City of Portage la Prairie

2023 Residual Biosolids Land Application Program

As per Environment Licence 1907

Portage la Prairie
City of Possibilities

97 Saskatchewan Avenue East
Portage la Prairie, MB R1N 0L8
www.city-plap.com

2023 Residual Biosolids Land Application Program

City of Portage la Prairie, Water Pollution Control Facility

Report to Manitoba Sustainable Development

Introduction

The City of Portage la Prairie (the City) owns and operates a wastewater treatment system known as the Water Pollution Control Facility (WPCF). Flows from the McMillan Industrial Park as well as Poplar Bluff Industrial Park are received into and pre-treated in the Low-Rate Anaerobic Reactor (LRAR). This pre-treated wastewater is combined with municipal flows and conveyed to the Sequencing Batch Reactors (SBRs) that provide secondary treatment. Waste Activated Sludge (WAS) is the residual solids that are generated through this process and required to be removed from the SBRs to ensure ongoing treatment. WAS is thickened through the addition of polymer and dewatered by a gravity belt. The material is then stabilized in the anaerobic digester to produce biosolid material that is suitable for land application as a fertilizer. Biosolids are stored throughout the year in the Bulk Volume Fermenter (BVF) or the Biosolids Storage Tanks (BSTs). Solids also accumulate within the LRAR and require removal to ensure adequate capacity and sludge depth within the Reactor. The process of removing the material to inject on agricultural land as a soil enhancement product begins once weather and harvest conditions allow. Injection of material helps to reduce runoff, prevent vector attraction, and minimize odours.

The removal, hauling, analyses and injection of this stored material constitutes the Biosolids Land Application program and is regulated under Environment Act License (EAL) #1907. During the fall of 2023, the City conducted its annual Residual Biosolids Land Application program and applied 728 dry tonnes of material to farmland.

Field Selection Process

After calculating how much land would be needed based on the quantity of biosolids to be removed, the City of Portage la Prairie administration contacted owners of land located in the Rural Municipality of Portage la Prairie. Initial screening consisted of reviewing the proposed land application area and determining the subsurface geological formation. This was obtained from a

map of the Rural Municipality of Portage la Prairie which was superimposed areas that had met the requirements under EAL 1907. The criteria can be listed as follows:

i) Depth of clay or clay till of less than 1.5 metres between the soil surface and the water table;
ii) Within 100 metres of an identifiable boundary of an aquifer which is exposed to the ground surface;
iii) Where, prior to the application of biosolids, the soil pH is less than 6.0;
iv) Where the surface slope of the land is greater than 5 percent;
v) where, prior to application of biosolids, the level of nitrate-nitrogen exceeds 100 kilograms per hectare in the upper 60 cm of the soil; or
vi) Where, prior to the application of biosolids, the concentration of sodium bicarbonate extractable phosphorous, as P, exceeds 60 micrograms per gram in the upper 15 centimetres of the soil.

Sites that met the above criteria were considered for biosolids application. Potential fields for use were advertised in the local newspaper as well as on the City of Portage la Prairie website and in the Citizen's Info flyer that is distributed to homes. Letters of notification were also sent to Manitoba Conservation and Climate and the Rural Municipality of Portage la Prairie. Copies of the ad and letters are included in this report. Areas selected were then subject to soil testing processes and final selection.

Nutrient Testing

Soil testing was carried out on all usable fields to determine the pH, sodium bicarbonate extractable phosphorous, as P, and nitrate nitrogen according to the following criteria as specified in EAL #1907.

Parameter	**Depth of Analysis (cm)**
Phosphorous	15
pH	15
Potassium	15
Nitrate-Nitrite	60
Total Nitrogen	60

Core samples were obtained from the selected application sites, as per license requirements. One core sample was collected for each 2-hectare area and combined to form a composite sample for analysis. A separate sample for clay analyses and verification of the water table was also taken. The City of Portage la Prairie contracted an external laboratory for soil testing.

Heavy Metals

Soil samples were collected and analyzed for background heavy metal concentrations. Heavy metal application was limited to one-third of the initial maximum addition of each heavy metal to be applied in any single application period per the environment license. All heavy metal analysis was conducted by an external laboratory. See Appendix B for background heavy metal concentration results. Background heavy metal concentrations in the soil not exceeding the following:

Metal	**Background Concentration (kg/h)**
Cadmium	2.88
Copper	90
Nickel	90
Lead	90
Zinc	270
Mercury	0.9
Chromium	216

For 2023, land sections **NE 1-13-7, NW 4-13-6, SE 16-12-6**, were sampled, analyzed, and approved for use. Once a field has been tested and selected for application, before application, landowners are required to sign a contract which outlines the process and indicates their agreement to receive biosolids, as well as information on growing restrictions. Copies of these agreements are also included in this report.

Biosolids Sampling and Testing

It is necessary to sample and analyze the residual solids material to determine nutrient and metal levels. This is used to firstly- confirm the material contains levels lower than the maximum allowable concentration before applying and secondly- to determine the application rate that the material can be applied to ensure the cumulative amounts are below license limits.

The BSTs and LRAR biosolids were sampled and analyzed per Clause 1, Appendix A of EAL 1907, for the following components:

a. conductivity
b. pH
c. total solids
d. volatile solids
e. nitrate nitrogen
f. total Kjeldahl nitrogen
g. ammonia nitrogen
h. organic nitrogen
i. total phosphorous
j. lead
k. mercury
I. nickel
m. potassium
n. cadmium
o. copper
p. zinc
q. chromium

Based on the reported results, the materials contained in the BSTs, and LRAR met the required criteria and were available for land application.

Sludge Handling

Biosolids Storage Facility

No concerns were noted from the Biosolids Storage Facility. Any spillage observed was attributed to material dripping from the hose after a truck was filled. All material that drips from the overhead filling hose is collected on the concrete spill pad that is washed down into a pit that conveys all material back to the Biosolids Storage Tanks.

Low-Rate Anaerobic Reactor

Sludge was withdrawn from the LRAR using internal lateral sludge lines that are normally used for sludge recirculation within the LRAR. Sludge was pumped directly to the trucks through a sludge transfer port and an overhead fill pipe. City staff continuously monitored the entire filling process and operation of the sludge pumps. Communication was maintained utilizing two-way radios.

Any spillage observed was attributed to material dripping from the hose after a truck was filled. All spillage that occurred was contained on a concrete spill pad that was washed after each load was hauled. The spilled material and wash water were conveyed to the headworks of the LRAR by a pumping station located at the fill site.

Bulk Volume Fermenter

For 2023, no biosolids were removed from the BVF. This material was sampled but due to the volume within the other two storage areas, it was not necessary to remove any from the BVF. It is not anticipated that this will have any consequences on the operations of the WPCF in 2024.

Biosolids Transportation and Transfer Station

Application began on September 11, 2023. Biosolids were removed from the BSTs as well as LRAR. Separate trucks were dedicated to each storage location and the contractor at the field recorded information to determine where the material was being injected. Composite samples from each storage location were also analyzed separately.

The biosolids were hauled via tanker truck to the field. Transportation routes were determined before application and Manitoba Conservation and Climate, and the RM of Portage la Prairie were notified of the intended routes. Copies of these notification letters are included with this report.

Biosolids were transferred from the tanks via a sludge transfer pump to the nurse tank. The nurse tank can hold approximately four tank loads. Cam-lock connections were used for all hose

connections mitigating any spillage, which may have occurred during the sludge transfer stage. The nurse tank directly feeds the Drag-Line injection system.

Injection

All biosolids injection was conducted by a Drag-Line injection system which had been modified to allow for injection and to allow for a furrow spacing of 0.50 metres (20 inches). A total of 6 furrows were created with each pass.

The injection rate was based on the ground speed of the Dragline and the solids and ammonia information of the sludge. The concentration of percent solids and ammonia data was transferred to the field utilizing two-way radio. This data was used by the operator of the Drag-Line equipment to estimate the speed of the unit using an injection rate chart. Approximately 100 kg/ha of plant-available nitrogen was applied to each application area as based on the following formula:

$$S = \frac{N_p}{(NO_3\text{–}N + NH_3\text{–}N + F \times \text{Org-N})}$$

Where:

S= sludge application rate (dry kg/ha)

N_p= plant available nitrogen requirement (kg/ha) = 100 kg/ha

NO_3-N= nitrate nitrogen content of sludge (kg/kg sludge)

NH_3-N= ammonia nitrogen content of sludge (kg/kg sludge)

F= organic nitrogen mineralization factor (0.2 dimensionless)

Org-N= organic nitrogen content of sludge (kg/kg sludge)

Biosolids Testing During Land Application

During the land application program, ongoing testing of samples from the BSTs, and LRAR are conducted. One grab sample is collected from every tanker to form a composite sample of five tankers. Each composite is analyzed for solids and ammonia content.

The ammonia and solids testing that occurs during the biosolids hauling process are analyzed in-house by City of Portage lab techs. Solids are determined using a moisture balance and ammonia is determined via Flow Injection Analysis following APHA Standard Methods for the Examination of Water and Wastewater 20th Ed, 1998 Method 4500-NH_3 H. Flow Injection Analysis.

The ongoing testing of ammonia and solids for each composite sample ensures that the application rate is being adjusted accordingly as the program proceeds. The spreadsheets used to determine rates also calculate the applied quantity of metals, phosphorus, and Nitrogen along with the background soil composition to ensure the cumulative values do not exceed license requirements. This information is documented in the Biosolids Application Recording sheets which are included in this report. A copy of this report is also given to each landowner.

Summary

Residual solids were removed and transported for land application between September 11, 2023, and October 18, 2023. In total, 728 dry tonnes were removed and injected including 426 tonnes from the LRAR and 302 dry tonnes from the Biosolids Storage Tanks. There was an overapplication of Nitrogen from the material from the BST on one day, however, the overall average for the field was only slightly above the PA-N application limit. There were no incidents or spills that occurred during the land application process. Follow-up with the landowner indicated they were content with the application process and are willing to have residual solids applied in future years.

APPENDIX A
LAND SOLICITATION AND ADVERTISING

Portage la Prairie
City of Possibilities

97 Saskatchewan Avenue East
Portage la Prairie, MB R1N 0L8
www.city-plap.com

September 11, 2023

Mr. Tyler Kneeshaw
Regional Supervisor
Manitoba Environment, Climate and Parks
25 Tupper Street North
Portage la Prairie, MB R1N 3K1

Re: 2023 Residual Biosolids Application Program

Dear Mr. Kneeshaw,

The City of Portage la Prairie intends to conduct land application of residual biosolids in the fall of 2023. The following land areas that have been identified as potential application sites and pending soil analysis, biosolids **may** be applied to the following agricultural lands:

LEGAL LAND DESCRIPTIONS

Watson- SE 16-12-6

Vanstone- SE 1-13-7

McDonald- NW 4-13-6, NE 1-13-7

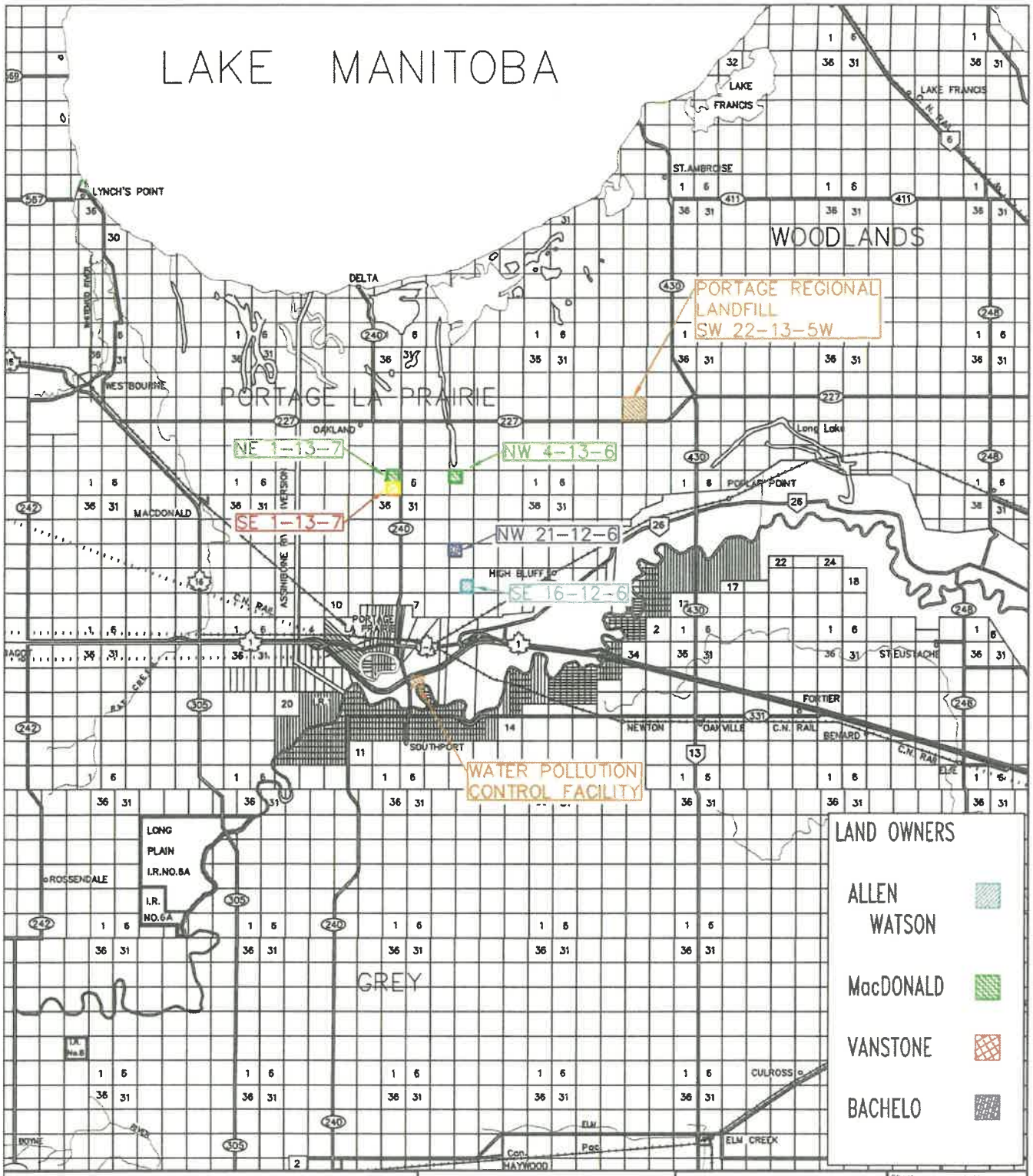
Bachalo- NW 21-12-6

As previously communicated, notice of intent to land apply to the above-noted sites was printed in the Portage Daily Graphic March 16th edition. The notice was also posted to the City website and included in the April Citizen's info page. A copy of the intended routes of transport as well as a confirmation of the start date will be sent once they are confirmed by the contractor. Please contact me at 204-239-8359 if you have or receive any concerns regarding the above sites.

A map of the Portage la Prairie region with fields identified has been included with this letter.

Sincerely,

Karly Friesen
Director of Utility



Portage la Prairie
City of Possibilities

Project
2023
BIOSOLIDS
APPLICATION
LAND DESCRIPTION

Sheet 1 y/m/d 23/03/07
Scale N.T.S
Drawing No M-214
Rev 0

Portage la Prairie
City of Possibilities

97 Saskatchewan Avenue East
Portage la Prairie, MB R1N 0L8
www.city-plap.com

September 11, 2023

Mr. Kyle Hamilton
Chief Administrative Officer
Rural Municipality of Portage la Prairie
35 Tupper Street South
Portage la Prairie, MB R1N 1W7

Re: 2023 Residual Biosolids Application Program

Dear Mr. Hamilton,

The City of Portage la Prairie intends to conduct land application of residual biosolids in the fall of 2023. The following land areas that have been identified as potential application sites and pending soil analysis, biosolids **may** be applied to the following agricultural lands:

LEGAL LAND DESCRIPTIONS

Watson- SE 16-12-6

Vanstone- SE 1-13-7

McDonald- NW 4-13-6, NE 1-13-7

Bachalo- NW 21-12-6

As required by Environment Act License 1907, Clause 17, notice of intent to land apply to the above-noted sites was printed in the Portage Daily Graphic March 16th edition. The notice was also posted to the City website and included in the April Citizen's info page. A copy of the intended routes of transport as well as a confirmation of the start date will be sent once they are confirmed by the contractor. Please contact me at 204-239-8359 if you have or receive any concerns regarding the above sites.

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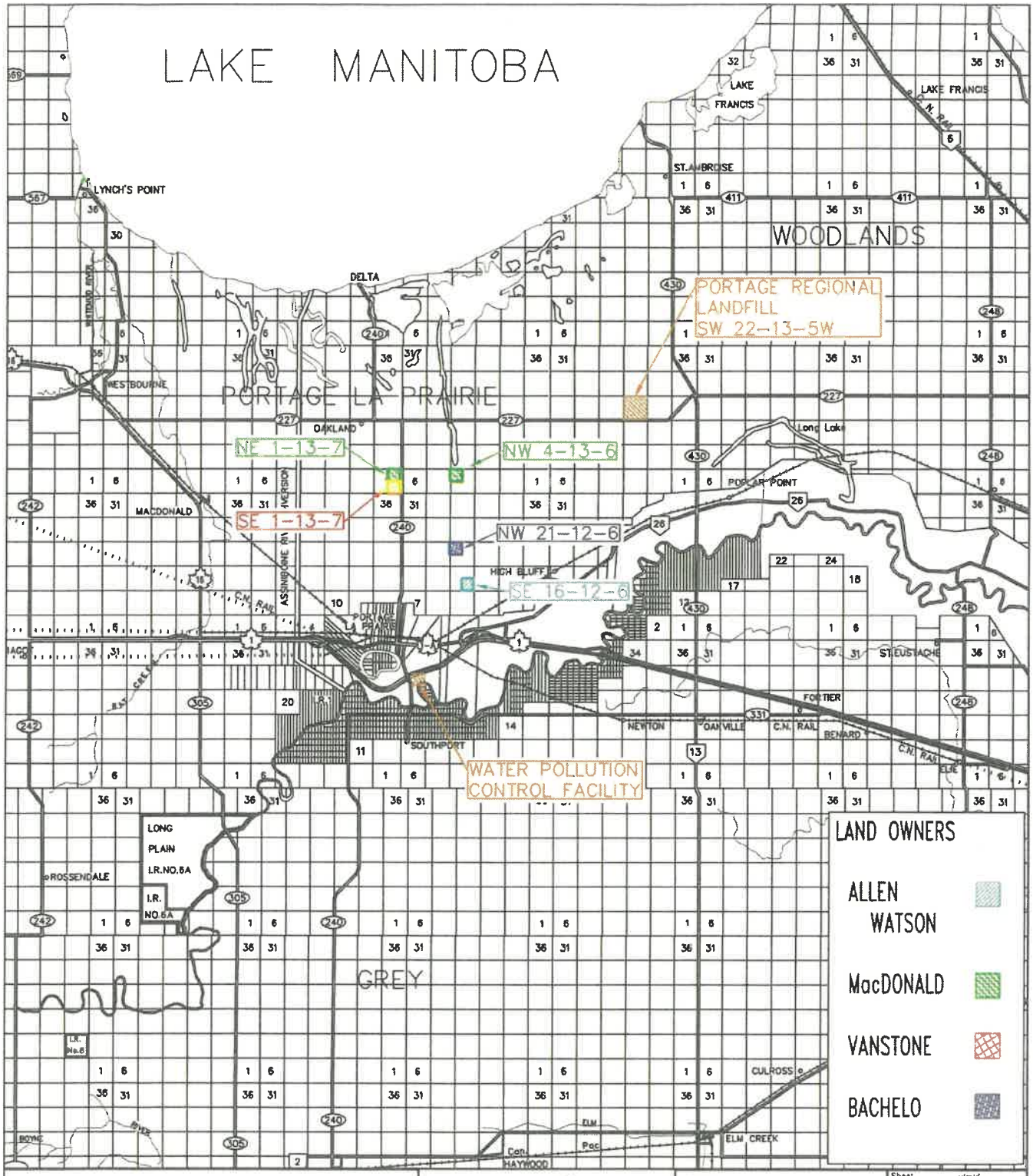
Karly Friesen
Director of Utility



Portage la Prairie
City of Possibilities

Project
2023
BIOSOLIDS
APPLICATION
LAND DESCRIPTION

Sheet 1 y/m/d 25/03/07
Scale NTS
Drawing No M-214
Rev 0

The City of Portage la Prairie intends to conduct the Residual Biosolids Land Application Program commencing in the fall of 2023.

Pending soil analysis, biosolids **may** be applied to the following agricultural lands:

LEGAL DESCRIPTION

NE 1-13-7, SE 1-13-7, NW 4-13-6, SE 16-12-6, NW 21-12-06

A map of land locations can be found at www.city-plap.com

Please contact Karly Friesen, Manager, Director of Utility at
204-239-8359 if you have or receive any concerns regarding the above sites.

