APPENDIX IR397-1 CERTIFICATE OF ANALYSIS FOR REPORT #R2314206 VERSION 1 – FINAL 2016/12/09

Appendix IR397-1 Certificate of Analysis for Report #R2314206 Version 1 – Final 2016/12/09
May 2019

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your Project #: 110773396/SPRINGBANK
Your C.O.C. #: A086822

Attention:KAHLIE FORSTER

STANTEC CONSULTING LTD
10160-112 STREET
EDMONTON, AB
CANADA T5K 2L6

Report Date: 2016/12/09
Report #: R2314206
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6A7957
Received: 2016/12/01, 13:29

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cation/EC Ratio	4	N/A	2016/12/08	AB WI-00065	Auto Calc
Calcium Carbonate Equivalent	2	N/A	2016/12/05	AB SOP-00019	Carter 2nd ed 20.2 m
Conductivity @25C (Soluble)	4	2016/12/07	2016/12/07	AB SOP-00033 / AB SOP-00004	SM 22 2510 B m
Total Organic Carbon by Combustion-Sub (1)	2	2016/12/09	2016/12/07		
pH @25C (1:2 Calcium Chloride Extract)	4	2016/12/05	2016/12/05	AB SOP-00033 / AB SOP-00006	SM 22 4500 H+B m
Sodium Adsorption Ratio	4	N/A	2016/12/08	AB WI-00065	Auto Calc
Soluble Ions	4	2016/12/07	2016/12/07	AB SOP-00033 / AB SOP-00042	EPA 200.7 CFR 2012 m
Soluble Paste	4	2016/12/07	2016/12/07	AB SOP-00033	Carter 2nd ed 15.2m
Texture by Hydrometer	4	N/A	2016/12/06	AB SOP-00030	Carter 2nd ed 55.3 m
Texture Class	4	N/A	2016/12/07	AB SOP-00030	Auto Calc
Theoretical Gypsum Requirement (2)	4	N/A	2016/12/08	AB WI-00065	Auto Calc

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods. Results relate to samples tested.

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

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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(1) This test was performed by Maxxam Ontario (From Edmonton)
(2) TGR calculation is based on a theoretical SAR of 4. Salt Contamination and Assessment and remediation guideline 2001 recommended SAR is ranging 4-8. TGR is reported in tonnes/ha.

Encryption Key

Wendy Sears
Project manager
09 Dec 2016 12:26:33

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Wendy Sears, Project manager
Email: WSears@maxxam.ca
Phone# (403)735-2277

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B6A7957
Report Date: 2016/12/09

STANTEC CONSULTING LTD
Client Project #: 110773396/SPRINGBANK
Sampler Initials: KF

SOIL SALINITY 3 (SOIL)

Maxxam ID		QE1984		QE1984		QE1985		
Sampling Date		2016/09/24		2016/09/24		2016/09/24		
COC Number		A086822		A086822		A086822		
	UNITS	SRKF16140-AHK	RDL	SRKF16140-AHK Lab-Dup	QC Batch	SRKF16140-AHKB	RDL	QC Batch
Calculated Parameters								
Cation/EC Ratio	N/A	13	0.10	N/A	8490411	13	0.10	8490411
Soluble Parameters								
Soluble Conductivity	dS/m	0.68	0.020	N/A	8496206	0.57	0.020	8496206
Soluble (CaCl2) pH	pH	7.34	N/A	7.36	8493529	7.44	N/A	8493524
Sodium Adsorption Ratio	N/A	0.14	0.10	N/A	8490618	0.18	0.10	8490618
Soluble Calcium (Ca)	mg/L	130	1.5	N/A	8496858	120	1.5	8496858
Soluble Magnesium (Mg)	mg/L	18	1.0	N/A	8496858	15	1.0	8496858
Soluble Sodium (Na)	mg/L	6.4	2.5	N/A	8496858	8.0	2.5	8496858
Soluble Potassium (K)	mg/L	8.6	1.3	N/A	8496858	5.3	1.3	8496858
Saturation %	%	69	N/A	N/A	8495099	62	N/A	8495099
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	N/A	8490418	<0.20	0.20	8490418

