Winnipeg

Water and Waste Department
Environmental Standards Division

Biosolids Dewatering, Monitoring, and Disposal Programs

Environment Act Licence #1089E RR

2017

Water and Waste Department • Service des eaux et des déchets
Environmental Standards Division • Division des Normes Environnementales

January 31, 2018 Our File: 040-17-08-23-01

Manitoba Sustainable Development
Environmental Compliance and Enforcement Branch
1007 Century Street
Winnipeg, MB R3H 04W

Attention: Mr. Don Labossiere, Regional Director

RE: ANNUAL COMPLIANCE REPORT FOR ENVIRONMENT ACT LICENCE 1089E RR

Enclosed you will find our annual compliance report which details the City of Winnipeg's Biosolids Dewatering and Disposal Program for 2017. Included in this report are:

a) details of the 2017 biosolids distribution and monitoring programs
b) details of the proposed 2018 biosolids distribution program

If you have any questions concerning the annual report, I may be reached by telephone at 204-986-8359 or by e-mail at rgrosselle@winnipeg.ca.

Yours sincerely,

Original signed by:

R. Grosselle
Manager of Environmental Standards

Enclosure

cc: M.L. Geer, CPA, CA, Water and Waste Department (email)
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C. Carroll, P. Eng., Water and Waste Department (email)
R. Park, Water and Waste Department (email)

2017 Biosolids Dewatering, Monitoring, and Disposal Programs

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APPENDICES

1.0 INTRODUCTION

Clause 22 of Environment Act Licence #1089E RR, issued on June 14, 2000, requires that the City of Winnipeg monitor its biosolids dewatering and disposal operations and submit an annual report to the regulating authority and various municipalities on or before the 31st of January of each year.

This report summarizes the results of the City's 2017 Biosolids Dewatering, Monitoring, and Disposal Program, and outlines the proposed plans for the 2018 calendar year.

The City of Winnipeg's Biosolids Master Plan[1] (BMP) is a 30 year plan for dealing with biosolids; it received approval from Manitoba Sustainable Development (MSD) in March 2016. As outlined in the BMP, the City is exploring options for beneficial uses of biosolids including composting, agricultural land application, and soil fabrication.

In 2017, the City produced 50,207 wet tonnes of anaerobically digested, mechanically-dewatered biosolids at its North End Water Pollution Control Centre (NEWPCC), with an average total solids concentration of 27.1%. Approximately 41,546 wet tonnes were disposed at the Brady Road Resource Management Facility (BRRMF), 5,240 wet tonnes were composted as part of the pilot biosolids composting program at BRRMF, 800 wet tonnes were mixed with ground clay and woodchips as part of the soil fabrication pilot program at BRRMF, and 2,621 wet tonnes were applied to agricultural land in the RM of Macdonald as part of a pilot land application program. In addition, a field storage assessment was performed in anticipation of a full-scale land application project.

In 2018, the City plans to complete the pilot composting program, submit an Environmental Act Licence Proposal for a full-scale three-year land application program, submit a final report for the BRRMF soil fabrication project, and begin a three-year pilot project for soil fabrication at the Summit Landfill.

2.0 DETAILS OF BIOSOLIDS DISTRIBUTION 2017

(a) Compost

As outlined in the BMP, 5,240 wet tonnes of biosolids were diverted to the compost facility, with the final product being used as a soil for landfill top cover. We have not been able to reach our goal of 20% diversion to compost thus far because we let the facility idle when it is below -10^{o}C to avoid damaging equipment; no mixing, loading, or turning of bunkers occurs during these periods.

(b) Land Application

As part of the Land Application Pilot Project, the City of Winnipeg conducted public engagement with stakeholders from March to August 2017, and applied 2,621 wet (671 dry) tonnes of biosolids to agricultural land in the RM of Macdonald from September to October 2017, following approval by MSD.

Biosolids were applied on approximately 55 ha (135 ac) of land (Appendix I contains a map of the Land Application Locations) between September 21 and October 23, 2017, at a rate of approximately 12 dry metric tonnes per hectare or 48 wet metric tonnes per hectare. A detailed description of the project is found in The City of Winnipeg Biosolids Land Application Pilot Program Summary Report[2], which was submitted to MSD in December 2017.

(c) Storage

In 2017, the temporary storage facility in the RM of West St. Paul was not used to provide interim storage for mechanically-dewatered biosolids.

An assessment of various field storage options was conducted between September and November 2017, on City-owned land located southwest of the West End Water Pollution Control Centre in anticipation of a future full-scale Land Application Project. The biosolids used during the assessment were disposed of at the BRRMF at the conclusion of the project. A detailed description of the project is found in The City of Winnipeg Biosolids Land Application Field Storage Assessment Summary Report[3], which was submitted to MSD in December 2017.

