

# Mississippi Mills Wastewater Treatment Plant Annual Report 2014

Please find below the **2014 Annual Performance Report** and other supporting documents for the **Mississippi Mills Wastewater Treatment Plant**. This report is a requirement of the Environmental Compliance Approval (ECA) (formerly known as the certificate of approval (CofA)) Number 2425-8DXR5U (issued February 16, 2011). The ECA allotted of the operation of both the lagoon treatment facility as well as the new wastewater treatment plant (WWTP). The new WWTP was brought into service on July 11, 2012.

## Summary:

### Flow Exceedances:

There were no flow exceedances.

### Bypass Events:

There were no bypass events during the reporting period.

### Overflow Events:

There were two overflow events during the reporting period

### Spills:

There was one **Digested Sludge Foam Spill** from **ATAD #2** during the reporting period.

## Effluent Compliance Limits

Parameter	Compliance Limit Met?		Treatment Objectives Met?	
	Concentration	Loadings	Concentration	Loadings
<b>cBOD</b>	YES	YES	YES	YES
<b>Suspended Solids</b>	YES	YES	YES	YES
<b>Total Phosphorus</b>	YES	YES	YES	<b>NO</b>
<b>Total Ammonia</b>	YES	YES	YES	YES
E. Coli (geo-mean)	N/A	N/A	YES	N/A

## Flow Assessment:

### WWTP Influent Flow Limits:

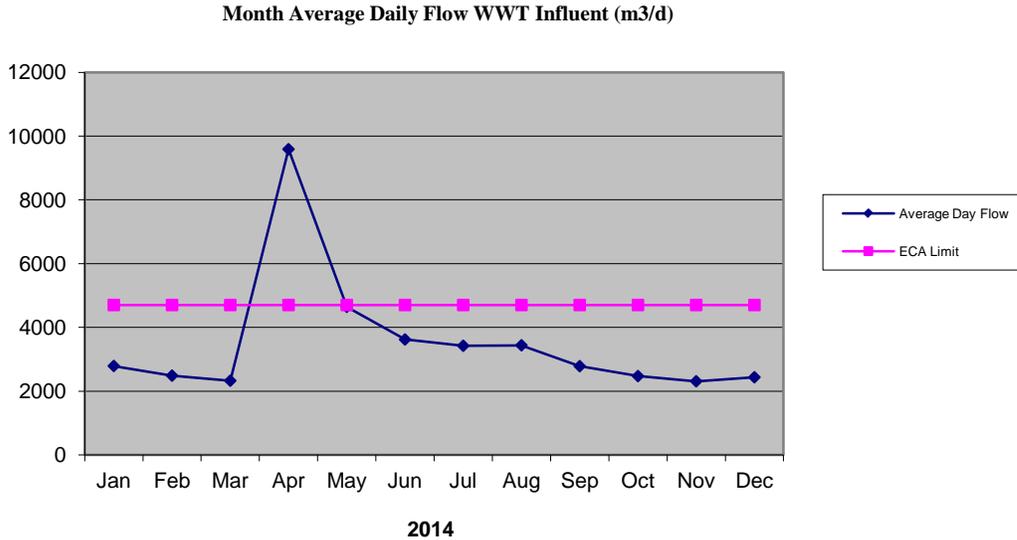
The WWTP ECA approves:

- A design average daily treatment capacity of 4,700 m<sup>3</sup>/d and a peak treatment capacity of 14,100 m<sup>3</sup>/d.

**Average Day Flow:**

The ECA limits the annual average day volume to 4700 m<sup>3</sup>/d. With a 2014 annual average day flow of 3525 m<sup>3</sup>/d, the WWTP is at **75.0% capacity**.

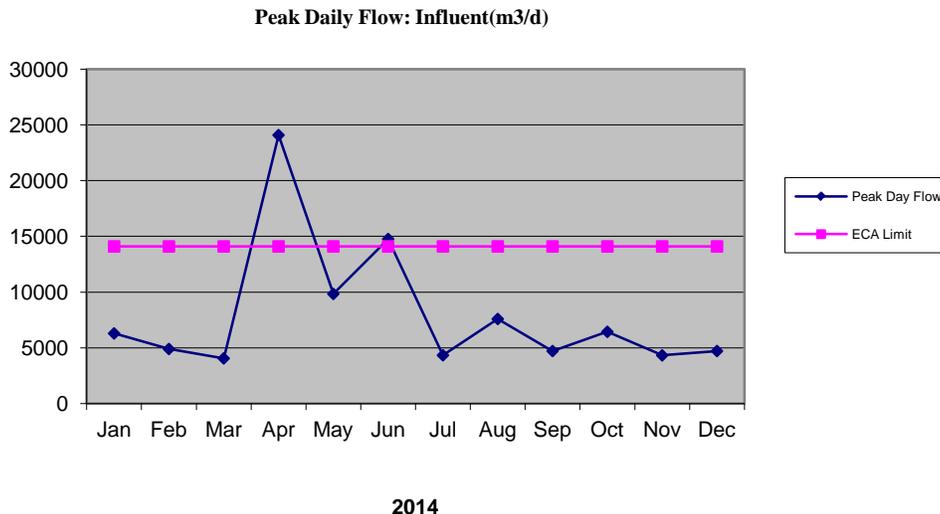
The chart below depicts the month average day flow from the Gemmill’s Bay Pumping Station.



**Peak Day Flow:**

The ECA limits the volume of wastewater pumped through the treatment processes at the WWTP to 14,100 m<sup>3</sup>/d. The peak raw sewage influent flow was 24,081.59 m<sup>3</sup>/d. The facility automatically diverts flows greater than 14,100 to an attenuation pond where the influent is stored and returned to the treatment facility for processing during lower flow periods; therefore the compliance limit has not been exceeded.

The chart below depicts the peak flow rates from the Gemmill’s Bay Pumping Station.



## Capacity Assessment:

Year	2011	2012 Jan - Jul (Lagoon)	2012 Jul- Dec (WWTP)	2013	2014
Average Day Flow (m <sup>3</sup> /d)	2541	2380	1687	2657	3525
ADF: Design Capacity (m <sup>3</sup> /d)	3020	3020	4700	4700	4700
<b>% of capacity</b> , based on average daily flows	<b>84.1</b>	<b>78.8</b>	<b>35.9</b>	<b>56.5</b>	<b>75.0</b>
Maximum Day Flow (m <sup>3</sup> /d)	14989	16311	4901	9566	24081

- (a) A summary and interpretation of all monitoring data and a comparison to the effluent limits including an overview of the success and adequacy of the *Works*

## Effluent Limits:

The requirements of the ECA for the treatment system are as follows:

Parameter	Effluent Limits	
	Concentration	Waste Loading
cBOD <sub>5</sub>	25.0 mg/L	117.5 kg/d
Suspended Solids	15.0 mg/L	70.5 kg/d
Total Phosphorous		
Sep 01 – May 30	0.3 mg/L	1.41 kg/d
Jun 01 – Aug 31	0.2 mg/L	0.94 kg/d
Total Ammonia		
Sep 01 – Apr 30	15 mg/L	70.5 kg/d
May 01 – Aug 31	5 mg/L	23.5 kg/d
pH of the effluent maintained between 6.0 to 9.5 inclusive, at all times.		

\*Based on monthly average concentration and monthly average loading

## Effluent Objectives

The requirements of the ECA for the treatment system are as follows:

Parameter	Effluent Objectives	
	Concentrations	Loading
cBOD <sub>5</sub>	10.0 mg/L	47 kg/d
Suspended Solids	10.0 mg/L	47 kg/d
Total Phosphorous	0.15 mg/L	0.71 kg/d
Total Ammonia		
Sep 01 – Apr 30	12 mg/L	56.4 kg/d
May 01 – Aug 31	3.0 mg/L	14.1 kg/d
E. Coli	100 organisms per 100 milliliters (Monthly geometric Mean Density)	Not applicable

Please find attached a copy of OCWA's Performance Assessment Report (PAR) - this report summarizes flow and chemical analysis for samples taken throughout the year.

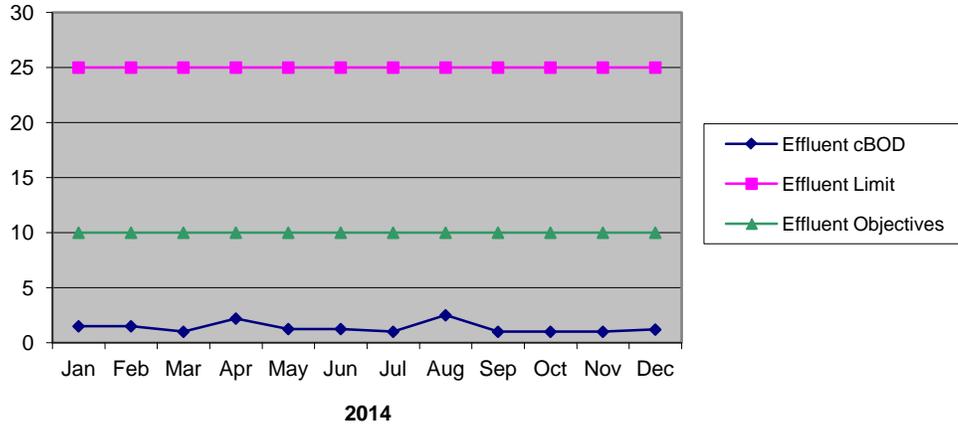
A report for effluent pH, temperature and unionized ammonia is attached.

The ECA requires quarterly samples to be taken and analyzed for Acute Lethality. The effluent passed the requirements of these tests.

A report on Acute Lethality testing for the new WWTP is included. RBT = Rainbow Trout and DM = Daphnia Magna test results.

# Effluent cBOD

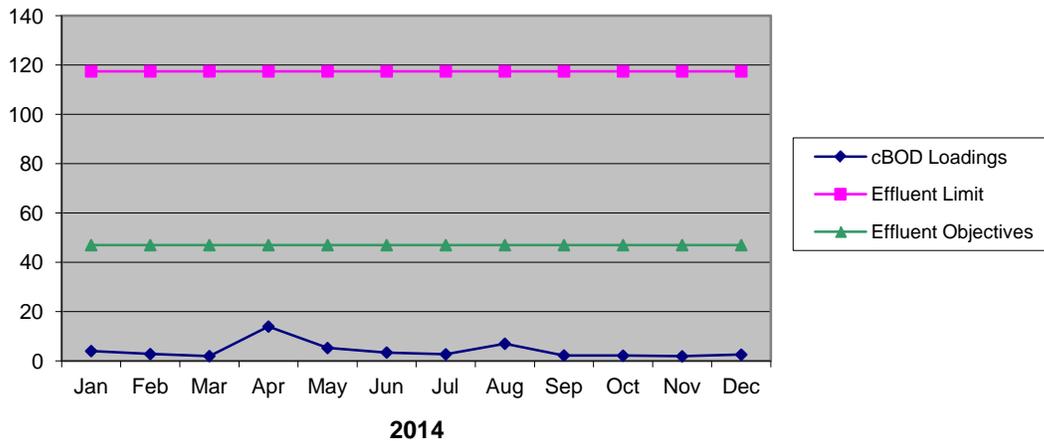
Month Average Effluent cBOD Concentration (mg/L)



Compliance Limit: The WWTP effluent met the compliance limits for cBOD effluent concentration.

Effluent cBOD Objectives: The WWTP effluent met the effluent objectives for cBOD effluent concentration.

Month Average Effluent cBOD Loadings (kg/d)

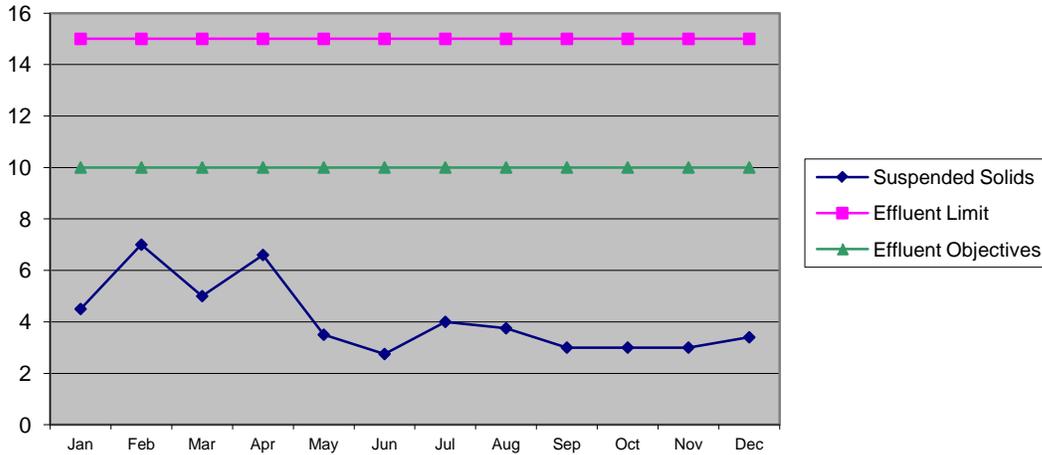


Compliance Limit: The WWTP effluent met the compliance limit for cBOD loadings.

Effluent Objectives: The WWTP effluent met the effluent objective for cBOD loadings.

