6.1(a)

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

June 12, 2014

RECEIVED
JUN 12 2014
Township of Puslinch

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

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 May 2014. As indicated, there were no exceedences to report in this month.

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

Sincerely,

Ron Van Ooteghem
Site Manager

CLERK'S DEPARTMENT	
TO S.D. June 13/14.	
Copy	
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For Your Information	
Council Agenda	
File	

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

Monthly Reporting
Mill Creek Aggregates Pit
May 2014

Date	DP21 (mASL)	Threshold Value (mASL)	Exceedance
9-May-14	305.97	305.60	NO
15-May-14	306.02	305.60	NO
22-May-14	305.98	305.60	NO
29-May-14	305.92	305.60	NO

Date	BH13 (mASL)	DP21 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
9-May-14	306.53	305.97	0.56	0.11	NO
15-May-14	306.53	306.02	0.51	0.11	NO
22-May-14	306.50	305.98	0.52	0.11	NO
29-May-14	306.43	305.92	0.51	0.11	NO

Date	DP17 (mASL)	Threshold Value (mASL)	Exceedance
9-May-14	305.34	305.17	NO
15-May-14	305.39	305.17	NO
22-May-14	305.36	305.17	NO
29-May-14	305.32	305.17	NO

Date	BH92-12 (mASL)	DP17 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
9-May-14	305.62	305.34	0.28	0.14	NO
15-May-14	305.64	305.39	0.25	0.14	NO
22-May-14	305.62	305.36	0.26	0.14	NO
29-May-14	305.58	305.32	0.26	0.14	NO

Date	DP3 (mASL)	Threshold Value (mASL)	Exceedance
9-May-14	304.85	304.54	NO
15-May-14	304.95	304.54	NO
22-May-14	304.88	304.54	NO
29-May-14	304.87	304.54	NO

Date	DP6 (mASL)	DP3 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
9-May-14	305.78	304.85	0.93	0.73	NO
15-May-14	305.84	304.95	0.89	0.73	NO
22-May-14	305.80	304.88	0.92	0.73	NO
29-May-14	305.76	304.87	0.89	0.73	NO

Date	DP2 (mASL)	Threshold Value (mASL)	Exceedance
9-May-14	304.27	303.69	NO
15-May-14	304.34	303.69	NO
22-May-14	304.33	303.69	NO
29-May-14	304.32	303.69	NO

Date	BH92-27 (mASL)	DP2 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
9-May-14	305.02	304.27	0.75	0.34	NO
15-May-14	305.10	304.34	0.76	0.34	NO
22-May-14	305.16	304.33	0.83	0.34	NO
29-May-14	305.15	304.32	0.83	0.34	NO

Date	DP1 (mASL)	Threshold Value (mASL)	Exceedance
9-May-14	304.38	303.97	NO
15-May-14	304.45	303.97	NO
22-May-14	304.45	303.97	NO
29-May-14	304.45	303.97	NO

Date	BH92-29 (mASL)	DP1 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
9-May-14	305.35	304.38	0.97	0.17	NO
15-May-14	305.31	304.45	0.86	0.17	NO
22-May-14	305.37	304.45	0.92	0.17	NO
29-May-14	305.38	304.45	0.93	0.17	NO

Date	DP5C (mASL)	Threshold Value (mASL)	Exceedance
9-May-14	303.31	302.86	NO
15-May-14	303.37	302.86	NO
22-May-14	303.32	302.86	NO
29-May-14	303.29	302.86	NO

Date	OW5-84 (mASL)	DP5C (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
9-May-14	303.68	303.31	0.37	0.30	NO
15-May-14	303.74	303.37	0.37	0.30	NO
22-May-14	303.70	303.32	0.38	0.30	NO
29-May-14	303.65	303.29	0.36	0.30	NO

Note: There are no excedences to report.

Monthly Reporting
Mill Creek Aggregates Pit
May 2014

								Max. Allowable as per PTTW- Main Pond					
								(Imperial Gallons)					(Litres)
Total Monthly Precipitation (mm):		47.9	Waterloo-Wellington Airport (May Actual)					2,500				per minute	11,365
Total Monthly Normal Precipitation (mm):		85	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 4	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)	Phase 4 Pond Level (mASL)	Exceedance Y/N (BELOW 304.5 mASL)	
1-May-14	0	2550	1,753,815	2,886,436	307.08	NO	306.48	NO	305.48	NO	305.49	NO	
2-May-14	0	0	1,749,855	3,630,152	307.10	NO	306.45	NO	305.48	NO	305.45	NO	
3-May-14	0	0	0	3,629,933	307.10	NO	306.45	NO	305.48	NO	305.45	NO	
4-May-14	0	0	0	3,629,933	307.10	NO	306.45	NO	305.48	NO	305.45	NO	
5-May-14	0	2400	1,766,353	336,553	307.22	NO	306.50	NO	305.42	NO	305.38	NO	
6-May-14	0	2700	1,769,433	0	307.14	NO	306.45	NO	305.40	NO	305.41	NO	
7-May-14	0	3600	1,753,595	0	307.06	NO	306.51	NO	305.40	NO	305.46	NO	
8-May-14	0	6300	1,746,776	1,234,247	307.00	NO	306.50	NO	305.47	NO	305.49	NO	
9-May-14	0	5950	1,737,537	3,780,172	307.00	NO	306.50	NO	305.47	NO	305.46	NO	
10-May-14	0	3125	0	0	307.00	NO	306.50	NO	305.47	NO	305.46	NO	
11-May-14	0	0	0	0	307.00	NO	306.50	NO	305.47	NO	305.46	NO	
12-May-14	0	7013	1,751,175	2,624,453	307.21	NO	306.50	NO	305.47	NO	305.48	NO	
13-May-14	0	6900	1,719,720	0	307.15	NO	306.53	NO	305.51	NO	305.55	NO	
14-May-14	0	3575	1,733,138	3,647,750	307.20	NO	306.53	NO	305.51	NO	305.50	NO	
15-May-14	0	5538	1,733,798	3,723,859	307.25	NO	306.55	NO	305.51	NO	305.53	NO	
16-May-14	0	5475	1,728,298	3,432,180	307.30	NO	306.55	NO	305.51	NO	305.50	NO	
17-May-14	0	0	0	0	307.30	NO	306.55	NO	305.51	NO	305.50	NO	
18-May-14	0	0	0	0	307.30	NO	306.55	NO	305.51	NO	305.50	NO	
19-May-14	0	0	0	0	307.30	NO	306.55	NO	305.51	NO	305.50	NO	
20-May-14	0	6300	1,738,857	0	307.25	NO	306.57	NO	305.51	NO	305.53	NO	
21-May-14	0	7500	1,734,897	0	307.21	NO	306.55	NO	305.51	NO	305.56	NO	
22-May-14	0	5375	1,724,559	852,161	307.21	NO	306.55	NO	305.51	NO	305.56	NO	
23-May-14	0	2975	1,748,096	3,719,240	307.15	NO	306.55	NO	305.51	NO	305.61	NO	
24-May-14	0	0	0	0	307.15	NO	306.55	NO	305.51	NO	305.61	NO	
25-May-14	0	0	0	0	307.15	NO	306.55	NO	305.51	NO	305.61	NO	
26-May-14	0	7500	1,655,489	3,660,728	307.18	NO	306.55	NO	305.58	NO	305.59	NO	
27-May-14	0	5900	1,610,175	3,574,060	307.21	NO	306.57	NO	305.51	NO	305.56	NO	
28-May-14	0	7500	1,734,238	3,673,706	307.23	NO	306.53	NO	305.50	NO	305.50	NO	
29-May-14	0	7500	1,723,679	3,648,190	307.25	NO	306.55	NO	305.44	NO	305.48	NO	
30-May-14	0	1725	1,735,337	0	307.27	NO	306.55	NO	305.42	NO	305.44	NO	
31-May-14	0	0	0	0	307.27	NO	306.55	NO	305.42	NO	305.44	NO	
Total	0	107400	36,348,818	51,683,755									
Avg./ day	0.0	3464.52	1,172,543	1,667,218	307.17	NO	306.52	NO	305.48	NO	305.50	NO	

Note: No exceedences to report.

6.1(b).

CLERK'S DEPARTMENT	
TO S.D - No Comments Except NO	
Copy	
Please Handle	
For Your Information	
Council Agenda	Aug 13/14
File	E13/MIL

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

July 10, 2014

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

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 June 2014. As indicated, there were no exceedences to report 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
June 2014

Date	DP21 (mASL)	Threshold Value (mASL)	Exceedance
6-Jun-14	305.86	305.60	NO
13-Jun-14	305.87	305.60	NO
18-Jun-14	305.87	305.60	NO
26-Jun-14	305.84	305.60	NO

Date	BH13 (mASL)	DP21 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
6-Jun-14	306.34	305.86	0.48	0.11	NO
13-Jun-14	306.36	305.87	0.49	0.11	NO
18-Jun-14	306.37	305.87	0.50	0.11	NO
26-Jun-14	306.31	305.84	0.47	0.11	NO

Date	DP17 (mASL)	Threshold Value (mASL)	Exceedance
6-Jun-14	305.29	305.17	NO
13-Jun-14	305.28	305.17	NO
18-Jun-14	305.26	305.17	NO
26-Jun-14	305.27	305.17	NO

Date	BH92-12 (mASL)	DP17 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
6-Jun-14	305.53	305.29	0.24	0.14	NO
13-Jun-14	305.52	305.28	0.24	0.14	NO
18-Jun-14	305.52	305.26	0.26	0.14	NO
26-Jun-14	305.46	305.27	0.19	0.14	NO

Date	DP3 (mASL)	Threshold Value (mASL)	Exceedance
6-Jun-14	304.85	304.54	NO
13-Jun-14	304.78	304.54	NO
18-Jun-14	304.73	304.54	NO
26-Jun-14	304.71	304.54	NO

Date	DP6 (mASL)	DP3 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
6-Jun-14	305.70	304.85	0.85	0.73	NO
13-Jun-14	305.69	304.78	0.91	0.73	NO
18-Jun-14	305.69	304.73	0.96	0.73	NO
26-Jun-14	305.66	304.71	0.95	0.73	NO

