

5.1(a)



Dufferin Aggregates
2300 Steeles Ave W, 4th Floor
Concord, ON L4K 5X6
Canada

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May 13, 2013

Al Murray
Guelph Area Team Supervisor
Ministry of Natural Resources
Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

RECEIVED

MAY 14 2013

Township of Puslinch

Attention: Mr. Al Murray

**Re: Monthly Monitoring Report
Mill Creek Pit, License #5738
Township of Puslinch, Wellington County**

Please find enclosed the required monitoring data for the month of April 2013. As indicated, there were no exceedences in this month.

If you have any questions, please do not hesitate to call.

Sincerely,

Ron Van Ooteghem
Site Manager

C.c.

Karen Landry (Township of Puslinch)
Sonja Strynatka (GRCA)
Kevin Mitchell (Dufferin Aggregates)
University of Guelph

Monthly Reporting
Mill Creek Aggregates Pit
April 2013

Date	DP21 (mASL)	Threshold Value (mASL)	Exceedance
4-Apr-13	305.91	305.60	NO
10-Apr-13	306.20	305.60	NO
18-Apr-13	306.00	305.60	NO
25-Apr-13	305.94	305.60	NO

Date	BH13 (mASL)	DP21 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
4-Apr-13	306.20	305.91	0.29	0.11	NO
10-Apr-13	306.54	306.20	0.34	0.11	NO
18-Apr-13	306.37	306.00	0.37	0.11	NO
25-Apr-13	306.34	305.94	0.40	0.11	NO

Date	DP17 (mASL)	Threshold Value (mASL)	Exceedance
4-Apr-13	305.34	305.17	NO
10-Apr-13	305.55	305.17	NO
18-Apr-13	305.39	305.17	NO
25-Apr-13	305.33	305.17	NO

Date	BH92-12 (mASL)	DP17 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
4-Apr-13	305.74	305.34	0.40	0.14	NO
10-Apr-13	305.78	305.55	0.23	0.14	NO
18-Apr-13	305.62	305.39	0.23	0.14	NO
25-Apr-13	305.56	305.33	0.23	0.14	NO

Date	DP3 (mASL)	Threshold Value (mASL)	Exceedance
4-Apr-13	304.83	304.54	NO
10-Apr-13	305.04	304.54	NO
18-Apr-13	304.94	304.54	NO
25-Apr-13	304.85	304.54	NO

Date	DP6 (mASL)	DP3 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
4-Apr-13	305.66	304.83	0.83	0.73	NO
10-Apr-13	305.95	305.04	0.91	0.73	NO
18-Apr-13	305.82	304.94	0.88	0.73	NO
25-Apr-13	305.76	304.85	0.91	0.73	NO

Date	DP2 (mASL)	Threshold Value (mASL)	Exceedance
4-Apr-13	304.30	303.69	NO
10-Apr-13	304.32	303.69	NO
18-Apr-13	304.36	303.69	NO
25-Apr-13	304.34	303.69	NO

Date	BH92-27 (mASL)	DP2 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
4-Apr-13	305.09	304.30	0.79	0.34	NO
10-Apr-13	305.09	304.32	0.77	0.34	NO
18-Apr-13	305.19	304.36	0.83	0.34	NO
25-Apr-13	305.15	304.34	0.81	0.34	NO

Date	DP1 (mASL)	Threshold Value (mASL)	Exceedance
4-Apr-13	304.55	303.97	NO
10-Apr-13	304.67	303.97	NO
18-Apr-13	304.49	303.97	NO
25-Apr-13	304.46	303.97	NO

Date	BH92-29 (mASL)	DP1 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
4-Apr-13	305.30	304.55	0.75	0.17	NO
10-Apr-13	305.35	304.67	0.68	0.17	NO
18-Apr-13	305.38	304.49	0.89	0.17	NO
25-Apr-13	305.33	304.46	0.87	0.17	NO

Date	DP5C (mASL)	Threshold Value (mASL)	Exceedance
4-Apr-13	303.37	302.86	NO
10-Apr-13	303.50	302.86	NO
18-Apr-13	303.33	302.86	NO
25-Apr-13	303.27	302.86	NO

Date	OW5-84 (mASL)	DP5C (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
4-Apr-13	303.69	303.37	0.32	0.30	NO
10-Apr-13	303.90	303.50	0.40	0.30	NO
18-Apr-13	303.76	303.33	0.43	0.30	NO
25-Apr-13	303.71	303.27	0.44	0.30	NO

Note: DP5C & DP1 was frozen on April 4, 92-27 frozen on April 4 & 10

Monthly Reporting
 Mill Creek Aggregates Pit
 April 2013

												Max. Allowable as per PTTW- Main Pond			
												(Imperial Gallons)			(Litres)
Total Monthly Precipitation (mm):		99.2	Waterloo-Wellington Airport (April Actual)									2,500		per minute	11,365
Total Monthly Normal Precipitation (mm):		73	Waterloo-Wellington Airport (30-year Normal)									1,800,000		per day	8,183,000
Date	Below Water Table Extraction (wet tonnes) Phase 2	Below Water Table Extraction (wet tonnes) Phase 3	Water Pumped from Main Pond (gals)	Water Pumped from Active Silt Pond (gals)	Main Pond Level (mASL)	Exceedance Y/N (BELOW 305.5 mASL)	Phase 2 Pond Level (mASL)	Exceedance Y/N (BELOW 305.0 mASL)	Phase 3 Pond Level (mASL)	Exceedance Y/N (BELOW 303.85 mASL)	SP2 Level (mASL)	Exceedance Y/N (ABOVE 305.5 mASL) or (BELOW 304.5 mASL)			
1-Apr-13	0	2784	0	0	306.40	NO	305.79	NO	304.97	NO	304.95	NO			
2-Apr-13	0	2344	0	0	306.38	NO	305.96	NO	305.49	NO	304.89	NO			
3-Apr-13	0	2930	0	0	306.38	NO	305.96	NO	305.48	NO	304.89	NO			
4-Apr-13	0	2930	521,767	0	306.38	NO	305.96	NO	305.48	NO	304.89	NO			
5-Apr-13	0	2051	1,202,132	6,159	306.38	NO	305.96	NO	305.47	NO	304.89	NO			
6-Apr-13	0	0	0	0	306.38	NO	305.96	NO	305.47	NO	304.89	NO			
7-Apr-13	0	0	0	0	306.38	NO	305.96	NO	305.47	NO	304.89	NO			
8-Apr-13	0	2784	1,141,271	909,793	306.36	NO	305.96	NO	305.49	NO	304.89	NO			
9-Apr-13	0	2930	1,215,770	1,610,615	306.37	NO	305.96	NO	305.49	NO	304.89	NO			
10-Apr-13	0	2930	1,231,608	2,042,194	306.43	NO	305.96	NO	305.49	NO	304.89	NO			
11-Apr-13	0	2930	326,214	0	306.40	NO	305.96	NO	305.50	NO	304.89	NO			
12-Apr-13	0	2198	0	0	306.40	NO	305.96	NO	305.50	NO	304.89	NO			
13-Apr-13	0	0	0	0	306.40	NO	305.96	NO	305.50	NO	304.89	NO			
14-Apr-13	0	0	0	0	306.40	NO	305.96	NO	305.50	NO	304.89	NO			
15-Apr-13	0	1319	1,233,588	1,438,379	306.53	NO	305.96	NO	305.58	NO	304.89	NO			
16-Apr-13	0	2930	1,214,230	1,540,885	306.56	NO	306.16	NO	305.56	NO	304.89	NO			
17-Apr-13	0	2784	1,208,951	1,483,913	306.56	NO	306.17	NO	305.57	NO	304.89	NO			
18-Apr-13	0	2198	1,203,672	1,213,790	306.56	NO	306.17	NO	305.57	NO	304.89	NO			
19-Apr-13	0	2784	1,206,751	1,307,717	306.60	NO	306.21	NO	305.55	NO	304.89	NO			
20-Apr-13	0	0	0	0	306.60	NO	306.21	NO	305.55	NO	304.89	NO			
21-Apr-13	0	0	0	0	306.60	NO	306.21	NO	305.55	NO	304.89	NO			
22-Apr-13	0	2930	1,255,145	1,560,242	306.60	NO	306.21	NO	305.54	NO	304.89	NO			
23-Apr-13	0	2784	1,156,598	1,520,427	306.57	NO	306.21	NO	305.51	NO	304.89	NO			
24-Apr-13	0	2784	1,204,772	1,374,588	306.59	NO	306.21	NO	305.51	NO	304.89	NO			
25-Apr-13	0	2051	1,195,753	1,258,004	306.61	NO	306.23	NO	305.53	NO	304.89	NO			
26-Apr-13	0	2344	0	748,335	306.62	NO	306.24	NO	305.49	NO	305.49	NO			
27-Apr-13	0	0	0	367,789	306.62	NO	306.24	NO	305.49	NO	305.49	NO			
28-Apr-13	0	0	0	0	306.62	NO	306.24	NO	305.49	NO	305.49	NO			
29-Apr-13	0	2930	1,224,349	1,864,239	306.66	NO	306.26	NO	305.50	NO	305.50	NO			
30-Apr-13	0	2930	1,201,032	2,042,194	306.67	NO	306.26	NO	305.48	NO	305.48	NO			
			0												
Total	0	57575	18,943,602	22,289,264											
Avg./ day	0.0	1919.15	611,083.94	742,975.46	306.50	NO	306.08	NO	305.49	NO	304.99	NO			