(d) Soil Fabrication

As part of the BRRMF Soil Fabrication Pilot Project, approximately 800 wet tonnes of biosolids were mixed with ground clay and elm wood chips to produce 5,000 m3 of fabricated soil over a three week period in February and March 2017. The fabricated soil was placed on a closed slope of the landfill and seeded. A detailed description of the project and initial findings are found in the Biosolids use in Landfill Topsoil Fabrication Demonstration – 2017 Interim Report[4], which was submitted to MSD in August 2017.

(e) Landfill

Of the 50,207 wet tonnes of mechanically-dewatered biosolids produced at the NEWPCC from January 1, 2017 to December 31, 2017, approximately 41,546 wet tonnes were disposed at the BRRMF.

Appendix II contains the Monthly Hauling Summaries for 2017.

3.0 DETAILS OF PROPOSED BIOSOLIDS DISTRIBUTION FOR 2018

(a) Compost

The pilot biosolids compost facility was initially approved to run from May 2015 to May 2017, however, due to cold weather challenges, a 1-year extension of the program to May 2018 was approved by MSD. A summary report on the Biosolids Composting Pilot Project will be submitted to MSD in 2018. Finished compost will continue to be used as a soil for landfill top cover in 2018.

(b) Land Application

Pending MSD approval, a full-scale 3 year Land Application Program of up to 20, 000 wet tonnes of biosolids per year is planned to begin in 2018.

(c) Storage

The City of Winnipeg has no plans to use the temporary storage facility in the RM of West St. Paul in 2018; field storage may be used as part of the Land Application Program.

(d) Soil Fabrication

In 2018, the City will continue monitoring soil, water, and vegetation as part of the BRRMF soil fabrication pilot project, and submit a final report to MSD.

The City will also conduct a soil fabrication pilot project at the Summit Landfill; a contract for Professional Consulting Services will be awarded in February 2018. An interim report will be completed by the City after each operational phase, and a final report will be completed by the City at the end of each study year and submitted to MSD.

(e) Landfill

In 2018, the City plans to continue to dispose of the majority of its biosolids at the BRRMF.

4.0 RESULTS OF ANALYSIS

(a) Biosolids

From January 1, 2017 to December 31, 2017 the City produced 50,207 wet tonnes of mechanically-dewatered biosolids at its NEWPCC facility. In 2017, the total solids in the biosolids averaged 27.1 ± 2.6% (n = 256). The dewatering equipment achieved a total solids content in the biosolids of at least 20 percent by weight throughout 2017.

Table 1 contains analytical results for biosolids samples in fulfillment of the monitoring requirements stipulated in Appendix B of Licence #1089E RR.

Historically, total kjeldahl nitrogen (TKN) analysis has been performed by the Analytical Service Branch (ASB) on wet samples. The ASB discontinued TKN analysis in favor of total nitrogen (TN) analysis in June 2016 because the equipment and methods used for TN analysis are more efficient, technologically advanced, and environmentally-friendly, and TKN can be calculated using TN. Because biosolids analysis requires a different test method than liquid samples, it is more cost-efficient to contract the biweekly TKN analysis out than to perform it in-house. We attempted to find a laboratory that could perform TKN analysis on wet biosolids samples, but were unable to find any that still offer this analysis. According to our research, other municipalities report TKN based on dry weight – in keeping with this standard practice, we have also reported TKN based on dry weight, effective January 2017.