Date	DP2 (mASL)	Threshold Value (mASL)	Exceedance
6-Jun-14	304.31	303.69	NO
13-Jun-14	304.27	303.69	NO
18-Jun-14	304.25	303.69	NO
26-Jun-14	304.30	303.69	NO

Date	BH92-27 (mASL)	DP2 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
6-Jun-14	305.13	304.31	0.82	0.34	NO
13-Jun-14	305.02	304.27	0.75	0.34	NO
18-Jun-14	304.98	304.25	0.73	0.34	NO
26-Jun-14	305.07	304.30	0.77	0.34	NO

Date	DP1 (mASL)	Threshold Value (mASL)	Exceedance
6-Jun-14	304.43	303.97	NO
13-Jun-14	304.38	303.97	NO
18-Jun-14	304.34	303.97	NO
26-Jun-14	304.42	303.97	NO

Date	BH92-29 (mASL)	DP1 (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
6-Jun-14	305.37	304.43	0.94	0.17	NO
13-Jun-14	305.33	304.38	0.95	0.17	NO
18-Jun-14	305.24	304.34	0.90	0.17	NO
26-Jun-14	305.34	304.42	0.92	0.17	NO

Date	DP5C (mASL)	Threshold Value (mASL)	Exceedance
6-Jun-14	303.20	302.86	NO
13-Jun-14	303.18	302.86	NO
18-Jun-14	303.16	302.86	NO
26-Jun-14	303.17	302.86	NO

Date	OW5-84 (mASL)	DP5C (mASL)	Head Difference (m)	Threshold Value (m)	Exceedance
6-Jun-14	303.62	303.20	0.42	0.30	NO
13-Jun-14	303.59	303.18	0.41	0.30	NO
18-Jun-14	303.57	303.16	0.41	0.30	NO
26-Jun-14	303.60	303.17	0.43	0.30	NO

Note: There are no excedences to report.

Monthly Reporting
Mill Creek Aggregates Pit
June 2014

Total Monthly Precipitation (mm):	46.7	Waterloo-Wellington Airport (June Actual)	
Total Monthly Normal Precipitation (mm):	81	Waterloo-Wellington Airport (30-year Normal)	

								Max. Allowable as per PTTW- Main Pond				
								(Imperial Gallons)				(Litres)
								2,500			per minute	11,365
								1,800,000			per day	8,183,000
Date	Below Water Table Extraction (wet tonnes) Phase 2	Below Water Table Extraction (wet tonnes) Phase 4	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)	Phase 4 Pond Level (mASL)	Exceedance Y/N (BELOW 304.5 mASL)
1-Jun-14	0	0	0	0	306.65	NO	306.55	NO	305.49	NO	305.51	NO
2-Jun-14	0	7500	1,697,063	0	307.15	NO	306.55	NO	305.49	NO	305.51	NO
3-Jun-14	0	7500	1,699,702	0	307.15	NO	306.55	NO	305.49	NO	305.55	NO
4-Jun-14	0	7500	1,686,944	0	307.12	NO	306.55	NO	305.52	NO	305.56	NO
5-Jun-14	0	7500	1,695,743	0	307.07	NO	306.55	NO	305.55	NO	305.58	NO
6-Jun-14	0	1625	1,697,283	0	307.04	NO	306.55	NO	305.56	NO	305.60	NO
7-Jun-14	0	0	0	0	307.04	NO	306.55	NO	305.56	NO	305.60	NO
8-Jun-14	0	0	0	0	307.04	NO	306.55	NO	305.56	NO	305.60	NO
9-Jun-14	0	6850	1,689,364	0	307.00	NO	306.55	NO	305.60	NO	305.64	NO
10-Jun-14	0	6850	1,686,724	3,347,492	306.97	NO	306.54	NO	305.62	NO	305.65	NO
11-Jun-14	0	6700	1,691,344	3,439,659	307.01	NO	306.54	NO	305.60	NO	305.62	NO
12-Jun-14	0	6700	1,689,804	3,591,218	307.05	NO	306.54	NO	305.57	NO	305.59	NO
13-Jun-14	0	0	1,692,003	3,598,697	307.10	NO	306.55	NO	305.54	NO	305.57	NO
14-Jun-14	0	0	0	3,599,137	307.10	NO	306.55	NO	305.54	NO	305.57	NO
15-Jun-14	0	0	0	3,533,806	307.10	NO	306.55	NO	305.54	NO	305.57	NO
16-Jun-14	0	7500	1,715,760	1,359,410	307.25	NO	306.53	NO	305.40	NO	305.41	NO
17-Jun-14	0	6550	1,697,943	0	307.21	NO	306.52	NO	305.42	NO	305.45	NO
18-Jun-14	0	7350	1,701,242	0	307.16	NO	306.53	NO	305.44	NO	305.47	NO
19-Jun-14	0	7500	1,697,063	0	307.12	NO	306.53	NO	305.47	NO	305.49	NO
20-Jun-14	0	2525	831,924	0	307.12	NO	306.53	NO	305.47	NO	305.49	NO
21-Jun-14	0	0	0	0	307.12	NO	306.53	NO	305.47	NO	305.49	NO
22-Jun-14	0	0	0	0	307.12	NO	306.53	NO	305.47	NO	305.49	NO
23-Jun-14	0	7550	1,688,484	0	307.01	NO	306.50	NO	305.47	NO	305.49	NO
24-Jun-14	0	7500	1,681,665	0	307.01	NO	306.49	NO	305.47	NO	305.52	NO
25-Jun-14	0	7500	1,676,606	3,478,594	306.95	NO	306.51	NO	305.51	NO	305.56	NO
26-Jun-14	0	7500	1,677,485	3,586,819	307.00	NO	306.51	NO	305.62	NO	305.56	NO
27-Jun-14	0	3125	1,688,264	3,598,257	307.04	NO	306.50	NO	305.50	NO	305.47	NO
28-Jun-14	0	0	0	3,642,251	307.04	NO	306.50	NO	305.50	NO	305.47	NO
29-Jun-14	0	0	0	3,578,240	307.04	NO	306.50	NO	305.50	NO	305.47	NO
30-Jun-14	0	6250	1,695,963	3,540,405	307.03	NO	306.48	NO	305.48	NO	305.49	NO
Total	0	129575	34,678,372	43,893,984								
Avg./ day	0.0	4319.17	1,155,946	1,463,133	307.06	NO	306.53	NO	305.51	NO	305.53	NO

Note: No exceedences to report.

6.2(a)

June 17, 2014
Our File: 199-024

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

Attention: Ms. Karen Landry
CAO/Clerk

Re: Mini Lakes Wastewater Treatment Plant Effluent Monitoring Report, 1st Quarter (2014)

Dear Ms. Landry:

We have reviewed the "Mini Lakes Mobile Home Community Quarterly Monitoring Program – 1st Quarter 2014" report, as submitted by Stantec Consulting Limited on May 1, 2014. 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 (2013) (column 5) and the MOE Certificate of Approval (C of A) compliance limits (column 6).

1	2	3	4	5	6
Parameters (mg/L)	**Q1 Avg.,** (Jan. 1 to Mar. 31, 2014)	**YTD Avg.,** (Jan. 1 to Mar. 31, 2014)	**Twelve-Month Rolling Avg.,** (Apr. 1, 2013 to Mar. 31, 2014)[a]	**Previous YTD Avg.** (Jan. 1 to Dec. 31, 2013)	**Compliance Limit**
$CBOD_5$[b]	16.5	16.5	15.0	12.9	20.0
TSS[c]	8.5	8.5	13.4[f]	16.0	20.0
TP[d]	0.2	0.2	0.3	0.42	1.0
NO_3[e]	9.9	9.9	4.9	4.8	5.0

a. Condition 3.1 of the MOE C of A, average is defined as "any twelve (12) consecutive calendar months"
b. $CBOD_5$ = 5 day Carbonaceous Biological Oxygen Demand
c. TSS = Total Suspended Solids
d. TP = Total Phosphorous
e. NO_3 = Nitrate
f. Note: Discrepancy compared to Table 1 in Stantec report due to Dec, 27, 2013 TSS results reported as <10 mg/L. Results were interpreted by G&M as 10 mg/L for purposes of calculating averages. Results were interpreted by Stantec as 0 mg/L for purposes of calculating averages.

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 $CBOD_5$

The average $CBOD_5$ effluent concentration for this quarter was 16.5 mg/L. This is below the C of A compliance limit of 20.0 mg/L for this parameter. Effluent $CBOD_5$ concentrations were below the compliance limit on three of the four sampling occasions during this quarter. The exception occurred on January 17, 2014, however the sample result of 51.0 mg/L is considered anomalous result. The twelve month rolling average for this parameter remains in compliance at 15.0 mg/L, demonstrating that the plant is generally performing acceptably with respect to $CBOD_5$.

Effluent TSS

The average TSS effluent concentration for this quarter was 8.5 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 all four sampling occasions this quarter. The twelve month rolling average for this parameter remains below the compliance limit at 13.4 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 0.2 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 0.3 mg/L, demonstrating that the plant is generally performing well with respect to TP.

Effluent NO_3

The average effluent NO_3 concentration for this quarter was 9.9 mg/L which is above the C of A compliance limit of 5.0 mg/L for this parameter. Effluent NO_3 concentrations were above the compliance limit on all three sampling occasions this quarter. The twelve month rolling average remains just below the compliance limit at 4.9 mg/L. In February 2014 the 12-month rolling average exceeded the compliance limit at 5.04 mg/L, and was reported to the Ministry of the Environment (MOE). Sludge cleanout of the system and dentrification zone was subsequently undertaken in early March as a mitigation measure.

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 as well as to re-rate the plant for an average daily flow of 158 m^3/d, revise the nitrate limit upwards to 8.0 mg/L and change the definition of non-compliance to "during any calendar year" from "during any 12 consecutive calendar months". It is acknowledged that review times for an ECA amendment can be quite lengthy, however the waiting period for this application has surpassed what is considered typical. Stantec has recently followed up with the MOE and was advised that the application will be reviewed 'shortly'. At the time this letter was prepared, the application has not yet been posted to the Environmental Registry for the 30 day comment period.

