City of Portage la Prairie

2018 Residual Biosolids Land Application Program

As per Environment Licence 1907

2018 Residual Biosolids Land Application Program

Report to Manitoba Sustainable Development

Introduction

Residual solids material is produced as a by-product of wastewater treatment at the City of Portage la Prairie Water Pollution Control Facility (WPCF). Flows from the McMillan Industrial Park are pre-treated in the on-site Low Rate Anaerobic Reactor. This pre-treated water is combined with municipal flows as well as pre-treated industrial wastewater from Poplar Bluff industrial park. These flows are 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 gravity belt. The material is then stabilized in the City's anaerobic digester to produce biosolids material that is suitable for land application as a fertilizer. The biosolids is stored throughout the year in the Bulk Volume Fermenter (BVF) or the Biosolids Storage Tanks (BSTs) until weather and harvest permits an opportunity to remove the material and inject it on farm land as a soil amendment. The removal, hauling, analyses and injection of this stored material constitutes the Residual Biosolids Land Application program.

Samples of biosolids from the various storage areas are sent to a contract lab for analyses as required in the EAL #1907. The fields to be used are also sampled and analyzed. From this, application rates are calculated to determine how much, if any, biosolids can be applied. Once the land is approved for use, biosolids are pumped from one of the two storage areas into tanker trucks and transported to the field. From there, material is pumped into a nurse tank which feeds the application equipment (Terragators) that inject the material below the surface. Injection helps to reduce runoff, prevent vector attraction and minimize odours.

Field Selection Process

The City of Portage la Prairie administration contacted owners of land located in the Rural Municipality of Portage la Prairie, that are within 25 km of the Water Pollution Control Facility.

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 on which was superimposed areas that had been deemed acceptable in accordance to Manitoba Environment Licence #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.

All 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. Letters of notification were also sent to the Department of Sustainable Development and the Rural Municipality of Portage la Prairie.

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 Manitoba Environment Licence #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 sample for clay analyses and to verification of water table was also taken. An external laboratory was contracted by the City of Portage la Prairie to conduct all soils testing.

Heavy Metals

Soil samples were collected and analysed 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 as per environment license. All heavy metal analysis was conducted by an external laboratory. See Appendix B for background heavy metal concentration results. Back-ground 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

The following fields were sampled and analyzed;

N 10-12-8
NW 1-13-7
E 7-9-7
SW 14-12-8
SW 22-12-8
E 30-12-8
NW 31-12-5

Based on results, all fields were selected for use except E 7-09-7 which did not contain the clay type material required. Once a field had been tested and selected for application, City of Portage la Prairie staff attended each field to mark out borders and boundaries in accordance with Sections 9 and 10-Discharge Limits, Terms, and Conditions of the license was adhered to during the application process. An agreement with each land owner was signed specifying the restrictions on future growing conditions. Copies of these agreements are also included in this report.

Biosolids Sampling and Testing

It is also necessary to sample and analyze the residual solids material to determine nutrient and metals 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.

Bulk Volume Fermenter Composite Sample

Sludge samples were collected from alternate sample ports located on the BVF cover. The individual samples were combined to form a composite sample that was submitted for analysis.

Biosolids Storage Tanks #1 & #2

Section 2 of the Environment Act License #1907 requires that wastewater solids must be held for a minimum of 30 days at 20°C prior to land application. The anaerobic digester currently does not have mixing which has reduced the overall capacity of the digester and the minimum 30 days of retention time cannot be confirmed. The BVF provides an additional 90 days of anaerobic digestion at 32°C however, the material stored in the BSTs does not receive this additional high temperature treatment. The City of Portage la Prairie requested two suspensions to this clause to allow the land application of biosolids material that had not met the license requirements in either Storage Tank. AECOM Engineering produced a report that demonstrated how the material in the biosolids storage tanks met the intended outcomes of anaerobic digestion using US EPA (40 CRF Part 503, Standards for the Use or Disposal of Sewage Sludge) as a reference. Testing for fecal coliform was performed 4 times per week for several weeks leading up to the removal of biosolids. Temperature, pH, conductivity and solids were also monitored. The Department of Sustainable Development granted the suspensions for BST 1 and 2 for the 2018 application program. Copies of the letters of request, data, and approval letters are included in this report in Appendix A.

Once approval was received, each storage tank was sampled and tested separately. Biosolids material was recirculated throughout the tanks and samples were collected from the sample port within the facility. Biosolids testing was conducted by ALS Labs, in accordance with Clause 1, Appendix A of Environmental Act Licence 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 BVF and the BSTs met the required criteria and were available for land application.

Sludge Handling

Bulk Volume Fermenter

Sludge was withdrawn from the BVF by means of internal lateral sludge lines that are normally used for sludge recirculation within the BVF. 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 by means of two-way radios.

Very little spillage was observed throughout the filling process. All spillage that occurred was contained on a concrete spill pad that was washed after each load hauled. The spilled material and wash water were conveyed to the headworks of the WPCF by means of a gravity collection line to a pumping station.

Biosolids Storage Facility

The contents of the storage tank were thoroughly mixed using the Seepex progressive cavity pumps in the facility and pumped to tanker trucks through an overhead fill line. City staff continuously monitored the entire filling process and operation of the sludge pumps.

Very little spillage was observed throughout the filling process. 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.

Biosolids Transportation and Transfer Station

The biosolids was hauled via tanker truck to the application area. Transportation routes were determined prior to application and Manitoba Sustainable Development and the RM of Portage la Prairie were notified of the intended routes.

A transfer station was located on site and contained a turning area, nurse tank and transfer pump. Sludge was transferred from the trucks via a sludge transfer pump to the nurse tank. The nurse tank can hold approximately four (4) sludge loads. Cam-lock connections were used for all hose connection mitigating any spillage, which may have occurred during the sludge transfer stage.

Injection

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

Injection rate was based on the ground speed of the Drag-Line and the solids and ammonia information of the sludge. Solids content and ammonia data was transferred to the field by means of cellular phones. This data was used by the driver to estimate the speed of the unit by means of 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 BVF is conducted. One grab sample is collected from five truck tankers to form a composite sample. 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 in accordance with 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 calculates the applied amount of metals, Phosphorous, 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 land owner.

Summary

Residual solids were required to be removed during two separate periods in 2018- which are referred to as the "spring" and "fall" programs. A combined total, from both the spring and fall programs, of 700 dry tonnes was injected to four different sections of land, located in the RM of Portage la Prairie. The spring application program occurred from May 22- June 4. During this period 215.4 dry tonnes of residual solids were removed from the BVF and 44.26 dry tonnes was removed from the BSTs and applied to field N 10-12-8. The spring program is carried out primarily to remove enough solids from the BVF to ensure enough storage until fall when most of the solids can be applied as there is more land available in the fall for application.

The fall application program was carried out between August 21 and October 23. Work was able to begin earlier than anticipated due to the dry summer and early harvest. The fall work included injection of 147.4 dry tonnes of solids from the BVF and 293.3 dry tonnes from the Biosolids Storage Tanks.

The 2018 Land Application of Residual Solids was successful. There were no incidents or spills that occurred during the land application process. Follow up with all farmers 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

March 12, 2018

Mr. Tyler Kneeshaw
Regional Supervisor
Environmental Compliance and Enforcement
Sustainable Development
25 Tupper Street North
Portage la Prairie, MB R1N 3K1

Re: 2018 Residual Biosolids Application Program

Dear Mr. Kneeshaw:

The City of Portage la Prairie intends to conduct land application of residual biosolids in the spring and fall of 2018. Below you will find the land areas that have been selected. A copy of the land map has been included as well. Pending soil analysis, biosolids **may** be applied to the following agricultural lands:

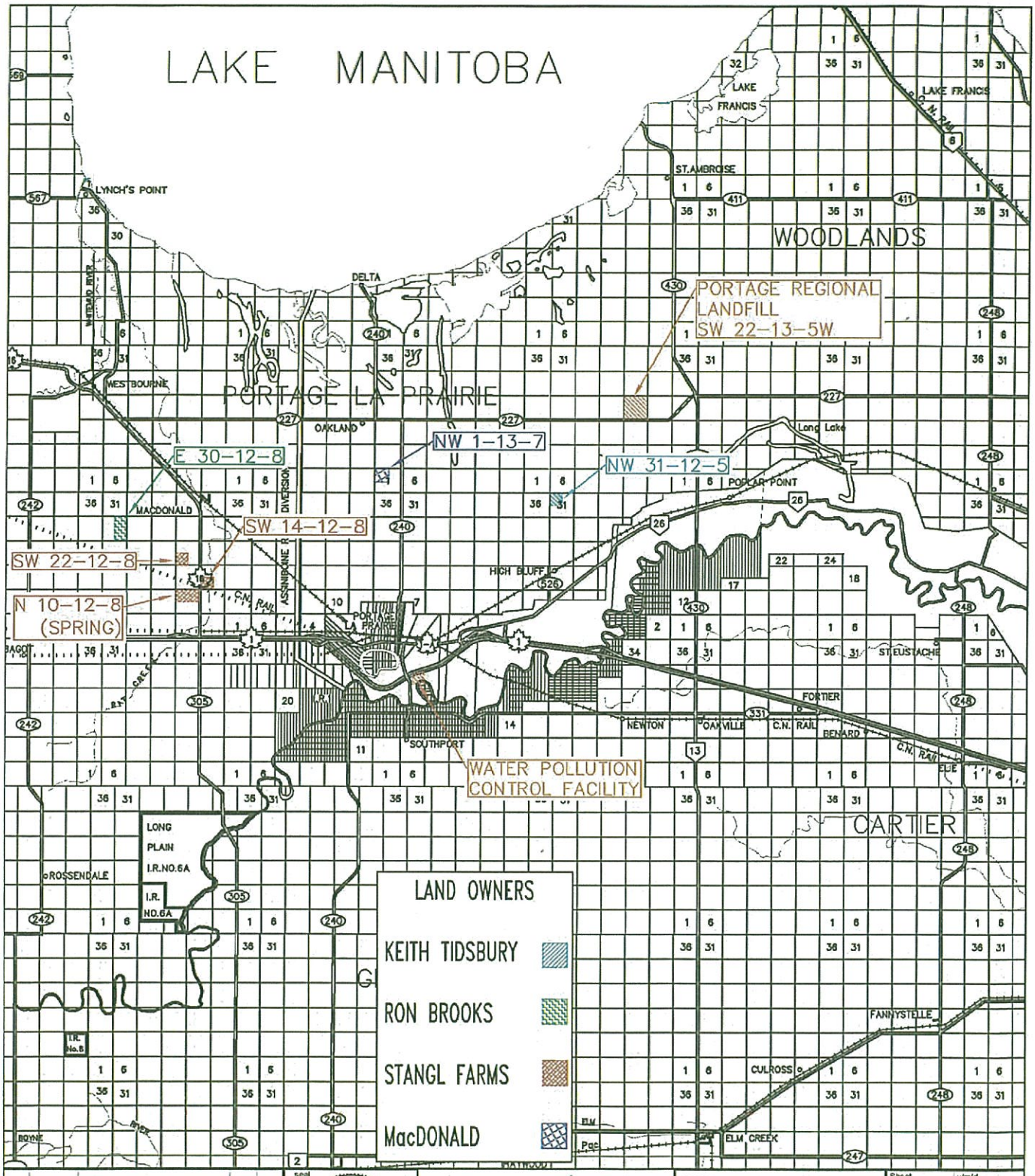
LEGAL DESCRIPTION	
Owner: *Lori Stangl-*	N 10-12-8 (Spring)
	SW 22-12-8
	SW 14-12-8
Owner: *Ron Brooks-*	E 30-12-8
Owner: *Keith Tidsbury-*	NW 31-12-5
Owner: *Darren McDonald-*	NW 1-13-7

As required in Environment Act License 1907, clause 17, notice of intent to land apply to the above noted sites was printed in the Portage la Prairie Daily Graphic on Tuesday, March 6. It was also posted on the City of Portage la Prairie website. A copy of the intended routes of transport will be sent once they are confirmed by the contractor. Please contact myself at 204-239-8359 if you have or receive any concerns regarding the above sites.

Sincerely,

Karly Friesen
Manager, Wastewater Treatment Division

Cc: Kelly Braden P. Eng., Director of Operations



No.	y/m/d	Revision	By	App.
0	17/02/15	ISSUED FOR REVIEW	M.P.	I.M.

seal

PROVINCE OF MANITOBA
K.N. BRADEN
REGISTERED PROFESSIONAL ENGINEER

Portage la Prairie
City of Possibilities

Project
2018
BIOSOLIDS
APPLICATION
LAND DESCRIPTION

Sheet	y/m/d
1	18/02/15
Scale	N.T.S
Drawing No.	Rev.
M-214	0

Portage la Prairie
City of Possibilities

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

March 12, 2018

Ms. Nettie Neudorf, CPA, CGA, CMMA
Chief Administrative Officer
Rural Municipality of Portage la Prairie
35 Tupper Street South
Portage la Prairie, MB R1N 1W7

Re: 2018 Residual Biosolids Application Program

Dear Ms. Neudorf:

The City of Portage la Prairie intends to conduct land application of residual biosolids in the spring and fall of 2018. Below you will find the land areas that have been selected. A copy of the land map has been included as well. Pending soil analysis, biosolids **may** be applied to the following agricultural lands:

LEGAL DESCRIPTION	
Owner: *Lori Stangl-*	N 10-12-8 (Spring)
	SW 22-12-8
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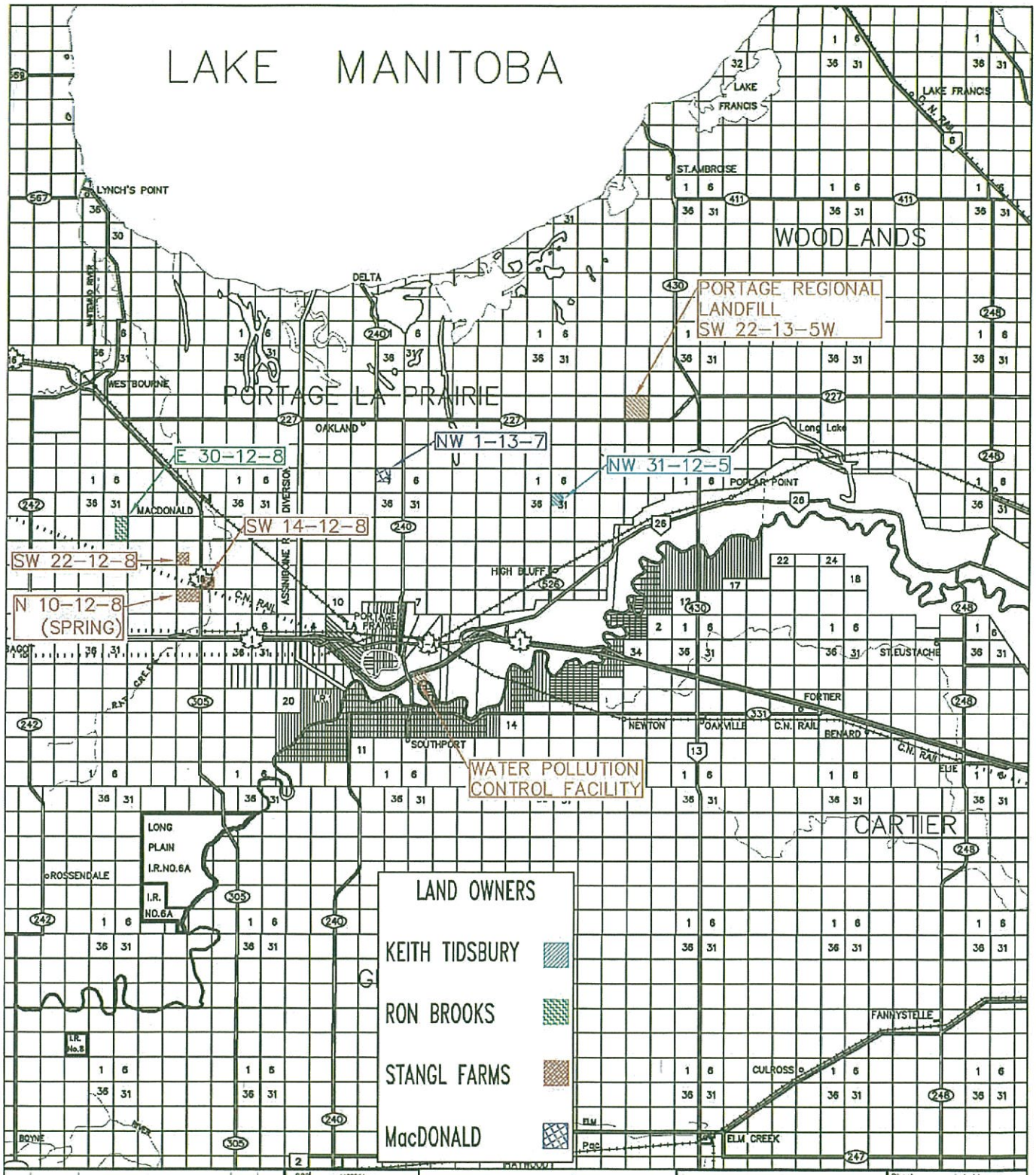
Sincerely,

Karly Friesen
Manager, Wastewater Treatment Division

Cc: Kelly Braden P. Eng., Director of Operations



No.	y/m/d	Revision	By	App.
0	17/02/15	ISSUED FOR REVIEW	M.P.	I.M.

seal

PROVINCE OF MANITOBA
K.N. BRADEN
REGISTERED PROFESSIONAL ENGINEER

Portage la Prairie
City of Possibilities

Project
2018
BIOSOLIDS
APPLICATION
LAND DESCRIPTION

Sheet	y/m/d
1	18/02/15
Scale	N.T.S
Drawing No.	Rev.
M-214	0

Memo

To: Terrie Todd

From: Karly Friesen

CC: Kelly Braden

Date: February 21, 2018

Re: Biosolids Application Ad for Citizens Info Page

Please run this ad in our next Citizen's info page as well as on our website/social media asap until March 15, 2017. An ad will also need to be placed in the Daily Graphic. This is a legal requirement of our environment license and is time sensitive. Please revise the website address once the map has been uploaded.

The City of Portage la Prairie intends to conduct the 2018 Residual Biosolids Land Application Program in the spring, late summer and fall of 2018.

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

LEGAL DESCRIPTION

E 30-12-8, SW 22-12-8, SW 14-12-8, N 10-12-8, NW 31-12-5, NW 1-13-7

A map of land locations can be found at http://www.city-plap.com/main

Please contact Karly Friesen, Manager, Wastewater Treatment Division at 204-239-8359 if you have or receive any concerns regarding the above sites.

APPENDIX B

SUSPENSION OF LICENSE –

CORRESPONDANCE & SUPPORTING DATA

Portage la Prairie
City of Possibilities

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

File No. WPCF 30-4

April 27, 2018

Ms. Tracey Braun
Environmental Approvals Branch
Manitoba Sustainable Development
1007 Century Street
Winnipeg, Manitoba
R3H 0W4

Re: Follow up on request for extension to suspension of Clause 2, EAL 1907.

Dear Ms. Braun:

The City of Portage la Prairie had sent a letter of request to your department on January 3, 2018 asking for an extension to the two Notices of Minor Alteration that were approved on May 27, 2017 and June 29, 2017. The notices of minor alteration granted suspension of clause 2 of Environment License 1907. It will be essential to the successful operation of the Water Pollution Control Facility to remove stored biosolids from the biosolids storage tanks for land application in the spring and fall of 2018. It is anticipated that a small volume, approximately 100 dry tonnes, will be applied in Spring and approximately 400 dry tonnes will need to be applied in the Fall.

Biosolids Storage Tank #1 will need have solids removed this spring, with anticipated start date of May 28, 2018. To assist in stabilization, no new solids material has been added to this tank since February 20, 2018. Samples from Storage Tank #1 have been sent to ALS Labs for fecal coliform testing at a frequency of three times per week. This testing will continue until the land application has commenced. A breakdown of these results is included to demonstrate the fecal coliform concentration is less that 2,000,000 CFU per gram of total dry weight, which is the standard measurement used by the US EPA for Class B biosolids, (40 CFR Part 503, Standards for the Use or Disposal of Sewage Sludge). The CCME "A Review of the Current Canadian Legislative Framework for Wastewater Biosolids" also refers to this standard. There is also demonstrated reduction of volatile solids which assists in lowering vector attraction.

Analysis of biosolids for fecal coliforms will resume for Biosolids Storage Tank #1 and #2 a minimum of one month prior to land application to demonstrate the stability of the material. A copy of these results will be sent to your department as they become available.

As stated, land application of biosolids material from Biosolids Storage Tank #1 will occur in late May. A response to this request prior to this date would be appreciated. If you have any questions or require any additional information, please contact myself at (204) 239-8359.

Regards,

Karly Friesen
Manager, Wastewater Treatment Division

Cc: Jay Rackham, Environmental Compliance and Enforcement
Tyler Kneeshaw, Environmental Compliance and Enforcement
Siobhan Burland Ross, Environmental Approvals Branch
Kelly Braden P. Eng., Director of Operations
Natalie Wilson, P. Eng., AECOM Engineering

Date	Digester					BST #1						
	pH	Temperature	TSS (mg/L)	VSSin	VSSout	pH	Conductivity	Temperature (oC)	TSS (mg/L)	VSS (mg/L)	Fecal Coliform (MPN/100mL)	Fecal Coliform (MPN/dry gram) (calculated)
4/1/2018		29.7	27600	23600	20900							
4/2/2018		22.1	28900	18600	21700							
4/3/2018	6.9	33.3	27950	21900	20750							
4/4/2018	6.8	228.1	29850	23900	22700							
4/5/2018	6.6	28.8	28550	18050	21750							
4/6/2018	6.8	27.6	28100	20600	21500							
4/7/2018		18.7	27900	19200	20300							
4/8/2018		19.8	22100	19400	16100							
4/9/2018	6.8	29.2	24650	23150	18100			13.2	42250	30100	41000	9704
4/10/2018	6.8	21.4	22550	29700	16450	6.7	3230	11.9	12850	9450	2910	2265
4/11/2018	6.9	20.6	42000	25800	30600	6.7		12.5	11245	8055	61300	54513
4/12/2018	6.8	210.9	34400	19400	25000							
4/13/2018	6.9	22.3	22400		16500							
4/14/2018		36.6	30700		22400							
4/15/2018		40	36900		26800							
4/16/2018	6.9	22	26300	22000	19950	6.7		12.7	15700	11900	24800	15796
4/17/2018	7.0	21.4	31350	21800	23400	6.7	3200	12.7	14700	11000	30800	20952
4/18/2018	6.9	31.7	31050		22600	6.7		12.8	13950	10600	21900	15699
4/19/2018	6.9	21.7	28450	25000	20850							
4/20/2018	6.9		33750		24800							
4/21/2018		26.9	32000	25500	23700							
4/22/2018		39.5	28600	22100	20050							
4/23/2018	6.7	30	34450	23650	25750	6.8		13.8	13330	8190	30800	23106
4/24/2018	6.9	35	30250	22650	22700		3290	13.4	14890	10680	27600	18536
4/25/2018	6.9	40.7	30900	22200	23050	6.7		13.4	75750	54250	Pending	#VALUE!
4/26/2018	6.9	22.14	25600	22550	19650							
4/27/2018		19.7										
4/28/2018		39.1										
4/29/2018												
4/30/2018												

Manitoba
Sustainable Development
Environmental Stewardship Division
Environmental Approvals Branch
1007 Century St, Winnipeg, Manitoba, Canada R3H 0W4
T 204 945-8321 F 204-945-5229
www.gov.mb.ca/conservation/eal

May 7, 2018

Karly Friesen
Manager, Wastewater Treatment Division
City of Portahe la Prairie
97 Saskatchewan Ave E
Portage la Prairie MB R1N 0L8
kfriesen@city-plap.com

Dear Ms. Friesen:

This is in response to your letter of April 27, 2018 requesting permission to allow Scott Howard and Brittany Denommee, both certified as operator-in-training (OIT) to operate the City of Portage la Prairie's Water Pollution Control Facility on weekends, holidays and standby as per facility rotation.

The Water and Wastewater Facility Operators Regulation requires facility owners to ensure that an operator-in-charge is responsible for the facility at all times. I realize that the City of Portage la Prairie has a continuous operation of its wastewater plant and therefore requires operators to be on site during weekends and holidays. Our record shows that Mr. Howard completed a Water and Wastewater Technician certificate while Ms. Denommee completed an Environmental Technician certificate.

In view of the foregoing, your request for Mr. Howard and Ms. Denommee to work alone at the wastewater facility during weekends, holidays and standby with the operator-in-charge (OIC) available by phone, is hereby approved with the following conditions:

- The OIC must ensure that the facility is operated in a safe manner, and must review and approve all process changes to be made;
- In case of emergency, the OIC must be able to respond and be available on site in a timely manner; and
- Mr. Howard and Ms. Denommee must write the required Class I wastewater treatment and Class I wastewater collection exams and apply for a full operator certificate by February 2, 2019, when both of them will earn their one-year operating experience.

If you have any questions on this matter please contact Ms. Donna Garcia, Certification Program Specialist, at (204) 945-7065 or by email at donna.garcia@gov.mb.ca .

Sincerely,

Tracey Braun
Director
Environmental Approvals Branch

Manitoba
Sustainable Development
Environmental Stewardship Division
Environmental Approvals Branch
1007 Century Street, Winnipeg, Manitoba, Canada R3H 0W4
T 204 945-8321 F 204-945-5229
www.gov.mb.ca/conservation/eal

File: 1020.30

May 7, 2018

Karly Friesen
Manager, Wastewater Treatment Division
City of Portage la Prairie
97 Saskatchewan Avenue East
Portage la Prairie, MB R1N 0L8

Dear Ms. Friesen:

Re: Application for Alternative Digestion – City of Potage la Prairie Water Pollution Control Facility

I am responding to your January 3, 2018 and April 27, 2018 letters regarding an additional supplementary request for approval for an alternative digestion method for the stabilization of biosolids materials that originate from the City of Portage la Prairie Water Pollution Control Facility (Facility). Environment Act Licence No. 1907 relates to the sludge solids disposal activities associated with the Facility. We acknowledge receipt of the completed Notice of Alteration form.

The January 3, 2018 letter indicates that previous efforts involving the attempted installation and operation of chopper pumps that were to act as mixers in the anaerobic digester have been unsuccessful. Solids have accumulated in the digesters, creating short-circuiting and reductions in digester residence time. The April 27, 2018 letter and attachment indicate that recent laboratory analysis demonstrates that interim bacterial destruction has occurred and that the fecal coliform count of the biosolids is below what the US EPA states as the maximum allowable for Class B biosolids. Previously submitted memorandums from AECOM dated May 8, 2017 and June 8, 2017 concluded that, compared with US EPA Regulations, Part 503, testing of biosolids from Biosolids Storage Tank No. 1 and Biosolids Storage Tank No. 2 respectively had indicated that similar material was suitable for land application subject to compliance with the provisions of Environment Act Licence No. 1907 related to heavy metals and sub-surface soil injection.

Upon review of the Notice of Alteration and the Licence, I have decided that the environmental impacts of the proposed alteration are insignificant. Accordingly, pursuant to Section 14(2) of The Environment Act, I hereby approve the request to allow the biosolids from Biosolids Storage Tank No. 1 to be land applied subject to the following limits, terms and conditions:

...2/

1. All associated activities are completed in accordance with the requirements of Environment Act Licence No. 1907;

2. A supplementary Notice of Alteration relative to completing similar activities with the biosolids from Biosolids Storage Tank No. 2 or any other biosolids containment facility must be submitted to the Environmental Approvals Branch for approval prior to commencing removal from the tank for land application of stored biosolids other than those currently contained in Biosolids Storage Tank No. 1; and

3. This approval shall terminate on the 10th day of November, 2018.

If you have any questions or would like to discuss the foregoing, please contact Robert Boswick, Environmental Engineer, at 204-945-6030.

Yours sincerely,

Tracey Braun, M.Sc.
Director

c: Don Labossiere/Scott Davies/Tyler Kneeshaw, Environmental Compliance and Enforcement Branch
Siobhan Burland Ross/Rob Boswick, Environmental Approvals Branch
Public Registries

Notice of Alteration Form

Manitoba
Sustainable Development

Client File No. :	Environment Act Licence No. : 1907
Legal name of the Licencee: City of Portage la Prairie	
Name of the development: Water Pollution Control Facility	
Category and Type of development per Classes of Development Regulation: Waste Treatment and Storage <SELECT> DIGESTION/BIOSOLIDS	
Licencee Contact Person: Karly Friesen Mailing address of the Licencee: 97 Saskatchewan Ave East City: Portage la Prairie Province: Manitoba Postal Code: R1N 0L8 Phone Number: (204) 239-8359 Fax: Email: kfriesen@city-plap.com	
Name of proponent contact person for purposes of the environmental assessment (e.g. consultant): Natalie Wilson, P.Eng, AECOM Canada	
Phone: (204) 982-8322 Fax:	Mailing address: 99 Commerce Drive, Winnipeg, Mb, R3P 0Y7
Email address: natalie.wilson@aecom.com	
Short Description of Alteration *(max 90 characters):* Equivalent Digestion Process for solids in Storage Tanks 1 & 2 for land application	
Alteration fee attached: Yes: ☐ No: ☑ If No, please explain: Minor Alteration with no environmental effects	
Date: 2018/05/02	Signature: Printed name: KARLY FRIESEN

A complete Notice of Alteration **(NoA)** consists of the following components:

- ☑ **Cover letter**
- ☑ **Notice of Alteration Form**
- ☐ **2 hard copies and 1 electronic copy of the NoA detailed report** (see "Information Bulletin - Alteration to Developments with Environment Act Licences")
- ☐ **$500 Application fee, if applicable** (Cheque, payable to the Minister of Finance)

Submit the complete NoA to:

Director
Environmental Approvals Branch
Manitoba Sustainable Development
1007 Century Street
Winnipeg, Manitoba R3H 0W4

For more information:

Phone: (204) 945-8321
Fax: (204) 945-5229
http://www.gov.mb.ca/sd/eal

Note: Per Section 14(3) of the Environment Act, Major Notices of Alteration must be filed through submission of an Environment Act Proposal Form (see "Information Bulletin – Environment Act Proposal Report Guidelines")

Portage la Prairie
City of Possibilities

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

File No. WPCF 30-4

August 16, 2018

Ms. Tracey Braun
Environmental Approvals Branch
Manitoba Sustainable Development
1007 Century Street
Winnipeg, Manitoba
R3H 0W4

Re: Notice of Alteration for Alternative Digestion Method for Residual Solids Stored in Biosolids Storage Tank #2.

Dear Ms. Braun:

The City of Portage la Prairie is submitting a Notices of Minor Alteration regarding residual solids material that is stored in Biosolids Storage Tank #2 (BST 2) at the Water Pollution Control Facility (WPCF) as the anaerobic digester continues to operate out of compliance of Biosolids License 1907, Clause 2. Similar requests were approved on May 27, 2017 and June 29, 2017. Approval for the same request for BST #1 was also granted on May 7, 2018. BST 2 has almost reached full storage capacity. To maintain treatment of incoming wastewater to the WPCF, it is necessary to remove these solids and land apply via injection to nearby farm land. The anticipated start date for this is September 4, 2018.

In Clause 2 of Biosolids License 1907 it states, "the licensee shall, after the 1st of June 1996, ensure that prior to removal for disposal on agricultural land, the biosolids have been subjected to anaerobic digestion for a period of 30 days at a minimum temperature of 20°C or an equivalent digestion process acceptable to the Director." The mixers in the anaerobic digester failed and solids have accumulated in the anaerobic digester, causing short circuiting. This has also caused a reduction in the residence time and therefore, materials processed through the anaerobic digester do not comply with the license as written. Due to operational constraints it is not possible to ensure the digester, in its current state, meets the requirements as stipulated in Clause 2, EAL 1907.

The biosolids license uses the time and temperature criteria as a confirmation of bacterial destruction and for the reduction in volatile solids to reduce vector attraction. The US EPA states that for Class B biosolids, (40 CFR Part 503, Standards for the Use or Disposal of Sewage Sludge) expected fecal coliforms levels in Class B biosolids should be < 2,000,000 CFU per gram total dry weight. The CCME

"A Review of the Current Canadian Legislative Framework for Wastewater Biosolids" also refers to this standard. The US EPA standard states a reduction in volatile solids concentration lowers vector attraction. Through ongoing laboratory analysis, the City of Portage la Prairie has been able to demonstrate that the fecal coliform count is below the EPA standard as stated above. Although the anaerobic digester at is not functioning as designed, the intended outcome of bacterial destruction is occurring and meets the US EPA guidelines for Class B biosolids. The potential for vector attraction can be mitigated when biosolids are injected, as is done by the City of Portage la Prairie. As required as part of the NOA application, the City of Portage la Prairie engaged AECOM Engineering to review the provision of using EPA guidelines for bacteria count. The memo provided demonstrated how bacterial destruction is considered an equivalent measurement of time and temperature under the EPA guidelines. A copy of this memo was submitted with the original applications. Ongoing monitoring of temperature, pH and coliform counts of residual solids in BST 2 for 2018 have been conducted and these results are included with this NOA.

The long-term plan to rectify this situation includes refurbishing the digester with externally located mixing equipment. This is included in the Nutrient Reduction upgrade for the wastewater facility which also includes a second anaerobic digester. This will allow for proper sludge stabilization in the new digester and allow the existing digester to be taken offline, cleaned out, and the mixing system repaired. This redundancy will ensure better operation and maintenance. The current timeline for the construction and operation of the new anaerobic digester is in 2021.

It is necessary for biosolids to be removed from storage to ensure ongoing capacity is available for solids being removed from the secondary system. Without storage room, the solids would accumulate in the secondary system and wash out to the river with the discharged effluent. The City of Portage la Prairie requests that the Director approve the alteration of license 1907, clause 2 to allow the land application of biosolids if the requirement of fecal coliform count is below 2,000,000 CFU per dry gram and if biosolids is applied via injection until November 30, 2018.

If you have any questions or require any additional information, please contact me at (204) 239-8359.

Regards,

Karly Friesen
Manager, Wastewater Treatment Division

Cc: Jay Rackham, Environmental Compliance and Enforcement
Tyler Kneeshaw, Environmental Compliance and Enforcement
Kelly Braden P. Eng., Director of Operations
Natalie Wilson, P. Eng., AECOM Engineering

Manitoba
Sustainable Development
Environmental Stewardship Division
Environmental Approvals Branch
1007 Century Street, Winnipeg, Manitoba, Canada R3H 0W4
T 204 945-8321 F 204-945-5229
www.gov.mb.ca/conservation/eal

File: 1020.30

September 7, 2018

Karly Friesen
Manager, Wastewater Treatment Division
City of Portage la Prairie
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 3K4

Dear Ms. Friesen:

Re: Application for Alternative Digestion – City of Portage la Prairie Water Pollution Control Facility – Biosolids Storage Tank #2

I am responding to your August 16, 2018 Notice of Alteration (NoA) consisting of a request for approval for an alternative digestion method for the stabilization of biosolids materials that originate from the City of Portage la Prairie Water Pollution Control Facility (Facility) and are currently held in Biosolids Storage Tank #2 (BST 2). Environment Act Licence No. 1907 relates to the sludge solids disposal activities associated with the Facility. We acknowledge receipt of the completed NoA form.

The August 16, 2018 letter indicates that solids have again accumulated in the digesters, creating short-circuiting and reductions in digester residence time. The letter and attachment indicate that recent laboratory analysis demonstrates that interim bacterial destruction has occurred and that the fecal coliform count of the biosolids is below what the US EPA states as the maximum allowable for Class B biosolids. Previously submitted memorandums from AECOM dated May 8, 2017 and June 8, 2017 concluded that, compared with US EPA Regulations, Part 503, testing of biosolids from Biosolids Storage Tank No. 1 (BST 1) and BST 2 respectively had indicated that similar material was suitable for land application subject to compliance with the provisions of Environment Act Licence No. 1907 related to heavy metals and sub-surface soil injection.

Through ongoing laboratory analysis, the City of Portage la Prairie has again determined that the fecal coliform count of the biosolids currently contained in BST 2 is below the maximum allowable for Class B biosolids. The NoA requests authorization to land apply biosolids from BST 2 until November 30, 2018.

Upon review of the NoA and the Licence, I have decided that the environmental impacts of the proposed alteration are insignificant. Accordingly, pursuant to Section 14(2) of The

…2/

Environment Act, I hereby approve the request to allow the biosolids from BST 2 to be land applied subject to the following limits, terms and conditions:

1. All associated activities are completed in accordance with the requirements of Environment Act Licence No. 1907;

2. A supplementary Notice of Alteration relative to completing similar activities with the biosolids from BST 1 or any other biosolids containment facility must be submitted to the Environmental Approvals Branch for approval prior to commencing removal from the tank for land application of stored biosolids other than those currently contained in BST 2; and

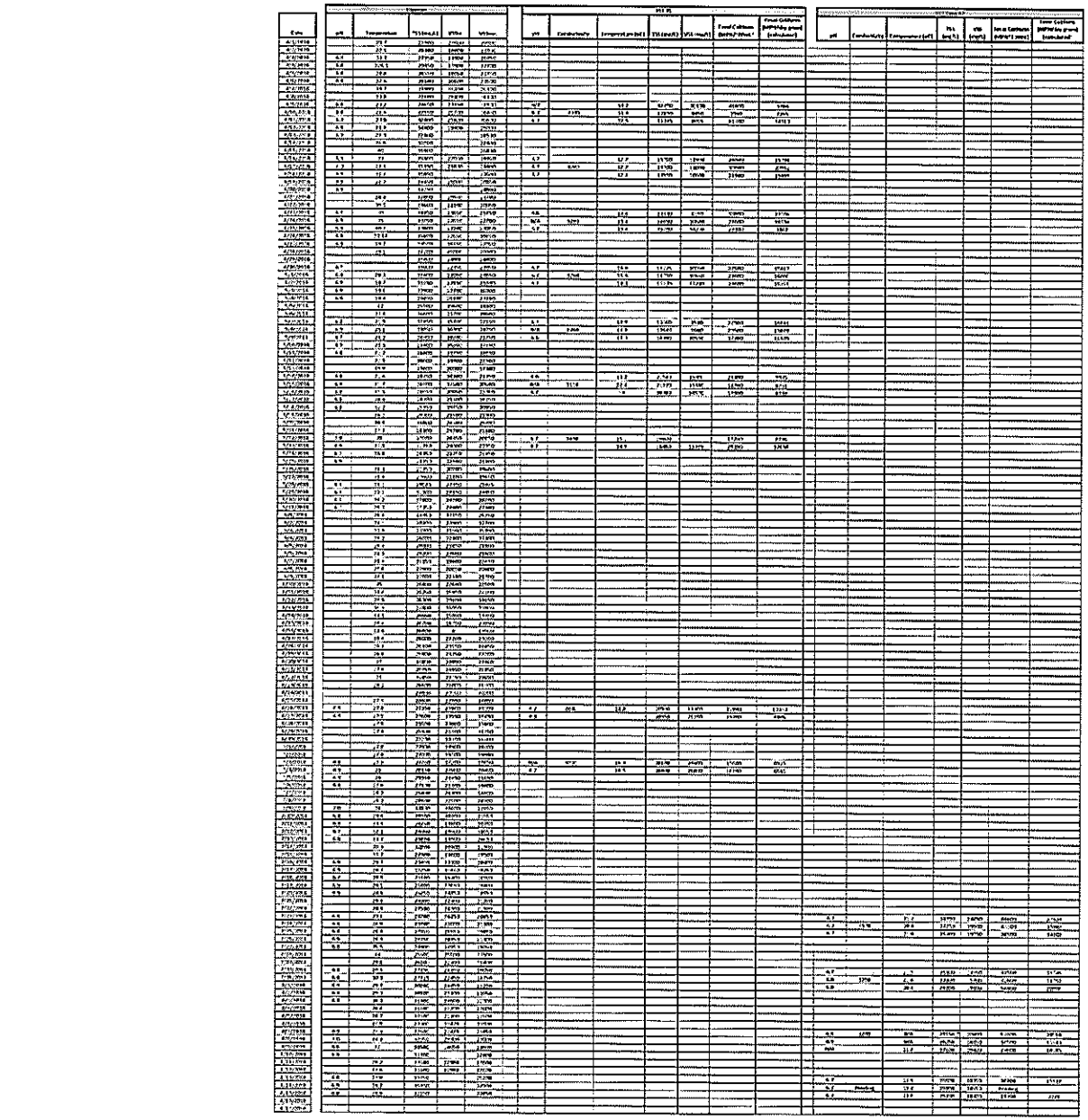
3. This approval shall terminate on the 10th day of November, 2018 unless otherwise approved by the Director.

