

## **SUMMARY OF COMMENTS/RECOMMENDATIONS**

**PROPOSER:** City of Winnipeg  
**PROPOSAL NAME:** Land Application of Biosolids  
**CLASS OF DEVELOPMENT:** 2  
**TYPE OF DEVELOPMENT:** Waste Treatment and Storage  
**CLIENT FILE NO.:** 5951.00

### **OVERVIEW**

Manitoba Environment, Climate and Parks received an Environment Act Proposal on February 2, 2018 for a biosolids land application program. The proposed program would consist of annual land application events for the City of Winnipeg's biosolids materials that have undergone final treatment at the City's North End Water Pollution Control Centre (NEWPCC) onto agricultural lands within rural municipalities located in proximity to the City in an agri-environmentally sustainable manner. The program would involve transporting biosolids via enclosed trucks from the NEWPCC to agricultural fields within the Rural Municipalities of Rosser and/or Macdonald and/or Cartier or other possible municipalities. Up to 70% of the monthly biosolids produced by the City during May through October of a given year, or approximately 20,000 wet metric tonnes, would be land applied each application season.

The department, on March 2, 2018, placed copies of the proposal in the public registry located online at <http://www.gov.mb.ca/sd/eal/registries/index.html>. The department placed a notice of the Environment Act Proposal in the Winnipeg Free Press newspaper on Saturday, March 3, 2018. The newspaper notification invited responses until April 3, 2018. The department distributed requests for comments on the Proposal to the Technical Advisory Committee (TAC) on March 5, 2018 requesting that the TAC provide responses by April 3, 2018.

The department forwarded TAC requests for additional information to the proponent on April 26, 2018. The department received the proponent's responses to the requests for additional information on May 22, 2018 and distributed them to the requestors on May 25, 2018. No additional comments followed.

### **COMMENTS FROM THE PUBLIC**

Table 1 City of Winnipeg Biosolids Land Application Program  
Public Comments

No	Public	Response Provided
1	Winnipeg Regional Health Authority	April 4, 2018

### **COMMENTS FROM THE TECHNICAL ADVISORY COMMITTEE**

Technical Advisory Committee (TAC) responses are summarized in Table 2 below. Substantive comments and their dispositions follow the table. TAC comments are provided in full in the public registry.

Table 2 City of Winnipeg Biosolids Land Application Program  
 Technical Advisory Committee Comments

No	Technical Advisory Committee Member	Response Provided
1	Manitoba Sustainable Development	
	Environmental Approvals:	No response.
	Water Power Act Licensing	No concerns.
	Forestry and Peatlands	No concerns.
	Lands Branch	No concerns.
	Wildlife and Fisheries Branch (Wildlife)	No concerns.
	Air Quality Management	No response.
	Onsite Wastewater Management Program	Not applicable
	Environmental Compliance and Enforcement Branch	April 5, 2018.
	Office of Drinking Water	March 6, 2018
	Drainage and Water Use Licensing Branch:	No response.
	Water Use Licensing Section	No concerns.
	Water Control Works and Drainage Licensing Section	No response.
	Climate Change and Clean Technology	No response
	Parks and Protected Spaces Branch	No comments/concerns
	Water Quality Management	April 11, 2018
2	Manitoba Agriculture and Resource Development	
	Agri-Resource Branch	Not applicable
	Wildlife and Fisheries Branch (fisheries)	No response.
	Forestry Branch	No response.
	Lands Branch	No response.
	Regional Land Manager / Integrated Resource Management Team	No response.
	Water Branch:	
	Water Quality Management Section	No response.
	Groundwater Management Section	No response.
	Mines	No response.
	Petroleum	No response.
3	Manitoba Sport, Culture, and Heritage – Historic Resources Branch	No notification.
4	Manitoba Municipal Relations:	
	Community and Regional Planning Branch	No concerns.
5	Manitoba Infrastructure – Highway Planning and Design Branch, Environmental Services	April 12, 2018
6	Manitoba Health, Seniors and Active Living – Environmental Health Unit	No response.
7	Office of the Fire Commissioner	No comments/concerns.

