

DARRYL M. ROBINS CONSULTING INC.
CIVIL & ENVIRONMENTAL ENGINEERING

M09010

December 31, 2014

Mr. Troy Cameron, Assistant Public Works Manager
The Municipality of Northern Bruce Peninsula
56 Lindsay Road 5, RR # 2
Lion's Head, ON
N0H 1W0

Mr. Leo-Paul Frigault, Cluster Manager
Ontario Clean Water Agency
PO Box 310
315 George Street
Warton, Ontario
N0H 2T0

**Re: 2014 Annual Report for Lakewood Subdivision Sewage System
Municipality of Northern Bruce Peninsula**

Dear Mr. Cameron & Mr. Frigault,

Darryl M. Robins Consulting Inc. (DMRC) is pleased to provide the following Annual Report for 2014. The following report outlines key elements of the sewage system and provides a brief discussion of the Consultant's observations at the site inspection. Please find attached to this report, the Inspection Reports dated November 18, 2014 and December 30, 2014, photos and Table Nos. 1 and 3.

The Ontario Clean Water Agency (OCWA) is the responsible authority for the operation and maintenance duties of the sewage system under contract to the Municipality of Northern Bruce Peninsula (Municipality). OCWA began these duties on July 1, 2009.

Sewage System Capacity:

From the records provided by the Municipality and OCWA as of November 18, 2014, there are currently 37 dwellings connected to the Lakewood Subdivision Sewage System. The original Certificate of Approval specified that each dwelling would be allotted a daily sewage flow of 1,200L/day for a maximum of 48 lots; therefore, the ultimate design daily sewage flow for the sewage system is 57,600L/day. With 37 dwellings online at present, the calculated daily sewage flow should be 44,400L/day.

OCWA has been maintaining records of the readings on the elapsed hour meters of the sewage dosing pumps for the tile field (See Table 1).

A pump test was completed on November 18, 2014 which resulted in the following sewage flow rates for the effluent pumps (See Table 2 09below). A significant change in flow rates was observed between the

pump test completed on November 1, 2013 and the pump test completed on November 18, 2014. OCWA reported that there were no repairs or replacement pumps installed that could justify the significant change in flows. Efforts were made to complete another pump test on December 30, 2014, but there was a constant inflow of sewage when the pump test had been scheduled. The sewage inflow would affect the results of the pump test; therefore it was decided to use the pump test results from November 2013. There was no means to stop the inflow of sewage to conduct the pump test on December 30, 2013. The dosing chamber valves and splitter valve chamber valves' positions in 2014 appeared to consistent with observations from 2013. (Please see the attached photos). OCWA and DMRC would continue to review pump flow rates.

Table 2: Pump Test Flow Rates

Pump	Flow Rates (L/min)	
	2014	2013
1	301.5	167.2
2	137.0	243.9

During normal operation it appears that the pumps are dosing the tile field with an average volume of approximately 7,000 L/day based on the respective pumping rates determined by the pumping tests conducted by OCWA and DMRC at the site meeting of November 1, 2013. The 2013 pumping rates should be used by OCWA personnel in recording and evaluating flows at the facility. The results from the dosing pump records suggest that the actual sewage flows being received by the system are substantially less than the design and that the sewage system should have sufficient capacity for completion of Phases 1 and 2B of the subdivision. The average daily sewage flow for 2014 (7,000 L/day) is approximately 8% less than the flows determined for 2013 (7,565 L/day).

The maximum daily sewage flow rate experienced in 2014 was 10,213 L/d which is substantially lower than the calculated daily sewage flows of 44,400 L/d for the 37 dwellings on-line in 2014.

Sampling Results:

OCWA took a sample of the sewage effluent during the 2014 annual inspection. The sample was analyzed by SGS Lakefield Research Limited and the results are shown on Table 3 (attached). The results of the Lakewood Subdivision sewage effluent sampling for the 2014 sampling event indicate that the sewage effluent is within typical values (or lower) and there are no adverse results within the parameters tested to suggest unsuitable treatment for discharge to the tile fields.