If you have any questions or would like to discuss the foregoing, please contact Robert Boswick, Environmental Engineer, at 204-945-6030.

Yours sincerely,

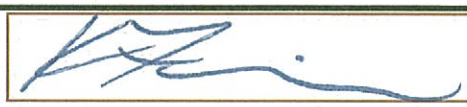
Tracey Braun, M.Sc.
Director

c: Don Labossiere/Tyler Kneeshaw/Jay Rackham, Environmental Compliance and Enforcement Branch
Siobhan Burland Ross/Robert Boswick, Environmental Approvals Branch
Public Registries



Notice of Alteration Form

Manitoba
Sustainable Development

Client File No. :	Environment Act Licence No. : 1907
Legal name of the Licencee: City of Portage la Prairie	
Name of the development: Water Pollution Control Facility	
Category and Type of development per Classes of Development Regulation: Waste Treatment and Storage	<SELECT> DIGESTION / BIOSOLIDS
Licencee Contact Person: Karly Friesen Mailing address of the Licencee: 97 Saskatchewan Ave East City: Portage la Prairie Province: Manitoba Postal Code: R1N 3K4 Phone Number:204-239-8359 Fax: Email: kfriesen@city-plap.com	
Name of proponent contact person for purposes of the environmental assessment (e.g. consultant): Natalie Wilson, P.Eng, AECOM Canada	
Phone: 204-982-8322 Fax:	Mailing address: 99 Commerce Driver, Winnipeg, MB, R3P 0Y
Email address: Natalie.Wilson@aecom.com	
Short Description of Alteration *(max 90 characters)*: Equivalent digestion process for residual solids in BST #2 for land application	
Alteration fee attached: Yes: ☐ No: ☑ If No, please explain: Minor Alteration with no environmental effects	
Date: 17/8/18	Signature:  Printed name: KARLY FRIESEN

A complete Notice of Alteration **(NoA)** consists of the following components:

- ☑ **Cover letter**
- ☐ **Notice of Alteration Form**
- ☑ **2 hard copies and 1 electronic copy of the NoA detailed report** (see "Information Bulletin - Alteration to Developments with Environment Act Licences")
- ☐ **$500 Application fee, if applicable** (Cheque, payable to the Minister of Finance)

Submit the complete NoA to:

Director
Environmental Approvals Branch
Manitoba Sustainable Development
1007 Century Street
Winnipeg, Manitoba R3H 0W4

For more information:

Phone: (204) 945-8321
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		BST #1							BST Tank #2						
/SSin	VSSout	pH	Conductivity	Temperature (oC)	TSS (mg/L)	VSS (mg/L)	Fecal Coliform (MPN/100mL)	Fecal Coliform (MPN/dry gram) (calculated)	pH	Conductivity	Temperature (oC)	TSS (mg/L)	VSS (mg/L)	Fecal Coliform (MPN/100mL)	Fecal Coliform (MPN/dry gram) (calculated)
3600	20900														
8600	21700														
1900	20750														
3900	22700														
8050	21750														
0600	21500														
9200	20300														
9400	16100														
3150	18100	N/A		13.2	42250	30100	41000	9704							
9700	16450	6.7	3230	11.9	12850	9450	2910	2265							
5800	30600	6.7		12.5	11245	8055	61300	54513							
9400	25000														
	16500														
	22400														
	26800														
2000	19950	6.7		12.7	15700	11900	24800	15796							
1800	23400	6.7	3200	12.7	14700	11000	30800	20952							
	22600	6.7		12.8	13950	10600	21900	15699							
5000	20850														
	24800														
5500	23700														
2100	20050														
3650	25750	6.8		13.8	13330	8190	30800	23106							
2650	22700	N/A	3290	13.4	14890	10680	27600	18536							
2200	23050	6.7		13.4	75750	54250	29100	3842							
2550	19650														
6150	22050														
5000	20900														
4800	24400														
2350	23950	6.7		14.0	14225	10050	22500	15817							
2050	23850	6.7	3260	13.6	14750	10560	23600	16000							
2650	25100	6.7		14.3	15370	11240	23600	15355							
2700	16900														
5100	23100														
9500	18800														
1700	19600														
7700	22150	6.7		14.9	13360	9510	22500	16841							
5900	24750	N/A	3360	14.9	13640	9680	20500	15029							
1700	21750	6.6		14.3	14790	10550	17200	11629							
6200	17550														
1750	18650														
9900	22500														
0000	17800														
1400	21350	6.6		14.2	21540	15300	21400	9935							
7600	20500	N/A	3110	22.4	21370	15380	18700	8751							
0950	22050	6.7		14	20380	14570	17900	8783							
1500	18350														
0750	20950														
1500	21900														
0500	25700														
1200	21100														
0950	20250	6.7	3450	15.1	19600		17200	8776							
1000	23950	6.7		14.9	16480	11995	29100	17658							
1250	21850														
1100	21300														
0200	19600														
1100	19650														
1350	21075														
1150	23050														
1200	28200														
1800	27400														
1250	25250														
0900	12700														
1500	15800														
1800	17300														
1850	21800														
1600	21600														
1600	22650														
1250	20600														
1100	21700														
1600	22500														
0950	22100														
1100	18650														
1050	21000														
0000	19300														
0750	20350														
0	19500														
1200	20200														
1550	21050														
1250	22200														
0250	23900														
0950	21950														
1150	23650														
1200	21100														
1100	20200														
0950	17050														
0600	20100	6.7	2840	18.8	26900	19200	32800	12193							
1550	17450	6.8			28950	21250	19700	6805							
1000	15800														
1100	23750														
0100	16300														
0000	20300														
0100	19980														
2100	19850	N/A	3020	18.4	28100	20400	19600	6975							
0000	20400	6.7		18.5	28400	21000	18700	6585							
0150	21850														
2100	19600														
2100	18800														
0100	20700														
0400	23950														
2100	21050														
0100	20350														
0000	18050														
0100	20650														
2100	21300														
0000	19500														
2100	20400														
0150	19250														
0000	18900														
1150	19400														
1150	18950														
0000	21200														
0000	21500														
1150	20850								6.7		21.7	31350	24250	86600	27624
0000	21300								6.7	3170	20.8	27250	19900	41100	15083
1150	19850								6.7		21.0	25700	19050	36500	14202
1150	21400														
1150	18050														
0000	17500														
0000	18400														
1150	19050								6.7		21.5	25100	17550	34500	13745
1150	18750								6.8	3290	21.6	22100	15700	32600	14751
1150	21150								6.8		20.4	26100	19100	54800	20996
0000	21050														
0000	22300														
0000	23000														
0000	23500														
2179	17000														
2179	23850								6.8	3240	N/A	28150	20700	57900	20568
0000	23000								6.9		N/A	26250	18850	34500	13143
1150	21600								N/A		21.8	27100	19400	27600	10185
	22800														
3888	23600														
3888	22600														
	25200								6.7		21.9	25600	18350	38700	15117
	24900								6.7	Pending	21.4	25900	18550	Pending	
	22850								6.7		21.6	25700	18400	18700	7276

APPENDIX C

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

SPRING

N 10-12-8

Portage la Prairie
City of Possibilities

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

April 27, 2018

Mr. Tyler Kneeshaw
Regional Supervisor- Environment Officer
Manitoba Sustainable Development
309-25 Tupper Street North
Portage la Prairie, MB
R1N 3K1

Re: 2018 Residual Biosolids Application Program Truck Routes

Dear Mr. Kneeshaw:

As requested, please find the enclosed route maps for spring biosolids application for review and comment. Transport and application of biosolids is scheduled to begin on Tuesday, May 22, 2018, pending dry weather conditions. Should there be any concerns throughout the hauling process with traffic or dust, please do not hesitate to contact myself as the contractor is responsible for both items.

Please direct any questions or concerns regarding routing to myself at 204-239-8359.

Sincerely,

Karly Friesen
Manager, Wastewater Treatment Division

Cc: Kelly Braden, P. Eng., Director of Operations

Google Maps

390 River Rd, Southport, MB R0H 1N1 to Road 68N, Macdonald, MB R0H 0S0

Drive 21.7 km, 17 min

Field N 10-12-8

Map data ©2018 Google 1 km

390 River Rd

Southport, MB R0H 1N1

1. Head northeast on River Rd

1.0 km

2. Turn left at the 1st cross street toward Trans-Canada Hwy/MB-1 W

34 m

3. Turn left at the 1st cross street onto Trans-Canada Hwy/MB-1 W

16.5 km

4. Turn right onto MB-16 W (signs for Trans Canada Highway/Saskatoon/Neepawa/Yellow Head Highway)

3.3 km

5. Turn left onto Road 68N

   Destination will be on the left

800 m

Road 68N

Macdonald, MB R0H 0S0

Portage la Prairie
City of Possibilities

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

April 27, 2018

Ms. Nettie Neudorf, CPA, CGA, CMMA
Chief Administrative Officer
Rural Municipality of Portage la Prairie
35 Tupper Street South
Portage la Prairie, MB R1N 1W7

Re: 2018 Residual Biosolids Application Program Truck Routes

Dear Ms. Neudorf:

As requested, please find the enclosed route maps for spring biosolids application, for review and comment by Reg Shostal. Transport and application of biosolids is scheduled to begin on Tuesday, May 22, 2018, pending dry weather conditions. Should there be any concerns throughout the hauling process with traffic or dust, please do not hesitate to contact myself as the contractor is responsible for these items.

Please direct any questions or concerns regarding routing to myself at 204-239-8359.

Sincerely,

Karly Friesen
Manager, Wastewater Treatment Division

Cc: Kelly Braden, P. Eng., Director of Operations

Google Maps

390 River Rd, Southport, MB R0H 1N1 to Road 68N, Macdonald, MB R0H 0S0

Drive 21.7 km, 17 min

Field N 10-12-8

Map data ©2018 Google 1 km

390 River Rd

Southport, MB R0H 1N1

1. Head northeast on River Rd

1.0 km

2. Turn left at the 1st cross street toward Trans-Canada Hwy/MB-1 W

34 m

3. Turn left at the 1st cross street onto Trans-Canada Hwy/MB-1 W

16.5 km

4. Turn right onto MB-16 W (signs for Trans Canada Highway/Saskatoon/Neepawa/Yellow Head Highway)

3.3 km

5. Turn left onto Road 68N

   Destination will be on the left

800 m

Road 68N

Macdonald, MB R0H 0S0

LETTER OF AGREEMENT

Mr. Kelly Braden, P.Eng.
Director of Operations
City of Portage la Prairie
97 Saskatchewan Ave. E.
Portage la Prairie, MB
R1N 0L8

Dear Sir:

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 2018 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 of Portage la Prairie will pay $ 90.00/acre (160 acre) rent for the acres of land described as N 10-12-8 in the municipality of Portage la Prairie for the year 2018.
14. 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 season 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.
g) Acknowledge that I will not have access to the aforementioned land for crop purposes in the 2018 season. Once the application program is complete as determined by the City, I shall have full access to the land.
h) Cultivate and otherwise keep the land in weed-free condition for growing season of 2018.
i) Release the City of Portage la Prairie from this agreement if, after soil testing, it is not allowable under Environment License 1907 to apply biosolids to the land for any reason.

Yours truly,

L J Slangl

Land Owner -

City Representative

Date

April 25/18

Date

of Land Owner		Stangl					
Description		N 10-12-8					
Owner Authorization		Yes					
300m from residences							
nclosed		Yes					
ield previously Used							
	Lat			Long			
	Date	Date		Date	Date		
	BVF 30/5/2018	BVF 30/5/2018 lbs/ac		BST 4/6/2018	BST 4/6/2018 lbs/ac		Comments
	0.423			0.423			
	34200			34200			
	20.9			20.9			
	19			19			
	8.9			8.9			
	0.0317			0.0317			
	23.6			23.6			
	8.03			8.03			
ıs < 60 ug/g	8			8			
	2220			2220			
e Nitrogen 0- kg/ha	29			29			
	67			67			
Nitrogen	383			383			
	2.97			2.84			
	38.0			36.4			
ty	3640			3030			
	210			243			
	9.28			9.88			
	0.23			0.391			
	40.2			32.8			
ogen	3			8.9			
trogen	730			2107			
	6.99			7.15			
	21200			11500			
gen	1113			2503			
phorus	8680			13300			
s	2.22			3.21			
lids	67			69.1			
	647			575			
< 2.88	0.777	0.693		0.768	0.69		
< 216	37.82	33.74		37.71	33.64		
90	35.28	31.47		34.77	31.02		
	16.07	14.34		16.04	14.31		
0.9	0.06	0.05		0.06	0.05		
)	42.67	38.07		42.52	37.93		
ppl. Rate PA-	100.07	89.28		99.54	88.81		
	1.81	1.61		1.51	1.35		
	123.92	110.56		122.04	108.88		
s	58.96	66.09		45.516	51.02		
s							

ASSINIBOINE INJECTIONS LTD

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

DAILY LIME APPLICATION PLAN

DATE: _____

FARMERS NAME: _____

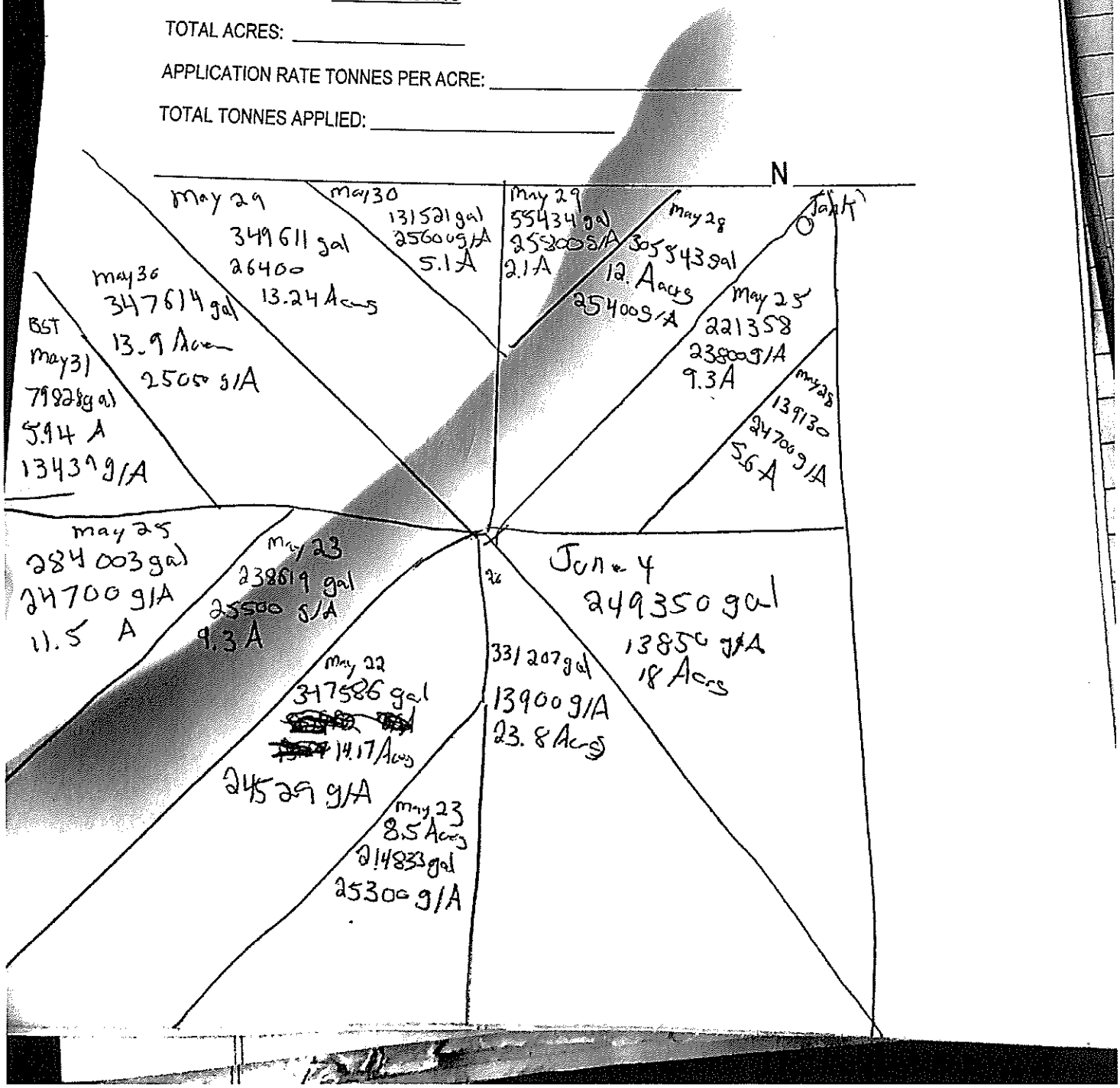
FIELD: SEC. ____ TWP _____ RGE _____

APPLICATION TYPE: BROADCASTING

TOTAL ACRES: _____

APPLICATION RATE TONNES PER ACRE: _____

TOTAL TONNES APPLIED: _____



City of Portage la Prairie - Wastewater
ATTN: AARON STECHESEN
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 0L8

Date Received: 01-MAY-18
Report Date: 15-MAY-18 11:03 (MT)
Version: FINAL

Client Phone: 204-239-8361

Certificate of Analysis

Lab Work Order #: L2087286
Project P.O. #: W02435
Job Reference:
C of C Numbers:
Legal Site Desc:

Hua Wo
Chemistry Laboratory Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2087286-1 18-04-68 N 10-12-8							
Sampled By: CLIENT on 30-APR-18 @ 15:30							
Matrix: SOIL							
Miscellaneous Parameters							
Available Phosphate-P	8.0		1.0	mg/kg	07-MAY-18	07-MAY-18	R4037513
Mercury (Hg)	0.0317		0.0050	mg/kg	02-MAY-18	02-MAY-18	R4031016
% Moisture	20.4		0.10	%	09-MAY-18	09-MAY-18	R4038685
pH (1:2 soil:water)	8.03		0.10	pH	07-MAY-18	07-MAY-18	R4035868
Metals							
Aluminum (Al)	14100		5.0	mg/kg	02-MAY-18	02-MAY-18	R4031209
Antimony (Sb)	0.43		0.10	mg/kg	02-MAY-18	02-MAY-18	R4031209
Arsenic (As)	7.94		0.10	mg/kg	02-MAY-18	02-MAY-18	R4031209
Barium (Ba)	159		0.50	mg/kg	02-MAY-18	02-MAY-18	R4031209
Beryllium (Be)	0.60		0.10	mg/kg	02-MAY-18	02-MAY-18	R4031209
Bismuth (Bi)	0.156		0.020	mg/kg	02-MAY-18	02-MAY-18	R4031209
Boron (B)	12		10	mg/kg	02-MAY-18	02-MAY-18	R4031209
Cadmium (Cd)	0.423		0.020	mg/kg	02-MAY-18	02-MAY-18	R4031209
Calcium (Ca)	34200		100	mg/kg	02-MAY-18	02-MAY-18	R4031209
Chromium (Cr)	20.9		1.0	mg/kg	02-MAY-18	02-MAY-18	R4031209
Cobalt (Co)	8.33		0.020	mg/kg	02-MAY-18	02-MAY-18	R4031209
Copper (Cu)	19.0		1.0	mg/kg	02-MAY-18	02-MAY-18	R4031209
Iron (Fe)	18700		25	mg/kg	02-MAY-18	02-MAY-18	R4031209
Lead (Pb)	8.93		0.20	mg/kg	02-MAY-18	02-MAY-18	R4031209
Magnesium (Mg)	13400		10	mg/kg	02-MAY-18	02-MAY-18	R4031209
Manganese (Mn)	651		0.50	mg/kg	02-MAY-18	02-MAY-18	R4031209
Molybdenum (Mo)	0.34		0.10	mg/kg	02-MAY-18	02-MAY-18	R4031209
Nickel (Ni)	23.6		0.50	mg/kg	02-MAY-18	02-MAY-18	R4031209
Phosphorus (P)	540		100	mg/kg	02-MAY-18	02-MAY-18	R4031209
Potassium (K)	2220		25	mg/kg	02-MAY-18	02-MAY-18	R4031209
Selenium (Se)	<0.50		0.50	mg/kg	02-MAY-18	02-MAY-18	R4031209
Silver (Ag)	<0.10		0.10	mg/kg	02-MAY-18	02-MAY-18	R4031209
Sodium (Na)	180		10	mg/kg	02-MAY-18	02-MAY-18	R4031209
Strontium (Sr)	54.1		0.10	mg/kg	02-MAY-18	02-MAY-18	R4031209
Thallium (Tl)	0.26		0.10	mg/kg	02-MAY-18	02-MAY-18	R4031209
Tin (Sn)	<5.0		5.0	mg/kg	02-MAY-18	02-MAY-18	R4031209
Titanium (Ti)	45.1		0.50	mg/kg	02-MAY-18	02-MAY-18	R4031209
Uranium (U)	1.01		0.020	mg/kg	02-MAY-18	02-MAY-18	R4031209
Vanadium (V)	45.9		0.50	mg/kg	02-MAY-18	02-MAY-18	R4031209
Zinc (Zn)	67		10	mg/kg	02-MAY-18	02-MAY-18	R4031209
L2087286-2 18-04-69							
Sampled By: CLIENT on 30-APR-18 @ 15:30							
Matrix: SOIL							
Miscellaneous Parameters							
Available Nitrate-N	29.0		1.0	mg/kg	03-MAY-18	03-MAY-18	R4033553
% Moisture	21.1		0.10	%	09-MAY-18	09-MAY-18	R4038685
Total Nitrogen by LECO	1310		200	mg/kg	04-MAY-18	04-MAY-18	R4034386
Total Available N & NO3-N, NO2-N & NH4							
Available Ammonium-N							
Available Ammonium-N	8.0		1.0	mg/kg	03-MAY-18	03-MAY-18	R4032757
Available Ammonium-N - Calculation							
Total Available Nitrogen	37.3		2.2	mg/kg		03-MAY-18	
Nitrate, Nitrite & Nitrate+Nitrite-N(KCL							
Nitrite-N	1.0		1.0	mg/kg	03-MAY-18	03-MAY-18	R4033322
Nitrate+Nitrite-N	29.3		2.0	mg/kg	03-MAY-18	03-MAY-18	R4033322
Nitrate-N	28.3		2.0	mg/kg	03-MAY-18	03-MAY-18	R4033322

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2087286-2 18-04-69							
Sampled By: CLIENT on 30-APR-18 @ 15:30							
Matrix: SOIL							
L2087286-3 18-04-70							
Sampled By: CLIENT on 30-APR-18 @ 15:30							
Matrix: SOIL							
Grain Size by Hydrometer							
Grain Size Curve	SEE ATTACHED				08-MAY-18	08-MAY-18	R4039707
Gravel (4.75mm - 3in.)	<1.0		1.0	%	08-MAY-18	08-MAY-18	R4039707
SAND (0.075mm - 4.75mm)	4.5		1.0	%	08-MAY-18	08-MAY-18	R4039707
Silt (0.005mm - 0.075mm)	29.8		1.0	%	08-MAY-18	08-MAY-18	R4039707
Clay (<0.005mm)	65.6		1.0	%	08-MAY-18	08-MAY-18	R4039707

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ETL-N-TOT-AVAIL-SK	Soil	Available Ammonium-N - Calculation	Soil Methods of Analysis (1993) CSSS
GRAIN SIZE-MBWQ-SK	Soil	Grain Size by Hydrometer	ASTM D422-63
Particle size curve is generated from dry sieving (particles > 2 mm), wet sieving (particles 2 mm-75 um and hydrometer readings (particles < 75 um)			
HG-200.2-CVAF-WP	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A
Samples for analysis are homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested by block digester (EPA 200.2). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may become "environmentally available." By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.			
MOIST-SK	Soil	Moisture Content	CWS for PHC in Soil - Tier 1
The weighed portion of soil is placed in a 105 C oven overnight. The dried soil is allowed to cooled to room temperature, weighed and the % moisture is calculated.			
N-TOT-LECO-SK	Soil	Total Nitrogen by combustion method	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.			
N2/N3-AVAIL-KCL-SK	Soil	Nitrate, Nitrite & Nitrate+Nitrite-N(KCL	CSSS (1993) p. 26-28
Plant available nitrate and nitrite are extracted from the sample with 2N KCl. Nitrate and Nitrite in the filtered extract are determined colorimetrically by Technicon auto-analyzer or flow injection analyzer at 520 nm.			
NH4-AVAIL-SK	Soil	Available Ammonium-N	Comm Soil Sci 19(6)
Ammonium (NH4-N) is extracted from the soil using 2 N KCl. Ammonium in the extract is mixed with hypochlorite and salicylate to form indophenol blue, which is determined colorimetrically by auto analysis at 660 nm.			
NO3-AVAIL-SK	Soil	Available Nitrate-N	Method = Alberta Ag (1988)
Available Nitrate and Nitrite are extracted from the soil using a dilute calcium chloride solution. Nitrate is quantitatively reduced to nitrite by passage of the sample through a copperized cadmium column. The nitrite (reduced nitrate plus original nitrite) is then determined by diazotizing with sulfanilamide followed by coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. The resulting water soluble dye has a magenta color which is measured at colorimetrically at 520nm.			
Reference: Recommended Methods of Soil Analysis for Canadian Prairie Agricultural Soils. Alberta Agriculture (1988) p. 19 and 28			
PH-1:2-SK	Soil	pH (1:2 Soil:Water Extraction)	AB Ag (1988) p.7
1 part dry soil and 2 parts de-ionized water (by volume) is mixed. The slurry is allowed to stand with occasional stirring for 30 - 60 minutes. After equilibration, pH of the slurry is measured using a pH meter.			
PO4-AVAIL-OLSEN-SK	Soil	Available Phosphate-P by Olsen	CSSS (2008) 8.2
Plant available phosphorus is extracted from the sample with sodium bicarbonate. PO4-P in the filtered extract is determined colorimetrically at 880 nm.			

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

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Quality Control Report

Workorder: L2087286 Report Date: 15-MAY-18

Client: City of Portage la Prairie - Wastewater
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 0L8

Contact: AARON STECHESEN

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
GRAIN SIZE-MBWQ-SK	Soil							
Batch R4039707								
WG2763480-1 DUP		**L2087286-3**						
Gravel (4.75mm - 3in.)		<1.0	<1.0	RPD-NA	%	N/A	25	08-MAY-18
SAND (0.075mm - 4.75mm)		4.5	4.4		%	2.5	25	08-MAY-18
Silt (0.005mm - 0.075mm)		29.8	29.9	J	%	0.1	5	08-MAY-18
Clay (<0.005mm)		65.6	65.6	J	%	0.0	5	08-MAY-18
WG2763480-2 IRM		**2017-PSA**						
Silt (0.005mm - 0.075mm)			32.6		%		25.8-35.8	08-MAY-18
Clay (<0.005mm)			26.9		%		22.7-32.7	08-MAY-18
HG-200.2-CVAF-WP	Soil							
Batch R4031016								
WG2763453-4 CRM		**CANMET TILL-1**						
Mercury (Hg)			96.8		%		70-130	02-MAY-18
WG2763453-5 DUP		**L2087286-1**						
Mercury (Hg)		0.0317	0.0352		mg/kg	10	40	02-MAY-18
WG2763453-2 LCS								
Mercury (Hg)			94.7		%		80-120	02-MAY-18
WG2763453-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	02-MAY-18
MET-200.2-MS-WP	Soil							
Batch R4031209								
WG2763439-4 CRM		**CANMET TILL-1**						
Aluminum (Al)			105.5		%		70-130	02-MAY-18
Antimony (Sb)			106.0		%		70-130	02-MAY-18
Arsenic (As)			97.0		%		70-130	02-MAY-18
Barium (Ba)			98.5		%		70-130	02-MAY-18
Beryllium (Be)			96.5		%		70-130	02-MAY-18
Bismuth (Bi)			99.1		%		70-130	02-MAY-18
Boron (B)			3		mg/kg		0-8	02-MAY-18
Cadmium (Cd)			95.7		%		70-130	02-MAY-18
Calcium (Ca)			92.9		%		70-130	02-MAY-18
Chromium (Cr)			94.4		%		70-130	02-MAY-18
Cobalt (Co)			95.7		%		70-130	02-MAY-18
Copper (Cu)			98.8		%		70-130	02-MAY-18
Iron (Fe)			99.8		%		70-130	02-MAY-18
Lead (Pb)			98.0		%		70-130	02-MAY-18
Magnesium (Mg)			103.6		%		70-130	02-MAY-18

ALS Environmental

Quality Control Report

Workorder: L2087286 Report Date: 15-MAY-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4031209								
WG2763439-4 CRM		**CANMET TILL-1**						
Manganese (Mn)			101.1		%		70-130	02-MAY-18
Molybdenum (Mo)			99.8		%		70-130	02-MAY-18
Nickel (Ni)			96.5		%		70-130	02-MAY-18
Phosphorus (P)			100.7		%		70-130	02-MAY-18
Potassium (K)			86.8		%		70-130	02-MAY-18
Selenium (Se)			105.2		%		70-130	02-MAY-18
Silver (Ag)			105.0		%		70-130	02-MAY-18
Sodium (Na)			95.7		%		70-130	02-MAY-18
Strontium (Sr)			93.2		%		70-130	02-MAY-18
Thallium (Tl)			0.12		mg/kg		0.03-0.23	02-MAY-18
Tin (Sn)			1.0		mg/kg		0-3.1	02-MAY-18
Titanium (Ti)			80.4		%		70-130	02-MAY-18
Uranium (U)			94.7		%		70-130	02-MAY-18
Vanadium (V)			93.8		%		70-130	02-MAY-18
Zinc (Zn)			94.8		%		70-130	02-MAY-18
WG2763439-2 LCS								
Aluminum (Al)			110.7		%		80-120	02-MAY-18
Antimony (Sb)			105.1		%		80-120	02-MAY-18
Arsenic (As)			102.1		%		80-120	02-MAY-18
Barium (Ba)			104.9		%		80-120	02-MAY-18
Beryllium (Be)			99.5		%		80-120	02-MAY-18
Bismuth (Bi)			103.2		%		80-120	02-MAY-18
Boron (B)			100.2		%		80-120	02-MAY-18
Cadmium (Cd)			100.7		%		80-120	02-MAY-18
Calcium (Ca)			99.5		%		80-120	02-MAY-18
Chromium (Cr)			101.6		%		80-120	02-MAY-18
Cobalt (Co)			100.2		%		80-120	02-MAY-18
Copper (Cu)			100.7		%		80-120	02-MAY-18
Iron (Fe)			101.3		%		80-120	02-MAY-18
Lead (Pb)			102.0		%		80-120	02-MAY-18
Magnesium (Mg)			113.6		%		80-120	02-MAY-18
Manganese (Mn)			103.6		%		80-120	02-MAY-18
Molybdenum (Mo)			103.7		%		80-120	02-MAY-18
Nickel (Ni)			100.0		%		80-120	02-MAY-18

ALS Environmental

Quality Control Report

Workorder: L2087286 Report Date: 15-MAY-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4031209								
WG2763439-2 LCS								
Phosphorus (P)			109.2		%		80-120	02-MAY-18
Potassium (K)			110.5		%		80-120	02-MAY-18
Selenium (Se)			99.7		%		80-120	02-MAY-18
Silver (Ag)			100.1		%		80-120	02-MAY-18
Sodium (Na)			108.9		%		80-120	02-MAY-18
Strontium (Sr)			104.3		%		80-120	02-MAY-18
Thallium (Tl)			99.4		%		80-120	02-MAY-18
Tin (Sn)			102.8		%		80-120	02-MAY-18
Titanium (Ti)			103.9		%		80-120	02-MAY-18
Uranium (U)			104.4		%		80-120	02-MAY-18
Vanadium (V)			103.4		%		80-120	02-MAY-18
Zinc (Zn)			97.9		%		80-120	02-MAY-18
WG2763439-1 MB								
Aluminum (Al)			<5.0		mg/kg		5	02-MAY-18
Antimony (Sb)			<0.10		mg/kg		0.1	02-MAY-18
Arsenic (As)			<0.10		mg/kg		0.1	02-MAY-18
Barium (Ba)			<0.50		mg/kg		0.5	02-MAY-18
Beryllium (Be)			<0.10		mg/kg		0.1	02-MAY-18
Bismuth (Bi)			<0.020		mg/kg		0.02	02-MAY-18
Boron (B)			<10		mg/kg		10	02-MAY-18
Cadmium (Cd)			<0.020		mg/kg		0.02	02-MAY-18
Calcium (Ca)			<100		mg/kg		100	02-MAY-18
Chromium (Cr)			<1.0		mg/kg		1	02-MAY-18
Cobalt (Co)			<0.020		mg/kg		0.02	02-MAY-18
Copper (Cu)			<1.0		mg/kg		1	02-MAY-18
Iron (Fe)			<25		mg/kg		25	02-MAY-18
Lead (Pb)			<0.20		mg/kg		0.2	02-MAY-18
Magnesium (Mg)			<10		mg/kg		10	02-MAY-18
Manganese (Mn)			<0.50		mg/kg		0.5	02-MAY-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	02-MAY-18
Nickel (Ni)			<0.50		mg/kg		0.5	02-MAY-18
Phosphorus (P)			<100		mg/kg		100	02-MAY-18
Potassium (K)			<25		mg/kg		25	02-MAY-18
Selenium (Se)			<0.50		mg/kg		0.5	02-MAY-18

ALS Environmental

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4031209								
WG2763439-1 MB								
Silver (Ag)			<0.10		mg/kg		0.1	02-MAY-18
Sodium (Na)			<10		mg/kg		10	02-MAY-18
Strontium (Sr)			<0.10		mg/kg		0.1	02-MAY-18
Thallium (Tl)			<0.10		mg/kg		0.1	02-MAY-18
Tin (Sn)			<5.0		mg/kg		5	02-MAY-18
Titanium (Ti)			<0.50		mg/kg		0.5	02-MAY-18
Uranium (U)			<0.020		mg/kg		0.02	02-MAY-18
Vanadium (V)			<0.50		mg/kg		0.5	02-MAY-18
Zinc (Zn)			<10		mg/kg		10	02-MAY-18
MOIST-SK	Soil							
Batch R4038685								
WG2766101-3 LCS								
% Moisture			99.3		%		90-110	09-MAY-18
WG2766101-2 MB								
% Moisture			<0.10		%		0.1	09-MAY-18
N-TOT-LECO-SK	Soil							
Batch R4034386								
WG2763185-8 IRM		08-109_SOIL						
Total Nitrogen by LECO			0.100		%		0.085-0.135	04-MAY-18
WG2763185-9 MB								
Total Nitrogen by LECO			<0.020		%		0.02	04-MAY-18
N2/N3-AVAIL-KCL-SK	Soil							
Batch R4033322								
WG2762498-3 IRM		SAL814						
Nitrate+Nitrite-N			102.5		%		70-130	03-MAY-18
WG2762498-2 MB								
Nitrite-N			<1.0		mg/kg		1	03-MAY-18
Nitrate+Nitrite-N			<2.0		mg/kg		2	03-MAY-18
NH4-AVAIL-SK	Soil							
Batch R4032757								
WG2762501-3 IRM		SAL814						
Available Ammonium-N			106.9		%		70-130	03-MAY-18
WG2762501-2 MB								
Available Ammonium-N			<1.0		mg/kg		1	03-MAY-18
NO3-AVAIL-SK	Soil							

ALS Environmental

Quality Control Report

Workorder: L2087286 Report Date: 15-MAY-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-AVAIL-SK	Soil							
Batch R4033553								
WG2763487-3 IRM		**SAL814**						
Available Nitrate-N			92.0		%		70-130	03-MAY-18
WG2763487-2 MB								
Available Nitrate-N			<1.0		mg/kg		1	03-MAY-18
PH-1:2-SK	Soil							
Batch R4035868								
WG2766082-1 DUP		**L2087286-1**						
pH (1:2 soil:water)		8.03	8.05	J	pH	0.02	3	07-MAY-18
WG2766082-2 IRM		**SAL814**						
pH (1:2 soil:water)			7.99		pH		7.65-8.25	07-MAY-18
WG2766082-3 LCS								
pH (1:2 soil:water)			6.90		pH		6.66-7.06	07-MAY-18
PO4-AVAIL-OLSEN-SK	Soil							
Batch R4037513								
WG2766090-1 DUP		**L2087286-1**						
Available Phosphate-P		8.0	6.6		mg/kg	19	30	07-MAY-18
WG2766090-3 IRM		**FARM2005**						
Available Phosphate-P			88.6		%		80-120	07-MAY-18
WG2766090-2 MB								
Available Phosphate-P			<1.0		mg/kg		1	07-MAY-18

Legend:

