



February 11, 2015

Municipality of West Perth

169 St. David Street

Mitchell, Ontario

N0K 1N0

ATTENTION: Mrs. Susan Duke

CAO

REFERENCE: Municipality of West Perth

Annual Wastewater Report 2014

Please find enclosed the Municipality of West Perth, Mitchell Wastewater Treatment Facility; Annual Operations Report 2014. The report is prepared in accordance with the annual report criteria within Environmental Compliance Approval # 5159-94HKX8 containing the following;

- Section 1: A summary and interpretation of all monitoring data and comparison to effluent limits;
- Section 2: A description of any operating problems and corrective actions;
- Section 3: A summary of the maintenance activities;
- Section 4: A summary of effluent quality assurance measures;
- Section 5: A summary of calibration methods and maintenance procedures for all monitoring equipment;
- Section 6: A description of efforts made and results achieved in meeting Effluent Objectives;
- Section 7: A tabulation of sewage quantities and characteristics from all sources;
- Section 8: Sludge generation volume and disposal methods;
- Section 9: A summary of any complaints received during the reporting period and actions taken to address the complaints;
- Section 10: A summary of all by-pass, spill or abnormal discharge events;

On behalf of the municipality, a copy of this report has been sent to MOE in the London Office (Mr. Jim Miller).

Yours very truly,

Municipality of West Perth

Environmental Services

1. Summary and interpretation of all monitoring data and comparison to effluent limits

The annual monitoring reports for the year are attached in accordance with the Environmental Compliance Approval guidelines for the period from January 01 to December 31, 2014.

The annualized average daily flow for the year was estimated to be 4.164 MLD, which represents approximately 58% of the expanded design capacity for the treatment facility (average day design flow 7.2 MLD). The maximum daily flow, which occurred in the month of November, was 16.558 MLD. Both the average and maximum flows for 2014 were slightly less (avg: 10%, max: 8%) than in 2013.

The treatment plant was able to handle and treat the average daily flows, while the high peak flows are diverted and temporarily stored in the peak overflow cell for treatment when flow volumes return to normal.

The annual effluent CBOD₅ and suspended solids achieved the annual criteria effluent limits for both concentration criteria and loading criteria in both the freezing and non-freezing periods.

The effluent total phosphorus achieved the monthly criteria effluent limits (concentration and loading) during the freezing and non-freezing period.

The effluent ammonia results achieved the daily criteria effluent limits (concentration and loading) for the freezing and non-freezing period.

The effluent limits criteria, in the Environmental Compliance Approval outline two conditions based on the freezing and non-freezing temperature conditions. The plant was able to achieve the criteria for the more stringent non-freezing criteria and the freezing criteria.

The Dissolved Oxygen (DO) level was recorded above 4.0 mg/l during the non-freezing period and above 5.0mg/l during the freezing period. The pH remained between the 6.5 to 9.0 criteria throughout the year.

We have summarized the annualized effluent concentration for Carbonaceous Biochemical Oxygen Demand, Suspended Solids, Total Ammonia and DO as follows:

Effluent Quality	Annual Average Concentration mg/L	Concentration Criteria mg/L @ freezing	Concentration Criteria mg/L @ non-freezing	Compliance
CBOD ₅	0.12	<15	<10	Annual
Suspended Solids	2.53	<15	<10	Annual
Ammonia	0.14	<5.0	<3.0	Daily
Dissolved Oxygen	6.66	>5	>4	Monthly

For the effluent total phosphorus, we have summarized the effluent on monthly basis in accordance with the certificate of approval:

Effluent Quality For Total Phosphorus	Monthly Average Concentration mg/L	Concentration Criteria mg/L	Compliance
May	0.22	<0.5 @ non Freezing	Monthly
June	0.25		
July	0.15		
August	0.11		
September	0.13		
October	0.09		
November	0.08		

December	0.05	<1.0 @Freezing	Monthly
January	0.08		
February	0.14		
March	0.14		
April	0.16		

For the effluent Ammonia, we have summarized the effluent on monthly basis in accordance with the certificate of approval:

Effluent Quality For Ammonia	Monthly Average Concentration mg/L	Concentration Criteria mg/L	Compliance
May	0.36	<3.0 @ non Freezing	Monthly
June	0.12		
July	0.20		
August	0.10		
September	0.68		
October	0.19		
November	0.16		
December	0.10	<5.0 @Freezing	Monthly
January	0.35		
February	1.13		
March	1.31		
April	3.17		