Average Sewage Flows

The average daily sewage flow rate to the plant ranged between 93.9 m^3/d and 108.5 m^3/d during this quarter. This is below the plant's current design capacity of 216 m^3/d, and proposed re-rated plant capacity of 158 m^3/d. The estimated number of occupied homes ranged between 220 and 225 this quarter, which represents approximately 75% of units in the current Draft Plan of Subdivision application of 292 units.

The estimated average daily flow per home ranged between 417 L/d and 493 L/d, below the design average daily flow per home of 540 L/d. The average flow is somewhat higher than has typically been observed during this quarter in previous years. The maximum daily flow rate of 800 L/unit/day was exceeded on one occasion when the flow per unit was estimated at 884 L/unit/day. The cause of the flow exceedance is not known at this time, and it is noted that there was no record of extreme weather or melt conditions that appeared to contribute to the exceedance. At this time, the flow exceedance is considered an anomaly, although we will closely review flows in coming reports to determine whether further investigation is needed.

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

Yours truly,

GM BLUEPLAN ENGINEERING
Per:

Amanda Pepping, P.Eng.

AP/mh

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.
Ms. Judy Beauchamp, Stantec Consulting Ltd.

6-2(b)

Stantec

Stantec Consulting Ltd.
49 Frederick Street, Kitchener ON N2H 6M7

RECEIVED
MAY 02 2014
Township of Puslinch

CLERK'S DEPARTMENT

TO	A.P. - Hamsby-comm
Copy	
Please Handle	✓
For Your Information	
Council Agenda	Aug 13/14
File	E12/MIN

May 1, 2014
File: 1611 07544/31

Attention: Karen Landry, CAO/Clerk
Township of Puslinch
R.R. #4
County Road 34 Aberfoyle
Guelph, ON N1H 6H9

Dear Ms. Landry,

Reference: Mini Lakes Mobile Home Community Quarterly Monitoring Program – 1st Quarter 2014

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 (CofA) for the sewage system. This letter represents the first quarter reporting for 2014.

As shown on Table 1, plant effluent has been sampled and analyzed on three (3) occasions for this quarter with one additional sampling for solids and organics in January to verify an anomalous carbonaceous biochemical oxygen demand (CBOD5) result early in the month.

The average $CBOD_5$ concentration for the quarter is 16.5 mg/L, which is below the compliance limit of 20 mg/L. $CBOD_5$ values were below the compliance limit on three (3) of four (4) sampling occasions this quarter, with the one (1) exceedance being 51.0 mg/L on January 17, 2014 deemed to be an anomalous result. The 12-month rolling average for $CBOD_5$ is 15.0 mg/L. Overall, the plant is deemed to be performing acceptably with respect to $CBOD_5$.

The average TSS concentration for the quarter is 8.5 mg/L, which is well below the compliance limit of 20 mg/L. TSS values were below the compliance limit on all four (4) sampling occasions this quarter. The 12-month rolling average for TSS is 12.6 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 0.2 mg/L, which is well below the compliance limit of 1.0 mg/L. TP values were below the compliance limit on all three (3) sampling occasions this quarter. The 12-month rolling average for TP is 0.3 mg/L. Overall, the plant is deemed to be performing very well with respect to TP.

The average nitrate concentration for the quarter is 9.9 mg/L, which is above the compliance limit of 5.0 mg/L. Nitrate values were above the compliance limit on all three (3) sampling occasions this quarter. The 12-month rolling average for nitrate is 4.9 mg/L, which is below the compliance limit due to improved summer and fall performance in 2013; however, nitrate slightly exceeded the 12-month rolling average in February 2014 (5.04 mg/L), which was reported to the Ministry of the Environment. Sludge cleanout of the system and denitrification zones was subsequently undertaken in early March as a mitigating measure.

Reference: Mini Lakes Mobile Home Community Quarterly Monitoring Program – 1st Quarter 2014

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:

- 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 CofA.

The recommended long term plan is to provide better sludge management by partitioning the existing primary clarifier into two (2) chambers, one (1) 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 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 m^3 and a primary effluent compartment having a working volume of 23 m^3.
  - 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 (1) RBC train and two (2) tertiary trains.
- One (1) new effluent pump and piping for effluent recirculation to primary clarifier inlet.
- New chemical building as previously approved.

Reference: Mini Lakes Mobile Home Community Quarterly Monitoring Program – 1st Quarter 2014

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 no earlier than spring of 2014 due to delays in the ECA. With the approval amendment, we also propose 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 above optimal values at an average of 7.5 mg/L, where the objective is to be below 2 mg/L to ensure reliable denitrification. An assessment of historic nitrate data appears to show more of a correlation between seasonal temperature variation and nitrate reduction than DO concentration; however, low DO levels are generally necessary for efficient denitrification. Higher DO is expected over the winter quarter due to higher oxygen saturation concentration in cold water.

The remaining parameters shown on Table 1 have been sampled in accordance with the CofA; 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 72,033 CFU/100 mL. Results for pH this quarter are consistent with expected values at an average of 7.1.

With respect to wastewater flows this quarter, the average flow per unit estimate is approximately 448 L/unit/day. This is moderately higher than the average per unit flow over the past three (3) years of approximately 400 L/unit/day; however, this is expected during the first quarter when infiltration and inflow is higher, coupled with declining occupancies. The design average is 540 L/unit/day and the maximum daily design flow is 800 L/unit/day. Estimated per unit flows have exceeded the daily design basis on one occasion this quarter (January 11, 2014) where daily flow was 194,550 L/d, and estimated per unit flow was 884 L/unit•d. It is not apparent why flow was this high on this day, as there were no extreme weather events or extensive snowmelt noted. The average day flow was only 46.0% of the design average day flow of 216 m^3/d this quarter, and the maximum day flow never exceeded the wastewater treatment plant maximum day design flow of 320 m^3/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.

Reference: Mini Lakes Mobile Home Community Quarterly Monitoring Program – 1st Quarter 2014

Table 2: Sewage Flow Volumes

Month (2014)	Average Daily Flow (L/d)	Maximum Daily Flow (L/d)	Estimated Number of Occupied Homes	Estimated Flow per Unit (L/d)
January	108,514	194,550	220	493
February	95,555	116,630	220	434
March	93,857	142,280	225	417

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.

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

Regards,

STANTEC CONSULTING LTD.

Miles MacCormack, P. Eng.
Project Manager, Water
Phone: (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)

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6.2(c).

June 17, 2014
Our File: 199-024

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

Attention: Ms. Karen Landry
CAO/Clerk

Re: Mini Lakes Mobile Home Community
2013 Annual Operation & Maintenance Report

Dear Ms. Landry:

We have reviewed the '2013 Operation and Maintenance Report' for the above facility, as submitted by Stantec Consulting Limited, dated March 21, 2014. 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 292 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 m^3/d with the effluent compliance limits stipulated in the Table below.

In December 2012, an application for amendment to C of A Number 2113-7M8RBP was submitted to the Ministry of the Environment (MOE) to undertake proposed plant improvements, re-rate the plant for an average daily flow of 158 m^3/d, revise the nitrate limit upwards to 8.0 mg/L and change the definition of non-compliance to "during any calendar year" from "during any 12 consecutive calendar months".

EFFLUENT QUALITY:

The following Table summarizes the average effluent quality for the year 2013 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 **Parameters (mg/L)**	2 **YTD Avg., (Jan. 1, 2013 to Dec.31, 2013)[a]**	3 **Previous YTD Avg., (Jan. 1, 2012 to Dec.31, 2012)[a]**	4 **C of A Compliance Limit**
$CBOD_5$[b]	12.9	11.5	20.0
TSS[c]	16.0[f]	15.0	20.0
TP[d]	0.42	0.43	1.0
NO_3[e]	4.8	4.7	5.0

a. Year to date (YTD) average, as reported by Stantec Consulting Ltd
b. $CBOD_5$ = 5 day Carbonaceous Biological Oxygen Demand
c. TSS = Total Suspended Solids
d. TP = Total Phosphorous
e. NO_3 = Nitrate
f. Note: Discrepancy compared to Table 2 in Stantec report due to Dec, 27, 2013 TSS results reported as <10 mg/L. Results were interpreted by G&M as 10 mg/L for purposes of calculating averages. Results were interpreted by Stantec as 0 mg/L for purposes of calculating averages.

The YTD average concentrations for $CBOD_5$, TSS, TP and NO_3 are all within C of A compliance limits for the year 2013. Periodic exceedances of TSS were observed in February, August and November. One exceedance of

$CBOD_5$ was observed in November. Exceedances of NO_3 occurred most frequently of any parameter and were observed in January, February, March, April, May, June, September and December. Plant effluent was sampled monthly during 2013, with the exception of nitrate and nitrite which were sampled more frequently as the result of ongoing denitrification issues.

TP concentrations were below the effluent limit in all 12 samples taken during 2013. The average TP concentration of 0.42 was well below the effluent limit of 1.0 mg/L. Overall the plant is considered to have performed well in terms TP removal during 2013.

$CBOD_5$ concentrations were below the effluent limit in 11 of 12 samples taken during 2013. The average $CBOD_5$ concentration of 12.9 mg/L was well below the effluent concentration of 20 mg/L. Overall the plant is considered to have performed well in terms of $CBOD_5$ during 2013.

TSS concentrations exceeded the effluent limit in three of the 12 samples taken in 2013. The average TSS concentration of 16.0 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 acceptably with respect to TSS during 2013.

The average nitrate concentration was, although below the compliance limit at 4.8 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 2013. High nitrate concentrations during the winter of 2012 and spring of 2013 meant that the plant was out of compliance on a 12-month rolling average basis for the third quarter of 2013. The reduction in denitrification during the winter and spring is attributed to colder temperatures which is known to 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.