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

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

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

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

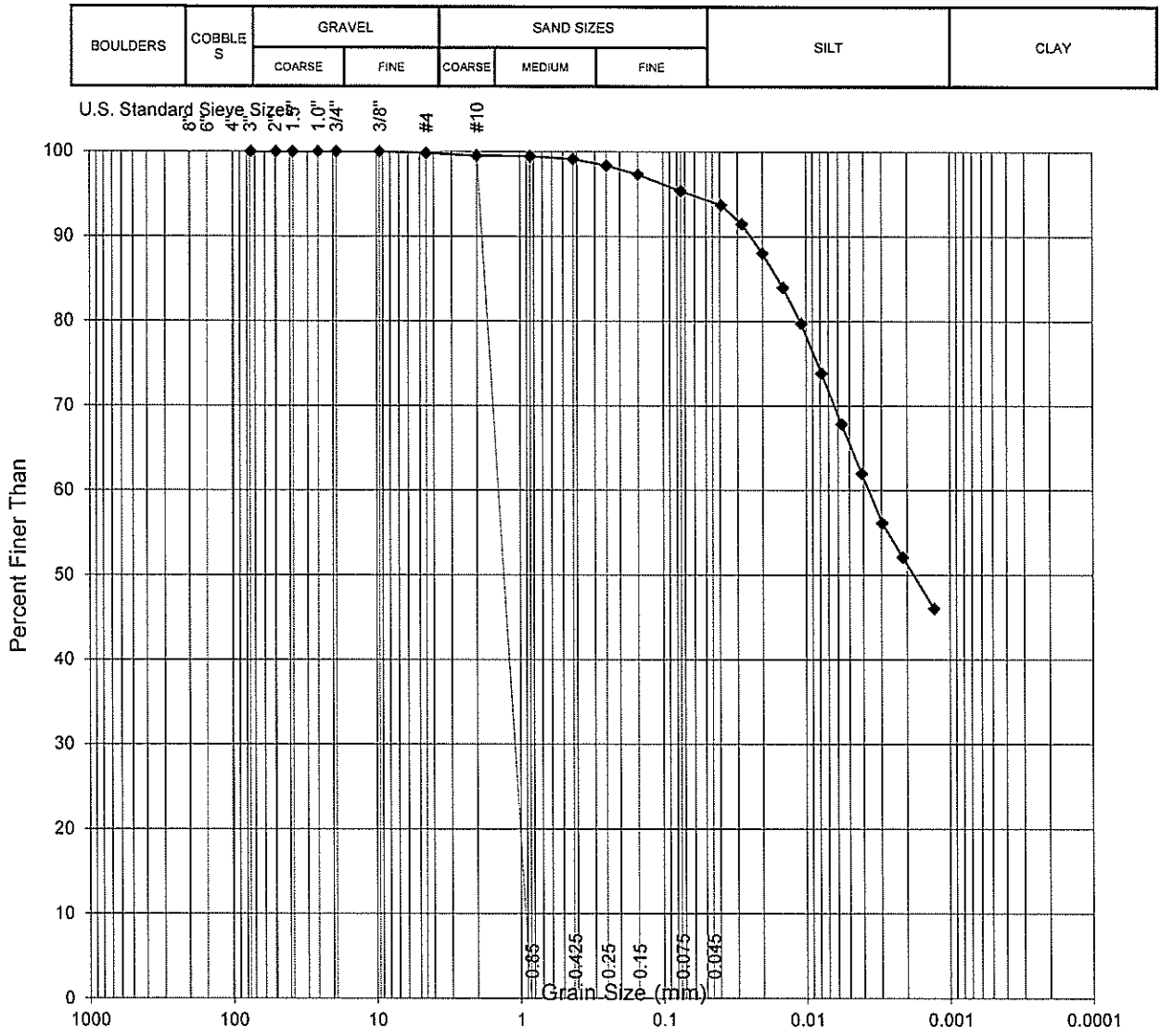
Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Laboratory Group

819-58th Street, Saskatoon,SK

PARTICLE SIZE DISTRIBUTION CURVE

Client Name:	City of Portage la Prairie - Wastewater
Project Number:	
Client Sample ID	18-04-70
Lab Sample ID	L2087286-3
Date Sample Received	01-May-18
Test Completion Date:	07-May-18
Analyst:	RPI



METHOD DESCRIPTION

Method Reference: ASTM D 422 - 63 (2002)

Dispersion method: Mechanical

Dispesion period: 1 minute cm/s

Soil classification system used: Unified Soil Classification

DESCRIPTION OF SAND AND GRAVEL PARTICLES

Shape: Angular
Hardness: Hard

PARTICLE SIZE DISTRIBUTION

Particle Size range (mm)	Weight %	Passing %	Grain size
> 75 mm	0	100	Cobbles
75 - 4.75 mm	0	100	Gravel
4.75 - 0.075 mm	4	95	Sand
0.075 - 0.005 mm	30	65	Silt
< 0.005 mm	65	42	Clay

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

L2087286-COFC

COC # L2087284

Page 1 of 1

Report to:			
Company:	City of Portage la Prairie	Standard: X	
Contact:	Aaron Stechesen	Select: PDF X Excel ____ Digital ____	
Address:	97 Saskatchewan Ave. E.	Email 1: astechesen@city-plap.com	
	Portage la Prairie, MB R1N 0L8	Email 2:	
Phone:	204-239-8361 Fax: 204-239-8364		
Invoice To:	Same as Report ? Yes / No ?	Client / Project Information:	
Company:	City of Portage la Prairie	Job #:	
Contact:	Accounts Payable	PO / AFE: W02432	
Address:	97 Saskatchewan Ave. E.	Legal Site Description:	
	Portage la Prairie, MB R1N 0L8		
Phone:	204-239-8357 Fax:	Quote #: Q45423	
Lab Work Order # (lab use only)		ALS Contact: Judy Dalmaijer	Sampler:

Service Requested: (rush - subject to availability)

- X Regular (Default)
- Priority (2-3 Business Days) - 50% Surcharge
- Emergency (1 Business Day) - 100% Surcharge
- For Emergency < 1 Day, ASAP or Weekend - Contact ALS

Analysis Request
(Indicate Filtered or Preserved, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	pH-1:2-SK	HG-200.2-CVAF-WP	MET-200.2-MS-WP	PO4-AVAIL-OLSEN-SK	N-TOT-AVAIL-SK	N-TOT-LECO-SK	NO3-AVAIL-SK	MOIST-SK	PREP-DRY/GRIND-SK	SPECIAL REQUEST-SK	ASTM D422-63	SAMPLE-DISPOSAL-WP	Number of Containers
1	18-04-68	30-Apr-18	15:30	Soil	✓	✓	✓	✓				✓	✓	✓		✓	3
2	18-04-69	30-Apr-18	15:30	Soil					✓	✓	✓	✓	✓	✓		✓	3
3	18-04-70	30-Apr-18	15:30	Soil									✓	✓	✓	✓	3

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
	May 1/18 9:30 am	AG	MAY 1/18	12:25	2.8			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENF 18.00 Front

City of Portage la Prairie - Wastewater
ATTN: AARON STECHESEN
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 0L8

Date Received: 25-APR-18
Report Date: 04-MAY-18 14:16 (MT)
Version: FINAL

Client Phone: 204-239-8361

Certificate of Analysis

Lab Work Order #: L2084816
Project P.O. #: W02432
Job Reference:
C of C Numbers:
Legal Site Desc:

Hua Wo
Chemistry Laboratory Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2084816-1 18-04-62							
Sampled By: CLIENT on 25-APR-18 @ 08:30							
Matrix: SLUDGE							
TC and FC to Endpoint by QT97							
Fecal Coliform to endpoint by MPN QT97							
Fecal Coliforms	29100		1	MPN/100mL		25-APR-18	R4023463
Total Coliforms to endpoint by MPN QT97							
Total Coliforms	391000		1	MPN/100mL		25-APR-18	R4023468
L2084816-2 18-04-63							
Sampled By: CLIENT on 25-APR-18 @ 11:00	BSTI						
Matrix: SLUDGE							
Miscellaneous Parameters							
Available Nitrate-N	8.9	DLM	3.0	mg/kg	01-MAY-18	01-MAY-18	R4030521
Available Phosphate-P	684		1.0	mg/kg	02-MAY-18	02-MAY-18	R4032176
Mercury (Hg)	0.391		0.050	mg/kg	27-APR-18	27-APR-18	R4024499
Total Kjeldahl Nitrogen	5.20	DLHC	0.60	%	01-MAY-18	02-MAY-18	R4032368
Total Solids and Total Volatile Solids							
Total Solids	3.21		0.10	%	01-MAY-18	01-MAY-18	R4029627
Total Volatile Solids (dry basis)	69.1		0.10	%	01-MAY-18	01-MAY-18	R4029627
pH and Conductitivity of Liquid Manure							
pH	7.15		0.10	pH	01-MAY-18	01-MAY-18	R4029390
Conductivity (EC)	3030		10	uS/cm	01-MAY-18	01-MAY-18	R4029390
Metals							
Aluminum (Al)	5320		5.0	mg/kg	27-APR-18	27-APR-18	R4025148
Antimony (Sb)	0.69		0.10	mg/kg	27-APR-18	27-APR-18	R4025148
Arsenic (As)	2.94		0.10	mg/kg	27-APR-18	27-APR-18	R4025148
Barium (Ba)	324		0.50	mg/kg	27-APR-18	27-APR-18	R4025148
Beryllium (Be)	0.26		0.10	mg/kg	27-APR-18	27-APR-18	R4025148
Bismuth (Bi)	6.88		0.020	mg/kg	27-APR-18	27-APR-18	R4025148
Boron (B)	49		10	mg/kg	27-APR-18	27-APR-18	R4025148
Cadmium (Cd)	2.84		0.020	mg/kg	27-APR-18	27-APR-18	R4025148
Calcium (Ca)	21600		100	mg/kg	27-APR-18	27-APR-18	R4025148
Chromium (Cr)	36.4		1.0	mg/kg	27-APR-18	27-APR-18	R4025148
Cobalt (Co)	13.9		0.020	mg/kg	27-APR-18	27-APR-18	R4025148
Copper (Cu)	243		1.0	mg/kg	27-APR-18	27-APR-18	R4025148
Iron (Fe)	10600		25	mg/kg	27-APR-18	27-APR-18	R4025148
Lead (Pb)	9.88		0.20	mg/kg	27-APR-18	27-APR-18	R4025148
Magnesium (Mg)	7420		10	mg/kg	27-APR-18	27-APR-18	R4025148
Manganese (Mn)	590		0.50	mg/kg	27-APR-18	27-APR-18	R4025148
Molybdenum (Mo)	21.9		0.10	mg/kg	27-APR-18	27-APR-18	R4025148
Nickel (Ni)	32.8		0.50	mg/kg	27-APR-18	27-APR-18	R4025148
Phosphorus (P)	13300		100	mg/kg	27-APR-18	27-APR-18	R4025148
Potassium (K)	11500		25	mg/kg	27-APR-18	27-APR-18	R4025148
Selenium (Se)	4.57		0.50	mg/kg	27-APR-18	27-APR-18	R4025148
Silver (Ag)	0.71		0.10	mg/kg	27-APR-18	27-APR-18	R4025148
Sodium (Na)	5350		10	mg/kg	27-APR-18	27-APR-18	R4025148
Strontium (Sr)	170		0.10	mg/kg	27-APR-18	27-APR-18	R4025148
Thallium (Tl)	0.24		0.10	mg/kg	27-APR-18	27-APR-18	R4025148
Tin (Sn)	7.6		5.0	mg/kg	27-APR-18	27-APR-18	R4025148
Titanium (Ti)	35.0		0.50	mg/kg	27-APR-18	27-APR-18	R4025148
Uranium (U)	6.19		0.020	mg/kg	27-APR-18	27-APR-18	R4025148
Vanadium (V)	14.2		0.50	mg/kg	27-APR-18	27-APR-18	R4025148
Zinc (Zn)	575		10	mg/kg	27-APR-18	27-APR-18	R4025148
Total Available N & NO3-N, NO2-N & NH4							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2084816-2 18-04-63							
Sampled By: CLIENT on 25-APR-18 @ 11:00							
Matrix: SLUDGE							
Available Ammonium-N							
Available Ammonium-N	5900	DLM	630	mg/kg	03-MAY-18	03-MAY-18	R4032757
Note: Analyzed as received and calculated to dry							
Available Ammonium-N - Calculation							
Total Available Nitrogen	6040		630	mg/kg		03-MAY-18	
Nitrate, Nitrite & Nitrate+Nitrite-N(KCL							
Nitrite-N	<25	DLM	25	mg/kg	03-MAY-18	03-MAY-18	R4033322
Nitrate+Nitrite-N	138	DLM	63	mg/kg	03-MAY-18	03-MAY-18	R4033322
Nitrate-N	138	DLM	63	mg/kg	03-MAY-18	03-MAY-18	R4033322
Note: Analyzed as received and calculated to dry							
Total Organic N-liquid manure -as rec'd							
Ammonium - N in Liquid Manure - as rec'd							
Ammonia, Total (as N)	3.2 383		1.0	lb/1000gal	01-MAY-18	01-MAY-18	R4029382
Nitrogen, Total Organic							
Total Organic Nitrogen	→ 17.6 2107		1.0	lb/1000gal		03-MAY-18	
Total N in Liquid Manure -as rec'd							
Total Nitrogen	20.9 2503		1.0	lb/1000gal	30-APR-18	30-APR-18	R4029384
L2084816-3 18-04-64							
Sampled By: CLIENT on 25-APR-18 @ 11:00	BVF						
Matrix: SLUDGE							
Miscellaneous Parameters							
Available Nitrate-N	<3.0	DLM	3.0	mg/kg	01-MAY-18	01-MAY-18	R4030521
Available Phosphate-P	404		1.0	mg/kg	02-MAY-18	02-MAY-18	R4032176
Mercury (Hg)	0.229		0.050	mg/kg	27-APR-18	27-APR-18	R4024499
Total Kjeldahl Nitrogen	5.12	DLHC	0.60	%	01-MAY-18	02-MAY-18	R4032368
Total Solids and Total Volatile Solids							
Total Solids	2.22		0.10	%	01-MAY-18	01-MAY-18	R4029627
Total Volatile Solids (dry basis)	66.8		0.10	%	01-MAY-18	01-MAY-18	R4029627
pH and Conductitivity of Liquid Manure							
pH	6.99		0.10	pH	01-MAY-18	01-MAY-18	R4029390
Conductivity (EC)	3640		10	uS/cm	01-MAY-18	01-MAY-18	R4029390
Metals							
Aluminum (Al)	6040		5.0	mg/kg	27-APR-18	27-APR-18	R4025148
Antimony (Sb)	0.67		0.10	mg/kg	27-APR-18	27-APR-18	R4025148
Arsenic (As)	3.43		0.10	mg/kg	27-APR-18	27-APR-18	R4025148
Barium (Ba)	224		0.50	mg/kg	27-APR-18	27-APR-18	R4025148
Beryllium (Be)	0.31		0.10	mg/kg	27-APR-18	27-APR-18	R4025148
Bismuth (Bi)	4.44		0.020	mg/kg	27-APR-18	27-APR-18	R4025148
Boron (B)	34		10	mg/kg	27-APR-18	27-APR-18	R4025148
Cadmium (Cd)	2.97		0.020	mg/kg	27-APR-18	27-APR-18	R4025148
Calcium (Ca)	16300		100	mg/kg	27-APR-18	27-APR-18	R4025148
Chromium (Cr)	38.0		1.0	mg/kg	27-APR-18	27-APR-18	R4025148
Cobalt (Co)	8.94		0.020	mg/kg	27-APR-18	27-APR-18	R4025148
Copper (Cu)	210		1.0	mg/kg	27-APR-18	27-APR-18	R4025148
Iron (Fe)	12600		25	mg/kg	27-APR-18	27-APR-18	R4025148
Lead (Pb)	9.28		0.20	mg/kg	27-APR-18	27-APR-18	R4025148
Magnesium (Mg)	5710		10	mg/kg	27-APR-18	27-APR-18	R4025148
Manganese (Mn)	287		0.50	mg/kg	27-APR-18	27-APR-18	R4025148
Molybdenum (Mo)	38.1		0.10	mg/kg	27-APR-18	27-APR-18	R4025148
Nickel (Ni)	40.2		0.50	mg/kg	27-APR-18	27-APR-18	R4025148
Phosphorus (P)	8680		100	mg/kg	27-APR-18	27-APR-18	R4025148

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2084816-3 18-04-64							
Sampled By: CLIENT on 25-APR-18 @ 11:00							
Matrix: SLUDGE							
Metals							
Potassium (K)	21200		25	mg/kg	27-APR-18	27-APR-18	R4025148
Selenium (Se)	3.47		0.50	mg/kg	27-APR-18	27-APR-18	R4025148
Silver (Ag)	0.43		0.10	mg/kg	27-APR-18	27-APR-18	R4025148
Sodium (Na)	11300		10	mg/kg	27-APR-18	27-APR-18	R4025148
Strontium (Sr)	56.1		0.10	mg/kg	27-APR-18	27-APR-18	R4025148
Thallium (Tl)	0.34		0.10	mg/kg	27-APR-18	27-APR-18	R4025148
Tin (Sn)	6.4		5.0	mg/kg	27-APR-18	27-APR-18	R4025148
Titanium (Ti)	39.3		0.50	mg/kg	27-APR-18	27-APR-18	R4025148
Uranium (U)	5.26		0.020	mg/kg	27-APR-18	27-APR-18	R4025148
Vanadium (V)	18.6		0.50	mg/kg	27-APR-18	27-APR-18	R4025148
Zinc (Zn)	647		10	mg/kg	27-APR-18	27-APR-18	R4025148
Total Available N & NO3-N, NO2-N & NH4							
Available Ammonium-N							
Available Ammonium-N	10300	DLM	1200	mg/kg	03-MAY-18	03-MAY-18	R4032757
Note: Analyzed as received and calculated to dry							
Available Ammonium-N - Calculation							
Total Available Nitrogen	10300		1200	mg/kg		03-MAY-18	
Nitrate, Nitrite & Nitrate+Nitrite-N(KCL							
Nitrite-N	<47	DLM	47	mg/kg	03-MAY-18	03-MAY-18	R4033322
Nitrate+Nitrite-N	<120	DLM	120	mg/kg	03-MAY-18	03-MAY-18	R4033322
Nitrate-N	<120	DLM	120	mg/kg	03-MAY-18	03-MAY-18	R4033322
Note: Analyzed as received and calculated to dry							
Total Organic N-liquid manure -as rec'd							
Ammonium - N in Liquid Manure - as rec'd							
Ammonia, Total (as N)	3.2	383	1.0	lb/1000gal	01-MAY-18	01-MAY-18	R4029382
Nitrogen, Total Organic							
Total Organic Nitrogen	6.1	730	1.0	lb/1000gal		03-MAY-18	
Total N in Liquid Manure -as rec'd							
Total Nitrogen	9.3	1113	1.0	lb/1000gal	30-APR-18	30-APR-18	R4029384

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ETL-N-TOT-AVAIL-SK	Soil	Available Ammonium-N - Calculation	Soil Methods of Analysis (1993) CSSS
ETL-N-TOTORG-AGL-SK	Manure	Nitrogen, Total Organic	APHA 4500 Norg-Calculated as TKN - NH3-N
FC-QT97-ENDPT-WP	Water	Fecal Coliform to endpoint by MPN QT97	APHA 9223B QT97

This analysis is carried out using procedures adapted from APHA Method 9223B "Enzyme Substrate Coliform Test". The sample is mixed with a mixture of hydrolyzable substrates and then sealed in a 97-well packet. The packet is incubated at 44.5 – 0.2 C for 18 hours and then the number of wells exhibiting a positive response are counted. The final result is obtained by comparing the number of positive responses to a probability table.

HG-200.2-CVAF-WP	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.

MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Samples for analysis are homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested by block digester (EPA 200.2). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may become "environmentally available." By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

N-TOT-LECO-AGL-SK	Manure	Total N in Liquid Manure -as rec'd	RMMA A3769 3.3

The sample is introduced into a quartz tube where it undergoes combustion at 900 C in the presence of oxygen.
Combustion gases are first carried through a catalyst bed in the bottom of the combustion tube, where oxidation is completed and then carried through a reducing agent (copper), where the nitrogen oxides are reduced to elemental nitrogen.
This mixture of N2, CO2, and H2O is then passed through an absorber column containing magnesium perchlorate to remove water. N2 and CO2 gases are then separated in a gas chromatographic column and detected by thermal conductivity.

Reference:
Reference: Wolf, A., Watson, M. and Nancy Wolf. 2005. In: John Peters(ed.) Recommended Methods for Manure Analysis. Method 3.3

N-TOTKJ-COL-SK	Soil	Total Kjeldahl Nitrogen	CSSS (2008) 22.2.3

The soil is digested with sulfuric acid in the presence of CuSO4 and K2SO4 catalysts. Ammonia in the soil extract is determined colrimetrically at 660 nm.

N2/N3-AVAIL-KCL-SK	Soil	Nitrate, Nitrite & Nitrate+Nitrite-N(KCL	CSSS (1993) p. 26-28

Plant available nitrate and nitrite are extracted from the sample with 2N KCl. Nitrate and Nitrite in the filtered extract are determined colorimetrically by Technicon auto-analyzer or flow injection analyzer at 520 nm.

NH4-AGL-SK	Manure	Ammonium - N in Liquid Manure - as rec'd	RMMA A3769 4.1

Ammonium is determined by steam distillation into boric acid followed by titration with standard acid.

Reference: Wolf, A., Watson, M. and Nancy Wolf. 2005. In: John Peters(ed.) Recommended Methods for Manure Analysis. Method 4.1

NH4-AVAIL-SK	Soil	Available Ammonium-N	Comm Soil Sci 19(6)

Ammonium (NH4-N) is extracted from the soil using 2 N KCl. Ammonium in the extract is mixed with hypochlorite and salicylate to form indophenol blue, which is determined colorimetrically by auto analysis at 660 nm.

NO3-AVAIL-SK	Soil	Available Nitrate-N	Method = Alberta Ag (1988)

Available Nitrate and Nitrite are extracted from the soil using a dilute calcium chloride solution.
Nitrate is quantitatively reduced to nitrite by passage of the sample through a copperized cadmium column. The nitrite (reduced nitrate plus original nitrite) is then determined by diazotizing with sulfanilamide followed by coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. The resulting water soluble dye has a magenta color which is measured at colorimetrically at 520nm.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

Reference:
Recommended Methods of Soil Analysis for Canadian Prairie Agricultural Soils. Alberta Agriculture (1988) p. 19 and 28

PH/EC-AGL-SK	Manure	pH and Conductitivity of Liquid Manure	RMMA A3769 7.5/8.5

The sample is analyzed directly using a calibrated pH/Conductivity meter.

Reference: Wolf, A., Watson, M. and Nancy Wolf. 2005. In: John Peters(ed.) Recommended Methods for Manure Analysis. Methods 7.5 and 8.5

PO4-AVAIL-OLSEN-SK	Soil	Available Phosphate-P by Olsen	CSSS (2008) 8.2

Plant available phosphorus is extracted from the sample with sodium bicarbonate. PO4-P in the filtered extract is determined colorimetrically at 880 nm.

SOLIDS-TOT/TOTVOL-SK	Manure	Total Solids and Total Volatile Solids	APHA 2540G

A well-mixed sample is evaporated in a weighed dish and dried to constant weight in an oven at 103-105°C. The increase in weight over that of the empty dish represents the Total Solids. The crucible is then ignited at 550°–10°C for 1 hour. The remaining solids represent the Total Fixed Solids, while the weight lost on ignition represents the Total Volatile Solids.

TC-QT97-ENDPT-WP	Water	Total Coliforms to endpoint by MPN QT97	APHA 9223B QT97

Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Susbtrate Coliform Test". Coliform bacteria are determined by mixing serial dilutions of sample with a product containing hydrolyzable substrates and sealing in a 97-well packet. The packet is incubated for 18 hours at 44.5C and the number of wells exhibiting characteristic positive responses are counted. The final results are obtained by comparing the positive counts to a probability table.

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

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Quality Control Report

Workorder: L2084816 Report Date: 04-MAY-18

Client: City of Portage la Prairie - Wastewater
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 0L8
Contact: AARON STECHESEN

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
FC-QT97-ENDPT-WP	Water							
Batch R4023463								
WG2758692-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	25-APR-18
TC-QT97-ENDPT-WP	Water							
Batch R4023468								
WG2758701-2 DUP		**L2084816-1**						
Total Coliforms		391000	160000	DUP-H	MPN/100mL	84	65	25-APR-18
WG2758701-1 MB								
Total Coliforms			<1		MPN/100mL		1	25-APR-18
HG-200.2-CVAF-WP	Soil							
Batch R4024499								
WG2760387-4 CRM		**CANMET TILL-1**						
Mercury (Hg)			101.6		%		70-130	27-APR-18
WG2760387-2 LCS								
Mercury (Hg)			93.9		%		80-120	27-APR-18
WG2760387-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	27-APR-18
MET-200.2-MS-WP	Soil							
Batch R4025148								
WG2760346-4 CRM		**CANMET TILL-1**						
Aluminum (Al)			105.5		%		70-130	27-APR-18
Antimony (Sb)			104.7		%		70-130	27-APR-18
Arsenic (As)			101.8		%		70-130	27-APR-18
Barium (Ba)			101.9		%		70-130	27-APR-18
Beryllium (Be)			105.8		%		70-130	27-APR-18
Bismuth (Bi)			101.7		%		70-130	27-APR-18
Boron (B)			3		mg/kg		0-8	27-APR-18
Cadmium (Cd)			109.4		%		70-130	27-APR-18
Calcium (Ca)			98.0		%		70-130	27-APR-18
Chromium (Cr)			102.2		%		70-130	27-APR-18
Cobalt (Co)			102.8		%		70-130	27-APR-18
Copper (Cu)			107.7		%		70-130	27-APR-18
Iron (Fe)			105.0		%		70-130	27-APR-18
Lead (Pb)			102.6		%		70-130	27-APR-18
Magnesium (Mg)			108.3		%		70-130	27-APR-18
Manganese (Mn)			106.0		%		70-130	27-APR-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4025148								
WG2760346-4 CRM		**CANMET TILL-1**						
Molybdenum (Mo)			102.3		%		70-130	27-APR-18
Nickel (Ni)			103.7		%		70-130	27-APR-18
Phosphorus (P)			95.1		%		70-130	27-APR-18
Potassium (K)			93.0		%		70-130	27-APR-18
Selenium (Se)			92.7		%		70-130	27-APR-18
Silver (Ag)			100.3		%		70-130	27-APR-18
Sodium (Na)			101.9		%		70-130	27-APR-18
Strontium (Sr)			98.3		%		70-130	27-APR-18
Thallium (Tl)			0.13		mg/kg		0.03-0.23	27-APR-18
Tin (Sn)			1.0		mg/kg		0-3.1	27-APR-18
Titanium (Ti)			88.0		%		70-130	27-APR-18
Uranium (U)			103.3		%		70-130	27-APR-18
Vanadium (V)			100.7		%		70-130	27-APR-18
Zinc (Zn)			102.5		%		70-130	27-APR-18
WG2760346-2 LCS								
Aluminum (Al)			102.5		%		80-120	27-APR-18
Antimony (Sb)			103.2		%		80-120	27-APR-18
Arsenic (As)			101.4		%		80-120	27-APR-18
Barium (Ba)			105.0		%		80-120	27-APR-18
Beryllium (Be)			104.2		%		80-120	27-APR-18
Bismuth (Bi)			103.2		%		80-120	27-APR-18
Boron (B)			102.0		%		80-120	27-APR-18
Cadmium (Cd)			99.5		%		80-120	27-APR-18
Calcium (Ca)			102.7		%		80-120	27-APR-18
Chromium (Cr)			103.6		%		80-120	27-APR-18
Cobalt (Co)			103.2		%		80-120	27-APR-18
Copper (Cu)			104.3		%		80-120	27-APR-18
Iron (Fe)			103.6		%		80-120	27-APR-18
Lead (Pb)			104.4		%		80-120	27-APR-18
Magnesium (Mg)			112.1		%		80-120	27-APR-18
Manganese (Mn)			101.4		%		80-120	27-APR-18
Molybdenum (Mo)			102.2		%		80-120	27-APR-18
Nickel (Ni)			104.2		%		80-120	27-APR-18
Phosphorus (P)			105.0		%		80-120	27-APR-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4025148								
WG2760346-2 LCS								
Potassium (K)			106.5		%		80-120	27-APR-18
Selenium (Se)			105.5		%		80-120	27-APR-18
Silver (Ag)			100.0		%		80-120	27-APR-18
Sodium (Na)			109.7		%		80-120	27-APR-18
Strontium (Sr)			105.9		%		80-120	27-APR-18
Thallium (Tl)			100.9		%		80-120	27-APR-18
Tin (Sn)			101.3		%		80-120	27-APR-18
Titanium (Ti)			104.1		%		80-120	27-APR-18
Uranium (U)			107.1		%		80-120	27-APR-18
Vanadium (V)			105.2		%		80-120	27-APR-18
Zinc (Zn)			98.9		%		80-120	27-APR-18
WG2760346-1 MB								
Aluminum (Al)			<5.0		mg/kg		5	27-APR-18
Antimony (Sb)			<0.10		mg/kg		0.1	27-APR-18
Arsenic (As)			<0.10		mg/kg		0.1	27-APR-18
Barium (Ba)			<0.50		mg/kg		0.5	27-APR-18
Beryllium (Be)			<0.10		mg/kg		0.1	27-APR-18
Bismuth (Bi)			<0.020		mg/kg		0.02	27-APR-18
Boron (B)			<10		mg/kg		10	27-APR-18
Cadmium (Cd)			<0.020		mg/kg		0.02	27-APR-18
Calcium (Ca)			<100		mg/kg		100	27-APR-18
Chromium (Cr)			<1.0		mg/kg		1	27-APR-18
Cobalt (Co)			<0.020		mg/kg		0.02	27-APR-18
Copper (Cu)			<1.0		mg/kg		1	27-APR-18
Iron (Fe)			<25		mg/kg		25	27-APR-18
Lead (Pb)			<0.20		mg/kg		0.2	27-APR-18
Magnesium (Mg)			<10		mg/kg		10	27-APR-18
Manganese (Mn)			<0.50		mg/kg		0.5	27-APR-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	27-APR-18
Nickel (Ni)			<0.50		mg/kg		0.5	27-APR-18
Phosphorus (P)			<100		mg/kg		100	27-APR-18
Potassium (K)			<25		mg/kg		25	27-APR-18
Selenium (Se)			<0.50		mg/kg		0.5	27-APR-18
Silver (Ag)			<0.10		mg/kg		0.1	27-APR-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4025148								
WG2760346-1 MB								
Sodium (Na)			<10		mg/kg		10	27-APR-18
Strontium (Sr)			<0.10		mg/kg		0.1	27-APR-18
Thallium (Tl)			<0.10		mg/kg		0.1	27-APR-18
Tin (Sn)			<5.0		mg/kg		5	27-APR-18
Titanium (Ti)			<0.50		mg/kg		0.5	27-APR-18
Uranium (U)			<0.020		mg/kg		0.02	27-APR-18
Vanadium (V)			<0.50		mg/kg		0.5	27-APR-18
Zinc (Zn)			<10		mg/kg		10	27-APR-18
N-TOTKJ-COL-SK	Soil							
Batch R4032368								
WG2761304-2 IRM		**08-109_SOIL**						
Total Kjeldahl Nitrogen			112.5		%		80-120	02-MAY-18
WG2761304-3 MB								
Total Kjeldahl Nitrogen			<0.020		%		0.02	02-MAY-18
N2/N3-AVAIL-KCL-SK	Soil							
Batch R4033322								
WG2762498-1 DUP		**L2084816-2**						
Nitrite-N		<25	<32	RPD-NA	mg/kg	N/A	30	03-MAY-18
Nitrate+Nitrite-N		138	162		mg/kg	16	30	03-MAY-18
COMMENTS: Analyzed as received and calculated to dry								
WG2762498-3 IRM		**SAL814**						
Nitrate+Nitrite-N			102.5		%		70-130	03-MAY-18
WG2762498-2 MB								
Nitrite-N			<1.0		mg/kg		1	03-MAY-18
Nitrate+Nitrite-N			<2.0		mg/kg		2	03-MAY-18
NH4-AVAIL-SK	Soil							
Batch R4032757								
WG2762501-1 DUP		**L2084816-2**						
Available Ammonium-N		5900	5620		mg/kg	4.9	20	03-MAY-18
COMMENTS: Analyzed as received and calculated to dry								
WG2762501-3 IRM		**SAL814**						
Available Ammonium-N			106.9		%		70-130	03-MAY-18
WG2762501-2 MB								
Available Ammonium-N			<1.0		mg/kg		1	03-MAY-18
NO3-AVAIL-SK	Soil							

ALS Environmental

Quality Control Report

Workorder: L2084816 Report Date: 04-MAY-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-AVAIL-SK	Soil							
Batch R4030521								
WG2760415-3 IRM		**SAL814**						
Available Nitrate-N			96.6		%		70-130	01-MAY-18
WG2760415-2 MB								
Available Nitrate-N			<1.0		mg/kg		1	01-MAY-18
PO4-AVAIL-OLSEN-SK	Soil							
Batch R4032176								
WG2762504-3 IRM		**FARM2005**						
Available Phosphate-P			95.7		%		80-120	02-MAY-18
WG2762504-2 MB								
Available Phosphate-P			<1.0		mg/kg		1	02-MAY-18
N-TOT-LECO-AGL-SK	Manure							
Batch R4029384								
WG2760208-2 DUP		**L2084816-2**						
Total Nitrogen		20.9	18.7		lb/1000gal	11	40	30-APR-18
NH4-AGL-SK	Manure							
Batch R4029382								
WG2761374-1 DUP		**L2084816-2**						
Ammonia, Total (as N)		3.2	3.3		lb/1000gal	0.5	30	01-MAY-18
WG2761374-2 IRM		**NH4-1000**						
Ammonia, Total (as N)			102.3		%		85-115	01-MAY-18
WG2761374-3 MB								
Ammonia, Total (as N)			<1.0		lb/1000gal		1	01-MAY-18
SOLIDS-TOT/TOTVOL-SK	Manure							
Batch R4029627								
WG2761369-1 DUP		**L2084816-2**						
Total Solids		3.21	3.12		%	3.1	25	01-MAY-18
Total Volatile Solids (dry basis)		69.1	67.4		%	2.5	25	01-MAY-18

Legend:

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Plant Available Nutrients							
Available Nitrate-N							
	2	25-APR-18 11:00	01-MAY-18 14:43	3	6	days	EHT
	3	25-APR-18 11:00	01-MAY-18 14:43	3	6	days	EHT
Nitrate, Nitrite & Nitrate+Nitrite-N(KCL							
	2	25-APR-18 11:00	03-MAY-18 16:51	3	8	days	EHT
	3	25-APR-18 11:00	03-MAY-18 16:51	3	8	days	EHT

Legend & Qualifier Definitions:

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

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2084816 were received on 25-APR-18 15:00.

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

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

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

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

L2084816-COFC

COC # _____

Page 1 of 1

Report to:			
Company:	City of Portage la Prairie	Standard: X	Other:
Contact:	Aaron Stechesen	Select: PDF X Excel ____ Digital ____	
Address:	97 Saskatchewan Ave. E.	Email 1: astechesen@city-plap.com	
	Portage la Prairie, MB R1N 0L8	Email 2:	
Phone:	204-239-8361 Fax: 204-239-8364		
Invoice To:	Same as Report ? Yes / No ?	Client / Project Information:	
Company:	City of Portage la Prairie	Job #:	
Contact:	Accounts Payable	PO / AFE: W02432	
Address:	97 Saskatchewan Ave. E.	Legal Site Description:	
	Portage la Prairie, MB R1N 0L8		
Phone:	204-239-8357 Fax:	Quote #: Q45423	
Lab Work Order # (lab use only)		ALS Contact: Judy Dolmaijer	Sampler:

Service Requested: (rush - subject to availability)

- X. Regular (Default)
- Priority (2-3 Business Days) - 50% Surcharge
- Emergency (1 Business Day) - 100% Surcharge
- For Emergency < 1 Day, ASAP or Weekend - Contact ALS

Analysis Request (Indicate Filtered or Preserved, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	SOLIDS-TOT/TOTVOL-SK	EC/pH-AGL-SK	N-TOT-ORG-AGL-SK	NO3-AVAIL-SK	N-TOTKJ-COL-SK	PO4-AVAIL-OLSEN-SK	HG-200.2-CVAF-WP	MET-200.2-MS-WP	N-TOT-AVAIL-SK	Coliform-TC,FC-MPN-ENDPT		SAMPLE-DISPOSAL-WP	Number of Containers
1	18-04-62	25-Apr-17	8:30	Sludge										✓		✓	2
2	18-04-63	25-Apr-17	11:00	Sludge	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	1
3	18-04-64	25-Apr-17	11:00	Sludge	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	2

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
	April 25/18 11:30am		April 25/18	3:20	15.7			

Delta Ag Services
City of Portage
Stangl N 10-12-08

Test Date: April 4, 2018

Test Boundary - 321.2 Ac
SamplePointsRW - 0 t
Clay Test sites - 1.1 Ac
Portage Soils-Clip - 307.6 Ac

Clay test sites 1,2 and 3 had no detectable water table at the 1.5 depth.

Delta Ag SERVICES

APPENDIX D

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

FALL

E 30-12-8

NW 1-13-7

NW 31-12-5

SW 14-12-8

SW 22-12-8

Portage la Prairie
City of Possibilities

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

August 13, 2018

Mr. Tyler Kneeshaw
Regional Supervisor- Environment Officer
Manitoba Sustainable Development
309-25 Tupper Street North
Portage la Prairie, MB
R1N 3K1

Re: 2018 Residual Biosolids Application Program Truck Routes

Dear Mr. Kneeshaw:

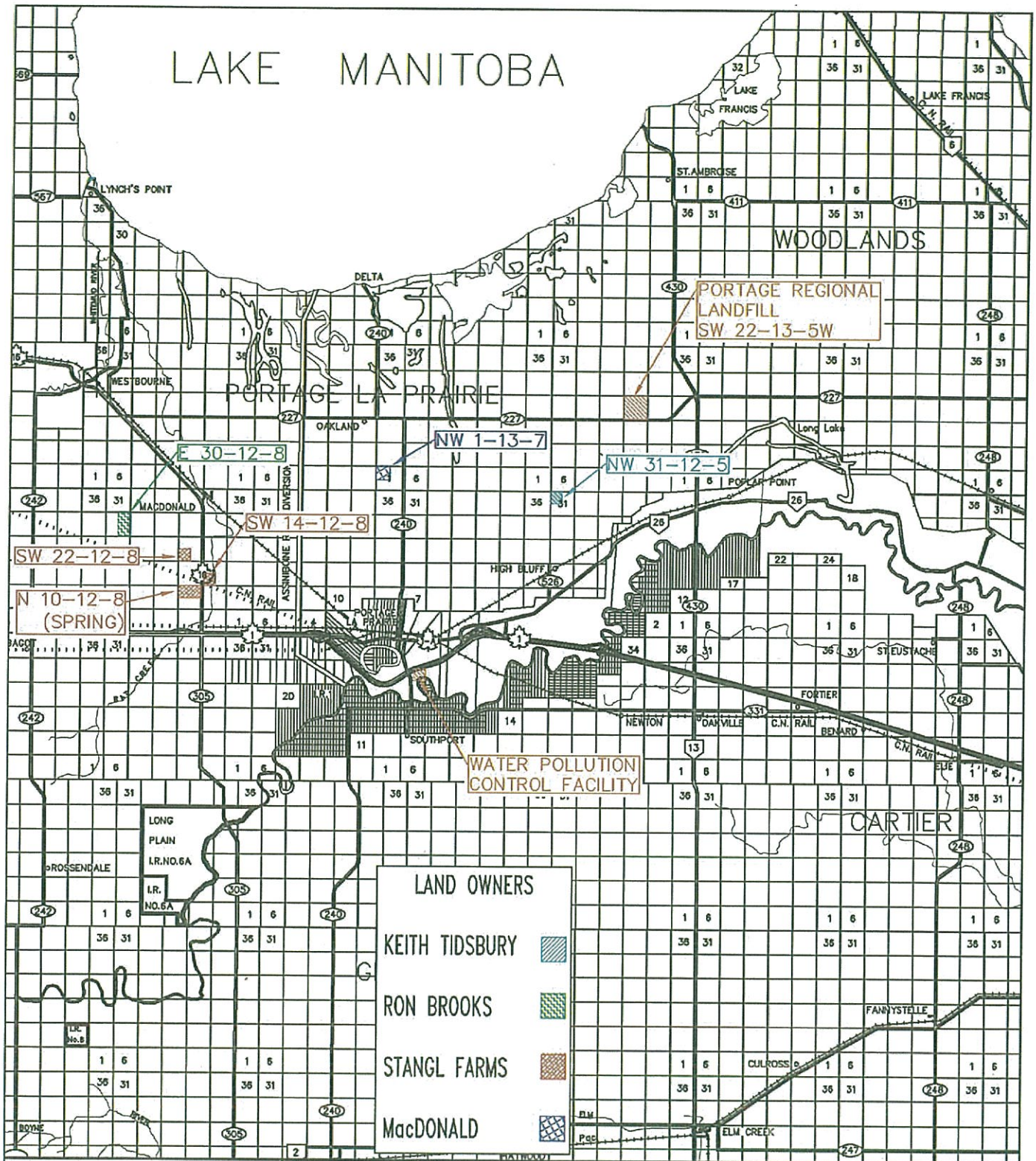
As requested, please find the enclosed route maps for spring biosolids application for review and comment. Transport and application of biosolids is scheduled to begin on Monday, August 20, 2018, pending dry weather conditions. Should there be any concerns throughout the hauling process with traffic or dust, please do not hesitate to contact myself as the contractor is responsible for both items.

