

Via Email

December 20, 2016

Ref.: 3315446-000-500

Ms. Tracy Braun
Director
Manitoba Sustainable Development
Environmental Approvals
123 Main Street, Suite 160
Winnipeg MB R3C 1A5

Dear Ms. Braun:

**Re: Year End Report on RM of Springfield Land Application of Sludge –
Dugald Lagoon and Cell #4 Oakbank Lagoon**

Introduction

MMM Group Limited (MMM), a WSP Global Company, has been retained by the Rural Municipality of Springfield (RM of Springfield) to complete a biosolid land application program for the two cells at the Dugald Lagoon and for Cell #4 of the decommissioned Oakbank wastewater lagoon. Assiniboine Injections Limited was contracted by the RM of Springfield to complete the application program. On August 19, 2016, MMM submitted calculated application prescription rates, background soil parameters and cumulative heavy metal weights as per Schedule A of the EAL #2994 to Manitoba Sustainable Development (MSD), which are also appended to this letter. Approval to proceed was received August 26, 2016 by Krista Olafsson, Environment Officer with MSD.

Surface Water Management

In accordance with Notice of Alteration #2 and subsequent approval provided by Manitoba Sustainable Development (May 4, 2016), ponded water from each of the six Oakbank cells was analysed for the required parameters. Through the analytical analysis it was determined that Cell #4 surface water met required guidelines and was discharged to the municipal drain adjacent to the Cell. The remaining cells did not meet the required guidelines. The remaining cells (1, 2, 3, 5 and 6) were pumped and retained in Cell #5. The discharge and pumping into Cell #5 occurred in early August of 2016 and again in late September prior to the deadline of October 1, 2016.

Field Program

MMM conducted sludge sampling of Cell #4 at the Oakbank lagoon and the two cells at the Dugald lagoon on July 27, 2015 and July 29, 2015, respectively, for analysis by ALS Laboratories. Further sludge sampling was conducted for the Dugald cells on August 10, 2016 and from Cell #4 on August 23, 2016 for nutrients only so as to better understand the mineralization rates of the biosolids and re-calculate nutrients should the available nitrogen have changed.

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Soil sampling was conducted on August 10, 2016 and on August 26, 2016, on two agricultural fields located at NW10-11-5EPM and NW11-11-5EPM, respectively. Soil testing was conducted at a Global Position System (GPS) referenced waypoint at two locations in each of the two fields. A Dutch auger was used to sample eight locations in an approximate 10 m circle around the GPS waypoint. Samples were taken at soil depth of 0 to 15 cm for nitrogen and phosphorous and metals, and 15 to 60 cm was sampled for nitrogen only. The eight samples taken at each waypoint were placed in a plastic pail and mixed to provide a composite sample. The georeferenced location was marked using a Garmin GPSmap 62st for annual follow-up sampling for the next three consecutive years. Soil samples were placed in a cooler with ice and submitted to ALS Laboratories on the same day.

MMM staff conducted three site visits during the application program, August 26, 30 and September 1, 2016 for monitoring. The land application of the two Dugald cells and Cell #4 biosolids were applied to the fields from August 26 to September 2, 2016. The fields applied had recently been harvested of a winter wheat crop. Assiniboine Injections used excavators and dozers to collect the material from the cell bottoms and then trucked it to the field where it was loaded into the spreader via front end loader. A tractor hauling the spreader then broadcast the biosolids evenly on the field surface. Due to the physical properties of the material, broadcast applications were done up to three times each pass on the field to achieve the desired application rate. MMM was present to evaluate licenced parameters such as setback distances and compaction; daily monitoring logs are attached. It was verbally confirmed with the cooperating farm producer that the fields were cultivated to incorporate the biosolids materials within 24 hours of application. The cooperating producer was pleased with the application method and biosolids material.

During the site visits, MMM staff observed that setback distances were being followed and that soil compaction was occurring at field entrances and field staging areas. No odour was observed during the application process. Assiniboine Injections reported a daily average application rate between 23.7 and 60.5 tonnes per ha with a daily average percent solids between 33.0 and 42.0%.

Attached are the MMM site visit reports and the daily application parameters as per Assiniboine Injection, as well as a field sketch of the daily application locations.

Future Activities

Remaining vegetation and biosolids will be cleared and stockpiled within each cell in early 2017 prior to spring melt.