PROPOSED UPGRADES:

In December 2012 Stantec applied on behalf of Mini Lakes for an amendment to the current C of A (now known as an Environmental Compliance Approval or ECA) for various upgrades, including proposed sludge management improvements. The Approval process is ongoing and is still awaiting MOE approval. 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. Stantec has recently followed up with the MOE and was advised that the application will be reviewed 'shortly'. At the time this letter was prepared, the application has not yet been posted to the Environmental Registry for the 30 day comment period. It is acknowledged that review times for an ECA amendment can be quite lengthy, however the waiting period for this application has surpassed what is considered typical.

It is noted that the system is not presently in conformance with the specific requirements of the C of A with respect to 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. The community currently has approval and funding in place for chemical building upgrades. Upgrades will be completed as part of the 2014 upgrades project awaiting approval by the MOE.

Other upgrade plans are ongoing and subject to approval and financial resources. Improvements to the control of sludge return rates and the removal of floating sludge remains a priority, however the replacement of intermediate and final clarifier pumps and scum removal systems are currently on hold due to the higher priority nature of the sludge management improvements planned for construction in 2014.

SEWAGE FLOWS:

From Table 3 of the 2013 Operation and Maintenance Report, the monthly average daily flow ranged from 88.5 m³/d to 105.7 m³/d during 2013. The monthly average daily flow for 2013 was 99.87 m³/d which represents approximately 46% of the current rated capacity (216 m³/d) and 63% of the proposed rated capacity (158 m³/d). The monthly average daily flow of 99.87 m^3/d is an increase of 6.9% from 2012.

The estimated number of homes occupied during 2013 ranged between 215 and 265 units, which represents approximately 80% occupancy based on the 292 units proposed under the Draft Plan of Subdivision Application. The estimated average daily flow per home ranged between 379 L/d and 453 L/d with an overall average of 424 L/d. This is a slight increase from the average per unit flow over the past three years of 399 L/unit/day, and is below the design average of 540 L/unit/day.

The overall plant maximum daily flow rate of 320 m^3/d has not been exceeded, even during periods of high occupancy and wet periods. Based on the above trends 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 2013 included the installation of alarms to each new lift station, and electrical work conducted on lift stations, WWTP electrical panel and plant wiring.

ENVIRONMENTAL/OPERATING PROBLEMS AND MITIGATION MEASURES:

Operational problems during 2013 mostly involved small issues with pumps and alarms, which were resolved and have not since recurred. Operational issues included a 'go-switch' alarm for RBC#2, which required clearing of alarm; Significant power outage resulting in pumpout of SPS#2, Sensaphone trending reports not showing all data, and issues with various pumps tripping out in October.

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 the 2014 upgrades project.

OTHER SYSTEM IMPROVEMENT:

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

- Improved chemical delivery system for reduced materials handling
- Improved sludge management and increased recirculation rates (scheduled for 2014, pending C of A amendment application and approval)
- There is no sludge removal system for the denitrification zone; sludge removal in this zone is necessary to maintain the efficiency of nitrogen removal from the system to stay within the C of A limits (not currently scheduled for feasibility reasons).

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

RECOMMENDATIONS:

Based on the information provided in the '2013 Annual Operation and Maintenance report', the Mini Lakes wastewater treatment plant effluent met the MOE (C of A) compliance limits for TP, $CBOD_5$ and TSS on an annual average basis during 2013. The wastewater treatment plant was in compliance on a 12-month rolling average basis for all parameters, with the exception of a nitrate during the third 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 in 2014 and take corrective action if the effluent is approaching the C of A limits.

2. The 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 (scheduled for implementation during 2014 plant upgrades).

5. The owner continues to provide updates to the Township in the quarterly monitoring reports with respect to the status of the MOE approval and timing for implementation of the sludge management upgrades and plant re-rating proposed to address nitrate compliance issues (scheduled for implementation during 2014, pending receipt of approval).

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

Yours truly,
GM BLUEPLAN ENGINEERING
Per:

Amanda Pepping, P.Eng.

AP/mh

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

6.2(d)

Stantec Consulting Ltd.
49 Frederick Street
Kitchener ON N2H 6M7
Tel: (519) 579-4410
Fax: (519) 579-6733

March 18, 2014
File: 1611 07544/31

Attention: Ms. Karen Landry, CAO/Clerk
Township of Puslinch
RR#3
County Road 34 Aberfoyle
Guelph ON N1H 6H9

Dear Ms. Landry,

Reference: Mini Lakes Mobile Home Community
2013 Operation and Maintenance Report

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.

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 2013 has been completed as per the requirements under the current C of A as enclosed in Appendix A. The following Monitoring Report was prepared in accordance with these requirements.

In November 2012, an application for amendment to C of A Number 2113-7M8RBP was submitted to the Ministry of the Environment (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 (m^3/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 SYSTEM

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.

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.

Reference: Mini Lakes Mobile Home Community
2013 Operation and Maintenance Report

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 $CBOD_5$, Total Suspended Solids (TSS), Total Phosphorus (TP), Total Ammonia Nitrogen (TAN = $NH_4^+ + NH_3$), Nitrate Nitrogen (NO_3^-), Nitrite Nitrogen (NO_2^-), 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 2013 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												
	$CBOD_5$	**TSS**	**TP**	**NH_3**	**NO_3**	**NO_2**	**TKN**	**TN (calc)**	**DO**		***E. coli***	**pH**
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		/100mL	
Limit	**20**	**20**	**1.00**	**na**	**5.00**	**na**	**na**	**na**	**na**		**na**	**na**
Date												
29-Jan-13	8	13	0.42	3.50	8.40	0.45	7.1	16.0	7.33		7,100	7.3
19-Feb-13	12	26	0.90	3.60	9.60	0.52	8.1	18.2	7.1		40,000	7.12
28-Mar-13	6	13	0.38	4.50	8.80	0.55	12	21.4	7.6		17,000	7.77
29-Apr-13	17	14	0.44	5.40	6.60	0.55	8	15.2	6.89		36,000	7.46
17-May-13	13	14	0.50	5.10	8.00	0.57	8.2	16.8	7.59		29,000	7.53
24-Jun-13	5	2	0.13	0.98	6.50	0.18	2.7	9.4	7.89		20,000	7.1
30-Jul-13	12	15	0.27	4.30	2.60	0.75	7.8	11.2	5.25		0	7.53
15-Aug-13	17	33	0.34	4.90	4.00	0.32	8.3	12.6	5.41		140,000	6.92
16-Aug-13					3.50	0.26						
19-Aug-13					2.00	0.14						
27-Aug-13					2.70	0.18						
28-Aug-13					1.60	0.18						
11-Sep-13					4.40	0.68						
12-Sep-13					6.60	1.20						
25-Sep-13	14	11	0.25	1.10			3		7.04		180,000	7.1
1-Oct-13	9	14	0.26	0.77			3.1		7.2		13,000	7.08
23-Oct-13					3.20	0.45						
24-Oct-13					3.50	0.50						
29-Oct-14					3.70	0.26						

Reference: Mini Lakes Mobile Home Community
2013 Operation and Maintenance Report

Effluent Sampling Parameters												
	$CBOD_5$	**TSS**	**TP**	**NH_3**	**NO_3**	**NO_2**	**TKN**	**TN (calc)**	**DO**		***E. coli***	**pH**
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		/100mL	
Limit	**20**	**20**	**1.00**	**na**	**5.00**	**na**	**na**	**na**	**na**		**na**	**na**
Date												
30-Oct-13					2.00	0.42						
4-Nov-13					4.10	0.25						
5-Nov-13					2.20	0.54						
22-Nov-13	27	27	0.51	2.10			4.7		5.45		80,000	7.1
27-Dec-13	15	<10	0.64	4.00	7.00	0.83	4.7	12.5	7.35		200,000	6.99
2013 Average	**12.9**	**15.2**	**0.42**	**3.4**	**4.8**	**0.5**	**6.5**	**14.8**	**6.8**		**63,508**	**7.3**
12-mo Count	**12**	**12**	**12**	**12**	**21**	**21**	**12**	**9**	**12**		**12**	**12**
notes:		- Shaded area exceeds compliance limit.										
	1. Compliance Limits stipulated in Certificate of Approval for the Sewage System.											
	2. na - No compliance limits stipulated by Certificate of Approval.											

A summary of the 2013 effluent results for parameters with effluent requirements are as follows.

Table 2: WWTP Effluent Quality Summary

Parameter	Compliance Limit	Annual Average
$CBOD_5$	20	12.9
TSS	20	15.2
TP	1	0.42
Nitrate Nitrogen	5	4.8

Plant effluent has generally been sampled and analyzed monthly in 2013 with the exception of nitrate and nitrite, which is sampled more frequently due to ongoing denitrification performance issues. Annual average effluent concentrations for $CBOD_5$, TSS, and TP, and nitrate were less than their respective effluent limit concentrations for the 2013 reporting period.

The average $CBOD_5$ concentration for 2013 was 12.9 mg/L, which is below the effluent limit of 20 mg/L. $CBOD_5$ concentrations were below the effluent limit on 11 of 12 samples taken in 2013. Overall, the plant is deemed to have performed well with respect to $CBOD_5$ in 2013.

Reference: Mini Lakes Mobile Home Community
2013 Operation and Maintenance Report

The average TSS concentration for 2013 is 15.2 mg/L, which is below the effluent limit of 20 mg/L. TSS concentrations were below the effluent limit on 9 of 12 samples taken in 2013. 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 2013.

The average TP concentration for 2013 is 0.42 mg/L, which is well below the effluent limit of 1.0 mg/L. TP values were below the effluent limit on all of the 12 samples taken in 2013. The historical average for TP has continued to drop below the compliance limit, and is now 0.66 mg/L. No exceedance 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 2013.

The average nitrate concentration for 2013 is 4.8 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 2013. The wastewater treatment plant was in compliance on a 12-month rolling average basis for nitrate for the first, second, and fourth quarters of the year. The wastewater treatment plant was out of compliance on a 12-month rolling average basis only in September of 2013 due to high nitrate effluent concentrations in the fall of 2012 and winter/spring of 2013. The historical average for nitrate continues to remain below the effluent limit, and is currently 4.6 mg/L. Overall, the plant is deemed to have performed acceptably with respect to nitrate in 2013.