Please direct any questions or concerns regarding routing to myself at 204-239-8359.

Sincerely,

Karly Friesen
Manager, Wastewater Treatment Division

Cc: Kelly Braden, P. Eng., Director of Operations



No.	y/m/d	Revision	By	App.
0	17/02/15	ISSUED FOR REVIEW	M.P.	I.M.

Seal: PROVINCE OF MANITOBA — K.N. BRADEN — REGISTERED PROFESSIONAL ENGINEER

Portage la Prairie
City of Possibilities

Project: 2018 BIOSOLIDS APPLICATION LAND DESCRIPTION

Sheet	y/m/d
1	18/02/15

Scale: N.T.S

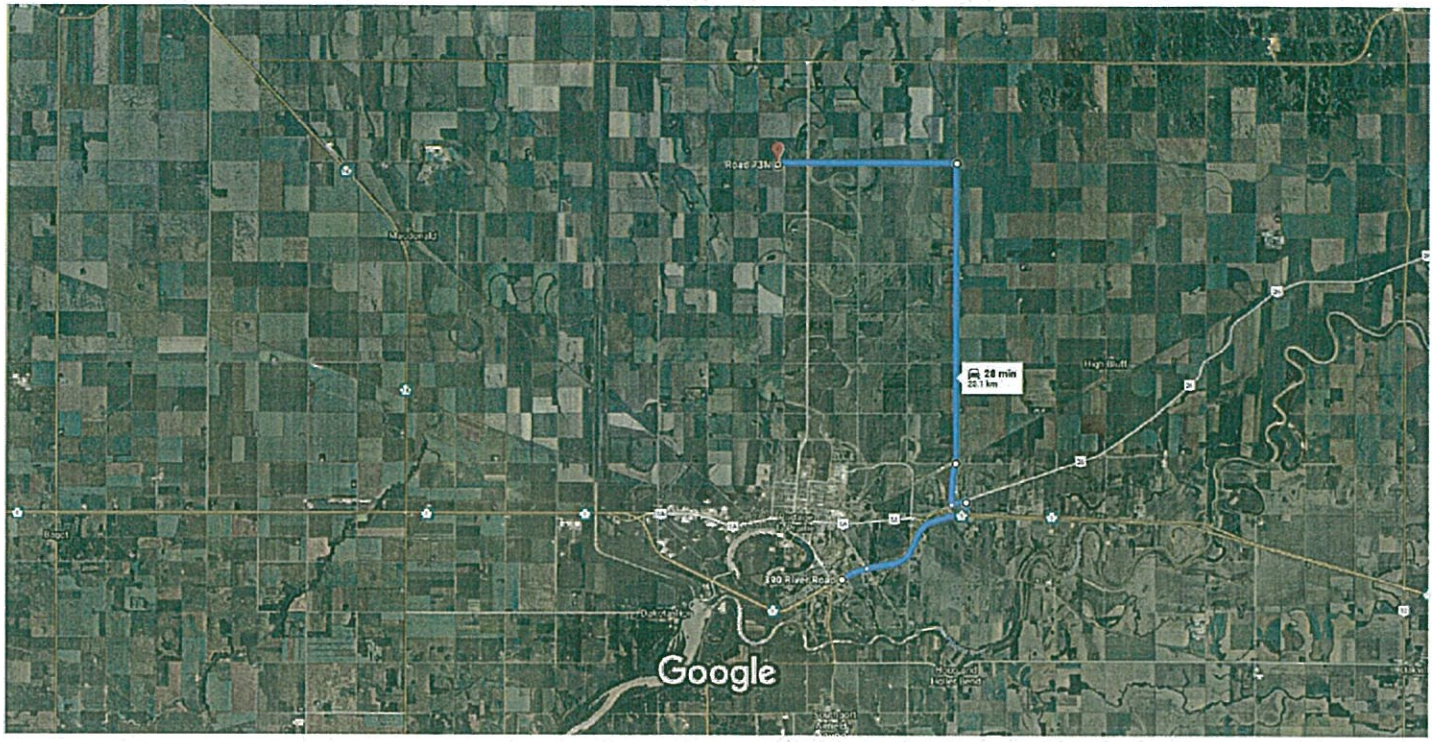
Drawing No.	Rev.
M-214	0

Google Maps

390 River Rd, Southport, MB R0H 1N1 to Road 73N, Macdonald, MB R0H 0S0

Drive 23.1 km, 28 min

McDonald- NW 1-13-7 (To Field)



Imagery ©2018 TerraMetrics, Map data ©2018 Google 2 km

390 River Rd

Southport, MB R0H 1N1

1. Head northeast on River Rd

950 m

2. Turn left at the 1st cross street toward Trans-Canada Hwy/MB-1 E

34 m

3. Turn right at the 1st cross street onto Trans-Canada Hwy/MB-1 E

4.0 km

4. Turn left onto MB-26 E

500 m

5. Turn left

500 m

6. Turn right onto Rd 33W

11.2 km

7. Turn left onto Road 73N

Destination will be on the left

5.9 km

Road 73N

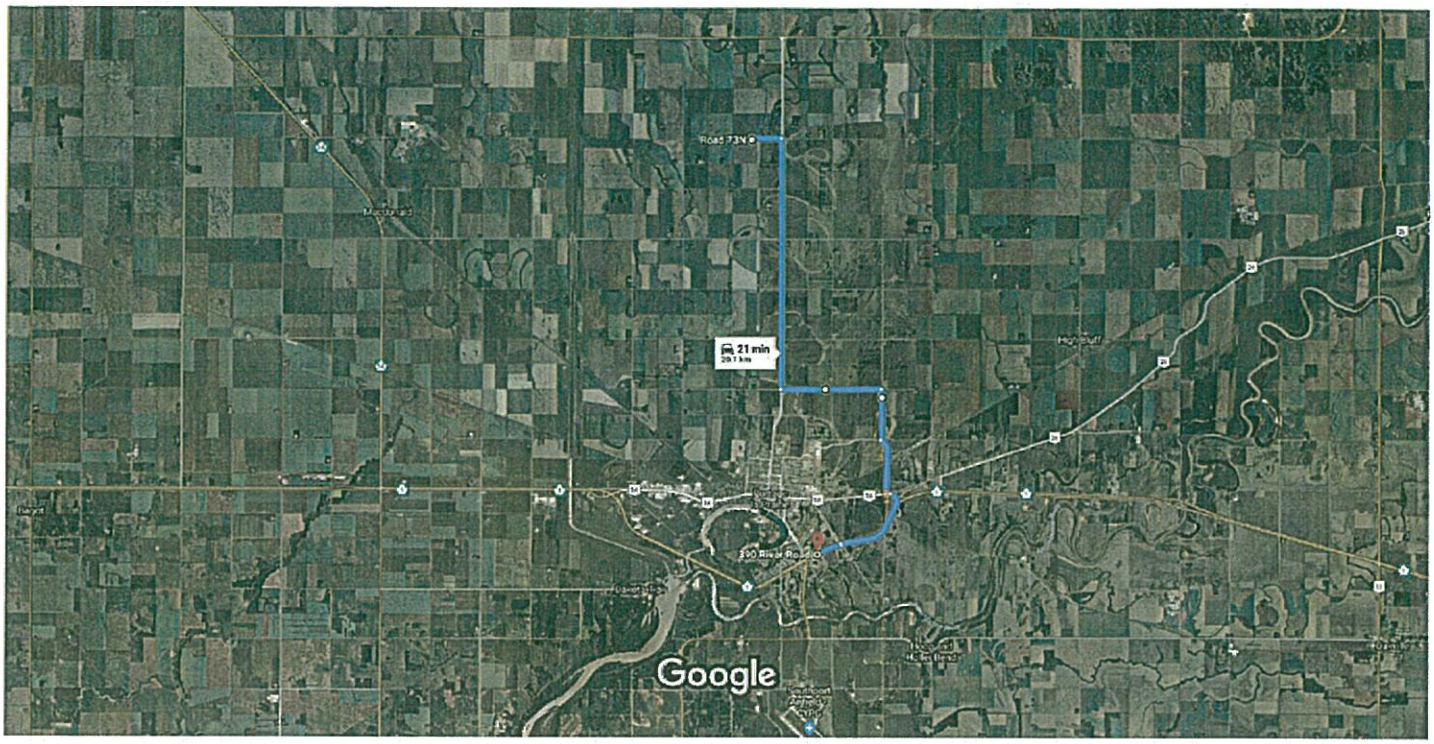
Macdonald, MB R0H 0S0

Google Maps

Road 73N, Macdonald, MB R0H 0S0 to 390 River Rd, Southport, MB R0H 1N1

Drive 20.1 km, 21 min

McDonald- NW 1-13-7 (RETURN EMPTY TOWPCF)



Imagery ©2018 TerraMetrics, Map data ©2018 Google 2 km

Road 73N

Macdonald, MB R0H 0S0

1. Head east on Road 73N toward MB-240 N

2 min (1.0 km)

2. Turn right at the 1st cross street onto MB-240 S

6 min (8.2 km)

Drive

7 min (5.0 km)

3. Turn left onto Road 68N

3.3 km

4. Turn right onto Rd 34W

1.7 km

Drive along Trans-Canada Hwy/MB-1 W

5 min (5.0 km)

5. Turn left at Lincoln Ave

1.9 km

6. Turn left onto MB-1A/Trans-Canada Hwy 1A

170 m

7. Keep right at the fork, follow signs for MB-1 W/Trans-Canada Highway/Brandon/Yellowhead Highway and merge onto Trans-Canada Hwy/MB-1 W

2.9 km

Drive to River Rd

2 min (950 m)

8. Turn left at Angle Rd

65 m

9. Turn right at the 1st cross street onto River Rd

850 m

390 River Rd
Southport, MB R0H 1N1

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Google Maps

Road 30W, High Bluff, MB R0H 0K0 to 390 River Rd, Southport, MB R0H 1N1

Drive 17.4 km, 17 min

Tidsbury- NW 31-12-5 — TO FIELD AND RETURN

Imagery ©2018 CNES / Airbus, DigitalGlobe, Landsat / Copernicus, Southport Aerospace, Map data ©2018 Google 1 km

Road 30W

High Bluff, MB R0H 0K0

Take Rd 30W to MB-26 W

8 min (7.0 km)

1. Head south on Road 30W toward Rd 71N

850 m

2. Continue onto Rd 30W

3.3 km

3. Continue onto Premier Dr

1.6 km

4. Continue onto 30 Rd W

1.3 km

Drive

6 min (9.5 km)

5. Turn right onto MB-26 W

5.3 km

6. Turn right onto Trans-Canada Hwy/MB-1 W (signs for Trans Canada Highway)

4.2 km

Drive to River Rd

2 min (900 m)

7. Turn left at Angle Rd

65 m

8. Turn right at the 1st cross street onto River Rd
   Destination will be on the left

850 m

390 River Rd
Southport, MB R0H 1N1

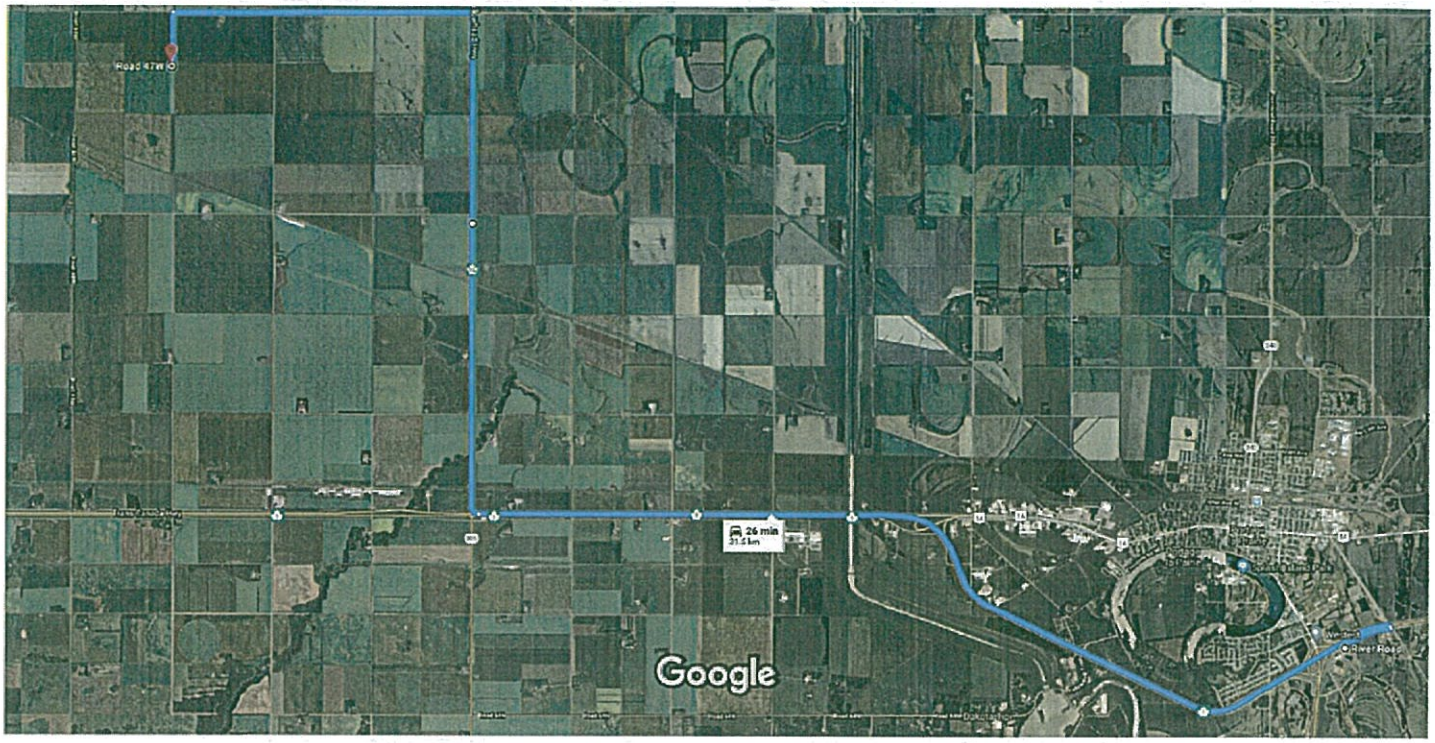
These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Google Maps

River Rd, Southport, MB R0H 1N1 to Road 47W, Macdonald, MB R0H 0S0

Drive 31.5 km, 26 min

Brooks- E 30-12-8 TO FIELD AND RETURN



Imagery ©2018 CNES / Airbus, DigitalGlobe, Landsat / Copernicus, Map data ©2018 Google 1 km

River Rd

Southport, MB R0H 1N1

1. Head northeast on River Rd

850 m

2. Turn left at the 1st cross street toward Trans-Canada Hwy/MB-1 W

34 m

3. Turn left at the 1st cross street onto Trans-Canada Hwy/MB-1 W

16.5 km

4. Turn right onto MB-16 W (signs for Trans Canada Highway/Saskatoon/Neepawa/Yellow Head Highway)

8.3 km

5. Turn left onto Rd 71N

4.9 km

6. Turn left onto Road 47W

Destination will be on the right

850 m

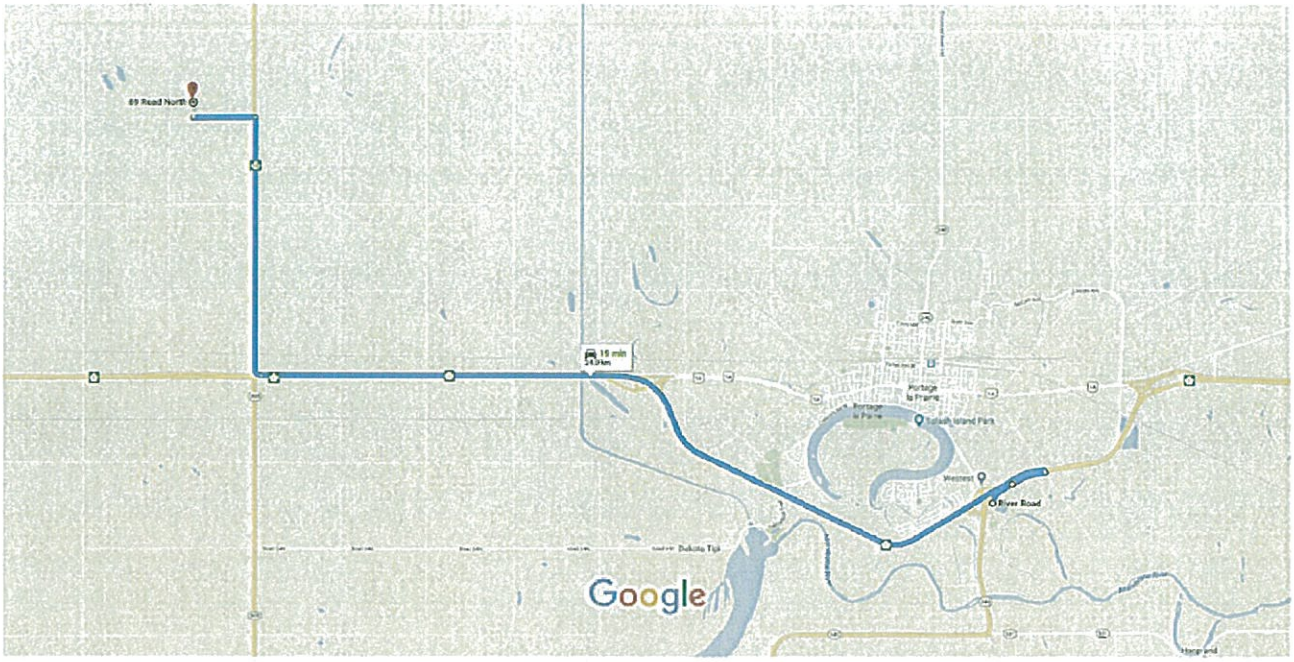
Road 47W

Macdonald, MB R0H 0S0

Google

River Rd, Southport, MB R0H 1N1 to 69 Rd N, Macdonald, MB R0H 0S0 — Drive 24.0 km, 19 min

Stangl- SW 22-12-8 TO FIELD AND RETURN



Map data ©2018 Google 1 km

River Rd

Southport, MB R0H 1N1

1. Head north on River Rd — 1.2 km
2. Turn left at the 1st cross street toward Trans-Canada Hwy/MB-1 W — 34 m
3. Turn left at the 1st cross street onto Trans-Canada Hwy/MB-1 W — 16.5 km
4. Turn right onto MB-16 W (signs for Trans Canada Highway/Saskatoon/Neepawa/Yellow Head Highway) — 5.0 km
5. Turn left onto 69 Rd N — 1.2 km

69 Rd N

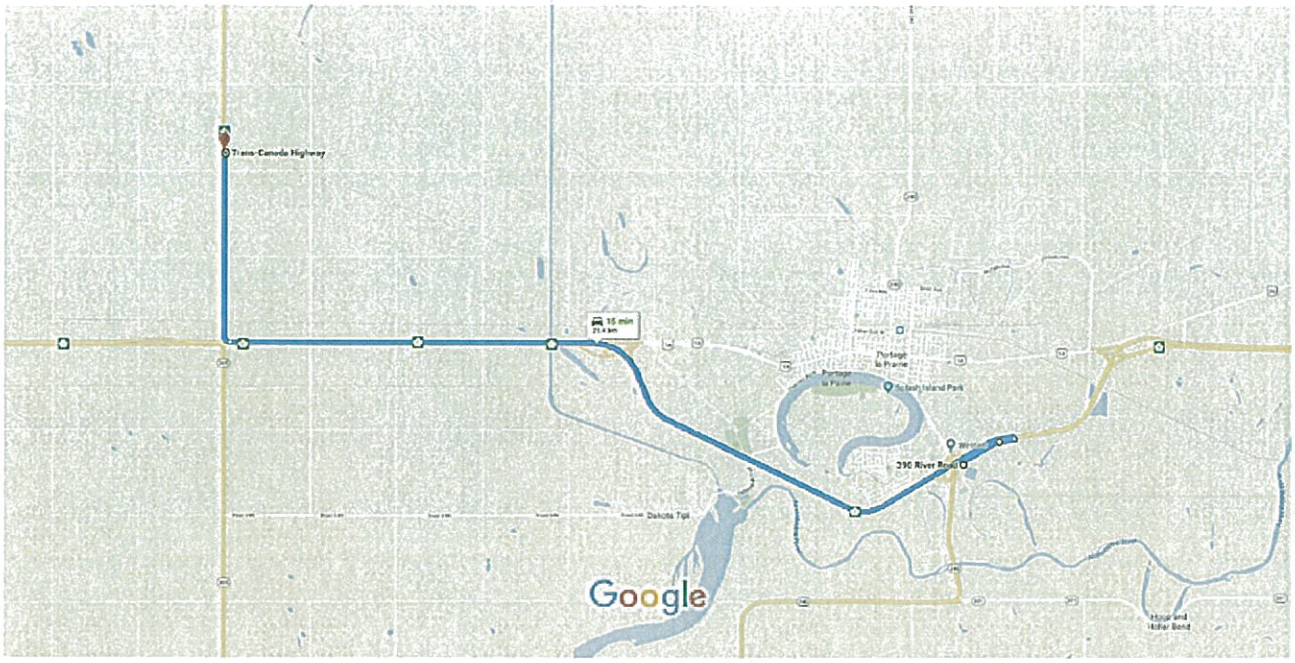
Macdonald, MB R0H 0S0

Google Maps

390 River Rd, Southport, MB R0H 1N1 to Trans-Canada Hwy, Macdonald, MB R0H 0S0

Drive 21.4 km, 15 min

Stangl- SW 14-12-8 TO FIELD AND RETURN



Map data ©2018 Google 1 km

390 River Rd

Southport, MB R0H 1N1

1. Head north on River Rd

1.1 km

2. Turn left at the 1st cross street toward Trans-Canada Hwy/MB-1 W

34 m

3. Turn left at the 1st cross street onto Trans-Canada Hwy/MB-1 W

16.5 km

4. Turn right onto MB-16 W (signs for Trans Canada Highway/Saskatoon/Neepawa/Yellow Head Highway)

Destination will be on the right

3.7 km

Trans-Canada Hwy

Macdonald, MB R0H 0S0

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the

Portage la Prairie
City of Possibilities

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

August 13, 2018

Ms. Nettie Neudorf, CPA, CGA, CMMA
Chief Administrative Officer
Rural Municipality of Portage la Prairie
35 Tupper Street South
Portage la Prairie, MB R1N 1W7

Re: 2018 Residual Biosolids Application Program Truck Routes

Dear Ms. Neudorf:

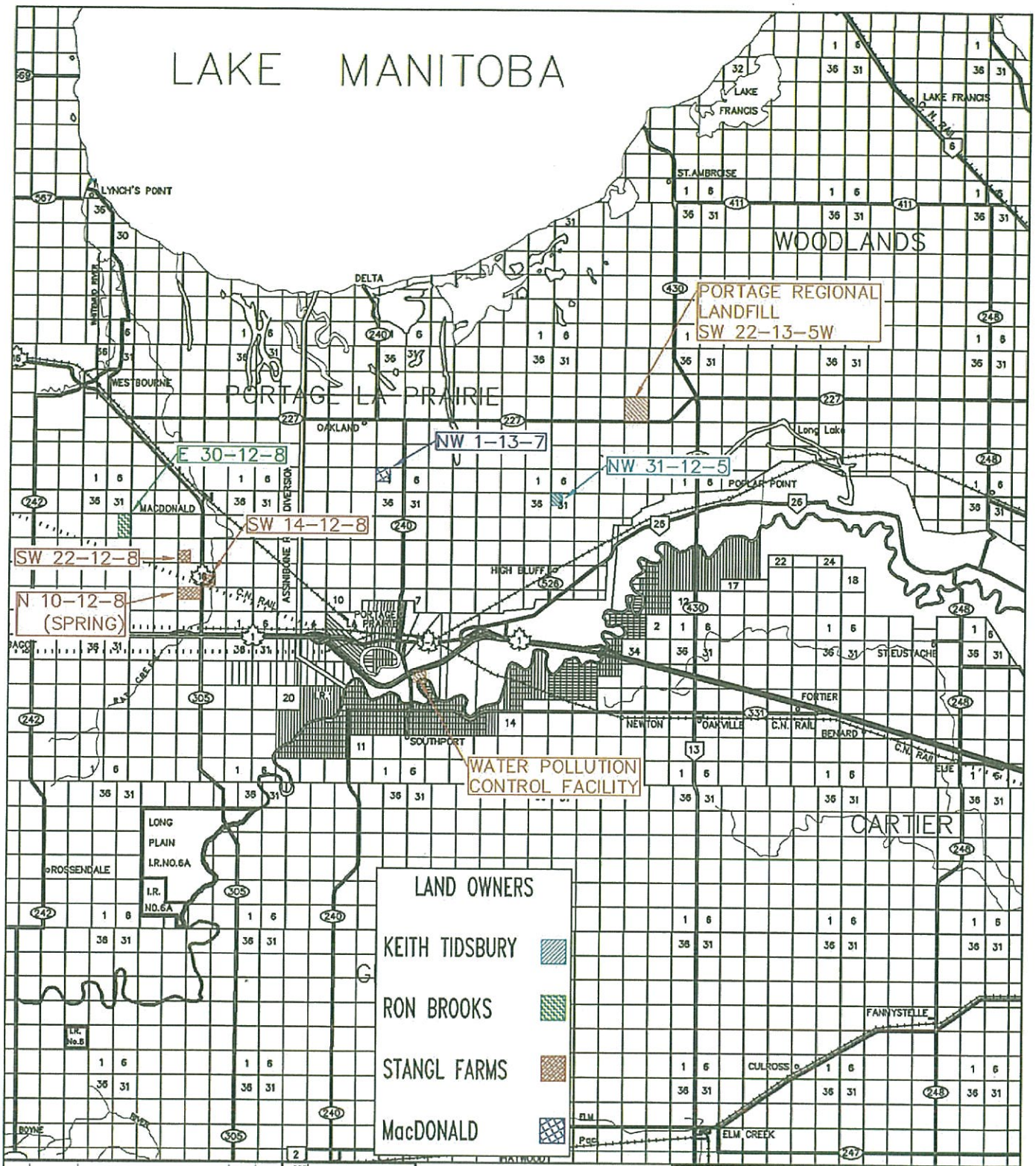
As requested, please find the enclosed route maps for spring biosolids application, for review and comment by Reg Shostal. Transport and application of biosolids is scheduled to begin on Monday, August 20, 2018, pending dry weather conditions. Should there be any concerns throughout the hauling process with traffic or dust, please do not hesitate to contact myself as the contractor is responsible for these items.

Please direct any questions or concerns regarding routing to myself at 204-239-8359.

Sincerely,

Karly Friesen
Manager, Wastewater Treatment Division

Cc: Kelly Braden, P. Eng., Director of Operations



No.	y/m/d	Revision	By	App.
0	17/02/15	ISSUED FOR REVIEW	M.P.	I.M.

PROVINCE OF MANITOBA
K.N. BRADEN
REGISTERED PROFESSIONAL ENGINEER

Portage la Prairie
City of Possibilities

Project
2018
BIOSOLIDS
APPLICATION
LAND DESCRIPTION

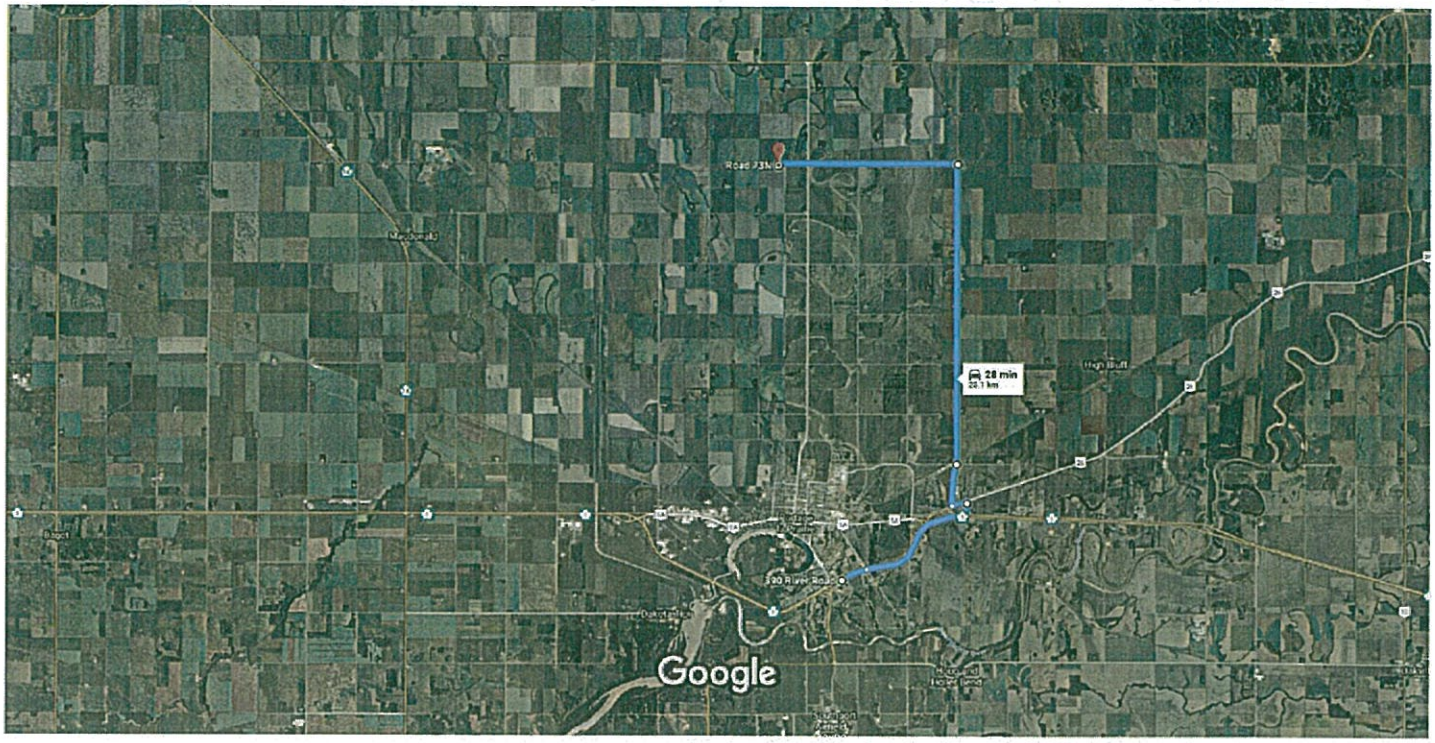
Sheet	y/m/d
1	18/02/15
Scale	N.T.S
Drawing No.	Rev.
M-214	0

Google Maps

390 River Rd, Southport, MB R0H 1N1 to Road 73N, Macdonald, MB R0H 0S0

Drive 23.1 km, 28 min

McDonald- NW 1-13-7 (To Field)



Imagery ©2018 TerraMetrics, Map data ©2018 Google 2 km

390 River Rd

Southport, MB R0H 1N1

1. Head northeast on River Rd

950 m

2. Turn left at the 1st cross street toward Trans-Canada Hwy/MB-1 E

34 m

3. Turn right at the 1st cross street onto Trans-Canada Hwy/MB-1 E

4.0 km

4. Turn left onto MB-26 E

500 m

5. Turn left

500 m

6. Turn right onto Rd 33W

11.2 km

7. Turn left onto Road 73N

Destination will be on the left

5.9 km

Road 73N

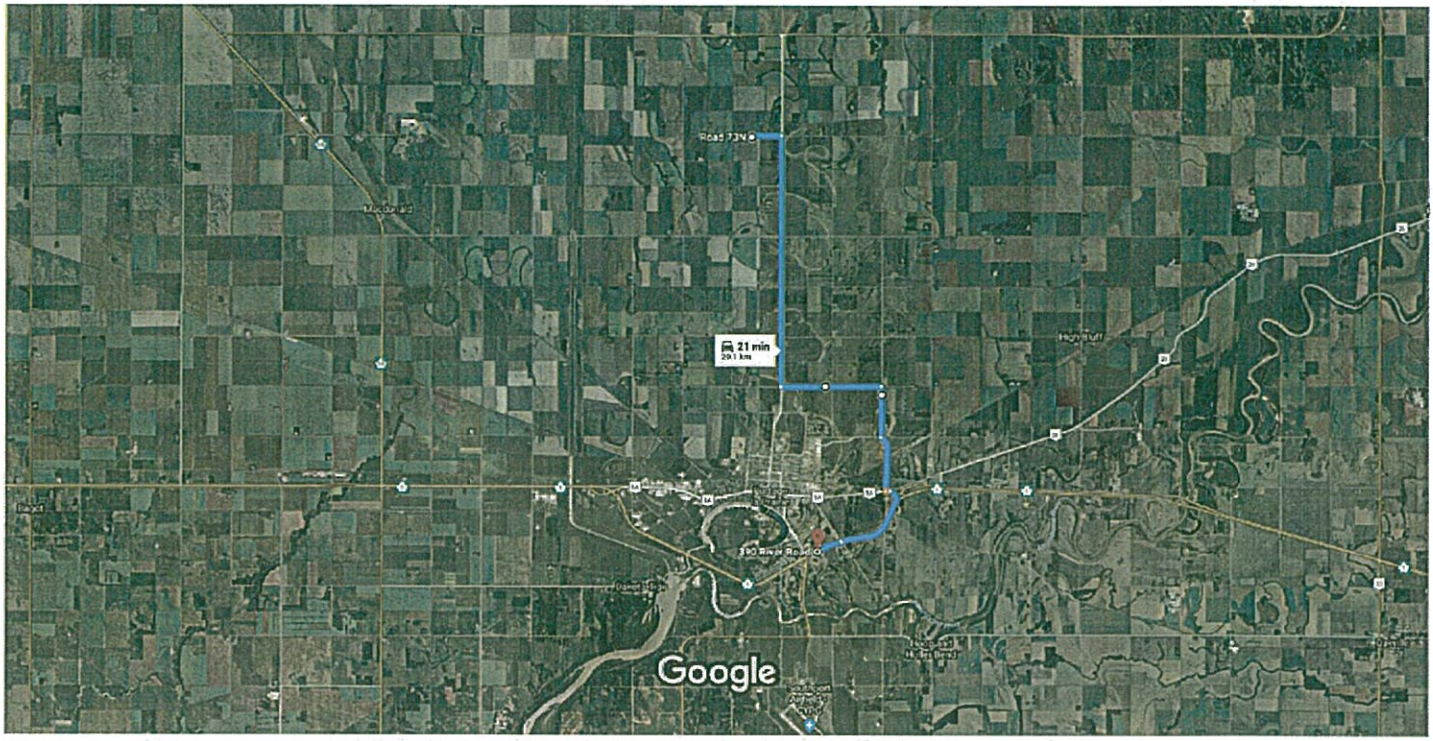
Macdonald, MB R0H 0S0

Google Maps

Road 73N, Macdonald, MB R0H 0S0 to 390 River Rd, Southport, MB R0H 1N1

Drive 20.1 km, 21 min

McDonald- NW 1-13-7 (RETURN EMPTY TOWPCF)



Imagery ©2018 TerraMetrics, Map data ©2018 Google 2 km

Road 73N

Macdonald, MB R0H 0S0

1. Head east on Road 73N toward MB-240 N

2 min (1.0 km)

2. Turn right at the 1st cross street onto MB-240 S

6 min (8.2 km)

Drive

7 min (5.0 km)

3. Turn left onto Road 68N

3.3 km

4. Turn right onto Rd 34W

1.7 km

Drive along Trans-Canada Hwy/MB-1 W

5 min (5.0 km)

5. Turn left at Lincoln Ave

1.9 km

6. Turn left onto MB-1A/Trans-Canada Hwy 1A

170 m

7. Keep right at the fork, follow signs for MB-1 W/Trans-Canada Highway/Brandon/Yellowhead Highway and merge onto Trans-Canada Hwy/MB-1 W

2.9 km

Drive to River Rd

2 min (950 m)

8. Turn left at Angle Rd

65 m

9. Turn right at the 1st cross street onto River Rd

850 m

390 River Rd

Southport, MB R0H 1N1

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Google Maps

Road 30W, High Bluff, MB R0H 0K0 to 390 River Rd, Southport, MB R0H 1N1

Drive 17.4 km, 17 min

Tidsbury- NW 31-12-5 — TO FIELD AND RETURN

Imagery ©2018 CNES / Airbus, DigitalGlobe, Landsat / Copernicus, Southport Aerospace, Map data ©2018 Google 1 km

Road 30W

High Bluff, MB R0H 0K0

Take Rd 30W to MB-26 W

8 min (7.0 km)

1. Head south on Road 30W toward Rd 71N

850 m

2. Continue onto Rd 30W

3.3 km

3. Continue onto Premier Dr

1.6 km

4. Continue onto 30 Rd W

1.3 km

Drive

6 min (9.5 km)

5. Turn right onto MB-26 W

5.3 km

6. Turn right onto Trans-Canada Hwy/MB-1 W (signs for Trans Canada Highway)

4.2 km

Drive to River Rd

2 min (900 m)