APPENDIX B

APPLICATION AREA SUMMARY, SOIL TESTING, BIOSOLIDS TESTING AND ANALYTICAL RESULTS

FALL

NE 1-13-7

NW 4-13-6

SE 16-12-6

Portage la Prairie
City of Possibilities

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www.city-plap.com

September 11, 2023

Mr. Tyler Kneeshaw
Regional Supervisor – Environment Officer
Manitoba Conservation and Climate
309 – 25 Tupper Street North
Portage la Prairie, MB R1N 3K1

Re: Truck Routes for 2022 Residual Biosolids Application Program

Dr. Kneeshaw,

Please find the enclosed route maps for the fall Residual Biosolids Land application for review and comment. Transport and application of biosolids is scheduled to begin on Monday, September 11, 2023. The contractor will apply to fields NE 1-13-7 and will begin NW 4-13-6 shortly after. Should there be any concerns with the routes provided or throughout the hauling process with traffic and/or dust, please contact me as the contractor is responsible for both items. I can be reached via phone at 204-239-8359 or email at kfriesen@city-plap.com.

There are two remaining fields, however, it is uncertain if they will be needed. Routes for those fields will be provided if required.

Sincerely,

Karly Friesen
Director of Utility
City of Portage la Prairie

Google Maps

Portage la Prairie, Manitoba to Portage la Prairie, Manitoba

Loaded trucks- to fields NE 1-13-7 and NW 4-13-6 from WPCF

Drive 22.4 km, 21 min

Map data ©2023 Google 2 km

via Rd 33W
23 min without traffic

21 min
22.4 km

Google Maps 50.0784873, -98.2852793 to River Rd, Southport, MB R0H 1N1

Unloaded- from fields to WPCF

Drive 19.5 km, 18 min

Map data ©2023 Google 2 km

via MB-240 S

18 min without traffic

18 min

19.5 km

Portage la Prairie
City of Possibilities

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Portage la Prairie, MB R1N 0L8
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September 11, 2023

Mr. Kyle Hamilton
Chief Administrative Officer
Rural Municipality of Portage la Prairie
35 Tupper Street South
Portage la Prairie, MB R1N 1W7

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There are two remaining fields, however, it is uncertain if they will be needed. Routes for those fields will be provided if required.

Sincerely,

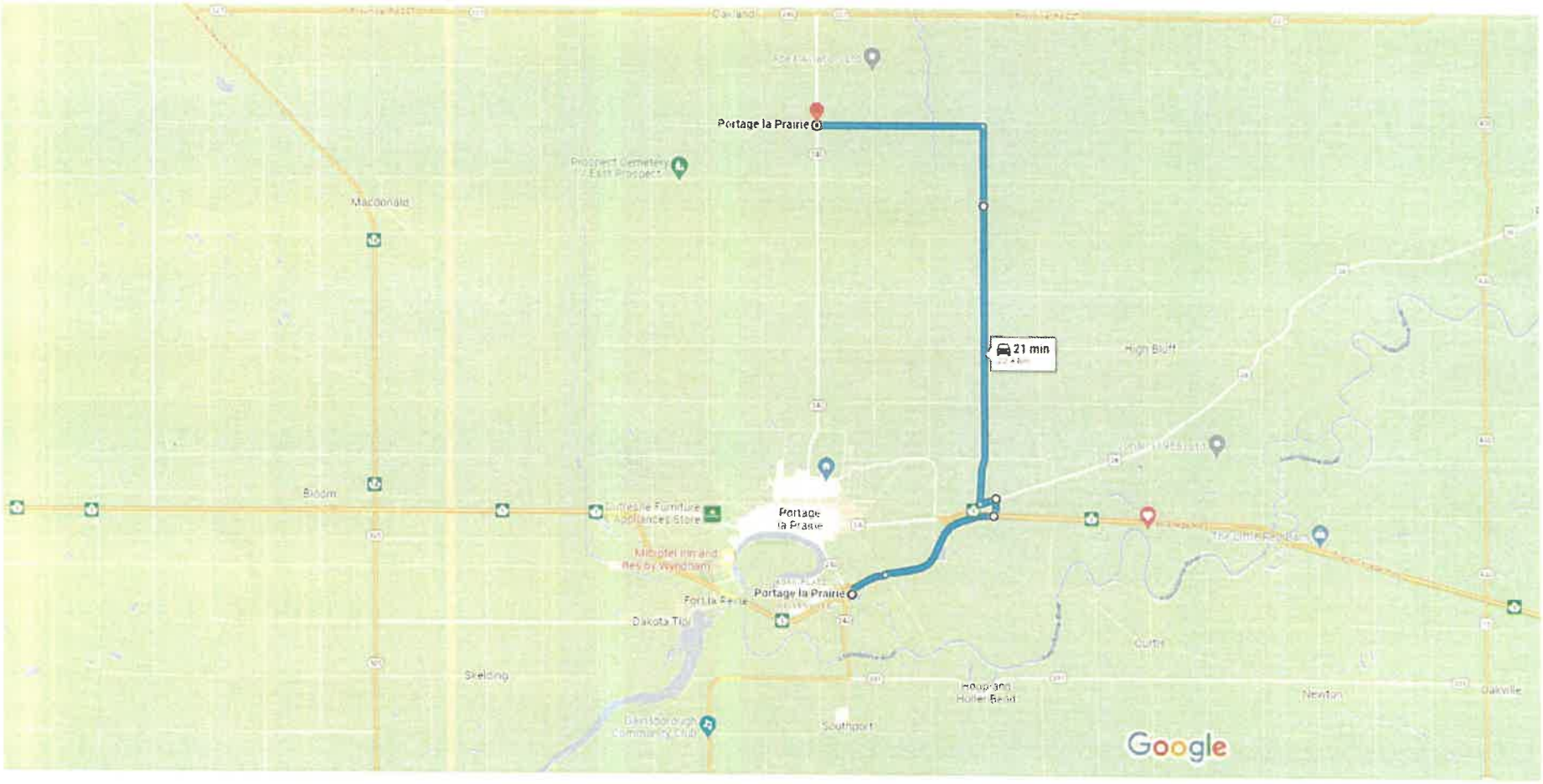
Karly Friesen
Director of Utility
City of Portage la Prairie

Google Maps

Portage la Prairie, Manitoba to Portage la Prairie, Manitoba

Loaded trucks- to fields NE 1-13-7 and NW 4-13-6 from WPCF

Drive 22.4 km, 21 min



Map data ©2023 Google 2 km

via Rd 33W

23 min without traffic

21 min

22.4 km

Google Maps 50.0784873, -98.2852793 to River Rd, Southport, MB R0H 1N1

Unloaded- from fields to WPCF

Drive 19.5 km, 18 min

Map data ©2023 Google 2 km

via MB-240 S		18 min
18 min without traffic		19.5 km

LETTER OF AGREEMENT

Ms. Karly Friesen
Director of Utility
City of Portage la Prairie
97 Saskatchewan Ave. E.
Portage la Prairie, MB
R1N 0L8

Dear Land Owner:

I hereby agree to permit the City of Portage la Prairie to apply wastewater treatment residual biosolids to the land, which I own as described below, on the understanding that:

1. The biosolids will be injected approximately 15 cm below the surface.
2. The biosolids will be injected to a maximum rate of 10 dry tonnes per hectare. (Maximum allowable over a 4-year period.)
3. Application will occur in the 2023 crop year, or as otherwise indicated.
4. Biosolids application will not be closer than 300 meters to a dwelling not belonging to the owner or lessee of the land on which biosolids are applied.
5. Biosolids will not be applied within 15 meters of a ditch draining less than one section and 30 meters from drains serving a larger watershed.
6. All roadways, access roads, and ditches will be repaired to the original condition upon completion of the application program, to the satisfaction of the City, municipality and the landowner.
7. The City makes no warranties or representations as to the fertilizer content nor any soil conditioning effect of the biosolids.
8. The City will determine background levels of nutrients, heavy metals, pH, and clay depth prior to the application of biosolids. This information will be provided to the landowner.
9. The City will assess the biosolids quality prior to the application program and will monitor it throughout the program. Test results will be provided to the landowner.
10. Temporary halting of the application due to wet field conditions will occur upon mutual agreement between representatives of the City, contractor and landowner.
11. Biosolids may be injected at a maximum rate of addition of plant-available nitrogen of 100 kilograms per hectare.
12. The cumulative mass per hectare of each heavy metal in the soil does not exceed the respective value stipulated in the City's Environment Act License, and that not more than one-third of the initial maximum addition of each heavy metal will be applied in this year's program.
13. The City will restore the field to a condition similar that as found prior to the application program.

LETTER OF AGREEMENT

I, on my part, agree to:

a) Plant a cereal, oilseed, forage, field pea, or lentil crop at the beginning of the next growing season. Only these listed crops will be grown for three growing seasons following biosolids application. A crop will not be grown that is a vegetable or a fruit and livestock will not be allowed to graze for three growing seasons after biosolids application on the land.
b) Provide crop information to the City on an annual basis.
c) Consider the soil and biosolids test results prior to applying nitrogen fertilizer in the growing season following biosolids application and restrict the addition of plant-available nitrogen to a maximum of 100 kg/ha, including that derived from the application of biosolids. Fertilizer, including that derived from biosolids, will be applied at the recommended agronomic rates.
d) Release and discharge the City of Portage la Prairie of and from all claims, demands, actions or causes of actions which I have or may have as the result of the application of wastewater biosolids to my land.
e) Provide the City with a letter of acceptance upon completion of the biosolids application indicating my acceptance of field conditions.
f) Notify the lessee of the land (if applicable) of this agreement.

Darren MacDonald
Land Owner Name

Land Owner Signature

Mar 24/22
Date

Kaely Friesen
City Representative Name

City Representative Signature

14/3/2023
Date

Land Location(s): NE 1-13 7

NW 4-13 6

2023 Bio-Solid Application Recording Sheet

Reference Sample Soil Material Criteria is SRM 1646a/SRM2709

See Appendix Section for Information

Name of Land Owner	D. McDonald
Legal Description	NE 1-13-7
Land Owner Authorization	Yes
Dist. >300m from residences	
Map Enclosed	Yes
Year Field previously Used	
GPS Lat	**Long**

		Date	Date	Date	Date	Date	Date	
		BST 14/09/2023	BST 14/09/2023 lbs/ac	LRAR 14/09/2023	LRAR 14/09/2023 lbs/ac			Comments
Field Soil Analaysis mg/kg 0-15 cm	Cadmium	0.458		0.458				
	Calcium							
	Chromium	26.3		26.3				
	Copper	21.5		21.5				
	Lead	11.2		11.2				
	Mercury	0.0357		0.0357				
	Nickel	28.0		28.0				
	pH	8.00		8.00				
	Phosphorus < 60 ug/g	677		677				
	Potassium	3160		3160				
	Soil Nitrate Nitrogen 0-60cm<100kg/ha	10.4		10.4				
	Zinc	92.4		92.4				
Bio-Solids Analysis mg/kg	Ammonia Nitrogen	678		154				
	Cadmium	0.00264		0.000427				
	Chromium	0.180		0.00773				
	Conductivity	5620		3420				
	Copper	1.71		0.0219				
	Lead	0.0797		0.00248				
	Mercury	0.0000250		0.0000250				
	Nickel	0.207		0.0203				
	Nitrate Nitrogen	0.400		0.400				
	Organic Nitrogen	432		34.2				
	pH	7.17		7.32				
	Potassium	262		246				
	Total Nitrogen	1110		187				
	Total Phosphorus	173		33.8				
	Total Solids	19200		7700				
	Volatile Solids	11500		194				
	Zinc	1.33		0.119				
Cummulative Results Kg/Hectare	Cadmium < 2.88	0.824	0.736	0.824	0.736			
	Chromium < 216	47.340	42.24	47.342	42.24			
	Copper < 90	38.704	34.53	38.716	34.54			
	Lead < 90	20.160	17.99	20.161	17.99			
	Mercury < 0.9	0.064	0.06	0.064	0.06			
	Nickel < 90	50.400	44.97	50.402	44.97			
	Nutrient Appl. Rate PA-N<100/kg	99.461	88.74	27.139	24.21			63.30 field average
	Solids <10	2.156	1.92	9.109	8.13			5.6325 field average
	Zinc < 270	166.321	148.39	166.323	148.39			
	Phosphorus	1218.973	1087.54	1220.18	1088.62			
	Comments							

ASSINIBOINE INJECTIONS LTD

BOX 160 177 NOTRE DAME AVE NOTRE DAME, MB ROG 1M0 PH: 204-248-2559 FAX: 204-248-2799

DAILY SLUDGE APPLICATION PLAN

DATE: _____

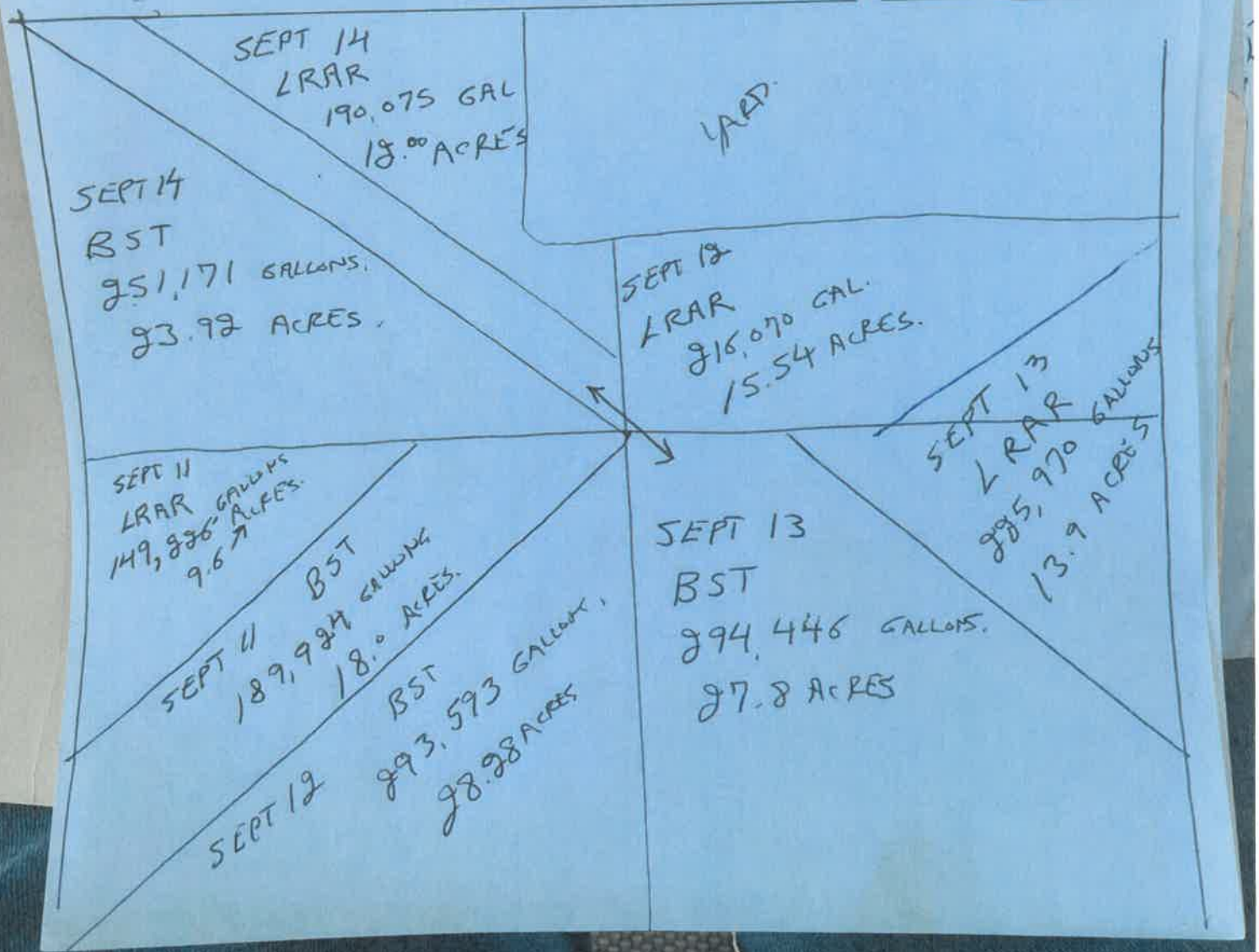
FARMERS NAME: _____

FIELD: SEC. ____ TWP _____ RGE _____

APPLICATION TYPE: INJECTION

DEPTH : 6" HA: _____ CM3: _____

N



ALS Canada Ltd.

NE 1-13-7 W P in metals

right solutions.
right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **WP2321296**	Page	: 1 of 4
Amendment	: **1**		
Client	: **City of Portage la Prairie**	Laboratory	: ALS Environmental - Winnipeg
Contact	: Aaron Stechesen	Account Manager	: Judy Dalmaijer
Address	: 97 Saskatchewan Avenue East Portage la Prairie MB Canada R1N 0L8	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg MB Canada R2J 3T4
Telephone	: 204 239 8361	Telephone	: +1 204 255 9720
Project	: Wastewater	Date Samples Received	: 29-Aug-2023 14:27
PO	: w23017	Date Analysis Commenced	: 30-Aug-2023
C-O-C number	: ----	Issue Date	: 08-Sep-2023 07:22
Sampler	: ----		
Site	: Wastewater		
Quote number	: Wastewater		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

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	Laboratory Supervisor	Sask Soils, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Sask Soils, Saskatoon, Saskatchewan
Jeremy Greuel	Laboratory Assistant	Sask Soils, Saskatoon, Saskatchewan
Milad Khani	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan
Milad Khani	Laboratory Analyst	Sask Soils, Saskatoon, Saskatchewan
Nancy Cruse	Laboratory Assistant	Inorganics, Saskatoon, Saskatchewan
Neha Kamran		Organics, Winnipeg, Manitoba
Rocio SeguradoRodezno	Laboratory Assistant	Organics, Saskatoon, Saskatchewan
Walt Kippenhuck	Supervisor - Inorganic	Metals, Waterloo, Ontario

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*
%	percent
°C	degrees celsius
mg/kg	milligrams per kilogram
pH units	pH units

<: 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.

Workorder Comments

Amendment (08-Sep-23): This report has been amended and re-released to allow the reporting of additional analytical data. Phosphorus reporting

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	23-08-47	23-08-48	23-08-49	----	----
					Client sampling date / time	29-Aug-2023 12:00	29-Aug-2023 12:00	29-Aug-2023 12:00	----	----
						WP2321296-001	WP2321296-002	WP2321296-003	----	----
						Result	Result	Result	----	----
Sample Preparation										
Temperature, oven	----	EPP441/SK	1	°C		----	<38	----	----	----
Physical Tests										
Atterberg plastic limit [PL] (moisture)	----	E199/SK	1.0	%		----	----	24.9	----	----
Moisture	----	E144/SK	0.25	%		20.3	----	----	----	----
Moisture	----	E144/WP	0.25	%		----	17.7	----	----	----
pH (1:2 soil:water)	----	E108/SK	0.10	pH units		8.00	----	----	----	----
Atterberg liquid limit [LL] (moisture)	----	E199/SK	1.0	%		----	----	45.9	----	----
Atterberg plasticity index [PI]	----	E199/SK	1.0	%		----	----	21.0	----	----
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	200	mg/kg		----	2300	----	----	----
Plant Available Nutrients										
Ammonium, available (as N)	14798-03-9	E312A/SK	1.0	mg/kg		----	11.1	----	----	----
Nitrate + Nitrite, available (as N)	----	E269.N+N/SK	1.0	mg/kg		----	11.1	----	----	----
Nitrate + Nitrite, available (as N)	----	E269A.N+N/SK	2.0	mg/kg		----	10.4	----	----	----
Nitrate, available (as N)	14797-55-8	EC269.NO3/SK	2.0	mg/kg		----	11.1	----	----	----
Nitrite, available (as N)	14797-65-0	E269.NO2/SK	0.40	mg/kg		----	<0.40	----	----	----
Nitrogen, total available	7727-37-9	EC269A.N/SK	2.2	mg/kg		----	21.5	----	----	----
Phosphate, available (as P)	14265-44-2	E385/SK	1.0	mg/kg		10.5	----	----	----	----
Nitrate, available (as N)	14797-55-8	EC269A.NO3/SK	2.0	mg/kg		----	10.4	----	----	----
Metals										
Cadmium	7440-43-9	E440/WT	0.020	mg/kg		0.458	----	----	----	----
Chromium	7440-47-3	E440/WT	0.50	mg/kg		26.3	----	----	----	----
Copper	7440-50-8	E440/WT	0.50	mg/kg		21.5	----	----	----	----
Lead	7439-92-1	E440/WT	0.50	mg/kg		11.2	----	----	----	----
Mercury	7439-97-6	E510/WT	0.0050	mg/kg		0.0357	----	----	----	----
Nickel	7440-02-0	E440/WT	0.50	mg/kg		28.0	----	----	----	----
Phosphorus	7723-14-0	E440/WT	50	mg/kg		677	----	----	----	----

Analytical Results

Sub-Matrix: Soil/Solid (Matrix: Soil/Solid)					Client sample ID	23-08-47	23-08-48	23-08-49	----	----
					Client sampling date / time	29-Aug-2023 12:00	29-Aug-2023 12:00	29-Aug-2023 12:00	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		WP2321296-001	WP2321296-002	WP2321296-003	-------	-------
						Result	Result	Result	---	---
Metals										
Potassium	7440-09-7	E440/WT	100	mg/kg		3160	----	----	----	----
Zinc	7440-66-6	E440/WT	2.0	mg/kg		92.4	----	----	----	----

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	:**WP2321296**	Page	: 1 of 8
Amendment	:1		
Client	:**City of Portage la Prairie**	Laboratory	: ALS Environmental - Winnipeg
Contact	:Aaron Stechesen	Account Manager	: Judy Dalmaijer
Address	:97 Saskatchewan Avenue East Portage la Prairie MB Canada R1N 0L8	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	:204 239 8361	Telephone	: +1 204 255 9720
Project	:Wastewater	Date Samples Received	: 29-Aug-2023 14:27
PO	: w23017	Issue Date	: 08-Sep-2023 07:22
C-O-C number	:----		
Sampler	:----		
Site	:Wastewater		
Quote number	:Wastewater		
No. of samples received	:3		
No. of samples analysed	:3		

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 Service 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 Test sample Surrogate recovery outliers exist.