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

Maxxam ID		QE1986	QE1987		
Sampling Date		2016/09/24	2016/09/24		
COC Number		A086822	A086822		
	UNITS	SRKF16140-CK1	SRKF16140-CK2	RDL	QC Batch
Calculated Parameters					
Cation/EC Ratio	N/A	14	12	0.10	8490411
Soluble Parameters					
Soluble Conductivity	dS/m	0.45	0.37	0.020	8496206
Soluble (CaCl2) pH	pH	7.54	7.79	N/A	8493524
Sodium Adsorption Ratio	N/A	0.17	0.21	0.10	8490618
Soluble Calcium (Ca)	mg/L	94	67	1.5	8496858
Soluble Magnesium (Mg)	mg/L	13	8.2	1.0	8496858
Soluble Sodium (Na)	mg/L	6.8	6.9	2.5	8496858
Soluble Potassium (K)	mg/L	4.3	3.2	1.3	8496858
Saturation %	%	55	40	N/A	8495099
Theoretical Gypsum Requirement	tonnes/ha	<0.20	<0.20	0.20	8490418

RDL = Reportable Detection Limit
N/A = Not Applicable

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Maxxam Job #: B6A7957
Report Date: 2016/12/09

STANTEC CONSULTING LTD
Client Project #: 110773396/SPRINGBANK
Sampler Initials: KF

RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		QE1984	QE1984	QE1985	QE1986	QE1987		
Sampling Date		2016/09/24	2016/09/24	2016/09/24	2016/09/24	2016/09/24		
COC Number		A086822	A086822	A086822	A086822	A086822		
	UNITS	SRKF16140-AHK	SRKF16140-AHK Lab-Dup	SRKF16140-AHKB	SRKF16140-CK1	SRKF16140-CK2	RDL	QC Batch
CONVENTIONALS								
Total Organic Carbon (C)	mg/kg	ATTACHED	N/A	ATTACHED	N/A	N/A	500	8499179
Soil Properties								
Calcium Carbonate Equivalent	%	N/A	N/A	N/A	28	36	0.60	8493479
Physical Properties								
% sand by hydrometer	%	25	26	22	25	69	2.0	8495731
% silt by hydrometer	%	60	59	66	65	26	2.0	8495731
Clay Content	%	15	15	12	9.7	5.5	2.0	8495731
Texture	N/A	SILT LOAM	N/A	SILT LOAM	SILT LOAM	SANDY LOAM	N/A	8491093

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

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GENERAL COMMENTS

Results relate only to the items tested.

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Report Date: 2016/12/09

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Client Project #: 110773396/SPRINGBANK
Sampler Initials: KF

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8493479	ACZ	QC Standard	Calcium Carbonate Equivalent	2016/12/05		98	%	75 - 125
8493479	ACZ	Spiked Blank	Calcium Carbonate Equivalent	2016/12/05		104	%	80 - 120
8493479	ACZ	Method Blank	Calcium Carbonate Equivalent	2016/12/05	<0.60		%	
8493479	ACZ	RPD	Calcium Carbonate Equivalent	2016/12/05	4.0		%	35
8493524	ACZ	QC Standard	Soluble (CaCl2) pH	2016/12/05		100	%	97 - 103
8493524	ACZ	Spiked Blank	Soluble (CaCl2) pH	2016/12/05		100	%	97 - 103
8493524	ACZ	RPD	Soluble (CaCl2) pH	2016/12/05	0.65		%	N/A
8493529	ACZ	QC Standard	Soluble (CaCl2) pH	2016/12/05		100	%	97 - 103
8493529	ACZ	Spiked Blank	Soluble (CaCl2) pH	2016/12/05		100	%	97 - 103
8493529	ACZ	RPD [QE1984-01]	Soluble (CaCl2) pH	2016/12/05	0.27		%	N/A
8495099	LX	QC Standard	Saturation %	2016/12/07		101	%	89 - 111
8495099	LX	RPD	Saturation %	2016/12/07	0.91		%	12
8495731	JB9	QC Standard	% sand by hydrometer	2016/12/06		91	%	90 - 110
			% silt by hydrometer	2016/12/06		104	%	92 - 108
			Clay Content	2016/12/06		105	%	87 - 113
8495731	JB9	RPD [QE1984-01]	% sand by hydrometer	2016/12/06	3.4		%	35
			% silt by hydrometer	2016/12/06	2.2		%	35
			Clay Content	2016/12/06	2.7		%	35
8496206	BJO	QC Standard	Soluble Conductivity	2016/12/07		102	%	84 - 116
8496206	BJO	Spiked Blank	Soluble Conductivity	2016/12/07		100	%	90 - 110
8496206	BJO	Method Blank	Soluble Conductivity	2016/12/07	<0.020		dS/m	
8496206	BJO	RPD	Soluble Conductivity	2016/12/07	0.55		%	35
8496858	JK9	Matrix Spike	Soluble Calcium (Ca)	2016/12/07		NC	%	75 - 125
			Soluble Magnesium (Mg)	2016/12/07		104	%	75 - 125
			Soluble Sodium (Na)	2016/12/07		91	%	75 - 125
			Soluble Potassium (K)	2016/12/07		96	%	75 - 125
8496858	JK9	QC Standard	Soluble Calcium (Ca)	2016/12/07		99	%	75 - 125
			Soluble Magnesium (Mg)	2016/12/07		104	%	75 - 125
			Soluble Sodium (Na)	2016/12/07		97	%	75 - 125
			Soluble Potassium (K)	2016/12/07		79	%	75 - 125
8496858	JK9	Spiked Blank	Soluble Calcium (Ca)	2016/12/07		105	%	75 - 125
			Soluble Magnesium (Mg)	2016/12/07		114	%	75 - 125
			Soluble Sodium (Na)	2016/12/07		102	%	75 - 125
			Soluble Potassium (K)	2016/12/07		105	%	75 - 125
8496858	JK9	Method Blank	Soluble Calcium (Ca)	2016/12/07	<1.5		mg/L	
			Soluble Magnesium (Mg)	2016/12/07	<1.0		mg/L	
			Soluble Sodium (Na)	2016/12/07	<2.5		mg/L	
			Soluble Potassium (K)	2016/12/07	<1.3		mg/L	
8496858	JK9	RPD	Soluble Calcium (Ca)	2016/12/07	0.39		%	35
			Soluble Magnesium (Mg)	2016/12/07	1.1		%	35
			Soluble Sodium (Na)	2016/12/07	2.4		%	35