TABLE 1

2017 Biosolids Quality

Sample Number	Date Sampled *	Total Cd (mg/Kg-Cd)	Total Cr (mg/Kg-Cr)	Total Cu (mg/Kg-Cu)	Total Ni (mg/Kg-Ni)	Total Pb (mg/Kg-Pb)	Total Zn (mg/Kg-Zn)	Total P (mg/Kg-P)	NH3-N (mg/Kg-N)	TKN (mg/Kg-N)	pH (units)	Specific Conductance (dS/m)	Moisture (%)
1	25-Dec-16	3.2	86	554	39.6	40.1	2200	22,400	12,900	39,000	5.91	8.5	73.0
2	8-Jan-17	5.7	97	594	22.5	43.8	1810	25,500	9,110	38,000	5.99	8.6	73.5
3	23-Jan-17	3.7	106	539	24.5	42.5	1270	24,500	9,730	38,000	5.95	5.8	71.0
4	5-Feb-17	2.8	254	557	NR	36.8	1120	26,800	9,210	42,000	5.93	6.6	73.7
5	19-Feb-17	1.7	169	493	32.0	30.4	1300	19,200	8,300	33,800	5.91	8.2	70.9
6	5-Mar-17	1.6	146	494	29.4	29.6	1100	18,800	8,130	33,400	5.95	9.3	70.9
7	19-Mar-17	1.5	119	483	29.5	34.3	940	17,400	7,110	31,100	5.84	8.1	68.7
8	2-Apr-17	1.4	89	412	30.9	29.5	785	16,000	6,510	26,000	5.98	8.6	69.2
9	18-Apr-17	1.5	90	473	38.5	45.1	844	15,600	8,820	27,000	6.06	8.0	69.4
10	1-May-17	1.7	75	446	31.6	41.2	791	16,200	9,380	28,000	5.98	9.6	70.9
11	15-May-17	1.9	185	552	36.6	49.7	855	17,500	9,080	31,000	6.00	10.2	72.7
12	29-May-17	3.8	264	650	40.1	45.6	1170	20,900	9,770	33,000	6.52	11.8	74.2
13	11-Jun-17	3.8	187	523	30.7	42.1	1010	16,600	8,990	34,000	6.16	9.5	73.7
14	25-Jun-17	2.6	126	493	30.4	40.3	918	15,800	9,830	32,000	6.10	9.3	72.5
15	10-Jul-17	2.1	99	440	27.9	44.4	854	15,600	9,260	25,000	6.06	9.4	73.1
16	24-Jul-17	3.8	114	527	29.1	55.3	1940	15,900	9,010	31,000	5.93	9.2	71.0
17	8-Aug-17	2.9	95	554	29.7	52.3	2760	16,800	8,650	31,000	6.05	9.1	73.4
18	20-Aug-17	2.4	90	602	32.1	53.6	2130	18,000	8,270	36,000	6.05	10.5	73.9
19	5-Sep-17	2.0	149	598	32.6	46.0	1500	15,400	7,870	37,000	6.23	11.4	75.3
20	18-Sep-17	1.7	315	632	34.4	50.4	1400	16,200	11,400	40,400	5.94	9.9	73.0
21	2-Oct-17	1.8	232	564	41.8	71.9	1090	15,300	8,860	34,400	6.02	10.4	69.9
22	15-Oct-17	1.8	169	666	31.5	46.8	1300	18,600	11,700	39,600	6.04	12.6	76.3
23	29-Oct-17	2.3	130	639	29.3	40.5	1390	18,300	11,600	44,600	6.00	11.4	76.8
24	14-Nov-17	6.6	112	641	32.8	42.4	1860	18,800	10,900	46,800	5.96	12.6	76.9
25	26-Nov-17	7.6	106	632	29.1	33.2	2750	21,900	10,300	49,500	6.17	11.5	75.6
26	10-Dec-17	10.3	123	531	26.5	30.4	2050	20,200	9,340	45,100	5.73	10.5	75.4
	Average:	3.2	143	550	31.7	43.0	1428	18,623	9,386	35,642	6.02	9.6	72.9
	Maximum:	10.3	315	666	41.8	71.9	2760	26,800	12,900	49,500	6.52	12.6	76.9
	Minimum:	1.4	75	412	22.5	29.5	785	15,300	6,510	25,000	5.73	5.8	68.7

*** Indicates starting date for year 2017 biweekly composite samples**
NR: no result due to analysis error

(b) Soil

Post-harvest soil samples were not collected in 2017 because biosolids were not applied to any fields in 2016.

As part of the land application project, soil samples were taken prior to land application to determine the site-specific application rate; analytical results and application rate calculations are included in The City of Winnipeg Biosolids Land Application Pilot Program Summary Report[2]. Post-harvest soil testing will be performed in 2018, 2019, and 2020.

As part of the field storage assessment project, soil samples were collected from the storage plots before the start of the study and after the removal of the biosolids to evaluate potential leaching of nutrients and metals from the stockpiles; analytical results are included in The City of Winnipeg Biosolids Land Application Field Storage Assessment Summary Report[3].

As part of the BRRMF soil fabrication project, soil samples were collected from the sample plots prior to the application of the fabricated soil to provide baseline data for soil quality; analytical results are included in The Biosolids use in Landfill Topsoil Fabrication Demonstration – 2017 Interim Report[4]. Additional soil samples were collected in the fall of 2017, and will be collected in Spring and Fall 2018; analytical results will be included in the final report.

(c) Surface Water

Surface water samples were not collected in 2017 because biosolids were not applied to any fields in 2016.

Water monitoring after precipitation events occurred in the fall of 2017 and will occur during spring run-off in 2018 as part of the BRRMF soil fabrication project; analytical results will be included in the final soil fabrication report.

(d) Odours

(i) BRRMF

We continue to monitor odours at the BRRMF on a weekly basis and follow up with any odour complaints; odour mitigation strategies for biosolids have largely been successful as none of the 11 odour complaints reported in 2017 were attributed specifically to biosolids. The City continues to use strategies to help mitigate odours including:

- Covering biosolids quickly with soil or other wastes that do not cause odours
- Scheduling the arrival of biosolids at specific times of day when wind conditions are not likely to cause concern for odour
- Collecting and burning landfill gas to help mitigate buried biosolid odours
- Controlling storm water runoff to prevent leachate generation and ponding of water that causes odour
- Using biofilters on the biosolids compost facility
- Using compost near odour point sources to help control odour
- Using woodchips in the biosolids trench to help mitigate odour when spreading biosolids
- Expanding the landfill gas collection system
- Continuing an odour monitoring program

(ii) Land Application

During the pilot land application project, the participating agricultural producer observed odour on two days, but did not consider it a significant concern. The RM of Macdonald Council received a few local concerns about odour; they felt odours could be minimized by shortening the application process and improving site selection processes. The City did not receive any feedback from the public through the project phone number or email address.