The RM of Springfield is committed to annual post-harvest soil testing for NW10-11-5EPM and NW11-11-5EPM in 2016, 2017 and 2018 for Nitrate-N (0-60cm) and phosphorous using Olsen-P test (0-15cm). Using the GPS coordinates taken in 2016 at NW10-11-5EPM (1. 655167.67 m E, 5530964.84 m N and 2. 655582.76 m E, 5531188.12 m N) and NW11-11-5EPM (1. 656799.31 m E, 5531177.86 m N and 2. 657134.52 m E, 5531002.29 m N), soil samples will be conducted at the same location after the farm producer has harvested their crop. The same procedure will

be followed as was undertaken during the initial background soil testing described above. Supplemental information such as supplemental fertilizer sources and rates, crop rotation and yields will be included in the monitoring program.

Conclusions


MMM was retained by the Rural Municipality of Springfield to complete a biosolid land application program for the decommissioned Dugald lagoon and Cell #4 of the decommissioned Oakbank lagoon. The land application was completed on September 2, 2016, and required 88.4 ha of land, located on fields NW10-11-5EPM and NW11-11-5EPM with an average daily application rate of 119 tonnes per hectare with average percent solids of 38.6%. MMM will continue to monitor the land applied fields annually and report results to MSD. Future cell closure plans for both Dugald and Oakbank cells are yet to be determined.

Should you have any questions please feel free to contact me at 204.943-3178 or via email at

Yours truly,

MMM Group Limited

Reviewed by:



Brian Moons, B.Sc., EPT
Biologist
Dated: December 15, 2016



Darren Keam, M.Sc., P.Ag.
Project Manager
Dated: December 15, 2016

cc.: Santokh Randhawa, M.Eng., P.Eng. (RM of Springfield)
Rob Boswick, P.Eng. (Manitoba Sustainable Development)
Krista Olafsson, (Manitoba Sustainable Development)

Encl.

Field Prescription Application Rates

August 30, 2016

Field ID:	NW11-11-05EPM	
Land Area Available (ha):	23	
2017 Crop:	Soybeans	
2017 Target Yield:	40	
	lb/ac	kg/ha
Target Nitrogen recommended :	50	56
Fertilizer Phosphate (P2O5) Recommended:	35	39.2
1 x P2O5 Crop Removal @ target Yield:	33	36.96
2 x P2O5 Crop Removal @ target Yield:	66	73.92

Plant Available Nutrients Soil Test Data						
Sample ID	L1819663-3	L1819663-4		L1819663-3	L1819663-4	
Sample Depth	0-15 cm	15-60 cm	Total Available	0-15 cm	15-60 cm	Total Available
Units	mg kg ⁻¹		kg ha ⁻¹	mg kg ⁻¹		kg ha ⁻¹
Available Nitrate-N	15.2	10.6	94	9.1	11.3	86
Available Phosphate-P (Olsen)	08.2		16	5.1		10.2
Available Potassium			-			-
Available Sulfate-S			-			-

Steinbach Biosolids Characteristics and Analysis

Parameter Name	Parameter Description	Unit	Biosolid Analysis (E1/2, Cell 4)
Estimated Biosolid Volume (+ 15% safety volume)	In-field	m ³	6,100
Specific Gravity	As Received	g cm ³	1.14
Estimated Biosolids		tonnes	6,954
Dry tonnes biosolids available (=wet tonnes x %solids)	Dried Basis	tonnes	3,508
Moisture	As Received	%	41.30
Total Solids	As Received	%	57.50
Total Volatile Solids	Dry Basis	%	6
Organic Matter	Dry Basis	%	3.00
Mineral Content	Dry Basis	%	97.00
Total Organic Carbon	Dry Basis	%	2.70
C:N Ratio	Dry Basis	x:1	23.48
C:P Ratio	Dry Basis	x:1	33.13
N:P Ratio	Dry Basis	x:1	1.41
pH	Saturated Paste		7.78

Total Kjeldahl N	% Dried Basis	%	0.115
Total Kjeldahl N	Dried Basis	mg kg ⁻¹	1,150
Total Kjeldahl N	Dried Basis	kg Tonne ⁻¹	1.15
Ammonium - N	Dried Basis	mg kg ⁻¹	2.00
Ammonium - N	Dried Basis	kg Tonne ⁻¹	0.002
Available Nitrate	Dried Basis	mg kg ⁻¹	-
Available Nitrate-N	Dried Basis	mg kg ⁻¹	-
Available Nitrate-N		kg Tonne ⁻¹	-
Total Phosphorous	Dried Basis	mg kg ⁻¹	815