## Effluent Suspended Solids

Month Average Effluent Suspended Solids Concentration (mg/L)

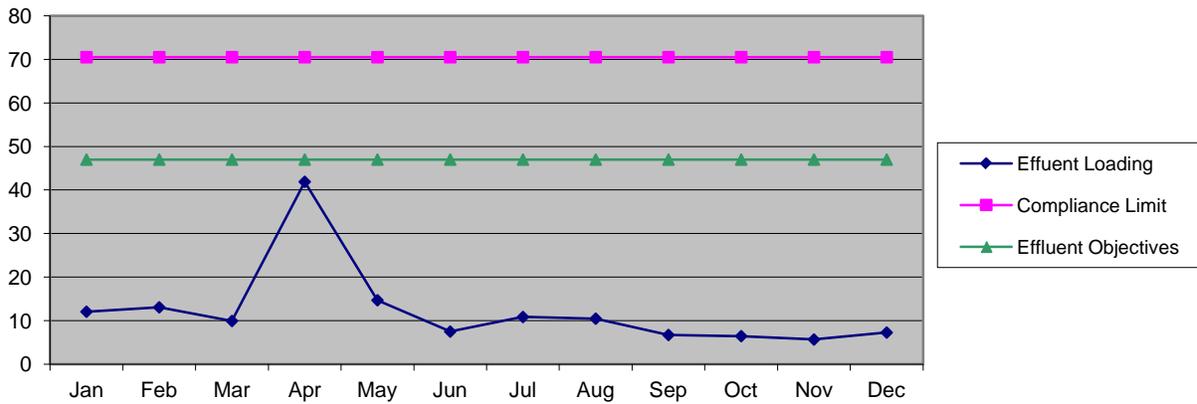


2014

Compliance Limit: The WWTP effluent met the compliance limits for suspended solids effluent concentration.

Effluent Objectives: The WWTP effluent met the effluent objective for suspended solids concentration.

Month Average Effluent Suspended Solids Loading (kg/d)

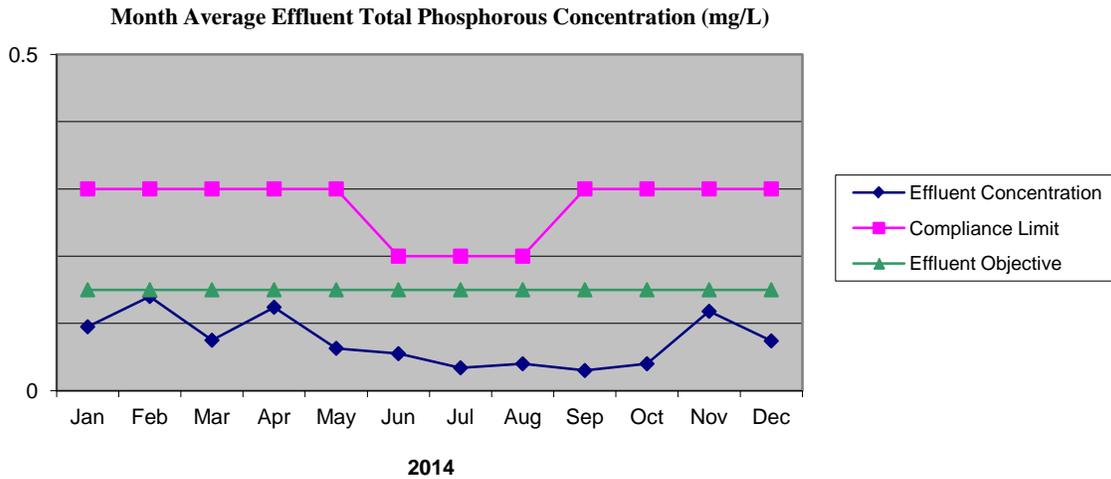


2014

Compliance Limits: The WWTP effluent met the compliance limit for total suspended solids loading.

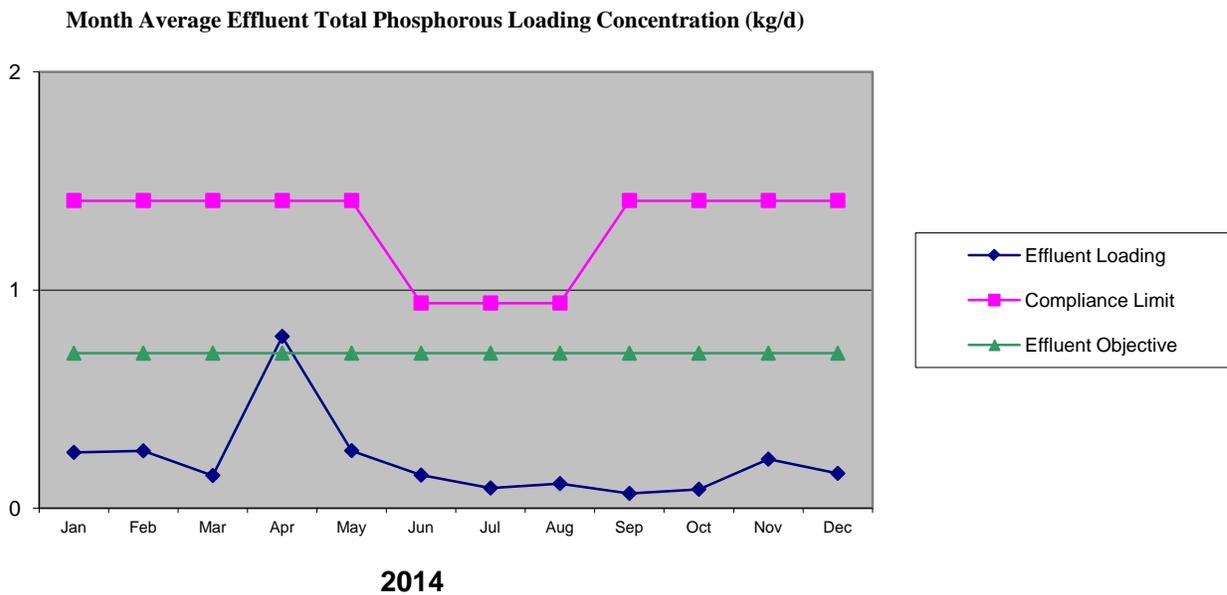
Effluent Objectives: The WWTP effluent met the total suspended solids loading requirement.

## Effluent Phosphorous



Compliance Limits: The WWTP effluent met the Total Phosphorous treatment compliance limits.

Effluent Objectives: The WWTP effluent met the Total Phosphorous treatment effluent objectives.

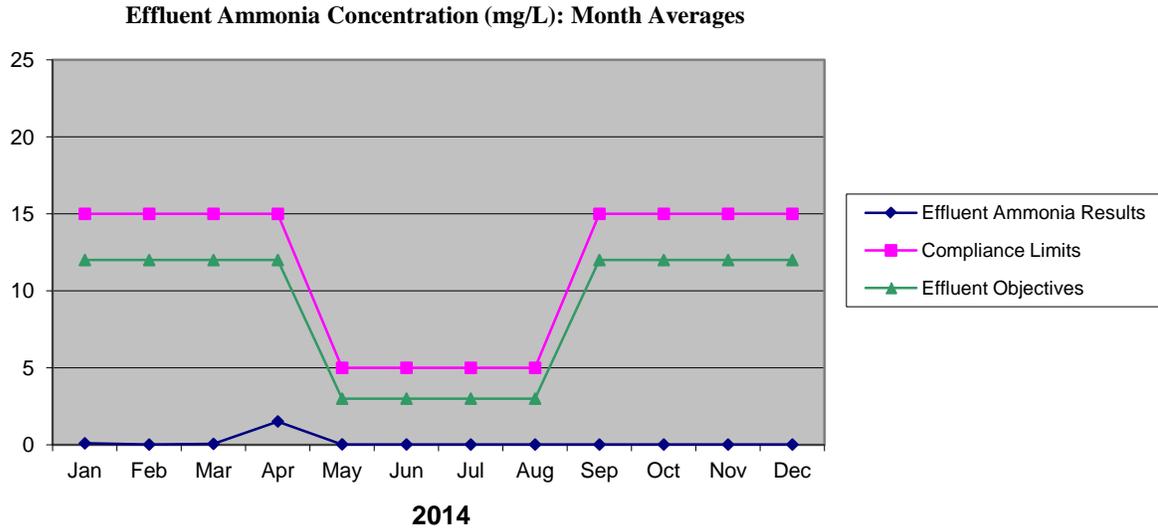


Compliance Limit: The WWTP effluent met the Total Phosphorous effluent loading compliance limit.

Effluent Objective: The WWTP effluent failed to meet the Total Phosphorous effluent loading objective in April.

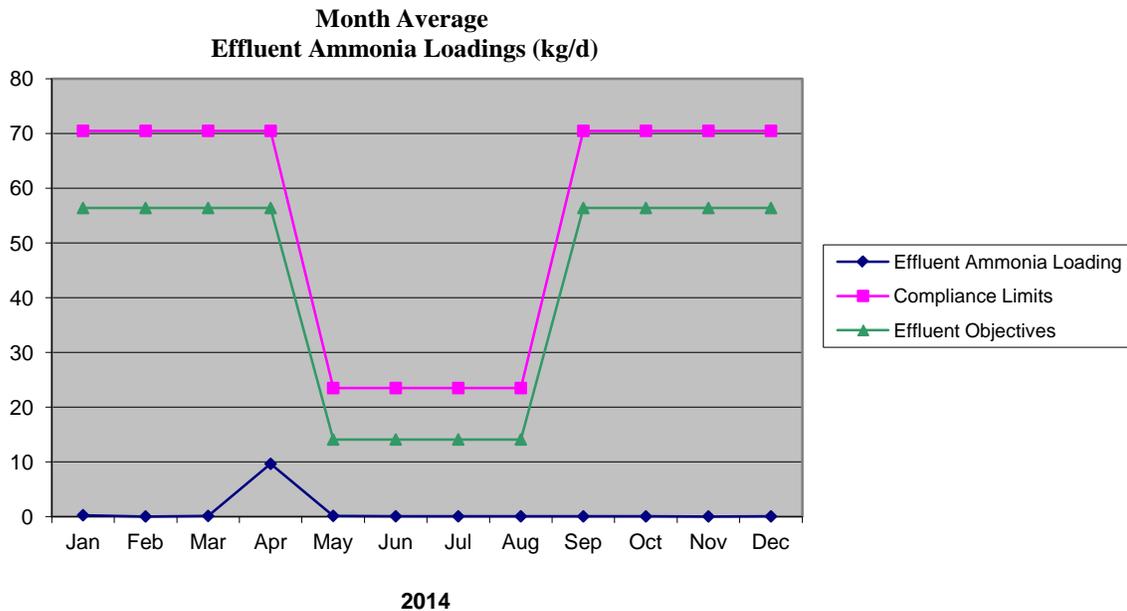
Please refer to section (b) below regarding a description of the operating problems encountered for phosphorous.

## Effluent Ammonia Concentrations



Compliance Limit: The WWTP effluent met the total ammonia concentration compliance requirements.

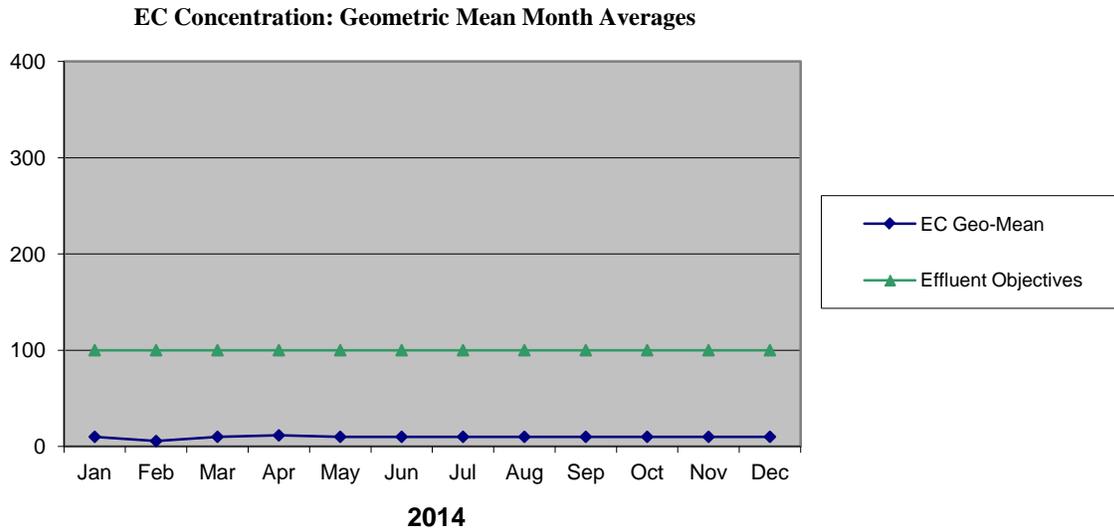
Effluent Objective: The WWTP effluent met the total ammonia concentration objectives.



Compliance Limit: The WWTP effluent met the total ammonia loading concentration compliance requirements.

Effluent Objective: The WWTP effluent met the total ammonia loading concentration objectives.

## Effluent Bacteriological (Escherichia coli)



Compliance Limit: There is no compliance limit for this parameter.

Effluent Objective: The WWTP effluent met the bacteriological concentration objectives.

### (b) A description of any operating problems encountered and corrective actions taken

Controlling the effluent Phosphorous Loadings in the treatment processes remained to be a challenge during the first and second quarters of 2014. High flows in April contributed to the treatment facility being unable to meet the phosphorous effluent loading objective for the month.