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.

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
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag 23-08-48	E366	29-Aug-2023	01-Sep-2023	28 days	3 days	✓	01-Sep-2023	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag 23-08-47	E510	29-Aug-2023	01-Sep-2023	28 days	3 days	✓	01-Sep-2023	28 days	3 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag 23-08-47	E440	29-Aug-2023	01-Sep-2023	180 days	3 days	✓	01-Sep-2023	180 days	3 days	✓
Physical Tests : Atterberg Limits										
LDPE bag 23-08-49	E199	29-Aug-2023	----	----	----		31-Aug-2023	180 days	2 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag 23-08-48	E144	29-Aug-2023	----	----	----		30-Aug-2023	----	1 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag 23-08-47	E144	29-Aug-2023	----	----	----		31-Aug-2023	----	2 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag 23-08-47	E108	29-Aug-2023	01-Sep-2023	30 days	3 days	✓	01-Sep-2023	30 days	3 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
Plant Available Nutrients : Available Ammonium by Colourimetry (2N Potassium Chloride Ext.)										
LDPE bag 23-08-48	E312A	29-Aug-2023	01-Sep-2023	----	----		01-Sep-2023	0 days	0 days	✓
Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride										
LDPE bag 23-08-48	E269.N+N	29-Aug-2023	01-Sep-2023	180 days	3 days	✓	01-Sep-2023	3 days	0 days	✓
Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (2N Potassium Chloride										
LDPE bag 23-08-48	E269A.N+N	29-Aug-2023	01-Sep-2023	180 days	3 days	✓	01-Sep-2023	3 days	0 days	✓
Plant Available Nutrients : Available Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)										
LDPE bag 23-08-48	E269.NO2	29-Aug-2023	01-Sep-2023	180 days	3 days	✓	01-Sep-2023	3 days	0 days	✓
Plant Available Nutrients : Available Phosphorus by Colourimetry (Olsen)										
LDPE bag 23-08-47	E385	29-Aug-2023	01-Sep-2023	----	----		01-Sep-2023	0 days	0 days	✓
Sample Preparation : Dry and Grind in Soil/Solid <38°C										
LDPE bag 23-08-48	EPP441	29-Aug-2023	31-Aug-2023	----	----		----	3 days	2 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)							
Atterberg Limits	E199	1114234	1	1	100.0	5.0	✓
Available Ammonium by Colourimetry (2N Potassium Chloride Ext.)	E312A	1114302	1	3	33.3	5.0	✓
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	1114259	1	17	5.8	5.0	✓
Available Nitrate and Nitrite by Colourimetry (2N Potassium Chloride Ext.)	E269A.N+N	1114301	1	1	100.0	5.0	✓
Available Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.NO2	1114260	1	17	5.8	5.0	✓
Available Phosphorus by Colourimetry (Olsen)	E385	1114306	1	1	100.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1114682	1	1	100.0	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1114683	1	1	100.0	5.0	✓
Moisture Content by Gravimetry	E144	1111538	1	20	5.0	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1114276	1	20	5.0	5.0	✓
Total Nitrogen by Combustion	E366	1115580	1	1	100.0	5.0	✓
Laboratory Control Samples (LCS)							
Atterberg Limits	E199	1114234	1	1	100.0	5.0	✓
Available Ammonium by Colourimetry (2N Potassium Chloride Ext.)	E312A	1114302	2	3	66.6	10.0	✓
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	1114259	2	17	11.7	10.0	✓
Available Nitrate and Nitrite by Colourimetry (2N Potassium Chloride Ext.)	E269A.N+N	1114301	2	1	200.0	10.0	✓
Available Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.NO2	1114260	2	17	11.7	10.0	✓
Available Phosphorus by Colourimetry (Olsen)	E385	1114306	2	1	200.0	10.0	✓
Mercury in Soil/Solid by CVAAS	E510	1114682	2	1	200.0	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1114683	2	1	200.0	10.0	✓
Moisture Content by Gravimetry	E144	1111538	1	20	5.0	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1114276	2	20	10.0	10.0	✓
Total Nitrogen by Combustion	E366	1115580	2	1	200.0	10.0	✓
Method Blanks (MB)							
Available Ammonium by Colourimetry (2N Potassium Chloride Ext.)	E312A	1114302	1	3	33.3	5.0	✓
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	1114259	1	17	5.8	5.0	✓
Available Nitrate and Nitrite by Colourimetry (2N Potassium Chloride Ext.)	E269A.N+N	1114301	1	1	100.0	5.0	✓
Available Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.NO2	1114260	1	17	5.8	5.0	✓
Available Phosphorus by Colourimetry (Olsen)	E385	1114306	1	1	100.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1114682	1	1	100.0	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1114683	1	1	100.0	5.0	✓
Moisture Content by Gravimetry	E144	1111538	1	20	5.0	5.0	✓
Total Nitrogen by Combustion	E366	1115580	1	1	100.0	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 Description
pH by Meter (1:2 Soil:Water Extraction)	E108 ALS Environmental - Saskatoon	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 °C) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 ALS Environmental - Saskatoon	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 the wet weight of the sample, expressed as a percentage.
Atterberg Limits	E199 ALS Environmental - Saskatoon	Soil/Solid	CSSS Ch. 58 (mod)	Atterberg Limits are measures of physical properties of fine grained soils. Liquid Limit (LL) is the water content where soil behaviour changes from plastic to liquid, and is determined by Casagrande cup. Plastic Limit (PL) is the water content where soil begins to exhibit plastic behaviour, and is measured as the moisture content of a 3 mm diameter thread of soil which begins to crumble when rolled. Plasticity Index (PI) is equal to LL - PL.
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N ALS Environmental - Saskatoon	Soil/Solid	Alberta Agriculture/APHA 4500-NO3 I (mod)	Plant available nitrate and nitrite are analyzed by colourimetry using a flow injection analyzer on a soil sample extract that has been extracted using 0.01M Calcium Chloride, then shaken well and filtered prior to analysis.
Available Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.NO2 ALS Environmental - Saskatoon	Soil/Solid	Alberta Agriculture/APHA 4500-NO2 B (mod)	Plant available nitrite is analyzed by colourimetry using a flow injection analyzer on a soil sample extract that has been extracted using 0.01M Calcium Chloride, then shaken well and filtered prior to analysis.
Available Nitrate and Nitrite by Colourimetry (2N Potassium Chloride Ext.)	E269A.N+N ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 6.2/APHA 4500-NO3 I (mod)	Plant available nitrate and nitrite is analyzed by colourimetry using a flow injection analyzer on a soil sample extract that has been extracted using 2N potassium chloride, then shaken well and filtered prior to analysis.
Available Ammonium by Colourimetry (2N Potassium Chloride Ext.)	E312A ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 6.2/Comm Soil Sci 19(6) (mod)	Plant available ammonium is analyzed by colourimetry on a soil sample extract that has been extracted using 2N Potassium Chloride, then shaken well and filtered prior to analysis.
Total Nitrogen by Combustion	E366 ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 22.4	The sample is ignited in a combustion analyzer where nitrogen in the reduced nitrous oxide gas is determined using a thermal conductivity detector.
Available Phosphorus by Colourimetry (Olsen)	E385 ALS Environmental - Saskatoon	Soil/Solid	Carter CSSS (2008) 8.3	Plant available phosphorus is extracted from air dried soil using a fixed ratio bicarbonate extraction. Phosphorus is determined by colorimetry.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Metals in Soil/Solid by CRC ICPMS	E440 ALS Environmental - Waterloo	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.
Mercury in Soil/Solid by CVAAS	E510 ALS Environmental - Waterloo	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.
Available Nitrate by Difference (0.01M Calcium Chloride Ext.)	EC269.NO3 ALS Environmental - Saskatoon	Soil/Solid	Alberta Agriculture/APHA 4500-NO3 I (mod)	Available Nitrate is determined by difference between Nitrate+Nitrite-N and Nitrite-N. A soil sample extract that has been extracted using 0.01M Calcium Chloride, then shaken well and filtered prior to analysis.
Total Available Nitrogen (Calculation)	EC269A.N ALS Environmental - Saskatoon	Soil/Solid	Calculation	Total available nitrogen is calculated as the sum of NO2-N+NO3-N and NH3-N extracted from soil using 2N potassium chloride solution.
Available Nitrate by Difference (2N Potassium Chloride Ext.)	EC269A.NO3 ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 6.2/APHA 4500-NO3 I (mod)	Available Nitrate is determined by difference between Nitrate+Nitrite-N and Nitrite-N. A soil sample extract that has been extracted using 2N Potassium Chloride, then shaken well and filtered prior to analysis.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 ALS Environmental - Saskatoon	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Fixed ratio 0.01M Calcium Chloride extraction for plant available nutrients	EP269 ALS Environmental - Saskatoon	Soil/Solid	Alberta Agriculture	Plant available nutrients (N&S) extracted using 0.01M calcium chloride, then shaken well and filtered prior to analysis.
2N Potassium Chloride extraction for available nutrients	EP269A ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 6.2	A soil sample extract is generated by fixed ratio extraction using 2N Potassium Chloride, then shaken well and filtered prior to analysis.
Bicarbonate extraction for soil	EP385 ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 8.2	Plant available phosphorus is extracted using fixed ratio sodium bicarbonate solution (Olsen method).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Metals and Mercury	EP440 ALS Environmental - Waterloo	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
Dry and Grind in Soil/Solid <38°C	EPP441 ALS Environmental - Saskatoon	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of coarse fragments a portion of homogenized sample is set in a tray and dried at less than 38°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.
Dry and Grind in Soil/Solid <60°C	EPP442 ALS Environmental - Saskatoon	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.

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QUALITY CONTROL REPORT

Work Order	:WP2321296	Page	: 1 of 7
Amendment	:1		
Client	:City of Portage la Prairie	Laboratory	:ALS Environmental - Winnipeg
Contact	:Aaron Stechesen	Account Manager	:Judy Dalmaijer
Address	:97 Saskatchewan Avenue East Portage la Prairie MB Canada R1N 0L8	Address	:1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	:	Telephone	:+1 204 255 9720
Project	:Wastewater	Date Samples Received	:29-Aug-2023 14:27
PO	:w23017	Date Analysis Commenced	:30-Aug-2023
C-O-C number	:----	Issue Date	:08-Sep-2023 07:23
Sampler	:---- 204 239 8361		
Site	:Wastewater		
Quote number	:Wastewater		
No. of samples received	:3		
No. of samples analysed	:3		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

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	Laboratory Supervisor	Saskatoon Sask Soils, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Saskatoon Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Saskatoon Sask Soils, Saskatoon, Saskatchewan
Jeremy Greuel	Laboratory Assistant	Saskatoon Sask Soils, Saskatoon, Saskatchewan
Milad Khani	Laboratory Analyst	Saskatoon Inorganics, Saskatoon, Saskatchewan
Milad Khani	Laboratory Analyst	Saskatoon Sask Soils, Saskatoon, Saskatchewan
Nancy Cruse	Laboratory Assistant	Saskatoon Inorganics, Saskatoon, Saskatchewan
Neha Kamran		Winnipeg Organics, Winnipeg, Manitoba
Rocio SeguradoRodezno	Laboratory Assistant	Saskatoon Organics, Saskatoon, Saskatchewan
Walt Kippenhuck	Supervisor - Inorganic	Waterloo Metals, Waterloo, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology 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 Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

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

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1111538)											
WP2320982-009	Anonymous	Moisture	----	E144	0.25	%	22.5	22.7	0.776%	20%	----
Physical Tests (QC Lot: 1114234)											
WP2321296-003	23-08-49	Atterberg liquid limit [LL] (moisture)	----	E199	1.0	%	45.9	46.8	1.85%	20%	----
		Atterberg plastic limit [PL] (moisture)	----	E199	1.0	%	24.9	24.7	0.978%	20%	----
Physical Tests (QC Lot: 1114276)											
WP2320803-005	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	6.53	6.53	0.00%	10%	----
Physical Tests (QC Lot: 1114562)											
RG2301364-001	Anonymous	Moisture	----	E144	0.25	%	25.2	24.4	3.41%	20%	----
Anions and Nutrients (QC Lot: 1115580)											
WP2321296-002	23-08-48	Nitrogen, total	7727-37-9	E366	0.020	%	2300 mg/kg	0.229	0.362%	20%	----
Plant Available Nutrients (QC Lot: 1114259)											
WP2321091-019	Anonymous	Nitrate + Nitrite, available (as N)	----	E269.N+N	1.0	mg/kg	<1.0	<1.0	0.0007	Diff <2x LOR	----
Plant Available Nutrients (QC Lot: 1114260)											
WP2321091-019	Anonymous	Nitrite, available (as N)	14797-65-0	E269.NO2	0.40	mg/kg	<0.40	<0.40	0.0003	Diff <2x LOR	----
Plant Available Nutrients (QC Lot: 1114301)											
WP2321296-002	23-08-48	Nitrate + Nitrite, available (as N)	----	E269A.N+N	2.0	mg/kg	10.4	10.4	0.08	Diff <2x LOR	----
Plant Available Nutrients (QC Lot: 1114302)											
WP2321296-002	23-08-48	Ammonium, available (as N)	14798-03-9	E312A	1.0	mg/kg	11.1	11.3	2.35%	20%	----
Plant Available Nutrients (QC Lot: 1114306)											
WP2321296-001	23-08-47	Phosphate, available (as P)	14265-44-2	E385	1.0	mg/kg	10.5	11.0	4.07%	30%	----
Metals (QC Lot: 1114682)											
WP2321296-001	23-08-47	Mercury	7439-97-6	E510	0.0050	mg/kg	0.0357	0.0374	4.51%	40%	----
Metals (QC Lot: 1114683)											
WP2321296-001	23-08-47	Cadmium	7440-43-9	E440	0.020	mg/kg	0.458	0.456	0.458%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	26.3	26.3	0.200%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	21.5	21.5	0.281%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	11.2	11.1	0.998%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	28.0	29.0	3.33%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	677	623	8.29%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	3160	3200	1.30%	40%	----

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 1114683) - continued											
WP2321296-001	23-08-47	Zinc	7440-66-6	E440	2.0	mg/kg	92.4	94.0	1.71%	30%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1111538)						
Moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 1114562)						
Moisture	----	E144	0.25	%	<0.25	----
Anions and Nutrients (QCLot: 1115580)						
Nitrogen, total	7727-37-9	E366	0.02	%	<0.020	----
Plant Available Nutrients (QCLot: 1114259)						
Nitrate + Nitrite, available (as N)	----	E269.N+N	1	mg/kg	<1.0	----
Plant Available Nutrients (QCLot: 1114260)						
Nitrite, available (as N)	14797-65-0	E269.NO2	0.4	mg/kg	<0.40	----
Plant Available Nutrients (QCLot: 1114301)						
Nitrate + Nitrite, available (as N)	----	E269A.N+N	2	mg/kg	<2.0	----
Plant Available Nutrients (QCLot: 1114302)						
Ammonium, available (as N)	14798-03-9	E312A	1	mg/kg	<1.0	----
Plant Available Nutrients (QCLot: 1114306)						
Phosphate, available (as P)	14265-44-2	E385	1	mg/kg	<1.0	----
Metals (QCLot: 1114682)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1114683)						
Cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
Chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
Copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
Lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
Nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
Phosphorus	7723-14-0	E440	50	mg/kg	<50	----
Potassium	7440-09-7	E440	100	mg/kg	<100	----
Zinc	7440-66-6	E440	2	mg/kg	<2.0	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1111538)									
Moisture	----	E144	0.25	%	50 %	102	90.0	110	----
Physical Tests (QCLot: 1114276)									
pH (1:2 soil:water)	----	E108	----	pH units	7 pH units	101	97.0	103	----
Physical Tests (QCLot: 1114562)									
Moisture	----	E144	0.25	%	50 %	95.3	90.0	110	----
Anions and Nutrients (QCLot: 1115580)									
Nitrogen, total	7727-37-9	E366	0.02	%	22.37 %	99.1	90.0	110	----
Plant Available Nutrients (QCLot: 1114259)									
Nitrate + Nitrite, available (as N)	----	E269.N+N	1	mg/kg	40 mg/kg	103	70.0	130	----
Plant Available Nutrients (QCLot: 1114260)									
Nitrite, available (as N)	14797-65-0	E269.NO2	0.4	mg/kg	20 mg/kg	98.6	70.0	130	----
Plant Available Nutrients (QCLot: 1114301)									
Nitrate + Nitrite, available (as N)	----	E269A.N+N	2	mg/kg	40 mg/kg	108	70.0	130	----
Plant Available Nutrients (QCLot: 1114302)									
Ammonium, available (as N)	14798-03-9	E312A	1	mg/kg	10 mg/kg	99.5	80.0	120	----
Plant Available Nutrients (QCLot: 1114306)									
Phosphate, available (as P)	14265-44-2	E385	1	mg/kg	20 mg/kg	107	80.0	120	----
Metals (QCLot: 1114682)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	111	80.0	120	----
Metals (QCLot: 1114683)									
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	100	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	100.0	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	98.7	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	101	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	110	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	107	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	100	80.0	120	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Physical Tests (QCLot: 1114234)									
	RM	Atterberg liquid limit [LL] (moisture)	----	E199	33.68 %	100	80.0	120	----
	RM	Atterberg plastic limit [PL] (moisture)	----	E199	20 %	105	80.0	120	----
Physical Tests (QCLot: 1114276)									
	RM	pH (1:2 soil:water)	----	E108	8.13 pH units	100	96.0	104	----
Anions and Nutrients (QCLot: 1115580)									
	RM	Nitrogen, total	7727-37-9	E366	0.11 %	90.5	80.0	120	----
Plant Available Nutrients (QCLot: 1114259)									
	RM	Nitrate + Nitrite, available (as N)	----	E269.N+N	11.3 mg/kg	106	70.0	130	----
Plant Available Nutrients (QCLot: 1114260)									
	RM	Nitrite, available (as N)	14797-65-0	E269.NO2	0.1 mg/kg	21.3	0	570	----
Plant Available Nutrients (QCLot: 1114301)									
	RM	Nitrate + Nitrite, available (as N)	----	E269A.N+N	11.1 mg/kg	109	70.0	130	----
Plant Available Nutrients (QCLot: 1114302)									
	RM	Ammonium, available (as N)	14798-03-9	E312A	70.1 mg/kg	106	80.0	120	----
Plant Available Nutrients (QCLot: 1114306)									
	RM	Phosphate, available (as P)	14265-44-2	E385	15.3 mg/kg	104	80.0	120	----
Metals (QCLot: 1114682)									
	RM	Mercury	7439-97-6	E510	0.0585 mg/kg	110	70.0	130	----
Metals (QCLot: 1114683)									
	RM	Cadmium	7440-43-9	E440	0.91 mg/kg	111	70.0	130	----
	RM	Chromium	7440-47-3	E440	101 mg/kg	103	70.0	130	----
	RM	Copper	7440-50-8	E440	123 mg/kg	114	70.0	130	----
	RM	Lead	7439-92-1	E440	267 mg/kg	105	70.0	130	----
	RM	Nickel	7440-02-0	E440	26.7 mg/kg	103	70.0	130	----
	RM	Phosphorus	7723-14-0	E440	752 mg/kg	105	70.0	130	----
	RM	Potassium	7440-09-7	E440	1587 mg/kg	107	70.0	130	----
	RM	Zinc	7440-66-6	E440	297 mg/kg	104	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 22 -