(iii) Field Storage

The Field Storage Assessment Summary Report[3] noted that the highest odour levels were recorded during the first week of storage and upon decommissioning of the project. It concluded that odours can be reduced by adding a cover material over biosolids stockpiles and adhering to applicable best management practices and prescribed setback distances.

5.0 CHANGES IN PROCEDURES - TEMPORARY STORAGE FACILITY OPERATION

There were no changes in the procedures normally used for the operation of the temporary storage facility located in the RM of West St. Paul.

6.0 REFERENCES

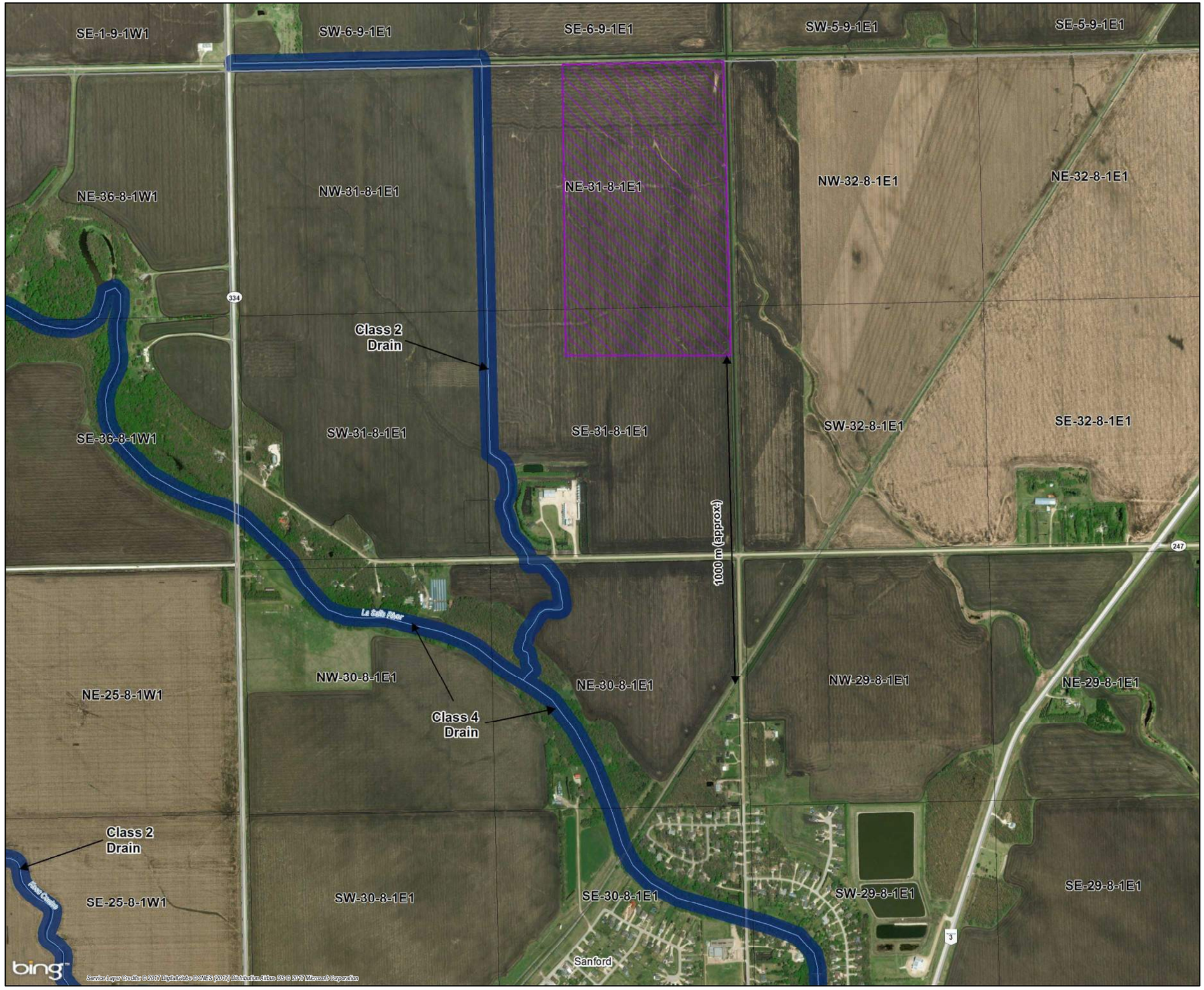
1. COW/Veolia. September 2014. City of Winnipeg Biosolids Master Plan

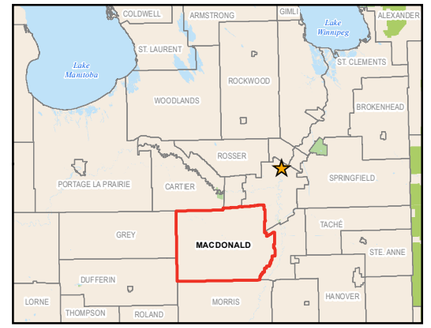
2. WSP. December 2017. City of Winnipeg Biosolids Land Application - Pilot Program Summary Report.