For the effluent Dissolved Oxygen, we have summarized the effluent on monthly basis in accordance with the certificate of approval:

Effluent Quality For DO	Monthly Average Concentration mg/L	Concentration Criteria mg/L	Compliance
May	5.40	>4.0 @ non Freezing	Monthly
June	6.05		
July	6.13		
August	6.13		
September	7.11		
October	7.64		
November	8.76		
December	9.08	>5.0 @Freezing	Monthly
January	5.09		
February	5.03		
March	5.25		
April	5.45		

The calculated removal efficiencies achieved at the treatment plant for the main effluent parameters are highlighted as follows:

- CBOD₅ removal efficiency was 99.9%
- Suspended solids removal efficiency was 98.4%
- Total Phosphorus removal efficiency was 97.9%

The annualized average effluent loading is compared to the loading criteria for both the non-freezing and freezing period in the table below;

Effluent Parameter	Loading Kg/day	Loading Criteria kg/day @ freezing	Loading Criteria kg/day @ non-freezing
CBOD₅	0.46	108 annual	72 annual
Suspended Solids	10.74	108 annual	72 annual
Total Phosphorus	0.56	7.2 annual	3.6 annual
Ammonia	0.66	36 daily	21.6 daily

The annual average effluent loading for CBOD₅, Suspended Solids and Total Phosphorus achieved compliance with the Environmental Compliance Approval effluent loading criteria. The daily ammonia loading also achieved compliance with the Environmental Compliance Approval effluent loading criteria.

E coli results did not exceed 200 counts per 100 mL during the required disinfection period from March 15 to October 30. The pH level for the wastewater effluent averaged 7.63 and the dissolved oxygen averaged 6.43 mg/l for the year 2014.

The maximum un-ionized ammonia value for 2014 was 0.01 mg/L, The ECA requires un-ionized value to be less than 0.1 mg/L at all times.

2. Description of operating problems and corrective actions

Q1 2014: No operating problems

Q2 2014: No operating problems

Q3 2014: Win911 alarm monitoring system failure, Back up added. Replaced grey water wash down pump. A number of UV lights burnt out and replacements are on-order.

Q4 2014: Issues with Win911 are ongoing and being addressed by Rick Beer, Air lift in sand filter #5 cracked, replacement air lift on-order.

3. Summary of maintenance activities

Currently Outlook Task Manager is being used to schedule the maintenance activities at the treatment plant from January to December. The operator is able to generate preventive maintenance and corrective work orders; as well as document work performed and issue work order history reports.

A highlight of the major maintenance carried out for 2014 is outlined below:

- The raw sewage pumps at both the Hebert and James Pump Stations were inspected and maintained by the operators.
- The Herbert Street, James Street and Sewage plant diesel generators received their annual service in early 2014 and are inspected and ran monthly
- The RAS, WAS and influent flow meters were calibrated by an outside contractor;
- Annual greasing and oil changes were completed on all blowers, Vibration readings are taken annually;
- All submersible pumps were inspected.
- Number one and two aerobic digesters including headers and piping were cleaned, inspected and serviced by the operators in the spring and fall
- The air lift piping on all the filter air lifts were pulled and inspected
- The UV system was monitored daily by the operators in 2014 for proper intensity and the lenses cleaned monthly, the bulbs were replaced as needed
- Outside contractors inspected the gas detectors, diesel generators, and lab equipment.

4. Influent – Effluent Quality Assurance Measures

The influent sample is obtained by a 24hr composite sampler (Epic), located at the headwork's of the treatment plant after screen and grit removal. A 75 ml sample is collected every 15 minutes.

A 24hr-composite sampler (Epic), located downstream of the effluent UV channel obtains the effluent sample. A 75 ml sample is collected every 15 minutes.

The effluent and influent samples were sent to Maxxam Analytics Inc. in Mississauga, Ontario. Maxxam is responsible for performing the quality assurance and control checks. For quality assurance purposes, the operator will split samples with the analytical tests performed in-house and at the contract laboratory. The operator performs a comparison of the sample results.

5. Calibration methods/Maintenance procedures for monitoring equipment

A copy of the calibration reports for the return activated sludge, waste activated sludge, and filter backwash water and influent flow meters are attached.

D.O. probes and meters are cleaned and calibrated as per the manufactures specifications, by the operators.

The pH meter is calibrated once a month, the meter is used on a daily basis and calibration is checked prior to usage, by the operators.