Page 1 of 1

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Environmental Division Winnipeg
Work Order Reference
WP2321296

Telephone : + 1 204 255 9720

E366 A

Report To	Contact and company name below will appear on the final report	Reports / Recipients	Turnaround Time (TAT) Requested
Company:	City of Portage La Prairie	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	
Contact:	Aaron Stechesen	Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A	
Phone:	1-204-239-8361	☐ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	
Street:	97 Saskatchewan Avenue East	Email 1 or Fax astechesen@city-plap.com	
City/Province:	Portage La Prairie	Email 2 astechesen@city-plap.com	
Postal Code:	R1N 0L8	Email 3	
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Recipients	
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Company:		Email 1 or Fax astechesen@city-plap.com	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	GMPP100 / WP2022GMPP1000002	AFE/Cost Center:	PO# W23017
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	W23017	Requisitioner:	
LSD:		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 CONTAINER	E108	E510	E440	E385	E312A, EC269A.NO3, E269A.N+N	E365	EC269.NO3, E269.N+N, E269.NO2 E269A.N, EC269A.NO2	MOIST-SK	PREP-DRY/GRIND-SK	E199	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	23-08-47	29-Aug-23	12:00	Soil	2	P4	P4	P4	P4				P4	P4				
	23-08-48	29-Aug-23	12:00	Soil	2					P4	P4	P4	P4	P4				
	23-08-49	29-Aug-23	12:00	Soil	3									P4	P4			

800-295-5310

HSI

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human consumption/ use? ☐ YES ☐ NO	

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		
1.7	3.1				

SHIPMENT RELEASE (client use)				INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Aaron Stechesen	Date: 29-Aug-23	Time: 12:00	Received by: SB	Date: AUG 29 2023	Time: 12:12	Received by:	Date:	Time:

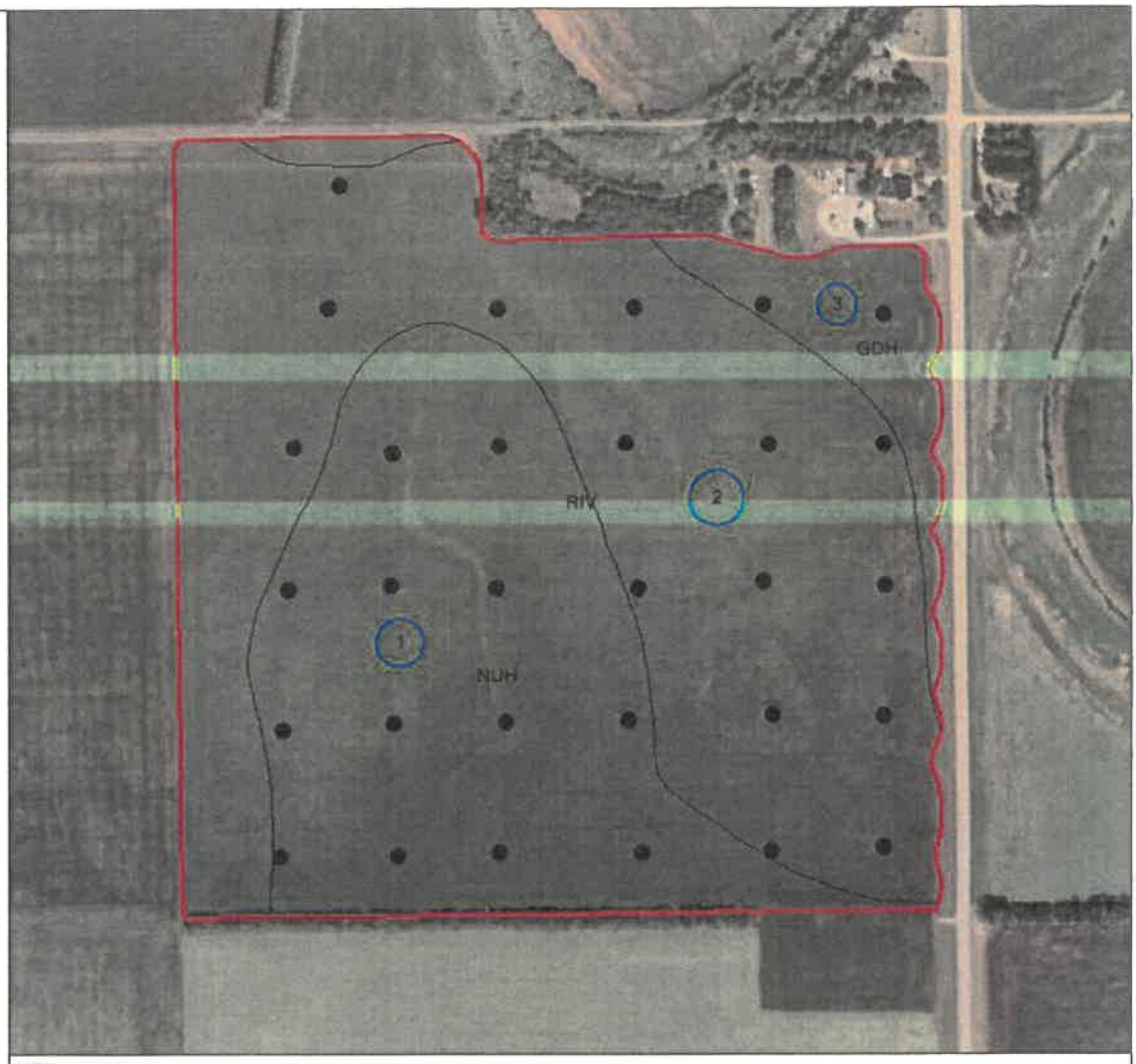
REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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

Delta Ag Services
City of Portage
MacDonald NE 1-13 -07



Clay Test - 1.4 Ac
Sample Points -2019RW
McDonald NE 1-13-07 - 144.9 Ac
Portage Soils-Clip - 144.9 Ac

Clay Test Sites; 1,2&3 Had no detectable water table at the 1.5 M depth

Delta Ag SERVICES

2023 Bio-Solid Application Recording Sheet

Reference Sample Soil Material Criteria is SRM 1646a/SRM2709

See Appendix Section for Information

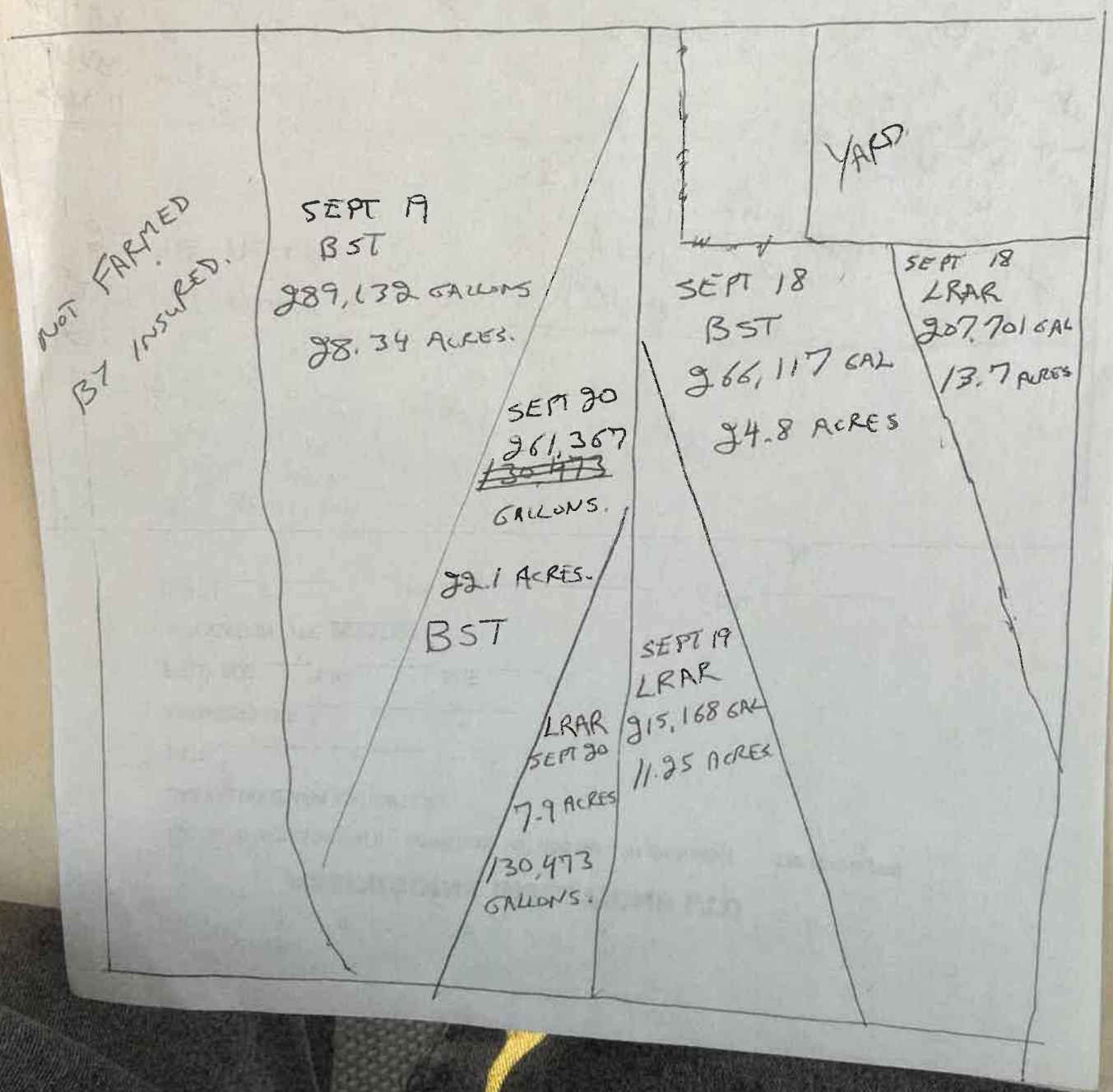
Name of Land Owner	D. McDonald			
Legal Description	NE 4-13-6			
Land Owner Authorization	Yes			
Dist. >300m from residences				
Map Enclosed	Yes			
Year Field previously Used				
GPS **Lat**		**Long**		

		Date	Date	Date	Date	Date	Date	
		BST 20/09/2023	BST 20/09/2023 lbs/ac	LRAR 20/09/2023	LRAR 20/09/2023 lbs/ac			Comments
Field Soil Analysis mg/kg 0-15 cm	Cadmium	0.690		0.690				
	Calcium							
	Chromium	30.40		30.40				
	Copper	24.8		24.8				
	Lead	13.0		13.0				
	Mercury	0.0315		0.0315				
	Nickel	32.4		32.4				
	pH	7.64		7.64				
	Phosphorus < 60 ug/g	1070		1070				
	Potassium	3700		3700				
	Soil Nitrate Nitrogen 0-60cm<100kg/ha	4.7		4.7				
	Zinc	114		114				
Bio-Solids Analysis mg/kg	Ammonia Nitrogen	678		154				
	Cadmium	0.00264		0.000427				
	Chromium	0.180		0.00773				
	Conductivity	5620		3420				
	Copper	1.71		0.0219				
	Lead	0.0797		0.00248				
	Mercury	0.0000250		0.0000250				
	Nickel	0.207		0.0203				
	Nitrate Nitrogen	0.400		0.400				
	Organic Nitrogen	432		34.2				
	pH	7.17		7.32				
	Potassium	262		246				
	Total Nitrogen	1110		187				
	Total Phosphorus	173		33.8				
	Total Solids	19200		7700				
	Volatile Solids	11500		194				
	Zinc	1.33		0.119				
Cummulative Results Kg/Hectare	Cadmium < 2.88	1.242	1.108	1.242	1.108			
	Chromium < 216	54.721	48.82	54.722	48.82			
	Copper < 90	44.647	39.83	44.657	39.84			
	Lead < 90	23.400	20.88	23.401	20.88			
	Mercury < 0.9	0.057	0.05	0.057	0.05			
	Nickel < 90	58.321	52.03	58.322	52.03			
	Nutrient Appl. Rate PAN<100/kg	106.520	95.04	33.097	29.53			69.8085 field average
	Solids <10	3.881	3.46	10.030	8.95			6.9555 field average
	Zinc < 270	205.200	183.08	205.200	183.08			
	Phosphorus	1926.671	1718.94	1927.735	1719.89			
	Comments							

2023

DARREN McDONALD

FIELD 9



NW 4-13-6 phosphorus in metals

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **WP2321890**	Page	: 1 of 4
Amendment	: **1**		
Client	: **City of Portage la Prairie**	Laboratory	: ALS Environmental - Winnipeg
Contact	: Aaron Stechesen	Account Manager	: Judy Dalmaijer
Address	: 97 Saskatchewan Avenue East Portage la Prairie MB Canada R1N 0L8	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg MB Canada R2J 3T4
Telephone	: 204 239 8361	Telephone	: +1 204 255 9720
Project	: Wastewater	Date Samples Received	: 01-Sep-2023 11:50
PO	: W23017	Date Analysis Commenced	: 05-Sep-2023
C-O-C number	: ----	Issue Date	: 15-Sep-2023 16:26
Sampler	: ----		
Site	: Wastewater		
Quote number	: Wastewater		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

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	Laboratory Supervisor	Inorganics, Saskatoon, Saskatchewan
Colby Bingham	Laboratory Supervisor	Sask Soils, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Sask Soils, Saskatoon, Saskatchewan
Maria Painchaud	Laboratory Assistant	Inorganics, Saskatoon, Saskatchewan
Maria Painchaud	Laboratory Assistant	Sask Soils, Saskatoon, Saskatchewan
Nancy Cruse	Laboratory Assistant	Sask Soils, Saskatoon, Saskatchewan
Neha Kamran		Organics, Winnipeg, Manitoba
Niral Patel		Centralized Prep, Waterloo, Ontario
Walt Kippenhuck	Supervisor - Inorganic	Metals, Waterloo, Ontario

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*
%	percent
°C	degrees celsius
mg/kg	milligrams per kilogram
pH units	pH units

<: 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.

Workorder Comments

Amendment (15-Sep-23): This report has been amended and re-released to allow the reporting of additional analytical data.

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	23-08-50	23-08-51	23-08-52	----	----
					Client sampling date / time	31-Aug-2023 10:15	31-Aug-2023 10:15	31-Aug-2023 10:15	----	----
						WP2321890-001	WP2321890-002	WP2321890-003	--------	--------
						Result	Result	Result	----	----
Sample Preparation										
Temperature, oven	----	EPP441/SK	1	°C		----	<38	----	----	----
Physical Tests										
Atterberg plastic limit [PL] (moisture)	----	E199/SK	1.0	%		----	----	25.6	----	----
Moisture	----	E144/WP	0.25	%		----	20.1	----	----	----
Moisture	----	E144/WT	0.25	%		17.3	----	----	----	----
pH (1:2 soil:water)	----	E108/SK	0.10	pH units		7.64	----	----	----	----
Atterberg liquid limit [LL] (moisture)	----	E199/SK	1.0	%		----	----	40.0	----	----
Atterberg plasticity index [PI]	----	E199/SK	1.0	%		----	----	14.3	----	----
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	200	mg/kg		----	1680	----	----	----
Plant Available Nutrients										
Ammonium, available (as N)	14798-03-9	E312A/SK	1.0	mg/kg		----	4.0	----	----	----
Nitrate + Nitrite, available (as N)	----	E269.N+N/SK	1.0	mg/kg		----	8.5	----	----	----
Nitrate + Nitrite, available (as N)	----	E269A.N+N/SK	2.0	mg/kg		----	4.7	----	----	----
Nitrate, available (as N)	14797-55-8	EC269.NO3/SK	2.0	mg/kg		----	8.5	----	----	----
Nitrite, available (as N)	14797-65-0	E269.NO2/SK	0.40	mg/kg		----	<0.40	----	----	----
Nitrogen, total available	7727-37-9	EC269A.N/SK	2.2	mg/kg		----	8.7	----	----	----
Phosphate, available (as P)	14265-44-2	E385/SK	1.0	mg/kg		17.9	----	----	----	----
Nitrate, available (as N)	14797-55-8	EC269A.NO3/SK	2.0	mg/kg		----	4.7	----	----	----
Metals										
Cadmium	7440-43-9	E440/WT	0.020	mg/kg		0.690	----	----	----	----
Chromium	7440-47-3	E440/WT	0.50	mg/kg		30.4	----	----	----	----
Copper	7440-50-8	E440/WT	0.50	mg/kg		24.8	----	----	----	----
Lead	7439-92-1	E440/WT	0.50	mg/kg		13.0	----	----	----	----
Mercury	7439-97-6	E510/WT	0.0050	mg/kg		0.0315	----	----	----	----
Nickel	7440-02-0	E440/WT	0.50	mg/kg		32.4	----	----	----	----
Phosphorus	7723-14-0	E440/WT	50	mg/kg		1070	----	----	----	----

Analytical Results

Sub-Matrix: **Soil/Solid** (Matrix: **Soil/Solid**)					Client sample ID	23-08-50	23-08-51	23-08-52	----	----
					Client sampling date / time	31-Aug-2023 10:15	31-Aug-2023 10:15	31-Aug-2023 10:15	----	----
Analyte	*CAS Number*	*Method/Lab*	*LOR*	*Unit*		**WP2321890-001**	**WP2321890-002**	**WP2321890-003**	********	********
						Result	Result	Result	----	----
Metals										
Potassium	7440-09-7	E440/WT	100	mg/kg		3700	----	----	----	----
Zinc	7440-66-6	E440/WT	2.0	mg/kg		114	----	----	----	----

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	:**WP2321890**	Page	: 1 of 8
Amendment	:**1**		
Client	:**City of Portage la Prairie**	Laboratory	: ALS Environmental - Winnipeg
Contact	:Aaron Stechesen	Account Manager	: Judy Dalmaijer
Address	:97 Saskatchewan Avenue East Portage la Prairie MB Canada R1N 0L8	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	:204 239 8361	Telephone	: +1 204 255 9720
Project	:Wastewater	Date Samples Received	: 01-Sep-2023 11:50
PO	: W23017	Issue Date	: 15-Sep-2023 16:37
C-O-C number	:----		
Sampler	:----		
Site	:Wastewater		
Quote number	:Wastewater		
No. of samples received	:3		
No. of samples analysed	:3		

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 Service 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 Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

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
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag 23-08-51	E366	31-Aug-2023	08-Sep-2023	28 days	8 days	✓	08-Sep-2023	28 days	8 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag 23-08-50	E510	31-Aug-2023	07-Sep-2023	28 days	7 days	✓	07-Sep-2023	28 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag 23-08-50	E440	31-Aug-2023	07-Sep-2023	180 days	7 days	✓	07-Sep-2023	180 days	7 days	✓
Physical Tests : Atterberg Limits										
LDPE bag 23-08-52	E199	31-Aug-2023	----	----	----		07-Sep-2023	180 days	7 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag 23-08-51	E144	31-Aug-2023	----	----	----		05-Sep-2023	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag 23-08-50	E144	31-Aug-2023	----	----	----		06-Sep-2023	----	6 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag 23-08-50	E108	31-Aug-2023	07-Sep-2023	30 days	7 days	✓	07-Sep-2023	30 days	7 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
Plant Available Nutrients : Available Ammonium by Colourimetry (2N Potassium Chloride Ext.)										
LDPE bag 23-08-51	E312A	31-Aug-2023	08-Sep-2023	----	----		08-Sep-2023	0 days	0 days	✓
Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride										
LDPE bag 23-08-51	E269.N+N	31-Aug-2023	08-Sep-2023	180 days	8 days	✓	08-Sep-2023	3 days	0 days	✓
Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (2N Potassium Chloride										
LDPE bag 23-08-51	E269A.N+N	31-Aug-2023	08-Sep-2023	180 days	8 days	✓	08-Sep-2023	3 days	0 days	✓
Plant Available Nutrients : Available Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)										
LDPE bag 23-08-51	E269.NO2	31-Aug-2023	08-Sep-2023	180 days	8 days	✓	08-Sep-2023	3 days	0 days	✓
Plant Available Nutrients : Available Phosphorus by Colourimetry (Olsen)										
LDPE bag 23-08-50	E385	31-Aug-2023	07-Sep-2023	----	----		07-Sep-2023	0 days	0 days	✓
Sample Preparation : Dry and Grind in Soil/Solid <38°C										
LDPE bag 23-08-51	EPP441	31-Aug-2023	06-Sep-2023	----	----		----	3 days	6 days	✖ EHT

Legend & Qualifier Definitions

EHT: Exceeded ALS recommended hold time prior to analysis.