3. WSP. December 2017. City of Winnipeg Biosolids Land Application - Field Storage Assessment Summary Report.

4. SYLVIS Environmental. August 2017. Biosolids use in Landfill Topsoil Fabrication Demonstration – 2017 Interim Report

APPENDIX I
LAND APPLICATION LOCATION MAPS





CITY OF WINNIPEG BIOSOLIDS LAND APPLICATION PILOT PROGRAM

Legend

- North End Sewage Treatment Plant (NEWPCC)
- Land Applied Area (134 Acres)
- Quarter Section Grid
- Drainage Network 30m buffer
- Drain Feature
- Provincial Trunk Highway
- Provincial Road
- Railway Line

DRAFT: For Discussion Purposes Only

Coordinate System: NAD 83, UTM Zone 14 N
Data Source: MLI, WSP, NRCan, Bing
Date Created: August 01, 2017
Revision Date: November 09, 2017

N

0 50 100 200 Metres
0 0.05 0.1 0.2 0.3 Miles

FIGURE 3

2017 Biosolids Land Applied Area for the Pilot Program

wsp

U:\Projects\PROJECTS_2017\17M-00008-00_CityWinnipegBiosolids\Phase_II\MXD\FIG3_2017BiosolidsLandAppliedAreaPilotProgram_20171109.mxd

RGE 1

SW-6-9-1E1

SE-6-9-1E1

SW-5-9-1E1

NW-31-8-1E1

NE-31-8-1E1

4

NW-32-8-1E1

(RIV$_7$ - OBO$_3$)

(MYT$_5$ - SCY$_5$)

W002

W003

W004

SW-31-8-1E1

SE-31-8-1E1

SW-32-8-1E1

bing

RGE 1

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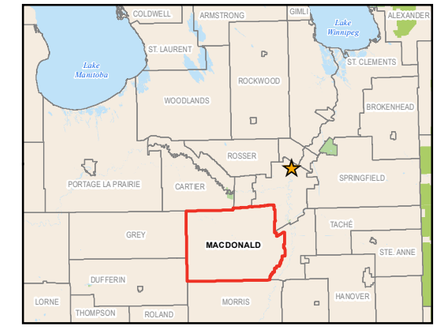

CITY OF WINNIPEG
BIOSOLIDS LAND APPLICATION
17M-00008

Legend

- North End Sewage Treatment Plant (NEWPCC)
- Soil Sample Location

Farm Producer Name

- Land Application Area

Agricultural Capability

- Class 1
- Class 2
- Class 3
- Class 4
- Quarter Section Grid
- Waterbody
- Provincial Trunk Highway
- Provincial Road
- Railway Line

Coordinate System: NAD 83, UTM Zone 14 N
Data Source: MLI, WSP, NRCan, Bing
Date Created: August 01, 2017
Revision Date: September 11, 2017

N

0 50 100 200 Metres

0 0.03 0.06 0.12 0.18 Miles

FIGURE 1
E 1/2 31-08-01 EPM
Biosolids Land Application Field (2017)
Agricultural Capability

wsp

APPENDIX II
MONTHLY HAULING SUMMARIES

2017 Biosolids Management Program

January			2017			
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads to Compost	Loads Total
1						
2	204.46	26.50	54.18	8	0	8
3	203.80	26.80	54.62	8	0	8
4	127.62	25.70	32.80	5	0	5
5	172.74	26.60	45.95	7	0	7
6	154.20	26.40	40.71	6	0	6
7						
8						
9	203.36	25.10	51.04	8	0	8
10	204.32	25.80	52.71	8	0	8
11	201.50	25.40	51.18	8	0	8
12	50.82	26.70	13.57	2	0	2
13	223.00	26.90	59.99	9	0	9
14						
15						
16	202.78	26.40	53.53	7	1	8
17	173.54	26.50	45.99	5	2	7
18	103.54	25.70	26.61	4	0	4
19	257.58	25.60	65.94	10	0	10
20	154.00	27.80	42.81	6	0	6
21						
22						
23	205.60	28.20	57.98	6	2	8
24	204.10	29.40	60.01	7	1	8
25	205.13	28.46	58.38	8	0	8
26	152.09	28.00	42.59	6	0	6
27	203.35	28.20	57.34	9	0	9
28						
29						
30	231.04	27.80	64.23	9	0	9
31	255.95	28.10	71.92	10	0	10
TOTAL	4094.52	26.91	1104.08	156	6	162
NOTES:						