### **COMMENTS FROM THE PUBLIC**

#### **Winnipeg Regional Health Authority – April 4, 2018**

- I support this initiative and believe that the health benefits of the program (climate change mitigation and economic benefits to farmers) will outweigh the potential harms, especially in light of the mitigation measures outlined in the document.

- I concur with mitigation measures outlined in the proposal, including the odor control measures for storage and adoption of “good neighbor practices” with respect to odor issues, as well as soil monitoring for heavy metals and regular review of the academic literature pertaining to ESOCs.
- I would suggest including a Medical Officer of Health (MOH) on the Advisory Committee to consult on odor and other health-related concerns. As well, I would request to be notified of any significant odor or other health related issues if/when they emerge.

Disposition:

- The draft Environment Act Licence includes a clause that requires that an advisory committee, chaired by the Licensee, be established and consist of city staff, one Medical Officer of Health representative of Manitoba Health, and a representative of related provincial departments such as environment, climate and parks, agriculture, or any amended relevant authority or department subsequently established

**COMMENTS FROM THE TECHNICAL ADVISORY COMMITTEE**

**Manitoba Transportation and Infrastructure – Environmental Services Section – April 12, 2018**

- Regional Operations

There shall be no application of the biosolids within MI right of way as this may affect quality of surface run off entering MI ditches. In addition, the proponent should ensure any proposed construction (berms or other) proposed within the Controlled Area must be applied for, and permitted by Manitoba Infrastructure and/or the Highway Traffic Board before any construction begins.

For permit applications, please contact Karen Toews-Therrien at Karen.ToewsTherrien@gov.mb.ca or at (204) 945-0324.

- Water Management, Planning and Standards

Water Management, Planning and Standards notes that the Red River Valley Designated Flood Area and the Lower Red River Designated Flood Area are shown as unavailable constraint areas in the proposal, which notes: “Biosolids will not be applied on lands located within 30 metres of Provincial flood designated areas.” Designated Flood Areas are regulatory areas in which a designated flood area permit is required, as per Section 14 of the Water Resources Administration Act and Designated Flood Area Regulation 59/2002. Designated Flood Areas do not include all flood prone land in the region, such as those areas adjacent to the Seine River, the Assiniboine River, and Lake Manitoba.

Water Management, Planning and Standards has no objections to EAP 5951.00. If further flood risk information is required, beyond the extent of the Designated Flood Areas noted in the EAP, inquiries can be directed to:

Development Review  
Manitoba Infrastructure  
2<sup>nd</sup> Floor 280 Broadway  
Winnipeg, Manitoba R3C 0R8  
[MITWaterReview@gov.mb.ca](mailto:MITWaterReview@gov.mb.ca)  
204-945-2121

Disposition:

- The draft Environment Act Licence contains clauses that requires that the Licensee must comply with the requirements of the Manitoba Water Protection Act and Nutrient Management Regulation and the Manitoba Water Resources Administration Act and Designated Flood Area Regulation or any future amendments thereof during all biosolids land application activities.

**Manitoba Sustainable Development – Water Science and Watershed Management Branch  
– April 11, 2018**

- General comments:

Application of biosolids at 2x crop P removal assuming 25% of total biosolids P is plant available would be a good place to start (note below that in Table C.2 the selected application rate is listed as 2X but the 18 tonne/ha rate is a 3x rate). Under Monitoring (section 9.1.3) I would add that we need crop yield data and an analysis of Total Phosphorus from a sample of any crop removed (grain and also straw if removed from the field) to be able to estimate crop removal of P (important for fine tuning application rates). Addition of a small amount of starter P with the seed will be important for many crops especially in cool/wet springs (for canola 10 lbs P<sub>2</sub>O<sub>5</sub>/acre would be the AgVise labs recommendation) but is generally a good idea when the main phosphorus application is broadcast and incorporated so that emerging seeds have ready access to P during early growth. As per other biosolids programs, biosolids should only be applied to fields with an Olsen-P soil test value (0-15cm) of less than 60 mg/kg.

I have attached a copy of their proposal/report with my comments/notes although most are listed below.

