, soluble ion content	RG2200255-002
sodium, soluble ion content	RG2200255-002
sulfur (as SO4), soluble ion content	RG2200255-002
sulfur (as SO4), soluble ion content	RG2200255-002

Metals (Matrix: Soil/Solid)

aluminum	RG2200255-002
antimony	RG2200255-002
arsenic	RG2200255-002
barium	RG2200255-002
beryllium	RG2200255-002
bismuth	RG2200255-002
boron	RG2200255-002
cadmium	RG2200255-002
calcium	RG2200255-002
chromium	RG2200255-002
cobalt	RG2200255-002

copper	RG2200255-002
iron	RG2200255-002
lead	RG2200255-002
lithium	RG2200255-002
magnesium	RG2200255-002
manganese	RG2200255-002
mercury	RG2200255-002
molybdenum	RG2200255-002
nickel	RG2200255-002
phosphorus	RG2200255-002
potassium	RG2200255-002
selenium	RG2200255-002
silver	RG2200255-002
sodium	RG2200255-002
strontium	RG2200255-002
sulfur	RG2200255-002
thallium	RG2200255-002
tin	RG2200255-002
titanium	RG2200255-002
tungsten	RG2200255-002
uranium	RG2200255-002
vanadium	RG2200255-002
zinc	RG2200255-002
zirconium	RG2200255-002

Volatile Organic Compounds Surrogates (Matrix: Soil/Solid)

bromofluorobenzene, 4-	RG2200255-002
difluorobenzene, 1,4-	RG2200255-002

Volatile Organic Compounds [BTEXS+MTBE] (Matrix: Soil/Solid)

benzene	RG2200255-002
ethylbenzene	RG2200255-002
toluene	RG2200255-002
xylene, m+p-	RG2200255-002
xylene, o-	RG2200255-002
xylenes, total	RG2200255-002
BTEX, total	RG2200255-002

Hydrocarbons (Matrix: Soil/Solid)

F1 (C6-C10)	RG2200255-002
F1-BTEX	RG2200255-002
F2 (C10-C16)	RG2200255-002
F3 (C16-C34)	RG2200255-002
F4 (C34-C50)	RG2200255-002

hydrocarbons, total (C6-C50)	RG2200255-002
chromatogram to baseline at nC50	RG2200255-002

Hydrocarbons Surrogates (Matrix: Soil/Solid)

bromobenzotrifluoride, 2- (F2-F4 surr)	RG2200255-002
dichlorotoluene, 3,4-	RG2200255-002

Physical Tests (Matrix: Soil/Solid)

moisture	RG2200255-003

Saturated Paste Extractables (Matrix: Soil/Solid)

% saturation	RG2200255-003
TGR (brine)	RG2200255-003
TGR (sodic)	RG2200255-003
calcium, soluble ion content	RG2200255-003
calcium, soluble ion content	RG2200255-003
chloride, soluble ion content	RG2200255-003
chloride, soluble ion content	RG2200255-003
conductivity, saturated paste	RG2200255-003
magnesium, soluble ion content	RG2200255-003
magnesium, soluble ion content	RG2200255-003
pH, saturated paste	RG2200255-003
potassium, soluble ion content	RG2200255-003
potassium, soluble ion content	RG2200255-003
sodium adsorption ratio [SAR]	RG2200255-003
sodium, soluble ion content	RG2200255-003
sodium, soluble ion content	RG2200255-003
sulfur (as SO4), soluble ion content	RG2200255-003
sulfur (as SO4), soluble ion content	RG2200255-003

Metals (Matrix: Soil/Solid)

aluminum	RG2200255-003
antimony	RG2200255-003
arsenic	RG2200255-003
barium	RG2200255-003
beryllium	RG2200255-003
bismuth	RG2200255-003
boron	RG2200255-003
cadmium	RG2200255-003
calcium	RG2200255-003
chromium	RG2200255-003
cobalt	RG2200255-003
copper	RG2200255-003
iron	RG2200255-003

lead	RG2200255-003
lithium	RG2200255-003
magnesium	RG2200255-003
manganese	RG2200255-003
mercury	RG2200255-003
molybdenum	RG2200255-003
nickel	RG2200255-003
phosphorus	RG2200255-003
potassium	RG2200255-003
selenium	RG2200255-003
silver	RG2200255-003
sodium	RG2200255-003
strontium	RG2200255-003
sulfur	RG2200255-003
thallium	RG2200255-003
tin	RG2200255-003
titanium	RG2200255-003
tungsten	RG2200255-003
uranium	RG2200255-003
vanadium	RG2200255-003
zinc	RG2200255-003
zirconium	RG2200255-003

Volatile Organic Compounds Surrogates (Matrix: Soil/Solid)

bromofluorobenzene, 4-	RG2200255-003
difluorobenzene, 1,4-	RG2200255-003

Volatile Organic Compounds [BTEXS+MTBE] (Matrix: Soil/Solid)

benzene	RG2200255-003
ethylbenzene	RG2200255-003
toluene	RG2200255-003
xylene, m+p-	RG2200255-003
xylene, o-	RG2200255-003
xylenes, total	RG2200255-003
BTEX, total	RG2200255-003

Hydrocarbons (Matrix: Soil/Solid)

F1 (C6-C10)	RG2200255-003
F1-BTEX	RG2200255-003
F2 (C10-C16)	RG2200255-003
F3 (C16-C34)	RG2200255-003
F4 (C34-C50)	RG2200255-003
hydrocarbons, total (C6-C50)	RG2200255-003
chromatogram to baseline at nC50	RG2200255-003

Hydrocarbons Surrogates (Matrix: Soil/Solid)

bromobenzotrifluoride, 2- (F2-F4 surr)	RG2200255-003
dichlorotoluene, 3,4-	RG2200255-003

Physical Tests (Matrix: Soil/Solid)

moisture	RG2200255-004

Saturated Paste Extractables (Matrix: Soil/Solid)

% saturation	RG2200255-004
TGR (brine)	RG2200255-004
TGR (sodic)	RG2200255-004
calcium, soluble ion content	RG2200255-004
calcium, soluble ion content	RG2200255-004
chloride, soluble ion content	RG2200255-004
chloride, soluble ion content	RG2200255-004
conductivity, saturated paste	RG2200255-004
magnesium, soluble ion content	RG2200255-004
magnesium, soluble ion content	RG2200255-004
pH, saturated paste	RG2200255-004
potassium, soluble ion content	RG2200255-004
potassium, soluble ion content	RG2200255-004
sodium adsorption ratio [SAR]	RG2200255-004
sodium, soluble ion content	RG2200255-004
sodium, soluble ion content	RG2200255-004
sulfur (as SO4), soluble ion content	RG2200255-004
sulfur (as SO4), soluble ion content	RG2200255-004

Metals (Matrix: Soil/Solid)

aluminum	RG2200255-004
antimony	RG2200255-004
arsenic	RG2200255-004
barium	RG2200255-004
beryllium	RG2200255-004
bismuth	RG2200255-004
boron	RG2200255-004
cadmium	RG2200255-004
calcium	RG2200255-004
chromium	RG2200255-004
cobalt	RG2200255-004
copper	RG2200255-004
iron	RG2200255-004
lead	RG2200255-004
lithium	RG2200255-004

magnesium	RG2200255-004
manganese	RG2200255-004
mercury	RG2200255-004
molybdenum	RG2200255-004
nickel	RG2200255-004
phosphorus	RG2200255-004
potassium	RG2200255-004
selenium	RG2200255-004
silver	RG2200255-004
sodium	RG2200255-004
strontium	RG2200255-004
sulfur	RG2200255-004
thallium	RG2200255-004
tin	RG2200255-004
titanium	RG2200255-004
tungsten	RG2200255-004
uranium	RG2200255-004
vanadium	RG2200255-004
zinc	RG2200255-004
zirconium	RG2200255-004

Volatile Organic Compounds Surrogates (Matrix: Soil/Solid)

bromofluorobenzene, 4-	RG2200255-004
difluorobenzene, 1,4-	RG2200255-004

Volatile Organic Compounds [BTEXS+MTBE] (Matrix: Soil/Solid)

benzene	RG2200255-004
ethylbenzene	RG2200255-004
toluene	RG2200255-004
xylene, m+p-	RG2200255-004
xylene, o-	RG2200255-004
xylenes, total	RG2200255-004
BTEX, total	RG2200255-004

Hydrocarbons (Matrix: Soil/Solid)

F1 (C6-C10)	RG2200255-004
F1-BTEX	RG2200255-004
F2 (C10-C16)	RG2200255-004
F3 (C16-C34)	RG2200255-004
F4 (C34-C50)	RG2200255-004
F4G-sg	RG2200255-004
hydrocarbons, total (C6-C50)	RG2200255-004
chromatogram to baseline at nC50	RG2200255-004

Hydrocarbons Surrogates (Matrix: Soil/Solid)

bromobenzotrifluoride, 2- (F2-F4 surr)	RG2200255-004
dichlorotoluene, 3,4-	RG2200255-004

Qualifier Legend

SMI	Surrogate recovery could not be measured due to sample matrix interference.