Amount of Biosolids Nutrient Available to Crop

Organic N (=TKN-ammonium N)	Dried Basis	mg kg ⁻¹	1,148.00
Organic N	Dried Basis	kg Tonne ⁻¹	1.148
Method of Application:			Incorporated
Anticipated Weather			Warm/dry
Anticipated Volatilization (%)	incorp within 1 days		57
Available Organic N	Dried Basis	kg Tonne ⁻¹	0.29
Ammonium nitrogen available	Dried Basis	kg Tonne ⁻¹	0.00
Total available nitrogen (Year 1) (@25%)	Dried Basis	kg Tonne ⁻¹	0.29
Mineralization N Year 2 (@12%)	Dried Basis	kg Tonne ⁻¹	0.14
Mineralization N Year 3 (@6%)	Dried Basis	kg Tonne ⁻¹	0.07
Total Phosphorus	Dried Basis	kg Tonne ⁻¹	0.82
P ₂ O ₅ equivalent	Dried Basis	kg Tonne ⁻¹	1.87
Total Available P2O5	Dried Basis	kg Tonne ⁻¹	0.94

Application Rate based on Nitrogen				Land Area Required (Ha)
Nitrogen Based Application Rate	Dried Basis	tonnes ha ⁻¹	194.54	18
Amount of Available P2O5 applied	Dried Basis	kg ha ⁻¹	182.33	
P2O5 Application check		%	465.13	
Application Rate based on Phosphorous (1xCR)				Land Area Required (Ha)
Total Phosphorus Based Application Rate	Dried Basis	tonnes ha ⁻¹	39.43	89
Amount of Nitrogen applied	Dried Basis	kg ha ⁻¹	11.35	
Additional Nitrogen required		kg ha ⁻¹	44.65	
Application Rate based on Phosphorous (2xCR)				Land Area Required (Ha)
Total Phosphorus Based Application Rate	Dried Basis	tonnes ha ⁻¹	78.87	44
Amount of Nitrogen applied	Dried Basis	kg ha ⁻¹	22.70	
Additional Nitrogen required		kg ha ⁻¹	(60.70)	
Selected Application rate based on:		2xCR	P2O5	
Selected Application rate based on P2O5	Dried Basis	tonnes ha ⁻¹	78.87	
		tons ac ⁻¹	35.49	
		tonnes ha ⁻¹	137.16	
	Wet	tons ac ⁻¹	61.72	
		L ha ⁻¹	63,575	
		gal ac ⁻¹	5,658	
Estimated Biosolids Volume Applied	Wet	Tonnes	3,155	
Estimated Biosolids Volume Remaining	Wet	Tonnes	3,799	

Notes

Available Ammonium N - Volatilization loss associated with different application methods (0% with injection)

Organic N - TKN - Ammonium N

Available Organic N - Organic N x 0.25Year 1

Mineralization of Year 2 = 12%, Year 3 = 6%

Plant Available Nitrogen= (NO₃-N)+Volatilization factor (NH₄-N)+Organic N Mineralization

Phosphorous Total and Olsen methods.

* See Estimates of Ammonium-N Retained After Biosolids application

C:N exceeds 30:1, N becomes a limiting nutrient for decomposer organisms, and this can reduce the rate of decomposition and results in N immobilization

C:P ratio between 200:1 and 300:1, mineralization and immobilization balance each other to result in no net release of P from the decomposing manure. When C:P is below this range, P is released.

When animal and municipal wastes have N:P ratios ranging from 1:1 to 1:2 are applied based on N rates on soils, over time P will accumulate

Table 2. Field Prescription Application Rates, Dugald North Cell

August 16, 2016

Field ID:	NW10-11-05EPM	
Land Area Available (ha):	61	
2017 Crop:	Soybeans	
2017 Target Yield:	40	
	lb/ac	kg/ha
Target Nitrogen recommended :	50	56
Fertilizer Phosphate (P2O5) Recommended:	35	39.2
1 x P2O5 Crop Removal @ target Yield:	29	32.48
2 x P2O5 Crop Removal @ target Yield:	70	64.96