- Appendix C – Table C.2 (annotated copy of table attached)
  1. The soil test data section should not be titled “Plant Available Nutrients Soil Test Data” but rather “soil test data” because the soil test phosphorus value is not a measure of plant available P. Olsen-P and all other soil test P methods are extractions which when correlated with field data for the area give guidance as to the probability of a crop response to fertilizer P. Calling it Available P is misleading and causes confusion in those reading the table. “Available Phosphate-P” should be labelled “Phosphorus (Olsen-P)”. The soil test results were not attached so I do not know what tests were used on the other elements but all should be labelled by the method and not the word “available”.

2. The calculations look fine and use an estimate of 25% of total P being plant available which is acceptable for now. However at the bottom of the table they have a section "Selected Application Rate" which indicates that they have selected to apply at a 2X crop P removal rate but the application rate they list (18 tonnes/ha) is based on a 3x crop P removal. I would not be in favor of a 3x rate especially since we are only assuming 25% available which could well turn out to be too low.
- The proposal includes a brief literature review which in the Phosphorus section (6.2.2.2) contains several points which are inaccurate/misquoted/misunderstood:
    1. The modified Kelowna extraction is not a recognized nor useful measure of plant available phosphorus in biosolids. I have been following the scientific literature and to date no one has found an extraction which can accurately predict plant available P from biosolids (plant availability is a function of the biosolid properties, the soil properties and how they interact – each biosolid-soil mixture is unique).
    2. The reference to Pastene (1981) relies on a few lines referenced in O'Connor et al (2002) [which is not in their reference list but they may mean O'Connor et al (2004)]. This reference does not contain any information as to the type of biosolid, the Fe and Al concentration or how the P-supplying power was assessed so Pastene's finding may or may not be relevant but cannot be given any weight without more information from the actual thesis. Basing their conclusions that the Winnipeg biosolids will provide a low percentage of plant available P on the Al-Fe/P molar ratio as per Pastene (1981) is unwarranted, especially since they have other actual references with detailed method descriptions indicating the 25-75% plant available P is likely appropriate for Winnipeg biosolids.
    3. O'Connor et al (2004) found that biosolids containing >50g/kg total Fe+Al AND a solids content >60% had bio-availability
    4. McCoy et al (1986) used TSP (triple super phosphate) not MCP (monocalcium phosphate) and compared it to composted sewage sludge (high solids and potentially lower plant available P due to drying) which had been treated with Fe or Fe+Al and found it was 10% as plant available as fertilizer P (Fe+Al of 45 and 54g/kg for the 2 composts). The proposal mistakenly attributes some results from de Haan (1980) to McCoy et al. de Haan (1980) who used MCP found 4% P bio-availability for non-biosolid sludges (called "chemical" sludge in the paper – either effluent or surface water treated with Fe/Al to remove P/impurities) which were a very different material from biosolids. For actual sewage sludges, De Haan found 17-54% P bioavailability for Fe treated sewage sludge and the only Fe treated sludge to have lower P availability than other sewage sludges was one that had 15% Fe content (150 g/kg which is much higher than Winnipeg biosolids).
    5. Vaneckhaute et al (2015) did not study biosolids but rather Fe treated liquid hog manure. They found that corn grown with the FePO<sub>4</sub>-sludge yielded as well as with P fertilizer despite lower P uptake – they do not clarify whether the fertilizer treatment had luxury uptake or if the sludge treatment was considered P deficient. The low water solubility indeed indicates poor suitability as a starter fertilizer and would suggest a small amount of starter P fertilizer may be warranted but otherwise the sludge appeared to meet crop P requirements.

Proponent Response – May 11, 2018:

- As outlined in Section 6.2.2.2 of the EAP; the agri-environmental prudent approach to nutrient management planning for the City's land application of biosolids program is to base land application rate recommendations on phosphorus requirements with a soil monitoring program and preparedness to adapt if soil monitoring for nitrate-nitrogen and phosphorus (Olsen-P) demonstrate limitations or excessive development of nutrient reserves. Regardless, the proposed approach to provide biosolids application prescriptions that ensure land application process will be compliant with; The Environment Act (C.C.S.M c. E125) Livestock Manure and Mortalities Management Regulations and the Water Protection Act (C.C.S.M. c.W65) Nutrient Management Regulation, emphasizing the need for respecting buffer zones, limitations, soil constraints and agronomic practices.