Note: Staff Guages installed in SP2 on April 26. Level of pond adjusted at that time.



**Groundwater
Science Corp.**

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MAY 07 2013

Township of Puslinch

24 Erb Street East,
Waterloo, ON N2J 1L6
Phone: (519) 746-6916
Fax: (519) 884-5996

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To: Colin Evans, CBM From: Andrew Penney
 Fax: (416) 423-6912 Pages: 2
 Phone: (416) 423-1300 Date: May 6, 2013
 Re: Puslinch Pit – Licence No. 17600 April 2013 Monitoring Report
 CC: MNR, Township of Puslinch, Harrington McAvan Ltd.

Urgent For Review Please Comment Please Reply For your information

• Comments: The content of this fax is confidential. If the reader is not the intended recipient (or its agent) then be advised that any dissemination, copying or distribution of this fax or content is prohibited. If you have received this fax by mistake please notify us immediately and return the original at our expense.

This Fax summarizes the results of the groundwater monitoring program for the CBM Puslinch Pit as per the Hydrogeological Recommendations of the current Pit Licence.

Below Water Table Extraction

CBM reports approximately 79,015 tonnes of gravel was extracted from below water within the South Pond area in April 2013.

Water Level Monitoring and Threshold Status

Water level measurements were obtained by CBM twice in April during below water extraction at all of the on-site monitoring locations. Ongoing weekly measurements will be obtained in May. The reported April weekly water level measurements, compared to threshold values, are summarized as follows:

Location	Threshold (mAMSL)	Measured Water Level Elevation (mAMSL)					
		Mar 20	Mar 28	Apr 3	Apr 16		
MP1	-	306.63	306.64	306.68	306.82		
MP2	-	306.11	306.13	306.16	306.29		
MP3	305.27	306.05	306.08	306.12	306.34		
MP4	305.27	306.07	306.12	306.15	306.25		
MP7	-	306.26	306.31	306.34	306.49		
North Pond	305.64	306.84	306.82	306.84	306.89		
South Pond	305.34	306.34	306.27	306.29	306.39		

April 8, 2013

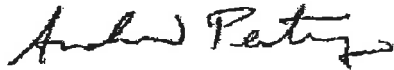
As indicated by the weekly measurements, there were no threshold exceedances observed and no Action Response in April 2013.

There is no current "Declared Low Water Condition" reported for Mill Creek and flows are currently shown to be above "Normal Summer Lowflow" as shown on the GRCA Low Water Response web site.

The monitoring program is proceeding as per the Licence requirements, and monthly summaries will continue to be provided during the operational season.

If you have any questions or require further information please do not hesitate to contact me.

Sincerely,



Andrew Pentney, P.Geol.
Hydrogeologist

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APR 22 2013

Township of Puslinch

File: 2517
By: Email & Mail

April 17, 2013

Township of Puslinch
7404 Wellington Rd 34
R.R. # 3
Guelph, Ontario
N1H 6H9

CLERK'S DEPARTMENT	
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Attention: Ms. Karen Landry
Clerk

Dear: Ms. Landry

Re: 2012 Ecological and Aquatic Monitoring Report for the Roszell Pit

As requested, I have reviewed the 2012 Ecological and Aquatic Monitoring Report prepared by Dance Environmental Inc for the Roszell Pit. I also inspected the site on April 15th to confirm some of the details provided in this report. Based on the information supplied and my field observations I offer the following comments.

1. Dance reported that as of December 6, 2012 silt fencing had not been installed along the setback limit from the western woodland/wetland feature. This situation was still the case at the time of my inspection. There was not, however, any evidence of erosion or sedimentation damage within the woodland/wetland area as a result of this lack of protective fencing, probably because constructed berms and existing extraction areas were not in close proximity to this natural feature. The silt fencing should nonetheless be installed in the appropriate locations as per the approved Site Plans since the level of extraction activity will likely escalate in 2013. A fence had, however been erected at the limit of the license boundary and CBM signage was attached to it.
2. The proposed locations for 6 vegetation monitoring plots seem appropriate as they are all situated in areas of groundwater seepage where sensitive groundflora may be found and existing trees and shrubs are adapted to a high water table. However, plots A and B are located in a portion of the woodland/wetland that is pastured by cattle which damage vegetation by browsing and trampling. This source of ongoing disturbance could mask the effects of potential changes to the groundwater regime and hence invalidate the interpretation of monitoring data. CBM should therefore approach the landowner to see if the electric fence that now runs through the wetland to the river could be shifted further north so that cattle no longer have access to the area where monitoring plots are established. I estimate this would result in the loss of less than an acre of poor quality woodland/wetland pasture.

3. The 10 X 10 m vegetation monitoring plot size seems reasonable and the proposed data collection procedures should generally be sufficient to document possible changes in vegetation cover caused by pit operations. However, trees are only recorded along 1 m wide transect lines though the plot by species, canopy layer and condition (i.e. alive versus dead) and I don't feel this provides sufficient evidence to properly interpret possible changes in tree health. For example, if all living trees are in poor health and they suddenly die one could assume it was somehow related to pit operations rather than natural causes. I therefore feel that all living trees ≥ 10 cm in diameter at breast height (dbh), growing in the main canopy should also be recorded by their health (e.g. good, fair, poor based on visible defects and indicators of decline). The tree inventory form can easily be modified to accommodate data on tree health. Furthermore, I think all trees in the main canopy should be recorded instead of just those located along the transect lines traversing the plot. Given the relatively small plot size I don't think this additional data will add much extra time to the monitoring program.

With respect to the tree inventory form and the shrub inventory form I am confused by the 3 canopy layers that are applied to each class of vegetation. For example, white cedar is recorded as being in the understory of the tree layer, presumably as regeneration (i.e. tree seedlings and saplings less than 10 cm dbh), and it is also recorded in the canopy, sub-canopy and understory of shrub layer. This apparent redundancy in data collection needs to be clarified as it makes no sense from a forestry perspective.

4. Appropriate procedures were used to assess trout spawning in the various creeks and the survey results were similar to those previously recorded.

