Winnipeg

Water and Waste Department • Service des eaux et des déchets

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Client File No.: 963.20
Our File No(s): S-1021
020-17-08-11-00
020-17-08-11-0N

Manitoba Sustainable Development
Climate Change and Environmental Protection Division
Environmental Approvals Branch
Suite 160 – 123 Main Street (Box 80)
Winnipeg, MB R3C 1A5

Attention: Ms. Tracey Braun, M.Sc., Director

Dear Ms. Braun:

Re: Notice of Alteration, Environment Act Licence No. 1089 E RR
Biosolids Land Application – Client File No. 963.20

Please accept this letter as a Notice of Alteration to the above noted Environment Act Licence, for a biosolids land application pilot program.

The City of Winnipeg is developing a biosolids land application program for the wastewater biosolids, as recommended in the 2014 Biosolids Master Plan. The City proposes to run a pilot program for biosolids land application of approximately 5,000 wet tonnes in the fall of 2017.

The purpose of the pilot program is to build relationships with stakeholders and prepare for an annual biosolids land application program of approximately 20,000 wet tonnes per year. The approach for the pilot program is described in Section 1. The potential effects, mitigation measures and the approach to field storage of biosolids are outlined in Section 2.

1.0 PILOT PROGRAM APPROACH

The pilot program and any future land application program will comply with all applicable regulations, including the Nutrient Management Regulation.

1.1 Description

The pilot land application program requires the uniform application of approximately 5,000 wet tonnes of biosolids. The application rates will be determined by a Professional Agrologist based on the parameters outlined in the Nutrient Management Regulation.

The plan is to use an agronomically sustainable method based on a three year land rotation. The method includes prescribing application rates for a two times crop removal rate of phosphorus; this means providing farm producers with sufficient nutrient loading to carry a crop for two harvests and maintain the residual phosphorus soil nutrient at a concentration that would permit multiple years of nutrient loading and manage phosphorus accumulation.

The biosolids will be tested bi-weekly from May to October 2017 for nutrient and metals parameters to ensure that accurate application rates are developed. The inorganic parameters will be reviewed including the loading and accumulation of metals, recognizing the limiting metals are copper, cadmium, mercury, arsenic, nickel, chromium, lead and zinc.

Based on preliminary calculations, in order to meet a two times crop removal application rate, the pilot program will require just over 300 hectares (755 acres) of land. The application rate and land area will be confirmed with supplemental analytical information for biosolids and soil parameters.

The application will be completed using a 50 ton JBS spreader equipped with rear seal end gates, GPS, auto steer and real time scale system for proper application rates.

The pilot application will be completed in the fall 2017. Starting in June, farm producers will be contacted to identify suitable land. It is anticipated that immediately following harvest, soil samples will be taken to confirm soil residual nutrient values and metal concentrations. This information will be used to determine the application rates. It is anticipated that land application will start at the end of August and will not extend past November 10th. During the 2018 season, farm producers will manage the crop and harvest. The 2018 growing season can be used to demonstrate the effectiveness of land application for reuse of nutrients from the biosolids. Soil sampling will be completed from 2017 to 2020.

When the agricultural land is confirmed, a letter addendum for this NOA will be submitted to the regulator. The addendum will include information on the locations, land use agreement(s), certificate of land title(s), soil suitability and crop rotation practices.

1.2 Public Engagement

Public acceptance and support is critical for the pilot program and any future land application program. The City is conducting public engagement from April to July 2017 to gather feedback from stakeholders. The public engagement process includes a workshop with regional stakeholders, meetings with municipalities, and public open houses.

The City will work with the public to provide balanced and objective information, ensure that public concerns are consistently understood and considered in decisions, and provide feedback on how public input influenced decisions.

The public engagement process will include input from regional and municipal stakeholders on areas that may be suitable for biosolids land application.

1.3 Farm Producer Engagement

The project team will work with farm producers to identify suitable lands for biosolids land application, within the constraints of the Nutrient Management Regulation and typical Environment Act Licence restrictions (e.g. thickness of clay, outside of known flood zones, etc.).

Selection of application sites will be influenced by the following:

- Provincial Acts and Regulations
- Best Management Practices
- Stakeholder input

- Land availability, suitability and agronomy
- Constraints such as soil type, agricultural capability, existing nutrient management programs, buffer zones, setback distances, hauling distance, etc.

A land use agreement is required between the farm producer/owner and the City, and must be maintained in pertinent records. Land use agreements will be signed for the pilot land application program prior to land application. The pilot land application will be completed with the intent of zero dollars compensation for land use as the nutrient value of the biosolids should be sufficient compensation.