Plant Available Nutrients Soil Test Data					
Sample ID	L1811999-1	L1811999-2	L1811999-3	L1811999-4	
Sample Depth	0-15 cm	15-60 cm	Total Available	0-15 cm	15-60 cm
Units	mg kg ⁻¹		kg ha ⁻¹	mg kg ⁻¹	
			kg ha ⁻¹	kg ha ⁻¹	
Available Nitrate-N	19.9	4.2	65	14.3	3.1
Available Phosphate-P (Olsen)	09.8		20	5.5	
Available Potassium			-		
Available Sulfate-S			-		

Steinbach Biosolids Characteristics and Analysis

Parameter Name	Parameter Description	Unit	Biosolid Analysis (DigidNorth)
Estimated Biosolid Volume (+ 15% safety volume)	In-field	m ³	1,698
Specific Gravity	As Received	kg L ⁻¹	1.14
Estimated Biosolids		tonnes	1,936
Dry tonnes biosolids available (=wet tonnes x %solids)	Dried Basis	tonnes	1,219
Moisture	As Received	%	36.00
Total Solids	As Received	%	71.80
Total Volatile Solids	Dry Basis	%	7
Organic Matter	Dry Basis	%	3.90
Mineral Content	Dry Basis	%	96.10
Total Organic Carbon	Dry Basis	%	1.70
C:N Ratio	Dry Basis	x:1	5.72
C:P Ratio	Dry Basis	x:1	15.89
N:P Ratio	Dry Basis	x:1	2.78
pH	Saturated Paste		7.77
Total Kjeldahl N	% Dried Basis	%	0.297
Total Kjeldahl N	Dried Basis	mg kg ⁻¹	2,970
Total Kjeldahl N	Dried Basis	kg Tonne ⁻¹	2.97
Ammonium - N	Dried Basis	mg kg ⁻¹	10.50
Ammonium - N	Dried Basis	kg Tonne ⁻¹	0.011
Available Nitrate	Dried Basis	mg kg ⁻¹	
Available Nitrate-N	Dried Basis	mg kg ⁻¹	23.50
Available Nitrate-N	Dried Basis	kg Tonne ⁻¹	0.02
Total Phosphorous	Dried Basis	mg kg ⁻¹	1,070
Amount of Biosolids Nutrient Available to Crop			
Organic N (=TKN-ammonium N)	Dried Basis	mg kg ⁻¹	2,959.50
Organic N	Dried Basis	kg Tonne ⁻¹	2.960
Method of Application:			
Anticipated Weather			Incorporated
Anticipated Volatilization (%)	within 48 hours		warm/dry
Available Organic N	Dried Basis	kg Tonne ⁻¹	57
Ammonium nitrogen available	Dried Basis	kg Tonne ⁻²	0.74
Total available nitrogen (Year 1) (@25%)	Dried Basis	kg Tonne ⁻¹	0.00
Mineralization N Year 2 (@12%)	Dried Basis	kg Tonne ⁻¹	0.74
Mineralization N Year 3 (@6%)	Dried Basis	kg Tonne ⁻¹	0.36
Total Phosphorus	Dried Basis	kg Tonne ⁻¹	0.18
P ₂ O ₅ equivalent	Dried Basis	kg Tonne ⁻¹	1.07
Total Available P2O5	Dried Basis	kg Tonne ⁻¹	2.46
			1.23

Application Rate based on Nitrogen				Land Area Required (Ha)
Nitrogen Based Application Rate	Dried Basis	tonnes ha ⁻¹	75.23	16
Amount of Available P2O5 applied	Dried Basis	kg ha ⁻¹	92.57	
P2O5 Application check		%	236.15	
Application Rate based on Phosphorus (1xCR)				Land Area Required (Ha)
Total Phosphorus Based Application Rate	Dried Basis	tonnes ha ⁻¹	26.40	46
Amount of Nitrogen applied	Dried Basis	kg ha ⁻¹	19.65	
Additional Nitrogen required		kg ha ⁻¹	36.35	
Application Rate based on Phosphorus (2xCR)				Land Area Required (Ha)
Total Phosphorus Based Application Rate	Dried Basis	tonnes ha ⁻¹	52.79	23
Amount of Nitrogen applied	Dried Basis	kg ha ⁻¹	39.30	
Additional Nitrogen required		kg ha ⁻¹	16.70	
Selected Application rate based on:				
Selected Application rate based on P2O5	Dried Basis	2xCR	tonnes ha ⁻¹	52.79
		P2O5	tons ac ⁻¹	23.76
	Wet		tonnes ha ⁻¹	73.53
			tons ac ⁻¹	33.09
			L ha ⁻¹	34,079
		igal ac ⁻¹	3,033	
Estimated Biosolids Volume Applied	Wet	Tonnes		4,485
Estimated Biosolids Volume Remaining	Wet	Tonnes		2,549