I trust these comments will prove helpful. Please feel free to call me if you require further clarification on these matters.

Yours truly,

GWS Ecological & Forestry Services Inc.



Greg W. Scheifele, M. A., R.P.F.
Principal Ecologist/Forester

5.4(a)



Stantec Consulting Ltd.
49 Frederick Street
Kitchener ON N2H 6M7
Tel: (519) 579-4410

Stantec

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MAY 08 2013

Township of Puslinch

April 29, 2013
File: 1611 07544/31

Township of Puslinch
R.R. #3
County Road 34 Aberfoyle
Guelph ON N1H 6H9

Attention: Ms. Karen Landry, CAO/Clerk

Dear Ms. Landry:

**Reference: Mini Lakes Mobile Home Community
Quarterly Monitoring Program – 1st Quarter 2013**

Please find enclosed the wastewater treatment plant effluent results for Mini Lakes Mobile Home Community, provided in Table 1 (attached). These results are provided in accordance with the Operation and Maintenance Agreement between the Mini Lakes Residents Association and The Township of Puslinch, and the Certificate of Approval (C of A) for the sewage system. This letter represents the first quarter reporting for 2013.

As shown on Table 1 (attached), plant effluent has been sampled and analyzed on three occasions for this quarter.

The average carbonaceous biochemical oxygen demand (CBOD₅) concentration for the quarter is 8.7 mg/L, which is well below the compliance limit of 20 mg/L. CBOD₅ values were below the compliance limit on all three (3) sampling occasions this quarter. The 12-month rolling average for CBOD₅ is 10.6 mg/L. Overall, the plant is deemed to be performing very well with respect to CBOD₅.

The average TSS concentration for the quarter is 17.3 mg/L, which is below the compliance limit of 20 mg/L. TSS values were below the compliance limit on two of the three sampling occasions this quarter. The 12-month rolling average for TSS is 14.2 mg/L. Overall, the plant is deemed to be performing well with respect to TSS.

The average total phosphorus (TP) concentration for the quarter is 0.6 mg/L, which is below the compliance limit of 1.0 mg/L. TP values were below the compliance limit on all three sampling occasions this quarter. The 12-month rolling average for TP is 0.4 mg/L. Overall, the plant is deemed to be performing well with respect to TP.

The average nitrate concentration for the quarter is 8.9 mg/L, which is above the compliance limit of 5.0 mg/L. Nitrate values were above the compliance limit on all three sampling occasions this quarter. The 12-month rolling average for nitrate is 4.6 mg/L, which is below the compliance limit. As water temperature greatly reduces the ability of the system to denitrify, achieving compliance with the C of A for nitrate is difficult in the winter months. The lack of denitrification could also be related to low influent CBOD₅ concentrations (less than 40 mg/L for the quarter).

**Reference: Mini Lakes Mobile Home Community
Quarterly Monitoring Program – 1st Quarter 2013**

Since it has been shown that consistent denitrification is difficult to achieve, operations staff need to continue close monitoring and maintenance of the denitrification process. General measures required to maintain denitrification and phosphorus removal include, but are not limited to:

- Emptying and cleaning of the denitrification chambers, including addition of new media in areas previous left empty. Effluent results have improved in 2013 compared to the same quarter in 2012.
- Recording of sludge depths on a weekly or more frequent basis, and prompt sludge removal (as necessary) in all clarifiers and the effluent pump chamber.
- Regular denitrification media maintenance cleanings and removal of floatable material from the denitrification chambers.
- Use of the RBC feed-forward valves to the maximum extent possible to improve soluble carbon availability and lower dissolved oxygen in the denitrification zone.
- Daily inspections and regular cleaning of all clarifier weirs.
- Balancing of chemical dosing flows; conceptual plans have been prepared and reviewed by AWC for new chemical dosing facilities in accordance with the existing C of A.

The recommended long term plan is to provide better sludge management by partitioning the existing primary clarifier into two chambers, one for primary clarification and sludge storage, and the second for primary effluent polishing. This will resolve issues with sludge carryover and washout, and allow much greater flexibility in recirculating sludge and effluent in order to optimize nitrogen removal. Current issues with sludge carryover are related to the buildup of sludge in the primary clarifier and washout during high flow events. Additionally, operations staff have indicated that the return sludge is deposited at the discharge end, contributing to excessive buildup prior to the rotating biological contactor trains, and thus there is a higher potential for carryover. There is also no weir/baffle assembly in this clarifier to prevent sludge from entering the clarifier overflow. The proposed upgrades are as follows:

- Primary clarifier upgrades including:
 - a partition wall separating the chamber into two compartments, an inlet and sludge storage compartment having a working volume of 73 m³ and a primary effluent compartment having a working volume of 23 m³.
 - an inlet baffle plate.
 - an outlet weir box and baffle plate.
 - extension of all sludge recirculation piping to inlet chamber.
- Denitrification inlet modifications to allow crossover between trains for redundancy and option to run on one RBC train and two tertiary trains.
- One new effluent pump and piping for effluent recirculation to primary clarifier inlet.
- New chemical building as previously approved.

Implementation of these upgrades will be difficult and complex due to the need to bypass the clarifier during installation using an offline tank; however, these upgrades would improve the operational efficiency of the plant, resistance to upsets (e.g., denitrification media plugging), and provide savings related to reduced sludge haulage. These upgrades will require an amendment to the current approval. Stantec has applied on behalf of Mini Lakes for an amended Environmental Compliance Approval (ECA) as of December 6, 2012 and we expect approval and construction to begin this summer. With the approval amendment, we also propose

**Reference: Mini Lakes Mobile Home Community
Quarterly Monitoring Program – 1st Quarter 2013**

to re-rate the wastewater treatment plant based on the current Draft Plan of Subdivision and subsequently revise the nitrate limit upwards to 8.0 mg/L based on lower long term projected nitrate loadings than originally designed.

It must be noted that these plans are ongoing and subject to approval and financial resources, though Mini Lakes already has approval and funding in place for the chemical building upgrades. MLRA is committed to resolving this situation, and additional monitoring of initial repairs to the denitrification media system will continue in the near term.

Results for dissolved oxygen (DO) this quarter are well above optimal values at an average of 7.3 mg/L, where the objective is to be below 2 mg/L to ensure reliable denitrification. The effluent DO concentrations are higher than in the previous quarter which showed DO effluent concentrations as low as 3.06 mg/L. This is primarily related to colder water temperatures which increase the DO saturation concentration. An assessment of historic nitrate data appears to show more of a correlation between seasonal temperature variation and nitrate reduction than DO concentration; however, nitrate performance appears to improve with lower DO levels.

The remaining parameters shown on Table 1 have been sampled in accordance with the C of A; however, they do not have compliance limits. The results for these additional parameters are deemed to be acceptable and are reasonable for this type of wastewater treatment plant. Results for effluent *E. coli* this quarter show an average of 21,367 CFU/100 mL. Results for pH this quarter are consistent with expected values at an average of 7.4.

With respect to wastewater flows this quarter, the average flow per unit estimate is approximately 446 L/unit/day. This is higher than the average per unit flow over the past three (3) years of approximately 400 L/unit/day, where the design average is 540 L/unit/day and the maximum daily design flow is 800 L/unit/day. Estimated per unit flows have not exceeded the daily design basis this quarter. The average day flow was only 44.8% of the design average day flow of 216 m³/d this quarter, and the maximum day flow never exceeded the wastewater treatment plant maximum day design flow of 320 m³/d. Based on these trends and the fact that the development as a whole is approximately 65% built out based on original design (and 90% based on current Draft Plan of Subdivision application for 292 total units), it is our opinion that infiltration and inflow are not an issue at this time. The average daily flows for each month, and the corresponding estimated number of occupied homes, is given below.