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 dentrification zone.
- Daily inspections and cleaning of all clarifier weirs.

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 and currently still under review with the MOE:

- A partition wall separating the chamber into two compartments, an inlet and sludge storage compartment having a working volume of 73 m^3 and a primary effluent compartment having a working volume of 23 m^3.

- 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 m^3/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 2013 are above expected values at an average of 6.8 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.

SEWAGE FLOW MONITORING

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

Reference: Mini Lakes Mobile Home Community
2013 Operation and Maintenance Report

Table 3: Sewage Flow Summary

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	94,603	141,590	215	440	2,932,700	29,170
February	96,027	121,900	215	447	2,688,760	72,500
March	99,432	135,800	220	452	3,082,400	59,170
April	104,886	129,630	230	456	3,146,580	19,500
May	105,660	127,540	240	440	3,275,460	82,350
June	100,195	141,260	250	401	3,005,850	55,590
July	100,420	136,820	265	379	3,113,010	50,070
August	100,753	131,800	260	388	3,123,350	77,350
September	99,762	183,320	255	391	2,992,870	13,580
October	104,901	141,830	235	446	3,251,920	41,260
November	103,198	136,130	230	449	3,095,940	80,260
December	88,534	135,380	220	402	2,744,560	18,270
Average =	**99,864**	**138,583**	**236**	**424**	**3,037,783**	**49,923**
High range =	105,660	183,320	265	453	3,275,460	82,350
Low range =	88,534	121,900	215	379	2,688,760	13,580

The as-recorded daily flows to effluent disposal ranged from 13,580 L/d to 183,320 L/d. On a monthly basis, average daily flows ranged from 88,534 L/d to 105,660 L/d. The overall average daily flow was 99,864 L/d, up 6.9% from last year. The maximum recorded monthly flow was 3,275,460 L and occurred in May 2013. 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 2013. 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 424 L/unit/day. This is slightly higher than the average per unit flow over the previous three years of 394 L/unit/day, where the design average is 500 L/unit/day and the design maximum allowance is 800 L/unit/day. This may be due to higher infiltration/inflow in 2013. The overall plant maximum daily flow of 320 m^3/d has never been exceeded. The average daily flow was only 46.2% of the daily design average flow rate of 216 m^3/d. Based 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.

Reference: Mini Lakes Mobile Home Community
2013 Operation and Maintenance Report

SYSTEM MAINTENANCE

The operation and maintenance of the sewage treatment unit has been performed by AWC as of November 2004. The AWC 2013 Annual Report is provided in Appendix C. Regular maintenance of the treatment unit is noted in the table below.

Table 4: System Maintenance Summary

Plant Area/Equipment	Activity
Lift Stations	• Obstructions removed and floats cleaned as necessary. • Sludge removed from all lift stations as required. • Floats adjusted as required. • Alarms connected to each new lift station.
Primary Settling Tank	• Sludge depths recorded on an ongoing basis. • Sludge removed by Weber Septic as necessary.
Biological Contactors	• Greased and oiled bearing as per manufacturer's instructions. • New 'go switch' installed. • Limit switched adjusted as required.
Intermediate Clarifiers	• Sludge depths recorded on an ongoing basis. • Weirs checked frequently for blockages. • Check valves cleaned on a regular basis.
Denitrification Tanks	• Weirs checked for blockages. • Floatable material and sludge removed on an ongoing basis. • Some sludge from media beds removed by Weber Septic.
Sludge Management	• Weekly sludge measurements. • Sludge return pump run times adjusted as required. • Check valves cleaned on return pumps.
Final Clarifiers	• Weirs checked for blockages. • Check valves, pumps cleaned as required. • Pump blockages cleared as required.
Effluent Pump Chambers	• Chambers pumped out as necessary to maintain low sludge depths. • Cleaned intakes and 'y' strainers on all pumps. • Pumps pulled and cleaned as required.
Chemical Systems - Alum - Carbon Source	• Chemical tanks, lines cleaned and replaced as required.
Subsurface Disposal System	• Some flushing conducted.

Reference: Mini Lakes Mobile Home Community
2013 Operation and Maintenance Report

Plant Area/Equipment	Activity
Other	• Annual alarm system verification conducted. • Flow meters, pH meter calibrated. • Inventory of pumps completed by Jet Fluid. • Electrical work conducted on lift stations, WWTP electrical panel, plant wiring.

ENVIRONMENTAL/OPERATING PROBLEMS AND MITIGATIVE MEASURES

A monthly summary of environmental/operating problems and mitigative measures by AWC is presented as follows (no issues were noted on months not listed):

March 2013

Some issues with the Sensaphone (data logger) trending reports not showing all the necessary data.

April 2013

Significant power outage (approx. 19 hours) resulted in Weber Septic being called in to pump out SPS#2 and dump into the primary clarifier to control station level.

June 2013

RBC #2 'go switch' alarm on June 27; clearing of alarm was required.

September 2013

September 2, AWC was paged by resident regarding an alarm at LS#1. Float was found to be stuck. Pumps were turned to manual and started automatically. Float was freed and cleaned, and system returned to automatic operation.

October 2013

Some issues with various pumps tripping out in October; intermediate clarifier #3, Lift Station #1 and Lift Station #4. All issues resolved.

December 2013

Lift Station #1 pump overload on December 2. Breaker reset and pump turned off until solution can be found. A power outage occurred from 03:00 on December 22 until about 12:30 on December 23; no issues on subsequent startup were noted.

Reference: Mini Lakes Mobile Home Community
2013 Operation and Maintenance Report

There were a few other minor power outages throughout 2013, but only the one in April (see above) had any significant impact on the wastewater system, despite the one in December being significantly longer in duration.

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 2014.

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 (completed in 2013).
- Install permanent wiring for alum pump (completed in 2013).
- Improved chemical delivery system for reduced materials handling (scheduled for 2014).
- Improve sludge management and increase recirculation rates (scheduled for 2014 pending C of A amendment approval).
- There is no sludge removal system for the denitrification zone; sludge removal in this zone is necessary to maintain the efficiency of nitrogen removal from the system to stay within the C of A limits (not currently scheduled for feasibility reasons).

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 availability. It is understood that a number of these recommendations as noted above are expected to be implemented in the 2014 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 2013 with the exception of September 2013, due to high nitrate effluent concentrations in the fall of 2012 and winter/spring of 2013. 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.

Reference: Mini Lakes Mobile Home Community
2013 Operation and Maintenance Report

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 73 m^3 and a primary effluent compartment having a working volume of 23 m^3.
    - 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.
    - 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.

Regards,

STANTEC CONSULTING LTD.

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

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

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

rmc w:\active\161107544_mini_lakes\design\report\2013 wastewater annual report\ltr_140228_mjm_2013_o&m_rpt.docx

6.4(a)

Groundwater Science Corp.

328 Daleview Place,
Waterloo, ON N2L 5M5
Phone: (519) 746-6916
groundwaterscience.ca

March 31, 2014

George Lourenco
Resource Manager,
Capital Paving Inc.
P.O. Box 815
Guelph, ON
N1H 6L8

Dear Mr. Lourenco:

RE: 2013 Groundwater Monitoring Summary,
Wellington Pit, Licence No. 20085
Part Lots 7 and 8, Concession 3, Township of Puslinch

This letter is a summary of the results of the 2013 groundwater monitoring program completed for the above reference property. The site location is shown on **Figure 1** (attached).

1.0 Monitoring Program Requirements

The Licence conditions as listed on the Site Plan are summarized as follows:

- *Quarterly (seasonal) groundwater level measurements at locations BH204, BH205, BH213, BH214, BH219, A3, A4, A5, A8, A10, and TP319 for the life of the pit;*
- *Annual reporting of the monitoring data. The report shall include a review of the monitoring program and recommendations regarding future monitoring frequency. It will also include a determination of the "normal" seasonal groundwater tale variations that will trigger mitigation measures;*
- *Should groundwater levels at any time be4 measured above or below the "normal" seasonal groundwater table variations, all below groundwater table extraction will cease immediately and the operator will inform the Ministry of Natural Resources (MNR), Ministry of the Environment (MOE) and the Township of Puslinch.*

2.0 Monitoring Completed

Water level monitoring at the site during the period 1997 to 2010 was completed by Stantec Consulting Ltd. Annual reporting was prepared by Stantec during years of site operation up until 2010 summarizing operational activities and monitoring results. Please refer to those previous reports for specific information. Based on recommendations made by Stantec in the March 30, 2010 report, monitoring was discontinued at that time. The historical data (April 1997 to January 2010) available for the site is incorporated into this (2013) report.

Groundwater Science Corp. was retained in November 2012 to reinstate the monitoring program. As part of that work the monitors were located and measurements obtained on November 26, 2012. At that time drive-point piezometers (A3, A4, A5, A8 and A10) could not be located. During a

subsequent visit on January 29, 2013, locations A3, A8 and A10 were found, however locations A4 and A5 could not be located and it is assumed that the two piezometers had been removed sometime after January 2010. Locations A4 and A5 were reinstalled on January 29, 2013. Based on the installation conditions and water level response, both piezometers are installed in a fine grained till unit and water levels had not recovered to static by the end of the monitoring event.

The monitoring locations are shown on **Figure 1**. Monitor installation details are shown in **Table 1**.

Monitor	Elevations (mAMSL)			
	Ground	Top of Well	Top of Screen	Bottom of Well
BH204	318.71	319.63	305.51	304.01
BH205	315.52	316.57	301.12	299.62
BH213	324.79	325.56	304.69	303.19
BH214	324.30	325.17	316.00	314.50
BH219	330.21	331.21	315.21	313.71
TP319	319.0*	319.9*	317.9*	316.4*
A3	315.6*	316.4*	314.5*	314.2*
A4	316.7*	317.6*	315.6*	315.3*
A5	313.9*	314.8*	312.9*	312.6*
A8	317.0*	317.9*	316.6*	316.3*
A10	315.4*	316.3*	313.7*	313.4*

mAMSL = metres above mean sea level
monitor elevations as per Stantec Consulting Ltd. report March 30, 2010
A3 and A5 elevations revised as per installation notes January 29, 2013
* elevations estimated from Site Plan topographic mapping

Table 1: Monitor Installation Details

Summaries of the water level data available for the site are attached to this letter report, in both tabular and hydrograph formats.