Notes

- Available Ammonium N - Volatilization loss associated with different application methods (0% with Injection)
- Organic N - TKN - Ammonium N
- Available Organic N - Organic N x 0.25Year 1
- Mineralization of Year 2 = 12%, Year 3 = 6%
- Plant Available Nitrogen= (NO3-N)+Volatilization factor (NH4-N)+Organic N Mineralization
- Phosphorous Total and Olsen methods.
- * See Estimates of Ammonium-N Retained After Biosolids application

C:N exceeds 30:1, N becomes a limiting nutrient for decomposer organisms, and this can reduce the rate of decomposition and results in N immobilization
 C:P ratio between 200:1 and 300:1, mineralization and immobilization balance each other to result in no net release of P from the decomposing manure. When C:P is below this range, P is released.
 When animal and municipal wastes have N:P ratios ranging from 1:1 to 1:2 are applied based on N rates on soils, over time P will accumulate

Table 3. Field Prescription Application Rates, Dugald South Cell

Field ID:	NW10-11-05E	
Land Area Available (ha):	64	
2017 Crop:	Soybeans	
2017 Target Yield:	40	
	lb/ac	kg/ha
Target Nitrogen recommended:	50	56
Fertilizer Phosphate (P2O5) Recommended:	35	39.2
1 x P2O5 Crop Removal @ target Yield:	29	32.48
2 x P2O5 Crop Removal @ target Yield:	70	64.96

Plant Available Nutrients Soil Test Data						
Sample ID	L1811999-1	L1811999-2	Total Available	L1811999-3	L1811999-4	Total Available
Sample Depth	0-15 cm	15-60 cm		0-15 cm	15-60 cm	
Units	mg kg ⁻¹		kg ha ⁻¹	mg kg ⁻¹		kg ha ⁻¹
Available Nitrate-N	19.9	4.2	65	14.3	3.1	47.2
Available Phosphate-P (Olsen)	09.8		20	5.5		11
Available Potassium			-			-
Available Sulfate-S			-			-

Steinbach Biosolids Characteristics and Analysis

Parameter Name	Parameter Description	Unit	Biosolid Analysis (DugdSouth)
Estimated Biosolid Volume (15% safety volume)	In-field	m ³	816
Specific Gravity	As Received	kg L ⁻¹	1.14
Estimated Biosolids		tonnes	930
Dry tonnes biosolids available (=wet tonnes x %solids)	Dried Basis	tonnes	410
Moisture	As Received	%	36.00
Total Solids	As Received	%	50.20
Total Volatile Solids	Dry Basis	%	26
Organic Matter	Dry Basis	%	10.80
Mineral Content	Dry Basis	%	89.20
Total Organic Carbon	Dry Basis	%	9.60
C:N Ratio	Dry Basis	x:1	20.38
C:P Ratio	Dry Basis	x:1	47.06
N:P Ratio	Dry Basis	x:1	2.31
pH	Saturated Paste		7.44
Total Kjeldahl N	% Dried Basis	%	0.471
Total Kjeldahl N	Dried Basis	mg kg ⁻¹	4,710
Total Kjeldahl N	Dried Basis	kg Tonne ⁻¹	4.71
Ammonium - N	Dried Basis	mg kg ⁻¹	7.80
Ammonium - N	Dried Basis	kg Tonne ⁻¹	0.008
Available Nitrate	Dried Basis	mg kg ⁻¹	-
Available Nitrate-N	Dried Basis	mg kg ⁻¹	82.40
Available Nitrate-N	Dried Basis	kg Tonne ⁻¹	0.08
Total Phosphorous	Dried Basis	mg kg ⁻¹	2,040