Table 2: Sewage Flow Volumes

Month (2013)	Average Daily Flow (L/d)	Maximum Daily Flow (L/d)	Estimated Number of Occupied Homes	Estimated Flow per Unit (L/d)
January	94,603	141,590	215	440
February	96,027	121,900	215	447
March	99,432	135,800	220	452

In addition to the monitoring requirements for the wastewater treatment plant, surface water and groundwater have been monitored for the development. Please find attached the letter report from CH2M Hill Canada Limited outlining the subsurface and groundwater monitoring results.

Stantec

April 29, 2013
Ms. Karen Landry, CAO/Clerk
Page 4 of 4

**Reference: Mini Lakes Mobile Home Community
Quarterly Monitoring Program – 1st Quarter 2013**

We trust this meets with your requirements. Should you have any questions, please contact the undersigned.

Sincerely,

STANTEC CONSULTING LTD.



Miles MacCormack, P. Eng.
Project Manager, Water
Tel: (519) 585-7499
Fax: (519) 579-8806
miles.maccormack@stantec.com

Attachment

- c. Ms. Dianne Paron, Mini Lakes Residents Associated (letter only)
- Ms. Lynn Zettle, Region Business Banking Centre (letter only)
- Mr. Ed McGurk, CH2M Hill Canada Limited (letter only)
- Ms. Amanda Pepping, Gamsby and Mannerow Limited (attachment)
- Ms. Lynnette Armour, Ministry of the Environment - Guelph District Office (attachment)
- Mr. Stan Denhoed, Harden Environmental Services Ltd. (attachment)



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JUN 03 2013

Township of Puslinch



Township of Puslinch
 RR3, 7404 Wellington Road 34
 Guelph, ON N1H 6H9

Attention: Ms. Karen Landry
 CAO/Clerk

May 31, 2013

Our File: 199-024
CLERK'S DEPARTMENT

TO	
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Council Agenda	June 19/13
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Re: Mini Lakes Wastewater Treatment
 Plant Effluent Monitoring Report,
 1st Quarter (2013)

Dear Ms. Landry:

We have reviewed the "Mini Lakes Mobile Home Community Quarterly Monitoring Program – 1st Quarter 2013" report, as submitted by Stantec Consulting Limited on April 29, 2013. We are pleased to provide our comments for your consideration.

The following table summarizes the average effluent quality for the first quarter (Q1) (column 2), the year to date (YTD) average (column 3), the 12-month rolling average (column 4), the previous YTD average (2012) (column 5) and the MOE Certificate of Approval (C of A) compliance limits (column 6).

1	2	3	4	5	6
Parameters (mg/L)	Q4 Avg., (Jan. 1 to Mar. 31, 2013)	YTD Avg., (Jan. 1 to Dec. 31, 2013)	Twelve-Month Rolling Avg., (Apr. 1, 2012 to Mar. 31, 2013) ^a	Previous YTD Avg. (Jan. 1 to Dec. 31, 2012)	Compliance Limit
CBOD ₅ ^b	8.7	8.7	10.6	11.5	20.0
TSS ^c	17.3	17.3	14.2	15.0	20.0
TP ^d	0.6	0.6	0.4	0.43	1.0
NO ₃ ^e	8.9	8.9	4.6	4.7	5.0

- a. Condition 3.1 of the MOE C of A, average is defined as "any twelve (12) consecutive calendar months"
- b. CBOD₅ = 5 day Carbonaceous Biological Oxygen Demand
- c. TSS = Total Suspended Solids
- d. TP = Total Phosphorous
- e. NO₃ = Nitrate

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The MOE C of A requires that plant effluent be sampled and analyzed on a monthly basis for each of the parameters defined above. As a minimum, plant effluent was sampled monthly for all parameters during this quarter.

Effluent CBOD₅

The average CBOD₅ effluent concentration for this quarter was 8.7 mg/L. This is below the C of A compliance limit of 20.0 mg/L for this parameter. Effluent CBOD₅ concentrations were below the compliance limit on all three sampling occasions during this quarter. The twelve month rolling average for this parameter is in compliance at 10.6 mg/L, demonstrating that the plant is performing well with respect to CBOD₅.

Effluent TSS

The average TSS effluent concentration for this quarter was 17.3 mg/L. This is below the C of A compliance limit of 20.0 mg/L for this parameter. Effluent TSS concentrations were below the compliance limit on two of the three sampling occasions this quarter. The twelve month rolling average for this parameter remains below the compliance limit at 14.2 mg/L, demonstrating that the plant is generally performing well with respect to TSS.

Effluent TP

The average TP effluent concentration for this quarter was 0.6 mg/L. This is well below the C of A compliance limit of 1.0 mg/L for this parameter. Effluent TP concentrations were below the compliance limit on all three sampling occasions this quarter. The twelve month rolling average for this parameter is in compliance at 0.4 mg/L, demonstrating that the plant is performing well with respect to TP.

Effluent NO₃

The average effluent NO₃ concentration for this quarter was 8.9 mg/L which is above the C of A compliance limit of 5.0 mg/L for this parameter. Effluent NO₃ concentrations were above the compliance limit on all three sampling occasions this quarter; however the twelve month rolling average is 4.6 mg/L, which is below the compliance limit. Historically it has proved difficult to achieve compliance with the C of A nitrate limit during the colder winter months, as reduced water temperature reduces the ability of the system to denitrify. It should be noted that nitrate effluent results have generally improved over the preceding year. This is believed to be the result of increased operation and maintenance measures.

The long term strategy for improving plant performance is to provide better sludge management capabilities by partitioning the existing primary clarifier into two chambers, one to be used for primary clarification and sludge storage and the other for effluent polishing. It is anticipated that this will resolve issues with sludge carryover and improve sludge and effluent recirculation abilities in order to optimize nitrogen removal.

On December 6, 2012 Stantec applied on behalf of Mini Lakes for an amendment to the Environmental Compliance Approval (ECA) for the proposed sludge management improvements. Approval and



construction is expected this summer. The application for amendment also includes a proposal to re-rate the plant based on the current Draft Plan of Subdivision and revise the nitrate limit upwards to 8.0 mg/L.

Average Sewage Flows

The average daily sewage flow rate to the plant ranged between 94.6 m³/d and 99.4 m³/d during this quarter. This is well below the plant's design capacity of 216 m³/d. The estimated number of occupied homes ranged between 215 and 220 this quarter, which represents approximately 75% of units in the current Draft Plan of Subdivision application.

The estimated average daily flow per home ranged between 440 L/d and 452 L/d, below the design average daily flow per home of 540 L/d.

We trust this is sufficient for your requirements. If you have any questions please call.

Yours truly,

GAMSBY AND MANNEROW LIMITED

Per:



Amanda Pepping, P.Eng.

AP/ar

cc: Ms. Dianne Paron, Mini Lakes Residents Association
Ms. Lynnette Armour, Ministry of the Environment – Guelph District Office
Mr. Stan Denhoed, Harden Environmental Services Ltd.
Mr. Miles McCormick, Stantec Consulting Ltd.

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Stantec

Stantec Consulting Ltd.
49 Frederick Street
Kitchener ON N2H 6M7
Tel: (519) 579-4410

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APR 02 2013

Township of Puslinch

March 27, 2013
File: 1611 07544/31

Township of Puslinch
RR#3
County Road 34 Aberfoyle
Guelph ON N1H 6H9

Attention: Ms. Brenda Law

Dear Ms. Law:

**Reference: Mini Lakes Mobile Home Community
2012 Operation and Maintenance Report**

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INTRODUCTION

The Mini Lakes Mobile Home Community is a private community located in the Hamlet of Aberfoyle, Township of Puslinch, in the County of Wellington, as shown on Figure 1.

The site was originally zoned for seasonal use; however, it was re-zoned in March 2000 to allow for a maximum of 400 year round mobile home and modular units. In conjunction with re-zoning requirements, a new sewage treatment and disposal system was required.