7. Turn left at Angle Rd

65 m

8. Turn right at the 1st cross street onto River Rd
   Destination will be on the left

850 m

390 River Rd
Southport, MB R0H 1N1

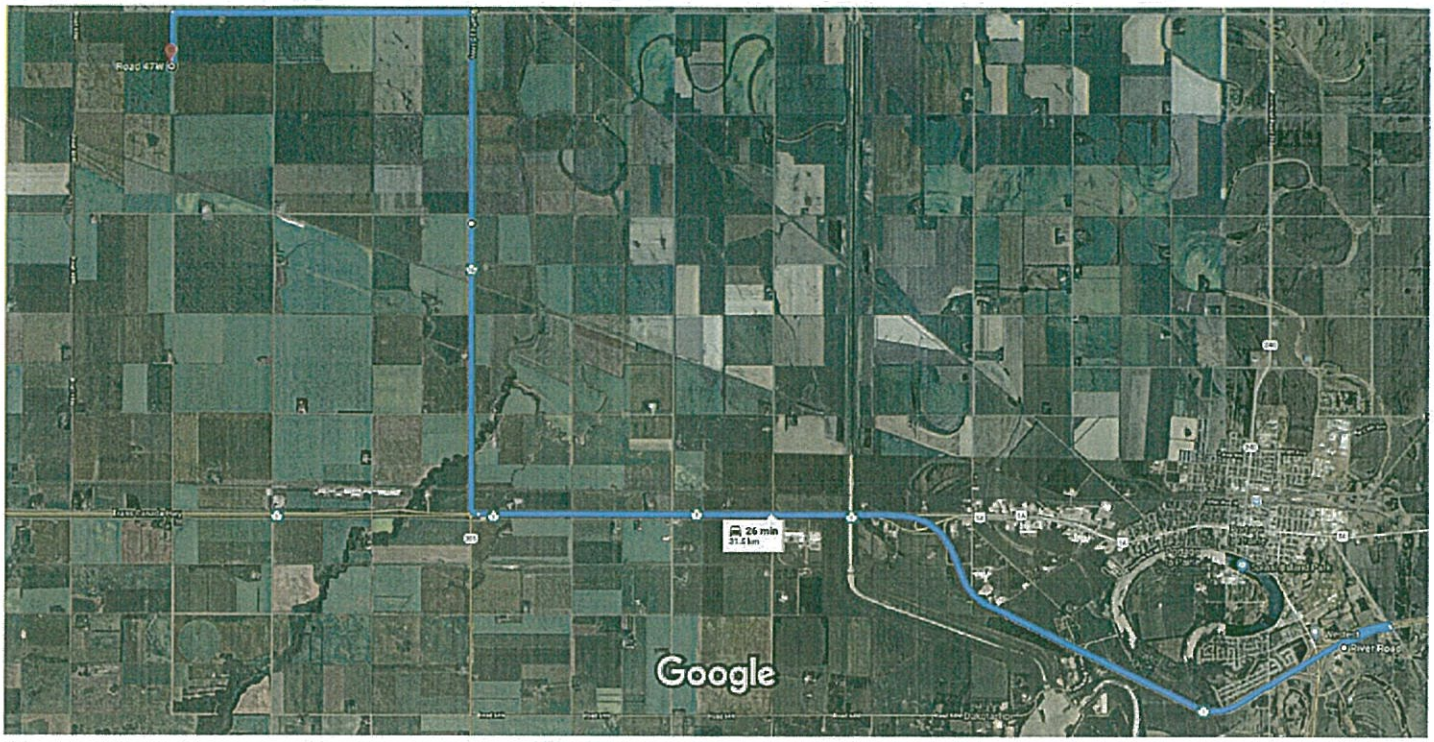
These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Google Maps

River Rd, Southport, MB R0H 1N1 to Road 47W, Macdonald, MB R0H 0S0

Drive 31.5 km, 26 min

Brooks- E 30-12-8 TO FIELD AND RETURN



Imagery ©2018 CNES / Airbus, DigitalGlobe, Landsat / Copernicus, Map data ©2018 Google 1 km

River Rd

Southport, MB R0H 1N1

1. Head northeast on River Rd

850 m

2. Turn left at the 1st cross street toward Trans-Canada Hwy/MB-1 W

34 m

3. Turn left at the 1st cross street onto Trans-Canada Hwy/MB-1 W

16.5 km

4. Turn right onto MB-16 W (signs for Trans Canada Highway/Saskatoon/Neepawa/Yellow Head Highway)

8.3 km

5. Turn left onto Rd 71N

4.9 km

6. Turn left onto Road 47W

Destination will be on the right

850 m

Road 47W

Macdonald, MB R0H 0S0

Google

River Rd, Southport, MB R0H 1N1 to 69 Rd N, Macdonald, MB R0H 0S0 — Drive 24.0 km, 19 min

Stangl- SW 22-12-8 TO FIELD AND RETURN

Map data ©2018 Google 1 km

River Rd

Southport, MB R0H 1N1

1. Head north on River Rd

1.2 km

2. Turn left at the 1st cross street toward Trans-Canada Hwy/MB-1 W

34 m

3. Turn left at the 1st cross street onto Trans-Canada Hwy/MB-1 W

16.5 km

4. Turn right onto MB-16 W (signs for Trans Canada Highway/Saskatoon/Neepawa/Yellow Head Highway)

5.0 km

5. Turn left onto 69 Rd N

1.2 km

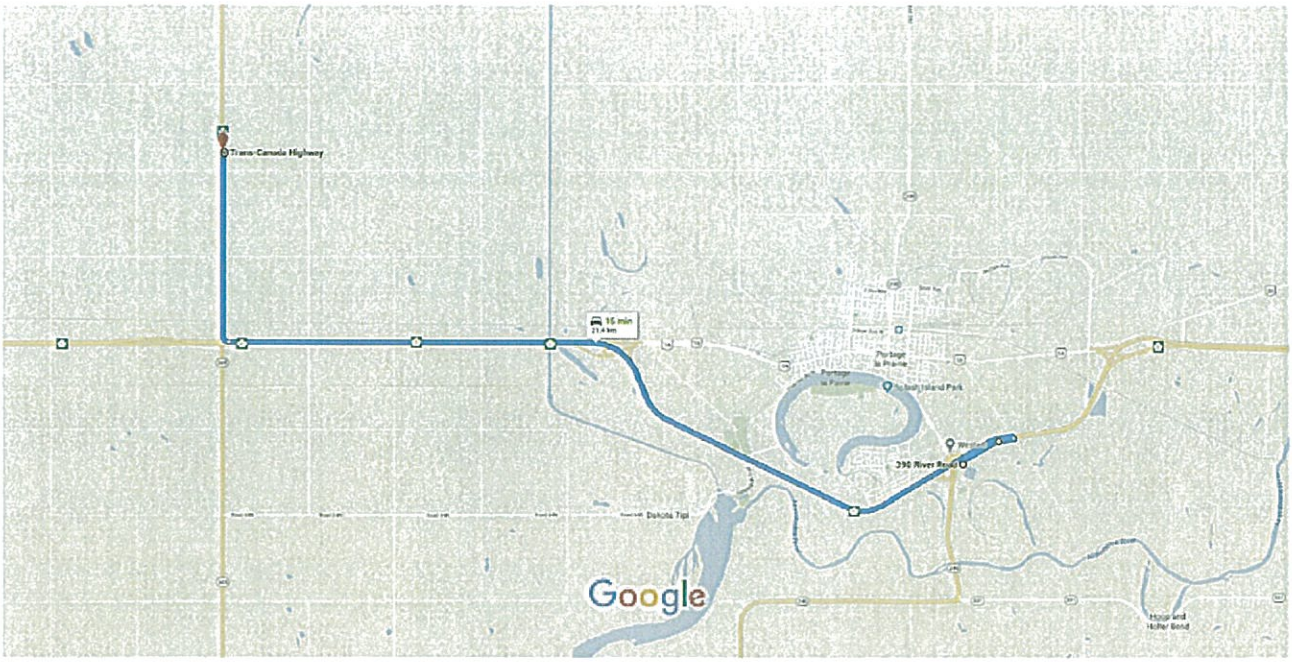
69 Rd N

Macdonald, MB R0H 0S0

Google Maps

390 River Rd, Southport, MB R0H 1N1 to Trans-Canada Hwy, Macdonald, MB R0H 0S0 — Drive 21.4 km, 15 min

Stangl- SW 14-12-8 TO FIELD AND RETURN



Map data ©2018 Google 1 km

390 River Rd

Southport, MB R0H 1N1

1. Head north on River Rd

1.1 km

2. Turn left at the 1st cross street toward Trans-Canada Hwy/MB-1 W

34 m

3. Turn left at the 1st cross street onto Trans-Canada Hwy/MB-1 W

16.5 km

4. Turn right onto MB-16 W (signs for Trans Canada Highway/Saskatoon/Neepawa/Yellow Head Highway)

   Destination will be on the right

3.7 km

Trans-Canada Hwy

Macdonald, MB R0H 0S0

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the

LETTER OF AGREEMENT

Mr. Kelly Braden, P.Eng.
Director of Operations
City of Portage la Prairie
97 Saskatchewan Ave. E.
Portage la Prairie, MB
R1N 0L8

Dear Sir:

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 2018 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 warrantles 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 season 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.

Yours truly,

Land Owner -

City Representative

Jan 19/18
Date

Jan 19/18
Date

Land Location(s): E 30-12-8

LETTER OF AGREEMENT

Mr. Kelly Braden, P.Eng.
Director of Operations
City of Portage la Prairie
97 Saskatchewan Ave. E.
Portage la Prairie, MB
R1N 0L8

Dear Sir:

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 2018 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 season 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.

Yours truly,

Land Owner -

City Representative

April 24/18.
Date

April 24/18
Date

Land Location(s): NW 1-13-7

LETTER OF AGREEMENT

Mr. Kelly Braden, P.Eng.
Director of Operations
City of Portage la Prairie
97 Saskatchewan Ave. E.
Portage la Prairie, MB
R1N 0L8

Dear Sir:

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 2018 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 season 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.

Yours truly,

(Land Owner -

City Representative

April 24/18
Date

April 24/18
Date

Land Location(s): NW 31-12-5

LETTER OF AGREEMENT

Mr. Kelly Braden, P.Eng.
Director of Operations
City of Portage la Prairie
97 Saskatchewan Ave. E.
Portage la Prairie, MB
R1N 0L8

Dear Sir:

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 2018 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 season 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.

Yours truly,

L J Stangl
Land Owner -

City Representative

Date

April 25/18
Date

Land Location(s): SW 22-12-8
SW 14-12-8

of Land Owner		Brooks			
Description		E 30-12-8			
Owner Authorization		Yes			
>300m from residences					
Enclosed		Yes			
Field previously Used					
	Lat		Long		
	Date	Date	Date	Date	
	BVF 17/10/2018	BVF 17/10/2018 lbs/ac	BST 16/10/2018	BST 16/10/2018 lbs/ac	Comments
	0.497		0.497		
	68600		68600		
	24.0		24.0		
	25.2		25.2		
	10.9		10.9		
	0.0437		0.0437		
	29.5		29.5		
	7.91		7.91		
ıs < 60 ug/g	2.2		2.2		
	2440		2440		
e Nitrogen 0- kg/ha	1.2		1.2		
	72		72		
Nitrogen	395		491		
	3.06		2.92		
	34.6		31.7		
ty	3590		4120		
	201		227		
	9.22		9.38		
	0.075		0.050		
	35.1		31.1		
ogen	5.0		41.1		
trogen	2311		2778		
	7.11		7.16		
	11900		18800		
gen	2719		3269		
phorus	8220		17600		
s	2.89		1.57		
ids	64.9		62.1		
	599		593		
: 2.88	0.902	0.805	0.901	0.804	
< 216	43.28	38.62	42.58	37.99	
0	45.84	40.90	45.89	40.94	
	19.64	17.52	19.64	17.52	
.9	0.08	0.07	0.08	0.07	
	53.18	47.45	53.18	47.44	
pl. Rate PA-	103.16	92.04	98.804	88.15	
	1.42	1.26	1.94	1.73	
	131.02	116.90	130.98	116.86	
s	23.49	20.96	44.87	40.03	

e of Land Owner		Darren McDonald			
Description		NW 1-13-7			
Owner Authorization		Yes			
>300m from residences					
Enclosed		Yes			
Field previously Used					
	Lat		Long		
	Date	Date	Date	Date	
	BST 24/8/2018	BST 24/8/2018 lbs/ac			Comments
	0.473				
	10800				
	23.6				
	21.7				
	13.6				
	0.0376				
	26.2				
	7.45				
us < 60 ug/g	19.7				
	2780				
e Nitrogen 0-kg/ha	5.2				
	95				
Nitrogen	371				
	3.15				
	36.5				
ty	3370				
	243				
	9.67				
	0.289				
	33.2				
ogen	44.6				
trogen	3114				
	7.07				
	13200				
gen	3485				
phorus	14600				
s	2.41				
lids	67				
	621				
< 2.88	0.860	0.767			
< 216	42.58	37.99			
0	39.75	35.46			
	24.51	21.86			
0.9	0.07	0.06			
	47.25	42.16			
ppl. Rate PA-	92.37	82.41			
	2.79	2.49			
	172.47	153.87			
s	76.67	68.40			

e of Land Owner		Tidsbury				
l Description		NW 13-12-5				
Owner Authorization		Yes				
>300m from residences						
Enclosed		Yes				
Field previously Used						
	Lat		Long			
	Date	Date	Date	Date		
	BVF 24/8/2018	BVF 24/8/2018 lbs/ac	BST 24/8/2018	BST 24/8/2018 lbs/ac		Comments
	0.556		0.556			
	9960		9960			
n	27.6		27.6			
	25.8		25.8			
	13.0		13.0			
	0.0440		0.0440			
	30.7		30.7			
	7.17		7.17			
us < 60 ug/g	38.1		38.1			
n	3650		3650			
e Nitrogen 0- 0kg/ha	5.5		5.5			
	103		103			
Nitrogen	395		491			
	3.06		2.92			
	34.6		31.7			
ity	3590		4120			
	201		227			
	9.22		9.38			
	0.075		0.050			
	35.1		31.1			
rogen	5.0		41.1			
itrogen	2311		2778			
	7.11		7.16			
	11900		18800			
gen	2719		3269			
sphorus	8220		17600			
s	2.89		1.57			
lids	64.9		62.1			
	599		593			
< 2.88	1.007	0.898	1.009	0.900		
< 216	49.75	44.38	49.77	44.41		
90	46.82	41.77	47.11	42.03		
	23.42	20.89	23.43	20.90		
0.9	0.08	0.07	0.08	0.07		
)	55.33	49.36	55.36	49.39		
ppl. Rate PA-	100.96	90.07	76.40	68.16		
	1.15	1.03	3.07	2.74		
	186.53	166.42	187.15	166.97		
s	84.13	75.06	120.402	107.42		
s						

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

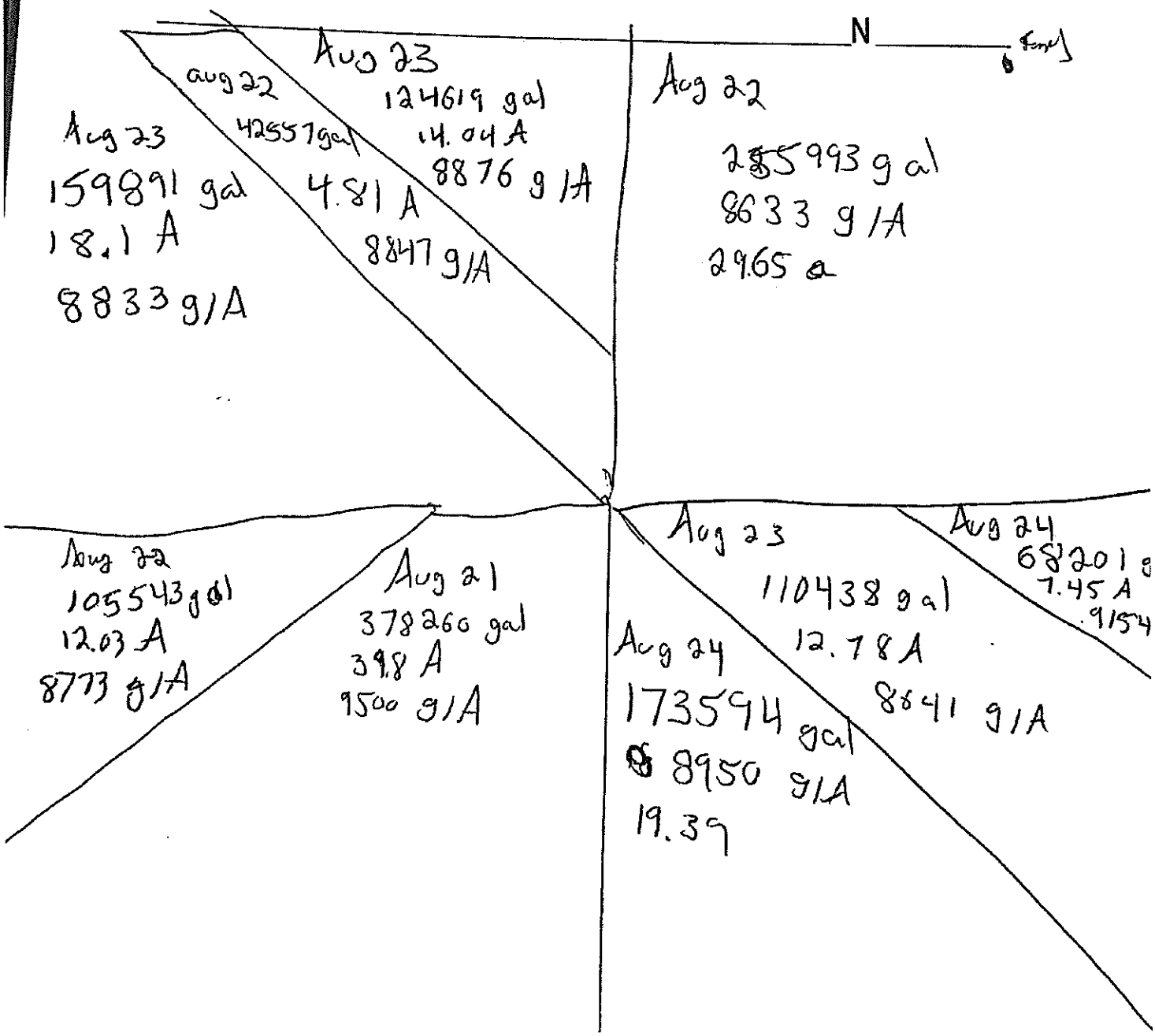
DATE: Aug 21 2019

FARMERS NAME: Darren MacDonald

FIELD: SEC. ____ TWP _____ RGE _____ NW 1-13-7

APPLICATION TYPE: INJECTION

DEPTH : 6" HA: _____ CM3: _____



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

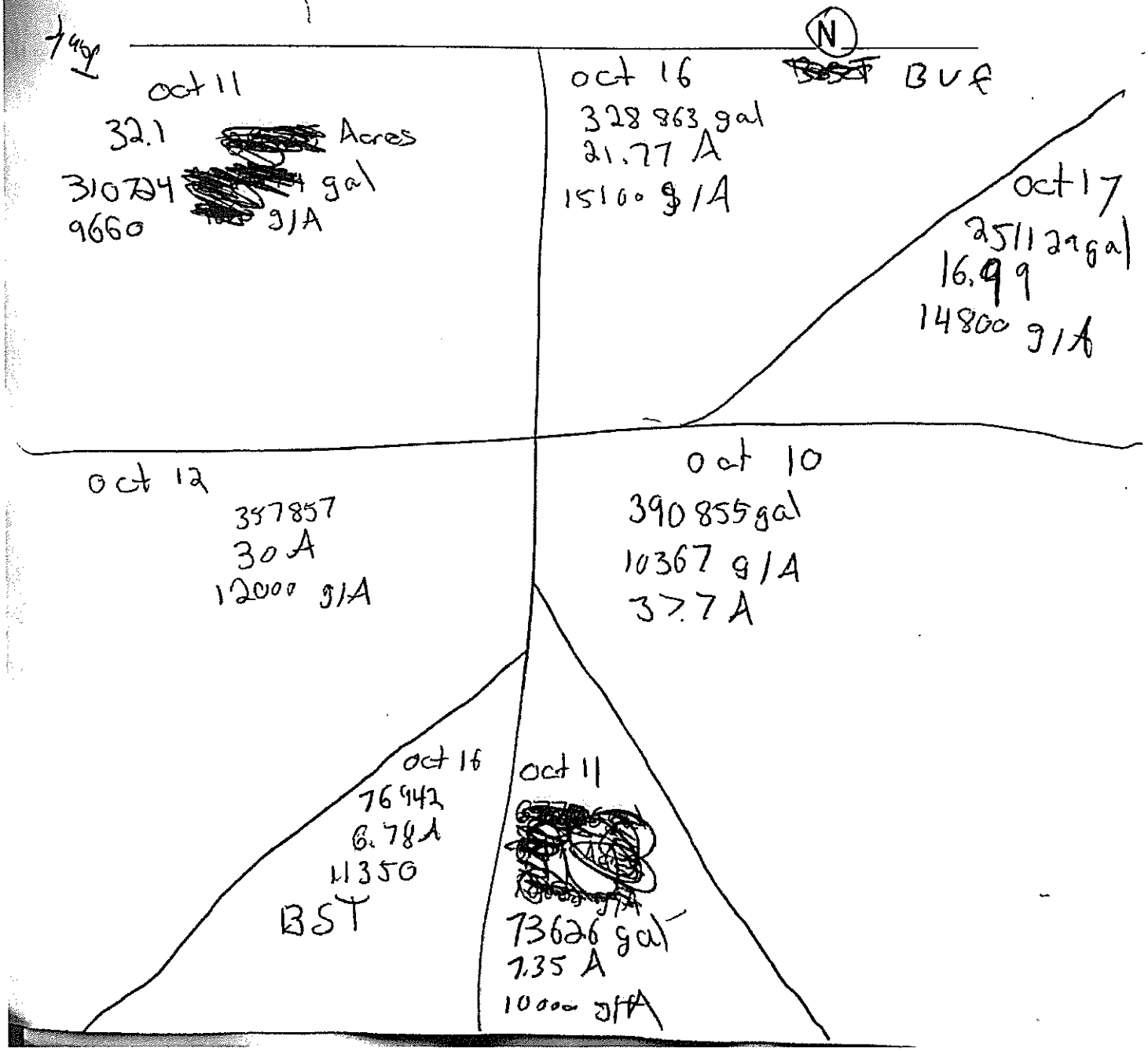
DATE: _____

FARMERS NAME: _____

FIELD: SEC. ____ TWP _____ RGE _____

APPLICATION TYPE: INJECTION

DEPTH : 6" HA: _____ CM3: _____



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

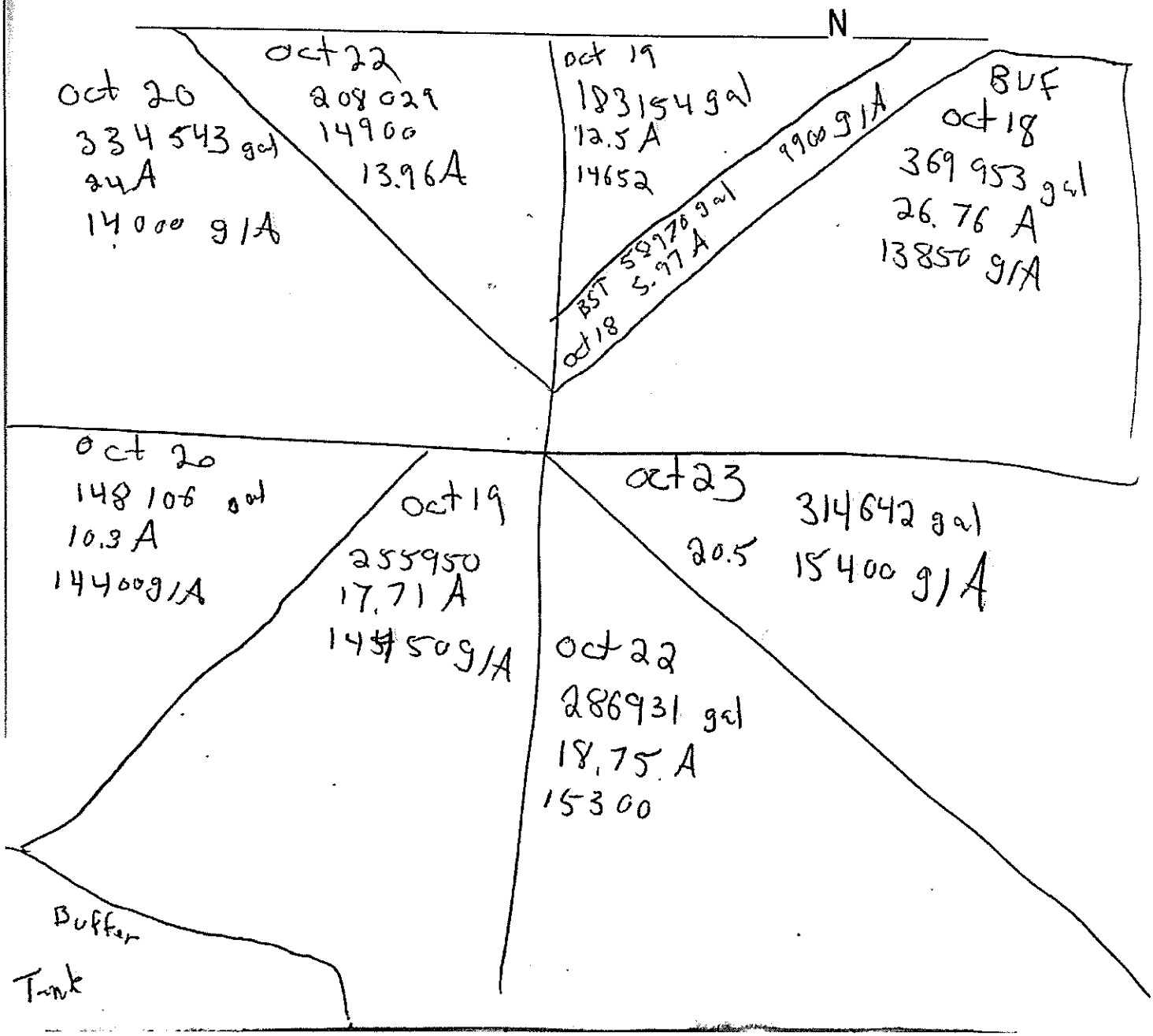
DATE: _____

FARMERS NAME: _____

FIELD: SEC. ____ TWP _____ RGE _____ 31-12-5

APPLICATION TYPE: INJECTION

DEPTH : 6" HA: _____ CM3: _____



City of Portage la Prairie - Wastewater
ATTN: AARON STECHESEN
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 0L8

Date Received: 31-AUG-18
Report Date: 12-SEP-18 07:19 (MT)
Version: FINAL

Client Phone: 204-239-8361

Certificate of Analysis

Lab Work Order #: L2156847
Project P.O. #: W02435
Job Reference:
C of C Numbers:
Legal Site Desc:

Hua Wo
Chemistry Laboratory Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2156847-1 18-08-305	Stangl	SW	22-12-8				
Sampled By: CLIENT on 30-AUG-18 @ 16:30							
Matrix: SOIL							
Miscellaneous Parameters							
Available Phosphate-P	30.1		1.0	mg/kg	11-SEP-18	11-SEP-18	R4212808
Mercury (Hg)	0.0316		0.0050	mg/kg	04-SEP-18	06-SEP-18	R4204697
% Moisture	19.7		0.10	%	11-SEP-18	11-SEP-18	R4212368
pH (1:2 soil:water)	7.98		0.10	pH	07-SEP-18	07-SEP-18	R4205254
Metals							
Aluminum (Al)	20900		500	mg/kg	04-SEP-18	05-SEP-18	R4203495
Antimony (Sb)	0.49		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Arsenic (As)	9.18		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Barium (Ba)	195		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Beryllium (Be)	0.85		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Bismuth (Bi)	0.217		0.020	mg/kg	04-SEP-18	05-SEP-18	R4203495
Boron (B)	17		10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Cadmium (Cd)	0.490		0.020	mg/kg	04-SEP-18	05-SEP-18	R4203495
Calcium (Ca)	21500		100	mg/kg	04-SEP-18	05-SEP-18	R4203495
Chromium (Cr)	30.7		1.0	mg/kg	04-SEP-18	05-SEP-18	R4203495
Cobalt (Co)	11.4		0.020	mg/kg	04-SEP-18	05-SEP-18	R4203495
Copper (Cu)	29.0		1.0	mg/kg	04-SEP-18	05-SEP-18	R4203495
Iron (Fe)	26000		25	mg/kg	04-SEP-18	05-SEP-18	R4203495
Lead (Pb)	12.1		0.20	mg/kg	04-SEP-18	05-SEP-18	R4203495
Magnesium (Mg)	14000		10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Manganese (Mn)	814		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Molybdenum (Mo)	0.34		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Nickel (Ni)	35.0		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Phosphorus (P)	670		100	mg/kg	04-SEP-18	05-SEP-18	R4203495
Potassium (K)	4310		25	mg/kg	04-SEP-18	05-SEP-18	R4203495
Selenium (Se)	<0.50		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Silver (Ag)	0.15		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Sodium (Na)	245		10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Strontium (Sr)	69.2		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Thallium (Tl)	0.34		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Tin (Sn)	<5.0		5.0	mg/kg	04-SEP-18	05-SEP-18	R4203495
Titanium (Ti)	69.7		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Uranium (U)	1.18		0.020	mg/kg	04-SEP-18	05-SEP-18	R4203495
Vanadium (V)	65.6		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Zinc (Zn)	99		10	mg/kg	04-SEP-18	05-SEP-18	R4203495
L2156847-2 18-08-306							
Sampled By: CLIENT on 30-AUG-18 @ 16:30							
Matrix: SOIL							
Miscellaneous Parameters							
Available Nitrate-N	4.3		1.0	mg/kg	07-SEP-18	07-SEP-18	R4205678
% Moisture	17.1		0.10	%	11-SEP-18	11-SEP-18	R4212368
Total Nitrogen by LECO	1650		200	mg/kg	07-SEP-18	07-SEP-18	R4206608
Total Available N & NO3-N, NO2-N & NH4							
Available Ammonium-N							
Available Ammonium-N	5.0		1.0	mg/kg	06-SEP-18	06-SEP-18	R4204765
Available Ammonium-N - Calculation							
Total Available Nitrogen	10.2		2.2	mg/kg		07-SEP-18	
Nitrate, Nitrite & Nitrate+Nitrite-N(KCL							
Nitrite-N	<1.0		1.0	mg/kg	06-SEP-18	06-SEP-18	R4211347
Nitrate+Nitrite-N	5.2		2.0	mg/kg	06-SEP-18	06-SEP-18	R4211347
Nitrate-N	5.2		2.0	mg/kg	06-SEP-18	06-SEP-18	R4211347

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2156847-2 18-08-306							
Sampled By: CLIENT on 30-AUG-18 @ 16:30							
Matrix: SOIL							
L2156847-3 18-08-307							
Sampled By: CLIENT on 30-AUG-18 @ 16:30							
Matrix: SOIL							
Atterberg limits							
Liquid Limit (LL)	48		1	%	10-SEP-18	10-SEP-18	R4208207
Moisture at Plastic Limit	22		1	%	10-SEP-18	10-SEP-18	R4208207
Plasticity Index (PI)	26		1	%	10-SEP-18	10-SEP-18	R4208207
L2156847-4 18-08-308							
Sampled By: CLIENT on 30-AUG-18 @ 16:30	Brooks	E 30-12-8					
Matrix: SOIL							
Miscellaneous Parameters							
% Moisture	17.2		0.10	%	07-SEP-18	08-SEP-18	R4205415
Available Phosphate-P	2.2		1.0	mg/kg	11-SEP-18	11-SEP-18	R4212808
Chromium, Hexavalent	<0.20		0.20	ug/g	07-SEP-18	10-SEP-18	R4207797
Mercury (Hg)	0.0437		0.0050	mg/kg	04-SEP-18	06-SEP-18	R4204697
% Moisture	20.7		0.10	%	11-SEP-18	11-SEP-18	R4212368
pH (1:2 soil:water)	7.91		0.10	pH	07-SEP-18	07-SEP-18	R4205254
Metals							
Aluminum (Al)	13600		5.0	mg/kg	04-SEP-18	05-SEP-18	R4203495
Antimony (Sb)	0.67		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Arsenic (As)	10.2		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Barium (Ba)	220		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Beryllium (Be)	0.66		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Bismuth (Bi)	0.199		0.020	mg/kg	04-SEP-18	05-SEP-18	R4203495
Boron (B)	15		10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Cadmium (Cd)	0.497		0.020	mg/kg	04-SEP-18	05-SEP-18	R4203495
Calcium (Ca)	68600		100	mg/kg	04-SEP-18	05-SEP-18	R4203495
Chromium (Cr)	24.0		1.0	mg/kg	04-SEP-18	05-SEP-18	R4203495
Cobalt (Co)	10.3		0.020	mg/kg	04-SEP-18	05-SEP-18	R4203495
Copper (Cu)	25.2		1.0	mg/kg	04-SEP-18	05-SEP-18	R4203495
Iron (Fe)	22100		25	mg/kg	04-SEP-18	05-SEP-18	R4203495
Lead (Pb)	10.9		0.20	mg/kg	04-SEP-18	05-SEP-18	R4203495
Magnesium (Mg)	26400		10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Manganese (Mn)	732		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Molybdenum (Mo)	2.34		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Nickel (Ni)	29.5		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Phosphorus (P)	590		100	mg/kg	04-SEP-18	05-SEP-18	R4203495
Potassium (K)	2440		25	mg/kg	04-SEP-18	05-SEP-18	R4203495
Selenium (Se)	<0.50		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Silver (Ag)	0.14		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Sodium (Na)	641		10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Strontium (Sr)	118		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Thallium (Tl)	0.34		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Tin (Sn)	<5.0		5.0	mg/kg	04-SEP-18	05-SEP-18	R4203495
Titanium (Ti)	76.5		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Uranium (U)	2.25		0.020	mg/kg	04-SEP-18	05-SEP-18	R4203495
Vanadium (V)	50.8		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Zinc (Zn)	72		10	mg/kg	04-SEP-18	05-SEP-18	R4203495

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2156847-5 18-08-309							
Sampled By: CLIENT on 30-AUG-18 @ 16:30							
Matrix: SOIL							
Miscellaneous Parameters							
Available Nitrate-N	1.2		1.0	mg/kg	07-SEP-18	07-SEP-18	R4205678
% Moisture	17.7		0.10	%	11-SEP-18	11-SEP-18	R4212368
Total Nitrogen by LECO	1440		200	mg/kg	07-SEP-18	07-SEP-18	R4206608
Total Available N & NO3-N, NO2-N & NH4							
Available Ammonium-N							
Available Ammonium-N	4.2		1.0	mg/kg	06-SEP-18	06-SEP-18	R4204765
Available Ammonium-N - Calculation							
Total Available Nitrogen	4.2		2.2	mg/kg		07-SEP-18	
Nitrate, Nitrite & Nitrate+Nitrite-N(KCL							
Nitrite-N	<1.0		1.0	mg/kg	06-SEP-18	06-SEP-18	R4211347
Nitrate+Nitrite-N	<2.0		2.0	mg/kg	06-SEP-18	06-SEP-18	R4211347
Nitrate-N	<2.0		2.0	mg/kg	06-SEP-18	06-SEP-18	R4211347
L2156847-6 18-08-310							
Sampled By: CLIENT on 30-AUG-18 @ 16:30							
Matrix: SOIL							
Atterberg limits							
Liquid Limit (LL)	50		1	%	10-SEP-18	10-SEP-18	R4208207
Moisture at Plastic Limit	22		1	%	10-SEP-18	10-SEP-18	R4208207
Plasticity Index (PI)	28		1	%	10-SEP-18	10-SEP-18	R4208207
L2156847-7 18-08-311							
Sampled By: CLIENT on 30-AUG-18 @ 16:30	Stangl	SW	14-12-8				
Matrix: SOIL							
Miscellaneous Parameters							
Available Phosphate-P	19.1		1.0	mg/kg	11-SEP-18	11-SEP-18	R4212808
Mercury (Hg)	0.0380		0.0050	mg/kg	04-SEP-18	06-SEP-18	R4204697
% Moisture	17.5		0.10	%	11-SEP-18	11-SEP-18	R4212368
pH (1:2 soil:water)	8.13		0.10	pH	07-SEP-18	07-SEP-18	R4205254
Metals							
Aluminum (Al)	15400		5.0	mg/kg	04-SEP-18	05-SEP-18	R4203495
Antimony (Sb)	0.51		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Arsenic (As)	9.79		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Barium (Ba)	214		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Beryllium (Be)	0.71		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Bismuth (Bi)	0.206		0.020	mg/kg	04-SEP-18	05-SEP-18	R4203495
Boron (B)	16		10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Cadmium (Cd)	0.600		0.020	mg/kg	04-SEP-18	05-SEP-18	R4203495
Calcium (Ca)	29900		100	mg/kg	04-SEP-18	05-SEP-18	R4203495
Chromium (Cr)	25.1		1.0	mg/kg	04-SEP-18	05-SEP-18	R4203495
Cobalt (Co)	10.2		0.020	mg/kg	04-SEP-18	05-SEP-18	R4203495
Copper (Cu)	25.8		1.0	mg/kg	04-SEP-18	05-SEP-18	R4203495
Iron (Fe)	23000		25	mg/kg	04-SEP-18	05-SEP-18	R4203495
Lead (Pb)	11.6		0.20	mg/kg	04-SEP-18	05-SEP-18	R4203495
Magnesium (Mg)	16300		10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Manganese (Mn)	791		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Molybdenum (Mo)	0.56		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Nickel (Ni)	28.4		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Phosphorus (P)	850		100	mg/kg	04-SEP-18	05-SEP-18	R4203495
Potassium (K)	3200		25	mg/kg	04-SEP-18	05-SEP-18	R4203495
Selenium (Se)	<0.50		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2156847-7 18-08-311							
Sampled By: CLIENT on 30-AUG-18 @ 16:30							
Matrix: SOIL							
Metals							
Silver (Ag)	0.12		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Sodium (Na)	177		10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Strontium (Sr)	67.6		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Thallium (Tl)	0.33		0.10	mg/kg	04-SEP-18	05-SEP-18	R4203495
Tin (Sn)	<5.0		5.0	mg/kg	04-SEP-18	05-SEP-18	R4203495
Titanium (Ti)	61.1		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Uranium (U)	1.51		0.020	mg/kg	04-SEP-18	05-SEP-18	R4203495
Vanadium (V)	53.8		0.50	mg/kg	04-SEP-18	05-SEP-18	R4203495
Zinc (Zn)	90		10	mg/kg	04-SEP-18	05-SEP-18	R4203495
L2156847-8 18-08-312							
Sampled By: CLIENT on 30-AUG-18 @ 16:30							
Matrix: SOIL							
Miscellaneous Parameters							
Available Nitrate-N	2.1		1.0	mg/kg	07-SEP-18	07-SEP-18	R4205678
% Moisture	16.6		0.10	%	11-SEP-18	11-SEP-18	R4212368
Total Nitrogen by LECO	1560		200	mg/kg	07-SEP-18	07-SEP-18	R4206608
Total Available N & NO3-N, NO2-N & NH4							
Available Ammonium-N							
Available Ammonium-N	4.9		1.0	mg/kg	06-SEP-18	06-SEP-18	R4204765
Available Ammonium-N - Calculation							
Total Available Nitrogen	7.4		2.2	mg/kg		07-SEP-18	
Nitrate, Nitrite & Nitrate+Nitrite-N(KCL							
Nitrite-N	<1.0		1.0	mg/kg	06-SEP-18	06-SEP-18	R4211347
Nitrate+Nitrite-N	2.4		2.0	mg/kg	06-SEP-18	06-SEP-18	R4211347
Nitrate-N	2.4		2.0	mg/kg	06-SEP-18	06-SEP-18	R4211347
L2156847-9 18-08-313							
Sampled By: CLIENT on 30-AUG-18 @ 16:30							
Matrix: SOIL							
Atterberg limits							
Liquid Limit (LL)	54		1	%	10-SEP-18	10-SEP-18	R4208207
Moisture at Plastic Limit	23		1	%	10-SEP-18	10-SEP-18	R4208207
Plasticity Index (PI)	30		1	%	10-SEP-18	10-SEP-18	R4208207

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ATTERBERG-SK	Soil	Atterberg limits	CARTER CSSS 58

The liquid limit (or upper plastic limit) is the point at which the soil becomes semifluid, like softened butter. In operational terms, the liquid limit is defined as the water content at which a trapezoidal groove cut in moist soil is closed after 25 taps on a hard rubber plate (ASTM D-18, 1958).