3.0 Discussion of Monitoring Results

For comparison to the hydrographs, a plot of the monthly precipitation and 30-year monthly precipitation normal reported for the Waterloo-Wellington Airport (and overall area) for the years 1994 to 2012 is attached to this report. Missing or incomplete 2007, 2008 and 2010 (November) data for the station was augmented using data reported for the University of Waterloo weather station (http://weather.uwaterloo.ca/). As illustrated, the climate conditions over the monitoring period have ranged from relatively "dry" to relatively "wet" and provide a good representation of the scale of natural variation.

In 2013 the estimated total reported precipitation of 886.3 mm is approximately 30.18 mm below the current 30-yr mean value of 916.48 mm. As indicated by the graph, January, April, June and October were relatively "wet" compared to average conditions, and, March, May, August, September, November and December were relatively "dry". Overall annual precipitation was close to average, however wet periods in spring and fall likely resulted in above average recharge conditions.

The data gathered to date indicates that groundwater elevations at the site have been maintained within in similar range under varying climate conditions since 1997 (prior to extraction). As shown on the hydrographs, water levels 2013 also remain within the historical range observed. No long-term trends that indicate significant or measurable groundwater level impacts (e.g. declines) are

evident. Therefore both historical and current water level elevations are interpreted to be within the range of "natural" seasonal conditions for the site and immediate area. This is consistent with monitoring results at other nearby sites over the same period.

Theoretically the reduction in runoff associated with the extraction to date has likely led to additional recharge as compared to the original site condition. This effect would tend to slightly increase local seasonal water table fluctuation and average annual groundwater levels. As illustrated by the hydrographs however, it is likely that the on-going seasonal and annual variation in recharge has a larger influence on local water table elevations, and masks any potential small-scale effect related to the extraction.

The maximum and minimum elevations measured in the period 1997 to 2013 are shown on the data tables and likely represents the "natural" range in fluctuation at the site. No mitigation measures response is recommended as a result of the monitoring data.

4.0 Recommendations

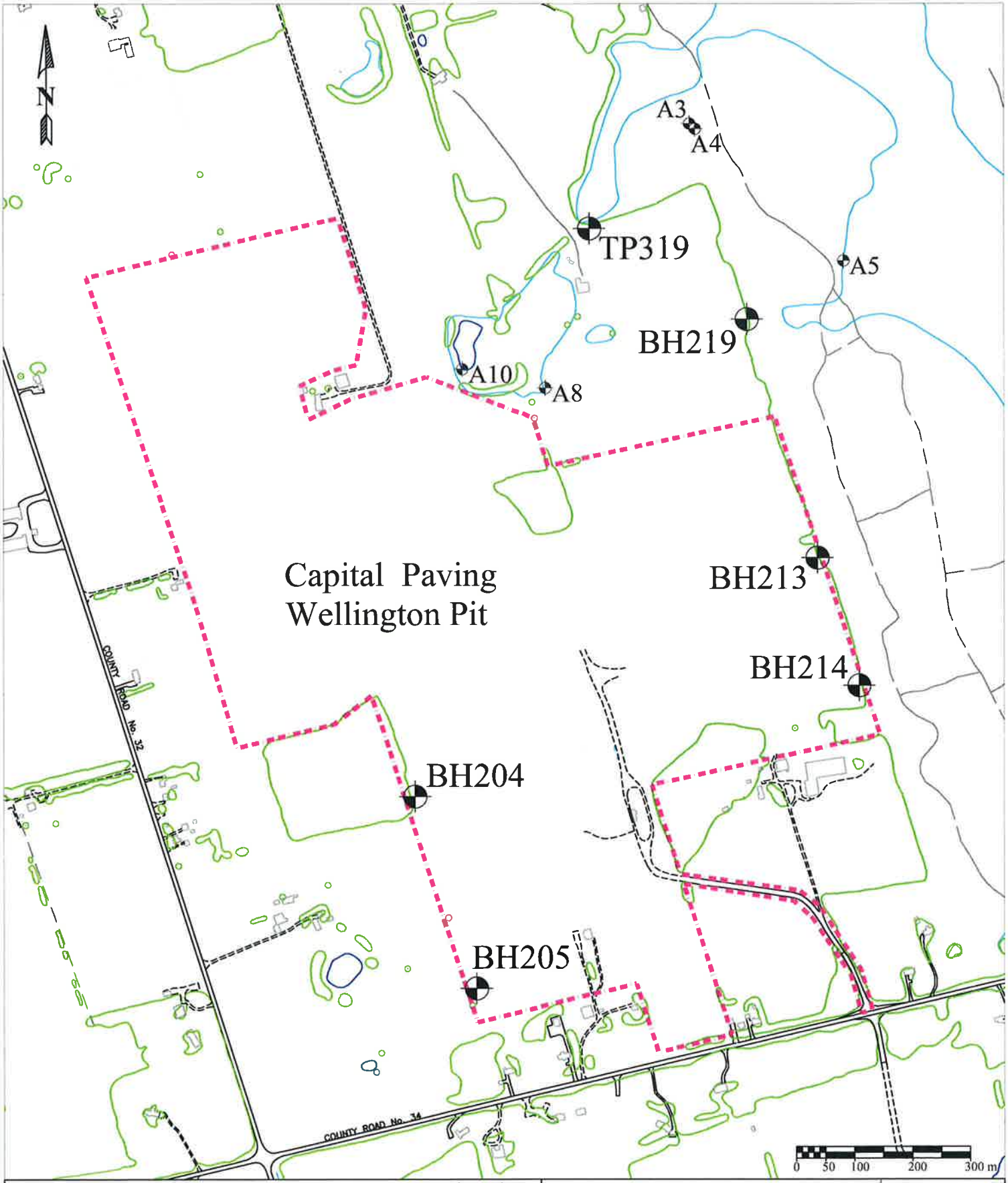
The monitoring program as listed on the Site Plan should continue in 2014.

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

Sincerely,

Andrew Pentney, P.Geo.
Hydrogeologist

Attached:
Figure 1 Monitoring Locations
Water Level Monitoring Data Summary Table
Hydrograph – Monitoring Well Water Level Data
Hydrograph – Drive-Point Piezometer Water Level Data
Precipitation Analysis



monitoring location

Licenced boundary (approx.)

surface water (pond, creek)

mapped wetlands

scale : as shown
March 2013

Figure 1: Monitoring Locations

Annual Monitoring Report

Capital Paving Inc. Wellington Pit
Lot 7, Con. 3, Township of Puslinch, County of Wellington