Amount of Biosolids Nutrient Available to Crop

Organic N (=TKN-ammonium N)	Dried Basis	mg kg ⁻¹	4,702.20
Organic N	Dried Basis	kg Tonne ⁻¹	4.702
Method of Application:			Incorporated
Anticipated Weather			Warm/dry
Anticipated Volatilization (%)	within 48 hours		57
Available Organic N	Dried Basis	kg Tonne ⁻¹	1.18
Ammonium nitrogen available	Dried Basis	kg Tonne ⁻¹	0.00
Total available nitrogen (Year 1) (@25%)	Dried Basis	kg Tonne ⁻¹	1.18
Mineralization N Year 2 (@12%)	Dried Basis	kg Tonne ⁻¹	0.56
Mineralization N Year 3 (@6%)	Dried Basis	kg Tonne ⁻¹	0.28
Total Phosphorus	Dried Basis	kg Tonne ⁻¹	2.04
P ₂ O ₅ equivalent	Dried Basis	kg Tonne ⁻¹	4.69
Total Available P2O5	Dried Basis	kg Tonne ⁻¹	2.35

Application Rate based on Nitrogen				Land Area Required (Ha)
Nitrogen Based Application Rate	Dried Basis	tonnes ha ⁻¹	47.50	9
Amount of Available P2O5 applied	Dried Basis	kg ha ⁻¹	111.44	
P2O5 Application check		%	284.28	
Application Rate based on Phosphorus (1xCR)				Land Area Required (Ha)
Total Phosphorus Based Application Rate	Dried Basis	tonnes ha ⁻¹	13.84	30
Amount of Nitrogen applied	Dried Basis	kg ha ⁻¹	16.32	
Additional Nitrogen required		kg ha ⁻¹	39.68	
Application Rate based on Phosphorus (2xCR)				Land Area Required (Ha)
Total Phosphorus Based Application Rate	Dried Basis	tonnes ha ⁻¹	27.69	15
Amount of Nitrogen applied	Dried Basis	kg ha ⁻¹	32.64	
Additional Nitrogen required		kg ha ⁻¹	23.36	
Selected Application rate based on:				
Selected Application rate based on P2O5	Dried Basis	tonnes ha ⁻¹	27.69	
		tons ac ⁻¹	12.46	
	Wet	tonnes ha ⁻¹	55.16	
		tons ac ⁻¹	24.82	
		l ha ⁻¹	25,566	
Estimated Biosolids Volume Applied	Wet	Tonnes	3,530	
Estimated Biosolids Volume Remaining	Wet	Tonnes	2,600	

Notes

- Available Ammonium N - Volatilization loss associated with different application methods (0% with Injection)
- Organic N - TKN - Ammonium N
- Available Organic N - Organic N x 0.25year 1
- Mineralization of Year 2 = 12%, Year 3 = 6%
- Plant Available Nitrogen= (NO3-N)+Volatilization factor (NH4-N)+Organic N Mineralization
- Phosphorous Total and Olsen methods.
- * See Estimates of Ammonium-N Retained After Biosolids application

C:N exceeds 30:1, N becomes a limiting nutrient for decomposer organisms, and this can reduce the rate of decomposition and results in N immobilization

C:P ratio between 200:1 and 300:1, mineralization and immobilization balance each other to result in no net release of P from the decomposing manure. When C:P is below this range, P is released.

When animal and municipal wastes have N:P ratios ranging from 1:1 to 1:2 are applied based on N rates on soils, over time P will accumulate



Photo 1. Land spreading biosolid material



Photo 2. Post-spreading, first pass of material



Date Taken: August 30, 2016

Taken by: BMoons

Project No.: 3315446

Client: RM of Springfield

Location: RM of Springfield, MB



Photo 3. Removal process of biosolids from Cell #4 at Oakbank lagoon



Photo 4. Staging area in NW-10-11-5EPM; unloading material from Cell #4



Date Taken: August 30, 2016

Client: RM of Springfield

Taken by: BMoons

Project No.: 3315446

Location: RM of Springfield, MB



Photo 5. Completed North Cell at Dugald lagoon



Photo 6. Completed South Cell at Dugald lagoon



Date Taken: August 30, 2016

Taken by: BMoons

Project No.: 3315446

Client: RM of Springfield

Location: RM of Springfield, MB



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 Winnipeg, Manitoba, Canada R3B 3B1
 Tel: (204) 943-3178 Fax: (204) 943-4948
 E-Mail: winniepeg@mmm.ca

Biosolid Land Application Report

Project Name: Biosolid land application
 Field Location: ~~North-SE~~ / NE 10-11-SE
 Client: RM of Springfield.
 Site Visit Date: 2016-08-26 @ 1:30 pm
 Contractor: Assiniboia Injections
 Weather: 22°C, partly cloudy, wind. S.