The plastic limit (or lower plastic limit) is defined as the water content at which soil begins to crumble on being rolled into a thread 1/8 inch (or 3 mm) in diameter. It represents the lowest water content at which soil can be deformed readily without cracking.

The plastic index (which is the difference between the liquid and plastic limits) gives an indication of the "clayeyness" or plasticity of a clay and is employed in engineering classification systems for soils.

This method is equivalent to ASTM D4318-10.

CR-CR6-IC-WT	Soil	Hexavalent Chromium in Soil	SW846 3060A/7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

ETL-N-TOT-AVAIL-SK	Soil	Available Ammonium-N - Calculation	Soil Methods of Analysis (1993) CSSS
HG-200.2-CVAA-WP	Soil	Mercury in Soil	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Samples for analysis are homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested by block digester (EPA 200.2). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may become "environmentally available." By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

MOIST-SK	Soil	Moisture Content	CWS for PHC in Soil - Tier 1

The weighed portion of soil is placed in a 105 C oven overnight. The dried soil is allowed to cooled to room temperature, weighed and the % moisture is calculated.

MOISTURE-WT	Soil	% Moisture	Gravimetric: Oven Dried
N-TOT-LECO-SK	Soil	Total Nitrogen by combustion method	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.

N2/N3-AVAIL-KCL-SK	Soil	Nitrate, Nitrite & Nitrate+Nitrite-N(KCL	CSSS (2008) 6.2-6.3

Plant available nitrate and nitrite are extracted from the sample with 2N KCl. Nitrate and Nitrite in the filtered extract are determined colorimetrically by Technicon auto-analyzer or flow injection analyzer at 520 nm.

NH4-AVAIL-SK	Soil	Available Ammonium-N	Comm Soil Sci 19(6)

Ammonium (NH4-N) is extracted from the soil using 2 N KCl. Ammonium in the extract is mixed with hypochlorite and salicylate to form indophenol blue, which is determined colorimetrically by auto analysis at 660 nm.

NO3-AVAIL-SK	Soil	Available Nitrate-N	Method = Alberta Ag (1988)

Available Nitrate and Nitrite are extracted from the soil using a dilute calcium chloride solution.
Nitrate is quantitatively reduced to nitrite by passage of the sample through a copperized cadmium column. The nitrite (reduced nitrate plus original nitrite) is then determined by diazotizing with sulfanilamide followed by coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. The resulting water soluble dye has a magenta color which is measured at colorimetrically at 520nm.

Reference:
Recommended Methods of Soil Analysis for Canadian Prairie Agricultural Soils. Alberta Agriculture (1988) p. 19 and 28

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
PH-1:2-SK	Soil	pH (1:2 Soil:Water Extraction)	AB Ag (1988) p.7
1 part dry soil and 2 parts de-ionized water (by volume) is mixed. The slurry is allowed to stand with occasional stirring for 30 - 60 minutes. After equilibration, pH of the slurry is measured using a pH meter.			
PO4-AVAIL-OLSEN-SK	Soil	Available Phosphate-P by Olsen	CSSS (2008) 8.2
Plant available phosphorus is extracted from the sample with sodium bicarbonate. PO4-P in the filtered extract is determined colorimetrically at 880 nm.			

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

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Quality Control Report

Workorder: L2156847 Report Date: 12-SEP-18

Client: City of Portage la Prairie - Wastewater
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 0L8
Contact: AARON STECHESEN

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-IC-WT	Soil							
Batch R4207797								
WG2870374-4 CRM		**WT-SQC012**						
Chromium, Hexavalent			90.4		%		70-130	10-SEP-18
WG2870374-3 DUP		**L2156847-4**						
Chromium, Hexavalent		<0.20	<0.20	RPD-NA	ug/g	N/A	35	10-SEP-18
WG2870374-2 LCS								
Chromium, Hexavalent			89.6		%		80-120	10-SEP-18
WG2870374-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	10-SEP-18
HG-200.2-CVAA-WP	Soil							
Batch R4204697								
WG2868099-10 CRM		**CANMET TILL-1**						
Mercury (Hg)			92.2		%		70-130	06-SEP-18
WG2868099-11 DUP		**L2156847-4**						
Mercury (Hg)		0.0437	0.0461		mg/kg	5.3	40	06-SEP-18
WG2868099-8 LCS								
Mercury (Hg)			98.5		%		80-120	06-SEP-18
WG2868099-7 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	06-SEP-18
MET-200.2-MS-WP	Soil							
Batch R4203495								
WG2867463-4 CRM		**CANMET TILL-1**						
Aluminum (Al)			106.0		%		70-130	05-SEP-18
Antimony (Sb)			110.2		%		70-130	05-SEP-18
Arsenic (As)			101.4		%		70-130	05-SEP-18
Barium (Ba)			102.8		%		70-130	05-SEP-18
Beryllium (Be)			97.4		%		70-130	05-SEP-18
Bismuth (Bi)			98.5		%		70-130	05-SEP-18
Boron (B)			2		mg/kg		0-8	05-SEP-18
Cadmium (Cd)			99.6		%		70-130	05-SEP-18
Calcium (Ca)			91.6		%		70-130	05-SEP-18
Chromium (Cr)			99.0		%		70-130	05-SEP-18
Cobalt (Co)			99.9		%		70-130	05-SEP-18
Copper (Cu)			103.3		%		70-130	05-SEP-18
Iron (Fe)			101.5		%		70-130	05-SEP-18
Lead (Pb)			101.5		%		70-130	05-SEP-18
Magnesium (Mg)			105.3		%		70-130	05-SEP-18
Manganese (Mn)			105.3		%		70-130	05-SEP-18

ALS Environmental

Quality Control Report

Workorder: L2156847 Report Date: 12-SEP-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4203495								
WG2867463-4 CRM		**CANMET TILL-1**						
Molybdenum (Mo)			107.4		%		70-130	05-SEP-18
Nickel (Ni)			99.1		%		70-130	05-SEP-18
Phosphorus (P)			102.7		%		70-130	05-SEP-18
Potassium (K)			89.8		%		70-130	05-SEP-18
Selenium (Se)			97.2		%		70-130	05-SEP-18
Silver (Ag)			101.8		%		70-130	05-SEP-18
Sodium (Na)			91.4		%		70-130	05-SEP-18
Strontium (Sr)			94.3		%		70-130	05-SEP-18
Thallium (Tl)			0.13		mg/kg		0.03-0.23	05-SEP-18
Tin (Sn)			1.0		mg/kg		0-3.1	05-SEP-18
Titanium (Ti)			89.4		%		70-130	05-SEP-18
Uranium (U)			101.1		%		70-130	05-SEP-18
Vanadium (V)			97.6		%		70-130	05-SEP-18
Zinc (Zn)			100.5		%		70-130	05-SEP-18
WG2867463-2 LCS								
Aluminum (Al)			104.4		%		80-120	05-SEP-18
Antimony (Sb)			105.0		%		80-120	05-SEP-18
Arsenic (As)			102.3		%		80-120	05-SEP-18
Barium (Ba)			102.6		%		80-120	05-SEP-18
Beryllium (Be)			98.7		%		80-120	05-SEP-18
Bismuth (Bi)			102.6		%		80-120	05-SEP-18
Boron (B)			97.5		%		80-120	05-SEP-18
Cadmium (Cd)			101.1		%		80-120	05-SEP-18
Calcium (Ca)			98.9		%		80-120	05-SEP-18
Chromium (Cr)			102.2		%		80-120	05-SEP-18
Cobalt (Co)			102.1		%		80-120	05-SEP-18
Copper (Cu)			102.6		%		80-120	05-SEP-18
Iron (Fe)			101.3		%		80-120	05-SEP-18
Lead (Pb)			102.1		%		80-120	05-SEP-18
Magnesium (Mg)			108.0		%		80-120	05-SEP-18
Manganese (Mn)			102.3		%		80-120	05-SEP-18
Molybdenum (Mo)			105.7		%		80-120	05-SEP-18
Nickel (Ni)			100.9		%		80-120	05-SEP-18
Phosphorus (P)			106.7		%		80-120	05-SEP-18

ALS Environmental

Quality Control Report

Workorder: L2156847 Report Date: 12-SEP-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4203495								
WG2867463-2 LCS								
Potassium (K)			103.0		%		80-120	05-SEP-18
Selenium (Se)			101.7		%		80-120	05-SEP-18
Silver (Ag)			99.7		%		80-120	05-SEP-18
Sodium (Na)			103.5		%		80-120	05-SEP-18
Strontium (Sr)			99.4		%		80-120	05-SEP-18
Thallium (Tl)			100.6		%		80-120	05-SEP-18
Tin (Sn)			105.1		%		80-120	05-SEP-18
Titanium (Ti)			103.5		%		80-120	05-SEP-18
Uranium (U)			100.6		%		80-120	05-SEP-18
Vanadium (V)			103.9		%		80-120	05-SEP-18
Zinc (Zn)			101.9		%		80-120	05-SEP-18
WG2867463-1 MB								
Aluminum (Al)			<5.0		mg/kg		5	05-SEP-18
Antimony (Sb)			<0.10		mg/kg		0.1	05-SEP-18
Arsenic (As)			<0.10		mg/kg		0.1	05-SEP-18
Barium (Ba)			<0.50		mg/kg		0.5	05-SEP-18
Beryllium (Be)			<0.10		mg/kg		0.1	05-SEP-18
Bismuth (Bi)			<0.020		mg/kg		0.02	05-SEP-18
Boron (B)			<10		mg/kg		10	05-SEP-18
Cadmium (Cd)			<0.020		mg/kg		0.02	05-SEP-18
Calcium (Ca)			<100		mg/kg		100	05-SEP-18
Chromium (Cr)			<1.0		mg/kg		1	05-SEP-18
Cobalt (Co)			<0.020		mg/kg		0.02	05-SEP-18
Copper (Cu)			<1.0		mg/kg		1	05-SEP-18
Iron (Fe)			<25		mg/kg		25	05-SEP-18
Lead (Pb)			<0.20		mg/kg		0.2	05-SEP-18
Magnesium (Mg)			<10		mg/kg		10	05-SEP-18
Manganese (Mn)			<0.50		mg/kg		0.5	05-SEP-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	05-SEP-18
Nickel (Ni)			<0.50		mg/kg		0.5	05-SEP-18
Phosphorus (P)			<100		mg/kg		100	05-SEP-18
Potassium (K)			<25		mg/kg		25	05-SEP-18
Selenium (Se)			<0.50		mg/kg		0.5	05-SEP-18
Silver (Ag)			<0.10		mg/kg		0.1	05-SEP-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4203495								
WG2867463-1 MB								
Sodium (Na)			<10		mg/kg		10	05-SEP-18
Strontium (Sr)			<0.10		mg/kg		0.1	05-SEP-18
Thallium (Tl)			<0.10		mg/kg		0.1	05-SEP-18
Tin (Sn)			<5.0		mg/kg		5	05-SEP-18
Titanium (Ti)			<0.50		mg/kg		0.5	05-SEP-18
Uranium (U)			<0.020		mg/kg		0.02	05-SEP-18
Vanadium (V)			<0.50		mg/kg		0.5	05-SEP-18
Zinc (Zn)			<10		mg/kg		10	05-SEP-18
MOIST-SK	Soil							
Batch R4212368								
WG2869895-1 DUP		**L2156847-4**						
% Moisture		20.7	20.9		%	0.9	20	11-SEP-18
WG2869895-3 LCS								
% Moisture			102.5		%		90-110	11-SEP-18
WG2869895-2 MB								
% Moisture			<0.10		%		0.1	11-SEP-18
MOISTURE-WT	Soil							
Batch R4205415								
WG2870761-2 LCS								
% Moisture			99.96		%		90-110	08-SEP-18
WG2870761-1 MB								
% Moisture			<0.10		%		0.1	08-SEP-18
N-TOT-LECO-SK	Soil							
Batch R4206608								
WG2866092-2 IRM		**08-109_SOIL**						
Total Nitrogen by LECO			95.7		%		80-120	07-SEP-18
WG2866092-5 LCS		**SULFADIAZINE**						
Total Nitrogen by LECO			101.2		%		90-110	07-SEP-18
WG2866092-4 MB								
Total Nitrogen by LECO			<0.020		%		0.02	07-SEP-18
N2/N3-AVAIL-KCL-SK	Soil							
Batch R4211347								
WG2868793-1 DUP		**L2156847-8**						
Nitrite-N		<1.0	<1.0	RPD-NA	mg/kg	N/A	30	06-SEP-18
Nitrate+Nitrite-N		2.4	2.3		mg/kg	3.8	30	06-SEP-18
WG2868793-3 IRM		**SAL814**						

ALS Environmental

Quality Control Report

Workorder: L2156847 Report Date: 12-SEP-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
N2/N3-AVAIL-KCL-SK	Soil							
Batch R4211347								
WG2868793-3 IRM		**SAL814**						
Nitrate+Nitrite-N			118.5		%		70-130	06-SEP-18
WG2868793-2 MB								
Nitrite-N			<1.0		mg/kg		1	06-SEP-18
Nitrate+Nitrite-N			<2.0		mg/kg		2	06-SEP-18
NH4-AVAIL-SK	Soil							
Batch R4204765								
WG2868790-1 DUP		**L2156847-8**						
Available Ammonium-N		4.9	4.5		mg/kg	9.4	20	06-SEP-18
WG2868790-3 IRM		**SAL814**						
Available Ammonium-N			104.9		%		70-130	06-SEP-18
WG2868790-4 LCS								
Available Ammonium-N			90.8		%		80-120	06-SEP-18
WG2868790-2 MB								
Available Ammonium-N			<1.0		mg/kg		1	06-SEP-18
NO3-AVAIL-SK	Soil							
Batch R4205678								
WG2868772-3 IRM		**SAL814**						
Available Nitrate-N			103.0		%		70-130	07-SEP-18
WG2868772-2 MB								
Available Nitrate-N			<1.0		mg/kg		1	07-SEP-18
PH-1:2-SK	Soil							
Batch R4205254								
WG2869905-2 IRM		**SAL814**						
pH (1:2 soil:water)			8.09		pH		7.65-8.25	07-SEP-18
WG2869905-3 LCS								
pH (1:2 soil:water)			6.99		pH		6.66-7.06	07-SEP-18
PO4-AVAIL-OLSEN-SK	Soil							
Batch R4212808								
WG2869909-3 IRM		**FARM2005**						
Available Phosphate-P			104.0		%		80-120	11-SEP-18
WG2869909-2 MB								
Available Phosphate-P			<1.0		mg/kg		1	11-SEP-18

Legend:

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

Sample Parameter Qualifier Definitions:

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

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Plant Available Nutrients							
Available Nitrate-N							
	2	30-AUG-18 16:30	07-SEP-18 00:00	3	7	days	EHT
	5	30-AUG-18 16:30	07-SEP-18 00:00	3	7	days	EHT
	8	30-AUG-18 16:30	07-SEP-18 00:00	3	7	days	EHT
Nitrate, Nitrite & Nitrate+Nitrite-N(KCL							
	2	30-AUG-18 16:30	06-SEP-18 16:44	3	7	days	EHT
	5	30-AUG-18 16:30	06-SEP-18 16:44	3	7	days	EHT
	8	30-AUG-18 16:30	06-SEP-18 16:44	3	7	days	EHT

Legend & Qualifier Definitions:

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

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2156847 were received on 31-AUG-18 11:25.

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

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

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

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Chain

L2156847-COFC

COC # L2156847

Page 1 of 1

Report to:			
Company:	City of Portage la Prairie	Standard: X Other:	
Contact:	Aaron Stechesen	Select: PDF X Excel Digital	
Address:	97 Saskatchewan Ave. E.	Email 1: astechesen@city-plap.com	
	Portage la Prairie, MB R1N 0L8	Email 2:	
Phone:	204-239-8361 Fax: 204-239-8364		
Invoice To:	Same as Report ? Yes / No ?	**Client / Project Information:**	
Company:	City of Portage la Prairie	Job #:	
Contact:	Accounts Payable	PO / AFE: W02435	
Address:	97 Saskatchewan Ave. E.	n	
	Portage la Prairie, MB R1N 0L8		
Phone:	204-239-8357 Fax:	Quote #:	
Lab Work Order # (lab use only)		ALS Contact: Judy Dalmeijer	Sampler:

Service Requested: (rush - subject to availability)

- X Regular (Default)
- Priority (2-3 Business Days) - 50% Surcharge
- Emergency (1 Business Day) - 100% Surcharge
- For Emergency < 1 Day, ASAP or Weekend - Contact ALS

Analysis Request

(Indicate Filtered or Preserved, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	pH-1:2-SK	HG-200.2-CVAF-WP	MET-200.2-MS-WP	PO4-AVAIL-OLSEN-SK	N-TOT-AVAIL-SK	N-TOT-LECO-SK	NO3-AVAIL-SK	MOIST-SK	PREP-DRY/GRIND-SK	SPECIAL REQUEST-SK	ATTERBERG-SK	SAMPLE-DISPOSAL-WP	Number of Containers
1	18-08-305	30-Aug-18	16:30	Soil	✓	✓	✓	✓				✓	✓	✓		✓	1
2	18-08-306	30-Aug-18	16:30	Soil					✓	✓	✓	✓	✓	✓		✓	2
3	18-08-307	30-Aug-18	16:30	Soil									✓	✓	✓	✓	2
3	18-08-308	30-Aug-18	16:30	Soil	✓	✓	✓	✓				✓	✓	✓		✓	1
3	18-08-309	30-Aug-18	16:30	Soil					✓	✓	✓	✓	✓	✓		✓	7
3	18-08-310	30-Aug-18	16:30	Soil									✓	✓	✓	✓	2
3	18-08-311	30-Aug-18	16:30	Soil	✓	✓	✓	✓				✓	✓	✓		✓	1
3	18-08-312	30-Aug-18	16:30	Soil					✓	✓	✓	✓	✓	✓		✓	3
3	18-08-313	30-Aug-18	16:30	Soil									✓	✓	✓	✓	2

Special Instructions / Regulations / Hazardous Details

CR-CR6-IC-WT (Hexavalent Chromium) on 18-08-308

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
	Aug 31/18 9:30am		31/08/18	11:25	13.8			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENF 18.00 Front

City of Portage la Prairie - Wastewater
ATTN: AARON STECHESEN
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 0L8

Date Received: 10-SEP-18
Report Date: 21-SEP-18 07:39 (MT)
Version: FINAL

Client Phone: 204-239-8361

Certificate of Analysis

Lab Work Order #: L2161177
Project P.O. #: W02435
Job Reference:
C of C Numbers:
Legal Site Desc:

Hua Wo
Chemistry Laboratory Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2161177-1 18-09-19	Tidsbury NW 31-12-5						
Sampled By: CLIENT on 07-SEP-18 @ 16:30							
Matrix: SOIL							
Miscellaneous Parameters							
Available Phosphate-P	38.1		1.0	mg/kg	20-SEP-18	20-SEP-18	R4229127
Mercury (Hg)	0.0440		0.0050	mg/kg	12-SEP-18	17-SEP-18	R4217950
% Moisture	17.1		0.10	%	18-SEP-18	18-SEP-18	R4218350
pH (1:2 soil:water)	7.17		0.10	pH	17-SEP-18	17-SEP-18	R4218009
Metals							
Aluminum (Al)	19800		5.0	mg/kg	12-SEP-18	12-SEP-18	R4216286
Antimony (Sb)	0.47		0.10	mg/kg	12-SEP-18	12-SEP-18	R4216286
Arsenic (As)	10.6		0.10	mg/kg	12-SEP-18	12-SEP-18	R4216286
Barium (Ba)	189		0.50	mg/kg	12-SEP-18	12-SEP-18	R4216286
Beryllium (Be)	0.80		0.10	mg/kg	12-SEP-18	12-SEP-18	R4216286
Bismuth (Bi)	0.222		0.020	mg/kg	12-SEP-18	12-SEP-18	R4216286
Boron (B)	14		10	mg/kg	12-SEP-18	12-SEP-18	R4216286
Cadmium (Cd)	0.556		0.020	mg/kg	12-SEP-18	12-SEP-18	R4216286
Calcium (Ca)	9960		100	mg/kg	12-SEP-18	12-SEP-18	R4216286
Chromium (Cr)	27.6		1.0	mg/kg	12-SEP-18	12-SEP-18	R4216286
Cobalt (Co)	11.2		0.020	mg/kg	12-SEP-18	12-SEP-18	R4216286
Copper (Cu)	25.8		1.0	mg/kg	12-SEP-18	12-SEP-18	R4216286
Iron (Fe)	24800		25	mg/kg	12-SEP-18	12-SEP-18	R4216286
Lead (Pb)	13.0		0.20	mg/kg	12-SEP-18	12-SEP-18	R4216286
Magnesium (Mg)	9340		10	mg/kg	12-SEP-18	12-SEP-18	R4216286
Manganese (Mn)	972		0.50	mg/kg	12-SEP-18	12-SEP-18	R4216286
Molybdenum (Mo)	0.42		0.10	mg/kg	12-SEP-18	12-SEP-18	R4216286
Nickel (Ni)	30.7		0.50	mg/kg	12-SEP-18	12-SEP-18	R4216286
Phosphorus (P)	630		100	mg/kg	12-SEP-18	12-SEP-18	R4216286
Potassium (K)	3650		25	mg/kg	12-SEP-18	12-SEP-18	R4216286
Selenium (Se)	<0.50		0.50	mg/kg	12-SEP-18	12-SEP-18	R4216286
Silver (Ag)	0.16		0.10	mg/kg	12-SEP-18	12-SEP-18	R4216286
Sodium (Na)	275		10	mg/kg	12-SEP-18	12-SEP-18	R4216286
Strontium (Sr)	43.1		0.10	mg/kg	12-SEP-18	12-SEP-18	R4216286
Thallium (Tl)	0.34		0.10	mg/kg	12-SEP-18	12-SEP-18	R4216286
Tin (Sn)	<5.0		5.0	mg/kg	12-SEP-18	12-SEP-18	R4216286
Titanium (Ti)	45.7		0.50	mg/kg	12-SEP-18	12-SEP-18	R4216286
Uranium (U)	1.28		0.020	mg/kg	12-SEP-18	12-SEP-18	R4216286
Vanadium (V)	61.7		0.50	mg/kg	12-SEP-18	12-SEP-18	R4216286
Zinc (Zn)	103		10	mg/kg	12-SEP-18	12-SEP-18	R4216286
L2161177-2 18-09-20							
Sampled By: CLIENT on 07-SEP-18 @ 16:30							
Matrix: SOIL							
Miscellaneous Parameters							
Available Nitrate-N	5.5		1.0	mg/kg	14-SEP-18	14-SEP-18	R4216645
% Moisture	31.6		0.10	%	18-SEP-18	18-SEP-18	R4218350
Total Nitrogen by LECO	1840		200	mg/kg	13-SEP-18	13-SEP-18	R4215061
Total Available N & NO3-N, NO2-N & NH4							
Available Ammonium-N							
Available Ammonium-N	8.7		1.0	mg/kg	18-SEP-18	18-SEP-18	R4220589
Available Ammonium-N - Calculation							
Total Available Nitrogen	13.4		2.2	mg/kg		18-SEP-18	
Nitrate, Nitrite & Nitrate+Nitrite-N(KCL							
Nitrite-N	<1.0		1.0	mg/kg	17-SEP-18	17-SEP-18	R4221129
Nitrate+Nitrite-N	4.7		2.0	mg/kg	17-SEP-18	17-SEP-18	R4221129
Nitrate-N	4.7		2.0	mg/kg	17-SEP-18	17-SEP-18	R4221129

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2161177-2 18-09-20 Sampled By: CLIENT on 07-SEP-18 @ 16:30 Matrix: SOIL							
L2161177-3 18-09-21 Sampled By: CLIENT on 07-SEP-18 @ 16:30 Matrix: SOIL							
Atterberg limits							
Liquid Limit (LL)	67		1	%	18-SEP-18	18-SEP-18	R4220231
Moisture at Plastic Limit	28		1	%	18-SEP-18	18-SEP-18	R4220231
Plasticity Index (PI)	38		1	%	18-SEP-18	18-SEP-18	R4220231

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ATTERBERG-SK	Soil	Atterberg limits	CARTER CSSS 58

The liquid limit (or upper plastic limit) is the point at which the soil becomes semifluid, like softened butter. In operational terms, the liquid limit is defined as the water content at which a trapezoidal groove cut in moist soil is closed after 25 taps on a hard rubber plate (ASTM D-18, 1958).

The plastic limit (or lower plastic limit) is defined as the water content at which soil begins to crumble on being rolled into a thread 1/8 inch (or 3 mm) in diameter. It represents the lowest water content at which soil can be deformed readily without cracking.

The plastic index (which is the difference between the liquid and plastic limits) gives an indication of the "clayeyness" or plasticity of a clay and is employed in engineering classification systems for soils.

This method is equivalent to ASTM D4318-10.

ETL-N-TOT-AVAIL-SK	Soil	Available Ammonium-N - Calculation	Soil Methods of Analysis (1993) CSSS
HG-200.2-CVAA-WP	Soil	Mercury in Soil	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Samples for analysis are homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested by block digester (EPA 200.2). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may become "environmentally available." By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

MOIST-SK	Soil	Moisture Content	CWS for PHC in Soil - Tier 1

The weighed portion of soil is placed in a 105 C oven overnight. The dried soil is allowed to cooled to room temperature, weighed and the % moisture is calculated.

N-TOT-LECO-SK	Soil	Total Nitrogen by combustion method	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.

N2/N3-AVAIL-KCL-SK	Soil	Nitrate, Nitrite & Nitrate+Nitrite-N(KCL	CSSS (2008) 6.2-6.3

Plant available nitrate and nitrite are extracted from the sample with 2N KCl. Nitrate and Nitrite in the filtered extract are determined colorimetrically by Technicon auto-analyzer or flow injection analyzer at 520 nm.

NH4-AVAIL-SK	Soil	Available Ammonium-N	CSSS Carter 6.2 / Comm Soil Sci 19(6)

Ammonium (NH4-N) is extracted from the soil using 2 N KCl. Ammonium in the extract is mixed with hypochlorite and salicylate to form indophenol blue, which is determined colorimetrically by auto analysis at 660 nm.

NO3-AVAIL-SK	Soil	Available Nitrate-N	Method = Alberta Ag (1988)

Available Nitrate and Nitrite are extracted from the soil using a dilute calcium chloride solution.
Nitrate is quantitatively reduced to nitrite by passage of the sample through a copperized cadmium column. The nitrite (reduced nitrate plus original nitrite) is then determined by diazotizing with sulfanilamide followed by coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. The resulting water soluble dye has a magenta color which is measured at colorimetrically at 520nm.

Reference:
Recommended Methods of Soil Analysis for Canadian Prairie Agricultural Soils. Alberta Agriculture (1988) p. 19 and 28

PH-1:2-SK	Soil	pH (1:2 Soil:Water Extraction)	AB Ag (1988) p.7

1 part dry soil and 2 parts de-ionized water (by volume) is mixed. The slurry is allowed to stand with occasional stirring for 30 - 60 minutes. After equilibration, pH of the slurry is measured using a pH meter.

PO4-AVAIL-OLSEN-SK	Soil	Available Phosphate-P by Olsen	CSSS (2008) 8.2

Plant available phosphorus is extracted from the sample with sodium bicarbonate. PO4-P in the filtered extract is determined colorimetrically at 880 nm.

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Quality Control Report

Workorder: L2161177 Report Date: 21-SEP-18

Client: City of Portage la Prairie - Wastewater
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 0L8
Contact: AARON STECHESEN

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAA-WP	Soil							
Batch R4217950								
WG2875027-4 CRM		**CANMET TILL-1**						
Mercury (Hg)			95.6		%		70-130	17-SEP-18
WG2875027-5 DUP		**L2161177-1**						
Mercury (Hg)		0.0440	0.0391		mg/kg	12	40	17-SEP-18
WG2875027-2 LCS								
Mercury (Hg)			105.0		%		80-120	17-SEP-18
WG2875027-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	17-SEP-18
MET-200.2-MS-WP	Soil							
Batch R4216286								
WG2874947-4 CRM		**CANMET TILL-1**						
Aluminum (Al)			108.1		%		70-130	12-SEP-18
Antimony (Sb)			104.5		%		70-130	12-SEP-18
Arsenic (As)			102.3		%		70-130	12-SEP-18
Barium (Ba)			97.0		%		70-130	12-SEP-18
Beryllium (Be)			99.0		%		70-130	12-SEP-18
Bismuth (Bi)			94.1		%		70-130	12-SEP-18
Boron (B)			5		mg/kg		0-8	12-SEP-18
Cadmium (Cd)			98.8		%		70-130	12-SEP-18
Calcium (Ca)			91.7		%		70-130	12-SEP-18
Chromium (Cr)			97.9		%		70-130	12-SEP-18
Cobalt (Co)			98.1		%		70-130	12-SEP-18
Copper (Cu)			100.6		%		70-130	12-SEP-18
Iron (Fe)			97.2		%		70-130	12-SEP-18
Lead (Pb)			99.3		%		70-130	12-SEP-18
Magnesium (Mg)			103.3		%		70-130	12-SEP-18
Manganese (Mn)			106.1		%		70-130	12-SEP-18
Molybdenum (Mo)			102.4		%		70-130	12-SEP-18
Nickel (Ni)			96.9		%		70-130	12-SEP-18
Phosphorus (P)			104.0		%		70-130	12-SEP-18
Potassium (K)			90.9		%		70-130	12-SEP-18
Selenium (Se)			98.9		%		70-130	12-SEP-18
Silver (Ag)			105.8		%		70-130	12-SEP-18
Sodium (Na)			85.7		%		70-130	12-SEP-18
Strontium (Sr)			94.0		%		70-130	12-SEP-18
Thallium (Tl)			0.12		mg/kg		0.03-0.23	12-SEP-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4216286								
WG2874947-4 CRM		**CANMET TILL-1**						
Tin (Sn)			1.1		mg/kg		0-3.1	12-SEP-18
Titanium (Ti)			87.1		%		70-130	12-SEP-18
Uranium (U)			92.3		%		70-130	12-SEP-18
Vanadium (V)			96.0		%		70-130	12-SEP-18
Zinc (Zn)			99.7		%		70-130	12-SEP-18
WG2874947-2 LCS								
Aluminum (Al)			104.9		%		80-120	12-SEP-18
Antimony (Sb)			103.7		%		80-120	12-SEP-18
Arsenic (As)			103.1		%		80-120	12-SEP-18
Barium (Ba)			102.6		%		80-120	12-SEP-18
Beryllium (Be)			98.4		%		80-120	12-SEP-18
Bismuth (Bi)			96.6		%		80-120	12-SEP-18
Boron (B)			94.9		%		80-120	12-SEP-18
Cadmium (Cd)			102.3		%		80-120	12-SEP-18
Calcium (Ca)			99.0		%		80-120	12-SEP-18
Chromium (Cr)			101.4		%		80-120	12-SEP-18
Cobalt (Co)			101.1		%		80-120	12-SEP-18
Copper (Cu)			102.1		%		80-120	12-SEP-18
Iron (Fe)			96.2		%		80-120	12-SEP-18
Lead (Pb)			98.4		%		80-120	12-SEP-18
Magnesium (Mg)			111.4		%		80-120	12-SEP-18
Manganese (Mn)			103.0		%		80-120	12-SEP-18
Molybdenum (Mo)			101.4		%		80-120	12-SEP-18
Nickel (Ni)			101.1		%		80-120	12-SEP-18
Phosphorus (P)			108.5		%		80-120	12-SEP-18
Potassium (K)			105.8		%		80-120	12-SEP-18
Selenium (Se)			100.0		%		80-120	12-SEP-18
Silver (Ag)			100.6		%		80-120	12-SEP-18
Sodium (Na)			101.9		%		80-120	12-SEP-18
Strontium (Sr)			102.3		%		80-120	12-SEP-18
Thallium (Tl)			98.7		%		80-120	12-SEP-18
Tin (Sn)			103.8		%		80-120	12-SEP-18
Titanium (Ti)			101.9		%		80-120	12-SEP-18
Uranium (U)			96.1		%		80-120	12-SEP-18

ALS Environmental

Quality Control Report

Workorder: L2161177 Report Date: 21-SEP-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4216286								
WG2874947-2 LCS								
Vanadium (V)			103.5		%		80-120	12-SEP-18
Zinc (Zn)			102.2		%		80-120	12-SEP-18
WG2874947-1 MB								
Aluminum (Al)			<5.0		mg/kg		5	12-SEP-18
Antimony (Sb)			<0.10		mg/kg		0.1	12-SEP-18
Arsenic (As)			0.46	B	mg/kg		0.1	12-SEP-18
Barium (Ba)			<0.50		mg/kg		0.5	12-SEP-18
Beryllium (Be)			<0.10		mg/kg		0.1	12-SEP-18
Bismuth (Bi)			<0.020		mg/kg		0.02	12-SEP-18
Boron (B)			<10		mg/kg		10	12-SEP-18
Cadmium (Cd)			<0.020		mg/kg		0.02	12-SEP-18
Calcium (Ca)			<100		mg/kg		100	12-SEP-18
Chromium (Cr)			<1.0		mg/kg		1	12-SEP-18
Cobalt (Co)			<0.020		mg/kg		0.02	12-SEP-18
Copper (Cu)			<1.0		mg/kg		1	12-SEP-18
Iron (Fe)			<25		mg/kg		25	12-SEP-18
Lead (Pb)			<0.20		mg/kg		0.2	12-SEP-18
Magnesium (Mg)			<10		mg/kg		10	12-SEP-18
Manganese (Mn)			<0.50		mg/kg		0.5	12-SEP-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	12-SEP-18
Nickel (Ni)			<0.50		mg/kg		0.5	12-SEP-18
Phosphorus (P)			<100		mg/kg		100	12-SEP-18
Potassium (K)			<25		mg/kg		25	12-SEP-18
Selenium (Se)			<0.50		mg/kg		0.5	12-SEP-18
Silver (Ag)			<0.10		mg/kg		0.1	12-SEP-18
Sodium (Na)			<10		mg/kg		10	12-SEP-18
Strontium (Sr)			<0.10		mg/kg		0.1	12-SEP-18
Thallium (Tl)			<0.10		mg/kg		0.1	12-SEP-18
Tin (Sn)			<5.0		mg/kg		5	12-SEP-18
Titanium (Ti)			<0.50		mg/kg		0.5	12-SEP-18
Uranium (U)			<0.020		mg/kg		0.02	12-SEP-18
Vanadium (V)			<0.50		mg/kg		0.5	12-SEP-18
Zinc (Zn)			<10		mg/kg		10	12-SEP-18
MOIST-SK	Soil							

ALS Environmental

Quality Control Report

Workorder: L2161177 Report Date: 21-SEP-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOIST-SK	Soil							
Batch R4218350								
WG2878489-1 DUP		**L2161177-1**						
% Moisture		17.1	18.1		%	5.8	20	18-SEP-18
WG2878489-3 LCS								
% Moisture			99.6		%		90-110	18-SEP-18
WG2878489-2 MB								
% Moisture			<0.10		%		0.1	18-SEP-18
N-TOT-LECO-SK	Soil							
Batch R4215061								
WG2873234-2 IRM		**08-109_SOIL**						
Total Nitrogen by LECO			84.8		%		80-120	12-SEP-18
WG2873234-5 LCS		**SULFADIAZINE**						
Total Nitrogen by LECO			100.8		%		90-110	12-SEP-18
WG2873234-4 MB								
Total Nitrogen by LECO			<0.020		%		0.02	12-SEP-18
N2/N3-AVAIL-KCL-SK	Soil							
Batch R4221129								
WG2878452-1 DUP		**L2161177-2**						
Nitrite-N		<1.0	<1.0	RPD-NA	mg/kg	N/A	30	17-SEP-18
Nitrate+Nitrite-N		4.7	4.7		mg/kg	0.3	30	17-SEP-18
WG2878452-3 IRM		**SAL814**						
Nitrate+Nitrite-N			99.8		%		70-130	17-SEP-18
WG2878452-2 MB								
Nitrite-N			<1.0		mg/kg		1	17-SEP-18
Nitrate+Nitrite-N			<2.0		mg/kg		2	17-SEP-18
NH4-AVAIL-SK	Soil							
Batch R4220589								
WG2878409-3 IRM		**SAL814**						
Available Ammonium-N			106.7		%		70-130	18-SEP-18
WG2878409-4 LCS								
Available Ammonium-N			102.1		%		80-120	18-SEP-18
WG2878409-2 MB								
Available Ammonium-N			<1.0		mg/kg		1	18-SEP-18
NO3-AVAIL-SK	Soil							
Batch R4216645								
WG2875516-3 IRM		**SAL814**						
Available Nitrate-N			102.7		%		70-130	14-SEP-18
WG2875516-2 MB								

ALS Environmental

Quality Control Report

Workorder: L2161177 Report Date: 21-SEP-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-AVAIL-SK	Soil							
Batch R4216645								
WG2875516-2 MB								
Available Nitrate-N			<1.0		mg/kg		1	14-SEP-18
PH-1:2-SK	Soil							
Batch R4218009								
WG2878458-1 DUP		**L2161177-1**						
pH (1:2 soil:water)		7.17	7.23	J	pH	0.06	3	17-SEP-18
WG2878458-2 IRM		**SAL814**						
pH (1:2 soil:water)			7.97		pH		7.65-8.25	17-SEP-18
WG2878458-3 LCS								
pH (1:2 soil:water)			6.93		pH		6.66-7.06	17-SEP-18
PO4-AVAIL-OLSEN-SK	Soil							
Batch R4229127								
WG2878892-1 DUP		**L2161177-1**						
Available Phosphate-P		38.1	42.2		mg/kg	10	30	20-SEP-18
WG2878892-3 IRM		**FARM2005**						
Available Phosphate-P			101.7		%		80-120	20-SEP-18
WG2878892-2 MB								
Available Phosphate-P			<1.0		mg/kg		1	20-SEP-18

Legend:

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Plant Available Nutrients							
Available Nitrate-N							
	2	07-SEP-18 16:30	14-SEP-18 14:38	3	7	days	EHTL
Nitrate, Nitrite & Nitrate+Nitrite-N(KCL							
	2	07-SEP-18 16:30	17-SEP-18 14:04	3	10	days	EHTL

Legend & Qualifier Definitions:

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

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2161177 were received on 10-SEP-18 11:40.