OCWA retained the services of their Process Specialist to evaluate the treatment processes and procedures. Recommendations were made for the optimization of the treatment processes and procedures to improve phosphorous removal. In June of 2014 the Town of Mississippi Mills was able to secure a Provincial Officers Order #1-BFR1I allowing for an additional primary coagulant injection point in the raw influent channel allowing more effective dosage to control the phosphorous levels.

April 2014:

The facility failed to meet the Effluent Waste Loading objective of 0.71 kg/day with a result of 0.787 kg/day. See above for actions taken.

April 8, 2014:

Heavy rain fall and rapid snow melt resulted in a Hydraulic overload of the Gemmill's Bay sewage pumping station capacity, causing a raw sewage overflow event. Samples were collected in accordance with the requirements of Condition 9(3) of the Amended Certificate of Approval # 2425-8DXR5U and Provincial Officers Order # 1-BCTVS.

June 24, 2014:

Heavy rainfall resulted in a hydraulic overload of the Gemmill's Bay sewage pumping station capacity, causing a raw sewage overflow event. Samples were collected in accordance with the requirements of Condition 9(3) of the Amended Certificate of Approval # 2425-8DXR5U and Provincial Officers Order # 1-BFR11.

June 27, 2014:

Digested sludge foam spill. It is suspected the ATAD process upset, likely caused by the level sensor instrumentation failure. Vacuum truck services were acquired to clean up the spill. The contents were dumped into the Peak attenuation pond.

The Digestion process utilizing the ATAD system experienced some problems specifically with the monitoring of the foam levels. It was determined that the sensor had failed to properly monitor this level and subsequently was the root cause to a spill. A new style replacement instrument has been purchased and installed, which is expected to have improved capability to prevent this issue to repeat.

**(c) summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works**

## Maintenance Summary

OCWA: Mississippi Mills WWTP:

<b>WO#</b>	<b>Completion Date</b>	<b>Comments</b>
3045270	03/12/2014	Final effluent sensor net probes, annual replacement required by manufacturer.
3045630	07/10/2014	MAU-1 &2 Motion sensors replacement. After troubleshooting and researching issues with the MAV's. It was found that the motion sensors that control s that system were not functioning properly and needed to be replaced.
3049752	06/06/2014	Electrical components to add outlets. There were no outlets in the basement of the facility. The requirement is to have one for the chlorine system and some plugs in various locations for Health and Safety reasons.
3052260	01/20/2014	Heat trace wire and insulation wrap. Chemical lines were freezing, required proper heat trace.
3063016	03/17/2014	Alum line from to clarifier is blocked with crystallized alum caused by freezing. Added unions to properly inspect and maintain in the future.

<b>WO#</b>	<b>Completion Date</b>	<b>Comments</b>
3085589	11/05/2014	No. 2 Clarifier Chain & Drive Sprocket and parts for Sprocket. Required due to freezing in Winter. SS chain changed to nonmetallic.
3103822	07/29/2014	Disc thickener #2 motor failure. Current motor tripping out on overloads. A replacement motor purchased.
3103866	05/16/2014	Emergency lighting distribution system. Purchased 10 batteries for replacement of old batteries.
3105868	05/20/2014	SCADA work. PLC Disk thickener high - low set point and clarifier rake alarm required re-programming.
3107838	05/21/2014	Compressor Mississippi Mills WWTF. Compressor controls, Compressor #1 would not run in auto. Required re-programming.
3125269	05/14/2014	Installed new raw influent alum feed lines as recommended by OCWA process specialist.
3135731	06/20/2014	Filtrate pump, seal breach causing lower bearing failure. Replaced sea and bearing.
3141058	08/08/2014	VFD display defective for service water system, required replacement.
3144642	07/14/2014	Sanitary pump station line broken due to vibration and water hammer, emergency repairs completed.
3202809	10/22/2014	Back up SCADA failure, install more memory and backup all files.

## **Town of Mississippi Mills**

### **2014 Sanitary Sewers**

#### **OPERATING AND CAPITAL**

##### **System Details**

- Estimated service population = 5,500
- 2697 accounts - 2,393 residential meters and 304 non residential meters
- Length of Collection System = 31km

##### **Maintenance & Operations**

- Cleaned and CCTV Inspected approximately 8km of sanitary sewers in the southeast quadrant of Almonte
- Inspect and oversee new development – Mill Run Subdivision (Honeybourne Street, Larocque Street and Horton Street), Ultramar,
- Joined and Implemented Ontario One Call procedure – utility locates;

##### **System Administration and Planning**

- Town awarded contract to Watson & Associates to complete update to Water and Wastewater Rate Study and Financial Plan (August 12, 2014);
- Ongoing study work relating by Geofirma relating to decommissioning of sewage lagoons;

##### **Collection System – Additions / Replacements**

- 190m of trunk sanitary sewers replaced on Spring Street and Clyde Street (Queen to Dead End);
- 320m of new sanitary sewers commissioned in Mill Run Phase 1B – Larocque Street, Horton Street and Honeybourne St.
- Upgraded and replaced the Spring Street Sanitary Pumpstation complete with back up power supplies (diesel generator)
- Commissioned new recreational vehicle dump station
- Designs advanced for future sewer replacements on Union St South, and Church Street (Ainley Group)

##### **Customer Requests**

- 3 frozen sewer laterals – private
- 4 blocked sewer services – private
- 1 repair of sewer lateral
- 1 sewer leak with subsequent repair at Spring Street Pump Station

**(d) A summary of any effluent quality assurance or control measures undertaken in the reporting period**

All sample analysis for compliance reporting are shipped to and analyzed by Exova of Canada, an accredited laboratory in Ottawa.

## **Quality Control & Compliance with Provincial Regulations**

OCWA uses internal compliance auditing techniques by teams from within the organization but not from within the facility work team. OCWA operates the Mississippi Mills Wastewater Treatment Plant in accordance with provincial regulations. Here is how we do it:

- Use of Accredited Labs. Analytical tests to monitor your water quality are conducted by a laboratory audited by the Canadian Association for Environmental Analytical Laboratories (CAEAL) and accredited by the Standards Council of Canada (SCC). Accreditation ensures that the laboratory has acceptable laboratory protocols and test methods in place. It also requires the laboratory to provide evidence and assurances of the proficiency of the analyst(s) performing the test methods.
- Operation by Licensed Operators. The wastewater treatment plant is operated and maintained by the Ontario Clean Water Agency's competent and licensed staff. The mandatory licensing program for operators of wastewater facilities is regulated under the Ontario Water Resources Act (OWRA) Regulation 129/04. Licensing means that an individual meets the education and experience requirements and has successfully passed the certification exam.
- Sampling and Analytical requirements. OCWA follows a sampling and analysis schedule required by the ECA.
- Adherence to Ministry Guidelines and Procedures. To ensure the protection of the Public's health and operational excellence, OCWA adheres to the guidelines and procedures developed by the Ministry of Environment

**(e) A summary of the calibration and maintenance carried out on all effluent monitoring equipment**

Ensuring the annual calibration of the flow meters is the responsibilities of OCWA's Instrumentation Technician. Attached is a copy of the annual calibration reports for review.

**(f) A description of efforts made and results achieved in meeting the Effluent Objectives**

Please refer to previous sections for information on effluent objectives for cBOD, Suspended Solids, Total Phosphorus, Ammonia and Bacteriological testing.

**(g) A tabulation of the volume of sludge removed from the Works during the reporting period and a summary of the location to where the sludge was disposed**

A total of 767.12 tonnes of biosolids was removed from the facility and applied to agricultural land in 2014. The facility is anticipating an increase in the amount of biosolids processed in 2014 as the facility is now accepting additional septage.

See the attached Biosolids Land Application 2014 Summary Report.

**(h) A summary of any complaints during the reporting period and any steps taken to address the complaints**

The operating authority did not receive any complaints for the wastewater treatment system. Please refer to the Maintenance section – Town of Mississippi Mills – Customer requests.

**(i) A summary of all by-pass, spill or abnormal discharge events**

**Bypass Events:** There were two (2) overflow events during this reporting period. Refer to section (b) for details.

**Spills** – refer to section (b) for Digested Sludge Foam spill.

**Abnormal discharge:** As noted previously, there was one instance where the effluent quality failed to meet the requirements of the ECA objectives.

Septage Received: In 2014, 1329.18 m<sup>3</sup> of septage were received

List of Attachments

PARs: WWTP Performance Assessment Report  
Customized Report: WWTP: Effluent pH, Temperature and Unionized Ammonia  
Customized Report: WWTP Acute Lethality: Daphnia magna (DM) and Rainbow Trout (RBT)  
Bypass / Overflow Daily Report: WWTP  
Biosolids Land Application 2014 Summary Report  
Meter Calibration Reports

END

Ontario Clean Water Agency  
Performance Assessment Report Wastewater/Lagoon  
From: 01/01/2014 to 01/01/2015

Report extracted 02/25/2015 08:35

Facility: [5678] MISSISSIPPI MILLS WASTEWATER TREATMENT FACILITY

Works: [5678] MISSISSIPPI MILLS WASTEWATER TREATMENT FACILITY

	01/2014	02/2014	03/2014	04/2014	05/2014	06/2014	07/2014	08/2014	09/2014	10/2014	11/2014	12/2014	<--Total-->	<--Avg.-->	<--Max.-->	<--Criteria-->
<b>Flows:</b>																
Raw Flow: Total - Raw Sewage (m³/d)	86415.100	69570.790	72102.250	287637.980	143982.720	108550.240	106054.570	106526.600	83456.810	76580.980	69230.000	75443.000	1285551.040			
Raw Flow: Avg - Raw Sewage (m³/d)	2787.584	2484.671	2325.879	9587.933	4644.604	3618.341	3421.115	3436.342	2781.894	2470.354	2307.667	2433.645		3525.002		
Raw Flow: Max - Raw Sewage (m³/d)	6300.280	4904.990	4062.710	24081.590	9842.500	14766.350	4341.340	7594.570	4720.650	6444.000	4333.000	4722.000			24081.590	
Eff. Flow: Total - Final Effluent (m³/d)	83243.120	52380.710	61762.820	190438.060	130350.840	82102.240	84333.840	86736.300	67492.880	66994.820	57069.000	66584.000	1029488.630			
Eff. Flow: Avg - Final Effluent (m³/d)	2685.262	1870.740	1992.349	6347.935	4204.866	2736.741	2720.446	2797.945	2249.763	2161.123	1902.300	2147.871		2818.112		
Eff. Flow: Max - Final Effluent (m³/d)	5184.020	3975.160	3083.500	9519.930	8976.170	9430.220	3457.600	5375.820	3661.170	5195.000	3523.000	4360.000			9519.930	
<b>Carbonaceous Biochemical Oxygen Demand: CBOD:</b>																
Raw: # of samples of cBOD5 - Raw Sewage	4.000	4.000	4.000	5.000	4.000	4.000	5.000	4.000	5.000	4.000	4.000	5.000	52.000			
Eff: Avg cBOD5 - Final Effluent (mg/L)	< 1.500	< 1.500	< 1.000	< 2.200	< 1.250	< 1.250	< 1.000	< 2.500	< 1.000	< 1.000	< 1.000	< 1.200		< 1.367	< 2.500	< 25.000
Eff: # of samples of cBOD5 - Final Effluent	4.000	4.000	4.000	5.000	4.000	4.000	5.000	4.000	5.000	4.000	4.000	5.000	52.000			
Loading: cBOD5 - Final Effluent (kg/d)	< 4.028	< 2.806	< 1.992	< 13.965	< 5.256	< 3.421	< 2.720	< 6.995	< 2.250	< 2.161	< 1.902	< 2.577		< 4.173	< 13.966	
Percent Removal: cBOD5 - Raw Sewage (mg/L)	98.319	98.883	98.886	92.254	97.619	99.084	98.869	96.885	99.010	99.288	99.111	99.271			99.288	
<b>Biochemical Oxygen Demand: BOD5:</b>																
Raw: # of samples of BOD5 - Raw Sewage	4.000	4.000	4.000	5.000	4.000	4.000	5.000	4.000	5.000	4.000	4.000	5.000	52.000			
Eff: Avg BOD5 - Final Effluent (mg/L)	< 2.000	< 2.500	< 2.750	< 2.800	< 1.500	< 1.250	< 1.200	< 1.750	< 1.000	< 1.000	< 1.250	< 1.200		< 1.683	< 2.800	< 25.000
Eff: # of samples of BOD5 - Final Effluent	4.000	4.000	4.000	5.000	4.000	4.000	5.000	4.000	5.000	4.000	4.000	5.000	52.000			
Loading: BOD5 - Final Effluent (kg/d)	< 5.371	< 4.677	< 5.479	< 17.774	< 6.307	< 3.421	< 3.265	< 4.896	< 2.250	< 2.161	< 2.378	< 2.577		< 5.046	< 17.774	
Percent Removal: BOD5 - Raw Sewage (mg/L)	98.194	98.540	98.004	93.458	97.880	99.182	98.853	98.383	99.230	99.375	99.153	99.507			99.507	
<b>Total Suspended Solids: TSS:</b>																
Raw: Avg TSS - Raw Sewage (mg/L)	139.000	215.500	205.500	96.500	83.750	172.750	103.800	103.750	155.600	293.750	156.500	334.000		171.700	334.000	
Raw: # of samples of TSS - Raw Sewage	4.000	4.000	4.000	4.000	4.000	4.000	5.000	4.000	5.000	4.000	4.000	5.000	51.000			
Eff: Avg TSS - Final Effluent (mg/L)	4.500	7.000	5.000	6.600	< 3.500	< 2.750	< 4.000	< 3.750	< 3.000	< 3.000	< 3.000	< 3.400		< 4.125	< 7.000	< 15.000
Eff: # of samples of TSS - Final Effluent	4.000	4.000	4.000	5.000	4.000	4.000	5.000	4.000	5.000	4.000	4.000	5.000	52.000			
Loading: TSS - Final Effluent (kg/d)	12.084	13.095	9.962	41.896	< 14.717	< 7.526	< 10.882	< 10.492	< 6.749	< 6.483	< 5.707	< 7.303		< 12.241	< 41.896	
Percent Removal: TSS - Raw Sewage (mg/L)	96.763	96.752	97.567	93.161	95.821	98.408	96.146	96.386	98.072	98.979	98.083	98.982			98.982	
<b>Total Phosphorus: TP:</b>																
Raw: Avg TP - Raw Sewage (mg/L)	2.860	4.973	4.113	1.354	2.470	4.805	2.474	2.823	4.820	7.965	3.653	8.006		4.193	8.006	
Raw: # of samples of TP - Raw Sewage	4.000	4.000	4.000	5.000	4.000	4.000	5.000	4.000	5.000	4.000	4.000	5.000	52.000			
Eff: Avg TP - Final Effluent (mg/L)	0.095	0.140	0.075	0.124	0.063	0.055	0.034	0.040	0.030	0.040	0.118	0.074		0.074	0.140	0.200
Eff: # of samples of TP - Final Effluent	4.000	4.000	4.000	5.000	4.000	4.000	5.000	4.000	5.000	4.000	4.000	5.000	52.000			
Loading: TP - Final Effluent (kg/d)	0.255	0.262	0.149	0.787	0.263	0.151	0.092	0.112	0.067	0.086	0.224	0.159		0.217	0.787	
Percent Removal: TP - Raw Sewage (mg/L)	96.678	97.185	98.176	90.842	97.470	98.855	98.626	98.583	99.378	99.498	96.783	99.076			99.498	
<b>Nitrogen Series:</b>																
Raw: Avg TKN - Raw Sewage (mg/L)	24.050	37.000	30.400	9.974	16.850	39.450	20.580	23.350	28.680	40.250	28.675	44.300		28.630	44.300	
Raw: # of samples of TKN - Raw Sewage	4.000	4.000	4.000	5.000	4.000	4.000	5.000	4.000	5.000	4.000	4.000	5.000	52.000			
Eff: Avg TAN - Final Effluent (mg/L)	< 0.098	< 0.020	< 0.062	< 1.520	< 0.033	< 0.025	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020		< 0.156	< 1.520	< 5.000
Eff: # of samples of TAN - Final Effluent	4.000	4.000	4.000	6.000	4.000	4.000	5.000	4.000	5.000	4.000	4.000	5.000	53.000			
Loading: TAN - Final Effluent (kg/d)	< 0.262	< 0.037	< 0.125	< 9.649	< 0.137	< 0.068	< 0.054	< 0.056	< 0.045	< 0.043	< 0.038	< 0.043		< 0.880	< 9.649	< 4.000
<b>Disinfection:</b>																
Eff: GMD E. Coli - Final Effluent (cfu/100mL)	10.000	5.623	10.000	11.487	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000		4.333	11.487	200.000
Eff: # of samples of E. Coli - Final Effluent	4.000	4.000	4.000	5.000	4.000	4.000	5.000	4.000	5.000	4.000	4.000	5.000	52.000			