2017 Biosolids Management Program

February	2017					
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads to Compost	Loads Total
1	255.39	27.43	70.05	10	0	10
2	203.60	28.67	58.37	8	0	8
3	153.46	31.66	48.59	6	0	6
4						
5						
6	204.31	26.60	54.35	8	0	8
7	204.05	26.00	53.05	8	0	8
8	229.55	26.67	61.22	8	0	8
9	150.42	25.90	38.96	6	0	6
10	153.20	27.43	42.02	6	0	6
11						
12						
13	204.26	26.41	53.95	8	0	8
14	204.21	25.47	52.01	6	2	8
15	204.07	26.20	53.47	8	0	8
16	203.98	25.32	51.65	8	0	8
17	180.11	26.32	47.40	7	0	7
18						
19						
20	205.91	29.54	60.83	8	0	8
21	205.21	29.54	60.62	8	0	8
22	255.71	28.94	74.00	6	0	6
23	280.45	30.67	86.01	11	0	11
24	142.89	35.65	50.94	6	0	6
25						
26						
27	59.70	30.25	18.06	3	0	3
28	140.31	30.25	42.44	4	2	6
TOTAL	3840.79	28.25	1077.99	143	4	147
NOTES:						

2017 Biosolids Management Program

March			2017			
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads to Compost	Loads Total
1	200.17	28.35	56.75	8	0	8
2	199.26	28.72	57.23	8	0	8
3	173.00	27.94	48.34	7	0	7
4						
5						
6	254.70	28.32	72.13	10	0	10
7	263.05	29.22	76.86	7	3	10
8	247.55	28.58	70.75	10	0	10
9	198.35	30.38	60.26	8	0	8
10	202.00	29.92	60.44	8	0	8
11						
12						
13	256.98	29.99	77.07	10	0	10
14	205.29	27.48	56.41	8	0	8
15	154.44	28.69	44.31	8	0	8
16	209.08	28.08	58.71	8	0	8
17	198.04	31.40	62.18	8	0	8
18						
19						
20	260.89	31.11	81.16	10	0	10
21	208.36	31.05	64.70	8	0	8
22	156.43	31.69	49.57	6	0	6
23	259.71	31.50	81.81	7	3	10
24	254.80	31.68	80.72	7	3	10
25						
26						
27	259.39	32.71	84.85	10	0	10
28	255.96	30.78	78.78	10	0	10
29	123.11	32.16	39.59	5	0	5
30	204.59	30.31	62.01	8	0	8
31	152.20	32.32	49.19	6	0	6
TOTAL	4897.35	30.10	1473.82	185	9	194
NOTES:						

2017 Biosolids Management Program

April	2017					
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads to Compost	Loads Total
1						
2						
3	205.31	32.59	66.91	8	0	8
4	205.73	31.50	64.80	8	0	8
5	204.33	31.73	64.83	8	0	8
6	201.57	31.95	64.40	8	0	8
7	121.87	31.51	38.40	5	0	5
8						
9						
10	178.63	30.23	54.00	7	0	7
11	254.25	30.36	77.19	10	0	10
12	250.75	29.97	75.15	10	0	10
13	148.47	29.58	43.92	6	0	6
14						
15						
16						
17	201.88	30.20	60.97	8	0	8
18	252.61	30.82	77.85	10	0	10
19	250.74	29.33	73.54	7	3	10
20	145.96	31.02	45.28	4	2	6
21	206.15	27.04	55.74	8	0	8
22						
23						
24	125.86	30.60	38.51	1	4	5
25	206.83	31.57	65.30	4	4	8
26	258.62	30.51	78.90	5	5	10
27	255.91	30.87	79.00	6	4	10
28	153.40	31.75	48.70	6	0	6
29						
30						
TOTAL	3828.87	30.69	1173.41	129	22	151
NOTES:						

2017 Biosolids Management Program

May	2017					
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads to Compost	Loads Total
1	258.68	26.84	69.43	10	0	10
2	206.81	29.65	61.32	8	0	8
3	309.26	30.18	93.33	12	0	12
4	257.47	31.55	81.23	10	0	10
5	222.18	30.43	67.61	9	0	9
6						
7						
8	257.81	29.89	77.06	7	3	10
9	253.85	29.18	74.07	6	4	10
10	125.18	30.02	37.58	5	0	5
11	328.96	29.60	97.37	7	6	13
12	217.27	29.62	64.36	8	1	9
13						
14						
15	279.50	28.98	81.00	5	6	11
16	204.36	26.42	53.99	7	1	8
17	153.11	28.08	42.99	6	0	6
18	92.04	27.75	25.54	4	0	4
19	46.12	28.52	13.15	2	0	2
20						
21						
22						
23	199.77	27.55	55.04	7	0	7
24	201.20	26.38	53.08	8	0	8
25	227.02	26.76	60.75	6	3	9
26	244.43	26.55	64.90	6	4	10
27						
28						
29	228.39	27.02	61.71	4	5	9
30	253.67	26.25	66.59	7	3	10
31	152.63	25.47	38.87	6	0	6
TOTAL	4719.71	28.30	1340.98	150	36	186
NOTES:						