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)							
Atterberg Limits	E199	1122759	1	1	100.0	5.0	✓
Available Ammonium by Colourimetry (2N Potassium Chloride Ext.)	E312A	1124536	1	15	6.6	5.0	✓
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	1124680	1	11	9.0	5.0	✓
Available Nitrate and Nitrite by Colourimetry (2N Potassium Chloride Ext.)	E269A.N+N	1124537	1	1	100.0	5.0	✓
Available Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.NO2	1124681	1	9	11.1	5.0	✓
Available Phosphorus by Colourimetry (Olsen)	E385	1122791	1	4	25.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1121800	1	1	100.0	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1121801	1	1	100.0	5.0	✓
Moisture Content by Gravimetry	E144	1118742	1	16	6.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1122273	1	20	5.0	5.0	✓
Total Nitrogen by Combustion	E366	1125282	1	16	6.2	5.0	✓
Laboratory Control Samples (LCS)							
Atterberg Limits	E199	1122759	1	1	100.0	5.0	✓
Available Ammonium by Colourimetry (2N Potassium Chloride Ext.)	E312A	1124536	2	15	13.3	10.0	✓
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	1124680	2	11	18.1	10.0	✓
Available Nitrate and Nitrite by Colourimetry (2N Potassium Chloride Ext.)	E269A.N+N	1124537	2	1	200.0	10.0	✓
Available Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.NO2	1124681	2	9	22.2	10.0	✓
Available Phosphorus by Colourimetry (Olsen)	E385	1122791	2	4	50.0	10.0	✓
Mercury in Soil/Solid by CVAAS	E510	1121800	2	1	200.0	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1121801	2	1	200.0	10.0	✓
Moisture Content by Gravimetry	E144	1118742	1	16	6.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1122273	2	20	10.0	10.0	✓
Total Nitrogen by Combustion	E366	1125282	2	16	12.5	10.0	✓
Method Blanks (MB)							
Available Ammonium by Colourimetry (2N Potassium Chloride Ext.)	E312A	1124536	1	15	6.6	5.0	✓
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	1124680	1	11	9.0	5.0	✓
Available Nitrate and Nitrite by Colourimetry (2N Potassium Chloride Ext.)	E269A.N+N	1124537	1	1	100.0	5.0	✓
Available Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.NO2	1124681	1	9	11.1	5.0	✓
Available Phosphorus by Colourimetry (Olsen)	E385	1122791	1	4	25.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1121800	1	1	100.0	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1121801	1	1	100.0	5.0	✓
Moisture Content by Gravimetry	E144	1118742	1	16	6.2	5.0	✓
Total Nitrogen by Combustion	E366	1125282	1	16	6.2	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
pH by Meter (1:2 Soil:Water Extraction)	E108 ALS Environmental - Saskatoon	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 °C) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 ALS Environmental - Waterloo	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 the wet weight of the sample, expressed as a percentage.
Atterberg Limits	E199 ALS Environmental - Saskatoon	Soil/Solid	CSSS Ch. 58 (mod)	Atterberg Limits are measures of physical properties of fine grained soils. Liquid Limit (LL) is the water content where soil behaviour changes from plastic to liquid, and is determined by Casagrande cup. Plastic Limit (PL) is the water content where soil begins to exhibit plastic behaviour, and is measured as the moisture content of a 3 mm diameter thread of soil which begins to crumble when rolled. Plasticity Index (PI) is equal to LL - PL.
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N ALS Environmental - Saskatoon	Soil/Solid	Alberta Agriculture/APHA 4500-NO3 I (mod)	Plant available nitrate and nitrite are analyzed by colourimetry using a flow injection analyzer on a soil sample extract that has been extracted using 0.01M Calcium Chloride, then shaken well and filtered prior to analysis.
Available Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.NO2 ALS Environmental - Saskatoon	Soil/Solid	Alberta Agriculture/APHA 4500-NO2 B (mod)	Plant available nitrite is analyzed by colourimetry using a flow injection analyzer on a soil sample extract that has been extracted using 0.01M Calcium Chloride, then shaken well and filtered prior to analysis.
Available Nitrate and Nitrite by Colourimetry (2N Potassium Chloride Ext.)	E269A.N+N ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 6.2/APHA 4500-NO3 I (mod)	Plant available nitrate and nitrite is analyzed by colourimetry using a flow injection analyzer on a soil sample extract that has been extracted using 2N potassium chloride, then shaken well and filtered prior to analysis.
Available Ammonium by Colourimetry (2N Potassium Chloride Ext.)	E312A ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 6.2/Comm Soil Sci 19(6) (mod)	Plant available ammonium is analyzed by colourimetry on a soil sample extract that has been extracted using 2N Potassium Chloride, then shaken well and filtered prior to analysis.
Total Nitrogen by Combustion	E366 ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 22.4	The sample is ignited in a combustion analyzer where nitrogen in the reduced nitrous oxide gas is determined using a thermal conductivity detector.
Available Phosphorus by Colourimetry (Olsen)	E385 ALS Environmental - Saskatoon	Soil/Solid	Carter CSSS (2008) 8.3	Plant available phosphorus is extracted from air dried soil using a fixed ratio bicarbonate extraction. Phosphorus is determined by colorimetry.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Description
Metals in Soil/Solid by CRC ICPMS	E440 ALS Environmental - Waterloo	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.
Mercury in Soil/Solid by CVAAS	E510 ALS Environmental - Waterloo	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.
Available Nitrate by Difference (0.01M Calcium Chloride Ext.)	EC269.NO3 ALS Environmental - Saskatoon	Soil/Solid	Alberta Agriculture/APHA 4500-NO3 I (mod)	Available Nitrate is determined by difference between Nitrate+Nitrite-N and Nitrite-N. A soil sample extract that has been extracted using 0.01M Calcium Chloride, then shaken well and filtered prior to analysis.
Total Available Nitrogen (Calculation)	EC269A.N ALS Environmental - Saskatoon	Soil/Solid	Calculation	Total available nitrogen is calculated as the sum of NO2-N+NO3-N and NH3-N extracted from soil using 2N potassium chloride solution.
Available Nitrate by Difference (2N Potassium Chloride Ext.)	EC269A.NO3 ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 6.2/APHA 4500-NO3 I (mod)	Available Nitrate is determined by difference between Nitrate+Nitrite-N and Nitrite-N. A soil sample extract that has been extracted using 2N Potassium Chloride, then shaken well and filtered prior to analysis.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Description
Leach 1:2 Soil:Water for pH/EC	EP108 ALS Environmental - Saskatoon	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Fixed ratio 0.01M Calcium Chloride extraction for plant available nutrients	EP269 ALS Environmental - Saskatoon	Soil/Solid	Alberta Agriculture	Plant available nutrients (N&S) extracted using 0.01M calcium chloride, then shaken well and filtered prior to analysis.
2N Potassium Chloride extraction for available nutrients	EP269A ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 6.2	A soil sample extract is generated by fixed ratio extraction using 2N Potassium Chloride, then shaken well and filtered prior to analysis.
Bicarbonate extraction for soil	EP385 ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 8.2	Plant available phosphorus is extracted using fixed ratio sodium bicarbonate solution (Olsen method).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Metals and Mercury	EP440 ALS Environmental - Waterloo	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
Dry and Grind in Soil/Solid <38°C	EPP441 ALS Environmental - Saskatoon	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of coarse fragments a portion of homogenized sample is set in a tray and dried at less than 38°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.
Dry and Grind in Soil/Solid <60°C	EPP442 ALS Environmental - Saskatoon	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.

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QUALITY CONTROL REPORT

Work Order	:**WP2321890**	Page	: 1 of 7
Amendment	:**1**		
Client	:City of Portage la Prairie	Laboratory	:ALS Environmental - Winnipeg
Contact	:Aaron Stechesen	Account Manager	:Judy Dalmaijer
Address	:97 Saskatchewan Avenue East Portage la Prairie MB Canada R1N 0L8	Address	:1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	:	Telephone	:+1 204 255 9720
Project	:Wastewater	Date Samples Received	:01-Sep-2023 11:50
PO	:W23017	Date Analysis Commenced	:05-Sep-2023
C-O-C number	:---	Issue Date	:15-Sep-2023 16:29
Sampler	:--- 204 239 8361		
Site	:Wastewater		
Quote number	:Wastewater		
No. of samples received	:3		
No. of samples analysed	:3		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

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	Laboratory Supervisor	Saskatoon Inorganics, Saskatoon, Saskatchewan
Colby Bingham	Laboratory Supervisor	Saskatoon Sask Soils, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Saskatoon Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Saskatoon Sask Soils, Saskatoon, Saskatchewan
Maria Painchaud	Laboratory Assistant	Saskatoon Inorganics, Saskatoon, Saskatchewan
Maria Painchaud	Laboratory Assistant	Saskatoon Sask Soils, Saskatoon, Saskatchewan
Nancy Cruse	Laboratory Assistant	Saskatoon Sask Soils, Saskatoon, Saskatchewan
Neha Kamran		Winnipeg Organics, Winnipeg, Manitoba
Niral Patel		Waterloo Centralized Prep, Waterloo, Ontario
Walt Kippenhuck	Supervisor - Inorganic	Waterloo Metals, Waterloo, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology 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 Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

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

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1118742)											
WP2321855-001	Anonymous	Moisture	----	E144	0.25	%	8.05	8.52	5.66%	20%	----
Physical Tests (QC Lot: 1121802)											
WP2321890-001	23-08-50	Moisture	----	E144	0.25	%	17.3	18.1	4.79%	20%	----
Physical Tests (QC Lot: 1122273)											
CG2312122-008	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	6.95	6.97	0.287%	10%	----
Physical Tests (QC Lot: 1122759)											
WP2321890-003	23-08-52	Atterberg liquid limit [LL] (moisture)	----	E199	1.0	%	40.0	39.8	0.494%	20%	----
		Atterberg plastic limit [PL] (moisture)	----	E199	1.0	%	25.6	25.5	0.445%	20%	----
Anions and Nutrients (QC Lot: 1125282)											
TY2308696-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.020	%	1.32	1.32	0.553%	20%	----
Plant Available Nutrients (QC Lot: 1122791)											
WP2321659-001	Anonymous	Phosphate, available (as P)	14265-44-2	E385	5.0	mg/kg	52.8	54.2	2.74%	30%	----
Plant Available Nutrients (QC Lot: 1124536)											
WP2321890-002	23-08-51	Ammonium, available (as N)	14798-03-9	E312A	1.0	mg/kg	4.0	4.8	0.8	Diff <2x LOR	----
Plant Available Nutrients (QC Lot: 1124537)											
WP2321890-002	23-08-51	Nitrate + Nitrite, available (as N)	----	E269A.N+N	2.0	mg/kg	4.7	4.4	0.3	Diff <2x LOR	----
Plant Available Nutrients (QC Lot: 1124680)											
FC2302453-001	Anonymous	Nitrate + Nitrite, available (as N)	----	E269.N+N	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
Plant Available Nutrients (QC Lot: 1124681)											
WP2321659-001	Anonymous	Nitrite, available (as N)	14797-65-0	E269.NO2	0.40	mg/kg	<0.40	0.49	0.09	Diff <2x LOR	----
Metals (QC Lot: 1121800)											
WP2321890-001	23-08-50	Mercury	7439-97-6	E510	0.0050	mg/kg	0.0315	0.0339	7.22%	40%	----
Metals (QC Lot: 1121801)											
WP2321890-001	23-08-50	Cadmium	7440-43-9	E440	0.020	mg/kg	0.690	0.632	8.80%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	30.4	28.3	7.13%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	24.8	23.3	6.30%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	13.0	12.0	8.32%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	32.4	30.7	5.36%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	1070	992	7.42%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	3700	3360	9.64%	40%	----

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 1121801) - continued											
WP2321890-001	23-08-50	Zinc	7440-66-6	E440	2.0	mg/kg	114	107	6.69%	30%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1118742)						
Moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 1121802)						
Moisture	----	E144	0.25	%	<0.25	----
Anions and Nutrients (QCLot: 1125282)						
Nitrogen, total	7727-37-9	E366	0.02	%	<0.020	----
Plant Available Nutrients (QCLot: 1122791)						
Phosphate, available (as P)	14265-44-2	E385	1	mg/kg	<1.0	----
Plant Available Nutrients (QCLot: 1124536)						
Ammonium, available (as N)	14798-03-9	E312A	1	mg/kg	<1.0	----
Plant Available Nutrients (QCLot: 1124537)						
Nitrate + Nitrite, available (as N)	----	E269A.N+N	2	mg/kg	<2.0	----
Plant Available Nutrients (QCLot: 1124680)						
Nitrate + Nitrite, available (as N)	----	E269.N+N	1	mg/kg	<1.0	----
Plant Available Nutrients (QCLot: 1124681)						
Nitrite, available (as N)	14797-65-0	E269.NO2	0.4	mg/kg	<0.40	----
Metals (QCLot: 1121800)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1121801)						
Cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
Chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
Copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
Lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
Nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
Phosphorus	7723-14-0	E440	50	mg/kg	<50	----
Potassium	7440-09-7	E440	100	mg/kg	<100	----
Zinc	7440-66-6	E440	2	mg/kg	<2.0	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1118742)									
Moisture	---	E144	0.25	%	50 %	101	90.0	110	---
Physical Tests (QCLot: 1121802)									
Moisture	---	E144	0.25	%	50 %	100	90.0	110	---
Physical Tests (QCLot: 1122273)									
pH (1:2 soil:water)	---	E108	---	pH units	7 pH units	100	97.0	103	---
Anions and Nutrients (QCLot: 1125282)									
Nitrogen, total	7727-37-9	E366	0.02	%	22.37 %	99.3	90.0	110	---
Plant Available Nutrients (QCLot: 1122791)									
Phosphate, available (as P)	14265-44-2	E385	1	mg/kg	20 mg/kg	102	80.0	120	---
Plant Available Nutrients (QCLot: 1124536)									
Ammonium, available (as N)	14798-03-9	E312A	1	mg/kg	10 mg/kg	105	80.0	120	---
Plant Available Nutrients (QCLot: 1124537)									
Nitrate + Nitrite, available (as N)	---	E269A.N+N	2	mg/kg	40 mg/kg	112	70.0	130	---
Plant Available Nutrients (QCLot: 1124680)									
Nitrate + Nitrite, available (as N)	---	E269.N+N	1	mg/kg	40 mg/kg	96.6	70.0	130	---
Plant Available Nutrients (QCLot: 1124681)									
Nitrite, available (as N)	14797-65-0	E269.NO2	0.4	mg/kg	20 mg/kg	104	70.0	130	---
Metals (QCLot: 1121800)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	116	80.0	120	---
Metals (QCLot: 1121801)									
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	102	80.0	120	---
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	99.8	80.0	120	---
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	98.7	80.0	120	---
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	102	80.0	120	---
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	98.2	80.0	120	---
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	101	80.0	120	---
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	101	80.0	120	---
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	97.3	80.0	120	---

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Physical Tests (QCLot: 1122273)									
	RM	pH (1:2 soil:water)	---	E108	8.13 pH units	98.5	96.0	104	---
Physical Tests (QCLot: 1122759)									
	RM	Atterberg liquid limit [LL] (moisture)	---	E199	33.68 %	99.6	80.0	120	---
	RM	Atterberg plastic limit [PL] (moisture)	---	E199	20 %	97.9	80.0	120	---
Anions and Nutrients (QCLot: 1125282)									
	RM	Nitrogen, total	7727-37-9	E366	0.11 %	95.6	80.0	120	---
Plant Available Nutrients (QCLot: 1122791)									
	RM	Phosphate, available (as P)	14265-44-2	E385	15.3 mg/kg	106	80.0	120	---
Plant Available Nutrients (QCLot: 1124536)									
	RM	Ammonium, available (as N)	14798-03-9	E312A	70.1 mg/kg	108	80.0	120	---
Plant Available Nutrients (QCLot: 1124537)									
	RM	Nitrate + Nitrite, available (as N)	---	E269A.N+N	11.1 mg/kg	99.0	70.0	130	---
Plant Available Nutrients (QCLot: 1124680)									
	RM	Nitrate + Nitrite, available (as N)	---	E269.N+N	11.3 mg/kg	106	70.0	130	---
Plant Available Nutrients (QCLot: 1124681)									
	RM	Nitrite, available (as N)	14797-65-0	E269.NO2	0.1 mg/kg	153	0	570	---
Metals (QCLot: 1121800)									
	RM	Mercury	7439-97-6	E510	0.0585 mg/kg	126	70.0	130	---
Metals (QCLot: 1121801)									
	RM	Cadmium	7440-43-9	E440	0.91 mg/kg	101	70.0	130	---
	RM	Chromium	7440-47-3	E440	101 mg/kg	102	70.0	130	---
	RM	Copper	7440-50-8	E440	123 mg/kg	108	70.0	130	---
	RM	Lead	7439-92-1	E440	267 mg/kg	101	70.0	130	---
	RM	Nickel	7440-02-0	E440	26.7 mg/kg	102	70.0	130	---
	RM	Phosphorus	7723-14-0	E440	752 mg/kg	94.3	70.0	130	---
	RM	Potassium	7440-09-7	E440	1587 mg/kg	105	70.0	130	---
	RM	Zinc	7440-66-6	E440	297 mg/kg	100	70.0	130	---

Chain of Custody (COC) / Analytical Request Form

COC Number: 22 -

Page 1 of 1

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Environmental Division Winnipeg
Work Order Reference
WP2321890

Telephone : +1 204 255 9720

Report To	Contact and company name below will appear on the final report
Company:	City of Portage La Prairie
Contact:	Aaron Stechesen
Phone:	1-204-239-8361
	Company address below will appear on the final report
Street:	97 Saskatchewan Avenue East
City/Province:	Portage La Prairie
Postal Code:	R1N 0L8
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

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: astechesen@city-plap.com
Email 2: astechesen@city-plap.com
Email 3:

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: astechesen@city-plap.com
Email 2:

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
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge
Additional fees may apply to rush requests on weekends, statutory holidays and non-standard TAT.
Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm
For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information

ALS Account # / Quote #:	GMPP100 / WP2022GMPP1000002
Job #:	
PO / AFE:	W23017
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO# W23017
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only):

ALS Contact: Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

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	E108	E510	E440	E385	E312A, EC269A.NO3, E269A.N+N	E366A	EC269.NO3, E269.N+N, E269.NO2	MOIST-SK	PREP-DRY/GRIND-SK	E199	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	23-08-50	31-Aug-23	10:15	Soil	2	P4	P4	P4	P4				P4	P4				
	23-08-51	31-Aug-23	10:15	Soil	2					P4	P4	P4	P4	P4				
	23-08-52	31-Aug-23	10:15	Soil	2									P4	P4			

RU
S-8194, ULI

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
20.6	

SHIPMENT RELEASE (client use)

Released by: Aaron Stechesen Date: 01-Sep-23 Time: 9:30

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: JB Date: SEP 01 2023 Time: 11:30

FINAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

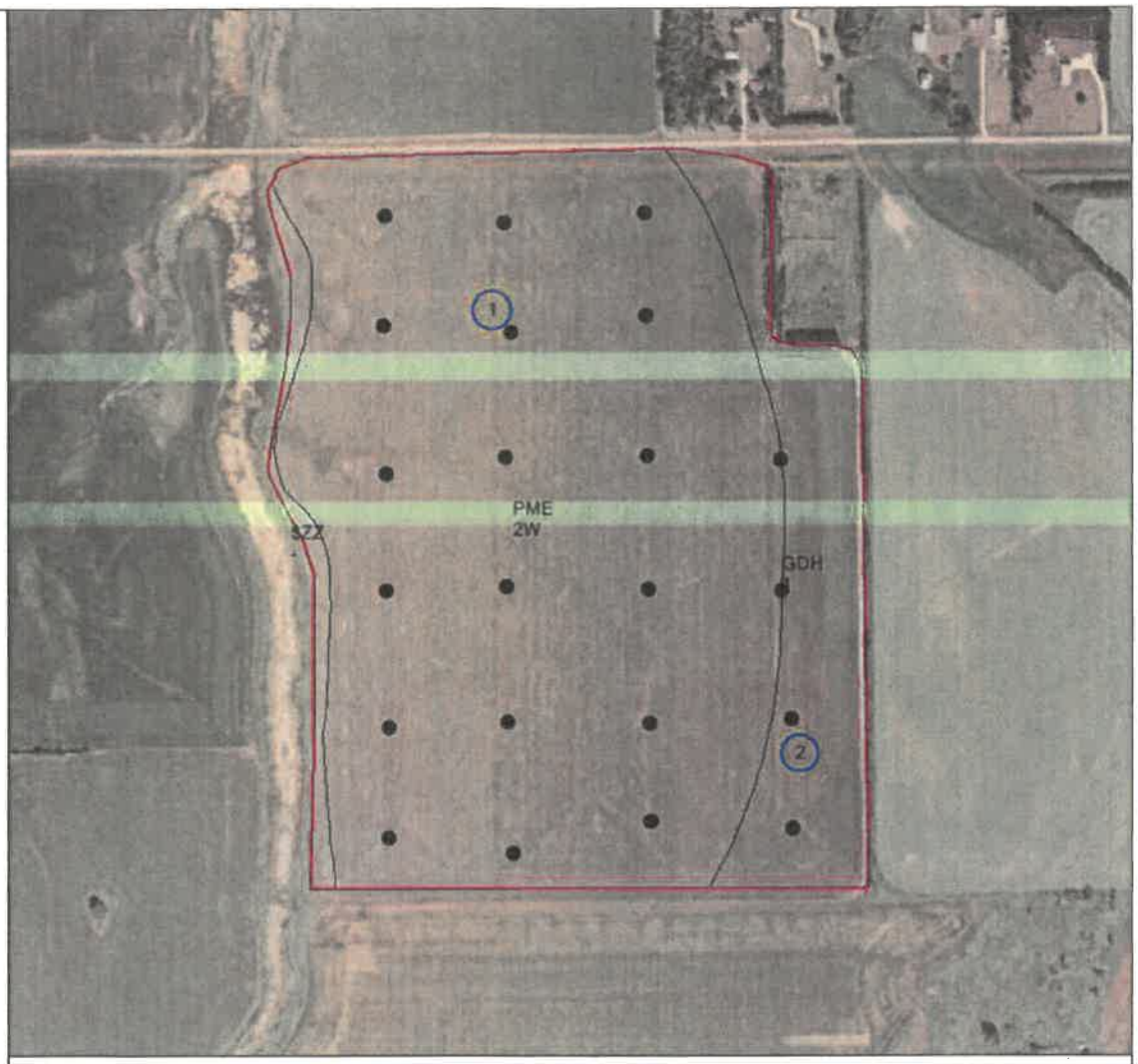
WHITE - LABORATORY COPY YELLOW - CLIENT COPY