The City will engage in continued agronomic monitoring (yield data and tissues, grain and straw sampling) of biosolid applied fields to better understand the phosphorus balance between biosolids, soil and crop.

Cooperating farm producers are being advised to supplement the biosolids land application with a starter phosphorus to ensure crop availability at early stages of emergence, growth and development.

- Agreed, the soil test data section of Table C.2 will be changed to "Soil Test Data". The proponent acknowledges that chemical extraction methods selectively, based on extraction method, remove P compounds from soil matrix to estimate the phosphorus that is available for plants' uptake during the growing season. The proponent additionally understands that the soil test phosphorus is calibrated or correlated against actual crop uptake or the probability of a fertilizer response. Specifically, the Olsen-P soil test was developed for calcareous soils and has been used to quantify plant available P in a calcareous soil (Havlin et al, 1999). Regardless, proponent ensures that the soil test methodology is consistent with; *The Environment Act (C.C.S.M c. E125) Livestock Manure and Mortalities Management Regulations and the Water Protection Act (C.C.S.M. c.W65) Nutrient Management Regulation*.
  - The soil test results were submitted to MSD with previous submissions and are available upon request.
- The insert for this table is an error (typo), the actual application rate calculation was 12 tonnes/ha as reported in the City of Winnipeg Biosolids Land Application Pilot Program Summary Report (WSP, December 22, 2017).
- It is acknowledged that the Kelowna extraction is not the most effective measure of plant available phosphorus in biosolids and it is for this purpose that the recommendations for application rates is not based on this methodology, but rather a tool to evaluate quality of the material without any better tool available.

- Reference O'Connor et al (2002) should be O'Connor et al (2004). WSP directly contacted the University of Wisconsin to acquire a copy of the Pastene (1981) thesis in electronic form. The University of Wisconsin was unable to provide an electronic scan. The only means to acquire a copy of the thesis would be to be in person to scan/photocopy, and this was not feasible.

As future data is collected through the City's biosolids land application program, knowledge on this point will improve and will provide a better understanding of P bioavailability of the City's biosolids.

- Agree, as future data is collected through the City's biosolids land application program, knowledge on this point will improve and will provide a better understanding of P bioavailability of the City's biosolids.
- Agree, WSP did miss-attribute the statement from de Haan (1980) to McCoy et al (1986). While the sludge is different from the City of Winnipeg Biosolids the chemical treatment with  $\text{FeCl}_3$  is similar and apparently reduces the plant uptake of phosphorus relative to MAP.

As future data is collected through the City's biosolids land application program, knowledge on this point will improve and will provide a better understanding of P bioavailability of the City's biosolids.

- Agree, the treatment with Fe is the concern with potentially limiting Phosphorus uptake regardless of the amendment source. The phytoavailability of phosphorus from the City of Winnipeg biosolids is not well understood due to the chemical treatment in the system. The risk of under supplying a vital nutrient to the cooperating farm producer's agronomic system causing an economic impact is an agri-sustainable concern. Additionally by under applying the quantity a greater land area is required, which may decrease the economic feasibility of the program. The published literature on the relative availability varies in source material, sampling and analysis procedures, soils characteristics and while some authors imply that chemical treatment of municipal biosolids limits the availability of phosphorus to crops as many authors imply moderate or good relative availability when compared to a commercial fertilizer.

### Proponent Responses Specific to EAP Report Body Comments

#### Section 5.1.2

**Concern:**  $\text{FeCl}_3$  biosolids Phosphate-P was approximately 4% of total phosphorus.

**Comment:** The other 96% would presumably be fairly plant available.

**Response:** Modified Kelowna phosphorus was measured on the City of Winnipeg biosolids and ranged from 226 to 1380 mg/kg with a mean concentrations of 637 mg/kg. The modified Kelowna P represent approximately 4% of the total phosphorus. Similarly, Smith et al (2002) completes a bicarbonate extractable P measure on fresh samples of the biosolids and found that it varied from <1.0% to >10% of the total-P concentration. Regardless, the final calculation of relative plant available phosphorus is not based on this analysis or extraction.