Evaluation Legend

✓	QC Lot met ALS Data Quality Objectives
x	QC Lot did not meet ALS Data Quality Objectives

Hold Time Evaluation Legend

✓	= within holding time

Client Sample ID	Matrix	Sub-Matrix	Method	Results	Detection Limit	Units	Qual
TH22-02 S1	Soil/Solid	Soil	E144	24.1	0.25	%	
TH22-02 S1	Soil/Solid	Soil	E141	133	1.0	%	
TH22-02 S1	Soil/Solid	Soil	EC106	<0.10	0.10	t/ha	
TH22-02 S1	Soil/Solid	Soil	EC106	<0.10	0.10	t/ha	
TH22-02 S1	Soil/Solid	Soil	E485	37.4	5.0	mg/L	
TH22-02 S1	Soil/Solid	Soil	EC485	49.7	6.6	mg/kg	
TH22-02 S1	Soil/Solid	Soil	E266.Cl	309	100	mg/L	
TH22-02 S1	Soil/Solid	Soil	EC266A.Cl	411	133	mg/kg	
TH22-02 S1	Soil/Solid	Soil	E102	1.11	0.010	dS/m	
TH22-02 S1	Soil/Solid	Soil	E485	27.0	5.0	mg/L	
TH22-02 S1	Soil/Solid	Soil	EC485	35.9	6.6	mg/kg	
TH22-02 S1	Soil/Solid	Soil	E114	8.06	0.10	pH units	
TH22-02 S1	Soil/Solid	Soil	E485	18.7	5.0	mg/L	
TH22-02 S1	Soil/Solid	Soil	EC485	24.9	6.6	mg/kg	
TH22-02 S1	Soil/Solid	Soil	EC102	4.96	0.10		
TH22-02 S1	Soil/Solid	Soil	E485	163	5.0	mg/L	
TH22-02 S1	Soil/Solid	Soil	EC485	217	6.6	mg/kg	
TH22-02 S1	Soil/Solid	Soil	E485	324	6	mg/L	
TH22-02 S1	Soil/Solid	Soil	EC485	431	8	mg/kg	
TH22-02 S1	Soil/Solid	Soil	E440	9010	50	mg/kg	
TH22-02 S1	Soil/Solid	Soil	E440	1.15	0.10	mg/kg	
TH22-02 S1	Soil/Solid	Soil	E440	5.94	0.10	mg/kg	
TH22-02 S1	Soil/Solid	Soil	E440	232	0.50	mg/kg	
TH22-02 S1	Soil/Solid	Soil	E440	0.40	0.10	mg/kg	
TH22-02 S1	Soil/Solid	Soil	E440	<0.20	0.20	mg/kg	
TH22-02 S1	Soil/Solid	Soil	E440	35.2	5.0	mg/kg	
TH22-02 S1	Soil/Solid	Soil	E440	0.370	0.020	mg/kg	
TH22-02 S1	Soil/Solid	Soil	E440	43100	50	mg/kg	
TH22-02 S1	Soil/Solid	Soil	E440	76.6	0.50	mg/kg	

TH22-02 S1	Soil/Solid	Soil	E440	5.87	0.10	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	18.2	0.50	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	16000	50	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	323	0.50	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	10.6	2.0	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	9910	20	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	358	1.0	mg/kg
TH22-02 S1	Soil/Solid	Soil	E510	0.114	0.0050	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	1.94	0.10	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	39.7	0.50	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	414	50	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	1710	100	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	0.26	0.20	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	<0.10	0.10	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	688	50	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	137	0.50	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	2000	1000	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	0.173	0.050	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	3.2	2.0	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	152	1.0	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	<0.50	0.50	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	0.677	0.050	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	29.2	0.20	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	180	2.0	mg/kg
TH22-02 S1	Soil/Solid	Soil	E440	8.4	1.0	mg/kg

TH22-02 S1	Soil/Solid	Soil	E611A	96.7	0.10	%
TH22-02 S1	Soil/Solid	Soil	E611A	94.1	0.10	%

TH22-02 S1	Soil/Solid	Soil	E611A	0.0232	0.0050	mg/kg
TH22-02 S1	Soil/Solid	Soil	E611A	0.557	0.015	mg/kg
TH22-02 S1	Soil/Solid	Soil	E611A	0.096	0.050	mg/kg
TH22-02 S1	Soil/Solid	Soil	E611A	1.38	0.050	mg/kg
TH22-02 S1	Soil/Solid	Soil	E611A	0.902	0.050	mg/kg
TH22-02 S1	Soil/Solid	Soil	E611A	2.28	0.075	mg/kg
TH22-02 S1	Soil/Solid	Soil	E611A	2.96	0.1	mg/kg

TH22-02 S1	Soil/Solid	Soil	E581.F1	403	5.0	mg/kg
TH22-02 S1	Soil/Solid	Soil	EC580	400	114	mg/kg
TH22-02 S1	Soil/Solid	Soil	E601.SG	787	25	mg/kg
TH22-02 S1	Soil/Solid	Soil	E601.SG	491	50	mg/kg

TH22-02 S1	Soil/Solid	Soil	E601.SG	495	50	mg/kg	
TH22-02 S1	Soil/Solid	Soil	E601.F4G	2110	500	mg/kg	
TH22-02 S1	Soil/Solid	Soil	EC581	2180	80	mg/kg	
TH22-02 S1	Soil/Solid	Soil	E601.SG	No			
TH22-02 S1	Soil/Solid	Soil	E601.SG	77.5	1.0	%	
TH22-02 S1	Soil/Solid	Soil	E581.F1	254	1.0	%	SMI
TH22-02 S2	Soil/Solid	Soil	E144	22.9	0.25	%	
TH22-02 S2	Soil/Solid	Soil	E141	57.4	1.0	%	
TH22-02 S2	Soil/Solid	Soil	EC106	<0.10	0.10	t/ha	
TH22-02 S2	Soil/Solid	Soil	EC106	<0.10	0.10	t/ha	
TH22-02 S2	Soil/Solid	Soil	E485	63.2	5.0	mg/L	
TH22-02 S2	Soil/Solid	Soil	EC485	36.3	5	mg/kg	
TH22-02 S2	Soil/Solid	Soil	E266.Cl	327	100	mg/L	
TH22-02 S2	Soil/Solid	Soil	EC266A.Cl	188	57	mg/kg	
TH22-02 S2	Soil/Solid	Soil	E102	1.69	0.010	dS/m	
TH22-02 S2	Soil/Solid	Soil	E485	37.5	5.0	mg/L	
TH22-02 S2	Soil/Solid	Soil	EC485	21.5	5	mg/kg	
TH22-02 S2	Soil/Solid	Soil	E114	7.80	0.10	pH units	
TH22-02 S2	Soil/Solid	Soil	E485	27.7	5.0	mg/L	
TH22-02 S2	Soil/Solid	Soil	EC485	15.9	5	mg/kg	
TH22-02 S2	Soil/Solid	Soil	EC102	6.53	0.10		
TH22-02 S2	Soil/Solid	Soil	E485	265	5.0	mg/L	
TH22-02 S2	Soil/Solid	Soil	EC485	152	5	mg/kg	
TH22-02 S2	Soil/Solid	Soil	E485	380	6	mg/L	
TH22-02 S2	Soil/Solid	Soil	EC485	218	8	mg/kg	
TH22-02 S2	Soil/Solid	Soil	E440	15300	50	mg/kg	
TH22-02 S2	Soil/Solid	Soil	E440	0.48	0.10	mg/kg	
TH22-02 S2	Soil/Solid	Soil	E440	7.27	0.10	mg/kg	
TH22-02 S2	Soil/Solid	Soil	E440	269	0.50	mg/kg	
TH22-02 S2	Soil/Solid	Soil	E440	0.64	0.10	mg/kg	
TH22-02 S2	Soil/Solid	Soil	E440	<0.20	0.20	mg/kg	
TH22-02 S2	Soil/Solid	Soil	E440	32.5	5.0	mg/kg	
TH22-02 S2	Soil/Solid	Soil	E440	0.305	0.020	mg/kg	
TH22-02 S2	Soil/Solid	Soil	E440	39000	50	mg/kg	
TH22-02 S2	Soil/Solid	Soil	E440	73.7	0.50	mg/kg	
TH22-02 S2	Soil/Solid	Soil	E440	8.44	0.10	mg/kg	

TH22-02 S2	Soil/Solid	Soil	E440	18.8	0.50	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	20200	50	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	26.4	0.50	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	19.3	2.0	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	11900	20	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	468	1.0	mg/kg
TH22-02 S2	Soil/Solid	Soil	E510	0.0428	0.0050	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	2.10	0.10	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	42.6	0.50	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	852	50	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	3220	100	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	0.30	0.20	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	<0.10	0.10	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	560	50	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	118	0.50	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	<1000	1000	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	0.203	0.050	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	<2.0	2.0	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	157	1.0	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	<0.50	0.50	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	0.846	0.050	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	41.6	0.20	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	78.7	2.0	mg/kg
TH22-02 S2	Soil/Solid	Soil	E440	9.5	1.0	mg/kg
TH22-02 S2	Soil/Solid	Soil	E611A	85.7	0.10	%
TH22-02 S2	Soil/Solid	Soil	E611A	75.5	0.10	%
TH22-02 S2	Soil/Solid	Soil	E611A	0.0198	0.0050	mg/kg
TH22-02 S2	Soil/Solid	Soil	E611A	0.234	0.015	mg/kg
TH22-02 S2	Soil/Solid	Soil	E611A	0.052	0.050	mg/kg
TH22-02 S2	Soil/Solid	Soil	E611A	0.452	0.050	mg/kg
TH22-02 S2	Soil/Solid	Soil	E611A	0.334	0.050	mg/kg
TH22-02 S2	Soil/Solid	Soil	E611A	0.786	0.075	mg/kg
TH22-02 S2	Soil/Solid	Soil	E611A	1.09	0.1	mg/kg
TH22-02 S2	Soil/Solid	Soil	E581.F1	18.5	5.0	mg/kg
TH22-02 S2	Soil/Solid	Soil	EC580	17.4	5.9	mg/kg
TH22-02 S2	Soil/Solid	Soil	E601.SG	<25	25	mg/kg
TH22-02 S2	Soil/Solid	Soil	E601.SG	169	50	mg/kg
TH22-02 S2	Soil/Solid	Soil	E601.SG	210	50	mg/kg