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Soluble Potassium (K)	2016/12/07	1.4		%	35

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

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Client Project #: 110773396/SPRINGBANK
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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Suwan Fock, B.Sc., QP, Inorganics Senior Analyst

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044

Chain of Custody

A0 [illegible] 22

Page: 1 of 1

	Invoice To:	C/O Report Address ☐	Report To:	Same as Invoice ☑
Company:	Stantec Consulting			
Contact:	Kahlie Forster			
Address:	10160 112 St			
	Prov: Edmonton AB	PC: ~~T102~~	Prov:	PC:
Contact #s:	Ph:	Cell: 780-231-3429	Ph:	Cell:

Report Distribution (E-Mail):
Kahlie.forster@stantec.com

REGULATORY GUIDELINES:
- ☐ AT1
- ☐ CCME
- ☐ Regulated Drinking Water
- ☐ Other:

All samples are held for 60 calendar days after sample receipt, unless specified otherwise.

PO #:	
Project # / Name:	110773394 / Springbank
Site Location:	
Quote #:	
Sampled By:	Kahlie Forster

SERVICE REQUESTED:
- ☐ RUSH (Contact lab to reserve) Date Required:
- ☑ REGULAR (5 to 7 Days)

See reverse for package specifics

#	Sample ID	Depth (unit)	Matrix GW / SW Soil	Date/Time Sampled YY/MM/DD 24:00	SOIL: BTEX F1-F4	SOIL: Sieve (75 micron)	SOIL: Regulated Metals (CCME / AT1)	SOIL: Salinity 4	SOIL: Assessment ICP Metals	SOIL: Basic Class II Landfill	WATER: ☐BTEX F1 ☐VOCs	WATER: ☐BTEX F1-F2 ☐BTEX F1-F4	WATER: ☐ Routine Water ☐ Turb ☐ F	WATER: ☐ TOC ☐ DOC	WATER: Regulated Metals (CCME / AT1) Total	WATER: Regulated Metals Dissolved	WATER: Mercury ☐ Total ☐ Dissolved	Other Analysis: Salinity 3	Other Analysis: Particle Size Analysis (Hydrometer)	Other Analysis: Calcium Carbonate Equivalent	Other Analysis: Total organic Carbon	HOLD - Do not Analyze	# of Containers Submitted
1	SRKF16140-ALK		Soil	16/09/24														✓	✓		✓		
2	SRKF16140-ALKb		"	"														✓	✓		✓		
3	SRKF16140-CK1		"	"														✓	✓	✓			
4	SRKF16140-CK2		"	"														✓	✓	✓			
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

Please indicate Filtered, Preserved or Both (F, P, F/P) → F/P

Relinquished By (Signature/Print):	Date (YY/MM/DD):	Time (24:00):
Relinquished By (Signature/Print):	Date (YY/MM/DD):	Time (24:00):

Special Instructions:

# of Jars Used & Not Submitted

LAB USE ONLY

Received By:	Date:	Time:	Maxxam Job #: B6A7957		BT
Chris Kelly	2016 12 01	1329	Custody Seal	Temperature	Ice
Lab Comments:			NO	15, 16, 14	NO

AB FCD-00331 Rev3 2010/05

Maxxam Analytics International Corporation o/a Maxxam Analytics