Amended Certificate of Approval (C of A) Number 6792-6U8JKA (October 2006) for the sewage treatment and disposal system has now been superseded by Amended C of A Number 2113-7M8RBP (February 18, 2009). The current C of A was amended by the Ministry of the Environment (MOE) to include and consolidate the existing onsite sewage collection system and to modify the monitoring program as requested by Mini Lakes Residents Association (MLRA). Monitoring for 2012 has been completed as per the requirements under the current C of A as provided in Enclosure 1. In addition, an Operation and Maintenance Agreement (Agreement), provided as Enclosure 2, was entered into between MLRA (formerly Mini Lakes Campers Association) and the Township of Puslinch (Township). As a condition of the Agreement, an annual Operation and Maintenance Report is required and is detailed in the following sections.

In November 2012, an application for amendment to C of A Number 2113-7M8RBP was submitted to the MOE. The application proposed upgrades to the wastewater treatment plant's primary clarifier, revisions to reflect the average daily flow of 158 cubic metres per day (m³/d), remove surface water sampling stations SW2 and SW7 from the monitoring program, revise the nitrate limit to 8.0 milligrams per litre (mg/L), and change the definition of non-compliance from "during any 12 consecutive calendar months" to "during any calendar year".

SEWAGE TREATMENT UNIT

Sewage from the community is treated by a dual-train, communal aerobic sewage treatment unit. This unit is a Rotating Biological Contactor (RBC) with denitrification and phosphorus reduction capabilities. A primary settlement tank precedes the RBC unit and sewage effluent is discharged from final clarifiers (following treatment in the RBC) to a Shallow Buried Trench (SBT) disposal system. The RBC system commenced operation in January 2001. Due to the nature of the development, the number of homes occupied fluctuates throughout the year. The corresponding flows generally peak in the summer and decline in the winter.

**Reference: Mini Lakes Mobile Home Community
 2012 Operation and Maintenance Report**

The communal sewage collection and treatment system was operated and maintained by American Water Canada Corporation (AWC) under contract for the entire year covered by this report.

In conformance with the Township confirmation letter dated September 21, 2000, and the Certificate of Insurance, both provided as Enclosure 3, the sewage treatment unit was operated and maintained in 2012 by AWC.

MONITORING REQUIREMENTS

In accordance with the C of A, monthly monitoring of the sewage treatment unit effluent is required. The sewage effluent from the RBC is to be monitored monthly for CBOD₅, Total Suspended Solids (TSS), Total Phosphorus (TP), Total Ammonia Nitrogen (TAN = NH₄⁺ + NH₃), Nitrate Nitrogen (NO₃⁻), Nitrite Nitrogen (NO₂⁻), Total Kjeldahl Nitrogen (TKN), *E. coli*, Dissolved Oxygen (DO), and pH.

MONITORING RESULTS

In accordance with the C of A requirements, Table 1 provides the 2012 monitoring data for the wastewater treatment plant. The annual average concentration for each parameter is listed at the bottom of the table.

Table 1: WWTP Effluent Sampling Results

	Effluent Sampling Parameters										
	CBOD ₅ mg/L	TSS mg/L	TP mg/L	NH ₃ mg/L	NO ₃ mg/L	NO ₂ mg/L	TKN mg/L	TN(calc) mg/L	DO mg/L	<i>E. coli</i> /100mL	pH
Effluent limit	20	20	1.00	na	5.00	na	na	na	na	na	na
Sampling Date											
16-Jan-12	17	24	0.43	2.3			4.6		6.13	13,000	7.27
26-Jan-12					13.00	0.38					
3-Feb-12	10	18	0.53	2.1			4.7		7.34	80,000	7.37
27-Feb-12					6.3	0.44					
6-Mar-12					8.9	0.64					
23-Mar-12	10	21	0.56	0.66			3.7		7.03		7.21
28-Mar-12										640	
2-Apr-12	16	16	0.71	0.64	9.20	0.27	4.5	14.0	7.19	8,800	7.07
16-May-12	5	5	0.36	1	9.10	0.30	4.6	14.0	7.78	7,800	7.28
24-May-12					6.10	0.56					
25-May-12					6.2	1.6					
14-Jun-12	7	12	0.23	4			7.4		8.05	20,000	7.44
21-Jun-12					2.2	0.52					
22-Jun-12					1.30	0.47					
4-Jul-12	13	41	0.77	6.40			8.08		3.82	20,000	7.51
10-Jul-12					0.45	0.89					
11-Jul-12					3.90	2.00					
27-Jul-12					1.40	1.10					

Reference: **Mini Lakes Mobile Home Community
 2012 Operation and Maintenance Report**

	Effluent Sampling Parameters										
	CBOD ₅ mg/L	TSS mg/L	TP mg/L	NH ₃ mg/L	NO ₃ mg/L	NO ₂ mg/L	TKN mg/L	TN(calc) mg/L	DO mg/L	E. coli /100mL	pH
Effluent limit	20	20	1.00	na	5.00	na	na	na	na	na	na
Sampling Date											
10-Aug-12	16	29	0.32	5.80			8.2		1.13	110,000	7.41
20-Aug-12					0.10	0.02					
21-Aug-12					3.70	0.32					
22-Aug-12					3.30	0.38					
23-Aug-12					1.80	0.86					
30-Aug-12		10			5.20	0.45					
7-Sep-12	3	11	0.31	3.80	4.40	0.18	5.5	10.1	7.72	200,000	7.33
26-Oct-12	20	<10	0.25	5.40	4.10	0.21	7.6	11.9	7.19	64,000	7.14
8-Nov-12	8	13	0.34	4.90			8.1		3.06	60,000	7.42
30-Nov-12		<10			3.30	0.37					
5-Dec-12	13	10	0.38	4.30	3.70	0.42	7.8	11.9	7.19	32,000	7.03
Annual Average	11.5	15.0	0.4	3.4	4.7	0.6	6.2	12.4	6.1	51,353.3	7.3
Sample Count	12	14	12	12	21	21	12	5	12	12	12
notes:	- Shaded area exceeds compliance limit. 1. Compliance Limits stipulated in Certificate of Approval for the Sewage System. 2. na - No effluent limits stipulated by Certificate of Approval. 3. YTD - Year to date										

A summary of the 2012 effluent results for parameters with effluent requirements are as follows.

Table 2: WWTP Effluent Quality Summary

Parameter	Compliance Limit	Annual Average
CBOD ₅	20	11.5
TSS	20	15.0
TP	1	0.4
Nitrate Nitrogen	5	4.7

**Reference: Mini Lakes Mobile Home Community
2012 Operation and Maintenance Report**

Plant effluent has generally been sampled and analyzed monthly in 2012 with the exception of nitrate and nitrite, which is sampled more frequently due to ongoing denitrification performance issues. Annual average effluent concentrations for CBOD₅, TSS, and TP, and nitrate were less than their respective effluent limit concentrations for the 2012 reporting period.

The average CBOD₅ concentration for 2012 was 11.5 mg/L, which is below the effluent limit of 20 mg/L. CBOD₅ concentrations were below the effluent limit in all of the 12 samples taken in 2012. Overall, the plant is deemed to have performed very well with respect to CBOD₅ in 2012.

The average TSS concentration for 2012 is 15.0 mg/L, which is below the effluent limit of 20 mg/L. TSS concentrations were below the effluent limit in 10 of the 14 samples taken in 2012. Although TSS does not have an associated Ontario Drinking Water Standards (ODWS) or Provincial Water Quality Objectives (PWQO), it does have the potential to affect the long term performance of the leaching beds, and should continue to be monitored closely given past issues with TSS. Overall, the plant is deemed to have performed well with respect to TSS in 2012.