Project No: 3315446.
 Field Staff: B MOONS
J PAULS.

Rates (as per Contractor):

/acre: 25 tons/acre.
 % Solids: ~~N/A~~ 35

Setback (Buffer) Distances:

- 75 m from any occupied residence Yes No N/A
- 400 metres from a residential area Yes No N/A
- 8 metres from a major wetland, bog, marsh or swamp Yes No N/A
- 15 metres from a first order waterway Yes No N/A
- 30 metres from a second order or higher order waterway Yes No N/A
- 50 meters from a groundwater well Yes No N/A
- Other:

Observations:

Excessive compaction?
~~At~~ At field entrance, some compaction.

Pipe blowouts?
N/A

Puddling?
N/A

Comments:
 - malfunction of equipment
 - @ idle & working on spreader
 - not expected to get back at it until ~5:30



MMM Group Limited
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Biosolid Land Application Report

Project Name: Springfield Biosolids

Project No: 3315446

Field Location: NW-10-11-SE

Client: RM of Springfield

Site Visit Date: 2016-08-30

Field Staff: B. Moors

Contractor: Assihiboine Injections

Weather: ~20°C, sunny, wind W

Rates (as per Contractor):

Volume: 100 ton/acre

% Solids: ~30%

Setback (Buffer) Distances:

- 75 m from any occupied residence Yes No N/A
- 400 metres from a residential area Yes No N/A
- 8 metres from a major wetland, bog, marsh or swamp Yes No N/A
- 15 metres from a first order waterway Yes No N/A
- 30 metres from a second order or higher order waterway Yes No N/A
- 50 meters from a groundwater well Yes No N/A
- Other:

Observations:

Excessive compaction?

AT access off cedar creek road & staging area

Pipe blowouts?

N/A

Puddling?

N/A

Comments:

- Spreading appears uniform - plan on finishing NW10 by this afternoon.
- due to ~~low~~ weight of sludge, applying 3 x 20 tons



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Biosolid Land Application Report

Project Name: Springfield biosolid land App.
Field Location: Oakbank / cell 4
Client: RM of Springfield
Site Visit Date: Sept 1/16
Contractor: Assiniboine Injections
Weather: 15°C / sunny

Project No:

Field Staff: J. Gallagher

Rates (as per Contractor):

tonnes/acre: 60 / acre
 % Solids: NA

Setback (Buffer) Distances:

- 75 m from any occupied residence Yes No N/A
- 400 metres from a residential area Yes No N/A
- 8 metres from a major wetland, bog, marsh or swamp Yes No N/A
- 15 metres from a first order waterway Yes No N/A
- 30 metres from a second order or higher order waterway Yes No N/A
- 50 meters from a groundwater well Yes No N/A
- Other:

Observations:

Excessive compaction? *there is compaction and settling at the entrances to the field*

Pipe blowouts?
 NA

Puddling?
 NA

Comments: *There have been a few mechanical site blocks that they hope to be finished by Friday Sept 2 morning or Saturday Sept. 3 afternoon at the latest*

inspected cell 4 - taking primarily from south portion, no solid content along E side has shown to be a bit inconsistent with more extensive stripping

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: AUG 26, AUG 27, AUG 28, AUG 30

FARMERS NAME: _____

FIELD: SEC. ^{NW} 10 TWP 11 RGE 5E

APPLICATION TYPE: BROADCASTING

TOTAL ACRES: _____

APPLICATION RATE TONNES PER ACRE: _____

TOTAL TONNES APPLIED: 4334

Aug 30 CELL 4 1260 Tons 59.2 T/A	BUFFER Yard BUFFER	N 4290 Moisture 21.3 Acres.
Aug 28 Dugald South CELL 23.7 T/A	3390 Moisture 684.92 Tons	28.9 Acres
Aug 27 Dugald North CELL 31.5 T/A	3790 Moisture 54.7 Acres	1723 TONS
Aug 26 Dugald North CELL 32 T/A	3590 Moisture 20.63 Acres	667 Ton

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DAILY LIME APPLICATION PLAN

DATE: Aug 30, Aug 31, Sept 1, Sept 2

FARMERS NAME: Greg Smith

FIELD: SEC. 11 TWP 11 RGE 05

APPLICATION TYPE: BROADCASTING

TOTAL ACRES: 92.9

APPLICATION RATE TONNES PER ACRE: 59.7 T/A

TOTAL TONNES APPLIED: 5552 T.