FEB 2022 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 aRegulated Drinking Water (DW) Systemplease submit using anAuthorized DW COC form

Delta Ag Services
City of Portage
MacDonald NW 4-13-6



Clay Test - 0.6 Ac
QuickMark2-2023
Boundary - 116.6 Ac
Portage Soils-Clip - 116.6 Ac

Clay Test Sites; 1 & 2 Had no detectable water table at the 1.5 M depth

Delta Ag SERVICES

LETTER OF AGREEMENT

Ms. Karly Friesen
Director of Utility
City of Portage la Prairie
97 Saskatchewan Ave. E.
Portage la Prairie, MB
R1N 0L8

Dear Land Owner:

I hereby agree to permit the City of Portage la Prairie to apply wastewater treatment residual biosolids to the land, which I own as described below, on the understanding that:

1. The biosolids will be injected approximately 15 cm below the surface.
2. The biosolids will be injected to a maximum rate of 10 dry tonnes per hectare. (Maximum allowable over a 4-year period.)
3. Application will occur in the 2023 crop year, or as otherwise indicated.
4. Biosolids application will not be closer than 300 meters to a dwelling not belonging to the owner or lessee of the land on which biosolids are applied.
5. Biosolids will not be applied within 15 meters of a ditch draining less than one section and 30 meters from drains serving a larger watershed.
6. All roadways, access roads, and ditches will be repaired to the original condition upon completion of the application program, to the satisfaction of the City, municipality and the landowner.
7. The City makes no warranties or representations as to the fertilizer content nor any soil conditioning effect of the biosolids.
8. The City will determine background levels of nutrients, heavy metals, pH, and clay depth prior to the application of biosolids. This information will be provided to the landowner.
9. The City will assess the biosolids quality prior to the application program and will monitor it throughout the program. Test results will be provided to the landowner.
10. Temporary halting of the application due to wet field conditions will occur upon mutual agreement between representatives of the City, contractor and landowner.
11. Biosolids may be injected at a maximum rate of addition of plant-available nitrogen of 100 kilograms per hectare.
12. The cumulative mass per hectare of each heavy metal in the soil does not exceed the respective value stipulated in the City's Environment Act License, and that not more than one-third of the initial maximum addition of each heavy metal will be applied in this year's program.
13. The City will restore the field to a condition similar that as found prior to the application program.

LETTER OF AGREEMENT

I, on my part, agree to:

a) Plant a cereal, oilseed, forage, field pea, or lentil crop at the beginning of the next growing season. Only these listed crops will be grown for three growing seasons following biosolids application. A crop will not be grown that is a vegetable or a fruit and livestock will not be allowed to graze for three growing seasons after biosolids application on the land.
b) Provide crop information to the City on an annual basis.
c) Consider the soil and biosolids test results prior to applying nitrogen fertilizer in the growing season following biosolids application and restrict the addition of plant-available nitrogen to a maximum of 100 kg/ha, including that derived from the application of biosolids. Fertilizer, including that derived from biosolids, will be applied at the recommended agronomic rates.
d) Release and discharge the City of Portage la Prairie of and from all claims, demands, actions or causes of actions which I have or may have as the result of the application of wastewater biosolids to my land.
e) Provide the City with a letter of acceptance upon completion of the biosolids application indicating my acceptance of field conditions.
f) Notify the lessee of the land (if applicable) of this agreement.

ALLAN WATSON
Land Owner Name

Land Owner Signature

14/3/23
Date

KAILY FRIESEN
City Representative Name

City Representative Signature

14/3/2023
Date

Land Location(s): SE 16-12-E

2023 Bio-Solid Application Recording Sheet

Reference Sample Soil Material Criteria is SRM 1646a/SRM2709

See Appendix Section for Information

Name of Land Owner	Watson
Legal Description	SE 16-12-6
Land Owner Authorization	Yes
Dist. >300m from residences	Yes
Map Enclosed	Yes
Year Field previously Used	2017- Started field in 2022, completed in 2023
GPS	**Lat** _____ **Long** _____

		Date	Date	Date	Date	Date	Date	
		BST 18/10/2023	BST 18/10/2023 lbs/ac	LRAR 18/10/2023	LRAR 18/10/2023 lbs/ac			Comments
Field Soil Analysis mg/kg 0-15 cm	Cadmium	0.503		0.503				
	Calcium							
	Chromium	22.5		22.5				
	Copper	19.2		19.2				
	Lead	10.0		10.0				
	Mercury	0.0319		0.0319				
	Nickel	24.4		24.4				
	pH	7.58		7.58				
	Phosphorus < 60 ug/g	755		755				
	Potassium	2730		2730				
	Soil Nitrate Nitrogen 0-60cm<100kg/ha	9.8		9.8				
	Zinc	94.6		95.0				
Bio-Solids Analysis mg/kg	Ammonia Nitrogen	678		154				
	Cadmium	0.00264		0.000427				
	Chromium	0.180		0.00773				
	Conductivity	5620		3420				
	Copper	1.71		0.0219				
	Lead	0.0797		0.00248				
	Mercury	0.0000250		0.0000250				
	Nickel	0.207		0.0203				
	Nitrate Nitrogen	0.400		0.400				
	Organic Nitrogen	432		34.2				
	pH	7.17		7.32				
	Potassium	262		246				
	Total Nitrogen	1110		187				
	Total Phosphorus	173		33.8				
	Total Solids	19200		7700				
	Volatile Solids	11500		194				
	Zinc	1.33		0.119				
Cummulative Results Kg/Hectare	Cadmium < 2.88	0.905	0.807	0.905	0.807			
	Chromium < 216	40.501	36.13	40.502	36.14			
	Copper < 90	34.568	30.84	34.577	30.85			
	Lead < 90	18.000	16.06	18.001	16.06			
	Mercury < 0.9	0.057	0.05	0.057	0.05			
	Nickel < 90	43.921	39.19	43.922	39.19			
	Nutrient Appl. Rate PA-N<100/kg	101.55	90.60	32.57	29.06			67.06 Field Average
	Solids <10	4.080	3.64	9.812	8.75			6.946 Field Average
	Zinc < 270	170.280	151.92	170.280	151.92			
	Phosphorus	1359.706	1213.10	1360.697	1213.99			
	Comments							

ALLAN WATSON
PORTAGE FALL OF 2022

ASSINIBOINE INJECTIONS LTD

BOX 160 177 NOTRE DAME AVE NOTRE DAME, MB ROG 1M0 PH: 204-248-2559 FAX: 204-248-2799

DAILY SLUDGE APPLICATION PLAN

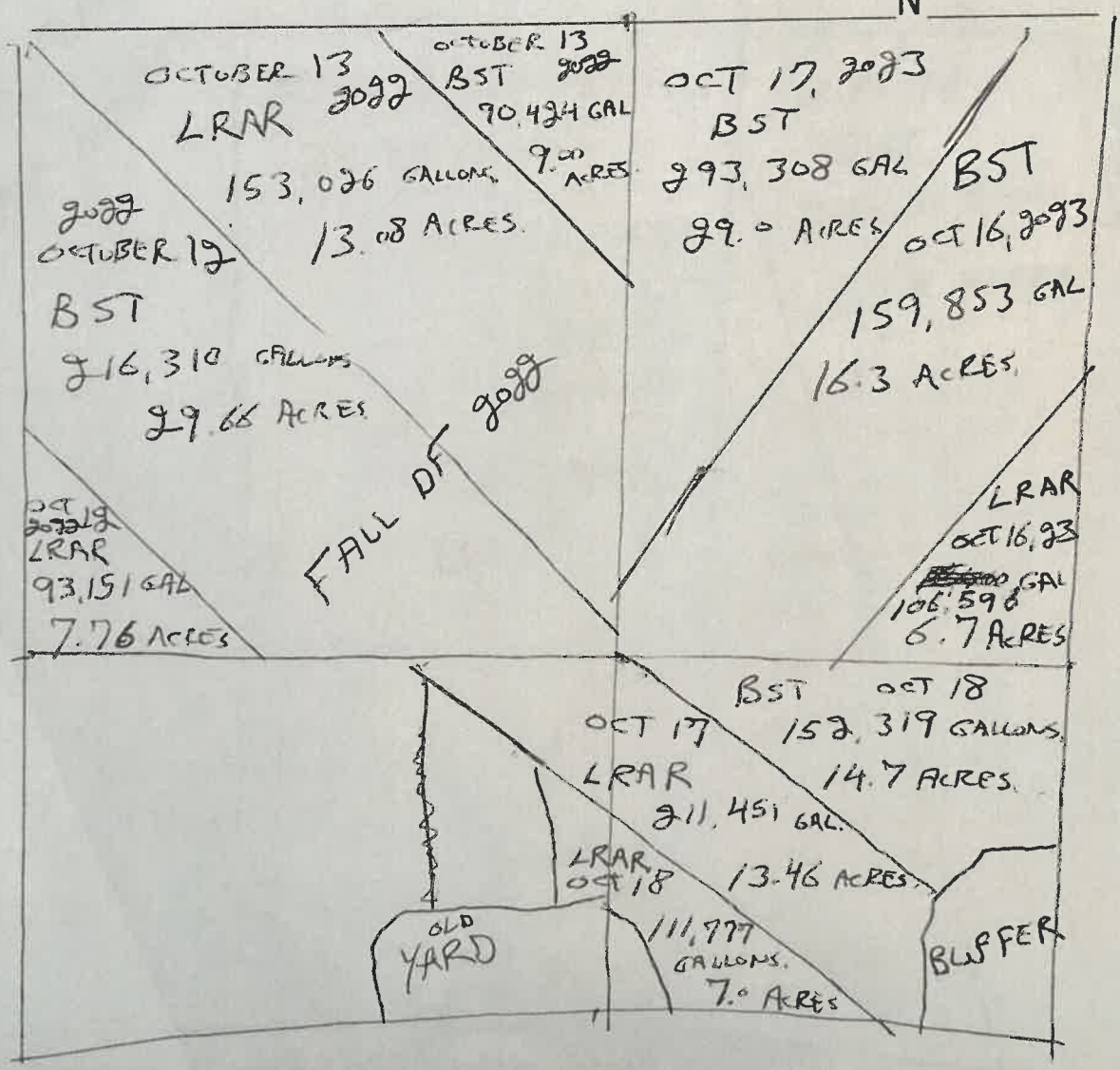
DATE: _____

FARMERS NAME: _____

FIELD: SEC. ____ TWP _____ RGE _____

APPLICATION TYPE: INJECTION

DEPTH : ___6"_____ HA: _____ CM3: _____



WAT 501

SE 16-12-6

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **WP2323097**	Page	: 1 of 4
Client	: **City of Portage la Prairie**	Laboratory	: ALS Environmental - Winnipeg
Contact	: Aaron Stechesen	Account Manager	: Judy Dalmaijer
Address	: 97 Saskatchewan Avenue East Portage la Prairie MB Canada R1N 0L8	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg MB Canada R2J 3T4
Telephone	: 204 239 8361	Telephone	: +1 204 255 9720
Project	: Wastewater	Date Samples Received	: 13-Sep-2023 14:30
PO	: w23017	Date Analysis Commenced	: 15-Sep-2023
C-O-C number	: ----	Issue Date	: 19-Sep-2023 12:00
Sampler	: ----		
Site	: Wastewater		
Quote number	: Wastewater		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

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	Laboratory Supervisor	Sask Soils, Saskatoon, Saskatchewan
Greg Pokocky	Manager - Inorganics	Centralized Prep, Waterloo, Ontario
Greg Pokocky	Manager - Inorganics	Metals, Waterloo, Ontario
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Sask Soils, Saskatoon, Saskatchewan
Jeremy Greuel	Laboratory Assistant	Inorganics, Saskatoon, Saskatchewan
Maria Painchaud	Laboratory Assistant	Sask Soils, Saskatoon, Saskatchewan
Milad Khani	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan
Milad Khani	Laboratory Analyst	Sask Soils, Saskatoon, Saskatchewan
Simrankaur Kaur		Organics, Winnipeg, Manitoba

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*
%	percent
°C	degrees celsius
mg/kg	milligrams per kilogram
pH units	pH units

<: 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.

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	23-09-43	23-09-44	23-09-45	----	----
					Client sampling date / time	13-Sep-2023 10:30	13-Sep-2023 10:30	13-Sep-2023 10:30	----	----
						WP2323097-001	WP2323097-002	WP2323097-003	--------	--------
						Result	Result	Result	---	---
Sample Preparation										
Temperature, oven	----	EPP441/SK	1	°C		----	<38	----	----	----
Physical Tests										
Atterberg plastic limit [PL] (moisture)	----	E199/SK	1.0	%		----	----	20.4	----	----
Moisture	----	E144/WP	0.25	%		----	19.2	----	----	----
Moisture	----	E144/WT	0.25	%		19.1	----	----	----	----
pH (1:2 soil:water)	----	E108/SK	0.10	pH units		7.58	----	----	----	----
Atterberg liquid limit [LL] (moisture)	----	E199/SK	1.0	%		----	----	38.4	----	----
Atterberg plasticity index [PI]	----	E199/SK	1.0	%		----	----	18.0	----	----
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	200	mg/kg		----	1390	----	----	----
Plant Available Nutrients										
Ammonium, available (as N)	14798-03-9	E312A/SK	1.0	mg/kg		----	7.1	----	----	----
Nitrate + Nitrite, available (as N)	----	E269.N+N/SK	1.0	mg/kg		----	9.8	----	----	----
Nitrate + Nitrite, available (as N)	----	E269A.N+N/SK	2.0	mg/kg		----	9.8	----	----	----
Nitrate, available (as N)	14797-55-8	EC269.NO3/SK	2.0	mg/kg		----	9.8	----	----	----
Nitrite, available (as N)	14797-65-0	E269.NO2/SK	0.40	mg/kg		----	<0.40	----	----	----
Phosphate, available (as P)	14265-44-2	E385/SK	1.0	mg/kg		24.0	----	----	----	----
Nitrate, available (as N)	14797-55-8	EC269A.NO3/SK	2.0	mg/kg		----	9.8	----	----	----
Metals										
Cadmium	7440-43-9	E440/WT	0.020	mg/kg		0.503	----	----	----	----
Chromium	7440-47-3	E440/WT	0.50	mg/kg		22.5	----	----	----	----
Copper	7440-50-8	E440/WT	0.50	mg/kg		19.2	----	----	----	----
Lead	7439-92-1	E440/WT	0.50	mg/kg		10.0	----	----	----	----
Mercury	7439-97-6	E510/WT	0.0050	mg/kg		0.0319	----	----	----	----
Nickel	7440-02-0	E440/WT	0.50	mg/kg		24.4	----	----	----	----
Phosphorus	7723-14-0	E440/WT	50	mg/kg		755	----	----	----	----
Potassium	7440-09-7	E440/WT	100	mg/kg		2730	----	----	----	----

Analytical Results

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

					Client sample ID	23-09-43	23-09-44	23-09-45	----	----
					Client sampling date / time	13-Sep-2023 10:30	13-Sep-2023 10:30	13-Sep-2023 10:30	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		WP2323097-001	WP2323097-002	WP2323097-003	--------	--------
						Result	Result	Result	----	----
Metals										
Zinc	7440-66-6	E440/WT	2.0	mg/kg		94.6	----	----	----	----

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	:**WP2323097**	Page	: 1 of 8
Client	:**City of Portage la Prairie**	Laboratory	: ALS Environmental - Winnipeg
Contact	:Aaron Stechesen	Account Manager	: Judy Dalmaijer
Address	:97 Saskatchewan Avenue East Portage la Prairie MB Canada R1N 0L8	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	:204 239 8361	Telephone	: +1 204 255 9720
Project	:Wastewater	Date Samples Received	: 13-Sep-2023 14:30
PO	: w23017	Issue Date	: 19-Sep-2023 12:00
C-O-C number	:----		
Sampler	:----		
Site	:Wastewater		
Quote number	:Wastewater		
No. of samples received	:3		
No. of samples analysed	:3		

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 Service 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 Test sample Surrogate recovery outliers exist.

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.