The average TP concentration for 2012 is 0.4 mg/L, which is below the effluent limit of 1.0 mg/L. TP values were below the effluent limit in all of the 12 samples taken in 2012. The historical average for TP has continued to drop below the compliance limit, and is now 0.67 mg/L. No exceedence of the TP effluent limit has occurred since May 2008. Overall, the plant is deemed to have performed very well with respect to TP in 2012.

The average nitrate concentration for 2012 is 4.7 mg/L, which is below the compliance limit of 5.0 mg/L. Nitrate values were below the compliance limit in 13 of the 21 samples taken in 2012. The wastewater treatment plant was in compliance on a 12-month rolling average basis for nitrate for the second, third, and fourth quarters of the year. The wastewater treatment plant was out of compliance on a 12-month rolling average basis for the first quarter of the year due to high nitrate effluent concentrations in winter/spring of 2011 and 2012. The historical average for nitrate continues to remain below the effluent limit, and is now 4.6 mg/L. Overall, the plant is deemed to have performed satisfactorily with respect to nitrate in 2012.

Since it has been shown that consistent denitrification is difficult to achieve, particularly in the winter, operations staff need to continue close monitoring and maintenance of the denitrification process. General measures required to maintain denitrification and phosphorus removal include, but are not limited to:

- Emptying and cleaning of the denitrification chambers, including addition of new media in areas previous left empty.
- Recording of sludge depths on a weekly or more frequent basis and prompt sludge removal as necessary in all clarifiers and the effluent pump chamber.
- Regular denitrification media maintenance cleanings and removal of floatable material from the denitrification chambers.
- Use of the RBC feed-forward valves to the maximum extent possible to improve soluble carbon availability and lower dissolved oxygen in the denitrification zone.
- Daily inspections and cleaning of all clarifier weirs.

**Reference: Mini Lakes Mobile Home Community
2012 Operation and Maintenance Report**

The following upgrades to the wastewater treatment plant were proposed in the application for amendment to C of A Number 2113-7M8RBP, submitted in November 2012:

- A partition wall separating the chamber into two compartments, an inlet and sludge storage compartment having a working volume of 73 m³ and a primary effluent compartment having a working volume of 23 m³
- An inlet baffle plate
- An outlet weir box and baffle plate
- Extension of all sludge recirculation piping to inlet chamber
- Denitrification inlet modifications to allow crossover between trains for redundancy and option to run on one RBC train and two tertiary trains
- One new effluent pump and piping for effluent recirculation to primary clarifier inlet
- New chemical building as previously approved

The proposed amendment to the C of A also includes re-rating the wastewater treatment plant, based on the current Draft Plan of Subdivision, to 158 m³/d and revising the nitrate limit to 8.0 mg/L based on lower long term projected nitrate loadings than original design.

The status of additional improvement works under previous consideration is generally as follows:

- Replacement of intermediate and final clarifier sludge pumps and scum removal systems due to mechanical issues is currently on hold due to higher priority items detailed above. This would be intended to provide better control of sludge return rates and removal of floating sludge.

It must be noted that these plans are ongoing and subject to approval and financial resources, though Mini Lakes already has approval and funding in place for the chemical building upgrades, and all five wastewater pumping station panels have been replaced as of November 2012. MLRA is committed to resolving this situation, and additional monitoring of initial repairs to the denitrification media system will continue in the near term.

Results for DO in 2012 are above expected values at an average of 6.1 mg/L. An assessment of historic nitrate data appears to show more of a correlation between seasonal temperature variation and nitrate reduction than DO concentration; however, nitrate performance generally appears to improve with lower DO levels.

The remaining parameters shown on Table 1 have been sampled in accordance with the C of A effluent monitoring requirements; however, they do not have corresponding effluent limits. With the exception of consistently elevated coliform results, which are normal in plants without disinfection, the non-regulated parameter concentrations are reasonable and demonstrate an efficiently operating sewage treatment plant.

Reference: Mini Lakes Mobile Home Community
 2012 Operation and Maintenance Report

SEWAGE FLOW VOLUMES

In addition to the effluent quality, the sewage effluent flows were also monitored. The monthly flow data is summarized in Table 3.

Table 3: Sewage Flow Volumes

Month	Recorded Average Daily Flow (L/d)	Maximum Daily Flow (L/d)	Number of Units Occupied (estimated)	Average Flow per Home (L/d)	Total Monthly Flow (L)	Minimum Daily Flow (L/d)
January	93,278	131,670	215	434	2,891,610	39,850
February	90,095	115,310	210	429	2,522,670	18,230
March	83,931	105,160	215	390	2,601,850	37,290
April	91,093	112,600	225	405	2,732,800	53,500
May	96,618	130,440	240	403	2,995,160	70
June	102,979	146,000	250	412	3,089,370	33,510
July	96,480	132,020	260	371	2,990,890	25,640
August	94,570	136,660	260	364	2,931,680	59,340
September	89,076	120,090	250	356	2,672,290	18,750
October	96,974	150,300	235	413	3,006,180	37,400
November	97,187	135,480	225	432	2,915,610	30,870
December	88,846	132,950	220	404	2,754,240	47,480
Average =	93,427	129,057	234	401	2,842,029	33,494
High range =	102,979	150,300	260	427	3,089,370	59,340
Low range =	83,931	105,160	210	356	2,522,670	70

The as-recorded daily flows to effluent disposal ranged from 18,230 L/d (70 L/d was recorded in May but represents inaccurate data due to power outage) to 150,300 L/d. On a monthly basis, average daily flows ranged from 83,931 L/d to 102,979 L/d. The overall average daily flow was 93,427 L/d, up 1.2% from last year. The maximum recorded monthly flow was 3,089,370 L and occurred in June 2012. Historically, there has been a seasonal variation in overall sewage flows and average sewage flow per home; however, overall flows and flows per unit were relatively consistent in 2012. Although higher per unit flows in wet period conditions appears to correspond to an increase in infiltration and inflow during these periods, total flow has remained within the design parameters.

The average sewage flow rate per unit is 401 L/unit/day. This is consistent with the average per unit flow over the previous three years of 399 L/unit/day, where the design average is 500 L/unit/day and the design maximum allowance is 800 L/unit/day. The overall plant maximum daily flow of 320 m³/d has never been exceeded. The average daily flow was only 43.2% of the daily design average flow rate of 216 m³/d. Based

**Reference: Mini Lakes Mobile Home Community
 2012 Operation and Maintenance Report**

on these trends and the fact that the development as a whole is approximately 65% built out (80% based on Draft Plan of Subdivision application), it is our opinion that infiltration and inflow is not an issue at this time.

SYSTEM MAINTENANCE

The operation and maintenance of the sewage treatment unit has been performed by AWC as of November 2004. Regular maintenance of the treatment unit included:

Table 4: System Maintenance Summary

Plant Area/Equipment	Activity
Lift Stations	<ul style="list-style-type: none"> • Obstructions removed and floats cleaned, as necessary. • Sludge removed from all lift stations as required. • Floats adjusted as required; lag float in LS #5 repaired. • Start control relay replaced in LS #5. • Replaced a fuse at LS#5. • Electrical panels replaced at all lift stations. • Rebuilt pump #2 in LS #5.
Primary Settling Tank	<ul style="list-style-type: none"> • Sludge depths recorded on an ongoing basis. • Sludge removed by Weber Septic as necessary.
Biological Contactors	<ul style="list-style-type: none"> • Greased bearing as per manufacturer's instructions. • New motor installed on RBC #1.
Intermediate Clarifiers	<ul style="list-style-type: none"> • Sludge depths recorded on an ongoing basis. • Weirs checked frequently for blockages. • Check valves cleaned on a regular basis.
Denitrification Tanks	<ul style="list-style-type: none"> • Weirs checked for blockages. • Floatable material and sludge removed on an ongoing basis.
Sludge Management	<ul style="list-style-type: none"> • Weekly sludge measurements. • Sludge return pump run times adjusted as required. • Check valves cleaned on return pumps.
Final Clarifiers	<ul style="list-style-type: none"> • Weirs checked for blockages. • Check valves, pumps cleaned as required.
Effluent Pump Chambers	<ul style="list-style-type: none"> • Chambers pumped out as necessary to maintain low sludge depths. • Cleaned intakes and 'y' strainers on all pumps. • Effluent pump #3 motor and pump head replaced.
Chemical Systems - Alum - Carbon Source	<ul style="list-style-type: none"> • Chemical tanks, lines cleaned and replaced as required. • Rebuilt 4-way valve on alum pump discharge.
Subsurface Disposal System	<ul style="list-style-type: none"> • Some flushing conducted.
Other	<ul style="list-style-type: none"> • Annual alarm system verification conducted. • Flow meters calibrated. • Some areas of sanitary line power washed. • New sewage collection system maps created.

