

DARRYL M. ROBINS CONSULTING INC.
CIVIL & ENVIRONMENTAL ENGINEERING

M09010

January 23, 2017

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

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

**Re: 2016 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 2016. 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 Report dated November 14, 2016, 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, 2016, 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 flow test was completed on December 15, 2015 which resulted in the following sewage flow rates for the effluent pumps (See Table 2 below).

Table 2: Pump Test Flow Rates

Pump	Flow Rates (L/min)
1	219.2
2	219.2

During normal operation it appears that the pumps are dosing the tile field with an average volume of approximately 7,598 L/day based on the respective pumping rates determined by the pumping tests conducted by OCWA and DMRC at the site meeting of December 15, 2015. The 2015 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 2016 (7,598 L/day) is approximately 0.3% lower than the flows determined for 2015 (7,623 L/day).

The maximum daily sewage flow rate experienced in 2016 was 11,915 L/d which is substantially lower than the theoretical daily sewage flow of 44,400 L/d for the 37 dwellings on-line in 2016.

Sampling Results:

OCWA took a sample of the sewage effluent during the 2016 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 2016 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. Some minor bare spots were observed on the slopes of the tile bed. There were also signs of erosion on the top of slope at the southeastern and southwestern corners of the tile bed. It is suggested that these areas be topsoiled and seeded in the spring. Please refer to the attached photos.

There was no detectable septic odour encountered except within the vicinity of the access opening of the dosing chamber. Both of the two (2) valve stem handles and brackets have disintegrated due to corrosion. Please see the attached photo. It is recommended that the valve stems and brackets be replaced as soon as possible.

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 November 2, 2017 and no major deficiencies were reported.

Annual Report Recommendations:

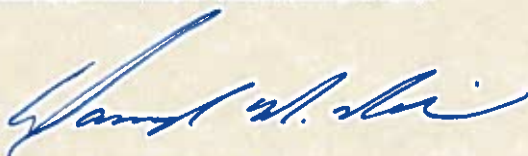
1. OCWA and the Municipality should replace the effluent discharge control valve stems and brackets as soon as possible.
2. The "Dosing Pump Elapsed Time Weekly Record Sheets" provided in the Updated Operations and Maintenance Manual should continue to be used by operations staff. Operators should continue 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 have been maintenance issues with the air relief valve in the past and the liquid contents of the chamber appear to be of a septic nature.
4. The hole in the dosing chamber lid for the safety chain attachment is corroded and the hole should be relocated and redrilled to ensure that there is adequate strength to support the weight of the lid structure.

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.



Darryl M. Robins, P.Eng.
President
Civil-Environmental Engineer
Designated Consulting Engineer

DMR/br
Encl.

cc: Mr. Bob Hart, CPHI, Public Health Manager, Grey Bruce Health Unit
Mr. Scot Roberts, Lakewood Subdivision Ratepayer's Association
Ms. Camille Leung, OCWA (via email)