**Concern:** Table C.2. Example of Field Prescription Application Rate

**Comment:**  $62/2.915 = 27 \text{ kg P/ha}$

**Response:** 1 x P2O5 Crop Removal @ target yield: 55 lb/ac x 1.12 conversion factor = 61.6 kg/ha (Tri-Provincial Manure Application and Use Guidelines).

**Comment:** Available Phosphate – P should be labeled as Olsen – P

**Response:** The parameter listed in the table is consistent with the ALS Certificate of Analysis. Table parameter labels are to maintain consistency between certificate of analysis and reporting tables. The methodology is Olsen –P.

**Comment:** Remove the analysis of Phosphate P (modified Kelowna solution, total phosphate ratio and percent phosphate of total.

**Response:** Agreed, this will be removed from the table. These parameters are only provided as background information and do not contribute to the determination of the proposed application rates.

Disposition:

- The draft Environment Act Licence contains clauses that requires that the Licensee must comply with the requirements of the Manitoba Water Protection Act and Nutrient Management Regulation and the Manitoba Water Resources Administration Act and Designated Flood Area Regulation or any future amendments thereof during all biosolids land application activities.
- The draft Environment Act Licence contains clauses which
  - require that the biosolids be incorporated to the soil a minimum of 15 centimetres below the soil surface within 48 hours of application; and
  - require that the application and incorporation of the biosolids is acceptable to an environment officer.
- The draft Environment Act Licence contains clauses that identify minimum setbacks from any occupied residence, residential area, waterways and groundwater wells that have been included in other recent similar licences.
- The draft Environment Act Licence contains a clause that requires the Licensee, during all biosolids land application activities, to comply with the requirements of the Manitoba Nutrient Management Regulation or any future amendment thereof.

**Manitoba Sustainable Development – Environmental Compliance and Enforcement Branch – April 15, 2018**

- Winnipeg District Office, Environmental Compliance and Enforcement Branch (ECE) of Manitoba Sustainable Development has reviewed the above noted Environmental Act Proposal (EAP) on biosolids land application program and has the following comments to provide:
  1. EAP propose a 75 meters setback distance (pages 13 & 39) from any occupied residence for land application of biosolids. However it was noted that Clause 13(a) in EAL 1089 ERR prescribe 300 meter setback distance.
  2. ECE is concerned about odour issues emanating from the field storage and land application of biosolids program. Therefore, it is recommended that the best



management practices and the mitigation measures stated in the EAP and brought up in the review process must be incorporated into the Licence conditions.

3. ECE noted several people expressed their concerns about “Emerging substances of concern (ESOC)” through City’s website dedicated to biosolids. Section 6.2.5 of the EAP states that proponent will continue to monitor academic literature to keep up with up to date information on ESOC. Thus, it is recommended that approval process must take into account of this aspect and consider inclusion of continues monitoring of scientific research and literature on ESOC as part of the reporting procedures for its Licence requirement.

#### Regulatory concerns - Environmental Act Licence No. 1089 E RR

4. It is noted that Environmental Act Licence No. 1089 E RR issued to City of Winnipeg is also dealing with temporary storage, transportation of biosolids and the disposal of biosolids on agricultural lands. It is also noted that several clauses under the above-mentioned Licence directly infringe upon activities proposed in the Environmental Act proposal. Clause 6 of the EAL 1089 E RR effectively prohibits temporary storage of biosolids other than designated temporary storage pad in RM of West St. Paul. EAP for the biosolids land application program propose field storage of biosolids for a period of five months, which is also considered as a temporary storage of biosolids. Thus, it is recommended that suspension of relevant clauses in the EAL 1089 E RR, which have a bearing on the field storage component of the present EAP, be considered as part of review process. Further, it is recommended that as part of the review process of this EAP, which proposed to obtain a new Environment Act Licence, to consider cancellation of existing EAL#1089 ERR which deals with management of City’s biosolids.

#### Miscellaneous comments:

5. It is mentioned in Section 2.1.1 that Class A biosolids likely will not require an Environment Act Licence (EAL). However, ECE noted that present Classes of Development Regulations MR 164/1988 as amended by MR 39/2016 does not recognize the different categories of biosolids and require an EAL for any biosolids application.
6. Section 5.2.2 (page 25) states that a report entitled “Summary Report City of Winnipeg Biosolids land Application Field Storage Assessment” dated November 2017 was provided as a supplementary report to the above EAP under review. However, it was noted that this report was not part of package for this EAP in Public Registry.