Stantec

March 28, 2013
Ms. Brenda Law
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**Reference: Mini Lakes Mobile Home Community
2012 Operation and Maintenance Report**

ENVIRONMENTAL/OPERATING PROBLEMS AND MITIGATIVE MEASURES

A monthly summary of environmental/operating problems and mitigative measures by AWC is presented as follows:

February 2012

AWC responded to Lift Station #3 high level alarm on February 26, 2012. Weber Septic was called in to power wash the collection system. Effluent pump #3 tripped out later the same day. The pump was manually run to bring down chamber levels and reset to auto operation on February 27, 2012.

April 2012

AWC operations staff responded to a final effluent pump #4 alarm on April 7, 2012. The pump was reset and left offline overnight.

June 2012

There were minor issues with temporary RBC#1 motor. These were eliminated when the new motor was installed.

September 2012

There was a brief problem with effluent pump #2 not recording data properly. This was rectified by Summa Engineering.

December 2012

RBC #2 go switched failed. The new switch was ordered and is expected in early 2013. Pump #1 in LS #2 lost a bushing. The LS is currently set up to run with only one pump until a replacement can be obtained and installed.

The wastewater treatment plant is currently not in conformance with the specific C of A requirements for chemical storage. In order to achieve conformance with the C of A, a 900 L carbon tank and a 2,300 L alum tank, complete with spill containment facilities are recommended. Funding for this project is approved, and Stantec is working with MLRA with the intent of implementing this project in 2013.

AWC has a number of recommendations to improve the overall system (efficiency, health and safety). They are as follows:

- Install wireless alarm transmitters at the sewage pump stations (scheduled for 2013).
- Improved chemical delivery system for reduced materials handling (scheduled for 2013).
- Improve sludge management and increase recirculation rates (scheduled for 2013, pending C of A amendment application and approval).
- Install permanent wiring for alum pump (scheduled for 2013).

The above recommendations are under consideration by Stantec on behalf of AWC and MLRA. Implementation of some or all of these measures will be dependent on approvals, priority level, and funding

**Reference: Mini Lakes Mobile Home Community
2012 Operation and Maintenance Report**

availability. It is understood that a number of these recommendations as noted above are expected to be implemented in the 2013 Wastewater Treatment Plant Upgrades.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the monitoring program discussed above, the following points are concluded:

- The sewage treatment unit sampling results indicate compliance with the C of A effluent limits on an annual average basis for all parameters. The wastewater treatment plant was in compliance on a 12-month rolling average basis for nitrate for all of 2012 with the exception of the first quarter, due to high nitrate effluent concentrations in winter/spring of 2011 and 2012. This situation has been reported to the MOE; however, operational changes and upgrades to resolve the nitrate issue are ongoing.
- The surface water sampling results have indicated no adverse impacts to surface water quality.
- The groundwater sampling results indicate groundwater quality has not been adversely impacted by the subsurface sewage disposal system, and that the nitrate concentrations leaving the property comply with the RUP objective:
 - It is unclear why DOC at up-gradient monitors MW1 and MW9 appear to be trending upwards; these have historically always been elevated for DOC, and likely indicate naturally high DOC levels associated with the adjacent wetlands or offsite impacts.
 - It is unclear why one sample from MW2 contained a high concentration (81 mg/L) of DOC; this is considered an anomalous value.
 - Elevated TP at the recently reconstructed MW10 is deemed to be due to construction impacts and is expected to recede over time.

It is therefore recommended that:

- The sewage treatment unit, surface water, and groundwater monitoring program continue in accordance with the C of A without modification until such time as the Amended ECA (under review) is issued.
- The mitigation plans presented in this report be implemented to improve operation, process reliability, and decrease effluent nitrate concentrations, including the following key measures planned for 2013 (pending approval of the application for amendment to C of A Number 2113-7M8RBP, submitted in November 2012):
 - A partition wall separating the chamber into two compartments, an inlet and sludge storage compartment having a working volume of 73m³ and a primary effluent compartment having a working volume of 23 m³
 - An inlet baffle plate
 - An outlet weir box and baffle plate
 - Extension of all sludge recirculation piping to inlet chamber

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March 28, 2013
Ms. Brenda Law
Page 10 of 10

**Reference: Mini Lakes Mobile Home Community
2012 Operation and Maintenance Report**

- Denitrification inlet modifications to allow crossover between trains for redundancy and option to run on one RBC train and two tertiary trains
 - One new effluent pump and piping for effluent recirculation to primary clarifier inlet
 - Revise the effluent nitrate criteria from 5 mg/L to 8 mg/L based on the revised maximum approved development build-out from 400 units to 329 units.
 - Revise the compliance criteria to annual average (average of 12 monthly averages) in the year being monitored, as opposed to previous 12 months (i.e., omit the 12-month rolling average compliance provision).
- Provide new chemical building and upgrade chemical dosing systems as per the existing C of A.

All of which is respectfully submitted,

STANTEC CONSULTING LTD.



Miles MacCormack, P. Eng.
Project Manager, Water
Tel: (519) 585-7499
Fax: (519) 579-8806
miles.maccormack@stantec.com

Enclosure: 1. Certificate of Approval – Sewage
 2. Operations and Maintenance Agreement
 3. Letters and Insurance

c. President, Mini Lakes Residents Associated (enclosure)
 Ms. Lynn Zettle, Regional Business Banking Centre (enclosure)



Gamsby and Mannerow
ENGINEERS

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JUN 03 2013

Township of Puslinch



Township of Puslinch,
RR#3, 7404 Wellington Road 34,
Guelph, ON N1H 6H9.

Attention: Ms. Karen Landry
CAO/Clerk

CLERK'S DEPARTMENT	
May 31, 2013	
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Council Agenda	June 19/13
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Re: Mini Lakes Mobile Home Community
2012 Annual Operation & Maintenance
Report

Dear Ms. Landry:

We have reviewed the '2012 Operation and Maintenance Report' for the above facility, as submitted by Stantec Consulting Limited, dated March 27, 2013. We are pleased to provide our comments for your consideration.

The Mini Lakes Mobile Home Community is permitted a maximum of 400 year round units based on the original design or 305 based on the current draft plan of subdivision application. The number of homes occupied varies throughout the year as well as the corresponding sewage flows to the wastewater treatment plant. Currently, the wastewater treatment plant is rated for an average daily flow of 216 m3/d with the effluent compliance limits stipulated in the Table below.

EFFLUENT QUALITY:

The following Table summarizes the average effluent quality for the year 2012 presented as year to date (YTD) average (column 2), previous YTD average (2011) (column 3) and Ministry of the Environment (MOE) Certificate of Approval (C of A) Compliance Limit (column 4).