TABLE 1
DOSING PUMP RECORDS
(ELAPSED TIME METER READINGS)
LAKEWOOD SUBDIVISION
DECEMBER 15, 2015 - NOVEMBER 14, 2016

DATE	TIME	Time (dec)	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)	ELAPSED TIME (days)	AVERAGE DAILY FLOW (L/d)			
15-Dec-15	10:27:00 AM	0.00	806.94												
24-Dec-15	10:57:00 AM	10.95	808.71	1.77	23,284	9.46	2,462	658.40	1.95	25,652	9.46	2,713	5,175	OK	
29-Dec-15	4:17:00 PM	16.28	810.83	2.12	27,888	5.22	5,340	660.34	1.94	25,520	5.22	4,887	10,227	OK	
05-Jan-16	1:07:00 PM	13.12	813.14	2.31	30,387	7.87	3,862	662.60	2.26	29,729	7.87	3,779	7,641	OK	
12-Jan-16	12:00:00 PM	12.00	814.32	1.18	15,522	5.95	2,607	663.73	1.13	14,865	5.95	2,997	5,104	OK TESTED/HL FLOAT/ALARM	
19-Jan-16	12:58:00 PM	12.97	815.82	1.50	19,732	7.04	2,803	665.01	1.28	16,838	7.04	2,392	5,194	OK	
26-Jan-16	11:25:00 AM	11.42	817.57	1.75	23,021	6.94	3,319	666.86	1.85	24,336	6.94	3,509	6,828	OK	
05-Feb-16	8:06:00 AM	8.10	819.55	1.98	26,046	9.86	2,641	669.06	2.20	28,940	9.86	2,935	5,576	OK	
11-Feb-16	1:00:00 PM	13.00	820.93	1.38	18,153	6.20	2,926	670.39	1.33	17,496	6.20	2,820	5,746	OK	
19-Feb-16	8:37:00 AM	8.62	822.92	1.99	26,178	7.82	3,349	672.07	1.68	22,100	7.82	2,827	6,176	OK TESTED/HL FLOAT	
25-Feb-16	11:20:00 AM	11.33	824.36	1.44	18,943	6.11	3,099	673.59	1.52	19,995	6.11	3,271	6,369	OK	
03-Mar-16	10:31:00 AM	10.52	825.74	1.38	18,153	6.97	2,606	675.10	1.54	20,258	6.97	2,908	5,514	OK	
11-Mar-16	9:01:00 AM	9.02	827.63	1.89	24,862	7.94	3,132	676.90	1.77	23,284	7.94	2,933	6,066	OK	
16-Mar-16	1:14:00 PM	13.23	828.98	1.35	17,759	5.18	3,431	678.40	1.50	19,732	5.18	3,812	7,244	OK	
29-Mar-16	8:20:00 AM	8.33	832.32	3.34	43,936	12.80	3,434	681.69	3.29	43,279	12.80	3,382	6,816	OK	
05-Apr-16	9:00:00 AM	9.00	833.94	1.62	21,311	7.03	3,032	683.52	1.83	24,073	7.03	3,425	6,458	OK TESTED/HL FLOAT	
14-Apr-16	10:04:00 AM	10.07	836.37	2.43	31,966	9.04	3,534	685.74	2.22	29,203	9.04	3,229	6,763	OK	
20-Apr-16	2:58:00 PM	14.97	838.14	1.77	23,284	6.20	3,753	687.56	1.82	23,941	6.20	3,859	7,612	OK	
28-Apr-16	9:02:00 AM	9.03	839.89	1.75	23,021	7.75	2,969	689.48	1.92	25,257	7.75	3,258	6,227	OK TESTED/HL FLOAT	
03-May-16	1:15:00 PM	13.25	841.16	1.27	16,706	5.18	3,228	690.61	1.13	14,865	5.18	2,872	6,100	OK	
10-May-16	8:18:00 PM	20.30	842.91	1.75	20,301	7.29	3,156	692.29	1.88	22,100	7.29	3,630	6,186	OK	
20-May-16	12:34:00 PM	12.57	845.06	2.15	28,282	9.68	2,922	694.93	2.64	34,728	9.68	3,588	6,511	OK	
30-May-16	3:49:00 PM	15.82	848.12	3.06	40,253	10.14	3,972	697.49	2.56	33,676	10.14	3,323	7,294	OK RSS	
8-Jun-16	9:28:00 AM	9.47	850.56	2.44	32,097	8.74	3,674	700.16	2.67	35,123	8.74	4,021	7,695	OK	