Ontario Clean Water Agency  
Time Series Info Report

From: 01/01/2014 to  
31/12/2014

Report extracted 02/24/2015 08:57

Facility Org Number: 5678  
 Facility Works Number: 110000873  
 Facility Name: MISSISSIPPI MILLS WASTEWATER TREATMENT FACILITY  
 Facility Owner:  
 Facility Classification: Class 3 Wastewater Treatment  
 Receiver: Mississippi River  
 Service Population:  
 Total Design Capacity: 14100.0 m3/day

	01/2014	02/2014	03/2014	04/2014	05/2014	06/2014	07/2014	08/2014	09/2014	10/2014	11/2014	12/2014	Avg	Max	Min
Final Effluent / Temperature - °C															
Max IH	12.200	9.700	7.900	8.900	15.700	18.100	21.800	22.400	20.500	17.200	13.600	10.500		22.400	
Mean IH	7.226	6.553	6.550	6.860	12.300	17.375	20.240	20.550	18.580	16.175	12.348	9.800	10.126		
Min IH	5.200	5.100	5.400	5.520	9.000	16.200	18.500	18.800	16.800	15.200	11.190	8.900			5.100
Final Effluent / Un-ionized Ammonia: NH3 - mg/L															
Max IH	0.001	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.010	
Mean IH	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001		
Min IH	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			0.000
Final Effluent / pH - ---															
Max OL	8.130	8.000	7.300	7.460	7.400	7.310	7.410	7.500	7.520	7.700	7.720	7.570		8.130	
Mean OL	7.498	7.056	6.983	7.322	7.308	7.257	7.362	7.355	7.440	7.535	7.623	7.332	7.268		
Min OL	7.120	6.680	6.560	7.160	7.170	7.200	7.270	7.280	7.370	7.360	7.550	7.220			6.560

Mrs Deborah Turner  
Ontario Clean Water Agency - Mississippi Mills WTP  
122 Patterson Cr.  
Carleton Place, ON  
K7C 4P3

Reference #: LH14-036 - 02  
Date Received: 01/30/14  
Total # of Pages: 8

### TOXICITY TESTING RESULTS

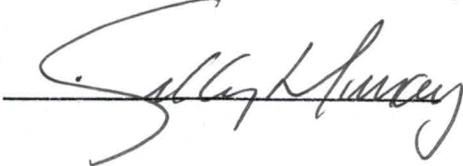
Report Date: 02/05/14

#### Sample Information

Sample #	Sample Description	Date Collected
LH14-036-02	Eff	01/29/14

Approved By: Kelly Murray, Laboratory Manager

Approval Date:



02/10/14

Inquires may be made to Kelly Murray.

Disposal of toxicity samples will occur within four weeks of reception unless alternate arrangements have been made.

ACCREDITED BY THE CANADIAN ASSOCIATION FOR LABORATORY ACCREDITATION (CALA),  
FOR THE SPECIFIC TESTS LISTED IN THE SCOPE OF ACCREDITATION.

ASI Group Ltd.  
250 Martindale Road, St. Catharines, Ontario L2R 6P9

48 HOUR STATIC DAPHNIA MAGNA SINGLE CONCENTRATION TEST  
EPS 1/RM/14

Project Number:	LH14-036	Sample Number:	02
Client:	Ontario Clean Water Agency	Test Number:	D02 & QAQC Replicate
	Mississippi Mills WTP	Sample Date/Time:	01/29/14//08:21 hrs
	Carleton Place, ON	Sample Technician:	Patrick Baker
Sample Name/ID:	Eff	Test Date/Time:	01/30/14//14:29 hrs
Sample Location:	Mmills WWTP Effluent	Technician:	J Bernard
Chain of Custody #:	14583		
Sample Method:	Grab		

RESULTS

48 HOUR RESULT:	Eff:	PASS (0.0% mortality)
	QAQC Replicate:	PASS (0.0% mortality)

QUALITY ASSURANCE INFORMATION

REFERENCE TEST CONDITIONS

Test Organism:	<i>Daphnia magna</i>	Photoperiod:	16 hours light/8 hours dark
Brood Culture:	12/17,24,31/13	Dilution Water:	Dechlorinated Tap
Test Type:	Static	Organism Age:	<24 hours
Test Temperature:	20 +/- 2C	Stock Source:	In house cultures
Test Volume:	150 mL	Time to First Brood:	9 days
Loading Density:	15 mL/neonate	Average Brood Size:	49 neonates
Control Water Hardness:	136 mg/L	Ephippia Frequency:	0

REFERENCE TOXICANT DATA

Chemical Used:	Sodium Chloride	Historic Mean LC50:	5772 mg/L
Date of Test:	January 20, 2014	Warning Limits:	5236 - 6362 mg/L
48-hour LC50:	6010 mg/L		
95% Confidence Interval:	5790 - 6220 mg/L		

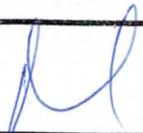
TEST PROTOCOL

Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*. Second Edition. Environment Canada. December 2000.

COMMENTS

The reference toxicant results show that test reproducibility and organism sensitivity are within acceptable limits. All data is scrutinized for errors daily during the test, at test termination and during the report Technical and Final Review stages. Instruments used to monitor parameters are calibrated daily and continuously maintained. No deviations from the protocol or operating procedure encountered during testing. Results from this test relate only to the sample collected.

QUALITY REVIEW

  
\_\_\_\_\_  
Technical Review

  
\_\_\_\_\_  
Final Review

ASI Group Ltd.  
250 Martindale Road, St. Catharines, Ontario L2R 6P9

96 HOUR STATIC RAINBOW TROUT SINGLE CONCENTRATION TEST  
EPS 1/RM/13

Project Number:	LH14-036	Sample Number:	02
Client:	Ontario Clean Water Agency Mississippi Mills WTP Carleton Place, ON	Test Number:	T02
Sample Name/ID:	Eff	Sample Date/Time:	01/29/14//08:21 hrs
Sample Location:	MMills WWTP Effluent	Sample Technician:	Patrick Baker
Chain of Custody #:	14583	Test Date/Time:	01/31/14//14:15 hrs
Sample Method:	Grab	Technician:	S Bray

RESULTS

96 HOUR RESULT:	Eff:	Pass (0.0% mortality)
-----------------	------	-----------------------

QUALITY ASSURANCE INFORMATION

REFERENCE TEST CONDITIONS

Test Organism:	Rainbow trout	Test Aeration Rate:	6.5 +/- 1 mL/min/L
Trout Batch Number:	13-17	Photoperiod:	16 hours light/8 hours dark
Test Type:	Static	Dilution Water:	Dechlorinated Tap
Test Temperature:	15+/-1C	Organism Age:	Fingerlings
Test Volume:	20 Litres	Stock Source:	Rainbow Springs Fish Hatchery
Test Solution Depth:	34 cm	Mean Weight:	0.40 +/- 0.09 g
Number of Organisms per Vessel:	10	Loading Density:	0.20 g/L

REFERENCE TOXICANT DATA

Chemical Used:	Sodium Chloride	Historic Mean LC50:	15924 mg/L
Date of Test:	January 12, 2014	Warning Limits:	13401 - 18922 mg/L
96-hour LC50:	14100 mg/L		
95% Confidence Interval:	12600 - 15800 mg/L		

TEST PROTOCOL

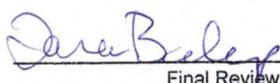
Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout. Second Edition. Environment Canada. December 2000 and amendment in May 2007.

COMMENTS

The reference toxicant results show that test reproducibility and organism sensitivity are within acceptable limits. All data is scrutinized for errors daily during the test, at test termination and during the report Technical and Final Review stages. Instruments used to monitor parameters are calibrated daily and continuously maintained. No deviations from the protocol or operating procedure encountered during testing. Results from this test relate only to the sample collected.

QUALITY REVIEW

  
Technical Review

  
Final Review

Mrs Deborah Turner  
Ontario Clean Water Agency - Mississippi Mills WTP  
122 Patterson Cr.  
Carleton Place, ON  
K7C 4P3

Reference #: LH14-036 - 03  
Date Received: 04/11/14  
Total # of Pages: 7

### TOXICITY TESTING RESULTS

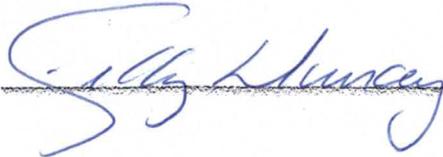
Report Date: 04/20/14

#### Sample Information

<u>Sample #</u>	<u>Sample Description</u>	<u>Date Collected</u>
LH14-036-03	Eff	04/10/14

Approved By: Kelly Murray, Laboratory Manager

Approval Date:



Inquiries may be made to Kelly Murray.

Disposal of toxicity samples will occur within four weeks of reception unless alternate arrangements have been made.

ACCREDITED BY THE CANADIAN ASSOCIATION FOR LABORATORY ACCREDITATION (CALA)  
FOR THE SPECIFIC TESTS LISTED IN THE SCOPE OF ACCREDITATION.

ASI Group Ltd.  
250 Martindale Road, St. Catharines, Ontario L2R 6P9

48 HOUR STATIC DAPHNIA MAGNA SINGLE CONCENTRATION TEST  
EPS 1/RM/14

Project Number:	LH14-036	Sample Number:	03
Client:	Ontario Clean Water Agency	Test Number:	D03
	Mississippi Mills WTP	Sample Date/Time:	04/10/14//07:25 hrs
	Carleton Place, ON	Sample Technician:	A Hoogenboom
Sample Name/ID:	Eff	Test Date/Time:	04/11/14//11:55 hrs
Sample Location:	Final Effluent	Technician:	J Bernard
Chain of Custody #:	14584		
Sample Method:	Grab		

RESULTS

48 HOUR RESULT:	Eff:	PASS (0.0% mortality)
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QUALITY ASSURANCE INFORMATION

REFERENCE TEST CONDITIONS

Test Organism:	<i>Daphnia magna</i>	Photoperiod:	16 hours light/8 hours dark
Brood Culture:	02/27/14 & 03/06, 13/14	Dilution Water:	Dechlorinated Tap
Test Type:	Static	Organism Age:	<24 hours
Test Temperature:	20 +/- 2C	Stock Source:	in house cultures
Test Volume:	150 mL	Time to First Brood:	8 days
Loading Density:	15 mL/neonate	Average Brood Size:	51 neonates
Control Water Hardness:	136 mg/L	Ephippia Frequency:	0

REFERENCE TOXICANT DATA

Chemical Used:	Sodium Chloride	Historic Mean LC50:	5863 mg/L
Date of Test:	March 31, 2014	Warning Limits:	5367 - 6405 mg/L
48-hour LC50:	5770 mg/L		
95% Confidence Interval:	5420 - 6070 mg/L		

TEST PROTOCOL

Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*. Second Edition. Environment Canada, December 2000.