1	2	3	4
Parameters (mg/L)	YTD Avg., (Jan. 1, 2012 to Dec.31, 2012) ^a	Previous YTD Avg., (Jan. 1, 2011 to Dec.31, 2011) ^a	C of A Compliance Limit
CBOD ₅ ^b	11.5	10.8	20.0
TSS ^c	15.0	13.7	20.0
TP ^d	0.4	0.34	1.0
NO ₃ ^e	4.7	6.1	5.0

- a. Year to date (YTD) average, as reported by Stantec Consulting Ltd
- b. CBOD₅ = 5 day Carbonaceous Biological Oxygen Demand
- c. TSS = Total Suspended Solids
- d. TP = Total Phosphorous
- e. NO₃ = Nitrate

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The YTD average concentrations for CBOD₅, TSS, TP and NO₃ are all within C of A compliance limits for the year 2012. Periodic exceedances of TSS were observed in January, March, July and August. Exceedances of NO₃ were observed in January, February, March, April, May and August.

Plant effluent was sampled monthly during 2012, with the exception of nitrate and nitrite which were sampled more frequently as the result of ongoing denitrification issues.

CBOD₅ and TP concentrations were below the effluent limit in all 12 samples taken during 2012. Overall the plant is considered to have performed very well in terms of CBOD₅ and TP removal during 2012.

TSS concentrations exceeded the effluent limit in four of the 14 samples taken in 2012. The average TSS concentration of 15.0 mg/L was below the effluent limit of 20 mg/L however. TSS has the potential to affect the long term performance of leaching beds and should therefore be monitored closely given past issues with TSS. Overall the plant is considered to have performed well with respect to TSS during 2012.

Average nitrate as nitrogen concentration, although below the compliance limit at 4.7 mg/L, is approaching the compliance limit of 5.0 mg/L. Nitrate values exceeded the effluent limit on eight of the 21 sampling visits during 2012. High nitrate concentrations during the winter of 2011 and spring of 2012 meant that the plant was out of compliance on a 12-month rolling average basis for the first quarter of 2012. The reduction in denitrification during the winter and spring is attributed to colder temperatures which impact the denitrification process. Operations staff members continue to closely monitor nitrate levels, and are undertaking additional operational and maintenance procedures required to maintain denitrification and phosphorus removal. Overall the plant is deemed to have operated satisfactorily with respect to nitrate in 2012.

PROPOSED UPGRADES:

In November 2012 Stantec applied on behalf of Mini Lakes for an amendment to current amended C of A (now known as an Environmental Compliance Approval (ECA)) for various upgrades, including proposed sludge management improvements. Approval and construction of these upgrades is expected this summer. The application for amendment also includes a proposal to re-rate the plant based on the current the Draft Plan of Subdivision to 158 m³/d and revise the nitrate limit upwards to 8.0 mg/L, based on lower long term projected nitrate loadings than originally designed.

Other upgrade plans are ongoing and subject to approval and financial resources. The community currently has approval and funding in place for chemical building upgrades, and all five wastewater pumping station panels were replaced as of November 2012. Additional monitoring of initial repairs to the denitrification media system will continue in the near term, with improvements to the control of sludge return rates, and the removal of floating sludge remaining a priority. The replacement of intermediate and final clarifier pumps and scum removal systems due to mechanical issues are currently on hold due to the higher priority nature of the sludge management improvements.



SEWAGE FLOWS:

From Table 3 of the 2012 Operation and Maintenance Report, the monthly average daily flow ranged from 83.9 m³/d to 102.9 m³/d during 2012. The monthly average daily flow for 2012 was 93.4 m³/d which represents approximately 43% of the current rated capacity (216 m³/d) and 59% of the proposed rated capacity (158 m³/d). The monthly average daily flow of 93.4 m³/d is similar compared to 2011.

The estimated number of homes occupied during 2012 ranged between 210 and 260 units. The estimated average daily flow per home ranged between 356 L/d and 427 L/d with an overall average of 401 L/d. This is consistent with the average per unit flow over the past three years of 399 L/unit/day, and is below the design average of 500 L/unit/day.

The overall plant maximum daily flow rate of 320 m³/d has never been exceeded, even during periods of high occupancy and wet periods. Based on the above trends and the fact that the development is now 65% built-out (80% based on the Draft Plan of Subdivision Application), infiltration and inflow is not considered to be an issue at this time.

SYSTEM MAINTENANCE:

Table 4, in the annual report summarizes the system maintenance during the year. For the most part the maintenance is general housekeeping items normally found in the operation of a wastewater treatment plant and sewage collection system.

Key maintenance items conducted during 2012 included the replacement of the Effluent Pump #3 motor and pump head, the rebuild of a 4-way valve on the alum pump discharge, and the creation of new sewage collection system maps.

ENVIRONMENTAL/OPERATING PROBLEMS AND MITIGATION MEASURES:

Operational problems during 2012 mostly involved small issues with pumps and rotating biological contactors (RBCs), which were resolved and have not since recurred. Operational issues included a high level alarm for Lift Station #3, which required the power washing of the collection system; problems with Effluent Pump #3, Effluent Pump #4, and data recording for Effluent Pump #2; and issues with a temporary motor for RBC #1. Issues which occurred in December 2012 and have not been resolved as yet include a failed switch on RBC #2, and a lost bushing on Pump #1 in Lift Station #2. Stantec reports that these issues were to be resolved in early 2013.

CHEMICAL STORAGE CONTAINMENT REQUIREMENTS:

As reported by Stantec, the wastewater treatment plant is currently out of compliance with the C of A requirements for chemical storage. In order to achieve conformance with the C of A, a 900 L carbon tank and 2300 L alum tank, complete with spill management facilities, are recommended. Stantec report that they are working with the Mini Lakes Residents Association to implement this project during 2013.



OTHER SYSTEM IMPROVEMENT:

American Water Canada Corporation (AWC), the system operator, has identified a number of recommendations to improve the overall system. These include:

- Installation of wireless alarm transmitters at the sewage pump stations
- Improved chemical delivery system for reduced materials handling
- Improved sludge management and increased recirculation rates (scheduled for 2013, pending C of A amendment application and approval)
- Installation of permanent wiring for the alum pump

These recommendations are under consideration by the owner, operators and Stantec. Implementation will depend on evaluation, priority levels and funding availability.

SUMMARY:

Based on the information provided in the '2012 Annual Operation and Maintenance report', the Mini Lakes wastewater treatment plant effluent met the MOE (C of A) compliance limits for all compliance parameters on an annual average basis during 2012. The wastewater treatment plant was in compliance on a 12-month rolling average basis for nitrate for all of 2012 with the exception of the first quarter. The situation has been reported to the MOE and operational changes and upgrades to resolve the nitrate issues are ongoing.

We recommend that;

1. The operators continue to closely monitor effluent parameters on a weekly or biweekly basis in 2013 and take corrective action if the effluent is approaching the C of A limits.
2. The owner and operators continue to implement the general measures outlined in the Stantec annual report to maintain the denitrification process.
3. The operators continue to report average daily flow, maximum daily flow and estimated number of occupied homes for each month in the quarterly reports. The estimate of occupied homes should include all occupied homes contributing sewage flows to the wastewater treatment plant.
4. The owner and operators take appropriate action to bring the wastewater treatment plant into compliance with respect to C of A requirements for chemical storage.
5. The owner is to provide an update to the Township on how they plan to implement the operator's recommendations to improve system efficiency and health and safety issues as identified in the Stantec report.



We trust this is sufficient for your requirements. If you have any questions please do not hesitate to contact us.

Yours truly,

GAMSBY AND MANNEROW LIMITED

Per:



Amanda Pepping, P.Eng.

AP/ar

cc: Ms. Dianne Paron, Mini Lakes Residents Association
Ms. Lynnette Armour, Ministry of the Environment – Guelph District Office
Mr. Stan Denhoed, Harden Environmental Services Ltd.
Mr. Miles McCormick, Stantec Consulting Ltd.

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