TH22-02 S2	Soil/Solid	Soil	EC581	398	80	mg/kg
TH22-02 S2	Soil/Solid	Soil	E601.SG	Yes		
TH22-02 S2	Soil/Solid	Soil	E601.SG	71.9	1.0	%
TH22-02 S2	Soil/Solid	Soil	E581.F1	92.5	1.0	%
TH22-02 S3	Soil/Solid	Soil	E144	25.0	0.25	%
TH22-02 S3	Soil/Solid	Soil	E141	105	1.0	%
TH22-02 S3	Soil/Solid	Soil	EC106	<0.10	0.10	t/ha
TH22-02 S3	Soil/Solid	Soil	EC106	<0.10	0.10	t/ha
TH22-02 S3	Soil/Solid	Soil	E485	638	25.0	mg/L
TH22-02 S3	Soil/Solid	Soil	EC485	670	26.2	mg/kg
TH22-02 S3	Soil/Solid	Soil	E266.Cl	152	100	mg/L
TH22-02 S3	Soil/Solid	Soil	EC266A.Cl	160	105	mg/kg
TH22-02 S3	Soil/Solid	Soil	E102	4.66	0.010	dS/m
TH22-02 S3	Soil/Solid	Soil	E485	294	25.0	mg/L
TH22-02 S3	Soil/Solid	Soil	EC485	309	26.2	mg/kg
TH22-02 S3	Soil/Solid	Soil	E114	7.87	0.10	pH units
TH22-02 S3	Soil/Solid	Soil	E485	31.0	25.0	mg/L
TH22-02 S3	Soil/Solid	Soil	EC485	32.6	26.2	mg/kg
TH22-02 S3	Soil/Solid	Soil	EC102	3.02	0.10	
TH22-02 S3	Soil/Solid	Soil	E485	367	25.0	mg/L
TH22-02 S3	Soil/Solid	Soil	EC485	385	26.2	mg/kg
TH22-02 S3	Soil/Solid	Soil	E485	3260	30.0	mg/L
TH22-02 S3	Soil/Solid	Soil	EC485	3420	31.4	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	18500	50	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	0.48	0.10	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	9.88	0.10	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	218	0.50	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	0.99	0.10	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	0.26	0.20	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	11.6	5.0	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	0.287	0.020	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	29600	50	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	106	0.50	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	12.9	0.10	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	29.9	0.50	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	27800	50	mg/kg

TH22-02 S3	Soil/Solid	Soil	E440	13.3	0.50	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	25.2	2.0	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	11700	20	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	483	1.0	mg/kg
TH22-02 S3	Soil/Solid	Soil	E510	0.0402	0.0050	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	3.17	0.10	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	43.0	0.50	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	450	50	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	2630	100	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	0.48	0.20	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	0.11	0.10	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	722	50	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	94.5	0.50	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	3600	1000	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	0.239	0.050	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	<2.0	2.0	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	60.8	1.0	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	<0.50	0.50	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	2.56	0.050	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	47.4	0.20	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	78.5	2.0	mg/kg
TH22-02 S3	Soil/Solid	Soil	E440	10.5	1.0	mg/kg
TH22-02 S3	Soil/Solid	Soil	E611A	98.5	0.10	%
TH22-02 S3	Soil/Solid	Soil	E611A	85.1	0.10	%
TH22-02 S3	Soil/Solid	Soil	E611A	<0.0050	0.0050	mg/kg
TH22-02 S3	Soil/Solid	Soil	E611A	<0.015	0.015	mg/kg
TH22-02 S3	Soil/Solid	Soil	E611A	<0.050	0.050	mg/kg
TH22-02 S3	Soil/Solid	Soil	E611A	<0.050	0.050	mg/kg
TH22-02 S3	Soil/Solid	Soil	E611A	<0.050	0.050	mg/kg
TH22-02 S3	Soil/Solid	Soil	E611A	<0.075	0.075	mg/kg
TH22-02 S3	Soil/Solid	Soil	E611A	<0.10	0.1	mg/kg
TH22-02 S3	Soil/Solid	Soil	E581.F1	<5.0	5.0	mg/kg
TH22-02 S3	Soil/Solid	Soil	EC580	<5.0	5	mg/kg
TH22-02 S3	Soil/Solid	Soil	E601.SG	<25	25	mg/kg
TH22-02 S3	Soil/Solid	Soil	E601.SG	<50	50	mg/kg
TH22-02 S3	Soil/Solid	Soil	E601.SG	<50	50	mg/kg
TH22-02 S3	Soil/Solid	Soil	EC581	<80	80	mg/kg
TH22-02 S3	Soil/Solid	Soil	E601.SG	Yes		

TH22-02 S3	Soil/Solid	Soil	E601.SG	69.1	1.0	%
TH22-02 S3	Soil/Solid	Soil	E581.F1	103	1.0	%
TH22-02 S100	Soil/Solid	Soil	E144	23.0	0.25	%
TH22-02 S100	Soil/Solid	Soil	E141	57.8	1.0	%
TH22-02 S100	Soil/Solid	Soil	EC106	<0.10	0.10	t/ha
TH22-02 S100	Soil/Solid	Soil	EC106	<0.10	0.10	t/ha
TH22-02 S100	Soil/Solid	Soil	E485	57.2	5.0	mg/L
TH22-02 S100	Soil/Solid	Soil	EC485	33.1	5	mg/kg
TH22-02 S100	Soil/Solid	Soil	E266.Cl	229	100	mg/L
TH22-02 S100	Soil/Solid	Soil	EC266A.Cl	132	58	mg/kg
TH22-02 S100	Soil/Solid	Soil	E102	1.49	0.010	dS/m
TH22-02 S100	Soil/Solid	Soil	E485	36.1	5.0	mg/L
TH22-02 S100	Soil/Solid	Soil	EC485	20.9	5	mg/kg
TH22-02 S100	Soil/Solid	Soil	E114	7.76	0.10	pH units
TH22-02 S100	Soil/Solid	Soil	E485	26.9	5.0	mg/L
TH22-02 S100	Soil/Solid	Soil	EC485	15.5	5	mg/kg
TH22-02 S100	Soil/Solid	Soil	EC102	5.81	0.10	
TH22-02 S100	Soil/Solid	Soil	E485	228	5.0	mg/L
TH22-02 S100	Soil/Solid	Soil	EC485	132	5	mg/kg
TH22-02 S100	Soil/Solid	Soil	E485	344	6	mg/L
TH22-02 S100	Soil/Solid	Soil	EC485	199	8	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	13800	50	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	0.46	0.10	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	7.07	0.10	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	360	0.50	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	0.58	0.10	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	<0.20	0.20	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	28.1	5.0	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	0.667	0.020	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	43700	50	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	69.1	0.50	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	8.21	0.10	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	17.2	0.50	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	19300	50	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	24.5	0.50	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	14.4	2.0	mg/kg

TH22-02 S100	Soil/Solid	Soil	E440	15700	20	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	898	1.0	mg/kg
TH22-02 S100	Soil/Solid	Soil	E510	0.0418	0.0050	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	1.90	0.10	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	40.6	0.50	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	528	50	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	2810	100	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	0.29	0.20	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	<0.10	0.10	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	520	50	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	125	0.50	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	<1000	1000	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	0.201	0.050	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	<2.0	2.0	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	137	1.0	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	<0.50	0.50	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	0.778	0.050	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	38.7	0.20	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	77.6	2.0	mg/kg
TH22-02 S100	Soil/Solid	Soil	E440	8.7	1.0	mg/kg
TH22-02 S100	Soil/Solid	Soil	E611A	86.6	0.10	%
TH22-02 S100	Soil/Solid	Soil	E611A	76.2	0.10	%
TH22-02 S100	Soil/Solid	Soil	E611A	0.0160	0.0050	mg/kg
TH22-02 S100	Soil/Solid	Soil	E611A	0.176	0.015	mg/kg
TH22-02 S100	Soil/Solid	Soil	E611A	<0.050	0.050	mg/kg
TH22-02 S100	Soil/Solid	Soil	E611A	0.322	0.050	mg/kg
TH22-02 S100	Soil/Solid	Soil	E611A	0.244	0.050	mg/kg
TH22-02 S100	Soil/Solid	Soil	E611A	0.566	0.075	mg/kg
TH22-02 S100	Soil/Solid	Soil	E611A	0.76	0.1	mg/kg
TH22-02 S100	Soil/Solid	Soil	E581.F1	9.8	5.0	mg/kg
TH22-02 S100	Soil/Solid	Soil	EC580	9.0	5	mg/kg
TH22-02 S100	Soil/Solid	Soil	E601.SG	<25	25	mg/kg
TH22-02 S100	Soil/Solid	Soil	E601.SG	138	50	mg/kg
TH22-02 S100	Soil/Solid	Soil	E601.SG	252	50	mg/kg
TH22-02 S100	Soil/Solid	Soil	E601.F4G	880	500	mg/kg
TH22-02 S100	Soil/Solid	Soil	EC581	400	80	mg/kg
TH22-02 S100	Soil/Solid	Soil	E601.SG	No		

TH22-02 S100	Soil/Solid	Soil	E601.SG	68.9	1.0	%
TH22-02 S100	Soil/Solid	Soil	E581.F1	80.0	1.0	%