COMMENTS

The reference toxicant results show that test reproducibility and organism sensitivity are within acceptable limits. All data is scrutinized for errors daily during the test, at test termination and during the report Technical and Final Review stages. Instruments used to monitor parameters are calibrated daily and continuously maintained. No deviations from the protocol or operating procedure encountered during testing. Results from this test relate only to the sample collected.

QUALITY REVIEW

  
Technical Review

  
Final Review

ASI Group Ltd.  
250 Martindale Road, St. Catharines, Ontario L2R 6P9

96 HOUR STATIC RAINBOW TROUT SINGLE CONCENTRATION TEST  
EP8 1/RM/13

Project Number:	LH14-036	Sample Number:	03
Client:	Ontario Clean Water Agency Mississippi Mills WTP Carleton Place, ON	Test Number:	T03
Sample Name/ID:	Eff	Sample Date/Time:	04/10/14//07:25 hrs
Sample Location:	Final Effluent	Sample Technician:	A Hoogenboom
Chain of Custody #:	14584	Test Date/Time:	04/11/14//12:00 hrs
Sample Method:	Grab	Technician:	S Bray

RESULTS

96 HOUR RESULT:	Eff:	Pass (0.0% mortality)
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QUALITY ASSURANCE INFORMATION

REFERENCE TEST CONDITIONS

Test Organism:	Rainbow trout	Test Aeration Rate:	6.5 +/- 1 mL/min/L
Trout Batch Number:	14-03	Photoperiod:	16 hours light/8 hours dark
Test Type:	Static	Dilution Water:	Dachlorinated Tap
Test Temperature:	15 +/- 1C	Organism Age:	Fingerlings
Test Volume:	10 Litres	Stock Source:	Rainbow Springs Fish Hatchery
Test Solution Depth:	18 cm	Mean Weight:	0.41 +/- 0.04 g
Number of Organisms per Vessel:	10	Loading Density:	0.41 g/L

REFERENCE TOXICANT DATA

Chemical Used:	Sodium Chloride	Historic Mean LC50:	15663 mg/L
Date of Test:	March 12, 2014	Warning Limits:	13467 - 18217 mg/L
96-hour LC50:	17000 mg/L		
95% Confidence Interval:	15500 - 18800 mg/L		

TEST PROTOCOL

Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout. Second Edition.  
Environment Canada, December 2000 and amendment in May 2007.

COMMENTS

The reference toxicant results show that test reproducibility and organism sensitivity are within acceptable limits.  
All data is scrutinized for errors daily during the test, at test termination and during the report Technical and Final Review stages.  
Instruments used to monitor parameters are calibrated daily and continuously maintained.  
No deviations from the protocol or operating procedure encountered during testing.  
Results from this test relate only to the sample collected.

QUALITY REVIEW

  
Technical Review

  
Final Review



Mrs Deborah Turner  
Ontario Clean Water Agency - Mississippi Mills WTP  
122 Patterson Cr.  
Carleton Place, ON  
K7C 4P3

Reference #: LH14-036 - 04  
Date Received: 07/17/14  
Total # of Pages: 6

**TOXICITY TESTING RESULTS**

Report Date: 07/22/14

**Sample Information**

<u>Sample #</u>	<u>Sample Description</u>	<u>Date Collected</u>
LH14-036-04	Eff	07/16/14

Approved By: Kelly Murray, Laboratory Manager

Approval Date:

Inquires may be made to Kelly Murray.

Disposal of toxicity samples will occur within four weeks of reception unless alternate arrangements have been made.

ACCREDITED BY THE CANADIAN ASSOCIATION FOR LABORATORY ACCREDITATION (CALA),  
FOR THE SPECIFIC TESTS LISTED IN THE SCOPE OF ACCREDITATION.

ASI Group Ltd.  
250 Martindale Road, St. Catharines, Ontario L2R 6P9

**48 HOUR STATIC DAPHNIA MAGNA SINGLE CONCENTRATION TEST**  
**EPS 1/RM/14**

Project Number:	LH14-036	Sample Number:	04
Client:	Ontario Clean Water Agency Mississippi Mills WTP Carleton Place, ON	Test Number:	D04
Sample Name/ID:	Eff	Sample Date/Time:	07/16/14//08:26 hrs
Sample Location:	MMills WWTP Effluent	Sample Technician:	M Larose
Chain of Custody #:	15654	Test Date/Time:	07/17/14//13:51 hrs
Sample Method:	Grab	Technician:	J Bernard

**RESULTS**

48 HOUR RESULT:	Eff:	PASS (0.0% mortality)
-----------------	------	-----------------------

**QUALITY ASSURANCE INFORMATION**

REFERENCE TEST CONDITIONS

Test Organism:	<i>Daphnia magna</i>	Photoperiod:	16 hours light/8 hours dark
Brood Culture:	06/05,12,17/14	Dilution Water:	Dechlorinated Tap
Test Type:	Static	Organism Age:	<24 hours
Test Temperature:	20 +/- 2C	Stock Source:	In house cultures
Test Volume:	150 mL	Time to First Brood:	9 days
Loading Density:	15 mL/neonate	Average Brood Size:	53 neonates
Control Water Hardness:	119 mg/L	Ephippia Frequency:	0

REFERENCE TOXICANT DATA

Chemical Used:	Sodium Chloride	Historic Mean LC50:	5900 mg/L
Date of Test:	July 7, 2014	Warning Limits:	5462 - 6373 mg/L
48-hour LC50:	5740 mg/L		
95% Confidence Interval:	5510 - 5960 mg/L		

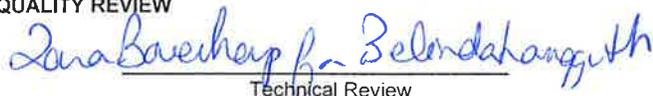
TEST PROTOCOL

Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*. Second Edition. Environment Canada. December 2000.

COMMENTS

The reference toxicant results show that test reproducibility and organism sensitivity are within acceptable limits. All data is scrutinized for errors daily during the test, at test termination and during the report Technical and Final Review stages. Instruments used to monitor parameters are calibrated daily and continuously maintained. No deviations from the protocol or operating procedure encountered during testing. Results from this test relate only to the sample collected.

QUALITY REVIEW

  
Technical Review

  
Final Review

ASI Group Ltd.  
250 Martindale Road, St. Catharines, Ontario L2R 6P9

96 HOUR STATIC RAINBOW TROUT SINGLE CONCENTRATION TEST  
EPS 1/RM/13

Project Number:	LH14-036	Sample Number:	04
Client:	Ontario Clean Water Agency	Test Number:	T04
	Mississippi Mills WTP	Sample Date/Time:	07/16/14//08:26 hrs
	Carleton Place, ON	Sample Technician:	M Larose
Sample Name/ID:	Eff	Test Date/Time:	07/18/14//11:00 hrs
Sample Location:	MMills WWTP Effluent	Technician:	J Bernard
Chain of Custody #:	15654		
Sample Method:	Grab		

RESULTS

96 HOUR RESULT:	Eff:	Pass (0.0% mortality)
-----------------	------	-----------------------

QUALITY ASSURANCE INFORMATION

REFERENCE TEST CONDITIONS

Test Organism:	Rainbow trout	Test Aeration Rate:	6.5 +/- 1 mL/min/L
Trout Batch Number:	14-08	Photoperiod:	16 hours light/8 hours dark
Test Type:	Static	Dilution Water:	Dechlorinated Tap
Test Temperature:	15+/-1C	Organism Age:	Fingerlings
Test Volume:	10 Litres	Stock Source:	Rainbow Springs Fish Hatchery
Test Solution Depth:	18 cm	Mean Weight:	0.3 +/- 0.04 g
Number of Organisms per Vessel:	10	Loading Density:	0.3 g/L

REFERENCE TOXICANT DATA

Chemical Used:	Sodium Chloride	Historic Mean LC50:	15614 mg/L
Date of Test:	July 7, 2014	Warning Limits:	13344 - 18272 mg/L
96-hour LC50:	17600 mg/L		
95% Confidence Interval:	16500 - 18700 mg/L		

TEST PROTOCOL

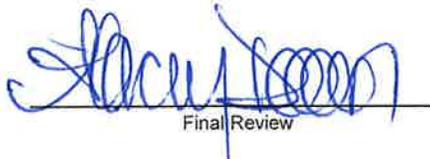
Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout. Second Edition.  
Environment Canada. December 2000 and amendment in May 2007.

COMMENTS

The reference toxicant results show that test reproducibility and organism sensitivity are within acceptable limits.  
All data is scrutinized for errors daily during the test, at test termination and during the report Technical and Final Review stages.  
Instruments used to monitor parameters are calibrated daily and continuously maintained.  
No deviations from the protocol or operating procedure encountered during testing.  
Results from this test relate only to the sample collected.

QUALITY REVIEW

  
Technical Review

  
Final Review



Mrs Deborah Turner  
Ontario Clean Water Agency - Mississippi Mills WTP  
122 Patterson Cr.  
Carleton Place, ON  
K7C 4P3

Reference #: LH14-036 - 05  
Date Received: 10/16/14  
Total # of Pages: 7

### TOXICITY TESTING RESULTS

Report Date: 10/23/14

#### Sample Information

Sample #	Sample Description	Date Collected
LH14-036-05	Eff	10/15/14

Approved By: Kelly Murray, Laboratory Manager

Approval Date:

10/29/14

Inquires may be made to Kelly Murray.

Disposal of toxicity samples will occur within four weeks of reception unless alternate arrangements have been made.

ACCREDITED BY THE CANADIAN ASSOCIATION FOR LABORATORY ACCREDITATION (CALA),  
FOR THE SPECIFIC TESTS LISTED IN THE SCOPE OF ACCREDITATION.

ASI Group Ltd.  
250 Martindale Road, St. Catharines, Ontario L2R 6P9

48 HOUR STATIC DAPHNIA MAGNA SINGLE CONCENTRATION TEST  
EPS 1/RM/14

Project Number:	LH14-036	Sample Number:	05
Client:	Ontario Clean Water Agency Mississippi Mills WTP Carleton Place, ON	Test Number:	D05
Sample Name/ID:	Eff	Sample Date/Time:	10/15/14//08:10 hrs
Sample Location:	MMills WWTP	Sample Technician:	P Baker
Chain of Custody #:	15214	Test Date/Time:	10/16/14//14:26 hrs
Sample Method:	Grab	Technician:	K Monaghan & S Doan

RESULTS

48 HOUR RESULT:	Eff:	PASS (0.0% mortality)
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QUALITY ASSURANCE INFORMATION

REFERENCE TEST CONDITIONS

Test Organism:	<i>Daphnia magna</i>	Photoperiod:	16 hours light/8 hours dark
Brood Culture:	09/11,16,18,23,25/14	Dilution Water:	Dechlorinated Tap
Test Type:	Static	Organism Age:	<24 hours
Test Temperature:	20 +/- 2C	Stock Source:	In house cultures
Test Volume:	150 mL	Time to First Brood:	8 days
Loading Density:	15 mL/neonate	Average Brood Size:	51 neonates
Control Water Hardness:	119 mg/L	Ephippia Frequency:	0

REFERENCE TOXICANT DATA

Chemical Used:	Sodium Chloride	Historic Mean LC50:	5823 mg/L
Date of Test:	October 14, 2014	Warning Limits:	5371 - 6314 mg/L
48-hour LC50:	5310 mg/L		
95% Confidence Interval:	5000 - 5540 mg/L		

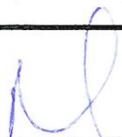
TEST PROTOCOL

Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*. Second Edition.  
Environment Canada. December 2000.

COMMENTS

The reference toxicant results show that test reproducibility and organism sensitivity are within acceptable limits.  
Despite this reference toxicant test falling outside the 95% warning limit, it is within the 99% control limit and is therefore valid.  
This will occur 5% of the time.  
All data is scrutinized for errors daily during the test, at test termination and during the report Technical and Final Review stages.  
Instruments used to monitor parameters are calibrated daily and continuously maintained.  
No deviations from the protocol or operating procedure encountered during testing.  
Results from this test relate only to the sample collected.