1.4 Notifications

Prior to each application of biosolids, notification will be provided to the Rural Municipality, farm producers and immediately adjacent neighbours. The notification process shall include the following:

- The project team will notify landowners and immediately adjacent neighbours two weeks prior to land application. The method of notification will be confirmed with the Rural Municipality, farm producers and site application neighbours. The notice will include details on the application site, application timing, regulatory framework and contact information for questions or concerns.
- Provide a record of these notifications to the City of Winnipeg
- Respond to any questions or queries from the public within three days.

1.5 Geographic Information System (GIS) Database Management

The GIS database will warehouse a cross-section of relevant data including, but not limited to:

- Land owner and farm producers contact information
- Land titles
- Soil series suitability
- Canadian Land Inventory Dryland Agricultural Capability
- Nutrient management plan
- Residual soil analysis
- Cropping systems and rotational information including specialty crop limitations
- Application restrictions
- Buffer zones
- Notification needs
- Complaints
- Compliance records

The database will be developed in ESRI ArcGIS. Data from the land application can be directly uploaded from field equipment to demonstrate real-time variable rate applications. The GIS database helps ensure information remains organized, structured and compliant with the requirements of regulatory agencies.

1.6 Soil Sampling

Soil sampling for the pilot program will be completed from 2017 to 2020. The anticipated number of soil sampling points for the pilot program is outlined in the table below, based on typical Environment Act Licence requirements.

Soil Sampling Points

Activity	Year	Est. Number of Soil Sampling Points
Pilot Land Application Program YR1	2017	13
Pilot Monitoring	2018	13
Pilot Monitoring	2019	13
Pilot Monitoring	2020	13

The soil sampling and analytical requirements of agricultural fields will be completed on a standard benchmark point basis within a representative soil polygon and landscape position. Benchmark sampling will be completed based on 24 hectare (60 acre) parcels as typically prescribed by Environment Act Licences. Benchmark sampling is a geo-referenced sample point where up to eight sub-samples are collected for a composite sample. The benchmark location will be selected based on the most representative soil polygon and landscape position as outlined by regulatory requirements.

The anticipated soil analysis program is based on the following:

- One benchmark sample point per 24 hectare field within the representative soil polygon.
- Two sample depths per benchmark sample point (from 0 to 15 cm and 15 to 60 cm depths).
- Each sample will be analyzed for:
    - Physical characteristics, nutrient profile and metals
    - Nutrient characteristics: nitrogen profile (total nitrogen, nitrate-nitrogen, ammonium nitrogen), olsen-bicarbonate phosphorous (0-15cm), potassium and sulfate-sulfur
    - CCME metals profile (0-15cm sample depth, up to 20 metals or as required by the regulator).

Soil samples will be submitted to a Canadian Association for Laboratory Accreditation Inc. (CALA) accredited laboratory for analysis. This accreditation is based on international standards (ISO 17025) and involves extensive site audits and ongoing performance evaluations.

Upon receipt of the soil sample analysis, a letter will be submitted to the regulator that outlines the soil results and will include a description of the prescribed application rate and the anticipated metals loading rate.

1.7 Reporting

The results of the pilot will be summarized in a report and submitted to the regulator. Information to be included in the report includes the following:

- Nutrient Management Plans and application rates.
- Land application details including; location, spread area, tonnage spread, application rates and date(s).
- Summary of analytical results for biosolids sampling and soil sampling including locations, quantities, certificates of analysis.
- Summary of all public enquiries and complaints about the biosolids land application program including the response and follow-up actions.
- Summary of all incidents, accidents and spills including corrective and preventative action taken.
- Recommendations (if any).

2.0 POTENTIAL EFFECTS

The potential effects to the environment and to human health and proposed mitigation measures are summarized in Section 2.1 and 2.2. The approach to field storage of biosolids is outlined in Section 2.3.

2.1 Potential Environmental Effects

The potential environmental effects of biosolids land application, with the proposed mitigation measures, are summarized in the table below:

Potential Environmental Concerns and Proposed Mitigation Measures

Potential Environmental Concern	Proposed Mitigation
Impacts to groundwater	• Biosolids will comply with all applicable regulations to protect groundwater, including the Nutrient Management Regulation • Biosolids will be applied at targeted application rates • The program will comply with all required buffer zones and setback distances from groundwater wells • The program will follow the typical Environment Act Licence requirement to apply and/ or store biosolids on land that has at least 1.5m of clay till
Impacts to surface water	• Biosolids will comply with all applicable regulations to protect surface water, including the Nutrient Management Regulation • Biosolids will be applied at targeted application rates • The program will comply with all required buffer zones and setback distances from water bodies • The program will follow the requirement to apply only during the application season, i.e. no application on frozen soil.
Nutrient Loading	• Biosolids will be applied at targeted application rates. • The program will follow all required buffer zones and setback distances.