Date Sampled	Time Sampled	Prep Date	Analysis Date	QC Lot	QC Eval	Hold Time Eval
26-Mar-2022	12:16		30-Mar-2022	445868	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446480	✓	✓
26-Mar-2022	12:16	31-Mar-2022	01-Apr-2022		✓	✓
26-Mar-2022	12:16	31-Mar-2022	01-Apr-2022		✓	✓
26-Mar-2022	12:16	31-Mar-2022	01-Apr-2022	446479	✓	✓
26-Mar-2022	12:16		01-Apr-2022		✓	✓
26-Mar-2022	12:16	31-Mar-2022	01-Apr-2022	446483	✓	✓
26-Mar-2022	12:16	31-Mar-2022	01-Apr-2022		✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446482	✓	✓
26-Mar-2022	12:16	31-Mar-2022	01-Apr-2022	446479	✓	✓
26-Mar-2022	12:16		01-Apr-2022		✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446481	✓	✓
26-Mar-2022	12:16	31-Mar-2022	01-Apr-2022	446479	✓	✓
26-Mar-2022	12:16		01-Apr-2022		✓	✓
26-Mar-2022	12:16		01-Apr-2022		✓	✓
26-Mar-2022	12:16	31-Mar-2022	01-Apr-2022	446479	✓	✓
26-Mar-2022	12:16		01-Apr-2022		✓	✓
26-Mar-2022	12:16	31-Mar-2022	01-Apr-2022	446479	✓	✓
26-Mar-2022	12:16		01-Apr-2022		✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓

26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
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26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446783	✓	✓
26-Mar-2022	12:16	30-Mar-2022	30-Mar-2022	445859		✓
26-Mar-2022	12:16	30-Mar-2022	30-Mar-2022	445859		✓
26-Mar-2022	12:16	30-Mar-2022	30-Mar-2022	445859	✓	✓
26-Mar-2022	12:16	30-Mar-2022	30-Mar-2022	445859	✓	✓
26-Mar-2022	12:16	30-Mar-2022	30-Mar-2022	445859	✓	✓
26-Mar-2022	12:16	30-Mar-2022	30-Mar-2022	445859	✓	✓
26-Mar-2022	12:16	30-Mar-2022	30-Mar-2022	445859	✓	✓
26-Mar-2022	12:16	30-Mar-2022	30-Mar-2022	445859	✓	✓
26-Mar-2022	12:16	30-Mar-2022	30-Mar-2022	445859	✓	✓
26-Mar-2022	12:16	30-Mar-2022	30-Mar-2022	445860	✓	✓
26-Mar-2022	12:16		31-Mar-2022		✓	✓
26-Mar-2022	12:16	30-Mar-2022	30-Mar-2022	445856	✓	✓
26-Mar-2022	12:16	30-Mar-2022	30-Mar-2022	445856	✓	✓

26-Mar-2022	12:16	30-Mar-2022	30-Mar-2022	445856	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	447547	✓	✓
26-Mar-2022	12:16		31-Mar-2022		✓	✓
26-Mar-2022	12:16	30-Mar-2022	30-Mar-2022	445856	✓	✓
26-Mar-2022	12:16	30-Mar-2022	30-Mar-2022	445856		✓
26-Mar-2022	12:16	30-Mar-2022	30-Mar-2022	445860		✓
26-Mar-2022	12:16		30-Mar-2022	445868	✓	✓
26-Mar-2022	12:16	31-Mar-2022	31-Mar-2022	446480	✓	✓
26-Mar-2022	12:16	31-Mar-2022	01-Apr-2022		✓	✓
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Duplicates RG2200255

Project	21-3931-001
Report To	Michael Badger, KGS Group
Date Received	29-Mar-2022 12:02
Issue Date	05-Apr-2022 08:36
Amendment	0

ALS ID	Reference	Client Sample ID	QC Type	QC Lot
Physical Tests (Matrix: Soil/Solid)				
QC-445868-004	RG2200255-001	TH22-02 S1	DUP	445868
Saturated Paste Extractables (Matrix: Soil/Solid)				
QC-MRG5-446479005	RG2200255-001	TH22-02 S1	DUP	446480
QC-MRG5-446479005	RG2200255-001	TH22-02 S1	DUP	446479
QC-MRG5-446479005	RG2200255-001	TH22-02 S1	DUP	446483
QC-MRG5-446479005	RG2200255-001	TH22-02 S1	DUP	446479
QC-MRG5-446479005	RG2200255-001	TH22-02 S1	DUP	446479
QC-MRG5-446479005	RG2200255-001	TH22-02 S1	DUP	446479
QC-MRG5-446479005	RG2200255-001	TH22-02 S1	DUP	446479
QC-MRG5-446479005	RG2200255-001	TH22-02 S1	DUP	446481
QC-MRG5-446479005	RG2200255-001	TH22-02 S1	DUP	446482
Metals (Matrix: Soil/Solid)				
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446782
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783

QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783
QC-MRG2-446782005	RG2200255-001	TH22-02 S1	DUP	446783

Volatile Organic Compounds (Matrix: Soil/Solid)

QC-MRG2-445859004	RG2200255-001	TH22-02 S1	DUP	445859
QC-MRG2-445859004	RG2200255-001	TH22-02 S1	DUP	445859
QC-MRG2-445859004	RG2200255-001	TH22-02 S1	DUP	445859
QC-MRG2-445859004	RG2200255-001	TH22-02 S1	DUP	445859
QC-MRG2-445859004	RG2200255-001	TH22-02 S1	DUP	445859

Volatile Organic Compounds Surrogates (Matrix: Soil/Solid)

QC-MRG2-445859004	RG2200255-001	TH22-02 S1	DUP	445859
QC-MRG2-445859004	RG2200255-001	TH22-02 S1	DUP	445859

Hydrocarbons (Matrix: Soil/Solid)

QC-MRG2-445859004	RG2200255-001	TH22-02 S1	DUP	445860
QC-445856-005	RG2200255-001	TH22-02 S1	DUP	445856
QC-445856-005	RG2200255-001	TH22-02 S1	DUP	445856
QC-445856-005	RG2200255-001	TH22-02 S1	DUP	445856
QC-447547-005	RG2200255-001	TH22-02 S1	DUP	447547

Hydrocarbons Surrogates (Matrix: Soil/Solid)

QC-445856-005	RG2200255-001	TH22-02 S1	DUP	445856
QC-MRG2-445859004	RG2200255-001	TH22-02 S1	DUP	445860

Evaluation Legend

✓ QC Lot met ALS Data Quality Objectives

× QC Lot did not meet ALS Data Quality Objectives

Analyte	Method	Sample Result	Duplicate Result	Detection Limit	Units	RPD(%) or Diff.
moisture	E144	24.1	24.6	0.25	%	1.94%
% saturation	E141	133	127	1	%	4.12%
calcium, soluble ion content	E485	37.4	39.0	5	mg/L	4.32%
chloride, soluble ion content	E266.Cl	309	305	20	mg/L	4
magnesium, soluble ion content	E485	27.0	28.4	5	mg/L	1.4
potassium, soluble ion content	E485	18.7	19.0	5	mg/L	0.3
sodium, soluble ion content	E485	163	168	5	mg/L	3.21%
sulfur (as SO4), soluble ion content	E485	324	336	6	mg/L	3.64%
pH, saturated paste	E114	8.06	8.05	0.1	pH units	0.124%
conductivity, saturated paste	E102	1.11 dS/m	1140	10	µS/cm	2.67%
aluminum	E440	9010	9400	50	mg/kg	4.23%
antimony	E440	1.15	1.02	0.1	mg/kg	11.5%
arsenic	E440	5.94	5.20	0.1	mg/kg	13.4%
barium	E440	232	232	0.5	mg/kg	0.0193%
beryllium	E440	0.40	0.42	0.1	mg/kg	0.02
bismuth	E440	<0.20	<0.20	0.2	mg/kg	0
boron	E440	35.2	30.4	5	mg/kg	4.8
cadmium	E440	0.370	0.443	0.02	mg/kg	17.9%
calcium	E440	43100	37300	50	mg/kg	14.5%
chromium	E440	76.6	73.5	0.5	mg/kg	4.12%
cobalt	E440	5.87	5.68	0.1	mg/kg	3.31%
copper	E440	18.2	16.2	0.5	mg/kg	12.0%
iron	E440	16000	14000	50	mg/kg	12.7%
lead	E440	323	295	0.5	mg/kg	8.97%
lithium	E440	10.6	10.6	2	mg/kg	0.008
magnesium	E440	9910	8610	20	mg/kg	14.0%
manganese	E440	358	320	1	mg/kg	11.3%
mercury	E510	0.114	0.0917	0.005	mg/kg	21.3%
molybdenum	E440	1.94	2.26	0.1	mg/kg	14.9%

nickel	E440	39.7	35.4	0.5	mg/kg	11.3%
phosphorus	E440	414	410	50	mg/kg	1.12%
potassium	E440	1710	1740	100	mg/kg	2.27%
selenium	E440	0.26	0.23	0.2	mg/kg	0.03
silver	E440	<0.10	0.12	0.1	mg/kg	0.02
sodium	E440	688	684	50	mg/kg	0.499%
strontium	E440	137	133	0.5	mg/kg	2.45%
sulfur	E440	2000	1900	1000	mg/kg	60
thallium	E440	0.173	0.163	0.05	mg/kg	0.011
tin	E440	3.2	3.7	2	mg/kg	0.5
titanium	E440	152	151	1	mg/kg	0.914%
tungsten	E440	<0.50	<0.50	0.5	mg/kg	0
uranium	E440	0.677	0.717	0.05	mg/kg	5.83%
vanadium	E440	29.2	29.4	0.2	mg/kg	1.02%
zinc	E440	180	160	2	mg/kg	11.8%
zirconium	E440	8.4	8.8	1	mg/kg	3.98%
benzene	E611A	0.0232	0.0241	0.005	mg/kg	0.0009
ethylbenzene	E611A	0.557	0.576	0.015	mg/kg	3.30%
toluene	E611A	0.096	0.098	0.05	mg/kg	0.002
xylene, m+p-	E611A	1.38	1.42	0.03	mg/kg	2.75%
xylene, o-	E611A	0.902	0.917	0.03	mg/kg	1.70%
bromofluorobenzene, 4-	E611A	0.43	0.43	0.1	%	95.8%
difluorobenzene, 1,4-	E611A	0.42	0.43	0.1	%	96.0%
F1 (C6-C10)	E581.F1	403	385	5	mg/kg	4.48%
F2 (C10-C16)	E601.SG	787	639	25	mg/kg	20.7%
F3 (C16-C34)	E601.SG	491	474	50	mg/kg	3.62%
F4 (C34-C50)	E601.SG	495	540	50	mg/kg	8.58%
F4G-sg	E601.F4G	2110	2300	500	mg/kg	190
bromobenzotrifluoride, 2- (F2-F4 surr)	E601.SG	448	475	1	%	82.7%
dichlorotoluene, 3,4-	E581.F1	113	112	1	%	251%