QUALITY REVIEW

  
\_\_\_\_\_  
Technical Review

  
\_\_\_\_\_  
Final Review

ASI Group Ltd.  
250 Martindale Road, St. Catharines, Ontario L2R 6P9

96 HOUR STATIC RAINBOW TROUT SINGLE CONCENTRATION TEST  
EPS 1/RM/13

Project Number:	LH14-036	Sample Number:	05
Client:	Ontario Clean Water Agency Mississippi Mills WTP Carleton Place, ON	Test Number:	T05
Sample Name/ID:	Eff	Sample Date/Time:	10/15/14//08:10 hrs
Sample Location:	MMills WWTP	Sample Technician:	P Baker
Chain of Custody #:	15214	Test Date/Time:	10/16/14//11:40 hrs
Sample Method:	Grab	Technician:	J Bernard

RESULTS

96 HOUR RESULT:	Eff:	Pass (0.0% mortality)
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QUALITY ASSURANCE INFORMATION

REFERENCE TEST CONDITIONS

Test Organism:	Rainbow trout	Test Aeration Rate:	6.5 +/- 1 mL/min/L
Trout Batch Number:	14-11	Photoperiod:	16 hours light/8 hours dark
Test Type:	Static	Dilution Water:	Dechlorinated Tap
Test Temperature:	15+/-1C	Organism Age:	Fingerlings
Test Volume:	10 Litres	Stock Source:	Rainbow Springs Fish Hatchery
Test Solution Depth:	18 cm	Mean Weight:	0.33 +/- 0.05 g
Number of Organisms per Vessel:	10	Loading Density:	0.33 g/L

REFERENCE TOXICANT DATA

Chemical Used:	Sodium Chloride	Historic Mean LC50:	15790 mg/L
Date of Test:	September 22, 2014	Warning Limits:	13537 - 18419 mg/L
96-hour LC50:	15300 mg/L		
95% Confidence Interval:	14700 - 16000 mg/L		

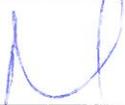
TEST PROTOCOL

Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout. Second Edition.  
Environment Canada. December 2000 and amendment in May 2007.

COMMENTS

The reference toxicant results show that test reproducibility and organism sensitivity are within acceptable limits.  
All data is scrutinized for errors daily during the test, at test termination and during the report Technical and Final Review stages.  
Instruments used to monitor parameters are calibrated daily and continuously maintained.  
No deviations from the protocol or operating procedure encountered during testing.  
Results from this test relate only to the sample collected.

QUALITY REVIEW

  
\_\_\_\_\_  
Technical Review

  
\_\_\_\_\_  
Final Review





**TERRATEC**  
ENVIRONMENTAL



## **2014 Summary Report**



Mississippi  
Mills

## **Town of Mississippi Mills: Almonte Biosolids Land Application Program**



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# Town of Mississippi Mills Biosolids Utilization Program 2014 Summary Report

## Introduction

The Mississippi Mills Land Application Program commenced June 4<sup>th</sup> and was completed on September 25<sup>th</sup>, 2014. Terratec land applied approximately **767.12 dry tonnes** of solid biosolids on **61.06 acres** of agricultural land in the County of Lanark.

Biosolids have been utilized in Ontario and recycled successfully on agricultural land for over 40 years with the implementation and enforcement of strict guidelines. Through the development and adoption of innovative technology, Terratec Environmental has always been on the leading edge of biosolids management in Ontario and North America.

There have been many interesting challenges facing the biosolids industry over the years. Through public-private partnerships, entrepreneurial spirit, increased public relations, hiring qualified professional staff, investing in new technology and a willingness to work pro-actively with the Ministries of Environment (MOE) and Agriculture, Food and Rural Affairs (OMAFRA), agricultural community, municipalities and the general public, we have met these challenges and continue to excel in all aspects of biosolids management. Our staff are highly motivated individuals and are involved at every level of the biosolids industry. We liaise with all the stakeholder groups including municipal, provincial and federal governments as well as with agricultural, industry and public agencies. We have representation on the Water Environment Association of Ontario (WEAO), local and regional Soil & Crop Improvement Associations, Waste Utilization Sub-Committee of the Ontario Soil Management Research and Services Committee, Ontario Institute of Agrologists, American Society of Agronomy Certified Crop Advisors and the provincial Biosolids Utilization Committee.

## Operations

We continue to use the best available technology and state of the art equipment. The solid spreaders with vertical beaters (**Figure #1**) are used for application because of their quick unloading time and ability to evenly broadcast the biosolids over a wide area. The farm community appreciates these efficiencies, which result in quick biosolids application and therefore minimal disruptions to farmer schedules. The high floatation tires on the equipment limit soil compaction during field application.



(**Figure #1**) Solid Biosolids Spreading Equipment



**(Figure #2)** Surface Application of solid biosolids

In 2014, all biosolids were surface applied **(Figure #2)** and incorporated **(Figure #3)** within six hours in order to remain in compliance with the Nutrient Management Act's requirements for Odour Class 3 biosolids. In fields that are part of a minimum tillage program, biosolids can be surface applied and are not required to be incorporated if there are no residences within setback distances specified within the Act.



**(Figure #3)** Incorporation of biosolids with an offset disc

Terratec Environmental's operating system of utilizing high flotation spreading equipment, timely incorporation practices, and direct soil injection technology generated the following benefits:

- Decreases nitrogen loss to atmosphere (volatilization)
- Ensures uniform application
- Provides tillage
- Prevents surface runoff
- Protects wells, watercourses and environmentally sensitive areas
- Decreases the opportunity for environmental risk
- Considerable reduction in odors
- Significant reduction of soil compaction
- Good public relations

### **In Summary**

- **767.12 dry tonnes (Appendix A)** of biosolids were applied to agricultural land
- A total of **61.06 Acres** (24.71 ha) received biosolids
- Land inventory (licensed) exceeds **592 Acres** (239.6 ha) (**Appendix B**)
- Post Application Reports (**Appendix E**)

## Site Locations

Sites in the following counties and townships received the Town of Mississippi Mills biosolids in 2014:

COUNTY	TOWNSHIP
Lanark	Mississippi Mills - Pakenham
	Mississippi Mills - Ramsay

## Public Relations

Our Land Application Coordinators and agronomists interact proactively and liaise with farmers and farm associations such as the Soil & Crop Improvement Association and the Federation of Agriculture as well as university researchers, agribusiness, municipal, provincial and federal governmental agencies and other industry stakeholders (**Figure #4**) to promote and endorse the Mississippi Mills Land Application Program.



(**Figure #4**) Biosolids injection equipment demonstration for Ministries of the Environment and Agriculture, Food and Rural Affairs staff

## Biosolids Promotion

The long-term viability of our biosolids utilization programs depends on successful public relations and an operational strategy based on sustaining the interest of the agricultural community while addressing the environmental and health related concerns from the general public.



(Figure #5) Hastings County Plowing Match 2014

Our public relations, networking and promotional programs educate the agricultural community and general public about the positive agronomic, social and environmental benefits of recycling biosolids on agricultural land in Ontario (**Table #1**). In other instances, word spreads about positive results from biosolids application due to quick visible results, helping to promote first hand the beneficial use of biosolids on agricultural lands (**Figure #6**).



(Figure #6) Area of hay field on left spread with biosolids while right section did not receive biosolids

### Table 1: Biosolids Promotion

These events include: public relations activities, educational programs, and exhibit and PowerPoint presentations.

Date	Event
January 10, 2014	<b>Durham Soil &amp; Crop Improvement Association Annual Meeting:</b> Terratec Environmental staff presented a promotional display
January 14, 2014	<b>Oxford Soil &amp; Crop Improvement Association Annual Meeting:</b> Terratec Environmental staff presented a promotional display
January 16, 2014	<b>Halton Soil &amp; Crop Improvement Association Annual Meeting:</b> Terratec staff made a presentation to over 45 farmers.
January 18, 2014	<b>Farm\$mart Agricultural Conference:</b> Terratec was a major sponsor at the event and Terratec's promotional exhibit was displayed.
February 3, 2014	<b>Niagara North/South and Haldimond Soil and Crop Improvement Association Annual Meeting:</b> Terratec staff attended meeting and made a presentation to over 45 farmers.
February 4 & 5, 2014	<b>Ontario Soil &amp; Crop Improvement Association Annual Meeting:</b> Terratec was a major sponsor
February 13, 2014	<b>Quinte Farm Trade Show:</b> Terratec Environmental presented a promotional display.
February 25, 2014	<b>Norfolk County Soil and Crop Improvement Association Annual Meeting:</b> Terratec staff presented a promotional Display
March 5-6, 2014	<b>East Central Farm Show:</b> Terratec Environmental staff presented a promotional display.
April 11, 2014	<b>Guest Speaker:</b> Terratec Environmental staff spoke to a Grade 11 Science Class at TA Blakelock High School regarding Waste Water Treatment and the end uses eg: Land Application
May 24, 2014	<b>Durham Region Public Works Day:</b> Terratec Environmental presented a promotional display.
June 4, 2014	<b>7<sup>th</sup> Canadian Biosolids and Residuals Conference, Vancouver BC:</b> Terratec staff chaired session and presented a paper at the event as well as our promotional exhibit was displayed
August 20-21, 2014	<b>Hastings County Plowing Match &amp; Farm Show:</b> Terratec Environmental staff presented a promotional display.
September 8, 2014	<b>International Workshop on Sludge/Biosolids Management, Burlington ON:</b> Terratec sponsored the event and our promotional exhibit was on display
November 26, 2014	<b>Forage Focus Conference, Shakespeare ON:</b> Terratec sponsored the event and our promotional exhibit was displayed
December 2, 2014	<b>WEAO Biosolids and Residuals Seminar, Burlington ON:</b> Terratec sponsored the event and our promotional exhibit was displayed

### **Sponsorships of Agricultural and Environmental Programs and Organizations:**

- American Society of Agronomy
- Brant Soil and Crop Improvement Association
- Canadian Cancer Society
- Characterizing Risks of Triclosan from Biosolids. University of Guelph Research Project
- Dufferin Feed and Seed Show
- Dufferin Soil and Crop Improvement Association
- Durham Soil and Crop Improvement Association
- Farm\$mart Agricultural Conference
- Farm\$mart Farming Systems Expo
- Georgian Central Soil and Crop Improvement Association
- Golden Horseshoe Soil and Crop Improvement Association
- Grey Bruce Farmers Week, Crops Day
- Halton Region Plowing Match
- Halton Soil and Crop Improvement Association Corporate Sponsor
- Halton Soil and Crop Improvement Association Summer Tour and BBQ
- Halton Assessing innovative Soil Sampling Technology project
- Heartland Regional Soil & Crop Improvement Association
- International Workshop on Sludge/Biosolids Management
- Norfolk Soil and Crop Improvement Association
- Niagara/Haldimand Soil and Crop Improvement Association
- Ontario Biomass Producers Co-operative
- Ontario Canola Growers Association
- Ontario Institute of Agrology
- Ontario Soil & Crop Improvement Association
- Peel-Dufferin Plowing Match
- Water Environment Association of Ontario
- Water for People

## Agricultural Contacts



Terratec's Land Application Managers consult with the farmer before land application begins. The application rate for NASM sites is based on crop production requirements of nitrogen and phosphorus, and crop removal in the harvested portion of the crop. OMAFRA's NMAN3 computer program is used by Terratec to ensure compliance with maximum application rates. Upon completion of biosolids field application,

each farmer receives: a copy of the agricultural soil test for their field, an aerial photograph of their farm indicating where biosolids were applied and a nutrient report stating the amount, type and source of nutrients applied on the site (**Appendix E**). This information helps the farmer fine-tune future fertilizer applications to meet crop nutrient requirements.

Our Land Application Coordinators have been trained in the following OMAFRA courses: "Fundamentals of Nutrient Management/Introduction to Nutrient Management", the "Nutrient Management Regulations and Protocols" course, the "Nutrient Management Brokers and Prescribed Materials Application Business License (PMABL)" course, the "How to Prepare a NASM Plan Using NMAN3" course, and the "NASM Plan Developer's Course". Our professional staff is continually upgrading their nutrient management skills through educational opportunities offered by the Ministries in an effort to stay abreast of current legislation and industry issues. After successfully completing the PMABL exam, Terratec staff is now certified as Brokers and hold a valid PMABL which allows for the haulage and land application of municipal sewage biosolids in accordance with the Nutrient Management Regulation. Participation in OMAFRA's nutrient management training and adopting the best management practices outlined in the courses has resulted in:

- Ensuring that all nutrients applied to farmland can be handled and applied in an environmentally responsible manner (**Figure #7**)
- Encouraging the treatment of manure and biosolids as a nutrient source for crop production in the agricultural community
- Allowing the farmer flexibility in setting different crop rotations while meeting realistic yield goals and applying nutrients only as required  
Targeting additional commercial fertilizer use only when needed
- Preventing the over-application of nutrients, which include manure, commercial fertilizer and municipal biosolids



(**Figure #7**) Nitrogen credit demo plot

## Material Analysis



Aerobic liquid biosolids from The Town of Mississippi Mills are typically sampled monthly at the WPCP. These samples are analyzed for bacteria, percent solids content and analyzed for quality as outlined in the “Sampling and Analysis Protocol For Ontario Regulation 267/03” by Exova Environmental Ontario. Results are provided to Terratec Environmental (**Appendix C**) and are used in determining application rates, ensuring compliance with O.Reg 267/03 and in creating nutrient management plans.



## Innovative Equipment

Terratec Environmental continues to refine its equipment needs and consistently seeks and adapts new technologies for the successful application of biosolids in our municipal land application programs. The application equipment utilized to land apply sewage biosolids to agricultural land continues to evolve as a result of investment in new technology and increased environmental regulation. New and innovative technological advancements in the industry allow biosolids to be land applied in a sustainable and environmentally friendly manner. We are extremely excited and optimistic with the many initiatives that we have undertaken which include the adoption and utilization of the following:

- Dewatered Biosolids Direct Injection System
- Inter-row Biosolids Land Application Program for Tree Nursery Stock

## **Complaints and Spills**

A detailed up-to-date record of complaints is kept on file. A comprehensive public relations/educational package and a complaint response letter can be given to the complainant (**Appendix D**). The expertise at the MOE local district office and OMAFRA Biosolids Specialists are utilized and contact names are forwarded to the individual in an effort to provide factual, scientific information regarding biosolids land application in Ontario.