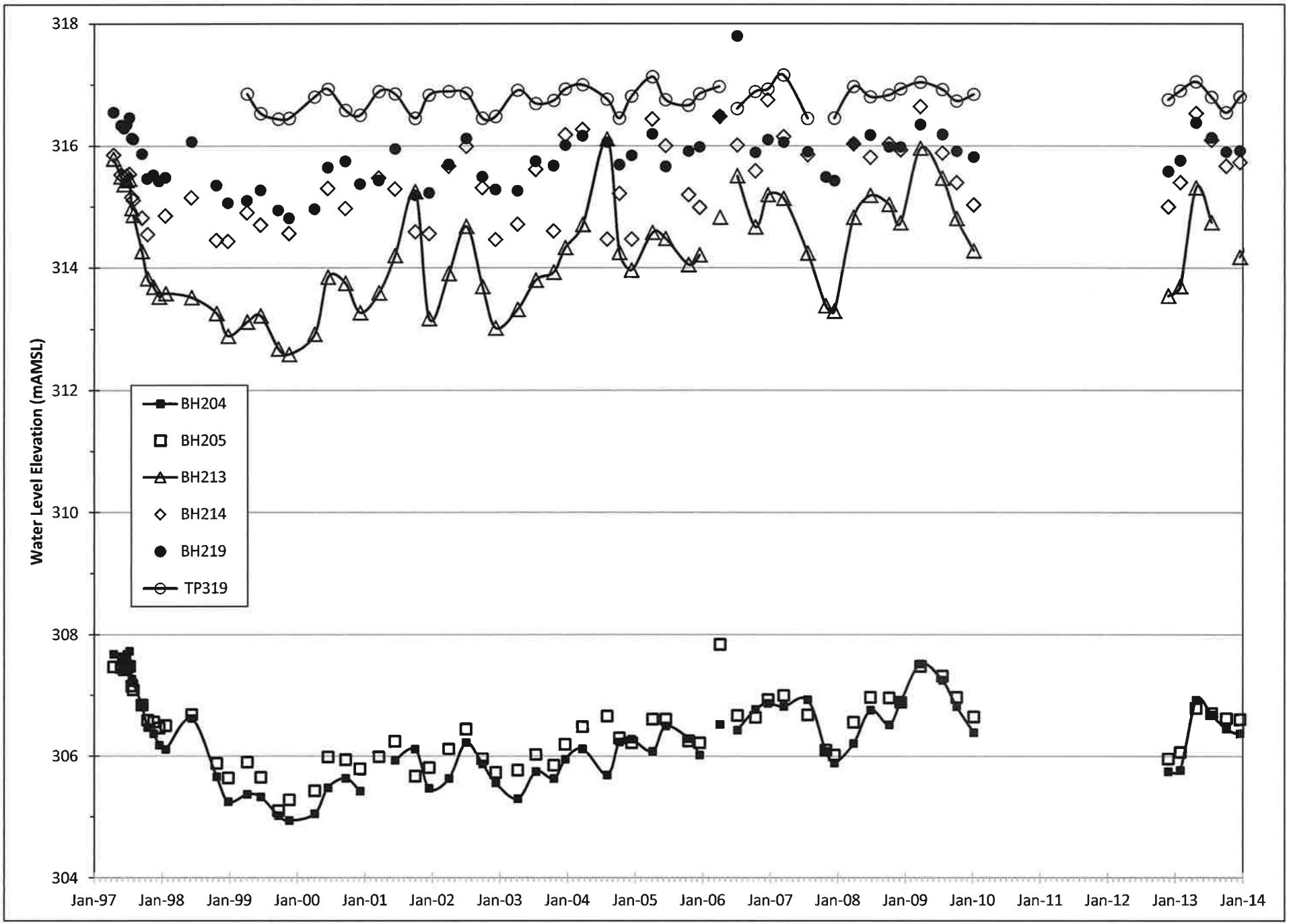
Date	Water Level Elevation (mAMSL)														
	BH204	BH205	BH213	BH214	BH219	TP319	A3 GW	A3 SW	A4 GW	A5 GW	A5 SW	A8 GW	A8 SW	A10 GW	A10 SW
15-Apr-97	307.68	307.47	315.79	315.85	316.55	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26-May-97	307.64	307.46	315.50	315.53	316.34	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11-Jun-97	307.58	307.42	315.37	315.49	316.29	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25-Jun-97	307.68	307.45	315.44	315.51	316.35	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9-Jul-97	307.73	307.48	315.46	315.54	316.46	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22-Jul-97	307.27	307.15	314.98	315.16	316.13	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-Jul-97	n/a	n/a	n/a	n/a	n/a	n/a	n/a	315.62	315.55	n/a	313.78	317.27	317.09	314.80	315.50
30-Jul-97	307.21	307.09	314.87	315.11	316.11	n/a	314.75	315.59	315.51	313.72	313.76	317.28	317.07	315.43	315.45
15-Sep-97	306.83	306.84	314.27	314.82	315.87	n/a	315.53	n/a	315.43	313.81	313.84	317.18	317.00	315.19	n/a
15-Oct-97	306.47	306.59	313.83	314.55	315.46	n/a	315.58	n/a	315.39	313.94	313.88	317.08	n/a	315.04	n/a
17-Nov-97	306.37	306.56	313.69	dry	315.52	n/a	315.58	315.59	315.46	313.98	313.96	317.05	n/a	315.00	n/a
17-Dec-97	306.18	306.46	313.53	dry	315.42	n/a	315.00	315.61	315.47	313.97	313.97	316.98	n/a	314.89	n/a
21-Jan-98	306.11	306.50	313.59	314.85	315.48	n/a	n/a	n/a	315.62	fr	n/a	fr	n/a	314.70	n/a
10-Jun-98	306.62	306.68	313.52	315.15	316.07	n/a	315.60	315.60	315.54	313.76	n/a	317.26	317.07	315.18	n/a
23-Oct-98	305.66	305.88	313.26	314.45	315.35	n/a	314.99	dry	dry	313.32	dry	316.60	dry	dry	n/a
24-Dec-98	305.25	305.64	312.89	314.43	315.06	n/a	315.08	dry	dry	313.72	dry	316.45	dry	dry	n/a
6-Apr-99	305.37	305.90	313.12	314.90	315.10	316.85	315.66	fr	315.59	314.15	313.94	317.11	dry	314.79	dry
18-Jun-99	305.33	305.65	313.22	314.70	315.27	316.53	315.51	dry	315.39	313.72	dry	316.76	dry	314.13	dry
22-Sep-99	305.02	305.10	312.68	dry	314.94	316.44	dry	dry	dry	dry	dry	316.16	dry	dry	dry
19-Nov-99	304.94	305.28	312.59	314.56	314.81	316.45	316.15	dry	dry	313.84	dry	316.13	dry	dry	dry
5-Apr-00	305.05	305.43	312.92	dry	314.96	316.80	315.53	dry	315.44	313.90	313.87	316.82	dry	dry	dry
16-Jun-00	305.48	305.99	313.85	315.30	315.64	316.93	315.82	315.79	316.71	313.96	313.91	317.24	317.02	dry	dry
19-Sep-00	305.64	305.94	313.75	314.97	315.74	316.58	315.54	dry	315.43	313.68	dry	317.11	dry	314.65	dry
7-Dec-00	305.43	305.80	313.27	dry	315.37	316.50	315.34	dry	dry	fr	fr	316.86	dry	314.24	dry
19-Mar-01	n/a	305.99	313.60	315.47	315.43	316.89	dry	n/a	315.63	314.13	n/a	317.02	dry	315.12	dry
14-Jun-01	305.93	306.25	314.20	315.29	315.95	316.85	315.70	315.69	315.61	313.86	313.85	317.22	dry	n/a	dry
1-Oct-01	306.12	305.67	315.25	314.59	315.19	316.45	315.05	dry	dry	313.27	dry	n/a	dry	313.71	dry
15-Dec-01	305.47	305.81	313.18	314.56	315.23	316.83	315.56	315.61	315.46	313.88	313.83	317.08	dry	314.48	dry
1-Apr-02	305.63	306.12	313.91	315.66	315.69	316.89	315.73	fr	315.64	313.86	313.94	316.96	dry	315.16	dry
4-Jul-02	306.23	306.45	314.68	315.99	316.12	316.86	315.72	315.71	315.66	313.80	313.79	317.27	317.06	n/a	dry
30-Sep-02	305.87	305.96	313.70	315.31	315.49	316.45	315.21	dry	dry	313.31	dry	316.94	dry	314.12	dry
10-Dec-02	305.56	305.73	313.02	314.46	315.28	316.48	315.09	dry	dry	313.51	dry	316.74	dry	313.87	dry
8-Apr-03	305.30	305.77	313.33	314.71	315.26	316.91	315.57	fr	315.53	fr	fr	317.00	fr	315.03	dry
15-Jul-03	305.75	306.03	313.80	315.61	315.74	316.69	315.63	dry	315.54	313.62	dry	317.03	dry	314.90	dry
20-Oct-03	305.63	305.85	313.93	314.60	315.67	316.74	315.55	315.60	315.48	313.77	313.74	316.94	dry	314.33	dry
21-Dec-03	305.95	306.20	314.33	316.18	316.01	316.93	fr	fr	315.65	fr	fr	317.04	dry	315.11	dry
24-Mar-04	306.13	306.49	314.71	316.26	316.16	317.00	fr	fr	315.68	fr	fr	317.05	dry	315.43	fr
3-Aug-04	305.69	306.66	316.11	314.47	316.06	316.76	315.63	315.62	315.58	313.68	dry	317.25	dry	315.41	315.40
8-Oct-04	306.24	306.30	314.25	315.22	315.69	316.45	315.32	dry	dry	313.32	dry	316.90	dry	314.77	dry
13-Dec-04	306.28	306.22	313.96	314.47	315.84	316.81	314.58	315.64	315.50	fr	fr	316.98	dry	314.83	dry
5-Apr-05	306.08	306.61	314.58	316.43	316.19	317.13	fr	fr	315.78	313.92	313.87	317.09	317.08	315.48	315.48
15-Jun-05	306.50	306.61	314.48	316.00	315.66	316.75	315.61	315.62	315.58	313.68	313.70	317.20	317.07	315.28	dry

Date	Water Level Elevation (mAMSL)														
	BH204	BH205	BH213	BH214	BH219	TP319	A3 GW	A3 SW	A4 GW	A5 GW	A5 SW	A8 GW	A8 SW	A10 GW	A10 SW
17-Oct-05	306.29	306.25	314.05	315.20	315.91	316.66	315.49	dry	315.45	313.60	dry	316.92	dry	314.38	dry
15-Dec-05	306.02	306.22	314.21	314.99	315.98	316.85	315.61	fr	315.60	313.82	fr	317.17	dry	314.84	dry
31-Mar-06	n/a	n/a	n/a	n/a	n/a	316.97	315.73	315.69	315.75	313.79	313.78	n/a	n/a	n/a	n/a
5-Apr-06	306.53	307.84	314.83	316.47	316.48	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6-Apr-06	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	317.35	317.30	315.69	315.69
7-Jul-06	306.43	306.67	315.51	316.01	317.79	316.60	315.50	315.48	316.75	313.68	313.69	n/a	n/a	315.21	dry
13-Oct-06	306.77	306.64	314.67	315.59	315.89	316.88	314.49	315.64	315.61	313.75	313.76	317.18	dry	315.13	dry
20-Dec-06	306.87	306.93	315.20	316.74	316.10	316.92	fr	fr	fr	fr	fr	fr	fr	fr	fr
15-Mar-07	306.82	307.00	315.14	316.15	316.06	317.15	fr	316.40	316.96	313.88	314.50	317.24	dry	315.75	dry
23-Jul-07	306.93	306.68	314.24	315.85	315.90	316.44	dry	dry	316.69	dry	dry	316.79	dry	315.65	dry
29-Oct-07	306.09	306.10	313.38	dry	315.49	dry	314.98	dry	dry	313.17	dry	317.11	dry	dry	dry
14-Dec-07	305.89	306.02	313.29	dry	315.43	316.45	315.14	n/a	315.52	313.56	n/a	316.97	n/a	dry	n/a
27-Mar-08	306.21	306.56	314.83	316.03	316.04	316.97	fr	fr	315.66	fr	fr	fr	fr	fr	fr
26-Jun-08	306.76	306.97	315.19	315.81	316.17	316.80	315.66	315.66	315.67	313.61	313.61	317.67	317.47	315.59	315.57
6-Oct-08	306.52	306.96	315.04	316.03	315.98	316.83	315.66	315.70	315.69	313.65	313.64	317.64	317.37	315.48	315.48
7-Dec-08	306.89	306.89	314.74	315.93	315.98	316.93	fr	fr	315.64	fr	fr	fr	fr	fr	fr
25-Mar-09	307.52	307.48	315.96	316.63	316.34	317.04	fr	fr	315.76	fr	fr	fr	fr	316.06	316.06
22-Jul-09	307.25	307.32	315.47	315.88	316.18	316.92	315.59	315.60	315.67	313.59	dry	317.77	317.67	315.79	315.79
7-Oct-09	306.82	306.97	314.81	315.40	315.91	316.73	315.49	315.54	315.56	313.63	313.63	317.81	317.29	315.43	315.40
8-Jan-10	306.39	306.65	314.28	315.03	315.81	316.84	315.58	fr	315.53	313.76	fr	317.06	fr	315.14	fr
26-Nov-12	305.75	305.96	313.55	315.00	315.58	316.75	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29-Jan-13	305.77	306.07	313.70	315.40	315.76	316.90	n/a	315.79	315.58	n/a	313.91	316.98	dry	314.38	dry
25-Apr-13	306.93	306.80	315.32	316.52	316.37	317.05	315.83	315.83	315.76	314.06	313.90	317.33	317.14	315.60	315.60
17-Jul-13	306.70	306.72	314.75	316.10	316.14	316.80	315.76	315.76	315.62	314.17	314.16	317.25	dry	315.75	dry
4-Oct-13	306.46	306.63	n/a	315.67	315.90	316.54	315.68	315.69	315.48	n/a	n/a	n/a	n/a	n/a	n/a
17-Dec-13	306.38	306.61	314.18	315.73	315.92	316.80	fr	fr	315.58	fr	fr	fr	fr	315.02	fr
13-Jan-14	306.50	306.68	314.33	315.76	315.98	316.86	fr	fr	315.64	fr	fr	fr	fr	315.10	fr