Physical Conditions of the Sewage System:

DMRC's inspector walked around the tile field and septic tank area during the inspection and there was snow covering the tile field. Observations of the tile field were limited by the presence of snow. Some vegetative cover was observed despite the snow. Mr. Mader (OCWA Operations) advised that the bare spots observed in 2013 had grown in. Signs of erosion were also observed at the north end of the tile bed. This area should be monitored.

There was no detectable septic odour encountered except within the vicinity of the access opening of the dosing chamber. One of the two valve stem handles has disintegrated due to the rust. Please see the attached photo. It is recommended that the valve stems be replaced.

The pump control panel and the dosing chamber appeared to be in good working order. The auto-dialer system was able to "call-out" during the inspection.

The splitter valve chamber was inspected and although the chamber did contain some water, there appears to be no need for concern and the valves are above the water level.

OCWA advised that the annual inspection of the collection system was completed on December 29, 2014 and no major deficiencies were reported.

Annual Report Recommendations:

1. OCWA and the Municipality should replace the effluent discharge control valve stems.
2. The "Dosing Pump Elapsed Time Weekly Record Sheets" provided in the Operations and Maintenance Manual originally provided by Henderson Paddon & Associates for recording and collecting data on dosing pump operation should continue to be used by operations staff. Operators should continue to keep a project-specific journal of their site visits, alarm conditions, maintenance, repairs and observations.
3. Operations staff should continue to monitor the air relief valve at SANMH2. There had been maintenance issues with the air relief valve in the past.
4. The Municipality should update the existing Operations and Maintenance Manual to accurately incorporate the upgraded dosing pump components.

It is the writer's overall opinion that the system is in good working order, and that the housing development within Phases 1 and 2B of the subdivision should continue with regards to the available capacity of the subdivision's existing sewage system.

Should you have any questions or concerns with the above and enclosed, please do not hesitate to contact the writer.

Yours truly,

DARRYL M. ROBINS CONSULTING INC.



Laura Swanson, P.Eng.
Civil-Environmental Engineer

LAS/br
Encl.

Cc: Mr. Bob Hart, CPHI, Public Health Manager, Grey Bruce Health Unit

Mr. John Nichol, Lakewood Subdivision Ratepayer's Association
Mr. David Trombley, OCWA (via email)

DARRYL M. ROBINS CONSULTING INC.
CIVIL & ENVIRONMENTAL ENGINEERING

INSPECTOR'S REPORT:

Project Title:	<u>Lakewood Subdivision</u>	Inspection Date:	<u>Nov. 18, 2014</u>
Inspector:	<u>Laura Swanson, P.Eng</u>	Inspection Time:	<u>10:00 am</u>
Location:	<u>Lakewood Subdivision</u>	File No.:	<u>M09010</u>

- The writer met with Mr. Paul Mader (Operations, OCWA) on November 18, 2014 at 10:00 am.
- There was only detectable septic odour encountered when the writer was in the vicinity of the dosing chamber.
- The writer observed the elapsed time meters at Pump No. 1 and 2 in operation during trials of dosing cycles at the site meeting. The elapsed time meter readings were noted at:

Pump No. 1	699.82 Hrs
Pump No. 2	552.46 Hrs
- Pumping rate tests were conducted on the effluent pumps at this inspection. Each pump was run for 4 minutes Ms. Swanson recorded the readings and completed the calculations in the office. The resulting effluent pump rates were calculated to be:

Pump No. 1:	301.5 L/min
Pump No. 2:	137.0 L/min
- Mr. Mader advised that there had been no major issues with the septic system this year.
- Mr Mader advised that a new alarm system had been installed (United Security Products). A test on the high level alarm was conducted at the site meeting. The alarm beacon and high level alarm light on the control box appeared to be in satisfactory working condition. OCWA reported that the alarm call was received on the designated phone numbers.
- A power failure test was completed to verify that the auto-dialer would call out. The auto dialer did not call out. OCWA advised verified on November 18th, that the alarm calls out after 3 minutes. The power was not off long enough during the inspection. OCWA tested the autodialer for a power failure alarm on Wednesday November 19th and it functioned as designed.
- Mr. Mader confirmed that the alarm parameters described below are correct.