2017 Biosolids Management Program

June	2017					
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads to Compost	Loads Total
1	248.61	27.48	68.32	6	4	10
2	201.46	26.13	52.64	4	4	8
3						
4						
5	255.61	25.86	66.10	10	0	10
6	204.08	25.54	52.12	8	0	8
7	152.78	25.08	38.32	6	0	6
8	253.27	25.46	64.48	10	0	10
9	146.36	25.77	37.72	6	0	6
10						
11						
12	254.66	25.38	64.63	10	0	10
13	254.86	25.31	64.51	10	0	10
14	200.08	23.68	47.38	8	0	8
15	201.60	26.84	54.11	8	0	8
16	152.08	29.03	44.15	6	0	6
17						
18						
19	205.71	28.06	57.72	7	1	8
20	256.13	24.84	63.62	10	0	10
21	255.77	25.84	66.09	10	0	10
22	174.24	27.85	48.53	7	0	7
23	145.19	28.09	40.78	6	0	6
24						
25						
26	205.95	28.15	57.97	8	0	8
27	205.78	25.28	52.02	8	0	8
28	205.20	28.47	58.42	8	0	8
29	146.31	27.15	39.72	6	0	6
30	126.62	27.15	34.38	5	0	5
TOTAL	4452.35	26.47	1173.74	167	9	176
NOTES:						

2017 Biosolids Management Program

July	2017					
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads to Compost	Loads Total
1						
2						
3						
4	280.47	27.01	75.75	11	0	11
5	305.93	28.73	87.89	7	5	12
6	310.96	26.73	83.12	9	3	12
7	232.84	32.31	75.23	9	0	9
8	155.25	28.07	43.58	6	0	6
9						
10	232.69	25.16	58.54	7	2	9
11	233.03	24.97	58.19	7	2	9
12	155.75	26.60	41.43	6	0	6
13	258.37	26.06	67.33	10	0	10
14	257.98	25.89	66.79	10	0	10
15						
16						
17	205.98	25.81	53.16	8	0	8
18	205.19	26.73	54.85	8	0	8
19	153.66	29.92	45.98	6	0	6
20	100.60	31.47	31.66	4	0	4
21	99.54	29.05	28.92	4	0	4
22						
23						
24	150.29	31.58	47.46	5	1	6
25	75.82	29.71	22.53	0	3	3
26	203.51	27.70	56.37	6	2	8
27	126.81	29.03	36.81	5	0	5
28	97.65	28.91	28.23	4	0	4
29						
30						
31	204.10	29.17	59.54	8	0	8
TOTAL	4046.42	28.12	1123.36	140	18	158
NOTES:						

2017 Biosolids Management Program

August	2017					
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads to Compost	Loads Total
1	202.69	29.14	59.06	5	3	8
2	151.26	29.70	44.92	2	4	6
3	76.12	27.91	21.25	3	0	3
4	153.78	29.02	44.63	6	0	6
5						
6						
7						
8	255.51	27.90	71.29	10	0	10
9	203.06	24.99	50.74	8	0	8
10	201.44	26.73	53.84	8	0	8
11	153.05	28.05	42.93	6	0	6
12						
13						
14	203.42	25.88	52.65	8	0	8
15	253.61	28.03	71.09	10	0	10
16	251.46	25.17	63.29	10	0	10
17	251.84	27.14	68.35	10	0	10
18	298.15	26.36	78.59	12	0	12
19						
20						
21	250.48	25.14	62.97	10	0	10
22	175.08	25.46	44.58	7	0	7
23	226.39	25.33	57.34	7	2	9
24	202.23	24.77	50.09	5	3	8
25	251.70	26.16	65.84	10	0	10
26						
27						
28	201.05	24.29	48.84	4	4	8
29	201.09	25.79	51.86	4	4	8
30	203.39	25.57	52.01	8	0	8
31	151.24	25.28	38.23	6	0	6
TOTAL	4518.04	26.54	1194.40	159	20	179
NOTES:						

2017 Biosolids Management Program

September	2017							
Date	Wet Cake Landfill	Wet Cake Landuse	% Total Solids	Dry Cake	Loads to Landfill	Loads to Compost	Loads to Landuse	Loads Total
1	149.05	0.00	26.66	39.74	6	0	0	6
2								
3								
4								
5	232.17	0.00	26.86	62.36	9	0	0	9
6	279.54	0.00	26.31	73.55	6	5	0	11
7	225.87	0.00	24.88	56.20	6	3	0	9
8	149.94	0.00	25.14	37.69	6	0	0	6
9								
10								
11	205.11	0.00	24.46	50.17	8	0	0	8
12	203.00	0.00	24.65	50.04	8	0	0	8
13	151.62	0.00	24.17	36.65	6	0	0	6
14	196.59	0.00	24.98	49.11	8	0	0	8
15	97.35	0.00	24.27	23.63	4	0	0	4
16								
17								
18	179.95	0.00	24.76	44.56	7	0	0	7
19	254.46	0.00	25.47	64.81	7	3	0	10
20	201.70	0.00	25.22	50.87	5	3	0	8
21	50.50	132.94	24.56	45.05	0	2	7	9
22	0.00	114.28	25.89	29.59	0	0	6	6
23								
24								
25	252.80	0.00	29.25	73.94	5	5	0	10
26	227.31	0.00	28.37	64.49	4	5	0	9
27	152.50	0.00	26.50	40.41	6	0	0	6
28	148.56	0.00	26.95	40.04	6	0	0	6
29	0.00	132.29	28.36	37.52	0	0	7	7
30								
TOTAL	3358.02	379.51	25.89	970.40	107	26	20	153