### Terratec's Land Application

Coordinators, Operations Managers and Site Supervisors have been trained in the proper containment and cleanup of spills in conjunction with our company's

Operational Procedures Manual. Any spills that occur are immediately reported to the MOE Spills Action Centre and promptly contained and cleaned up in an effort to safeguard the surrounding environment.

**Appendix A**  
Sites Applied with The Town of Mississippi Mills Biosolids in 2014

Mississippi Mills - Sites Applied with Biosolids 2014												
Date 2014	Farmer/ Landowner	NASM#	Lot	Con	Township	Field #	Application Method	Total Dry Tonnes (t)	Area Spread (ha)	Percent of Five Year Limit Applied		
										Total Solids (%)	Phosphate (%)	Copper (%)
4-Jun	Don Cochrane - <b>Giles</b>	20811	5	7	Pakenham	1	Incorporated	309.43	7.91	32	86	22
24-25 Sept	Don Cochrane - <b>Clayton</b>	20811	21	7	Ramsay	1	Incorporated	457.69	16.8	23	53	14
							<b>TOTAL</b>	<b>767.12</b>	<b>24.71</b>			
<p><b>Note:</b> - For NASM sites copper, &amp; total solids are the primary limiting factors which stay constant as NASM Plans progress.</p> <p>- Phosphate is also a primary limiting factor. However, allowable Phosphate percentage will fluctuate as NASM plans progress due to dependence on cropping practices.</p>												

**Appendix B**  
Town of Mississippi Mills Landbank

### Town of Mississippi Mills Landbank

Town of Mississippi Mills Landbank							
Farmer	Site #	Farm Name	Lot	Con	Township	Area (ha)	Expiry Date
Don, Cathy & Adam Cochrane	20811	Clayton Rd.	21	7	Ramsay	37.2	Dec 31 2016
		Gavin Giles	5	7	Pakenham	22	
		Home Farm	23	7	Ramsay	38.16	
		John Steele - Bennie Rd	25	7	Ramsay	15.2	
		John Steele - Home	22	7	Ramsay	30.4	
		Lyle Reid North	4	7	Pakenham	16	
		Lyle Reid South	4	7	Pakenham	11.2	
		Peter Cochran Conc 7	23	6	Ramsay	26.8	
		Peter Cochran Home	20	6	Ramsay	27.44	
		Sharon Reid	3	7	Pakenham	15.2	
					TOTAL	239.6	

## **Appendix C**

### Twelve Month Average of Biosolids Analysis from Mississippi Mills WWTP Jan 2014 - Dec 2014

<b>Twelve Month Average: January 2014 - December 2014</b>		
<b>Mississippi Mills</b>		
<b>Metals</b>	<b>Maximum Acceptable Concentration (mg/kg)</b>	<b>2014 Average</b>
As	170	2
Cd	34	0.88
Co	340	2
Cr	2800	15.5
Cu	1700	405.85
Hg	11	0.39
Mo	94	3.15
Ni	420	12.62
Pb	1100	15.35
Se	34	2
Zn	4200	403.31
E. Coli	Maximum Acceptable Concentration (CFU/g)	
	2,000,000	138
Total P (ppm)		27,400
Ammonia+Ammonium (ppm)		4,235
Nitrate+Nitrites (ppm)		1,454.00
TKN (ppm)		35,700
Potassium (ppm)		900
Solids (ppm)		174,600

**Appendix D**  
**Biosolids Information Package and Complaint Response Letter**

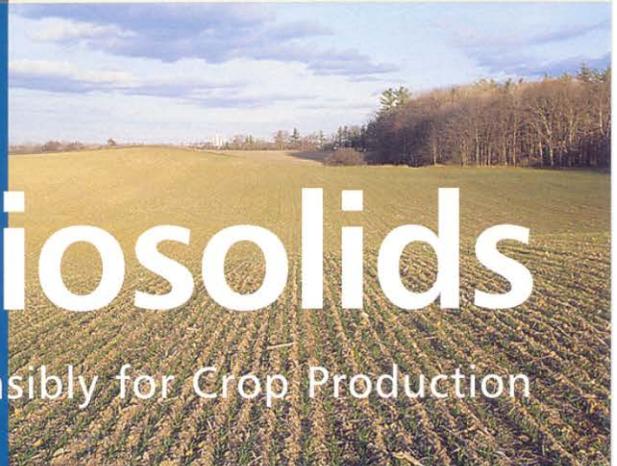


Ministry of  
Agriculture, Food  
and Rural Affairs

Ministère de  
l'Agriculture, de l'Alimentation  
et des Affaires rurales

# Sewage Biosolids

## Managing Urban Nutrients Responsibly for Crop Production



### Sewage biosolids result from municipal wastewater treatment.

The treatment of municipal wastewater produces:

- clean effluent that is discharged to a nearby watercourse
- sewage biosolids, which are organic solid, semi-solid, or liquid materials that are retained for further treatment and processing.

Sewage biosolids are then stabilized by methods such as digestion or addition of lime to reduce the pathogen content and odour-producing potential. Once stabilized, biosolids can be applied to land in liquid form, or be dewatered and applied as a solid material.

### Sewage biosolids contain nutrients.

Biosolids contain nutrients and organic matter that are important to plant growth, such as:

- mineral and organic nitrogen, phosphorus, and potassium
- micronutrients such as zinc, magnesium, and copper.

They may also contain trace amounts of other elements such as arsenic, lead, and mercury. Concentrations of these elements in land-applied sewage biosolids are regulated under the Environmental Protection Act.

### Crop production can be enhanced by biosolids.

When applied according to best management practices, sewage biosolids will:

- improve soil fertility – offsetting the need for commercial fertilizers
- add organic matter – enhancing soil structure, moisture retention and permeability, while reducing the potential for wind and water erosion.

### Applying biosolids to agricultural land benefits urban and rural communities alike.

Sewage biosolids have been utilized on agricultural land in Canada, the United States and Europe for more than 30 years. Applying sewage biosolids to farmland is an important means of recycling nutrients in the environment. As such, the process offers economic and environmental advantages to society at large.

As with spreading manure, applying biosolids may produce odours. And as with manure, odours can be reduced by timely incorporation into the soil. When planning biosolids application, it's of utmost importance to use best management practices, which help to maximize benefit by conserving nitrogen, while minimizing odour.

The sewage biosolids land application program in Ontario is not without rules. Sewage biosolids are regulated under Regulation 347 of the Environmental Protection Act. Environmental quality, food safety, and human health issues and concerns are addressed in the *Guidelines for the Utilization of Biosolids and Other Wastes on Agricultural Land*, a publication of the Ontario Ministry of Agriculture, Food and Rural Affairs and the Ontario Ministry of the Environment (March, 1996). In addition, each farm receiving sewage biosolids must be approved by the Ministry of the Environment.



**BUC members:**

- Ministry of Agriculture, Food and Rural Affairs
- Ministry of the Environment
- Ministry of Health
- Association of Local Public Health Agencies
- Ontario Federation of Agriculture
- University of Guelph
- Water Environment Association Ontario
- Municipal Engineers Association
- Ontario Sewage and Liquid Waste Carriers Association
- Ontario Clean Water Agency
- Terratec Environmental Ltd.
- Water Technology International Corporation

To learn more about biosolids utilization or BUC, contact your local Ministry of Agriculture, Food and Rural Affairs office, your local Ministry of the Environment office or:

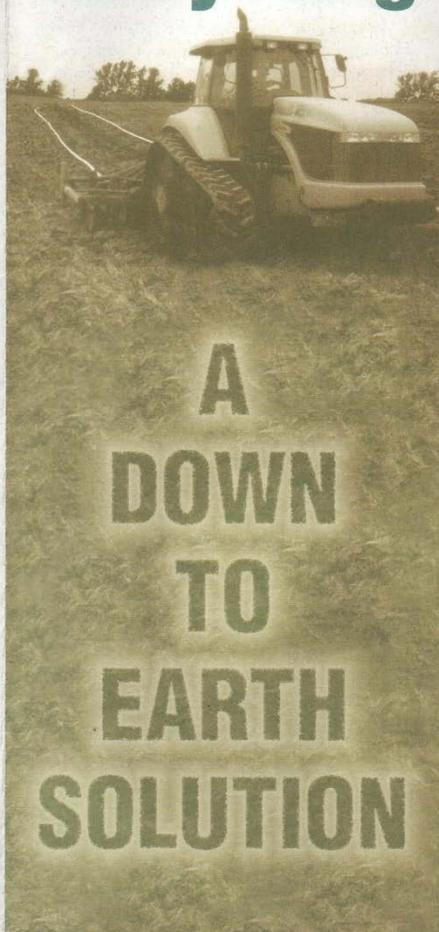
Biosolids Utilization Committee  
1 Stone Road West  
Guelph, ON N1G 4Y2  
General Inquiry: (519) 826-4120  
E-mail: [buc@omafra.gov.on.ca](mailto:buc@omafra.gov.on.ca)  
or visit the biosolids web site at  
<http://www.gov.on.ca/OMAFRA/english/environment>



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Photos courtesy of Terratec Environmental Limited

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# Biosolids Recycling



## Why use biosolids?

Biosolids recycling offers an environmentally sound management alternative to disposal, thereby reducing the amount of material that would otherwise go to landfill or incineration. Land application of biosolids:

- reduces demand for commercial fertilizers
- improves soil fertility
- enhances soil structure, moisture retention and soil permeability
- adds organic matter which reduces the potential for soil erosion and
- makes economic sense

Biosolids are ideal for crops such as corn, soybeans, canola and cereals and can also benefit forage and pasture land. Biosolids can be used in forestry to encourage tree growth, and therefore timber production, or to rehabilitate soils affected by mining or quarrying.

## Best management practices

BUC supports sound management practices for biosolids utilization. Responsible management ensures biosolids application benefits crops without degrading the soil or risking the health of humans, livestock or plants.

## Biosolids quality

Only high quality biosolids that conform to provincial standards are acceptable for application to agricultural land. Biosolids are analyzed regularly for nitrogen, phosphorous, metals and other properties.

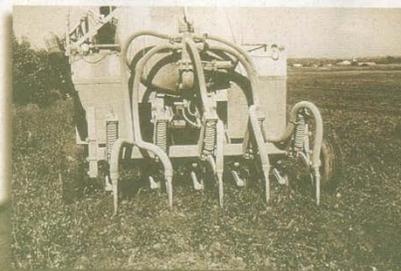
## Site quality

Soil tests ensure suitability for biosolids application. Suitability is based on levels of phosphorous, metals and pH of the soil.

The guidelines require that:

- the land is suitably located within a specified distance from residences, wells and water courses, and
- the timing and method of application are appropriate for the specific site conditions and crop management

Studies by the Ministry of Agriculture, Food and Rural Affairs confirm that repeated applications of biosolids over many years cause no harmful effects to soil quality.





# TERRATEC

## ENVIRONMENTAL

November 26, 2014

To Whom It May Concern:

Thank you for your interest in the Mississippi Mills Biosolids Land Application Program. Biosolids have been successfully applied to agricultural land in Ontario for over thirty years and provide the agricultural community with nutrients such as nitrogen, phosphorus and organic matter. The biosolids and the soil have been tested prior to land application to ensure that both meet the Ministry of Environment's strict guideline criteria. Site maps have been approved by the Ministry of Agriculture to ensure that the fields are suitable for the land application of biosolids. Environmentally sensitive areas such as streams, wells and homes are protected through the Ministry's strict regulations and Terratec's Land Application Managers ensure that these areas are indeed protected. Biosolids have not been applied within the well setback distances specified within the Nutrient Management Act.

I have included the Ministry of Agriculture, Food & Rural Affairs Fact sheet and brochure for your information. Should you have additional questions, please do not hesitate to call me at 1-905-432-0954 Ext 11.

Sincerely,

A handwritten signature in blue ink that reads "Greg Hillier". The signature is written in a cursive style.

Greg Hillier  
Land Application Coordinator  
Terratec Environmental Ltd.

**Appendix E**  
**2014 The Town of Mississippi Mills Post Application Reports**



## NASM Plan Post Application Report

Lingerlane Farm (ATAD; Gavin Giles, Giles)

Submission ID: 20811

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### **General Information**

Any false or misleading information included in this document may result in non-compliance with any approvals or permits granted, and prosecution in accordance to the provisions of the Nutrient Management Act, 2002.

### **Compliance with Regulatory Standards**

The evaluation performed when generating this Post Application Report assumes that all sources of nutrients, including fertilizers, intended for land application on this field have been included when preparing the NASM plan.

Based on the data supplied in this Post Application Report, the land application practices described in this document are in compliance with regulatory standards.