Station telephone number: 519-793-4434

The alarm dialer will call out for the following conditions:

- a) Pump Failure
- b) High Level Alarm
- c) Power Failure

The current alarm call-out protocol is as follows:

1. OCWA operator on-call cell phone 519-372-3034
2. Lion' Head Water Treatment Plant 519-793-6900
3. Warton Water Treatment Plant 519-534-1610

- The writer walked over the tile field looking for any signs of vandalism, rodent infestation, erosion or breakouts. There was snow covering the tile field, so the tile field was not visible. The writer inquired if the bare spots observed at the 2013 inspection had been rectified. Mr. Mader confirmed that the bare spots had been filled and the tile field was in adequate condition at his last inspection.
- The discharge control valve stems (dosing chamber) that control discharge to the tile fields were operable, however the handles are rusty and in poor condition.
- An inspection of the splitter valve chamber to the tile fields was conducted. There were no deficiencies noted. The chamber did contain some water; the valves were above the water level. The water was clear and expected to be from infiltration. The poly-seal (bowl) was full of water and is therefore functioning adequately.
- The control panel, enclosure and associated equipment appeared to be in good condition and operating normally.
- OCWA identified that the annual inspection of the maintenance holes had been completed but was the results were inconclusive.
- Digital photos of the existing conditions of the sewage system were taken and are saved under the project file number at Darryl M. Robins Consulting Inc.
- Mr. Mader took samples of the sewage effluent from the dosing chamber at the facility for lab analysis on November 17, 2014 as part of their regular routine. Leo-Paul forwarded a copy of the chain of custody. The sample results will be forwarded upon receipt.

Report finalized on December 30, 2014.

DARRYL M. ROBINS CONSULTING INC.



Laura Swanson, P.Eng
Civil – Environmental Engineer

DARRYL M. ROBINS CONSULTING INC.
CIVIL & ENVIRONMENTAL ENGINEERING

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Location:	<u>Lakewood Subdivision</u>	File No.:	<u>M09010</u>

- The writer met with Mr. Leo-Paul Frigault (Operations, OCWA) on December 30, 2014 at 10:00 am to complete another pump test.
- There was a detectable septic odour encountered when the writer was in the vicinity of the dosing chamber.
- Mr. Frigault and the writer prepared to complete the pump test. It was noted that there was sewage was trickling in from the septic tank, when the dosing chamber was opened. However, the flow increased during the final preparations to complete the pump test. The increased flow continued for the duration of the inspection. The pump test could not be completed because the significant inflow would have an effect on the pump test. It was decided that DMRC would use the pump test results from 2013 for the preparation of the 2014 annual report. Efforts would be made to verify the pump rates. Mr. Frigault advised that he would inspect some maintenance holes when he leaves the site to check if the sewage flows were from infiltration.
- The writer walked over the tile field looking for any signs of vandalism, rodent infestation, erosion or breakouts. There was some snow covering the tile field, so the tile field was not completely visible. The writer did observe that there was vegetative cover over tile bed.
- The discharge control valve stems (dosing chamber) that control discharge to the tile fields are rusty and in poor condition.
- An inspection of the splitter valve chamber to the tile fields was conducted. There were no deficiencies noted. The chamber did contain some water; the valves were above the water level. The water was clear and expected to be from infiltration. The poly-seal (bowl) was full of water and is therefore functioning adequately.
- Mr. Frigault advised that the maintenance hole inspection had been completed on December 29, 2014. All the maintenance holes were in satisfactory condition. The maintenance hole closest to the septic system (SANMH10) contained some roots. The roots were removed.
- Digital photos of the existing conditions of the sewage system were taken and are saved under the project file number at Darryl M. Robins Consulting Inc.