Duplicate Limits	Qual	Eval
20		✓
20		✓
30		✓
Diff <2x LOR		✓
Diff <2x LOR		✓
Diff <2x LOR		✓
30		✓
30		✓
10		✓
20		✓
40		✓
30		✓
30		✓
40		✓
Diff <2x LOR		✓
Diff <2x LOR		✓
Diff <2x LOR		✓
30		✓
30		✓
30		✓
30		✓
30		✓
30		✓
40		✓
Diff <2x LOR		✓
30		✓
30		✓
40		✓
40		✓

30	✓
30	✓
40	✓
Diff <2x LOR	✓
Diff <2x LOR	✓
40	✓
40	✓
Diff <2x LOR	✓
Diff <2x LOR	✓
Diff <2x LOR	✓
40	✓
Diff <2x LOR	✓
30	✓
30	✓
30	✓
30	✓

Diff <2x LOR	✓
30	✓
Diff <2x LOR	✓
30	✓
30	✓

70-130
70-130

40	✓
40	✓
40	✓
40	✓
Diff <2x LOR	✓

60-140
70-130

Quality Control RG2200255

Project	21-3931-001
Report To	Michael Badger, KGS Group
Date Received	29-Mar-2022 12:02
Issue Date	05-Apr-2022 08:36
Amendment	0

QC Type	Analyte	QC Lot	ALS QC ID	Method
Physical Tests (Matrix: Soil/Solid)				
MB	moisture	445868	QC-445868-001	E144
LCS	moisture	445868	QC-445868-002	E144
Saturated Paste Extractables (Matrix: Soil/Solid)				
LCS	% saturation	446480	QC-MRG5-446479002	E141
LCS	calcium, soluble ion content	446479	QC-MRG5-446479002	E485
LCS	magnesium, soluble ion content	446479	QC-MRG5-446479002	E485
LCS	potassium, soluble ion content	446479	QC-MRG5-446479002	E485
LCS	sodium, soluble ion content	446479	QC-MRG5-446479002	E485
LCS	sulfur (as SO4), soluble ion content	446479	QC-MRG5-446479002	E485
LCS	chloride, soluble ion content	446483	QC-MRG5-446479002	E266.Cl
LCS	conductivity, saturated paste	446482	QC-MRG5-446479002	E102
LCS	pH, saturated paste	446481	QC-MRG5-446479002	E114
RM	% saturation	446480	QC-MRG5-446479003	E141
RM	calcium, soluble ion content	446479	QC-MRG5-446479003	E485
RM	magnesium, soluble ion content	446479	QC-MRG5-446479003	E485
RM	potassium, soluble ion content	446479	QC-MRG5-446479003	E485
RM	sodium, soluble ion content	446479	QC-MRG5-446479003	E485
RM	sulfur (as SO4), soluble ion content	446479	QC-MRG5-446479003	E485
RM	chloride, soluble ion content	446483	QC-MRG5-446479003	E266.Cl
RM	conductivity, saturated paste	446482	QC-MRG5-446479003	E102
RM	pH, saturated paste	446481	QC-MRG5-446479003	E114
MB	calcium, soluble ion content	446479	QC-MRG3-446479001	E485
MB	magnesium, soluble ion content	446479	QC-MRG3-446479001	E485
MB	potassium, soluble ion content	446479	QC-MRG3-446479001	E485
MB	sodium, soluble ion content	446479	QC-MRG3-446479001	E485
MB	sulfur (as SO4), soluble ion content	446479	QC-MRG3-446479001	E485
MB	chloride, soluble ion content	446483	QC-MRG3-446479001	E266.Cl
MB	conductivity, saturated paste	446482	QC-MRG3-446479001	E102
Metals (Matrix: Soil/Solid)				
LCS	aluminum	446783	QC-MRG2-446782002	E440
LCS	antimony	446783	QC-MRG2-446782002	E440

LCS	arsenic	446783	QC-MRG2-446782002	E440
LCS	barium	446783	QC-MRG2-446782002	E440
LCS	beryllium	446783	QC-MRG2-446782002	E440
LCS	bismuth	446783	QC-MRG2-446782002	E440
LCS	boron	446783	QC-MRG2-446782002	E440
LCS	cadmium	446783	QC-MRG2-446782002	E440
LCS	calcium	446783	QC-MRG2-446782002	E440
LCS	chromium	446783	QC-MRG2-446782002	E440
LCS	cobalt	446783	QC-MRG2-446782002	E440
LCS	copper	446783	QC-MRG2-446782002	E440
LCS	iron	446783	QC-MRG2-446782002	E440
LCS	lead	446783	QC-MRG2-446782002	E440
LCS	lithium	446783	QC-MRG2-446782002	E440
LCS	magnesium	446783	QC-MRG2-446782002	E440
LCS	manganese	446783	QC-MRG2-446782002	E440
LCS	molybdenum	446783	QC-MRG2-446782002	E440
LCS	nickel	446783	QC-MRG2-446782002	E440
LCS	phosphorus	446783	QC-MRG2-446782002	E440
LCS	potassium	446783	QC-MRG2-446782002	E440
LCS	selenium	446783	QC-MRG2-446782002	E440
LCS	silver	446783	QC-MRG2-446782002	E440
LCS	sodium	446783	QC-MRG2-446782002	E440
LCS	strontium	446783	QC-MRG2-446782002	E440
LCS	sulfur	446783	QC-MRG2-446782002	E440
LCS	thallium	446783	QC-MRG2-446782002	E440
LCS	tin	446783	QC-MRG2-446782002	E440
LCS	titanium	446783	QC-MRG2-446782002	E440
LCS	tungsten	446783	QC-MRG2-446782002	E440
LCS	uranium	446783	QC-MRG2-446782002	E440
LCS	vanadium	446783	QC-MRG2-446782002	E440
LCS	zinc	446783	QC-MRG2-446782002	E440
LCS	zirconium	446783	QC-MRG2-446782002	E440
LCS	mercury	446782	QC-MRG2-446782002	E510
RM	aluminum	446783	QC-MRG2-446782003	E440
RM	antimony	446783	QC-MRG2-446782003	E440
RM	arsenic	446783	QC-MRG2-446782003	E440
RM	barium	446783	QC-MRG2-446782003	E440
RM	beryllium	446783	QC-MRG2-446782003	E440
RM	boron	446783	QC-MRG2-446782003	E440
RM	cadmium	446783	QC-MRG2-446782003	E440
RM	calcium	446783	QC-MRG2-446782003	E440
RM	chromium	446783	QC-MRG2-446782003	E440
RM	cobalt	446783	QC-MRG2-446782003	E440
RM	copper	446783	QC-MRG2-446782003	E440

RM	iron	446783	QC-MRG2-446782003	E440
RM	lead	446783	QC-MRG2-446782003	E440
RM	lithium	446783	QC-MRG2-446782003	E440
RM	magnesium	446783	QC-MRG2-446782003	E440
RM	manganese	446783	QC-MRG2-446782003	E440
RM	molybdenum	446783	QC-MRG2-446782003	E440
RM	nickel	446783	QC-MRG2-446782003	E440
RM	phosphorus	446783	QC-MRG2-446782003	E440
RM	potassium	446783	QC-MRG2-446782003	E440
RM	silver	446783	QC-MRG2-446782003	E440
RM	sodium	446783	QC-MRG2-446782003	E440
RM	strontium	446783	QC-MRG2-446782003	E440
RM	thallium	446783	QC-MRG2-446782003	E440
RM	tin	446783	QC-MRG2-446782003	E440
RM	titanium	446783	QC-MRG2-446782003	E440
RM	uranium	446783	QC-MRG2-446782003	E440
RM	vanadium	446783	QC-MRG2-446782003	E440
RM	zinc	446783	QC-MRG2-446782003	E440
RM	zirconium	446783	QC-MRG2-446782003	E440
RM	mercury	446782	QC-MRG2-446782003	E510
MB	aluminum	446783	QC-MRG2-446782001	E440
MB	antimony	446783	QC-MRG2-446782001	E440
MB	arsenic	446783	QC-MRG2-446782001	E440
MB	barium	446783	QC-MRG2-446782001	E440
MB	beryllium	446783	QC-MRG2-446782001	E440
MB	bismuth	446783	QC-MRG2-446782001	E440
MB	boron	446783	QC-MRG2-446782001	E440
MB	cadmium	446783	QC-MRG2-446782001	E440
MB	calcium	446783	QC-MRG2-446782001	E440
MB	chromium	446783	QC-MRG2-446782001	E440
MB	cobalt	446783	QC-MRG2-446782001	E440
MB	copper	446783	QC-MRG2-446782001	E440
MB	iron	446783	QC-MRG2-446782001	E440
MB	lead	446783	QC-MRG2-446782001	E440
MB	lithium	446783	QC-MRG2-446782001	E440
MB	magnesium	446783	QC-MRG2-446782001	E440
MB	manganese	446783	QC-MRG2-446782001	E440
MB	molybdenum	446783	QC-MRG2-446782001	E440
MB	nickel	446783	QC-MRG2-446782001	E440
MB	phosphorus	446783	QC-MRG2-446782001	E440
MB	potassium	446783	QC-MRG2-446782001	E440
MB	selenium	446783	QC-MRG2-446782001	E440
MB	silver	446783	QC-MRG2-446782001	E440
MB	sodium	446783	QC-MRG2-446782001	E440