### **List of Attachments**

Required Sampling and Analysis Results  
Maps/Sketches

---

### **Preparer Information**

Greg Hillier (#NASMPDC12045)  
Terratec Environmental  
1612 Baseline Road  
Courtice, ON, Canada L1E 2S5  
Phone #1: 905-432-0954 X11  
Phone #2: 905-242-1470  
Email: greg.hillier@amwater.com

### **Agricultural Operation Information**

Federal Business Number:  
Operation Type: Partnership  
Partner Names: Don Cochran  
Cathy Cochran  
Adam Cochran

Operator Contact Information  
Don Cochran  
2556 Concession 7B Ramsay  
RR#1  
Almonte, ON, Canada K0A 1A0  
Phone #1: 613-256-1029  
Email: cochranseeds@xplornet.com

Owner is the same as the operator

---

### **Material Source Summary**

#### **ATAD**

Form: Solid  
Category: 3  
NASM Type: 11d. Other sewage biosolids  
Material Generator: Mississippi Mills  
212 Wolfe Grove Rd  
Almonte, ON, Canada K0A 1A0  
Phone #1: 613-256-8468

Metals Content (CM) Level: CM2 (confirmed by lab analysis)  
Pathogen Content (CP) Level: CP2 (confirmed by lab analysis)  
Odour Category (OC): OC3

#### Beneficial Use

Total Concentration of PAN, PAP, and PAK: 40591 ppm (Dry Basis)

Dry Basis

Nutrient	Value	
Dry Matter (DM)	18.1 %	
Nitrogen (Total Kjeldhal Nitrogen)	3.79 %	
Ammonia + Ammonium Nitrogen	4566.67 ppm	
Nitrate + Nitrite Nitrogen	1128.13 ppm	
Phosphorus (P)	2.6 %	
Potassium (K)	0.1 %	
Arsenic (As)	2 ppm	CM1
Cadmium (Cd)	0.9 ppm	CM1
Cobalt (Co)	2 ppm	CM1
Chromium (Cr)	15.33 ppm	CM1
Copper (Cu)	421.67 ppm	CM2
Mercury (Hg)	0.37 ppm	CM1
Molybdenum (Mo)	3.33 ppm	CM1
Nickel (Ni)	13.67 ppm	CM1
Lead (Pb)	15 ppm	CM1
Selenium (Se)	2 ppm	CM1
Zinc (Zn)	390.67 ppm	CM1
E. coli	426.03 CFU	CP1

**Farm Unit Summary**

**Gavin Giles**

This farm is a:

Commercial Fertilizer Receiver  
NASM Receiver

Farm Location

County of Lanark, Town of Mississippi Mills  
PAKENHAM, Concession: 7, Lot: 5

Status: Owned

Roll Number(s) 093194601515400

**Field Summary**

**Giles**

Area for Material: 7.91 ha

Planned Material Application Frequency: Once Every Five Years

(Fall 2013 - Fall 2014)	Agronomic (kg/ha)			Crop Removal (kg/ha)		
	N	P2O5	K2O	N	P2O5	K2O
 <b>9-23-30</b> June 3, 2014 Custom @ 135 kg/ha Total Applied: 1067.9 kg	12	31	41	12	31	41
 <b>Material App 1</b> June 4, 2014 (actual) ATAD @ 39.1 tonne/ha Total Applied: 309 tonne Spreader, Incorporated 1 day	103	169	8	103	337	8
 <b>Soybeans @ 2.4 tonne/ha</b> Planted: June 6, 2014 Harvested: October 1, 2014	0	-50	-60	-155	-33	-56



## NASM Application Summary

### Regulated Metals

1 addition(s) over regulated time period

Regulated Metal	Soil Test	This Application	Total Applied	5 Year Limit
Arsenic (As)	2.1 ppm	0.014 kg/ha	0.014 kg/ha	1%
Cadmium (Cd)	< 0.5 ppm	0.006 kg/ha	0.006 kg/ha	2%
Cobalt (Co)	9 ppm	0.014 kg/ha	0.014 kg/ha	1%
Chromium (Cr)	21.3 ppm	0.109 kg/ha	0.109 kg/ha	0%
Copper (Cu)	< 9.1 ppm	2.986 kg/ha	2.986 kg/ha	22%
Mercury (Hg)	< 0.05 ppm	0.003 kg/ha	0.003 kg/ha	3%
Molybdenum (Mo)	< 1 ppm	0.024 kg/ha	0.024 kg/ha	3%
Nickel (Ni)	11.1 ppm	0.097 kg/ha	0.097 kg/ha	3%
Lead (Pb)	8 ppm	0.106 kg/ha	0.106 kg/ha	1%
Selenium (Se)	< 1 ppm	0.014 kg/ha	0.014 kg/ha	5%
Zinc (Zn)	50 ppm	2.766 kg/ha	2.766 kg/ha	8%

### Total Solids

This application: 7.1 tonne/ha  
Total applied over regulated time period: 7.1 tonne/ha (32% of 5 year limit)

### Phosphate

Cropping Year	P2O5 Crop Removal Balance
Fall 2013 - Fall 2014	335 kg/ha

Net P2O5 balance over regulated time period: 335 kg/ha (86% of 5 year limit)

## NASM Minimum Setback Summary

Incorporation Details: Incorporated 1 day

### Wells

Municipal Well 100 m  
Drilled Well (15 m deep, 6 m casing) 15 m  
Other Well 90 m

### Surface Water

No vegetated buffer 20 m

### Odour

Single Dwelling 450 m (100 m if incorporated < 6 hrs)  
Residential Area, Commercial, Community or Institutional 900 m (200 m if incorporated < 6 hrs)

### Waiting Periods

#### Pre-Harvest Waiting Period After Application

Crop	Waiting Period
Commercial sod	12 months
Hay and haylage	3 weeks
Tree fruits and grapes	3 months
Small fruits	15 months
Vegetables	12 months
Tobacco	12 months

#### Pre-Grazing Waiting Period After Application

Livestock Type	Waiting Period
Horses, beef or dairy cattle	2 months
Swine, sheep or goats	6 months

### Depth of Unsaturated Soil

Depth	Restrictions
< 30 cm	No application is permitted
30 - 60 cm	Application is permitted if: 1) the land is pre-tilled no more than 7 days before the application OR 2) the maximum application rate is 18 tonne/ha per 48 hours.
61 - 90 cm	Application is permitted if the maximum application rate is 27 tonne/ha per 48 hours.
> 90 cm	No restrictions



## NASM Plan Post Application Report

Lingerlane Farm (ATAD; Clayton Rd. , Clayton Rd.)

Submission ID: 20811

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### General Information

Any false or misleading information included in this document may result in non-compliance with any approvals or permits granted, and prosecution in accordance to the provisions of the Nutrient Management Act, 2002.

### **Compliance with Regulatory Standards**

The evaluation performed when generating this Post Application Report assumes that all sources of nutrients, including fertilizers, intended for land application on this field have been included when preparing the NASM plan.

Based on the data supplied in this Post Application Report, the land application practices described in this document are in compliance with regulatory standards.

### **List of Attachments**

Required Sampling and Analysis Results  
Maps/Sketches

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### Preparer Information

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Phone #1: 905-242-1470  
Email: greg.hillier@amwater.com

### Agricultural Operation Information

Federal Business Number:  
Operation Type: Partnership  
Partner Names: Don Cochran  
Cathy Cochran  
Adam Cochran

Operator Contact Information  
Don Cochran  
R.R. #1  
2556 Concession 7B Ramsay  
Almonte, ON, Canada K0A 1A0  
Phone #1: 613-256-1029  
Email: cochranseeds@xplornet.com

Owner is the same as the operator

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### Material Source Summary

#### **ATAD**

Almonte / Mississippi Mills Municipal Biosolids

Form: Solid  
Category: 3  
NASM Type: 11d. Other sewage biosolids  
Material Generator: Almonte/ Mississippi Mills WWTP  
212 Wolfe Grove Rd.  
Almonte, ON, Canada K0A 1A0  
Phone #1: 613-256-8468

Metals Content (CM) Level: CM2 (confirmed by lab analysis)  
Pathogen Content (CP) Level: CP2 (confirmed by lab analysis)  
Odour Category (OC): OC3

#### Beneficial Use

Total Concentration of PAN, PAP, and PAK: 38486 ppm (Dry Basis)

Dry Basis

Nutrient	Value	
Dry Matter (DM)	18.38 %	
Nitrogen (Total Kjeldhal Nitrogen)	3 %	
Ammonia + Ammonium Nitrogen	3460 ppm	
Nitrate + Nitrite Nitrogen	1710.38 ppm	
Phosphorus (P)	2.65 %	
Potassium (K)	0.1 %	
Arsenic (As)	2.2 ppm	CM1
Cadmium (Cd)	0.82 ppm	CM1
Cobalt (Co)	2 ppm	CM1
Chromium (Cr)	16.2 ppm	CM1
Copper (Cu)	388.8 ppm	CM2
Mercury (Hg)	0.34 ppm	CM1
Molybdenum (Mo)	3.2 ppm	CM1
Nickel (Ni)	12.2 ppm	CM1
Lead (Pb)	15.4 ppm	CM1
Selenium (Se)	1.8 ppm	CM1
Zinc (Zn)	390.6 ppm	CM1
E. coli	86.17 CFU	CP1

**Farm Unit Summary**

**Clayton Rd.**

This farm is a:

Commercial Fertilizer Receiver  
NASM Receiver

Farm Location

County of Lanark, Town of Mississippi Mills  
RAMSAY, Concession: 7, Lot: 21

Status: Owned

Roll Number(s) 093192902502300

**Field Summary**

**Clayton Rd.**

Area for Material: 16.8 ha

Planned Material Application Frequency: Once Every Three Years

(Fall 2011 - Fall 2015)	Agronomic (kg/ha)			Crop Removal (kg/ha)		
	N	P2O5	K2O	N	P2O5	K2O
 <b>Nutrient Balance</b> September 1, 2011 - August 31, 2012	0	0	0	0	0	0
 <b>Nutrient Balance</b> September 1, 2012 - August 31, 2013	0	0	0	0	0	0
 <b>Nutrient Balance</b> September 1, 2013 - August 31, 2014	0	0	0	0	0	0
 <b>Material App 1</b> September 24, 2014 (actual) ATAD @ 27.2 tonne/ha Total Applied: 458 tonne Spreader, Incorporated 1 day	57	122	5	57	243	5

 <b>Soybeans @ 2.7 tonne/ha</b> Planted: May 15, 2015 Harvested: October 1, 2015	0	-40	-60	-174	-38	-63
 <b>Nutrient Balance</b> September 1, 2014 - September 30, 2015	57 	82 	-55 	-117	205	-58
 <b>Multi-Year Nutrient Balance</b> September 1, 2011 - September 30, 2015	57	82	-55	-117	205	-58

## **NASM Application Summary**

### ***Regulated Metals***

1 addition(s) over regulated time period

Regulated Metal	Soil Test	This Application	Total Applied	5 Year Limit
Arsenic (As)	2.7 ppm	0.011 kg/ha	0.011 kg/ha	1%
Cadmium (Cd)	< 0.5 ppm	0.004 kg/ha	0.004 kg/ha	2%
Cobalt (Co)	9.7 ppm	0.01 kg/ha	0.01 kg/ha	0%
Chromium (Cr)	24.3 ppm	0.081 kg/ha	0.081 kg/ha	0%
Copper (Cu)	10.3 ppm	1.947 kg/ha	1.947 kg/ha	14%
Mercury (Hg)	< 0.05 ppm	0.002 kg/ha	0.002 kg/ha	2%
Molybdenum (Mo)	< 1 ppm	0.016 kg/ha	0.016 kg/ha	2%
Nickel (Ni)	12.4 ppm	0.061 kg/ha	0.061 kg/ha	2%
Lead (Pb)	8 ppm	0.077 kg/ha	0.077 kg/ha	1%
Selenium (Se)	< 1 ppm	0.009 kg/ha	0.009 kg/ha	3%
Zinc (Zn)	60 ppm	1.956 kg/ha	1.956 kg/ha	6%

### ***Total Solids***

This application: 5 tonne/ha  
Total applied over regulated time period: 5 tonne/ha (23% of 5 year limit)

### ***Phosphate***

Cropping Year	P2O5 Crop Removal Balance
Fall 2011 - Fall 2012	0 kg/ha
Fall 2012 - Fall 2013	0 kg/ha
Fall 2013 - Fall 2014	0 kg/ha
Fall 2014 - Fall 2015	205 kg/ha

Net P2O5 balance over regulated time period: 205 kg/ha (53% of 5 year limit)

## **NASM Minimum Setback Summary**

Incorporation Details: Incorporated 1 day

### Wells

Municipal Well	100 m
Drilled Well (15 m deep, 6 m casing)	15 m
Other Well	90 m

### Surface Water

No vegetated buffer	20 m
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### Odour

Single Dwelling	450 m (100 m if incorporated < 6 hrs)
Residential Area, Commercial, Community or Institutional	900 m (200 m if incorporated < 6 hrs)

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## **Waiting Periods**

### Pre-Harvest Waiting Period After Application

<u>Crop</u>	<u>Waiting Period</u>
Commercial sod	12 months
Hay and haylage	3 weeks
Tree fruits and grapes	3 months
Small fruits	15 months
Vegetables	12 months
Tobacco	12 months

### Pre-Grazing Waiting Period After Application

<u>Livestock Type</u>	<u>Waiting Period</u>
Horses, beef or dairy cattle	2 months
Swine, sheep or goats	6 months

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## **Depth of Unsaturated Soil**

<u>Depth</u>	<u>Restrictions</u>
< 30 cm	No application is permitted
30 - 60 cm	Application is permitted if the maximum application rate is 27 tonne/ha per 48 hours.
61 - 90 cm	No restrictions
> 90 cm	No restrictions