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

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

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

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Chai

L2161177-COFC

COC # _____

Page 1 of 1

Report to:			
Company:	City of Portage la Prairie	Standard: X Other:	
Contact:	Aaron Stechesen	Select: PDF X Excel Digital	
Address:	97 Saskatchewan Ave. E.	Email 1: astechesen@city-plap.com	
	Portage la Prairie, MB R1N 0L8	Email 2:	
Phone:	204-239-8361 Fax: 204-239-8364		
Invoice To:	Same as Report ? Yes / No ?	Client / Project Information:	
Company:	City of Portage la Prairie	Job #:	
Contact:	Accounts Payable	PO / AFE: W02435	
Address:	97 Saskatchewan Ave. E.	n	
	Portage la Prairie, MB R1N 0L8		
Phone:	204-239-8357 Fax:	Quote #:	
Lab Work Order # (lab use only)		ALS Contact: Judy Dalmaijer	Sampler:

Service Requested: (rush - subject to availability)

X	Regular (Default)
	Priority (2-3 Business Days) - 50% Surcharge
	Emergency (1 Business Day) - 100% Surcharge
	For Emergency < 1 Day, ASAP or Weekend - Contact ALS

Analysis Request

(Indicate Filtered or Preserved, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	pH-1:2-SK	HG-200.2-CVAF-WP	MET-200.2-MS-WP	PO4-AVAIL-OLSEN-SK	N-TOT-AVAIL-SK	N-TOT-LECO-SK	NO3-AVAIL-SK	MOIST-SK	PREP-DRY/GRIND-SK	SPECIAL REQUEST-SK	ATTERBERG-SK	SAMPLE-DISPOSAL-WP	Number of Containers
1	18-08-305	07-Sep-18	16:30	Soil	✓	✓	✓	✓				✓	✓	✓		✓	1
2	18-08-306	07-Sep-18	16:30	Soil				-	✓	✓	✓	✓	✓	✓		✓	3
3	18-08-307	07-Sep-18	16:30	Soil								-	✓	✓	✓	✓	4

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
	Sept 10/18 9:30am		09/10/18	11:40	19.1			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENF 18.00 Front

City of Portage la Prairie - Wastewater
ATTN: AARON STECHESEN
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 0L8

Date Received: 14-AUG-18
Report Date: 21-AUG-18 13:37 (MT)
Version: FINAL

Client Phone: 204-239-8361

Certificate of Analysis

Lab Work Order #: L2146089
Project P.O. #: W02435
Job Reference:
C of C Numbers:
Legal Site Desc:

Hua Wo
Chemistry Laboratory Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2146089-1 18-08-47	McDonald NW 1-13-7						
Sampled By: CLIENT on 14-AUG-18 @ 08:00							
Matrix: SOIL							
Miscellaneous Parameters							
Available Phosphate-P	19.7		1.0	mg/kg	20-AUG-18	20-AUG-18	R4178732
Mercury (Hg)	0.0376		0.0050	mg/kg	15-AUG-18	15-AUG-18	R4171819
% Moisture	18.6		0.10	%	17-AUG-18	17-AUG-18	R4175445
pH (1:2 soil:water)	7.45		0.10	pH	20-AUG-18	20-AUG-18	R4178488
Metals							
Aluminum (Al)	16300		5.0	mg/kg	15-AUG-18	15-AUG-18	R4170709
Antimony (Sb)	0.34		0.10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Arsenic (As)	6.08		0.10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Barium (Ba)	164		0.50	mg/kg	15-AUG-18	15-AUG-18	R4170709
Beryllium (Be)	0.93		0.10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Bismuth (Bi)	0.228		0.020	mg/kg	15-AUG-18	15-AUG-18	R4170709
Boron (B)	14		10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Cadmium (Cd)	0.473		0.020	mg/kg	15-AUG-18	15-AUG-18	R4170709
Calcium (Ca)	10800		100	mg/kg	15-AUG-18	15-AUG-18	R4170709
Chromium (Cr)	23.6		1.0	mg/kg	15-AUG-18	15-AUG-18	R4170709
Cobalt (Co)	9.48		0.020	mg/kg	15-AUG-18	15-AUG-18	R4170709
Copper (Cu)	21.7		1.0	mg/kg	15-AUG-18	15-AUG-18	R4170709
Iron (Fe)	22200		25	mg/kg	15-AUG-18	15-AUG-18	R4170709
Lead (Pb)	13.6		0.20	mg/kg	15-AUG-18	15-AUG-18	R4170709
Magnesium (Mg)	8820		10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Manganese (Mn)	817		0.50	mg/kg	15-AUG-18	15-AUG-18	R4170709
Molybdenum (Mo)	0.40		0.10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Nickel (Ni)	26.2		0.50	mg/kg	15-AUG-18	15-AUG-18	R4170709
Phosphorus (P)	540		100	mg/kg	15-AUG-18	15-AUG-18	R4170709
Potassium (K)	2780		25	mg/kg	15-AUG-18	15-AUG-18	R4170709
Selenium (Se)	<0.50		0.50	mg/kg	15-AUG-18	15-AUG-18	R4170709
Silver (Ag)	0.13		0.10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Sodium (Na)	288		10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Strontium (Sr)	65.3		0.10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Thallium (Tl)	0.32		0.10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Tin (Sn)	<5.0		5.0	mg/kg	15-AUG-18	15-AUG-18	R4170709
Titanium (Ti)	21.8		0.50	mg/kg	15-AUG-18	15-AUG-18	R4170709
Uranium (U)	1.87		0.020	mg/kg	15-AUG-18	15-AUG-18	R4170709
Vanadium (V)	50.3		0.50	mg/kg	15-AUG-18	15-AUG-18	R4170709
Zinc (Zn)	95		10	mg/kg	15-AUG-18	15-AUG-18	R4170709
L2146089-2 18-08-48							
Sampled By: CLIENT on 14-AUG-18 @ 08:00							
Matrix: SOIL							
Miscellaneous Parameters							
Available Nitrate-N	5.2		1.0	mg/kg	17-AUG-18	17-AUG-18	R4178347
% Moisture	18.0		0.10	%	17-AUG-18	17-AUG-18	R4175445
Total Nitrogen by LECO	1700		200	mg/kg	18-AUG-18	18-AUG-18	R4176907
Total Available N & NO3-N, NO2-N & NH4							
Available Ammonium-N							
Available Ammonium-N	5.5		1.0	mg/kg	17-AUG-18	17-AUG-18	R4175493
Available Ammonium-N - Calculation							
Total Available Nitrogen	9.8		2.2	mg/kg		17-AUG-18	
Nitrate, Nitrite & Nitrate+Nitrite-N(KCL							
Nitrite-N	<1.0		1.0	mg/kg	20-AUG-18	20-AUG-18	R4178672
Nitrate+Nitrite-N	4.3		2.0	mg/kg	20-AUG-18	20-AUG-18	R4178672
Nitrate-N	4.3		2.0	mg/kg	20-AUG-18	20-AUG-18	R4178672

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2146089-2 18-08-48 Sampled By: CLIENT on 14-AUG-18 @ 08:00 Matrix: SOIL							
L2146089-3 18-08-49 Sampled By: CLIENT on 14-AUG-18 @ 08:00 Matrix: SOIL							
Grain Size by Hydrometer							
Grain Size Curve	SEE ATTACHED				21-AUG-18	21-AUG-18	R4179214
Gravel (4.75mm - 3in.)	<1.0		1.0	%	21-AUG-18	21-AUG-18	R4179214
SAND (0.075mm - 4.75mm)	<1.0		1.0	%	21-AUG-18	21-AUG-18	R4179214
Silt (0.005mm - 0.075mm)	21.9		1.0	%	21-AUG-18	21-AUG-18	R4179214
Clay (<0.005mm)	78.1		1.0	%	21-AUG-18	21-AUG-18	R4179214

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ETL-N-TOT-AVAIL-SK	Soil	Available Ammonium-N - Calculation	Soil Methods of Analysis (1993) CSSS
GRAIN SIZE-MBWQ-SK	Soil	Grain Size by Hydrometer	ASTM D422-63

Particle size curve is generated from dry sieving (particles > 2 mm), wet sieving (particles 2 mm-75 um and hydrometer readings (particles < 75 um)

HG-200.2-CVAA-WP	Soil	Mercury in Soil	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Samples for analysis are homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested by block digester (EPA 200.2). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may become "environmentally available." By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

MOIST-SK	Soil	Moisture Content	CWS for PHC in Soil - Tier 1

The weighed portion of soil is placed in a 105 C oven overnight. The dried soil is allowed to cooled to room temperature, weighed and the % moisture is calculated.

N-TOT-LECO-SK	Soil	Total Nitrogen by combustion method	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.

N2/N3-AVAIL-KCL-SK	Soil	Nitrate, Nitrite & Nitrate+Nitrite-N(KCL	CSSS (2008) 6.2-6.3

Plant available nitrate and nitrite are extracted from the sample with 2N KCl. Nitrate and Nitrite in the filtered extract are determined colorimetrically by Technicon auto-analyzer or flow injection analyzer at 520 nm.

NH4-AVAIL-SK	Soil	Available Ammonium-N	Comm Soil Sci 19(6)

Ammonium (NH4-N) is extracted from the soil using 2 N KCl. Ammonium in the extract is mixed with hypochlorite and salicylate to form indophenol blue, which is determined colorimetrically by auto analysis at 660 nm.

NO3-AVAIL-SK	Soil	Available Nitrate-N	Method = Alberta Ag (1988)

Available Nitrate and Nitrite are extracted from the soil using a dilute calcium chloride solution.
Nitrate is quantitatively reduced to nitrite by passage of the sample through a copperized cadmium column. The nitrite (reduced nitrate plus original nitrite) is then determined by diazotizing with sulfanilamide followed by coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. The resulting water soluble dye has a magenta color which is measured at colorimetrically at 520nm.

Reference:
Recommended Methods of Soil Analysis for Canadian Prairie Agricultural Soils. Alberta Agriculture (1988) p. 19 and 28

PH-1:2-SK	Soil	pH (1:2 Soil:Water Extraction)	AB Ag (1988) p.7

1 part dry soil and 2 parts de-ionized water (by volume) is mixed. The slurry is allowed to stand with occasional stirring for 30 - 60 minutes. After equilibration, pH of the slurry is measured using a pH meter.

PO4-AVAIL-OLSEN-SK	Soil	Available Phosphate-P by Olsen	CSSS (2008) 8.2

Plant available phosphorus is extracted from the sample with sodium bicarbonate. PO4-P in the filtered extract is determined colorimetrically at 880 nm.

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

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Quality Control Report

Workorder: L2146089 Report Date: 21-AUG-18

Client: City of Portage la Prairie - Wastewater
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 0L8

Contact: AARON STECHESEN

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
GRAIN SIZE-MBWQ-SK	Soil							
Batch R4179214								
WG2847585-2 IRM		2017-PSA						
Silt (0.005mm - 0.075mm)			35.7		%		25.8-35.8	21-AUG-18
Clay (<0.005mm)			23.6		%		22.7-32.7	21-AUG-18
HG-200.2-CVAA-WP	Soil							
Batch R4171819								
WG2851185-4 CRM		CANMET TILL-1						
Mercury (Hg)			95.7		%		70-130	15-AUG-18
WG2851185-2 LCS								
Mercury (Hg)			95.0		%		80-120	15-AUG-18
WG2851185-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	15-AUG-18
MET-200.2-MS-WP	Soil							
Batch R4170709								
WG2850388-4 CRM		CANMET TILL-1						
Aluminum (Al)			98.7		%		70-130	15-AUG-18
Antimony (Sb)			102.2		%		70-130	15-AUG-18
Arsenic (As)			95.8		%		70-130	15-AUG-18
Barium (Ba)			94.8		%		70-130	15-AUG-18
Beryllium (Be)			104.5		%		70-130	15-AUG-18
Bismuth (Bi)			99.1		%		70-130	15-AUG-18
Boron (B)			3		mg/kg		0-8	15-AUG-18
Cadmium (Cd)			90.1		%		70-130	15-AUG-18
Calcium (Ca)			102.2		%		70-130	15-AUG-18
Chromium (Cr)			94.9		%		70-130	15-AUG-18
Cobalt (Co)			94.3		%		70-130	15-AUG-18
Copper (Cu)			97.4		%		70-130	15-AUG-18
Iron (Fe)			98.2		%		70-130	15-AUG-18
Lead (Pb)			100.5		%		70-130	15-AUG-18
Magnesium (Mg)			101.4		%		70-130	15-AUG-18
Manganese (Mn)			98.8		%		70-130	15-AUG-18
Molybdenum (Mo)			108.7		%		70-130	15-AUG-18
Nickel (Ni)			100.3		%		70-130	15-AUG-18
Phosphorus (P)			93.3		%		70-130	15-AUG-18
Potassium (K)			87.3		%		70-130	15-AUG-18
Selenium (Se)			90.3		%		70-130	15-AUG-18
Silver (Ag)			106.4		%		70-130	15-AUG-18

ALS Environmental

Quality Control Report

Workorder: L2146089 Report Date: 21-AUG-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4170709								
WG2850388-4 CRM		**CANMET TILL-1**						
Sodium (Na)			81.3		%		70-130	15-AUG-18
Strontium (Sr)			104.9		%		70-130	15-AUG-18
Thallium (Tl)			0.13		mg/kg		0.03-0.23	15-AUG-18
Tin (Sn)			1.0		mg/kg		0-3.1	15-AUG-18
Titanium (Ti)			82.4		%		70-130	15-AUG-18
Uranium (U)			99.9		%		70-130	15-AUG-18
Vanadium (V)			94.0		%		70-130	15-AUG-18
Zinc (Zn)			97.6		%		70-130	15-AUG-18
WG2850388-2 LCS								
Aluminum (Al)			95.1		%		80-120	15-AUG-18
Antimony (Sb)			98.2		%		80-120	15-AUG-18
Arsenic (As)			93.9		%		80-120	15-AUG-18
Barium (Ba)			93.7		%		80-120	15-AUG-18
Beryllium (Be)			99.7		%		80-120	15-AUG-18
Bismuth (Bi)			98.9		%		80-120	15-AUG-18
Boron (B)			94.9		%		80-120	15-AUG-18
Cadmium (Cd)			93.4		%		80-120	15-AUG-18
Calcium (Ca)			97.8		%		80-120	15-AUG-18
Chromium (Cr)			93.5		%		80-120	15-AUG-18
Cobalt (Co)			93.1		%		80-120	15-AUG-18
Copper (Cu)			94.2		%		80-120	15-AUG-18
Iron (Fe)			94.3		%		80-120	15-AUG-18
Lead (Pb)			98.7		%		80-120	15-AUG-18
Magnesium (Mg)			102.2		%		80-120	15-AUG-18
Manganese (Mn)			93.6		%		80-120	15-AUG-18
Molybdenum (Mo)			101.0		%		80-120	15-AUG-18
Nickel (Ni)			92.8		%		80-120	15-AUG-18
Phosphorus (P)			94.6		%		80-120	15-AUG-18
Potassium (K)			95.3		%		80-120	15-AUG-18
Selenium (Se)			102.0		%		80-120	15-AUG-18
Silver (Ag)			97.5		%		80-120	15-AUG-18
Sodium (Na)			94.1		%		80-120	15-AUG-18
Strontium (Sr)			103.3		%		80-120	15-AUG-18
Thallium (Tl)			96.2		%		80-120	15-AUG-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4170709								
WG2850388-2 LCS								
Tin (Sn)			92.8		%		80-120	15-AUG-18
Titanium (Ti)			89.1		%		80-120	15-AUG-18
Uranium (U)			97.1		%		80-120	15-AUG-18
Vanadium (V)			94.8		%		80-120	15-AUG-18
Zinc (Zn)			93.2		%		80-120	15-AUG-18
WG2850388-1 MB								
Aluminum (Al)			<5.0		mg/kg		5	15-AUG-18
Antimony (Sb)			<0.10		mg/kg		0.1	15-AUG-18
Arsenic (As)			<0.10		mg/kg		0.1	15-AUG-18
Barium (Ba)			<0.50		mg/kg		0.5	15-AUG-18
Beryllium (Be)			<0.10		mg/kg		0.1	15-AUG-18
Bismuth (Bi)			<0.020		mg/kg		0.02	15-AUG-18
Boron (B)			<10		mg/kg		10	15-AUG-18
Cadmium (Cd)			<0.020		mg/kg		0.02	15-AUG-18
Calcium (Ca)			<100		mg/kg		100	15-AUG-18
Chromium (Cr)			<1.0		mg/kg		1	15-AUG-18
Cobalt (Co)			<0.020		mg/kg		0.02	15-AUG-18
Copper (Cu)			<1.0		mg/kg		1	15-AUG-18
Iron (Fe)			<25		mg/kg		25	15-AUG-18
Lead (Pb)			<0.20		mg/kg		0.2	15-AUG-18
Magnesium (Mg)			<10		mg/kg		10	15-AUG-18
Manganese (Mn)			<0.50		mg/kg		0.5	15-AUG-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	15-AUG-18
Nickel (Ni)			<0.50		mg/kg		0.5	15-AUG-18
Phosphorus (P)			<100		mg/kg		100	15-AUG-18
Potassium (K)			<25		mg/kg		25	15-AUG-18
Selenium (Se)			<0.50		mg/kg		0.5	15-AUG-18
Silver (Ag)			<0.10		mg/kg		0.1	15-AUG-18
Sodium (Na)			<10		mg/kg		10	15-AUG-18
Strontium (Sr)			<0.10		mg/kg		0.1	15-AUG-18
Thallium (Tl)			<0.10		mg/kg		0.1	15-AUG-18
Tin (Sn)			<5.0		mg/kg		5	15-AUG-18
Titanium (Ti)			<0.50		mg/kg		0.5	15-AUG-18
Uranium (U)			<0.020		mg/kg		0.02	15-AUG-18

ALS Environmental

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4170709								
WG2850388-1 MB								
Vanadium (V)			<0.50		mg/kg		0.5	15-AUG-18
Zinc (Zn)			<10		mg/kg		10	15-AUG-18
MOIST-SK	Soil							
Batch R4175445								
WG2851008-3 LCS								
% Moisture			97.3		%		90-110	17-AUG-18
WG2851008-2 MB								
% Moisture			<0.10		%		0.1	17-AUG-18
N-TOT-LECO-SK	Soil							
Batch R4176907								
WG2851361-2 IRM		08-109_SOIL						
Total Nitrogen by LECO			89.1		%		80-120	18-AUG-18
WG2851361-4 LCS		SULFADIAZINE						
Total Nitrogen by LECO			96.6		%		90-110	18-AUG-18
WG2851361-3 MB								
Total Nitrogen by LECO			<0.020		%		0.02	18-AUG-18
N2/N3-AVAIL-KCL-SK	Soil							
Batch R4178672								
WG2850491-3 IRM		SAL814						
Nitrate+Nitrite-N			106.0		%		70-130	20-AUG-18
WG2850491-2 MB								
Nitrite-N			<1.0		mg/kg		1	20-AUG-18
Nitrate+Nitrite-N			<2.0		mg/kg		2	20-AUG-18
NH4-AVAIL-SK	Soil							
Batch R4175493								
WG2851758-3 IRM		SAL814						
Available Ammonium-N			98.3		%		70-130	17-AUG-18
WG2851758-2 MB								
Available Ammonium-N			<1.0		mg/kg		1	17-AUG-18
NO3-AVAIL-SK	Soil							
Batch R4178347								
WG2849354-3 IRM		SAL814						
Available Nitrate-N			106.1		%		70-130	17-AUG-18
WG2849354-2 MB								
Available Nitrate-N			<1.0		mg/kg		1	17-AUG-18
PH-1:2-SK	Soil							

ALS Environmental

Quality Control Report

Workorder: L2146089 Report Date: 21-AUG-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-1:2-SK	Soil							
Batch R4178488								
WG2851763-2 IRM		**SAL814**						
pH (1:2 soil:water)			7.90		pH		7.65-8.25	20-AUG-18
WG2851763-3 LCS								
pH (1:2 soil:water)			6.95		pH		6.66-7.06	20-AUG-18
PO4-AVAIL-OLSEN-SK	Soil							
Batch R4178732								
WG2853010-1 DUP		**L2146089-1**						
Available Phosphate-P		19.7	17.0		mg/kg	15	30	20-AUG-18
WG2853010-3 IRM		**FARM2005**						
Available Phosphate-P			117.4		%		80-120	20-AUG-18
WG2853010-2 MB								
Available Phosphate-P			<1.0		mg/kg		1	20-AUG-18

Legend:

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

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Plant Available Nutrients							
Nitrate, Nitrite & Nitrate+Nitrite-N(KCL	2	14-AUG-18 08:00	20-AUG-18 13:15	3	6	days	EHT

Legend & Qualifier Definitions:

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

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2146089 were received on 14-AUG-18 11:20.

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

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

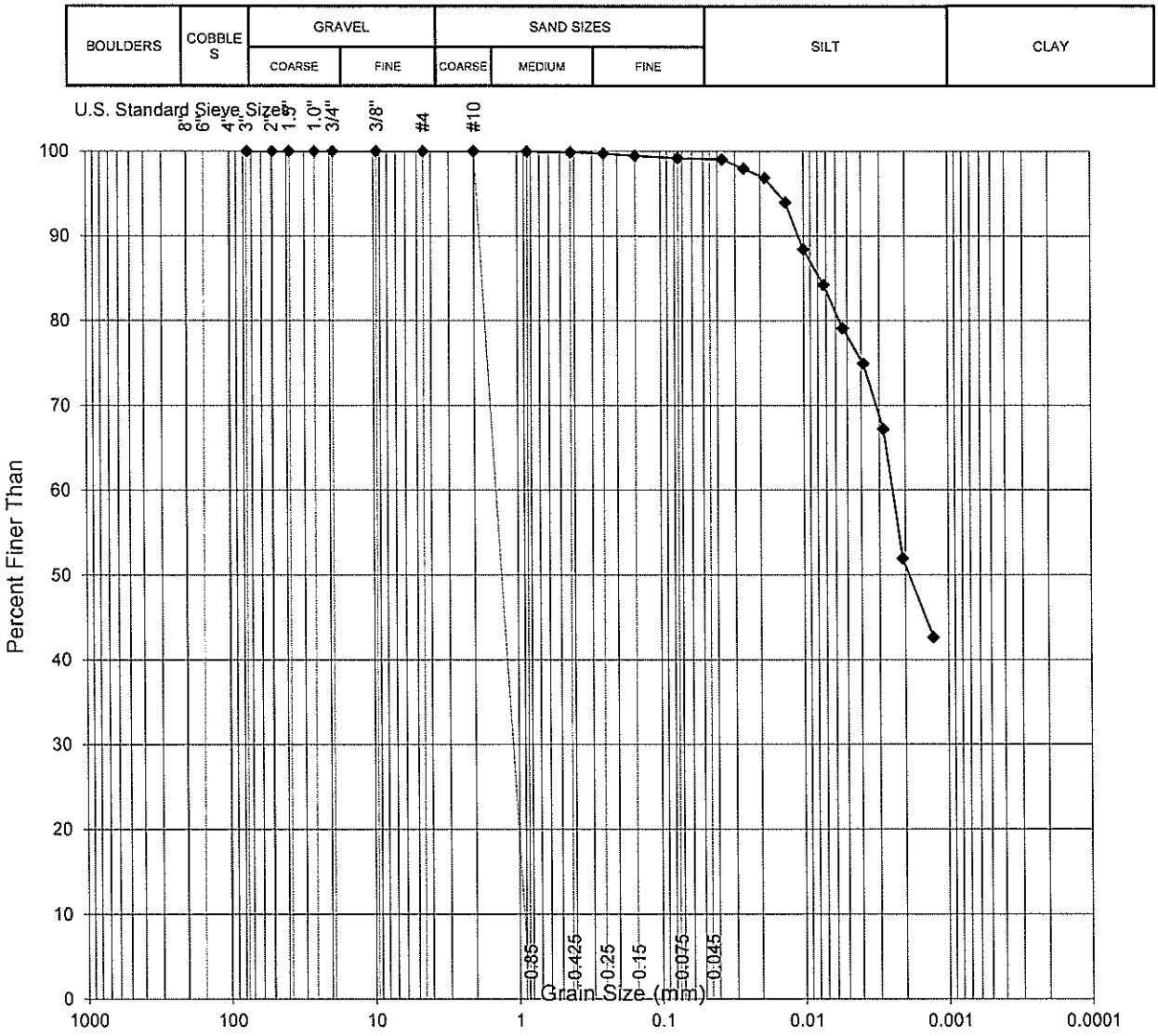
Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Laboratory Group

819-58th Street, Saskatoon,SK

PARTICLE SIZE DISTRIBUTION CURVE

Client Name:	City of Portage la Prairie - Wastewater
Project Number:	
Client Sample ID	18-08-49
Lab Sample ID	L2146089-3
Date Sample Received	14-Aug-18
Test Completion Date:	17-Aug-18
Analyst:	SHC



METHOD DESCRIPTION

Method Reference: ASTM D 422 - 63 (2002)

Dispersion method: Mechanical

Dispesion period: 1 minute cm/s

Soil classification system used: Unified Soil Classification

DESCRIPTION OF SAND AND GRAVEL PARTICLES

Shape: Angular
Hardness: Hard

PARTICLE SIZE DISTRIBUTION

Particle Size range (mm)	Weight %	Passing %	Grain size
> 75 mm	0	100	Cobbles
75 - 4.75 mm	0	100	Gravel
4.75 - 0.075 mm	1	99	Sand
0.075 - 0.005 mm	21	78	Silt
< 0.005 mm	78	8	Clay

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Cha

L2146089-COFC

COC # _____

Page 1 of 1

Report to:			
Company:	City of Portage la Prairie	Standard: X	Other:
Contact:	Aaron Stechesen	Select: PDF X	Excel ____ Digital ____
Address:	97 Saskatchewan Ave. E.	Email 1:	astechesen@city-plap.com
	Portage la Prairie, MB R1N 0L8	Email 2:	
Phone:	204-239-8361	Fax: 204-239-8364	
Invoice To:	Same as Report ? Yes / No ?	Client / Project Information:	
Company:	City of Portage la Prairie	Job #:	
Contact:	Accounts Payable	PO / AFE:	W02435
Address:	97 Saskatchewan Ave. E.	Legal Site Description:	
	Portage la Prairie, MB R1N 0L8		
Phone:	204-239-8357	Fax:	Quote #:
Lab Work Order # (lab use only)		ALS Contact: Judy Dolmaijer	Sampler:

Service Requested: (rush - subject to availability)

- Regular (Default)
- X Priority (2-3 Business Days) - 50% Surcharge
- Emergency (1 Business Day) - 100% Surcharge
- For Emergency < 1 Day, ASAP or Weekend - Contact ALS

Analysis Request
(Indicate Filtered or Preserved, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	pH-1:2-SK	HG-200.2-CVAF-WP	MET-200.2-MS-WP	PO4-AVAIL-OLSEN-SK	N-TOT-AVAIL-SK	N-TOT-LECO-SK	NO3-AVAIL-SK	MOIST-SK	PREP-DRY/GRIND-SK	SPECIAL REQUEST-SK	ASTM D422-63	SAMPLE-DISPOSAL-WP	Number of Containers
1	18-08-47	14-Aug-18	8:00	Soil	✓	✓	✓	✓				✓	✓	✓		✓	1
2	18-08-48	14-Aug-18	8:00	Soil					✓	✓	✓	✓	✓	✓		✓	2
3	18-08-49	14-Aug-18	8:00	Soil									✓	✓	✓	✓	1

SH

Special Instructions / Regulations / Hazardous Details

PRIORITY - RUSH- Service - Results needed by August 20 before noon!

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
	Aug 14/18 9:30 am	GRN	08/14/18	11:20	14.9			

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

L2146089-COFC

COC # _____ Page 1 of 1

Report to:			
Company:	City of Portage la Prairie	Standard: X Other:	
Contact:	Aaron Stechesen	Select: PDF X Excel Digital	
Address:	97 Saskatchewan Ave. E.	Email 1: astechesen@city-plap.com	
	Portage la Prairie, MB R1N 0L8	Email 2:	
Phone:	204-239-8361 Fax: 204-239-8364		
Invoice To:	Same as Report ? Yes / No ?	Client / Project Information:	
Company:	City of Portage la Prairie	Job #:	
Contact:	Accounts Payable	PO / AFE: W02435	
Address:	97 Saskatchewan Ave. E.	Legal Site Description:	
	Portage la Prairie, MB R1N 0L8		
Phone:	204-239-8357 Fax:	Quote #:	
Lab Work Order # (lab use only)		ALS Contact: Judy Dalmaijer	Sampler:

Service Requested: (rush - subject to availability)
- Regular (Default)
- X Priority (2-3 Business Days) - 50% Surcharge
- Emergency (1 Business Day) - 100% Surcharge
- For Emergency < 1 Day, ASAP or Weekend - Contact ALS

Analysis Request
(Indicate Filtered or Preserved, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	PH-1:2-SK	HG-200.2-CVAF-WP	MET-200.2-MS-WP	PO4-AVAIL-OLSEN-SK	N-TOT-AVAIL-SK	N-TOT-LECO-SK	NO3-AVAIL-SK	MOIST-SK	PREP-DRY/GRIND-SK	SPECIAL REQUEST-SK	ASTM D422-63	SAMPLE-DISPOSAL-WP	Number of Containers
1	18-08-47	14-Aug-18	8:00	Soil	✓	✓	✓	✓				✓	✓	✓		✓	N
2	18-08-48	14-Aug-18	8:00	Soil					✓	✓	✓		✓	✓	✓	✓	)
3	18-08-49	14-Aug-18	8:00	Soil													

SH

Special Instructions / Regulations / Hazardous Details

ORITY - RUSH- Service - Results needed by August 20 before noon!

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)		
	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
	Aug 14/18 9:30am	GRM	08/14/18	11:20	14.9			

BACK PAGE FOR ALS LOCATIONS

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GEN 18.00 Front

City of Portage la Prairie - Wastewater
ATTN: AARON STECHESEN
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 0L8

Date Received: 22-AUG-18
Report Date: 04-SEP-18 07:28 (MT)
Version: FINAL

Client Phone: 204-239-8361

Certificate of Analysis

Lab Work Order #: L2151553
Project P.O. #: W02435
Job Reference:
C of C Numbers:
Legal Site Desc:

Hua Wo
Chemistry Laboratory Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2151553-1 18-08-285 Sampled By: CLIENT on 22-AUG-18 @ 10:30 Matrix: SLUDGE	BVF						
Miscellaneous Parameters							
Available Nitrate-N	4.5	DLM	4.0	mg/kg	30-AUG-18	30-AUG-18	R4195450
Available Phosphate-P	382	DLHC	10	mg/kg	28-AUG-18	28-AUG-18	R4189813
Mercury (Hg)	0.075		0.025	mg/kg	24-AUG-18	28-AUG-18	R4190953
Total Kjeldahl Nitrogen	3.44	DLHC	0.40	%	29-AUG-18	30-AUG-18	R4195681
Total Solids and Total Volatile Solids							
Total Solids	2.89		0.10	%	29-AUG-18	29-AUG-18	R4192553
Total Volatile Solids (dry basis)	64.9		0.10	%	29-AUG-18	29-AUG-18	R4192553
pH and Conductitivity of Liquid Manure							
pH	7.11		0.10	pH	01-SEP-18	01-SEP-18	R4196201
Conductivity (EC)	3590		10	uS/cm	01-SEP-18	01-SEP-18	R4196201
Metals							
Aluminum (Al)	7010		5.0	mg/kg	24-AUG-18	24-AUG-18	R4183499
Antimony (Sb)	0.61		0.10	mg/kg	24-AUG-18	24-AUG-18	R4183499
Arsenic (As)	3.04		0.10	mg/kg	24-AUG-18	24-AUG-18	R4183499
Barium (Ba)	243		0.50	mg/kg	24-AUG-18	24-AUG-18	R4183499
Beryllium (Be)	0.36		0.10	mg/kg	24-AUG-18	24-AUG-18	R4183499
Bismuth (Bi)	3.92		0.020	mg/kg	24-AUG-18	24-AUG-18	R4183499
Boron (B)	31		10	mg/kg	24-AUG-18	24-AUG-18	R4183499
Cadmium (Cd)	3.06		0.020	mg/kg	24-AUG-18	24-AUG-18	R4183499
Calcium (Ca)	17800		100	mg/kg	24-AUG-18	24-AUG-18	R4183499
Chromium (Cr)	34.6		1.0	mg/kg	24-AUG-18	24-AUG-18	R4183499
Cobalt (Co)	9.28		0.020	mg/kg	24-AUG-18	24-AUG-18	R4183499
Copper (Cu)	201		1.0	mg/kg	24-AUG-18	24-AUG-18	R4183499
Iron (Fe)	11200		25	mg/kg	24-AUG-18	24-AUG-18	R4183499
Lead (Pb)	9.22		0.20	mg/kg	24-AUG-18	24-AUG-18	R4183499
Magnesium (Mg)	5310		10	mg/kg	24-AUG-18	24-AUG-18	R4183499
Manganese (Mn)	407		0.50	mg/kg	24-AUG-18	24-AUG-18	R4183499
Molybdenum (Mo)	29.9		0.10	mg/kg	24-AUG-18	24-AUG-18	R4183499
Nickel (Ni)	35.1		0.50	mg/kg	24-AUG-18	24-AUG-18	R4183499
Phosphorus (P)	8220		100	mg/kg	24-AUG-18	24-AUG-18	R4183499
Potassium (K)	11900		25	mg/kg	24-AUG-18	24-AUG-18	R4183499
Selenium (Se)	2.59		0.50	mg/kg	24-AUG-18	24-AUG-18	R4183499
Silver (Ag)	0.61		0.10	mg/kg	24-AUG-18	24-AUG-18	R4183499
Sodium (Na)	7270		10	mg/kg	24-AUG-18	24-AUG-18	R4183499
Strontium (Sr)	51.1		0.10	mg/kg	24-AUG-18	24-AUG-18	R4183499
Thallium (Tl)	0.35		0.10	mg/kg	24-AUG-18	24-AUG-18	R4183499
Tin (Sn)	5.3		5.0	mg/kg	24-AUG-18	24-AUG-18	R4183499
Titanium (Ti)	39.2		0.50	mg/kg	24-AUG-18	24-AUG-18	R4183499
Uranium (U)	3.73		0.020	mg/kg	24-AUG-18	24-AUG-18	R4183499
Vanadium (V)	19.2		0.50	mg/kg	24-AUG-18	24-AUG-18	R4183499
Zinc (Zn)	599		10	mg/kg	24-AUG-18	24-AUG-18	R4183499
Total Available N & NO3-N, NO2-N & NH4							
Nitrate, Nitrite & Nitrate+Nitrite-N(KCL							
Nitrite-N	<2.0	DLM	2.0	mg/kg	30-AUG-18	30-AUG-18	R4195743
Nitrate+Nitrite-N	<5.0	DLM	5.0	mg/kg	30-AUG-18	30-AUG-18	R4195743
Nitrate-N	<5.0	DLM	5.0	mg/kg	30-AUG-18	30-AUG-18	R4195743
Total Organic N-liquid manure -as rec'd							
Ammonium - N in Liquid Manure - as rec'd							
Ammonia, Total (as N)	3.3		1.0	lb/1000gal	01-SEP-18	01-SEP-18	R4196198
Nitrogen, Total Organic							
Total Organic Nitrogen	19.3		1.0	lb/1000gal		01-SEP-18	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2151553-1 18-08-285 Sampled By: CLIENT on 22-AUG-18 @ 10:30 Matrix: SLUDGE							
Total N in Liquid Manure -as rec'd							
Total Nitrogen	22.7		1.0	lb/1000gal	30-AUG-18	30-AUG-18	R4196202

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ETL-N-TOTORG-AGL-SK	Manure	Nitrogen, Total Organic	APHA 4500 Norg-Calculated as TKN - NH3-N
HG-200.2-CVAA-WP	Soil	Mercury in Soil	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Samples for analysis are homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested by block digester (EPA 200.2). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may become "environmentally available." By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

N-TOT-LECO-AGL-SK	Manure	Total N in Liquid Manure -as rec'd	RMMA A3769 3.3

The sample is introduced into a quartz tube where it undergoes combustion at 900 C in the presence of oxygen.
Combustion gases are first carried through a catalyst bed in the bottom of the combustion tube, where oxidation is completed and then carried through a reducing agent (copper), where the nitrogen oxides are reduced to elemental nitrogen.
This mixture of N2, CO2, and H2O is then passed through an absorber column containing magnesium perchlorate to remove water. N2 and CO2 gases are then separated in a gas chromatographic column and detected by thermal conductivity.

Reference:
Reference: Wolf, A., Watson, M. and Nancy Wolf. 2005. In: John Peters(ed.) Recommended Methods for Manure Analysis. Method 3.3

N-TOTKJ-COL-SK	Soil	Total Kjeldahl Nitrogen	CSSS (2008) 22.2.3

The soil is digested with sulfuric acid in the presence of CuSO4 and K2SO4 catalysts. Ammonia in the soil extract is determined colrimetrically at 660 nm.

N2/N3-AVAIL-KCL-SK	Soil	Nitrate, Nitrite & Nitrate+Nitrite-N(KCL	CSSS (2008) 6.2-6.3

Plant available nitrate and nitrite are extracted from the sample with 2N KCl. Nitrate and Nitrite in the filtered extract are determined colorimetrically by Technicon auto-analyzer or flow injection analyzer at 520 nm.

NH4-AGL-SK	Manure	Ammonium - N in Liquid Manure - as rec'd	RMMA A3769 4.1

Ammonium is determined by steam distillation into boric acid followed by titration with standard acid.

Reference: Wolf, A., Watson, M. and Nancy Wolf. 2005. In: John Peters(ed.) Recommended Methods for Manure Analysis. Method 4.1

NO3-AVAIL-SK	Soil	Available Nitrate-N	Method = Alberta Ag (1988)

Available Nitrate and Nitrite are extracted from the soil using a dilute calcium chloride solution.
Nitrate is quantitatively reduced to nitrite by passage of the sample through a copperized cadmium column. The nitrite (reduced nitrate plus original nitrite) is then determined by diazotizing with sulfanilamide followed by coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. The resulting water soluble dye has a magenta color which is measured at colorimetrically at 520nm.

Reference:
Recommended Methods of Soil Analysis for Canadian Prairie Agricultural Soils. Alberta Agriculture (1988) p. 19 and 28

PH/EC-AGL-SK	Manure	pH and Conductitivity of Liquid Manure	RMMA A3769 7.5/8.5

The sample is analyzed directly using a calibrated pH/Conductivity meter.