6. Efforts made and results achieved in meeting Effluent Objectives

The annual effluent CBOD₅ achieved the effluent objectives for the concentration criteria and loading criteria in both the freezing and non-freezing periods.

The annual effluent suspended solids achieved the effluent objectives for the concentration criteria and loading criteria in both the freezing and non-freezing periods.

The effluent ammonia results achieved the effluent objectives (concentration and loading) for both the freezing and non-freezing periods.

The effluent total phosphorus achieved the effluent objectives for the concentration criteria and loading criteria during both the freezing period and non-freezing period.

7. Monthly Sewage quantities and characteristics from all sources

The plant received sewage from collection system connected sources this reporting period; the town of Mitchell proper, including residential and small business operations. Parmalat Canada dairy processing plant, Great Lakes Specialty Meats pork livestock processing plant.

While quantities from all sources are monitored independently, characteristics of the sewage from the Town, Parmalat and Great Lakes Specialty Meats are combined as they are not segregated in the collection system.

In adherence to the operating certificate of approval; imported waste flows are monitored and samples are taken for outside analysis on a weekly basis when received.

Total monthly sewage quantities from all sources are tabulated in the following table. Note volumes followed by a * indicate final effluent wash water quantities.

Monthly Quantities from source	Town of Mitchell Million Liters	Parmalat Dairy Million Liters	Great lakes Specialty Meats Million Liters	Imported waste Million Liters
January	125.54	62.670	8.523	0.197
February	80.036	57.610	6.066	0.099
March	141.143	66.398	10.050	0.065
April	206.860	66.616	9.382	0.345
May	166.698	67.692	8.743	0.010
June	86.182	56.420	1.525	0.055
July	115.623	67.793	0.825	0.040
August	96.146	65.798	3.512	0.356
September	146.342	65.003	3.931	0.585
October	112.607	63.250	2.312	0.077
November	134.602	60.619	2.970	0.206
December	109.459	59.881	1.133	0.268
Totals	1,521.238	759.75	58.972	2.303

The following chart is a comparison of anticipated monthly average daily flow versus, actual average daily flow from all sources.

Average daily flow Vs. anticipated daily flow M ³	Town of Mitchell M ³	Parmalat Dairy M ³	Great lakes Specialty Meats M ³	Imported Waste M ³
<i>Anticipated</i>	<i>4,755</i>	<i>2,000</i>	<i>350</i>	<i>95</i>
January	4050	2022	275	197
February	2858	2057	217	4
March	4553	2142	324	2
April	6895	2221	313	12
May	5377	2184	282	0
June	2873	1881	51	2
July	3730	2187	27	1
August	3101	2123	113	11
September	4878	2167	131	20
October	3632	2040	75	2
November	4487	2021	99	7
December	3531	1932	37	9

Monthly average Characteristics of sewage by source; this table shows the combined sewage from the Town of Mitchell, the Parmalat dairy and Great Lakes Specialty Meats.

Characteristics of combined sources	CBOD5 mg/l	TKN mg/l	Total Phosphorus mg/l	Total Suspended solids mg/l
January	322.0	33.0	6.4	124.3
February	490.0	39.0	18.3	246.7
March	213.0	34.8	7.9	241.1
April	225.5	28.8	5.2	106.2
May	400.0	30.5	6.4	184.7
June	147.5	24.5	5.6	174.7
July	162.2	21.8	4.8	140.6
August	325.0	26.5	5.7	178.7
September	203.2	20.6	4.2	137.0
October	280.0	28.5	4.0	113.6
November	408.8	22.0	4.8	171.7
December	236.0	21.6	4.4	119.5

❖ **Monthly average characteristics of the imported waste source.**

Imported waste products accounted for less than 1% of total annual plant flow. Imported waste products are slowly metered into the head works of treatment process where they mix with the influent from the pump stations. In accordance with the operating Certificate of Approval, weekly samples of the imported waste are taken, where applicable; sampling has been primarily of the high strength sources. On those occasions where the carrier has not filled the designated sample containers, operators sampled directly from the receiving station and identified these samples as “Mixed”.