MB	strontium	446783	QC-MRG2-446782001	E440
MB	sulfur	446783	QC-MRG2-446782001	E440
MB	thallium	446783	QC-MRG2-446782001	E440
MB	tin	446783	QC-MRG2-446782001	E440
MB	titanium	446783	QC-MRG2-446782001	E440
MB	tungsten	446783	QC-MRG2-446782001	E440
MB	uranium	446783	QC-MRG2-446782001	E440
MB	vanadium	446783	QC-MRG2-446782001	E440
MB	zinc	446783	QC-MRG2-446782001	E440
MB	zirconium	446783	QC-MRG2-446782001	E440
MB	mercury	446782	QC-MRG2-446782001	E510

Volatile Organic Compounds (Matrix: Soil/Solid)

LCS	benzene	445859	QC-445859-002	E611A
LCS	ethylbenzene	445859	QC-445859-002	E611A
LCS	toluene	445859	QC-445859-002	E611A
LCS	xylene, m+p-	445859	QC-445859-002	E611A
LCS	xylene, o-	445859	QC-445859-002	E611A
MS	benzene	445859	TH22-02 S1	E611A
MS	ethylbenzene	445859	TH22-02 S1	E611A
MS	toluene	445859	TH22-02 S1	E611A
MS	xylene, m+p-	445859	TH22-02 S1	E611A
MS	xylene, o-	445859	TH22-02 S1	E611A
MB	benzene	445859	QC-MRG2-445859001	E611A
MB	ethy benzene	445859	QC-MRG2-445859001	E611A
MB	toluene	445859	QC-MRG2-445859001	E611A
MB	xylene, m+p-	445859	QC-MRG2-445859001	E611A
MB	xylene, o-	445859	QC-MRG2-445859001	E611A

Volatile Organic Compounds Surrogates (Matrix: Soil/Solid)

LCS	bromofluorobenzene, 4-	445859	QC-445859-002	E611A
LCS	difluorobenzene, 1,4-	445859	QC-445859-002	E611A
MS	bromofluorobenzene, 4-	445859	TH22-02 S1	E611A
MS	difluorobenzene, 1,4-	445859	TH22-02 S1	E611A
MB	bromofluorobenzene, 4-	445859	QC-MRG2-445859001	E611A
MB	difluorobenzene, 1,4-	445859	QC-MRG2-445859001	E611A

Hydrocarbons (Matrix: Soil/Solid)

LCS	F2 (C10-C16)	445856	QC-445856-002	E601.SG
LCS	F3 (C16-C34)	445856	QC-445856-002	E601.SG
LCS	F4 (C34-C50)	445856	QC-445856-002	E601.SG
RM	F2 (C10-C16)	445856	QC-445856-003	E601.SG
RM	F3 (C16-C34)	445856	QC-445856-003	E601.SG
RM	F4 (C34-C50)	445856	QC-445856-003	E601.SG

LCS	F1 (C6-C10)	445860	QC-445860-002	E581.F1
LCS	F4G-sg	447547	QC-447547-002	E601.F4G
RM	F4G-sg	447547	QC-447547-003	E601.F4G
MB	F2 (C10-C16)	445856	QC-445856-001	E601.SG
MB	F3 (C16-C34)	445856	QC-445856-001	E601.SG
MB	F4 (C34-C50)	445856	QC-445856-001	E601.SG
MB	F4G-sg	447547	QC-447547-001	E601.F4G
MB	F1 (C6-C10)	445860	QC-MRG2-445859001	E581.F1

Hydrocarbons Surrogates (Matrix: Soil/Solid)

MB	bromobenzotrifluoride, 2- (F2-F4 surr)	445856	QC-445856-001	E601.SG
LCS	bromobenzotrifluoride, 2- (F2-F4 surr)	445856	QC-445856-002	E601.SG
RM	bromobenzotrifluoride, 2- (F2-F4 surr)	445856	QC-445856-003	E601.SG
LCS	dichlorotoluene, 3,4-	445860	QC-445860-002	E581.F1
MB	dichlorotoluene, 3,4-	445860	QC-MRG2-445859001	E581.F1

Evaluation Legend

✓	QC Lot met ALS Data Quality Objectives
×	QC Lot did not meet ALS Data Quality Objectives

Result	Target	Units	%	Limit	Units	Qual	Eval
<0.25		%	-	0.25	%		✓
48.8	50 %	%	97.6	90-110	%		✓
101	100 %	%	101	80-120	%		✓
103	100 mg/L	mg/L	103	80-120	%		✓
99.3	100 mg/L	mg/L	99.3	80-120	%		✓
99.8	100 mg/L	mg/L	99.8	80-120	%		✓
105	100 mg/L	mg/L	105	80-120	%		✓
306	300 mg/L	mg/L	102	80-120	%		✓
54	50 mg/L	mg/L	108	80-120	%		✓
978	1000 µS/cm	µS/cm	97.8	80-120	%		✓
6.89	6.86 pH units	pH units	100	95.6-104	%		✓
50.3	48.3 %	%	104	70-130	%		✓
849	776 mg/L	mg/L	109	70-130	%		✓
270	261 mg/L	mg/L	103	70-130	%		✓
111	111 mg/L	mg/L	99.9	70-130	%		✓
349	330 mg/L	mg/L	106	70-130	%		✓
2160	1841 mg/L	mg/L	118	70-130	%		✓
1190	1237 mg/L	mg/L	96.3	70-130	%		✓
6210	5970 µS/cm	µS/cm	104	70-130	%		✓
7.54	7.59 pH units	pH units	99.3	96-104	%		✓
<5.0		mg/L	-	5	mg/L		✓
<5.0		mg/L	-	5	mg/L		✓
<5.0		mg/L	-	5	mg/L		✓
<5.0		mg/L	-	5	mg/L		✓
<6.0		mg/L	-	6	mg/L		✓
<20		mg/L	-	20	mg/L		✓
<10		µS/cm	-	10	µS/cm		✓
203	200 mg/kg	mg/kg	102	80-120	%		✓
98.9	100 mg/kg	mg/kg	98.9	80-120	%		✓

98.5	100 mg/kg	mg/kg	98.5	80-120	%	✓
24.0	25 mg/kg	mg/kg	96.1	80-120	%	✓
9.78	10 mg/kg	mg/kg	97.8	80-120	%	✓
95.0	100 mg/kg	mg/kg	95.0	80-120	%	✓
96.2	100 mg/kg	mg/kg	96.2	80-120	%	✓
9.77	10 mg/kg	mg/kg	97.7	80-120	%	✓
4900	5000 mg/kg	mg/kg	98.1	80-120	%	✓
24.4	25 mg/kg	mg/kg	97.8	80-120	%	✓
24.8	25 mg/kg	mg/kg	99.0	80-120	%	✓
23.8	25 mg/kg	mg/kg	95.4	80-120	%	✓
110	100 mg/kg	mg/kg	110	80-120	%	✓
45.7	50 mg/kg	mg/kg	91.5	80-120	%	✓
25.8	25 mg/kg	mg/kg	103	80-120	%	✓
5000	5000 mg/kg	mg/kg	100	80-120	%	✓
24.2	25 mg/kg	mg/kg	96.6	80-120	%	✓
25.5	25 mg/kg	mg/kg	102	80-120	%	✓
48.5	50 mg/kg	mg/kg	96.9	80-120	%	✓
1140	1000 mg/kg	mg/kg	114	80-120	%	✓
4910	5000 mg/kg	mg/kg	98.2	80-120	%	✓
101	100 mg/kg	mg/kg	101	80-120	%	✓
10.2	10 mg/kg	mg/kg	102	80-120	%	✓
5180	5000 mg/kg	mg/kg	104	80-120	%	✓
24.6	25 mg/kg	mg/kg	98.6	80-120	%	✓
4800	5000 mg/kg	mg/kg	96.4	80-120	%	✓
90.9	100 mg/kg	mg/kg	90.9	80-120	%	✓
49.5	50 mg/kg	mg/kg	99.0	80-120	%	✓
23.4	25 mg/kg	mg/kg	93.8	80-120	%	✓
9.54	10 mg/kg	mg/kg	95.4	80-120	%	✓
0.471	0.5 mg/kg	mg/kg	94.2	80-120	%	✓
49.2	50 mg/kg	mg/kg	98.3	80-120	%	✓
49.2	50 mg/kg	mg/kg	98.4	80-120	%	✓
9.8	10 mg/kg	mg/kg	98.0	80-120	%	✓
0.0965	0.1 mg/kg	mg/kg	96.5	80-120	%	✓
8930	9817 mg/kg	mg/kg	91.0	70-130	%	✓
3.48	3.99 mg/kg	mg/kg	87.1	70-130	%	✓
3.84	3.73 mg/kg	mg/kg	103	70-130	%	✓
99.0	105 mg/kg	mg/kg	94.3	70-130	%	✓
0.33	0.349 mg/kg	mg/kg	94.0	70-130	%	✓
8.1	8.5 mg/kg	mg/kg	95.2	40-160	%	✓
0.868	0.91 mg/kg	mg/kg	95.4	70-130	%	✓
29500	31082 mg/kg	mg/kg	94.9	70-130	%	✓
87.8	101 mg/kg	mg/kg	87.0	70-130	%	✓
6.58	6.9 mg/kg	mg/kg	95.3	70-130	%	✓
120	123 mg/kg	mg/kg	97.7	70-130	%	✓