#### Proponent Response – May 11, 2018:

- The 75 meters setback distance is a recommended practice provided in the Farm Practice for Pig Producers in Manitoba (April 2007) for material that is surface applied and incorporated within 48 hours. The purpose to request this reduced land setback distance is to ensure that as much of the agricultural surface area receives the benefit of biosolids application enhancing the agronomic and economic benefits for the cooperating farm producer. With continued urban sprawl occurring, having the extended setback distance from residences may reduce the useable area on a parcel of land so significantly that it may eliminate the parcel due to insufficient land available. The City would request that the 75 meter setback distance be applied in the licence and allow good neighbor practices to establish additional setback if and when required to

accommodate individual concerns. Additionally, the 75 m setback from residences has been accepted by Manitoba Sustainable Development in previous EAP submissions for municipal biosolids land application programs, e.g. City of Steinbach, RM of Springfield, Granny's Poultry Cooperative Ltd. and Town of Gladstone.

- The City is working on the closure of EAL 1089 ERR. The City will develop a decommissioning plan for the land associated with EAL 1089ERR.

Disposition:

- The draft Environment Act Licence contains clauses that identify minimum setbacks from any occupied residence, residential area, waterways and groundwater wells.
- The draft Environment Act Licence contains a clause that requires that within one year of the date of this licence, the licensee submit to the director for review and approval, a decommissioning plan for the site used for the temporary biosolids storage facility during activities associated with the most recent previous similar licence issued to the licensee.
- The draft Environment Act Licence contains a clause that immediately rescinds Environment Act Licence No. 1089 E RR.

**Office of Drinking Water – March 6, 2018**

- Applicable setback distances around residential areas, residences, groundwater wells, surface water drainage systems and sensitive areas/features will be established as outlined in the provincial Nutrient Management Regulation under The Water Protection Act and the Farm Practices Guidelines for Pig Producers in Manitoba (April 2007).
- The Office of Drinking Water wants to ensure that setback distances are written into the License or the applicable legislation is referenced;
- ODW is concerned specifically about surface water, groundwater, and wells.

Proponent Response – General – May 11, 2018

- At this time, the City would like to request the suspension of Clause 13 (a) in EAL 1089 ERR in which the 300 meter setback distance is prescribed. Also at this time, the City would like to request the suspension of Clause 6, 7, 8,9 and Appendix A in EAL 1089 ERR which are associated with the temporary storage facility, application timing, leachate associated with temporary storage and notification to the RM of West St. Paul. This suspension is requested to prevent conflict between EAL 1089 ERR and a newly granted EAL.WSP and the City of Winnipeg greatly appreciate all comments received by the TAC and appreciate the effort put into the review of the EAP. Should there be any further questions or comments regarding our responses to the TAC comments, please contact the undersigned directly at your convenience.

Disposition:

- The draft Environment Act Licence contains clauses that identify minimum setbacks from any occupied residence, residential area, waterways and groundwater wells.

## **PUBLIC HEARING**

As the public did not provide comments requesting a public hearing, a public hearing is not recommended.

## **CROWN-INDIGENOUS CONSULTATION**

The Government of Manitoba recognizes that it has a duty to consult in a meaningful way with Indigenous communities when any proposed provincial law, regulation, decision or action may infringe upon or adversely affect the exercise of the Indigenous rights of that community.

The proposal involves annual land application events of biosolids materials that have undergone final treatment onto agricultural lands within rural municipalities located in proximity to the city in an agri-environmentally sustainable manner. The program involves transporting biosolids via enclosed trucks from the NEWPCC to agricultural fields within the Rural Municipalities of Rosser and/or Macdonald and/or Cartier or other possible municipalities.

Since activities of the Development involved do not affect resource use, it is concluded that Crown-Indigenous consultation is not required for the project.

## **RECOMMENDATION**

It is recommended that the development be licensed under The Environment Act subject to the limits, terms and conditions as described on the attached draft Environment Act Licence. It is further recommended that the licence be administered by the environmental compliance and enforcement branch – Winnipeg region.

Prepared by:

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January 27, 2022

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