Potential Environmental Concern	Proposed Mitigation
	• The program will consider the availability of the nutrient source, the overall crop rotation, residual nutrients available within the soil profile, and other factors. • The soil will be monitored for 3 years following application.
Metals	• There are limits in the City of Winnipeg's Sewer By-Law for many contaminants. Industries out of by-law compliance are subject to the Pollution Prevention Program. • Biosolids will be sampled bi-weekly and analyzed for metals • Soil sampling will be conducted prior to application and samples will be analyzed for metals. • The CCME guidelines for soil quality will be followed. • The soil will be monitored for 3 years following application.
Odour	• The program will follow best management practices for odour management outlined in the CCME Guidance Document for Beneficial Use of Biosolids and the US EPA Guidelines for Field Storage of Biosolids. • The program will follow all required buffer zones and setback distances • Biosolids will be incorporated into the soil as soon as possible after application

2.2 Potential Human Health Effects

The potential human health effects of biosolids land application, with the proposed mitigation measures, are summarized in the table below:

Potential Human Health Concerns and Proposed Mitigation Measures

Potential Human Health Concern	Proposed Mitigation
Metals	• There are limits in the City of Winnipeg's Sewer By-Law for many contaminants. Industries out of by-law compliance are subject to the Pollution Prevention Program. • Biosolids will be sampled bi-weekly and analyzed for metals • Soil sampling will be conducted prior to application and samples will be analyzed for metals. • The CCME guidelines for soil quality will be followed. • The soil will be monitored for 3 years following application. • The program will follow the crop restrictions typically outlined in Environment Act Licences, which limits the crops that can be planted in the 3 years following application.

Potential Human Health Concern	Proposed Mitigation
Pathogens	• Biosolids to be applied are anaerobically digested at the wastewater treatment plant, which significantly reduces pathogens, and produces US EPA Class B biosolids. • Once biosolids are applied, pathogen survival decreases significantly due to climate exposure (desiccation, UV light) and the soil environment (pH, temperature, competing organisms, etc.) • The program will follow the crop restrictions typically outlined in Environment Act Licences, which limits the crops that can be planted in the 3 years following application.
Emerging Substances of Concern	• Scientists, health experts and agronomists continually review regulatory requirements and standards for land application to verify that they protect food safety and human health. • The program will follow the crop restrictions typically outlined in Environment Act Licences, which limits the crops that can be planted in the 3 years following application.

2.3 Field Storage of Biosolids

In order to run the land application program, temporary storage of biosolids is required. The temporary storage facility in the R.M. of West St. Paul outlined in Appendix A of EAL 1089 E RR is no longer used for biosolids storage.

The approach to field storage will be determined in the coming months. The details of field storage will be submitted to the regulator prior to any field storage, including information on odour management, water management, security and placement and access during wet weather.

The City's proposed approach to field storage will be consistent with the best management practices outlined in the CCME Guidance Document for Beneficial Use of Biosolids (2012) and the US EPA Guidelines for Field Storage of Biosolids (2002). The field storage approach will comply with the Livestock Manure and Mortalities Management Regulation (LMMMR) (42/98). The mitigation measures for field storage are described in the table below.

Proposed Mitigation Measures for Field Storage of Biosolids

Proposed Approach	Environmental Aspect to Mitigate	Supporting Argument
Locate biosolids storage location at least 100 m from any surface water course, sinkhole, and spring or well and in a manner that does not cause pollution of surface water, groundwater or soil.	Access to surface water, sinkhole, spring or well.	• Manitoba Environment Act, LMMMR.
Only biosolids that contain more than 25% solids matter and/or meet a slump test requirement can be stored in field.	Access to surface water, sinkhole, spring or well.	• Manitoba Environment Act, LMMMR.
Locate biosolids storage location at a site with the presence of clay and clay till to a depth of 1.5 metres.	Access to groundwater impacts through leachate	• Manitoba Environment Act Licence Schedule A as applied to biosolids land application programs.
Locate biosolids storage site at least 1600 m from designated residential area, 300 m from a residence, at least 30 m from property line with residence and at least 15 m from property line without residence.	Odour buffer zone and good neighbour practices.	• Farm Practices Guidelines for Pig Producers in Manitoba (2007). Table 11 Recommended Distances from Residential Areas and Property Lines for Apply Manure. Application method: Irrigation – assumed to be most odour generating practice hence most separation distances applied. • US EPA Guide to Field Storage of Biosolids • National Manual of Good Practices for Biosolids, National Biosolids Partnership, June 2011.
Biosolids field storage shall be removed and land applied in a field storage area between May 1 and November 10 of the year stored.	Odour, exposure management	• Manitoba Environment Act, LMMMR.