21800	23558 mg/kg	mg/kg	92.4	70-130	%	✓
250	267 mg/kg	mg/kg	93.6	70-130	%	✓
9.0	9.5 mg/kg	mg/kg	95.0	70-130	%	✓
5260	5509 mg/kg	mg/kg	95.5	70-130	%	✓
243	269 mg/kg	mg/kg	90.4	70-130	%	✓
1.00	1.03 mg/kg	mg/kg	96.6	70-130	%	✓
25.7	26.7 mg/kg	mg/kg	96.3	70-130	%	✓
761	752 mg/kg	mg/kg	101	70-130	%	✓
1310	1587 mg/kg	mg/kg	82.4	70-130	%	✓
3.37	4.06 mg/kg	mg/kg	83.1	70-130	%	✓
728	797 mg/kg	mg/kg	91.4	70-130	%	✓
76.1	86.1 mg/kg	mg/kg	88.4	70-130	%	✓
0.096	0.0786 mg/kg	mg/kg	123	40-160	%	✓
9.9	10.6 mg/kg	mg/kg	93.4	70-130	%	✓
676	839 mg/kg	mg/kg	80.6	70-130	%	✓
0.477	0.52 mg/kg	mg/kg	91.8	70-130	%	✓
29.4	32.7 mg/kg	mg/kg	89.9	70-130	%	✓
282	297 mg/kg	mg/kg	95.0	70-130	%	✓
4.9	5.73 mg/kg	mg/kg	85.1	70-130	%	✓
0.0605	0.059 mg/kg	mg/kg	102	70-130	%	✓
<50		mg/kg	-	50	mg/kg	✓
<0.10		mg/kg	-	0.1	mg/kg	✓
<0.10		mg/kg	-	0.1	mg/kg	✓
<0.50		mg/kg	-	0.5	mg/kg	✓
<0.10		mg/kg	-	0.1	mg/kg	✓
<0.20		mg/kg	-	0.2	mg/kg	✓
<5.0		mg/kg	-	5	mg/kg	✓
<0.020		mg/kg	-	0.02	mg/kg	✓
<50		mg/kg	-	50	mg/kg	✓
<0.50		mg/kg	-	0.5	mg/kg	✓
<0.10		mg/kg	-	0.1	mg/kg	✓
<0.50		mg/kg	-	0.5	mg/kg	✓
<50		mg/kg	-	50	mg/kg	✓
<0.50		mg/kg	-	0.5	mg/kg	✓
<2.0		mg/kg	-	2	mg/kg	✓
<20		mg/kg	-	20	mg/kg	✓
<1.0		mg/kg	-	1	mg/kg	✓
<0.10		mg/kg	-	0.1	mg/kg	✓
<0.50		mg/kg	-	0.5	mg/kg	✓
<50		mg/kg	-	50	mg/kg	✓
<100		mg/kg	-	100	mg/kg	✓
<0.20		mg/kg	-	0.2	mg/kg	✓
<0.10		mg/kg	-	0.1	mg/kg	✓
<50		mg/kg	-	50	mg/kg	✓

<0.50		mg/kg	-	0.5	mg/kg	✓
<1000		mg/kg	-	1000	mg/kg	✓
<0.050		mg/kg	-	0.05	mg/kg	✓
<2.0		mg/kg	-	2	mg/kg	✓
<1.0		mg/kg	-	1	mg/kg	✓
<0.50		mg/kg	-	0.5	mg/kg	✓
<0.050		mg/kg	-	0.05	mg/kg	✓
<0.20		mg/kg	-	0.2	mg/kg	✓
<2.0		mg/kg	-	2	mg/kg	✓
<1.0		mg/kg	-	1	mg/kg	✓
<0.0050		mg/kg	-	0.005	mg/kg	✓

2.41	2.5 mg/kg	mg/kg	96.3	70-130	%	✓
2.58	2.5 mg/kg	mg/kg	103	70-130	%	✓
2.62	2.5 mg/kg	mg/kg	105	70-130	%	✓
5.10	5 mg/kg	mg/kg	102	70-130	%	✓
2.61	2.5 mg/kg	mg/kg	104	70-130	%	✓
2.94	3.125 mg/kg	mg/kg	95.4	60-140	%	✓
3.29	3.125 mg/kg	mg/kg	107	60-140	%	✓
3.47	3.125 mg/kg	mg/kg	113	60-140	%	✓
7.18	6.25 mg/kg	mg/kg	116	60-140	%	✓
3.14	3.125 mg/kg	mg/kg	102	60-140	%	✓
<0.0050		mg/kg	-	0.005	mg/kg	✓
<0.015		mg/kg	-	0.015	mg/kg	✓
<0.050		mg/kg	-	0.05	mg/kg	✓
<0.030		mg/kg	-	0.05	mg/kg	✓
<0.030		mg/kg	-	0.05	mg/kg	✓

0.30	0.3125 mg/kg	mg/kg	97.9	70-130	%
0.28	0.3125 mg/kg	mg/kg	90.2	70-130	%
ND	0.3125 mg/kg	mg/kg	95.4	70-130	%
ND	0.3125 mg/kg	mg/kg	87.0	70-130	%
102		mg/kg	-	70-130	%
95.2		mg/kg	-	70-130	%

565	530 mg/kg	mg/kg	107	70-130	%	✓
1010	1112 mg/kg	mg/kg	90.6	70-130	%	✓
552	515.2 mg/kg	mg/kg	107	70-130	%	✓
5090	4316 mg/kg	mg/kg	118	70-130	%	✓
14500	12844 mg/kg	mg/kg	113	70-130	%	✓
942	1156 mg/kg	mg/kg	81.5	70-130	%	✓

92.5	80 mg/kg	mg/kg	116	70-130	%	✓
860	700 mg/kg	mg/kg	123	70-130	%	✓
9800	8598 mg/kg	mg/kg	114	70-130	%	✓
<25		mg/kg	-	25	mg/kg	✓
<50		mg/kg	-	50	mg/kg	✓
<50		mg/kg	-	50	mg/kg	✓
<500		mg/kg	-	500	mg/kg	✓
<5.0		mg/kg	-	5	mg/kg	✓

73.5		mg/kg	-	60-140	%
405	562.5 mg/kg	mg/kg	72.0	60-140	%
499	562.5 mg/kg	mg/kg	88.8	60-140	%
29.1	31.25 mg/kg	mg/kg	93.2	70-130	%
82.1		mg/kg	-	70-130	%

Methodology RG2200255

Project	21-3931-001
Report To	Michael Badger, KGS Group
Date Received	29-Mar-2022 12:02
Issue Date	05-Apr-2022 08:36
Amendment	0

Method	ALS Test Description	Lab Location	Matrix
Hydrocarbons (Matrix: Soil/Solid)			
E581.F1	CCME PHC - F1 by Headspace GC-FID	Saskatoon - Environme	Soil/Solid
E601.F4G	CCME PHCs - F4G by Gravimetry	Saskatoon - Environme	Soil/Solid
E601.SG	CCME PHCs - F2-F4 by GC-FID	Saskatoon - Environme	Soil/Solid
EC580	F1-BTEX	Saskatoon - Environme	Soil/Solid
EC581	Sum F1 to F4 (C6-C50)	Saskatoon - Environme	Soil/Solid
Hydrocarbons Surrogates (Matrix: Soil/Solid)			
E581.F1	CCME PHC - F1 by Headspace GC-FID	Saskatoon - Environme	Soil/Solid
E601.SG	CCME PHCs - F2-F4 by GC-FID	Saskatoon - Environme	Soil/Solid
Metals (Matrix: Soil/Solid)			
E440	Metals in Soil/Solid by CRC ICPMS	Saskatoon - Environme	Soil/Solid
E510	Mercury in Soil/Solid by CVAAS	Saskatoon - Environme	Soil/Solid
Physical Tests (Matrix: Soil/Solid)			
E144	Moisture Content by Gravimetry	Saskatoon - Environme	Soil/Solid
Saturated Paste Extractables (Matrix: Soil/Solid)			

E102	Conductivity in Soil (Saturated Paste)	Saskatoon - Environme Soil/Solid
E114	pH by Meter (Saturated Paste)	Saskatoon - Environme Soil/Solid
E141	Saturation Percentage	Saskatoon - Environme Soil/Solid
E266.Cl	Chloride by Colourimetry (Saturated Paste)	Saskatoon - Environme Soil/Solid
E485	Ca, K, Mg, Na, B and S by ICPOES (Saturated Paste)	Saskatoon - Environme Soil/Solid
EC102	Sodium Adsorption Ratio (SAR) Saturated Paste	Saskatoon - Environme Soil/Solid
EC106	Theoretical Gypsum Requirements (TGR) Saturated Paste	Saskatoon - Environme Soil/Solid
EC266A.Cl	Chloride by Colourimetry (Saturated Paste) (mg/kg)	Saskatoon - Environme Soil/Solid
EC485	Ca, K, Mg, Na, B and S by ICPOES (Saturated Paste) (mg/kg)	Saskatoon - Environme Soil/Solid

Volatile Organic Compounds Surrogates (Matrix: Soil/Solid)

E611A	BTEX by Headspace GC-MS	Saskatoon - Environme Soil/Solid

Volatile Organic Compounds [BTEXS+MTBE] (Matrix: Soil/Solid)

E611A	BTEX by Headspace GC-MS	Saskatoon - Environme Soil/Solid

Method References

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as
Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifica

Method Reference	Methodology Description
CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHC in Soil - Tier 1	A portion of the silica gel treated sample extract is filtered and dried at 105°C and the mass of the residual gravimetric heavy hydrocarbons (F4G) is determined gravimetrically.
CCME PHC in Soil - Tier 1	Sample extracts are subjected to in-situ silica gel treatment prior to analysis by GC-FID for CCME hydrocarbon fractions (F2-F4).
CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
CCME PHC in Soil - Tier 1	Hydrocarbons, total (C6-C50) is the sum of CCME Fractions F1(C6-C10), F2(C10-C16), F3(C16-C34), and F4(C34-C50). F4G-sg is not used within this calculation due to overlap with other fractions.
CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHC in Soil - Tier 1	Sample extracts are subjected to in-situ silica gel treatment prior to analysis by GC-FID for CCME hydrocarbon fractions (F2-F4).
EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.