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
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag 23-09-44	E366	13-Sep-2023	16-Sep-2023	28 days	3 days	✓	16-Sep-2023	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag 23-09-43	E510	13-Sep-2023	16-Sep-2023	28 days	3 days	✓	18-Sep-2023	28 days	5 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag 23-09-43	E440	13-Sep-2023	16-Sep-2023	180 days	3 days	✓	18-Sep-2023	180 days	5 days	✓
Physical Tests : Atterberg Limits										
LDPE bag 23-09-45	E199	13-Sep-2023	----	----	----		18-Sep-2023	180 days	5 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag 23-09-44	E144	13-Sep-2023	----	----	----		15-Sep-2023	----	2 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag 23-09-43	E144	13-Sep-2023	----	----	----		16-Sep-2023	----	3 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag 23-09-43	E108	13-Sep-2023	16-Sep-2023	30 days	3 days	✓	18-Sep-2023	30 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
Plant Available Nutrients : Available Ammonium by Colourimetry (2N Potassium Chloride Ext.)										
LDPE bag 23-09-44	E312A	13-Sep-2023	18-Sep-2023	----	----		18-Sep-2023	0 days	0 days	✓
Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride										
LDPE bag 23-09-44	E269.N+N	13-Sep-2023	18-Sep-2023	180 days	5 days	✓	18-Sep-2023	3 days	0 days	✓
Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (2N Potassium Chloride										
LDPE bag 23-09-44	E269A.N+N	13-Sep-2023	18-Sep-2023	180 days	5 days	✓	18-Sep-2023	3 days	0 days	✓
Plant Available Nutrients : Available Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)										
LDPE bag 23-09-44	E269.NO2	13-Sep-2023	18-Sep-2023	180 days	5 days	✓	18-Sep-2023	3 days	0 days	✓
Plant Available Nutrients : Available Phosphorus by Colourimetry (Olsen)										
LDPE bag 23-09-43	E385	13-Sep-2023	18-Sep-2023	----	----		18-Sep-2023	0 days	0 days	✓
Sample Preparation : Dry and Grind in Soil/Solid <38°C										
LDPE bag 23-09-44	EPP441	13-Sep-2023	15-Sep-2023	----	----		----	3 days	2 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)							
Atterberg Limits	E199	1139391	1	1	100.0	5.0	✓
Available Ammonium by Colourimetry (2N Potassium Chloride Ext.)	E312A	1138119	1	14	7.1	5.0	✓
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	1138110	1	12	8.3	5.0	✓
Available Nitrate and Nitrite by Colourimetry (2N Potassium Chloride Ext.)	E269A.N+N	1138120	1	2	50.0	5.0	✓
Available Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.NO2	1138111	1	11	9.0	5.0	✓
Available Phosphorus by Colourimetry (Olsen)	E385	1138122	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1136709	1	1	100.0	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1136710	1	2	50.0	5.0	✓
Moisture Content by Gravimetry	E144	1136230	1	8	12.5	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1137819	1	20	5.0	5.0	✓
Total Nitrogen by Combustion	E366	1138202	1	11	9.0	5.0	✓
Laboratory Control Samples (LCS)							
Atterberg Limits	E199	1139391	1	1	100.0	5.0	✓
Available Ammonium by Colourimetry (2N Potassium Chloride Ext.)	E312A	1138119	2	14	14.2	10.0	✓
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	1138110	2	12	16.6	10.0	✓
Available Nitrate and Nitrite by Colourimetry (2N Potassium Chloride Ext.)	E269A.N+N	1138120	2	2	100.0	10.0	✓
Available Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.NO2	1138111	2	11	18.1	10.0	✓
Available Phosphorus by Colourimetry (Olsen)	E385	1138122	2	12	16.6	10.0	✓
Mercury in Soil/Solid by CVAAS	E510	1136709	2	1	200.0	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1136710	2	2	100.0	10.0	✓
Moisture Content by Gravimetry	E144	1136230	1	8	12.5	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1137819	2	20	10.0	10.0	✓
Total Nitrogen by Combustion	E366	1138202	2	11	18.1	10.0	✓
Method Blanks (MB)							
Available Ammonium by Colourimetry (2N Potassium Chloride Ext.)	E312A	1138119	1	14	7.1	5.0	✓
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	1138110	1	12	8.3	5.0	✓
Available Nitrate and Nitrite by Colourimetry (2N Potassium Chloride Ext.)	E269A.N+N	1138120	1	2	50.0	5.0	✓
Available Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.NO2	1138111	1	11	9.0	5.0	✓
Available Phosphorus by Colourimetry (Olsen)	E385	1138122	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1136709	1	1	100.0	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1136710	1	2	50.0	5.0	✓
Moisture Content by Gravimetry	E144	1136230	1	8	12.5	5.0	✓
Total Nitrogen by Combustion	E366	1138202	1	11	9.0	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 Description
pH by Meter (1:2 Soil:Water Extraction)	E108 ALS Environmental - Saskatoon	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 °C) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 ALS Environmental - Waterloo	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 the wet weight of the sample, expressed as a percentage.
Atterberg Limits	E199 ALS Environmental - Saskatoon	Soil/Solid	CSSS Ch. 58 (mod)	Atterberg Limits are measures of physical properties of fine grained soils. Liquid Limit (LL) is the water content where soil behaviour changes from plastic to liquid, and is determined by Casagrande cup. Plastic Limit (PL) is the water content where soil begins to exhibit plastic behaviour, and is measured as the moisture content of a 3 mm diameter thread of soil which begins to crumble when rolled. Plasticity Index (PI) is equal to LL - PL.
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N ALS Environmental - Saskatoon	Soil/Solid	Alberta Agriculture/APHA 4500-NO3 I (mod)	Plant available nitrate and nitrite are analyzed by colourimetry using a flow injection analyzer on a soil sample extract that has been extracted using 0.01M Calcium Chloride, then shaken well and filtered prior to analysis.
Available Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.NO2 ALS Environmental - Saskatoon	Soil/Solid	Alberta Agriculture/APHA 4500-NO2 B (mod)	Plant available nitrite is analyzed by colourimetry using a flow injection analyzer on a soil sample extract that has been extracted using 0.01M Calcium Chloride, then shaken well and filtered prior to analysis.
Available Nitrate and Nitrite by Colourimetry (2N Potassium Chloride Ext.)	E269A.N+N ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 6.2/APHA 4500-NO3 I (mod)	Plant available nitrate and nitrite is analyzed by colourimetry using a flow injection analyzer on a soil sample extract that has been extracted using 2N potassium chloride, then shaken well and filtered prior to analysis.
Available Ammonium by Colourimetry (2N Potassium Chloride Ext.)	E312A ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 6.2/Comm Soil Sci 19(6) (mod)	Plant available ammonium is analyzed by colourimetry on a soil sample extract that has been extracted using 2N Potassium Chloride, then shaken well and filtered prior to analysis.
Total Nitrogen by Combustion	E366 ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 22.4	The sample is ignited in a combustion analyzer where nitrogen in the reduced nitrous oxide gas is determined using a thermal conductivity detector.
Available Phosphorus by Colourimetry (Olsen)	E385 ALS Environmental - Saskatoon	Soil/Solid	Carter CSSS (2008) 8.3	Plant available phosphorus is extracted from air dried soil using a fixed ratio bicarbonate extraction. Phosphorus is determined by colorimetry.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Metals in Soil/Solid by CRC ICPMS	E440 ALS Environmental - Waterloo	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.
Mercury in Soil/Solid by CVAAS	E510 ALS Environmental - Waterloo	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.
Available Nitrate by Difference (0.01M Calcium Chloride Ext.)	EC269.NO3 ALS Environmental - Saskatoon	Soil/Solid	Alberta Agriculture/APHA 4500-NO3 I (mod)	Available Nitrate is determined by difference between Nitrate+Nitrite-N and Nitrite-N. A soil sample extract that has been extracted using 0.01M Calcium Chloride, then shaken well and filtered prior to analysis.
Available Nitrate by Difference (2N Potassium Chloride Ext.)	EC269A.NO3 ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 6.2/APHA 4500-NO3 I (mod)	Available Nitrate is determined by difference between Nitrate+Nitrite-N and Nitrite-N. A soil sample extract that has been extracted using 2N Potassium Chloride, then shaken well and filtered prior to analysis.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 ALS Environmental - Saskatoon	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Fixed ratio 0.01M Calcium Chloride extraction for plant available nutrients	EP269 ALS Environmental - Saskatoon	Soil/Solid	Alberta Agriculture	Plant available nutrients (N&S) extracted using 0.01M calcium chloride, then shaken well and filtered prior to analysis.
2N Potassium Chloride extraction for available nutrients	EP269A ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 6.2	A soil sample extract is generated by fixed ratio extraction using 2N Potassium Chloride, then shaken well and filtered prior to analysis.
Bicarbonate extraction for soil	EP385 ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 8.2	Plant available phosphorus is extracted using fixed ratio sodium bicarbonate solution (Olsen method).
Digestion for Metals and Mercury	EP440 ALS Environmental - Waterloo	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Description
Dry and Grind in Soil/Solid <38°C	EPP441 ALS Environmental - Saskatoon	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of coarse fragments a portion of homogenized sample is set in a tray and dried at less than 38°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.
Dry and Grind in Soil/Solid <60°C	EPP442 ALS Environmental - Saskatoon	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.

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QUALITY CONTROL REPORT

Work Order	:**WP2323097**	Page	: 1 of 7
Client	:City of Portage la Prairie	Laboratory	:ALS Environmental - Winnipeg
Contact	:Aaron Stechesen	Account Manager	:Judy Dalmaijer
Address	:97 Saskatchewan Avenue East Portage la Prairie MB Canada R1N 0L8	Address	:1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	:	Telephone	:+1 204 255 9720
Project	:Wastewater	Date Samples Received	:13-Sep-2023 14:30
PO	:w23017	Date Analysis Commenced	:15-Sep-2023
C-O-C number	:---	Issue Date	:19-Sep-2023 12:02
Sampler	:--- 204 239 8361		
Site	:Wastewater		
Quote number	:Wastewater		
No. of samples received	:3		
No. of samples analysed	:3		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

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	Laboratory Supervisor	Saskatoon Sask Soils, Saskatoon, Saskatchewan
Greg Pokocky	Manager - Inorganics	Waterloo Centralized Prep, Waterloo, Ontario
Greg Pokocky	Manager - Inorganics	Waterloo Metals, Waterloo, Ontario
Hedy Lai	Team Leader - Inorganics	Saskatoon Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Saskatoon Sask Soils, Saskatoon, Saskatchewan
Jeremy Greuel	Laboratory Assistant	Saskatoon Inorganics, Saskatoon, Saskatchewan
Maria Painchaud	Laboratory Assistant	Saskatoon Sask Soils, Saskatoon, Saskatchewan
Milad Khani	Laboratory Analyst	Saskatoon Inorganics, Saskatoon, Saskatchewan
Milad Khani	Laboratory Analyst	Saskatoon Sask Soils, Saskatoon, Saskatchewan
Simrankaur Kaur		Winnipeg Organics, Winnipeg, Manitoba

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology 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 Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

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

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1136230)											
WP2323024-001	Anonymous	Moisture	----	E144	0.25	%	22.2	23.3	4.79%	20%	----
Physical Tests (QC Lot: 1137819)											
CG2312654-013	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	8.00	7.98	0.250%	10%	----
Physical Tests (QC Lot: 1138008)											
VA23C1475-006	Anonymous	Moisture	----	E144	0.25	%	8.53	9.59	11.7%	20%	----
Physical Tests (QC Lot: 1139391)											
WP2323097-003	23-09-45	Atterberg liquid limit [LL] (moisture)	----	E199	1.0	%	38.4	38.2	0.258%	20%	----
		Atterberg plastic limit [PL] (moisture)	----	E199	1.0	%	20.4	20.4	0.197%	20%	----
Anions and Nutrients (QC Lot: 1138202)											
VA23C1307-003	Anonymous	Nitrogen, total	7727-37-9	E366	0.020	%	0.106	0.104	0.002	Diff <2x LOR	----
Plant Available Nutrients (QC Lot: 1138110)											
WP2322619-001	Anonymous	Nitrate + Nitrite, available (as N)	----	E269.N+N	2.5	mg/kg	<2.5	<2.5	2.5	Diff <2x LOR	----
Plant Available Nutrients (QC Lot: 1138111)											
WP2322619-001	Anonymous	Nitrite, available (as N)	14797-65-0	E269.NO2	1.00	mg/kg	<1.00	<1.00	1.00	Diff <2x LOR	----
Plant Available Nutrients (QC Lot: 1138119)											
WP2323097-002	23-09-44	Ammonium, available (as N)	14798-03-9	E312A	1.0	mg/kg	7.1	7.7	0.6	Diff <2x LOR	----
Plant Available Nutrients (QC Lot: 1138120)											
WP2323097-002	23-09-44	Nitrate + Nitrite, available (as N)	----	E269A.N+N	2.0	mg/kg	9.8	10.7	1.0	Diff <2x LOR	----
Plant Available Nutrients (QC Lot: 1138122)											
VA23C1652-001	Anonymous	Phosphate, available (as P)	14265-44-2	E385	1.0	mg/kg	6.0	6.0	0.005	Diff <2x LOR	----
Metals (QC Lot: 1136709)											
WP2323097-001	23-09-43	Mercury	7439-97-6	E510	0.0050	mg/kg	0.0319	0.0307	3.99%	40%	----
Metals (QC Lot: 1136710)											
WP2323097-001	23-09-43	Cadmium	7440-43-9	E440	0.020	mg/kg	0.503	0.486	3.44%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	22.5	22.0	2.42%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	19.2	18.6	3.40%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	10.0	9.89	1.14%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	24.4	23.8	2.85%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	755	714	5.67%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	2730	2670	2.27%	40%	----

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 1136710) - continued											
WP2323097-001	23-09-43	Zinc	7440-66-6	E440	2.0	mg/kg	94.6	91.9	2.87%	30%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1136230)						
Moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 1138008)						
Moisture	----	E144	0.25	%	<0.25	----
Anions and Nutrients (QCLot: 1138202)						
Nitrogen, total	7727-37-9	E366	0.02	%	<0.020	----
Plant Available Nutrients (QCLot: 1138110)						
Nitrate + Nitrite, available (as N)	----	E269.N+N	1	mg/kg	<1.0	----
Plant Available Nutrients (QCLot: 1138111)						
Nitrite, available (as N)	14797-65-0	E269.NO2	0.4	mg/kg	<0.40	----
Plant Available Nutrients (QCLot: 1138119)						
Ammonium, available (as N)	14798-03-9	E312A	1	mg/kg	<1.0	----
Plant Available Nutrients (QCLot: 1138120)						
Nitrate + Nitrite, available (as N)	----	E269A.N+N	2	mg/kg	<2.0	----
Plant Available Nutrients (QCLot: 1138122)						
Phosphate, available (as P)	14265-44-2	E385	1	mg/kg	<1.0	----
Metals (QCLot: 1136709)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1136710)						
Cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
Chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
Copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
Lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
Nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
Phosphorus	7723-14-0	E440	50	mg/kg	<50	----
Potassium	7440-09-7	E440	100	mg/kg	<100	----
Zinc	7440-66-6	E440	2	mg/kg	<2.0	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1136230)									
Moisture	---	E144	0.25	%	50 %	100	90.0	110	---
Physical Tests (QCLot: 1137819)									
pH (1:2 soil:water)	---	E108	---	pH units	7 pH units	100	97.0	103	---
Physical Tests (QCLot: 1138008)									
Moisture	---	E144	0.25	%	50 %	99.6	90.0	110	---
Anions and Nutrients (QCLot: 1138202)									
Nitrogen, total	7727-37-9	E366	0.02	%	22.37 %	101	90.0	110	---
Plant Available Nutrients (QCLot: 1138110)									
Nitrate + Nitrite, available (as N)	---	E269.N+N	1	mg/kg	40 mg/kg	102	70.0	130	---
Plant Available Nutrients (QCLot: 1138111)									
Nitrite, available (as N)	14797-65-0	E269.NO2	0.4	mg/kg	20 mg/kg	95.9	70.0	130	---
Plant Available Nutrients (QCLot: 1138119)									
Ammonium, available (as N)	14798-03-9	E312A	1	mg/kg	10 mg/kg	93.2	80.0	120	---
Plant Available Nutrients (QCLot: 1138120)									
Nitrate + Nitrite, available (as N)	---	E269A.N+N	2	mg/kg	40 mg/kg	114	70.0	130	---
Plant Available Nutrients (QCLot: 1138122)									
Phosphate, available (as P)	14265-44-2	E385	1	mg/kg	20 mg/kg	105	80.0	120	---
Metals (QCLot: 1136709)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	105	80.0	120	---
Metals (QCLot: 1136710)									
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	100	80.0	120	---
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	---
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	99.4	80.0	120	---
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	98.7	80.0	120	---
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	100	80.0	120	---
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	102	80.0	120	---
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	102	80.0	120	---
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	98.5	80.0	120	---

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Physical Tests (QCLot: 1137819)									
	RM	pH (1:2 soil:water)	----	E108	8.13 pH units	98.9	96.0	104	----
Physical Tests (QCLot: 1139391)									
	RM	Atterberg liquid limit [LL] (moisture)	----	E199	33.68 %	97.3	80.0	120	----
	RM	Atterberg plastic limit [PL] (moisture)	----	E199	20 %	98.8	80.0	120	----
Anions and Nutrients (QCLot: 1138202)									
	RM	Nitrogen, total	7727-37-9	E366	0.11 %	102	80.0	120	----
Plant Available Nutrients (QCLot: 1138110)									
	RM	Nitrate + Nitrite, available (as N)	----	E269.N+N	11.3 mg/kg	97.7	70.0	130	----
Plant Available Nutrients (QCLot: 1138111)									
	RM	Nitrite, available (as N)	14797-65-0	E269.NO2	0.1 mg/kg	23.0	0	570	----
Plant Available Nutrients (QCLot: 1138119)									
	RM	Ammonium, available (as N)	14798-03-9	E312A	70.1 mg/kg	102	80.0	120	----
Plant Available Nutrients (QCLot: 1138120)									
	RM	Nitrate + Nitrite, available (as N)	----	E269A.N+N	11.1 mg/kg	97.6	70.0	130	----
Plant Available Nutrients (QCLot: 1138122)									
	RM	Phosphate, available (as P)	14265-44-2	E385	15.3 mg/kg	117	80.0	120	----
Metals (QCLot: 1136709)									
	RM	Mercury	7439-97-6	E510	0.0585 mg/kg	112	70.0	130	----
Metals (QCLot: 1136710)									
	RM	Cadmium	7440-43-9	E440	0.91 mg/kg	113	70.0	130	----
	RM	Chromium	7440-47-3	E440	101 mg/kg	107	70.0	130	----
	RM	Copper	7440-50-8	E440	123 mg/kg	117	70.0	130	----
	RM	Lead	7439-92-1	E440	267 mg/kg	104	70.0	130	----
	RM	Nickel	7440-02-0	E440	26.7 mg/kg	108	70.0	130	----
	RM	Phosphorus	7723-14-0	E440	752 mg/kg	101	70.0	130	----
	RM	Potassium	7440-09-7	E440	1587 mg/kg	100	70.0	130	----
	RM	Zinc	7440-66-6	E440	297 mg/kg	107	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 22

Page 1 of 1

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Canada Toll Free: 1 800 668 9878

Environmental Division Winnipeg
Work Order Reference
WP2323097

Telephone : +1 204 255 9720

Report To	Contact and company name below will appear on the final report	Reports / Recipients	Turnaround Time (TAT) Reque
Company:	City of Portage La Prairie	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	☐ Routine [R] if received by 3pm M-F - no surcharg
Contact:	Aaron Stechesen	Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A	☐ 4 day [P4] if received by 3pm M-F - 20% rush su
Phone:	1-204-239-8361	☐ Compare Results to Criteria on Report - provide details below if box checked	☐ 3 day [P3] if received by 3pm M-F - 25% rush su
	Company address below will appear on the final report	Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	☐ 2 day [P2] if received by 3pm M-F - 50% rush su
Street:	97 Saskatchewan Avenue East	Email 1 or Fax astechesen@city-plap.com	☑ 1 day [E] if received by 3pm M-F - 100% rush su
City/Province:	Portage La Prairie	Email 2 astechesen@city-plap.com	☐ Same day [E2] if received by 10am M-S - 200% r
Postal Code:	R1N 0L8	Email 3	Additional fees may apply to rush requests
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Recipients	Date and Time Required for all E&P TATs:
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	For all tests with rush TATs requested, please contact your AM to confirm availability.
Company:		Email 1 or Fax astechesen@city-plap.com	
Contact:		Email 2	

HERE

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	GMPP100 / WP2022GMPP1000002	AFE/Cost Center:	PO# W23017
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	W23017	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):		ALS Contact:	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

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	E108	E510	E440	E385	E312A, EC269A,NO3, E269A,N+N	E366A	EC269,NO3, E269,N+N, E269,NO2,	MOIST-SK	PREP-DRY/GRIND-SK	E199	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	23-09-43	13-Sep-23	10:30	Soil	1	E	E	E	E				E	E				
	23-09-44	13-Sep-23	10:30	Soil	1					E	E	E	E	E				
	23-09-45	13-Sep-23	10:30	Soil	2									E	E			

RUSH

S-8194, ULINE, 800-295-5510

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human consumption/ use? ☐ YES ☐ NO	

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			
19.1							

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by: Aaron Stechesen	Date: 13-Sep-23	Time: 13:00	Received by: CA	Date: SEP 13 2023	Time: 230	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

FEB 2022 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 taken from a Regulated Drinking Water (DW) System please submit using an Authorized DW COC form

Delta Ag Services
City of Portage
Watson SE 16-12-6

Clay Test - 2.7 Ac
Soil Type - 160.5 Ac
No Test - 44.2 Ac
Soil sample

SE 16-12-06 - 160.5 Ac

Clay Test Sites 1 & 2 had no detectable water table at the 1.5 m depth

Delta Ag SERVICES

ALS Canada Ltd.

BST & LRAP BIOSOLIDS RESULTS

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **WP2319027**	Page	: 1 of 4
Client	: **City of Portage la Prairie**	Laboratory	: ALS Environmental - Winnipeg
Contact	: Aaron Stechesen	Account Manager	: Judy Dalmaijer
Address	: 97 Saskatchewan Avenue East Portage la Prairie MB Canada R1N 0L8	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg MB Canada R2J 3T4
Telephone	: 204 239 8361	Telephone	: +1 204 255 9720
Project	: Wastewater	Date Samples Received	: 11-Aug-2023 11:31
PO	: W23017	Date Analysis Commenced	: 11-Aug-2023
C-O-C number	: ----	Issue Date	: 18-Aug-2023 13:35
Sampler	: ----		
Site	: Wastewater		
Quote number	: Wastewater		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

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*
Rhovee Guevarra		Inorganics, Winnipeg, Manitoba
Rhovee Guevarra		Metals, Winnipeg, Manitoba
Walt Kippenhuck	Supervisor - Inorganic	Inorganics, Waterloo, Ontario

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*
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

<: 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.

Workorder Comments

Sample(s) -001 & 2: Sample Received Unpreserved. Results may be biased low for indicated parameter(s).

Sample Comments

Sample	Client Id	*Comment*
WP2319027-001	23-08-32	Sample(s) 001-002: Sample Received Unpreserved. Results may be biased low for indicated parameter(s).