NOTES: Biosolids land application began September 21, 2017 in the RM of Macdonald

2017 Biosolids Management Program

October	2017							
Date	Wet Cake Landfill	Wet Cake Landuse	% Total Solids	Dry Cake	Loads to Landfill	Loads to Compost	Loads to Landuse	Loads Total
1								
2	0.00	94.98	28.87	27.42	0	0	5	5
3	0.00	209.46	27.89	58.42	0	0	11	11
4	0.00	133.37	28.33	37.78	0	0	7	7
5	0.00	114.12	27.78	31.70	0	0	6	6
6	0.00	57.08	29.45	16.81	0	0	3	3
7								
8								
9	0.00	38.05	29.29	11.14	0	0	2	2
10	100.09	0.00	29.12	29.15	0	4	0	4
11	49.98	0.00	33.40	16.69	0	2	0	2
12	0.00	259.28	25.49	66.09	0	0	13	13
13	0.00	206.05	24.84	51.18	0	0	10	10
14								
15								
16	0.00	335.43	23.87	80.07	0	0	13	13
17	0.00	206.13	23.47	48.38	0	0	8	8
18	0.00	178.62	23.27	41.56	0	0	7	7
19	0.00	154.60	24.48	37.85	0	0	6	6
20	0.00	150.90	25.69	38.77	0	0	6	6
21								
22								
23	100.05	104.12	23.06	47.08	0	4	4	8
24	205.08	0.00	25.26	51.80	8	0	0	8
25	200.23	0.00	24.21	48.48	4	4	0	8
26	150.46	0.00	23.06	34.70	2	4	0	6
27	102.41	0.00	24.45	25.04	4	0	0	4
28								
29								
30	201.37	0.00	24.19	48.71	8	0	0	8
31	201.42	0.00	23.39	47.11	8	0	0	8
TOTAL	1311.09	2242.19	26.04	895.94	34	18	101	153

NOTES: Biosolids land application ended October 23, 2017 in the RM of Macdonald

2017 Biosolids Management Program

November	2017					
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads to Compost	Loads Total
1	127.69	24.22	30.93	5	0	5
2	126.43	25.24	31.91	5	0	5
3	152.49	23.39	35.67	6	0	6
4						
5						
6	183.11	23.21	42.50	7	0	7
7	176.58	22.72	40.12	7	0	7
8	201.75	22.17	44.73	8	0	8
9	251.37	22.87	57.49	10	0	10
10	150.89	22.56	34.04	6	0	6
11						
12						
13	201.66	23.41	47.21	8	0	8
14	176.06	23.15	40.76	7	0	7
15	200.98	21.95	44.12	8	0	8
16	301.65	23.24	70.10	12	0	12
17	125.41	23.81	29.86	5	0	5
18						
19						
20	201.08	23.52	47.29	4	4	8
21	200.97	22.78	45.78	4	4	8
22	226.05	23.44	52.99	5	4	9
23	225.76	22.60	51.02	5	4	9
24	225.83	22.40	50.59	7	2	9
25						
26						
27	251.59	24.34	61.24	10	0	10
28	200.88	24.92	50.06	8	0	8
29	250.81	24.64	61.80	10	0	10
30	172.70	24.45	42.23	7	0	7
TOTAL	4331.74	23.41	1012.42	154	18	172
NOTES:						

2017 Biosolids Management Program

December			2017			
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads to Compost	Loads Total
1	173.71	24.03	41.74	7	0	7
2						
3						
4	200.66	22.98	46.11	8	0	8
5	200.26	23.52	47.10	8	0	8
6	225.55	23.30	52.55	9	0	9
7	100.13	24.78	24.81	3	1	4
8	151.04	24.41	36.87	3	3	6
9						
10						
11	255.33	25.91	66.16	10	0	10
12	179.30	24.97	44.77	7	0	7
13	255.37	24.73	63.15	10	0	10
14	252.89	24.78	62.67	10	0	10
15	198.55	25.15	49.94	8	0	8
16	101.19	24.78	25.07	4	0	4
17						
18	203.03	25.22	51.20	5	3	8
19	175.94	25.34	44.58	3	4	7
20	154.37	24.50	37.82	6	0	6
21	258.21	25.27	65.25	10	0	10
22	232.30	24.78	57.56	9	0	9
23	76.67	24.78	19.00	3	0	3
24						
25						
26	101.96	24.78	25.27	4	0	4
27	180.09	25.44	45.81	7	0	7
28	206.00	25.88	53.31	8	0	8
29	152.59	25.83	39.41	6	0	6
30	151.58	24.78	37.56	6	0	6
31						
TOTAL	4186.72	24.78	1037.74	154	11	165
NOTES:						