Reference: Wolf, A., Watson, M. and Nancy Wolf. 2005. In: John Peters(ed.) Recommended Methods for Manure Analysis. Methods 7.5 and 8.5

PO4-AVAIL-OLSEN-SK	Soil	Available Phosphate-P by Olsen	CSSS (2008) 8.2

Plant available phosphorus is extracted from the sample with sodium bicarbonate. PO4-P in the filtered extract is determined colorimetrically at 880 nm.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
SOLIDS-TOT/TOTVOL-SK	Manure	Total Solids and Total Volatile Solids	APHA 2540G

A well-mixed sample is evaporated in a weighed dish and dried to constant weight in an oven at 103-105°C. The increase in weight over that of the empty dish represents the Total Solids. The crucible is then ignited at 550°–10°C for 1 hour. The remaining solids represent the Total Fixed Solids, while the weight lost on ignition represents the Total Volatile Solids.

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

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Quality Control Report

Workorder: L2151553 Report Date: 04-SEP-18

Client: City of Portage la Prairie - Wastewater
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 0L8
Contact: AARON STECHESEN

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAA-WP	Soil							
Batch R4190953								
WG2859394-9 CRM		**CANMET TILL-1**						
Mercury (Hg)			92.1		%		70-130	28-AUG-18
WG2859394-7 LCS								
Mercury (Hg)			98.0		%		80-120	28-AUG-18
WG2859394-6 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	28-AUG-18
MET-200.2-MS-WP	Soil							
Batch R4183499								
WG2859367-4 CRM		**CANMET TILL-1**						
Aluminum (Al)			101.6		%		70-130	24-AUG-18
Antimony (Sb)			104.0		%		70-130	24-AUG-18
Arsenic (As)			96.2		%		70-130	24-AUG-18
Barium (Ba)			93.5		%		70-130	24-AUG-18
Beryllium (Be)			95.2		%		70-130	24-AUG-18
Bismuth (Bi)			93.9		%		70-130	24-AUG-18
Boron (B)			2		mg/kg		0-8	24-AUG-18
Cadmium (Cd)			96.2		%		70-130	24-AUG-18
Calcium (Ca)			89.2		%		70-130	24-AUG-18
Chromium (Cr)			91.7		%		70-130	24-AUG-18
Cobalt (Co)			94.9		%		70-130	24-AUG-18
Copper (Cu)			97.2		%		70-130	24-AUG-18
Iron (Fe)			94.9		%		70-130	24-AUG-18
Lead (Pb)			95.8		%		70-130	24-AUG-18
Magnesium (Mg)			98.8		%		70-130	24-AUG-18
Manganese (Mn)			100.4		%		70-130	24-AUG-18
Molybdenum (Mo)			105.1		%		70-130	24-AUG-18
Nickel (Ni)			93.3		%		70-130	24-AUG-18
Phosphorus (P)			97.3		%		70-130	24-AUG-18
Potassium (K)			80.7		%		70-130	24-AUG-18
Selenium (Se)			88.8		%		70-130	24-AUG-18
Silver (Ag)			96.0		%		70-130	24-AUG-18
Sodium (Na)			78.9		%		70-130	24-AUG-18
Strontium (Sr)			92.3		%		70-130	24-AUG-18
Thallium (Tl)			0.11		mg/kg		0.03-0.23	24-AUG-18
Tin (Sn)			1.1		mg/kg		0-3.1	24-AUG-18
Titanium (Ti)			81.0		%		70-130	24-AUG-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4183499								
WG2859367-4 CRM		CANMET TILL-1						
Uranium (U)			88.8		%		70-130	24-AUG-18
Vanadium (V)			90.9		%		70-130	24-AUG-18
Zinc (Zn)			93.6		%		70-130	24-AUG-18
WG2859367-2 LCS								
Aluminum (Al)			100.2		%		80-120	24-AUG-18
Antimony (Sb)			106.6		%		80-120	24-AUG-18
Arsenic (As)			98.7		%		80-120	24-AUG-18
Barium (Ba)			97.3		%		80-120	24-AUG-18
Beryllium (Be)			98.0		%		80-120	24-AUG-18
Bismuth (Bi)			97.1		%		80-120	24-AUG-18
Boron (B)			99.5		%		80-120	24-AUG-18
Cadmium (Cd)			98.0		%		80-120	24-AUG-18
Calcium (Ca)			96.1		%		80-120	24-AUG-18
Chromium (Cr)			97.3		%		80-120	24-AUG-18
Cobalt (Co)			98.0		%		80-120	24-AUG-18
Copper (Cu)			98.8		%		80-120	24-AUG-18
Iron (Fe)			92.7		%		80-120	24-AUG-18
Lead (Pb)			97.4		%		80-120	24-AUG-18
Magnesium (Mg)			107.9		%		80-120	24-AUG-18
Manganese (Mn)			97.5		%		80-120	24-AUG-18
Molybdenum (Mo)			105.7		%		80-120	24-AUG-18
Nickel (Ni)			97.2		%		80-120	24-AUG-18
Phosphorus (P)			99.8		%		80-120	24-AUG-18
Potassium (K)			101.1		%		80-120	24-AUG-18
Selenium (Se)			98.9		%		80-120	24-AUG-18
Silver (Ag)			96.5		%		80-120	24-AUG-18
Sodium (Na)			95.0		%		80-120	24-AUG-18
Strontium (Sr)			104.4		%		80-120	24-AUG-18
Thallium (Tl)			98.8		%		80-120	24-AUG-18
Tin (Sn)			101.1		%		80-120	24-AUG-18
Titanium (Ti)			101.7		%		80-120	24-AUG-18
Uranium (U)			96.8		%		80-120	24-AUG-18
Vanadium (V)			99.4		%		80-120	24-AUG-18
Zinc (Zn)			99.3		%		80-120	24-AUG-18
WG2859367-1 MB								

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4183499								
WG2859367-1 MB								
Aluminum (Al)			<5.0		mg/kg		5	24-AUG-18
Antimony (Sb)			<0.10		mg/kg		0.1	24-AUG-18
Arsenic (As)			<0.10		mg/kg		0.1	24-AUG-18
Barium (Ba)			<0.50		mg/kg		0.5	24-AUG-18
Beryllium (Be)			<0.10		mg/kg		0.1	24-AUG-18
Bismuth (Bi)			<0.020		mg/kg		0.02	24-AUG-18
Boron (B)			<10		mg/kg		10	24-AUG-18
Cadmium (Cd)			<0.020		mg/kg		0.02	24-AUG-18
Calcium (Ca)			<100		mg/kg		100	24-AUG-18
Chromium (Cr)			<1.0		mg/kg		1	24-AUG-18
Cobalt (Co)			<0.020		mg/kg		0.02	24-AUG-18
Copper (Cu)			<1.0		mg/kg		1	24-AUG-18
Iron (Fe)			<25		mg/kg		25	24-AUG-18
Lead (Pb)			<0.20		mg/kg		0.2	24-AUG-18
Magnesium (Mg)			<10		mg/kg		10	24-AUG-18
Manganese (Mn)			<0.50		mg/kg		0.5	24-AUG-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	24-AUG-18
Nickel (Ni)			<0.50		mg/kg		0.5	24-AUG-18
Phosphorus (P)			<100		mg/kg		100	24-AUG-18
Potassium (K)			<25		mg/kg		25	24-AUG-18
Selenium (Se)			<0.50		mg/kg		0.5	24-AUG-18
Silver (Ag)			<0.10		mg/kg		0.1	24-AUG-18
Sodium (Na)			<10		mg/kg		10	24-AUG-18
Strontium (Sr)			<0.10		mg/kg		0.1	24-AUG-18
Thallium (Tl)			<0.10		mg/kg		0.1	24-AUG-18
Tin (Sn)			<5.0		mg/kg		5	24-AUG-18
Titanium (Ti)			<0.50		mg/kg		0.5	24-AUG-18
Uranium (U)			<0.020		mg/kg		0.02	24-AUG-18
Vanadium (V)			<0.50		mg/kg		0.5	24-AUG-18
Zinc (Zn)			<10		mg/kg		10	24-AUG-18
N-TOTKJ-COL-SK	Soil							

ALS Environmental

Quality Control Report

Workorder: L2151553 Report Date: 04-SEP-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
N-TOTKJ-COL-SK	Soil							
Batch R4195681								
WG2857706-1 DUP		**L2151553-1**						
Total Kjeldahl Nitrogen		3.44	3.55		%	3.2	20	30-AUG-18
WG2857706-2 IRM		**08-109_SOIL**						
Total Kjeldahl Nitrogen			90.9		%		80-120	30-AUG-18
WG2857706-3 MB								
Total Kjeldahl Nitrogen			<0.020		%		0.02	30-AUG-18
N2/N3-AVAIL-KCL-SK	Soil							
Batch R4195743								
WG2863496-2 IRM		**SAL814**						
Nitrate+Nitrite-N			96.1		%		70-130	30-AUG-18
WG2863496-1 MB								
Nitrite-N			<1.0		mg/kg		1	30-AUG-18
Nitrate+Nitrite-N			<2.0		mg/kg		2	30-AUG-18
NO3-AVAIL-SK	Soil							
Batch R4195450								
WG2863499-3 IRM		**SAL814**						
Available Nitrate-N			89.0		%		70-130	30-AUG-18
WG2863499-2 MB								
Available Nitrate-N			<1.0		mg/kg		1	30-AUG-18
PO4-AVAIL-OLSEN-SK	Soil							
Batch R4189813								
WG2860645-3 IRM		**FARM2005**						
Available Phosphate-P			84.9		%		80-120	28-AUG-18
WG2860645-2 MB								
Available Phosphate-P			<1.0		mg/kg		1	28-AUG-18
N-TOT-LECO-AGL-SK	Manure							
Batch R4196202								
WG2863528-1 DUP		**L2151553-1**						
Total Nitrogen		22.7	20.7		lb/1000gal	9.1	30	30-AUG-18
WG2863528-3 IRM		**IH-10**						
Total Nitrogen			97.0		%		90-110	30-AUG-18
WG2863528-4 LCS		**SULFADIAZINE**						
Total Nitrogen			99.1		%		90-110	30-AUG-18
WG2863528-2 MB								
Total Nitrogen			<1.0		lb/1000gal		1	30-AUG-18
NH4-AGL-SK	Manure							

ALS Environmental

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH4-AGL-SK	Manure							
Batch R4196198								
WG2861182-1 DUP		L2151553-1						
Ammonia, Total (as N)		3.3	3.3		lb/1000gal	1.9	30	01-SEP-18
WG2861182-2 IRM		NH4-1000						
Ammonia, Total (as N)			102.3		%		85-115	01-SEP-18
WG2861182-3 MB								
Ammonia, Total (as N)			<1.0		lb/1000gal		1	01-SEP-18
SOLIDS-TOT/TOTVOL-SK	Manure							
Batch R4192553								
WG2861189-1 DUP		L2151553-1						
Total Solids		2.89	3.01		%	4.1	25	29-AUG-18
Total Volatile Solids (dry basis)		64.9	64.3		%	0.9	25	29-AUG-18

Legend:

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

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH and Conductitivity of Liquid Manure							
	1	22-AUG-18 10:30	01-SEP-18 00:00	7	10	days	EHT
Anions and Nutrients							
Total N in Liquid Manure -as rec'd							
	1	22-AUG-18 10:30	30-AUG-18 00:00	7	8	days	EHT
Plant Available Nutrients							
Ammonium - N in Liquid Manure - as rec'd							
	1	22-AUG-18 10:30	01-SEP-18 00:00	7	10	days	EHT
Available Nitrate-N							
	1	22-AUG-18 10:30	30-AUG-18 14:13	3	8	days	EHT
Nitrate, Nitrite & Nitrate+Nitrite-N(KCL							
	1	22-AUG-18 10:30	30-AUG-18 17:48	3	8	days	EHT

Legend & Qualifier Definitions:

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

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2151553 were received on 22-AUG-18 15:45.

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

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

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

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

L2151553-COFC

COC # L2151553

Page 1 of 1

Report to:				Service Requested: (rush - subject to availability)	
Company:	City of Portage la Prairie	Standard: X	Other:		Regular (Default)
Contact:	Aaron Stechesen	Select: PDF X Excel	Digital	X	Priority (2-3 Business Days) - 50% Surcharge
Address:	97 Saskatchewan Ave. E.	Email 1: astechesen@city-plap.com			Emergency (1 Business Day) - 100% Surcharge
	Portage la Prairie, MB R1N 0L8	Email 2:			For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	204-239-8361 Fax: 204-239-8364			Analysis Request	
Invoice To:	Same as Report ? Yes / No ?	Client / Project Information:		(Indicate Filtered or Preserved, F/P)	
Company:	City of Portage la Prairie	Job #:			
Contact:	Accounts Payable	PO / AFE: W0243S			
Address:	97 Saskatchewan Ave. E.	Legal Site Description:			
	Portage la Prairie, MB R1N 0L8				
Phone:	204-239-8357 Fax:	Quote #:			
Lab Work Order # (lab use only)		ALS Contact: Judy Dalmoijer	Sampler:		

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	SOLIDS-TOT/TOTVOL-SK	EC/pH-AGL-SK	N-TOT-ORG-AGL-SK	NO3-AVAIL-SK	N-TOTKJ-COL-SK	PO4-AVAIL-OLSEN-SK	HG-200.2-CVAF-WP	MET-200.2-MS-WP	N-TOT-AVAIL-SK	Coliform-TC,FC-MPN-ENDPT		SAMPLE-DISPOSAL-WP	Number of Containers
1	18-08-285	22-Aug-18	~~8:30~~ 10:30	Sludge	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	1

Special Instructions / Regulations / Hazardous Details

PRIORITY/RUSH Service - Results required by August 20 before noon!

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
	Aug 22/18 11:30am		08/08/18	345	07.8			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENF 18.00 Front

City of Portage la Prairie - Wastewater
ATTN: AARON STECHESEN
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 0L8

Date Received: 14-AUG-18
Report Date: 24-AUG-18 11:25 (MT)
Version: FINAL

Client Phone: 204-239-8361

Certificate of Analysis

Lab Work Order #: L2146080
Project P.O. #: W02435
Job Reference:
C of C Numbers:
Legal Site Desc:

Hua Wo
Chemistry Laboratory Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2146080-1 18-08-46	BST1						
Sampled By: CLIENT on 14-AUG-18 @ 08:30							
Matrix: SLUDGE							
Miscellaneous Parameters							
Available Phosphate-P	1180	DLHC	20	mg/kg	20-AUG-18	20-AUG-18	R4178732
Mercury (Hg)	0.289		0.0050	mg/kg	15-AUG-18	15-AUG-18	R4171819
Total Kjeldahl Nitrogen	49200	DLHC	6000	mg/kg	18-AUG-18	20-AUG-18	R4178492
Total Solids and Total Volatile Solids							
Total Solids	2.41		0.10	%	20-AUG-18	20-AUG-18	R4176887
Total Volatile Solids (dry basis)	67.2		0.10	%	20-AUG-18	20-AUG-18	R4176887
pH and Conductitivity of Liquid Manure							
pH	7.07		0.10	pH	17-AUG-18	17-AUG-18	R4175645
Conductivity (EC)	3370		10	uS/cm	17-AUG-18	17-AUG-18	R4175645
Metals							
Aluminum (Al)	5930		5.0	mg/kg	15-AUG-18	15-AUG-18	R4170709
Antimony (Sb)	0.73		0.10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Arsenic (As)	3.36		0.10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Barium (Ba)	341		0.50	mg/kg	15-AUG-18	15-AUG-18	R4170709
Beryllium (Be)	0.31		0.10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Bismuth (Bi)	6.62		0.020	mg/kg	15-AUG-18	15-AUG-18	R4170709
Boron (B)	47		10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Cadmium (Cd)	3.15		0.020	mg/kg	15-AUG-18	15-AUG-18	R4170709
Calcium (Ca)	24300		100	mg/kg	15-AUG-18	15-AUG-18	R4170709
Chromium (Cr)	36.5		1.0	mg/kg	15-AUG-18	15-AUG-18	R4170709
Cobalt (Co)	14.6		0.020	mg/kg	15-AUG-18	15-AUG-18	R4170709
Copper (Cu)	243		1.0	mg/kg	15-AUG-18	15-AUG-18	R4170709
Iron (Fe)	10700		25	mg/kg	15-AUG-18	15-AUG-18	R4170709
Lead (Pb)	9.67		0.20	mg/kg	15-AUG-18	15-AUG-18	R4170709
Magnesium (Mg)	7700		10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Manganese (Mn)	630		0.50	mg/kg	15-AUG-18	15-AUG-18	R4170709
Molybdenum (Mo)	21.9		0.10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Nickel (Ni)	33.2		0.50	mg/kg	15-AUG-18	15-AUG-18	R4170709
Phosphorus (P)	14600		100	mg/kg	15-AUG-18	15-AUG-18	R4170709
Potassium (K)	13200		25	mg/kg	15-AUG-18	15-AUG-18	R4170709
Selenium (Se)	4.23		0.50	mg/kg	15-AUG-18	15-AUG-18	R4170709
Silver (Ag)	0.60		0.10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Sodium (Na)	5910		10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Strontium (Sr)	157		0.10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Thallium (Tl)	0.23		0.10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Tin (Sn)	7.6		5.0	mg/kg	15-AUG-18	15-AUG-18	R4170709
Titanium (Ti)	37.8		0.50	mg/kg	15-AUG-18	15-AUG-18	R4170709
Uranium (U)	5.58		0.020	mg/kg	15-AUG-18	15-AUG-18	R4170709
Vanadium (V)	16.1		0.50	mg/kg	15-AUG-18	15-AUG-18	R4170709
Zinc (Zn)	621		10	mg/kg	15-AUG-18	15-AUG-18	R4170709
Total Available N & NO3-N, NO2-N & NH4							
Nitrate, Nitrite & Nitrate+Nitrite-N(KCL							
Nitrite-N	<1.6	DLM	1.6	mg/kg	20-AUG-18	20-AUG-18	R4178672
Nitrate+Nitrite-N	44.6	DLM	4.0	mg/kg	20-AUG-18	20-AUG-18	R4178672
Nitrate-N	44.6	DLM	4.0	mg/kg	20-AUG-18	20-AUG-18	R4178672
Total Organic N-liquid manure -as rec'd							
Ammonium - N in Liquid Manure - as rec'd							
Ammonia, Total (as N)	3.1		1.0	lb/1000gal	17-AUG-18	17-AUG-18	R4176075
Total N in Liquid Manure -as rec'd							
Total Nitrogen	29.1		1.0	lb/1000gal	17-AUG-18	17-AUG-18	R4176186

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
HG-200.2-CVAA-WP	Soil	Mercury in Soil	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Samples for analysis are homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested by block digester (EPA 200.2). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may become "environmentally available." By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

N-TOT-LECO-AGL-SK	Manure	Total N in Liquid Manure -as rec'd	RMMA A3769 3.3

The sample is introduced into a quartz tube where it undergoes combustion at 900 C in the presence of oxygen.
Combustion gases are first carried through a catalyst bed in the bottom of the combustion tube, where oxidation is completed and then carried through a reducing agent (copper), where the nitrogen oxides are reduced to elemental nitrogen.
This mixture of N2, CO2, and H2O is then passed through an absorber column containing magnesium perchlorate to remove water. N2 and CO2 gases are then separated in a gas chromatographic column and detected by thermal conductivity.

Reference:
Reference: Wolf, A., Watson, M. and Nancy Wolf. 2005. In: John Peters(ed.) Recommended Methods for Manure Analysis. Method 3.3

N-TOTKJ-COL-SK	Soil	Total Kjeldahl Nitrogen	CSSS (2008) 22.2.3

The soil is digested with sulfuric acid in the presence of CuSO4 and K2SO4 catalysts. Ammonia in the soil extract is determined colrimetrically at 660 nm.

N2/N3-AVAIL-KCL-SK	Soil	Nitrate, Nitrite & Nitrate+Nitrite-N(KCL	CSSS (2008) 6.2-6.3

Plant available nitrate and nitrite are extracted from the sample with 2N KCl. Nitrate and Nitrite in the filtered extract are determined colorimetrically by Technicon auto-analyzer or flow injection analyzer at 520 nm.

NH4-AGL-SK	Manure	Ammonium - N in Liquid Manure - as rec'd	RMMA A3769 4.1

Ammonium is determined by steam distillation into boric acid followed by titration with standard acid.

Reference: Wolf, A., Watson, M. and Nancy Wolf. 2005. In: John Peters(ed.) Recommended Methods for Manure Analysis. Method 4.1

PH/EC-AGL-SK	Manure	pH and Conductitivity of Liquid Manure	RMMA A3769 7.5/8.5

The sample is analyzed directly using a calibrated pH/Conductivity meter.

Reference: Wolf, A., Watson, M. and Nancy Wolf. 2005. In: John Peters(ed.) Recommended Methods for Manure Analysis. Methods 7.5 and 8.5

PO4-AVAIL-OLSEN-SK	Soil	Available Phosphate-P by Olsen	CSSS (2008) 8.2

Plant available phosphorus is extracted from the sample with sodium bicarbonate. PO4-P in the filtered extract is determined colorimetrically at 880 nm.

SOLIDS-TOT/TOTVOL-SK	Manure	Total Solids and Total Volatile Solids	APHA 2540G

A well-mixed sample is evaporated in a weighed dish and dried to constant weight in an oven at 103-105°C. The increase in weight over that of the empty dish represents the Total Solids. The crucible is then ignited at 550°–10°C for 1 hour. The remaining solids represent the Total Fixed Solids, while the weight lost on ignition represents the Total Volatile Solids.

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

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
SK		ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA	
WP		ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA	

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Quality Control Report

Workorder: L2146080 Report Date: 24-AUG-18

Client: City of Portage la Prairie - Wastewater
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 0L8
Contact: AARON STECHESEN

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAA-WP	Soil							
Batch R4171819								
WG2851185-4 CRM		**CANMET TILL-1**						
Mercury (Hg)			95.7		%		70-130	15-AUG-18
WG2851185-2 LCS								
Mercury (Hg)			95.0		%		80-120	15-AUG-18
WG2851185-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	15-AUG-18
MET-200.2-MS-WP	Soil							
Batch R4170709								
WG2850388-4 CRM		**CANMET TILL-1**						
Aluminum (Al)			98.7		%		70-130	15-AUG-18
Antimony (Sb)			102.2		%		70-130	15-AUG-18
Arsenic (As)			95.8		%		70-130	15-AUG-18
Barium (Ba)			94.8		%		70-130	15-AUG-18
Beryllium (Be)			104.5		%		70-130	15-AUG-18
Bismuth (Bi)			99.1		%		70-130	15-AUG-18
Boron (B)			3		mg/kg		0-8	15-AUG-18
Cadmium (Cd)			90.1		%		70-130	15-AUG-18
Calcium (Ca)			102.2		%		70-130	15-AUG-18
Chromium (Cr)			94.9		%		70-130	15-AUG-18
Cobalt (Co)			94.3		%		70-130	15-AUG-18
Copper (Cu)			97.4		%		70-130	15-AUG-18
Iron (Fe)			98.2		%		70-130	15-AUG-18
Lead (Pb)			100.5		%		70-130	15-AUG-18
Magnesium (Mg)			101.4		%		70-130	15-AUG-18
Manganese (Mn)			98.8		%		70-130	15-AUG-18
Molybdenum (Mo)			108.7		%		70-130	15-AUG-18
Nickel (Ni)			100.3		%		70-130	15-AUG-18
Phosphorus (P)			93.3		%		70-130	15-AUG-18
Potassium (K)			87.3		%		70-130	15-AUG-18
Selenium (Se)			90.3		%		70-130	15-AUG-18
Silver (Ag)			106.4		%		70-130	15-AUG-18
Sodium (Na)			81.3		%		70-130	15-AUG-18
Strontium (Sr)			104.9		%		70-130	15-AUG-18
Thallium (Tl)			0.13		mg/kg		0.03-0.23	15-AUG-18
Tin (Sn)			1.0		mg/kg		0-3.1	15-AUG-18
Titanium (Ti)			82.4		%		70-130	15-AUG-18

ALS Environmental

Quality Control Report

Workorder: L2146080 Report Date: 24-AUG-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4170709								
WG2850388-4 CRM		**CANMET TILL-1**						
Uranium (U)			99.9		%		70-130	15-AUG-18
Vanadium (V)			94.0		%		70-130	15-AUG-18
Zinc (Zn)			97.6		%		70-130	15-AUG-18
WG2850388-2 LCS								
Aluminum (Al)			95.1		%		80-120	15-AUG-18
Antimony (Sb)			98.2		%		80-120	15-AUG-18
Arsenic (As)			93.9		%		80-120	15-AUG-18
Barium (Ba)			93.7		%		80-120	15-AUG-18
Beryllium (Be)			99.7		%		80-120	15-AUG-18
Bismuth (Bi)			98.9		%		80-120	15-AUG-18
Boron (B)			94.9		%		80-120	15-AUG-18
Cadmium (Cd)			93.4		%		80-120	15-AUG-18
Calcium (Ca)			97.8		%		80-120	15-AUG-18
Chromium (Cr)			93.5		%		80-120	15-AUG-18
Cobalt (Co)			93.1		%		80-120	15-AUG-18
Copper (Cu)			94.2		%		80-120	15-AUG-18
Iron (Fe)			94.3		%		80-120	15-AUG-18
Lead (Pb)			98.7		%		80-120	15-AUG-18
Magnesium (Mg)			102.2		%		80-120	15-AUG-18
Manganese (Mn)			93.6		%		80-120	15-AUG-18
Molybdenum (Mo)			101.0		%		80-120	15-AUG-18
Nickel (Ni)			92.8		%		80-120	15-AUG-18
Phosphorus (P)			94.6		%		80-120	15-AUG-18
Potassium (K)			95.3		%		80-120	15-AUG-18
Selenium (Se)			102.0		%		80-120	15-AUG-18
Silver (Ag)			97.5		%		80-120	15-AUG-18
Sodium (Na)			94.1		%		80-120	15-AUG-18
Strontium (Sr)			103.3		%		80-120	15-AUG-18
Thallium (Tl)			96.2		%		80-120	15-AUG-18
Tin (Sn)			92.8		%		80-120	15-AUG-18
Titanium (Ti)			89.1		%		80-120	15-AUG-18
Uranium (U)			97.1		%		80-120	15-AUG-18
Vanadium (V)			94.8		%		80-120	15-AUG-18
Zinc (Zn)			93.2		%		80-120	15-AUG-18
WG2850388-1 MB								

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-WP	Soil							
Batch R4170709								
WG2850388-1 MB								
Aluminum (Al)			<5.0		mg/kg		5	15-AUG-18
Antimony (Sb)			<0.10		mg/kg		0.1	15-AUG-18
Arsenic (As)			<0.10		mg/kg		0.1	15-AUG-18
Barium (Ba)			<0.50		mg/kg		0.5	15-AUG-18
Beryllium (Be)			<0.10		mg/kg		0.1	15-AUG-18
Bismuth (Bi)			<0.020		mg/kg		0.02	15-AUG-18
Boron (B)			<10		mg/kg		10	15-AUG-18
Cadmium (Cd)			<0.020		mg/kg		0.02	15-AUG-18
Calcium (Ca)			<100		mg/kg		100	15-AUG-18
Chromium (Cr)			<1.0		mg/kg		1	15-AUG-18
Cobalt (Co)			<0.020		mg/kg		0.02	15-AUG-18
Copper (Cu)			<1.0		mg/kg		1	15-AUG-18
Iron (Fe)			<25		mg/kg		25	15-AUG-18
Lead (Pb)			<0.20		mg/kg		0.2	15-AUG-18
Magnesium (Mg)			<10		mg/kg		10	15-AUG-18
Manganese (Mn)			<0.50		mg/kg		0.5	15-AUG-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	15-AUG-18
Nickel (Ni)			<0.50		mg/kg		0.5	15-AUG-18
Phosphorus (P)			<100		mg/kg		100	15-AUG-18
Potassium (K)			<25		mg/kg		25	15-AUG-18
Selenium (Se)			<0.50		mg/kg		0.5	15-AUG-18
Silver (Ag)			<0.10		mg/kg		0.1	15-AUG-18
Sodium (Na)			<10		mg/kg		10	15-AUG-18
Strontium (Sr)			<0.10		mg/kg		0.1	15-AUG-18
Thallium (Tl)			<0.10		mg/kg		0.1	15-AUG-18
Tin (Sn)			<5.0		mg/kg		5	15-AUG-18
Titanium (Ti)			<0.50		mg/kg		0.5	15-AUG-18
Uranium (U)			<0.020		mg/kg		0.02	15-AUG-18
Vanadium (V)			<0.50		mg/kg		0.5	15-AUG-18
Zinc (Zn)			<10		mg/kg		10	15-AUG-18
N-TOTKJ-COL-SK	Soil							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
N-TOTKJ-COL-SK	Soil							
Batch R4178492								
WG2851441-2 IRM		**08-109_SOIL**						
Total Kjeldahl Nitrogen			89.7		%		80-120	20-AUG-18
WG2851441-3 MB								
Total Kjeldahl Nitrogen			<0.020		%		0.02	20-AUG-18
N2/N3-AVAIL-KCL-SK	Soil							
Batch R4178672								
WG2850491-3 IRM		**SAL814**						
Nitrate+Nitrite-N			106.0		%		70-130	20-AUG-18
WG2850491-2 MB								
Nitrite-N			<1.0		mg/kg		1	20-AUG-18
Nitrate+Nitrite-N			<2.0		mg/kg		2	20-AUG-18
PO4-AVAIL-OLSEN-SK	Soil							
Batch R4178732								
WG2853010-3 IRM		**FARM2005**						
Available Phosphate-P			117.4		%		80-120	20-AUG-18
WG2853010-2 MB								
Available Phosphate-P			<1.0		mg/kg		1	20-AUG-18
N-TOT-LECO-AGL-SK	Manure							
Batch R4176186								
WG2851749-1 DUP		**L2146080-1**						
Total Nitrogen		29.1	26.7		lb/1000gal	8.3	30	17-AUG-18
WG2851749-3 IRM		**IH-10**						
Total Nitrogen			99.6		%		90-110	17-AUG-18
WG2851749-4 LCS		**SULFADIAZINE**						
Total Nitrogen			100.6		%		90-110	17-AUG-18
WG2851749-2 MB								
Total Nitrogen			<1.0		lb/1000gal		1	17-AUG-18
NH4-AGL-SK	Manure							
Batch R4176075								
WG2851611-2 IRM		**NH4-1000**						
Ammonia, Total (as N)			102.3		%		85-115	17-AUG-18
WG2851611-3 MB								
Ammonia, Total (as N)			<1.0		lb/1000gal		1	17-AUG-18
SOLIDS-TOT/TOTVOL-SK	Manure							

ALS Environmental

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TOT/TOTVOL-SK	Manure							
Batch R4176887								
WG2851607-1 DUP		**L2146080-1**						
Total Solids		2.41	2.34		%	3.1	25	20-AUG-18
Total Volatile Solids (dry basis)		67.2	65.7		%	2.3	25	20-AUG-18

Legend:

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

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Plant Available Nutrients							
Nitrate, Nitrite & Nitrate+Nitrite-N(KCL	1	14-AUG-18 08:30	20-AUG-18 13:15	3	6	days	EHT

Legend & Qualifier Definitions:

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

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2146080 were received on 14-AUG-18 11:20.

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

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

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

ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Chain of Custody / Analytical Request Form

COC # _____

Page 1 of 1

L2146080-COFC

Report to:			
Company:	City of Portage la Prairie		
Contact:	Aaron Stechesen		
Address:	97 Saskatchewan Ave. E.	Email 1:	astechesen@city-plap.com
	Portage la Prairie, MB R1N 0L8	Email 2:	
Phone:	204-239-8361 Fax: 204-239-8364		
Invoice To:	Same as Report ? Yes / No ?	Client / Project Information:	
Company:	City of Portage la Prairie	Job #:	
Contact:	Accounts Payable	PO / AFE:	W02435
Address:	97 Saskatchewan Ave. E.	Legal Site Description:	
	Portage la Prairie, MB R1N 0L8		
Phone:	204-239-8357 Fax:	Quote #:	
Lab Work Order # (lab use only)		ALS Contact:	Judy Dolmaijer
		Sampler:	

Service Requested: (rush - subject to availability)

- Regular (Default)
- X Priority (2-3 Business Days) - 50% Surcharge
- Emergency (1 Business Day) - 100% Surcharge
- For Emergency < 1 Day, ASAP or Weekend - Contact ALS

Analysis Request

(Indicate Filtered or Preserved, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	SOLIDS-TOT/TOTVOL-SK	EC/pH-AGL-SK	N-TOT-ORG-AGL-SK	NO3-AVAIL-SK	N-TOTKJ-COL-SK	PO4-AVAIL-OLSEN-SK	HG-200.2-CVAF-WP	MET-200.2-MS-WP	N-TOT-AVAIL-SK	Coliform-TC,FC-MPN-ENDPT		SAMPLE-DISPOSAL-WP	Number of Containers
1	18-08-46	14-Aug-18	8:30	Sludge	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	1

HS

Special Instructions / Regulations / Hazardous Details

PRIORITY/RUSH Service - Results required by August 20 before noon!

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
	Aug 14/18 9:30am	GRU	08/14/18	11:20	14.9			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENF 18.00 Front

Delta Ag Services
City of Portage
Brooks E 30-12-8

Test Date: August 30, 2018

E 30-12-08 - 316.8 Ac

Portage Soils-Clip - 316.8 Ac

SamplePointsRW - 0 t

Clay test - 4 Ac

Clay test sites 1 and 2 had no detectable water table at the 1.5 m depth

Delta Ag SERVICES

Delta Ag Services
City of Portage
McDonald NW 01-13-07

Test Date: August 13, 2018

Portage Soils-Clip - 161.1 Ac
Clay Water test - 1.2 Ac
NW 1-13-7 - 161.1 Ac
SamplePointsEF - 0 t

Clay Test sites 1 and 2 had no detectable water table at the 1.5 m depth

Delta Ag SERVICES

Delta Ag Services
City of Portage
Tidsbury NW 31-12-5

Test Date: September 7, 2018

Clay Test - 2.4 Ac
NW 31-12-5 - 161.2 Ac
Portage Soils-Clip - 161.2 Ac
SamplePointsRW - 0 t

Clay test sites 1,2,3 and 4 had no detectable water table at the 1.5 m depth

Delta Ag SERVICES

Delta Ag Services
City of Portage
Stangl SW 14-12-8

Test Date: August 30, 2018

SW 14-12-8 - 189.7 Ac
Portage Soils-Clip - 189.7 Ac
SamplePointsRW - 0 t
Clay Test - 1.9 Ac

Clay Test sites 1 and 2 had no detectable water table at the 1.5 m depth.

Delta Ag SERVICES

Delta Ag Services
City of Portage
Stangl SW 22-12-8

Test date: August 30, 2018

Boundary - 154.6 Ac
Portage Soils-Clip - 154.6 Ac
Clay Test - 1 Ac

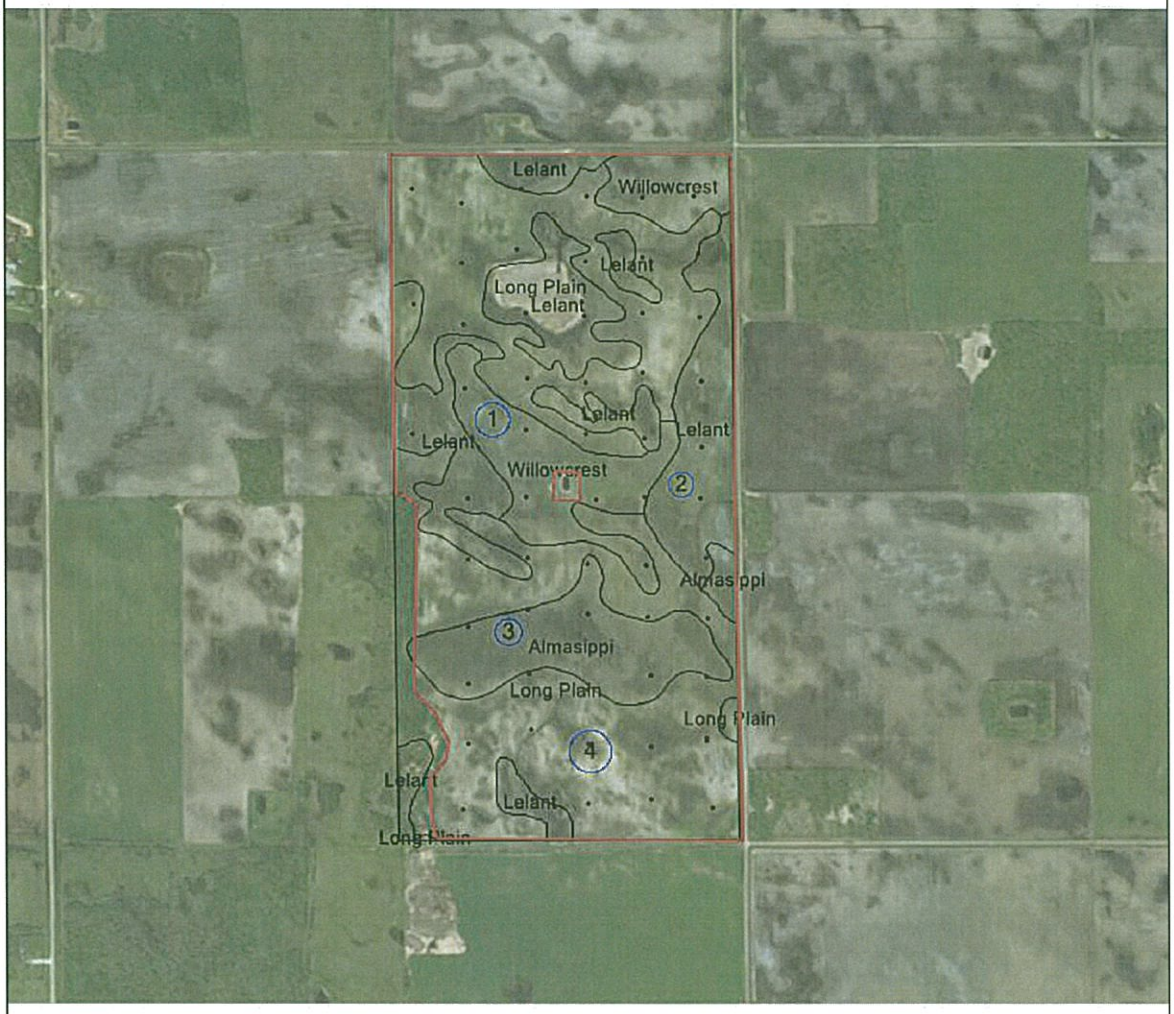
SamplePointsRW - 0 t

Clay test sites 1 and 2 had no detectable water table at the 1.5 m depth.

Delta Ag SERVICES

Delta Ag Services
City of Portage
E 07-09-07

Test date: June 12 2018



soilmap-Clip - 319.8 Ac
Clay test - 4.6 Ac
Boundary bf merged - 306.7 Ac
Sample Points - 0 t

Clay test sites 3 and 4 had detectable water table at the 1.5 M depth. Sites 1 and 2 had no detectable water table.

Delta Ag SERVICES