CSSS Ch. 15 (mod)/APHA 2510 (mod)/AER	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a filtered extract from a soil sample prepared using the saturated paste procedure. Conductivity measurements are temperature-compensated to 25°C.
Carter-CSSS / APHA 4500 H	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C) on a soil produced by the saturated paste extraction procedure.
CSSS Ch. 15 (mod)/AER D50	Saturation Percentage (SP) is determined as the total volume of water present in a saturated paste (in mL) divided by the dry weight of the sample (in grams), expressed as a percentage.
CSSS Ch. 15/APHA 4500-CL E (mod)/AER I	Inorganic anions are analyzed by obtaining a soil extract produced by the saturated paste extraction procedure which is then analyzed by colourimetry using a discrete analyzer.
CSSS CH15/EPA 6010B/AER D50	A soil extract produced by the saturated paste extraction procedure is analyzed for Calcium, Magnesium, Potassium, Sodium, Boron, and Sulfur (as SO4) by ICPOES.
CCME Sodium Adsorption Ratio (SAR)	The Sodium Adsorption Ratio (SAR) for a sample is calculated from the Sodium, Calcium, and Magnesium concentrations from sediment paste extract.
J. Ashworth et al (1999)	Theoretical Gypsum Requirement is an estimate of the gypsum amendment required to remediate brine contaminated or sodic soils, and is provided in units of tonnes per hectare (t/ha) for a treatment depth of 15cm. TGR(brine), intended for brine-contaminated soils, is calculated using Method A from "A Comparison of Methods for Gypsum Requirement of Brine-Contaminated Soils", by J. Ashworth (Cdn J. of Soil Science, 1999), available at www.alsglobal.com. TGR(sodic), intended for naturally sodic soils, uses the Oster and Frenkel method (Method B) from the same paper. Reported TGR values are capped at 50 t/ha, considered the maximum practical gypsum amendment. To convert TGR from t/ha to tons/acre, multiply by 0.446. To determine a TGR value for an alternate treatment depth, multiply by [desired treatment depth (cm) / 15 cm].
CSSS Ch. 15/APHA 4500-CL E (mod)	Inorganic anions are analyzed by obtaining a soil extract produced by the saturated paste extraction procedure which is then analyzed by colourimetry using a discrete analyzer.
CSSS CH15/EPA 6010B	A soil extract produced by the saturated paste extraction procedure is analyzed for Calcium, Magnesium, Potassium, Sodium, Boron, and Sulfur (as SO4) by ICPOES. Results are calculated in mg/kg using Saturation Percentage.
EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.

s those published by US EPA, APHA
ations to improve performance

Detection Limits RG2200255

Project	21-3931-001
Report To	Michael Badger, KGS Group
Date Received	29-Mar-2022 12:02
Issue Date	05-Apr-2022 08:36
Amendment	0

Client Sample ID		TH22-02 S1	TH22-02 S2
Date Sampled		26-Mar-2022	26-Mar-2022
Time Sampled		12:16	12:16
ALS Sample ID		RG2200255-001	RG2200255-002
Analyte	Units	Sub-Matrix: Soil	Sub-Matrix: Soil
Physical Tests (Matrix: Soil/Solid)			
moisture	%	0.25	0.25
Saturated Paste Extractables (Matrix: Soil/Solid)			
% saturation	%	1.0	1.0
TGR (brine)	t/ha	0.10	0.10
TGR (sodic)	t/ha	0.10	0.10
calcium, soluble ion content	mg/L	5.0	5.0
calcium, soluble ion content	mg/kg	6.6	5
chloride, soluble ion content	mg/L	100	100
chloride, soluble ion content	mg/kg	133	57
conductivity, saturated paste	dS/m	0.010	0.010
magnesium, soluble ion content	mg/L	5.0	5.0
magnesium, soluble ion content	mg/kg	6.6	5
pH, saturated paste	pH units	0.10	0.10
potassium, soluble ion content	mg/L	5.0	5.0
potassium, soluble ion content	mg/kg	6.6	5
sodium adsorption ratio [SAR]		0.10	0.10
sodium, soluble ion content	mg/L	5.0	5.0
sodium, soluble ion content	mg/kg	6.6	5
sulfur (as SO4), soluble ion content	mg/L	6	6
sulfur (as SO4), soluble ion content	mg/kg	8	8
Metals (Matrix: Soil/Solid)			
aluminum	mg/kg	50	50
antimony	mg/kg	0.10	0.10
arsenic	mg/kg	0.10	0.10
barium	mg/kg	0.50	0.50
beryllium	mg/kg	0.10	0.10
bismuth	mg/kg	0.20	0.20

boron	mg/kg	5.0	5.0
cadmium	mg/kg	0.020	0.020
calcium	mg/kg	50	50
chromium	mg/kg	0.50	0.50
cobalt	mg/kg	0.10	0.10
copper	mg/kg	0.50	0.50
iron	mg/kg	50	50
lead	mg/kg	0.50	0.50
lithium	mg/kg	2.0	2.0
magnesium	mg/kg	20	20
manganese	mg/kg	1.0	1.0
mercury	mg/kg	0.0050	0.0050
molybdenum	mg/kg	0.10	0.10
nickel	mg/kg	0.50	0.50
phosphorus	mg/kg	50	50
potassium	mg/kg	100	100
selenium	mg/kg	0.20	0.20
silver	mg/kg	0.10	0.10
sodium	mg/kg	50	50
strontium	mg/kg	0.50	0.50
sulfur	mg/kg	1000	1000
thallium	mg/kg	0.050	0.050
tin	mg/kg	2.0	2.0
titanium	mg/kg	1.0	1.0
tungsten	mg/kg	0.50	0.50
uranium	mg/kg	0.050	0.050
vanadium	mg/kg	0.20	0.20
zinc	mg/kg	2.0	2.0
zirconium	mg/kg	1.0	1.0

Volatile Organic Compounds Surrogates (Matrix: Soil/Solid)

bromofluorobenzene, 4-	%	0.10	0.10
difluorobenzene, 1,4-	%	0.10	0.10

Volatile Organic Compounds [BTEXS+MTBE] (Matrix: Soil/Solid)

benzene	mg/kg	0.0050	0.0050
ethylbenzene	mg/kg	0.015	0.015
toluene	mg/kg	0.050	0.050
xylene, m+p-	mg/kg	0.050	0.050
xylene, o-	mg/kg	0.050	0.050
xylenes, total	mg/kg	0.075	0.075
BTEX, total	mg/kg	0.1	0.1

Hydrocarbons (Matrix: Soil/Solid)

F1 (C6-C10)	mg/kg	5.0	5.0
F1-BTEX	mg/kg	114	5.9
F2 (C10-C16)	mg/kg	25	25
F3 (C16-C34)	mg/kg	50	50
F4 (C34-C50)	mg/kg	50	50
F4G-sg	mg/kg	500	
hydrocarbons, total (C6-C50)	mg/kg	80	80
chromatogram to baseline at nC50			

Hydrocarbons Surrogates (Matrix: Soil/Solid)

bromobenzotrifluoride, 2- (F2-F4 surr)	%	1.0	1.0
dichlorotoluene, 3,4-	%	1.0	1.0

TH22-02 S3	TH22-02 S100
26-Mar-2022	26-Mar-2022
12:16	12:16
RG2200255-003	RG2200255-004
Sub-Matrix: Soil	Sub-Matrix: Soil
0.25	0.25
1.0	1.0
0.10	0.10
0.10	0.10
25.0	5.0
26.2	5
100	100
105	58
0.010	0.010
25.0	5.0
26.2	5
0.10	0.10
25.0	5.0
26.2	5
0.10	0.10
25.0	5.0
26.2	5
30.0	6
31.4	8
50	50
0.10	0.10
0.10	0.10
0.50	0.50
0.10	0.10
0.20	0.20

5.0	5.0
0.020	0.020
50	50
0.50	0.50
0.10	0.10
0.50	0.50
50	50
0.50	0.50
2.0	2.0
20	20
1.0	1.0
0.0050	0.0050
0.10	0.10
0.50	0.50
50	50
100	100
0.20	0.20
0.10	0.10
50	50
0.50	0.50
1000	1000
0.050	0.050
2.0	2.0
1.0	1.0
0.50	0.50
0.050	0.050
0.20	0.20
2.0	2.0
1.0	1.0

0.10	0.10
0.10	0.10

0.0050	0.0050
0.015	0.015
0.050	0.050
0.050	0.050
0.050	0.050
0.075	0.075
0.1	0.1

5.0	5.0
5	5
25	25
50	50
50	50
	500
80	80

1.0	1.0
1.0	1.0