Proposed Approach	Environmental Aspect to Mitigate	Supporting Argument
After the biosolids are removed, the field storage area must remain empty of biosolids for at least 12 months. Before storing biosolids in the area again, the site must grow a crop on the emptied biosolids storage area that will deplete the area of any leached nutrients.	Odour, exposure and nutrient management	• Manitoba Environment Act, LMMMR.
The field storage location would be established to be of sufficient capacity to store all the managed biosolids to be used on the land application site for the period of time needed for its application as a fertilizer.	Odour, exposure and nutrient management	• BC Environment Management Act Clause 18. • US EPA Guide to Field Storage of Biosolids • National Manual of Good Practices for Biosolids, National Biosolids Partnership, June 2011.
Develop a Best Management Practice, site selection requirement and operations checklist prior to implementing a field storage location.	Best Management Practices and good neighbour practices	• US EPA Guide to Field Storage of Biosolids • National Manual of Good Practices for Biosolids, National Biosolids Partnership, June 2011.

3.0 REGULATORY COMPLIANCE

The City's Environment Act Licence (EAL) 1089 E RR for biosolids land application was originally issued in 1989 and revised in 2000, before the Nutrient Management Regulation came into force in 2008.

The main alteration to EAL 1089 E RR is that the pilot land application program will follow the agronomic rates, methods, nutrient management zones, sampling requirements, etc. outlined in the Nutrient Management Regulation, which are significantly more stringent than the rates and methods outlined in EAL 1089 E RR. The lower application rates and greater restrictions will result in a pilot application program which is more protective of water quality and adheres to responsible nutrient application.

The pilot program will comply with all applicable regulations, including the provincial Nutrient Management Regulation, the Water Protection Act, the Environment Act, the Livestock Manure and Mortalities Management Regulation and the Workplace Safety and Health Act.

Should you have any questions or require additional information, please contact Duane Griffin at (204) 986-4483 or at dgriffin@winnipeg.ca . Thank you for your consideration.

Yours truly,

Chris Carroll, P. Eng., MBA
Manager of Wastewater Services Division

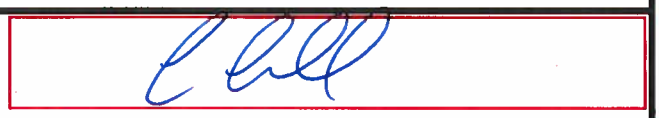
Attachment

AEW/jl

c: M.L. Geer, CPA, CA, Water and Waste Department (email)
G.K. Patton, P.Eng., Water and Waste Department (email)
D.E. Griffin, P.Eng., Water and Waste Department (email)
D. Keam, WSP Global Company (email)

Notice of Alteration Form

Manitoba
Sustainable Development

Client File No.: 963.20	Environment Act Licence No.: 1089 E RR
Legal name of the Licencee: City of Winnipeg	
Name of the development: Biosolids land application - pilot project	
Category and Type of development per Classes of Development Regulation: Waste Treatment and Storage — Biosolids application	
Licencee Contact Person: Chris Carroll, City of Winnipeg, Manager of Wastewater Services Mailing address of the Licencee: 109 -1199 Pacific Avenue City: Winnipeg — Province: MB — Postal Code: R3E 3S8 Phone Number: (204) 986-7435 Fax: — Email: ccarroll@winnipeg.ca	
Name of proponent contact person for purposes of the environmental assessment (e.g. consultant): Amanda Wolfe, City of Winnipeg Project Manager	
Phone: (204) 986-2808 Fax:	Mailing address: 110 - 1199 Pacific Ave. Winnipeg R3E 3S8
Email address: awolfe@winnipeg.ca	
Short Description of Alteration *(max 90 characters)*: Pilot application of 5,000 wet tonnes of wastewater biosolids on agricultural land	
Alteration fee attached: Yes: ☑ No: ☐ If No, please explain:	
Date: 8 June 2017	Signature:  Printed name: Chris Carroll

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

- ☑ **Cover letter**
- ☑ **Notice of Alteration Form**
- ☑ **4 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
Suite 160, 123 Main Street
Winnipeg, Manitoba R3C 1A5

For more information:

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