TABLE 1
DOSING PUMP RECORDS
(ELAPSED TIME METER READINGS)
LAKEWOOD SUBDIVISION
OCTOBER 31, 2013 - NOVEMBER 18, 2014

DATE	TIME	PUMP NO. 1				PUMP NO. 2				COMBINED AVERAGE DAILY FLOW (L/d)	OPERATOR'S NOTES
		RECORDED RUN TIME (hrs)	ELAPSED PUMP TIME (hr)	VOLUME PUMPED (L)	ELAPSED TIME (days)	AVERAGE DAILY FLOW (L/d)	RECORDED RUN TIME (hrs)	ELAPSED PUMP TIME (hr)	VOLUME PUMPED (L)		
31-Oct-13	11:20:00	588.65	1.53	15,349	2.178	444.57	1.63	23,853	7.05	3,384	RSS OK
07-Nov-13	12:30:00	590.18	1.53	15,349	2.178	446.20	1.63	23,853	7.05	3,384	5,562 RSS
14-Nov-13	14:20:00	592.34	2.16	21,669	3.062	448.35	2.15	31,463	7.08	4,446	7,508 RSS
21-Nov-13	11:15:00	593.89	1.55	15,550	2.263	449.93	1.58	23,122	6.87	3,355	5,628 RSS
28-Nov-13	10:32:00	595.76	1.87	18,760	2.691	451.73	1.80	26,341	6.97	3,779	6,471 RSS
05-Dec-13	08:40:00	597.25	1.49	14,948	2.159	453.45	1.72	25,170	6.92	3,636	5,796 RSS ALARM
12-Dec-13	13:00:00	599.27	2.02	20,265	2.822	455.29	1.84	26,927	7.18	3,750	6,572 RSS
19-Dec-13	11:20:00	601.02	1.75	17,556	2.533	456.90	1.61	23,561	6.93	3,400	5,933 RSS
26-Dec-13	12:20:00	603.37	2.35	23,575	3.348	459.23	2.33	34,097	7.04	4,842	8,190 RSS ALARM
02-Jan-14	09:35:00	606.11	2.74	27,488	3.992	461.80	2.57	37,609	6.89	5,462	9,454 RSS OK
09-Jan-14	09:50:00	608.20	2.09	20,967	2.991	463.81	2.01	29,414	7.01	4,196	7,187 RSS OK
16-Jan-14	09:06:00	610.01	1.81	18,158	2.605	465.88	1.87	27,366	6.97	3,927	6,532 RSS OK ALARM
24-Jan-14	08:20:00	611.63	1.62	16,252	2.040	467.38	1.70	24,878	7.97	3,122	5,162 RSS OK/CHECK
31-Jan-14	13:16:00	613.16	1.53	15,349	2.130	468.64	1.26	18,439	7.21	2,559	4,589 RSS OK
06-Feb-14	09:15:00	614.54	1.38	13,844	2.574	470.27	1.63	23,853	5.83	4,090	6,463 RSS OK ALARM
13-Feb-14	09:25:00	616.32	1.78	17,857	2.548	471.71	1.44	21,073	7.01	3,007	5,556 RSS OK
20-Feb-14	10:45:00	618.05	1.73	17,355	2.460	473.33	1.62	23,707	7.06	3,300	5,820 RSS OK
07-Mar-14	08:30:00	622.26	2.47	24,779	3.134	477.32	2.17	31,756	7.91	4,017	7,151 RSS OK
13-Mar-14	08:05:00	623.82	1.56	15,650	2.616	478.90	1.58	23,122	5.98	3,855	6,481 RSS OK
20-Mar-14	08:50:00	625.34	1.52	15,249	2.169	480.40	1.50	21,951	7.03	3,122	5,291 RSS OK
27-Mar-14	10:10:00	626.66	1.32	13,242	1.877	481.69	1.29	18,878	7.06	2,676	4,552 RSS OK
03-Apr-14	08:20:00	628.10	1.44	14,446	2.086	483.20	1.51	22,097	6.92	3,192	5,278 RSS OK
10-Apr-14	13:00:00	630.41	2.31	23,174	3.221	485.31	2.11	30,878	7.19	4,292	7,513 RSS OK ALARM
17-Apr-14	09:30:00	632.20	1.79	17,957	2.620	487.07	1.76	25,756	6.85	3,758	6,378 RSS OK
22-Apr-14	18:00:00	634.50	2.30	23,074	4.309	489.23	2.16	31,609	5.35	5,904	10,213 ALARM 2 OVERLOAD TLP