Note: 1997 to 2010 data as reported by Stantec
2012 data as measured by Groundwater Science Corp.

n/a = not available
fr = frozen

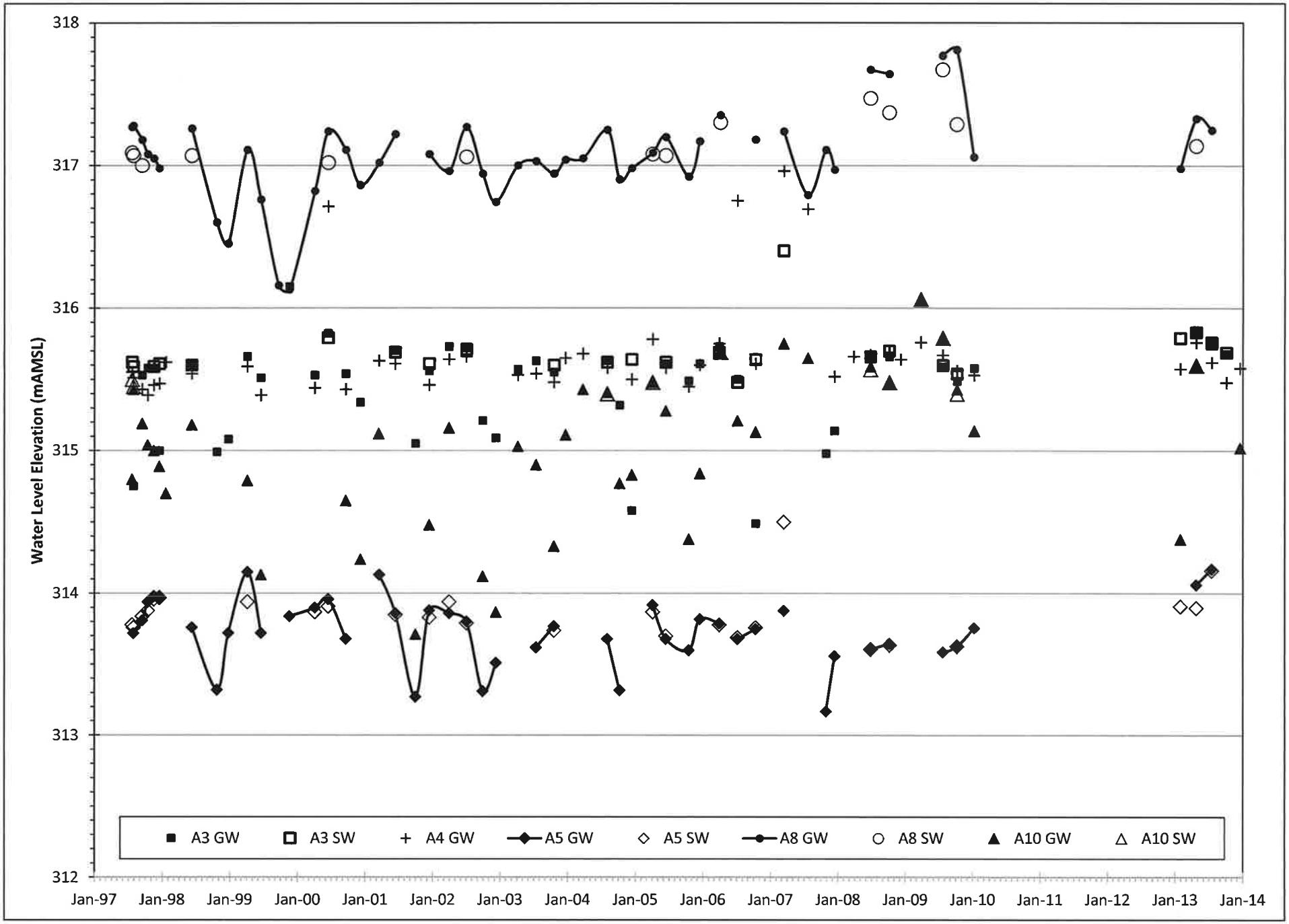
1997 to 2013 Maximum and Minimum Elevations (mAMSL)															
max	307.73	307.84	316.11	316.74	317.79	317.15	316.15	316.40	316.96	314.17	314.50	317.81	317.67	316.06	316.06
min	304.94	305.10	312.59	314.43	314.81	316.44	314.49	315.48	315.39	313.17	313.61	316.13	317.00	313.71	315.40



Capital Paving Inc.
Wellington Pit

Monitoring Well Hydrograph

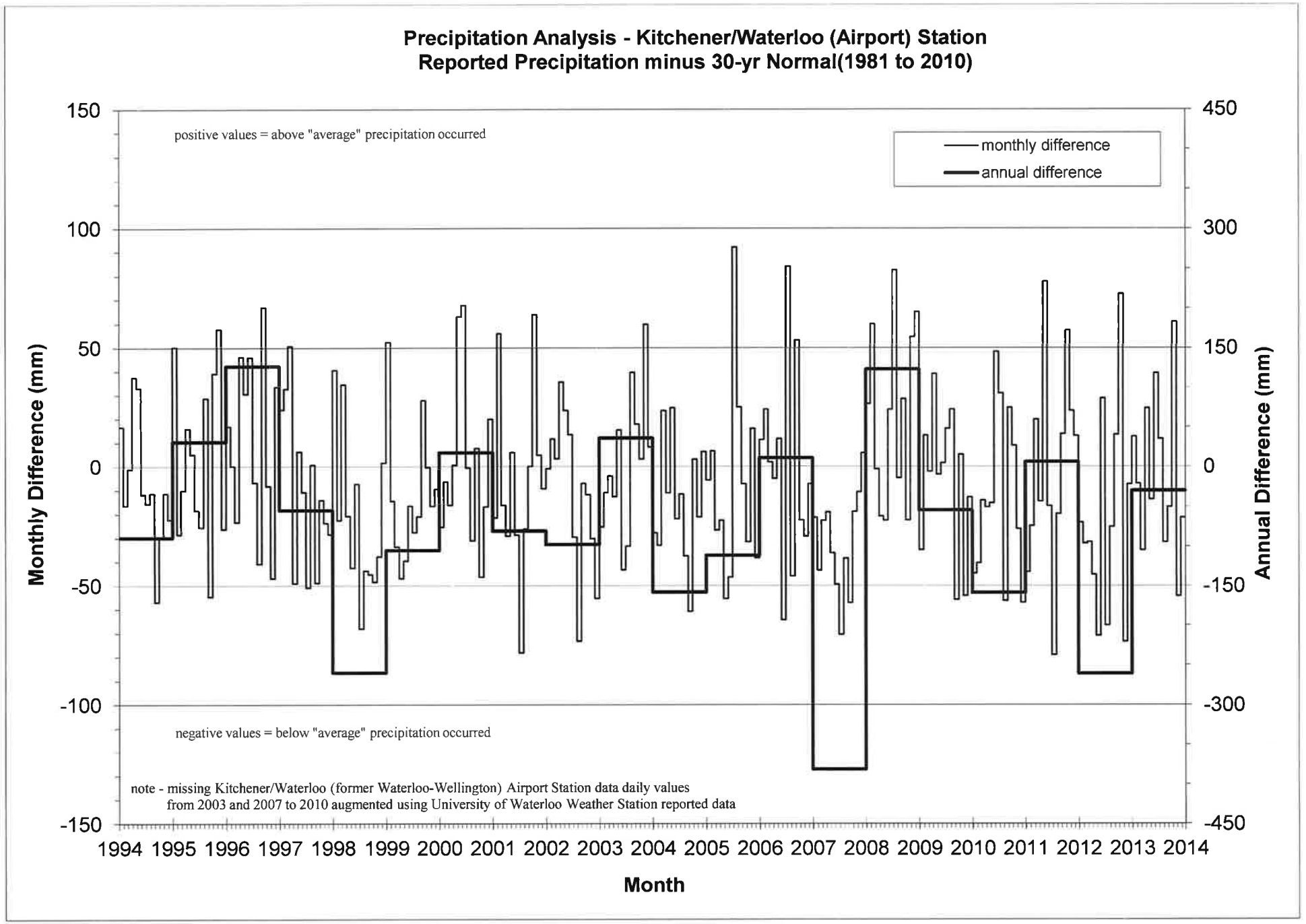
Annual Monitoring Report
Groundwater Science Corp.



Capital Paving Inc.
Wellington Pit

Piezometer Hydrograph

Annual Monitoring Report
Groundwater Science Corp.


Precipitation Analysis - Kitchener/Waterloo (Airport) Station
Reported Precipitation minus 30-yr Normal(1981 to 2010)
positive values = above "average" precipitation occurred
monthly difference
annual difference
negative values = below "average" precipitation occurred
note - missing Kitchener/Waterloo (former Waterloo-Wellington) Airport Station data daily values
from 2003 and 2007 to 2010 augmented using University of Waterloo Weather Station reported data
Monthly Difference (mm)
Annual Difference (mm)
150
100
50
0
-50
-100
-150
450
300
150
0
-150
-300
-450
1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
Month