Imported Waste Characteristics	CBOD₅ mg/l	TKN mg/l	Total Phosphorus Mg/l	Total suspended solids mg/l
January	N/A	N/A	N/A	N/A
February	919.4	25.5	6.4	6225.8
March	8620.4	45.2	8.3	2104.7
April	2113.7	42.6	5.8	3121.8
May	N/A	N/A	N/A	N/A
June	2870	27.6	4.5	236
July	66.5	8.5	3.1	72.3
August	10971.3	46.5	10.9	5484.6
September	697.3	40.9	6.4	439.7
October	58.1	4.8	0.5	83.9
November	94	2.3	0.5	29.7
December	606.5	40.6	8.5	951.0

Annual average characteristics of imported waste by source

Imported Waste Quality	CBOD_s mg/l	TKN mg/l	Total Phosphorus Mg/l	Total suspended solids mg/l	Volume Received Million Liters
Mitchell Feed Mill	42.49	3.7	0.83	65.4	0.534
Rothsay	3.0	0.5	0.2	18.6	0.175
Cadbury	N/A	N/A	N/A	N/A	0.036
Kellogs	1800	9.1	1.9	555.9	0.169
Mixed	433.1	10.5	1.8	936.9	N/A

8. Sludge generation volume and disposal methods

The annual compliance summary provides a tabulation of sludge generation for 2014. In total, approximately 34,976m³ of sludge was wasted.

Based on current loadings, we expect a similar amount of sludge generation in 2015.

Digested sludge from the WWTP and from the sludge storage lagoon are removed by Ontario Greenways Inc.

Biosolids are usually applied to sites approved by the MOE for land application of biosolids. This year there were no land application of biosolids.

The summary of the sludge applied during 2014 and the projections for the year 2015 are as follows:

YEAR	LAND APPLICATION SITE NUMBER	SLUDGE APPLIED TO LAND/ M3
2014	N/A	N/A
2015 Projection	11 Sites Available	

Sufficient capacity is available within the existing approved land application sites for 2015. The acquisition and submission of application site approval requests are currently conducted by the contracted and licensed Hauler / land application contractor.

9. Summary of complaints and action taken to address complaints

1) No complaints were reported to operations staff in 2014.

10. Summary of all by-pass, spill or abnormal discharge events

There were no bypasses or spills during the 2014 operating period.

Nitrogen Removal Summary

Sampling Date	Raw Sewage (TKN)	Effluent Nitrate Concentration (mg/L)	Upstream of WPCP outfall Nitrate Concentration (mg/L)	Downstream of WPCP outfall Nitrate Concentration (mg/L)
01-06-14	17	21		
01-14-14	16	13		
01-20-14	16	8.3		
01-28-14	83	24		
02-03-14	61	38		
02-10-14	35	40		
02-18-14	33	44		
02-24-14	27	15.8		
03-03-14	57	30.4		
03-10-14	55	21.9		

03-17-14	26	17.6		
03-24-14	18	14.6		
03-31-14	18	13.5		
04-07-14	13	8.43		
04-14-14	11	9.46		
04-22-14	29	16.8		
04-28-14	62	22.9	4.16	4.41
05-05-14	65	19.9	6.54	6.49
05-12-14	17	20.6	4.27	4.64
05-20-14	20	15.1	6.45	6.63
05-26-14	20	19.7	6.58	6.71
06-02-14	29	32.4	4.36	5.3
06-09-14	22	30.6	2.43	4.01
06-16-14	22	23.3	11.0	11.8
06-23-14	25	17.9		
06-26-14			4.62	5.19
07-02-14	25	17.9	4.13	5.99
07-07-14	23	23.5	4.68	5.78
07-14-14	15	18.4	8.65	8.63
07-21-14	25	15.5	5.38	5.61
07-28-14	21	23.2	3.12	3.32
08-05-14	29	16.3	5.29	5.32
08-11-14	21	15.7	2.57	3.07

08-18-14	30	17.2	1.86	2.77
08-25-14	26	1.98	3.12	2.98
09-02-14	23	28.2	2.54	2.31
09-08-14	12	10.1	4.84	4.63
09-15-14	18	10.4	4.15	4.23
09-22-14	16	16.8	4.07	3.95
09-29-14	34	22.3	3.96	4.11
10-06-14	15	13	5.29	5.08
10-14-14	50	49.4	5.15	5.55
10-20-14	21	10.6	5.09	5.29
10-27-14	28	17.6	4.67	4.6
11-03-14	22	18.3	4.54	4.63
11-10-14	23	21.8	5.38	5.13
11-17-14	34	21.5	4.94	4.94
11-24-14	9	10.7		
12-01-14	18	12.5		
12-08-14	25	9.35		
12-15-14	27	2.87		
12-22-14	20	5.01		
12-29-14	18	15.8		