24-Apr-14	13:30:00	634.88	0.38	3,812	2.103	489.55	0.42	6,146	1.81	3,391	5,494 RSS OK
01-May-14	09:30:00	637.04	2.16	21,669	3.171	491.58	1.93	28,244	6.83	4,133	7,304 RSS ALARM
08-May-14	14:00:00	639.15	2.11	21,168	2.945	493.50	1.92	28,097	7.19	3,909	6,854 RSS/HEATER OFF
15-May-14	10:50:00	641.17	2.02	20,265	2.951	495.46	1.96	28,683	6.87	4,176	7,127 RSS
22-May-14	13:00:00	643.66	2.49	24,980	4.984	498.04	2.58	37,756	7.09	5,325	8,848 RSS ALARM
29-May-14	13:00:00	645.64	1.98	19,863	2.638	500.00	1.96	28,683	7.00	4,098	6,935 RSS
06-Jun-14	11:30:00	648.16	2.52	25,281	3.185	502.24	2.24	32,780	7.94	4,130	7,315 RSS OK
12-Jun-14	10:30:00	649.78	1.62	16,252	2.728	503.77	1.53	22,390	5.96	3,758	6,485 RSS OK ALARM
19-Jun-14	12:23:00	651.82	2.04	20,465	2.891	506.06	2.29	33,512	7.08	4,734	7,626 RSS OK
03-Jul-14	10:00:00	655.93	5.11	51,264	3.688	511.07	5.01	73,316	13.90	5,274	8,962 RSS OK
10-Jul-14	11:20:00	659.34	2.41	24,177	3.427	513.42	2.35	34,390	7.06	4,874	8,301 RSS OK
18-Jul-14	11:20:00	661.91	2.57	25,782	3.223	515.57	2.15	31,463	8.00	3,933	7,156 RSS OK
24-Jul-14	09:40:00	664.19	2.28	22,873	3.857	517.95	2.38	34,829	5.93	5,873	9,730 RSS ALARM CHECK
01-Aug-14	08:25:00	666.85	2.66	26,685	3.557	520.74	2.79	40,829	7.95	5,137	8,495 CHECK
07-Aug-14	12:25:00	669.07	2.22	22,271	3.612	523.97	2.23	32,634	6.17	5,292	8,903 CHECK
14-Aug-14	06:30:00	671.86	2.59	25,983	3.847	525.05	2.08	30,439	6.75	4,507	8,354 CHECK RSS OK
21-Aug-14	10:30:00	674.22	2.56	25,682	3.584	527.62	2.57	37,609	7.17	5,248	8,831 RSS OK
30-Aug-14	12:00:00	677.66	3.64	36,516	4.029	531.05	3.43	50,195	9.06	5,539	9,568 RSS OK
04-Sep-14	11:45:00	679.67	1.81	18,158	3.639	532.81	1.76	25,756	4.99	5,162	8,801 RSS OK
09-Sep-14	12:00:00	681.23	1.56	15,650	3.123	534.09	1.28	18,732	5.01	3,739	6,862 RSS OK
18-Sep-14	08:00:00	683.32	2.09	20,957	2.374	536.32	2.23	32,634	8.83	3,694	6,068 RSS OK
24-Sep-14	09:25:00	685.12	1.80	18,058	2.980	537.83	1.51	22,097	6.06	3,647	6,627 RSS OK
02-Oct-14	10:50:00	686.92	1.80	18,058	2.241	539.84	2.01	29,414	8.06	3,650	5,891 RSS OK
08-Oct-14	10:30:00	688.65	1.73	17,355	2.899	541.53	1.89	24,731	5.99	4,131	7,031 RSS OK
16-Oct-14	13:50:00	690.72	2.07	20,766	2.551	543.82	2.29	33,512	8.14	4,117	6,669 RSS OK ALARM
23-Oct-14	11:00:00	692.69	1.97	19,763	2.872	545.71	1.89	27,658	6.88	4,019	6,891 RSS OK
31-Oct-14	11:30:00	694.81	2.12	21,288	2.652	547.67	1.96	28,683	8.02	3,576	6,228 OK
06-Nov-14	14:00:00	696.61	1.80	18,058	2.958	549.28	1.61	23,561	6.10	3,860	6,818 OK RSS
14-Nov-14	09:35:00	698.82	2.21	22,171	2.837	551.41	2.13	31,170	7.82	3,988	6,825 OK
18-Nov-14	10:00:00	699.82	1.00	10,032	2.497	552.46	1.05	15,365	4.92	3,825	6,322 INSPECTION