Qualifiers

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

BST LAMAR

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	23-08-32	23-08-33	23-08-34FE	----	----
					Client sampling date / time	11-Aug-2023 00:00	11-Aug-2023 00:00	11-Aug-2023 00:00	----	----
						WP2319027-001	WP2319027-002	WP2319027-003	----	----
						Result	Result	Result	----	----
Physical Tests										
Conductivity	----	E100/WP	2.0	µS/cm		5620	3420	----	----	----
pH	----	E108/WP	0.10	pH units		7.17	7.32	----	----	----
Solids, fixed suspended [FSS]	----	E170/WP	3.0	mg/L		5320	220	----	----	----
Solids, total [TS]	----	E157/WP	10	mg/L		19200	7700	----	----	----
Solids, total suspended [TSS]	----	E160/WP	3.0	mg/L		16800	414	----	----	----
Solids, volatile suspended [VSS]	----	EC167/WP	3.0	mg/L		11500	194	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E303/WP	0.010	mg/L		678	154	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E319/WP	0.15	mg/L		1110	187	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3/WP	0.020	mg/L		<0.400 DLM	<0.400 DLM	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/WP	0.0050	mg/L		<0.447	<0.447	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2/WP	0.010	mg/L		<0.200 DLM	<0.200 DLM	----	----	----
Nitrogen, total organic	----	EC363/WP	0.050	mg/L		432	<34.2	----	----	----
Phosphorus, total	7723-14-0	E372/WP	0.020	mg/L		173	33.8	----	----	----
Total Metals										
Cadmium, total	7440-43-9	E420/WP	0.0000050	mg/L		0.00264	0.000427	----	----	----
Chromium, total	7440-47-3	E420/WP	0.00050	mg/L		0.180	0.00773	----	----	----
Cobalt, total	7440-48-4	E420/WP	0.00010	mg/L		0.0380	0.00571	----	----	----
Copper, total	7440-50-8	E420/WP	0.00050	mg/L		1.71	0.0219	----	----	----
Lead, total	7439-92-1	E420/WP	0.000050	mg/L		0.0797	0.00248	----	----	----
Mercury, total	7439-97-6	E508/WP	0.0000050	mg/L		<0.0000250 DLM	<0.0000250 DLM	----	----	----
Nickel, total	7440-02-0	E420/WP	0.00050	mg/L		0.207	0.0203	----	----	----
Potassium, total	7440-09-7	E420/WP	0.050	mg/L		262	246	----	----	----
Zinc, total	7440-66-6	E420/WP	0.0030	mg/L		1.33	0.119	----	----	----
Aggregate Organics										
Phenols, total (4AAP)	----	E562/WT	0.0010	mg/L		----	----	<0.0010	----	----

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	:**WP2319027**	Page	: 1 of 11
Client	:**City of Portage la Prairie**	Laboratory	: ALS Environmental - Winnipeg
Contact	:Aaron Stechesen	Account Manager	: Judy Dalmaijer
Address	:97 Saskatchewan Avenue East Portage la Prairie MB Canada R1N 0L8	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	:204 239 8361	Telephone	: +1 204 255 9720
Project	:Wastewater	Date Samples Received	: 11-Aug-2023 11:31
PO	: W23017	Issue Date	: 18-Aug-2023 13:34
C-O-C number	:----		
Sampler	:----		
Site	:Wastewater		
Quote number	:Wastewater		
No. of samples received	:3		
No. of samples analysed	:3		

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 Service 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.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

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: **Water**

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
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) 23-08-34FE	E562	11-Aug-2023	16-Aug-2023	28 days	6 days	✓	16-Aug-2023	28 days	6 days	✓
Anions and Nutrients : Ammonia in Water by Colour										
HDPE 23-08-32	E303	11-Aug-2023	14-Aug-2023	3 days	3 days	✓	14-Aug-2023	28 days	0 days	✓
Anions and Nutrients : Ammonia in Water by Colour										
HDPE 23-08-33	E303	11-Aug-2023	14-Aug-2023	3 days	3 days	✓	14-Aug-2023	28 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE 23-08-32	E235.NO3	11-Aug-2023	11-Aug-2023	3 days	1 days	✓	11-Aug-2023	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE 23-08-33	E235.NO3	11-Aug-2023	11-Aug-2023	3 days	1 days	✓	11-Aug-2023	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE 23-08-32	E235.NO2	11-Aug-2023	11-Aug-2023	3 days	1 days	✓	11-Aug-2023	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE 23-08-33	E235.NO2	11-Aug-2023	11-Aug-2023	3 days	1 days	✓	11-Aug-2023	3 days	1 days	✓

Matrix: **Water**

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
Anions and Nutrients : Total Kjeldahl Nitrogen by Colourimetry										
HDPE 23-08-32	E319	11-Aug-2023	15-Aug-2023	3 days	4 days	✖ EHT	16-Aug-2023	28 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Colourimetry										
HDPE 23-08-33	E319	11-Aug-2023	15-Aug-2023	3 days	4 days	✖ EHT	16-Aug-2023	28 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.02 mg/L)										
HDPE 23-08-32	E372	11-Aug-2023	14-Aug-2023	3 days	3 days	✓	15-Aug-2023	28 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.02 mg/L)										
HDPE 23-08-33	E372	11-Aug-2023	14-Aug-2023	3 days	3 days	✓	15-Aug-2023	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE 23-08-32	E100	11-Aug-2023	14-Aug-2023	28 days	3 days	✓	14-Aug-2023	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE 23-08-33	E100	11-Aug-2023	14-Aug-2023	28 days	3 days	✓	14-Aug-2023	28 days	3 days	✓
Physical Tests : FSS by Gravimetry										
HDPE 23-08-32	E170	11-Aug-2023	----	----	----		15-Aug-2023	7 days	4 days	✓
Physical Tests : FSS by Gravimetry										
HDPE 23-08-33	E170	11-Aug-2023	----	----	----		15-Aug-2023	7 days	4 days	✓
Physical Tests : pH by Meter										
HDPE 23-08-32	E108	11-Aug-2023	14-Aug-2023	0.25 hrs	82 hrs	✖ EHTR-FM	14-Aug-2023	0.25 hrs	82 hrs	✖ EHTR-FM

Matrix: **Water**

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
Physical Tests : pH by Meter										
HDPE 23-08-33	E108	11-Aug-2023	14-Aug-2023	0.25 hrs	82 hrs	✖ EHTR-FM	14-Aug-2023	0.25 hrs	82 hrs	✖ EHTR-FM
Physical Tests : TS by Gravimetry										
HDPE 23-08-32	E157	11-Aug-2023	----	----	----		16-Aug-2023	7 days	6 days	✓
Physical Tests : TS by Gravimetry										
HDPE 23-08-33	E157	11-Aug-2023	----	----	----		16-Aug-2023	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE 23-08-32	E160	11-Aug-2023	----	----	----		14-Aug-2023	7 days	3 days	✓
Physical Tests : TSS by Gravimetry										
HDPE 23-08-33	E160	11-Aug-2023	----	----	----		14-Aug-2023	7 days	3 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) 23-08-32	E508	11-Aug-2023	15-Aug-2023	28 days	4 days	✓	15-Aug-2023	28 days	4 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) 23-08-33	E508	11-Aug-2023	15-Aug-2023	28 days	4 days	✓	15-Aug-2023	28 days	4 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE 23-08-32	E420	11-Aug-2023	15-Aug-2023	0 hrs	106 hrs	✖ UCP	15-Aug-2023	0 hrs	108 hrs	✖ UCP
Total Metals : Total metals in Water by CRC ICPMS										
HDPE 23-08-33	E420	11-Aug-2023	15-Aug-2023	0 hrs	106 hrs	✖ UCP	15-Aug-2023	0 hrs	108 hrs	✖ UCP

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

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

UCP: Unsuitable Container and/or Preservative used (invalidates standard hold time). Maximum hold time of zero applied. Test results may be biased low / unreliable, and may not meet regulatory requirements.

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: **Water**

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)							
Ammonia in Water by Colour	E303	1083903	1	20	5.0	5.0	✓
Conductivity in Water	E100	1083601	1	15	6.6	5.0	✓
FSS by Gravimetry	E170	1085519	1	4	25.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1083529	1	11	9.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1083528	0	4	0.0	5.0	✖
pH by Meter	E108	1083602	1	15	6.6	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1088075	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Colourimetry	E319	1085313	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1085518	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	1085288	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.02 mg/L)	E372	1084449	0	19	0.0	5.0	✖
TS by Gravimetry	E157	1087708	1	8	12.5	5.0	✓
TSS by Gravimetry	E160	1083896	1	5	20.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia in Water by Colour	E303	1083903	1	20	5.0	5.0	✓
Conductivity in Water	E100	1083601	1	15	6.6	5.0	✓
Nitrate in Water by IC	E235.NO3	1083529	1	11	9.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1083528	1	4	25.0	5.0	✓
pH by Meter	E108	1083602	1	15	6.6	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1088075	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Colourimetry	E319	1085313	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1085518	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	1085288	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.02 mg/L)	E372	1084449	1	19	5.2	5.0	✓
TS by Gravimetry	E157	1087708	1	8	12.5	5.0	✓
TSS by Gravimetry	E160	1083896	1	5	20.0	5.0	✓
Method Blanks (MB)							
Ammonia in Water by Colour	E303	1083903	1	20	5.0	5.0	✓
Conductivity in Water	E100	1083601	1	15	6.6	5.0	✓
FSS by Gravimetry	E170	1085519	1	4	25.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1083529	1	11	9.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1083528	1	4	25.0	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1088075	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Colourimetry	E319	1085313	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1085518	1	20	5.0	5.0	✓

Matrix: **Water**

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*
Method Blanks (MB) - Continued							
Total metals in Water by CRC ICPMS	E420	1085288	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.02 mg/L)	E372	1084449	1	19	5.2	5.0	✓
TS by Gravimetry	E157	1087708	1	8	12.5	5.0	✓
TSS by Gravimetry	E160	1083896	1	5	20.0	5.0	✓
Matrix Spikes (MS)							
Ammonia in Water by Colour	E303	1083903	1	20	5.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1083529	1	11	9.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1083528	0	4	0.0	5.0	✖
Phenols (4AAP) in Water by Colorimetry	E562	1088075	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Colourimetry	E319	1085313	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1085518	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	1085288	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.02 mg/L)	E372	1084449	1	19	5.2	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 Description
Conductivity in Water	E100 ALS Environmental - Winnipeg	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Winnipeg	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TS by Gravimetry	E157 ALS Environmental - Winnipeg	Water	APHA 2540 B (mod)	Total Solids (TS) are determined by drying an aliquot of a well-mixed sample in a pre-weighed dish to constant weight in an oven at 104 ± 1°C. The final weight minus the empty dish represents the total solids.
TSS by Gravimetry	E160 ALS Environmental - Winnipeg	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
FSS by Gravimetry	E170 ALS Environmental - Winnipeg	Water	APHA 2540 E (mod)	Fixed Suspended Solids (FSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. This residue is ignited to constant weight at 550°C. The remaining solids represent the Fixed Suspended Solids (FSS), while the weight lost on ignition represents the Volatile Suspended Solids (VSS). Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia in Water by Colour	E303 ALS Environmental - Winnipeg	Water	APHA 4500 NH3-NITROGEN (AMMONIA)	This analysis is carried out using procedures adapted from APHA Method 4500 NH3 "NITROGEN (AMMONIA)". Ammonia is determined using the automated phenate colourimetric method.
Total Kjeldahl Nitrogen by Colourimetry	E319 ALS Environmental - Winnipeg	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by colourimetric analysis.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Description
Total Phosphorus by Colourimetry (0.02 mg/L)	E372 ALS Environmental - Winnipeg	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total metals in Water by CRC ICPMS	E420 ALS Environmental - Winnipeg	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 ALS Environmental - Winnipeg	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Phenols (4AAP) in Water by Colorimetry	E562 ALS Environmental - Waterloo	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K3Fe(CN)6) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.
VSS by Gravimetry	EC167 ALS Environmental - Winnipeg	Water	APHA 2540 E (mod)	Volatile Suspended Solids (VSS) are determined by filtering a well-mixed sample through a weighed standard glass-fiber filter and the residue retained on the filter is dried to a constant weight at 104 ± 1°C. This residue is ignited to constant weight at 550°C. The remaining solids represent the fixed suspended solids while the weight lost on ignition is the volatile suspended solids.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Winnipeg	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
Total Organic Nitrogen (Calculation)	EC363 ALS Environmental - Winnipeg	Water	APHA 4500-NORG (TKN)/NH3-NITROGEN (NH3)	Total Organic Nitrogen is a calculated parameter. Total Organic Nitrogen = Total Kjeldahl Nitrogen - Ammonia.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Description
Preparation for Ammonia	EP298 ALS Environmental - Winnipeg	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 ALS Environmental - Winnipeg	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Winnipeg	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

QUALITY CONTROL REPORT

Work Order	: **WP2319027**	Page	: 1 of 8
Client	: City of Portage la Prairie	Laboratory	: ALS Environmental - Winnipeg
Contact	: Aaron Stechesen	Account Manager	: Judy Dalmaijer
Address	: 97 Saskatchewan Avenue East Portage la Prairie MB Canada R1N 0L8	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	:	Telephone	: +1 204 255 9720
Project	: Wastewater	Date Samples Received	: 11-Aug-2023 11:31
PO	: W23017	Date Analysis Commenced	: 11-Aug-2023
C-O-C number	: ----	Issue Date	: 18-Aug-2023 13:35
Sampler	: ---- 204 239 8361		
Site	: Wastewater		
Quote number	: Wastewater		
No. of samples received	: 3		
No. of samples analysed	: 3		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

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*
Rhovee Guevarra		Winnipeg Inorganics, Winnipeg, Manitoba
Rhovee Guevarra		Winnipeg Metals, Winnipeg, Manitoba
Walt Kippenhuck	Supervisor - Inorganic	Waterloo Inorganics, Waterloo, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology 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 Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

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

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1083601)											
WP2318988-010	Anonymous	Conductivity	----	E100	2.0	µS/cm	1100	1080	2.01%	10%	----
Physical Tests (QC Lot: 1083602)											
WP2318988-010	Anonymous	pH	----	E108	0.10	pH units	7.15	7.16	0.140%	4%	----
Physical Tests (QC Lot: 1083896)											
WP2319101-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	23.1	20.5	2.6	Diff <2x LOR	----
Physical Tests (QC Lot: 1085519)											
WP2318961-001	Anonymous	Solids, fixed suspended [FSS]	----	E170	3.0	mg/L	15.8	18.6	2.8	Diff <2x LOR	----
Physical Tests (QC Lot: 1087708)											
WP2319066-001	Anonymous	Solids, total [TS]	----	E157	10	mg/L	1300	1320	1.83%	20%	----
Anions and Nutrients (QC Lot: 1083529)											
WP2319069-006	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1083903)											
WP2319103-014	Anonymous	Ammonia, total (as N)	7664-41-7	E303	0.010	mg/L	0.011	0.026	0.015	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1085313)											
WP2319025-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E319	0.15	mg/L	0.37	0.38	0.007	Diff <2x LOR	----
Total Metals (QC Lot: 1085288)											
WP2319007-001	Anonymous	Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000136	0.0000139	0.0000003	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00017	0.00016	0.000003	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00944	0.00948	0.422%	20%	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.000397	0.000383	0.000013	Diff <2x LOR	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00189	0.00186	0.00002	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	4.86	4.89	0.688%	20%	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	0.0143	0.0145	0.0001	Diff <2x LOR	----
Total Metals (QC Lot: 1085518)											
WP2318907-004	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1088075)											
TY2307861-009	Anonymous	Phenols, total (4AAP)	----	E562	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1083601)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1083896)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 1085519)						
Solids, fixed suspended [FSS]	----	E170	3	mg/L	<3.0	----
Physical Tests (QCLot: 1087708)						
Solids, total [TS]	----	E157	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1083528)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1083529)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1083903)						
Ammonia, total (as N)	7664-41-7	E303	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1084449)						
Phosphorus, total	7723-14-0	E372	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1085313)						
Kjeldahl nitrogen, total [TKN]	----	E319	0.15	mg/L	<0.20	----
Total Metals (QCLot: 1085288)						
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Total Metals (QCLot: 1085518)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 1088075)						
Phenols, total (4AAP)	----	E562	0.001	mg/L	<0.0010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1083601)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 1083602)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1083896)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	107	85.0	115	----
Physical Tests (QCLot: 1087708)									
Solids, total [TS]	----	E157	10	mg/L	1150 mg/L	94.8	85.0	115	----
Anions and Nutrients (QCLot: 1083528)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1083529)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1083903)									
Ammonia, total (as N)	7664-41-7	E303	0.01	mg/L	0.25 mg/L	97.8	85.0	115	----
Anions and Nutrients (QCLot: 1084449)									
Phosphorus, total	7723-14-0	E372	0.02	mg/L	0.5 mg/L	91.9	80.0	120	----
Anions and Nutrients (QCLot: 1085313)									
Kjeldahl nitrogen, total [TKN]	----	E319	0.15	mg/L	4 mg/L	98.4	75.0	125	----
Total Metals (QCLot: 1085288)									
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	100	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	107	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	99.8	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	102	80.0	120	----
Total Metals (QCLot: 1085518)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	100	80.0	120	----
Aggregate Organics (QCLot: 1088075)									

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Aggregate Organics (QCLot: 1088075) - continued									
Phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	104	85.0	115	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report: Spike Concentration	Spike Target	Recovery (%): MS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Anions and Nutrients (QCLot: 1083529)										
WP2319069-006	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.59 mg/L	2.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1083903)										
WP2319103-014	Anonymous	Ammonia, total (as N)	7664-41-7	E303	0.312 mg/L	0.25 mg/L	125	75.0	125	----
Anions and Nutrients (QCLot: 1084449)										
WP2319001-002	Anonymous	Phosphorus, total	7723-14-0	E372	0.245 mg/L	0.25 mg/L	97.9	70.0	130	----
Anions and Nutrients (QCLot: 1085313)										
WP2319025-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E319	5.51 mg/L	5 mg/L	110	70.0	130	----
Total Metals (QCLot: 1085288)										
WP2319007-001	Anonymous	Cadmium, total	7440-43-9	E420	0.00370 mg/L	0.004 mg/L	92.6	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0377 mg/L	0.04 mg/L	94.4	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0188 mg/L	0.02 mg/L	93.9	70.0	130	----
		Copper, total	7440-50-8	E420	0.0174 mg/L	0.02 mg/L	87.0	70.0	130	----
		Lead, total	7439-92-1	E420	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0361 mg/L	0.04 mg/L	90.3	70.0	130	----
		Potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Zinc, total	7440-66-6	E420	0.358 mg/L	0.4 mg/L	89.4	70.0	130	----
Total Metals (QCLot: 1085518)										
WP2318907-005	Anonymous	Mercury, total	7439-97-6	E508	0.0000993 mg/L	0.0001 mg/L	99.3	70.0	130	----
Aggregate Organics (QCLot: 1088075)										
TY2307861-009	Anonymous	Phenols, total (4AAP)	----	E562	0.101 mg/L	0.1 mg/L	101	75.0	125	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 22 -

Page 1 of 1

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Report To	Contact and company name below will appear on the final report
Company:	City of Portage La Prairie
Contact:	Aaron Stechesen
Phone:	1-204-239-8361
	Company address below will appear on the final report
Street:	97 Saskatchewan Avenue East
City/Province:	Portage La Prairie
Postal Code:	R1N 0L8
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

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 astechesen@city-plap.com
Email 2 astechesen@city-plap.com
Email 3

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax astechesen@city-plap.com
Email 2

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 minimum
☐ 3 day [P3] If received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] If received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] If received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] If received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information

ALS Account # / Quote #:	GMPP100 / WP2022GMPP1000002
Job #:	
PO / AFE:	W23017
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO# W23017
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only):

ALS Contact: Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

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	E100 Conductivity	E108 pH	S235 N+N	E319 Total Kjehldahl Nitrogen	E303 Ammonia	EC363 Total Organic Nitrogen	E372 Total Phosphorus	E170 FSS by Gravimetry	E157 Total Solids	E160 Total Suspended Solids	EC167 Volatile Suspended Solids	E420 Total Metals in Water	E508 Total Mercury in Water	Phenols-4AAP	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	23-08-32	10-Aug-23	8:00	Wastewater	2	R	R	R	R	R	R	R	R	R	R	R	R	R				
	23-08-33	10-Aug-23	8:00	Wastewater	2	R	R	R	R	R	R	R	R	R	R	R	R	R				
	23-08-34FE	11-Aug-23	8:00	Wastewater	1														R			

Environmental Division Winnipeg
Work Order Reference
WP2319027

Telephone : +1 204 255 9720

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 R
Cooling Method: ☐ NONE ☐ ICE
Submission Comments identified on S
Cooler Custody Seals Intact: ☐ YE
INITIAL COOLER TEMPERATURE
9.9

SHIPMENT RELEASE (client use)

Released by: Aaron Stechesen Date: 11-Aug-23 Time: 9:30

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: AUG 11 2023 Time: 11:31

FINAL
Received by:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

FEB 2022 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 aRegulated Drinking Water (DW) Systemplease submit using anAuthorized DW COC form