PUMP 1
YEARLY AVERAGE DAILY FLOW:
MAX. DAILY FLOW RATE:

2,896 L/d
4,309 L/d
7,000 L/d
10,213 L/d

1

PUMP 2
YEARLY AVERAGE DAILY FLOW:
MAX. DAILY FLOW RATE:

4,104 L/d
5,904 L/d

PUMPING TEST FLOW RATES:
PUMP #1: 167.2 L/min
PUMP #2: 243.9 L/min

(NOV 1, 2013)

DARRYL M. ROBINS CONSULTING INC.
CIVIL & ENVIRONMENTAL ENGINEERING

Dec 30, 2014

Lakewood Subdivision – Sewage System

Photo ID: DSCF1944: Splitter Valve Chamber



Photo ID: DSCF1946: Dosing Chamber Valves



TABLE 3
 LAB ANALYSIS RESULTS OF SEPTIC TANK EFFLUENT
 LAKEWOOD SUBDIVISION SEWAGE SYSTEM
 2014 ANNUAL INSPECTION REPORT

Date	BOD mg/L	Total Suspended Solids mg/L	pH pH units	Nitrate mg/L	Ammonia (N) Total mg/L	Total Kjeldahl Nitrogen mg/L	Phosphorus Total mg/L
May 30/03	155	76	7.38	0.2	58.8	75.8	10.7
Sept. 7/04	82	22	7.35	0.1	62.4	70.9	9.88
Sept. 19/05	53	44	7.41	<0.1	63.9	75.5	10.6
Sept. 22/06	93	90	7.47	0.1	63.4	74.6	9.65
Nov. 26/07	64	18	7.7	<0.1	59.1	67.4	9.49
Nov. 18/08	81	32	8.12	0.1	68.5	71.1	9.6
Nov. 24/09	62	44	N/A	<0.05	74.5	73.9	9.59
Oct. 19/10	74	23	7.77	<0.06	69.9	66.3	10.1
Nov. 15/11	74	10	7.85	<0.05	63.1	63.7	8.85
Oct. 16/12	89	98	8.00	<0.05	68.5	70.3	10.2
Nov. 1/13	46	26	7.88	<0.06	76.2	84	10.4
Nov. 17/14	57	18	7.49	<0.06	60.8	70.1	8.55
Typical Concentration Range for Septic Effluent	140 to 200	50 to 100				40 to 100	5 to 15

- Typical concentration range for septic tank effluent were obtained from the USEPA On-Site Wastewater Treatment Systems Manual

- Lab Analysis Conducted by Caduceon Environmental Laboratories Inc (2003-2008)

- Lab Analysis Conducted by SGS Lakefield Research (2009-2014)

N/A - sample parameter result not provided