18-Jun-16	3:54:00 PM	15.90	853.18	2.62	34,465	10.27	3,357	702.54	2.38	31,308	10.27	3,049	6,406	OK HL FLOAT/ALARM TEST	
24-Jun-16	1:40:00 PM	13.67	854.73	1.55	20,390	5.91	3,452	704.24	1.70	22,363	5.91	3,786	7,238	OK	
30-Jun-16	10:10:00 AM	10.17	856.45	1.72	22,626	5.85	3,885	705.92	1.68	22,100	5.85	3,775	7,640	OK	
7-Jul-16	3:33:00 PM	15.55	859.49	3.04	39,990	7.22	5,535	708.88	2.96	38,938	7.22	5,390	10,925	OK	
12-Jul-16	11:53:00 AM	11.88	861.41	1.92	25,257	4.85	5,211	710.70	1.82	23,941	4.85	4,939	10,150	OK	
22-Jul-16	3:24:00 PM	15.40	864.99	3.58	47,094	10.15	4,641	714.50	3.84	50,514	10.15	4,978	9,620	OK	
26-Jul-16	10:01:00 AM	10.02	866.55	1.56	20,521	3.78	5,435	716.40	1.66	24,468	3.78	6,480	11,915	OK HL FLOAT/TEST	
5-Aug-16	8:30:00 AM	8.50	871.12	4.57	60,117	9.94	6,050	720.74	4.34	57,091	9.94	5,745	11,795	OK	
9-Aug-16	2:43:00 PM	14.72	872.60	1.48	19,469	4.26	4,571	722.28	1.54	20,258	4.26	4,757	9,328	OK	
17-Aug-16	10:04:00 AM	10.07	875.43	2.83	37,228	7.81	4,769	725.30	3.02	39,727	7.81	5,089	9,858	OK	
24-Aug-16	9:12:00 AM	9.20	877.79	2.36	31,045	6.96	4,656	727.54	2.24	29,466	6.96	4,231	8,889	OK HL FLOAT/ALARM TEST	
2-Sep-16	10:51:00 AM	10.85	881.00	3.21	42,226	9.07	4,856	730.67	3.13	41,174	9.07	4,540	9,196	OK	
7-Sep-16	9:42:00 AM	9.70	882.81	1.81	23,810	4.95	4,808	732.69	2.02	26,572	4.95	5,366	10,174	OK	
14-Sep-16	3:02:00 PM	15.03	884.93	2.12	27,888	7.22	3,861	734.60	1.91	25,125	7.22	3,479	7,340	OK	
22-Sep-16	8:26:00 AM	8.43	886.64	1.71	22,494	7.73	2,912	736.45	1.85	24,336	7.73	3,150	6,062	OK HL FLOAT/ALARM TEST	
1-Oct-16	10:20:00 AM	10.33	888.98	2.34	30,782	9.08	3,390	738.84	2.39	31,440	9.08	3,463	6,853	OK	
3-Oct-16	11:35:00 AM	11.58	889.66	0.68	8,945	2.05	4,359	739.41	0.57	7,498	2.05	3,654	8,013	OK	
12-Oct-16	9:05:00 AM	9.35	892.79	3.13	41,174	8.91	4,623	742.40	2.99	39,332	8.91	4,416	9,039	OK	
18-Oct-16	9:21:00 AM	9.25	894.96	2.17	28,546	6.00	4,761	744.93	2.53	33,281	6.00	5,551	10,312	OK	
28-Oct-16	9:15:00 AM	16.70	897.73	2.77	36,438	10.31	3,534	746.90	1.97	25,915	10.31	2,513	6,048	OK	
2-Nov-16	4:42:00 PM	12.03	898.55	0.82	10,787	4.81	2,245	748.90	2.00	26,309	4.81	5,475	7,719	OK HL MTC	
14-Nov-16	12:02:00 PM	0.00	901.99	3.44	45,252	11.50	3,935	751.64	2.74	36,044	11.50	3,135	7,070	OK HL FLOAT/ALARM TEST	

PUMPING TEST FLOW RATES:
PUMP #1: 219.2 L/min
PUMP #2: 219.2 L/min
(DEC 15/15)

PUMP 1
YEARLY AVERAGE DAILY FLOW: 3,771 L/d
MAX. DAILY FLOW RATE: 6,050 L/d
COMBINED AVERAGE DAILY FLOW RATE: 7,598 L/d
COMBINED MAXIMUM DAILY FLOW RATE: 11,915 L/d
ASSUMED ERRONEOUS READINGS: 0

PUMP 2
YEARLY AVERAGE DAILY FLOW: 3,827 L/d
MAX. DAILY FLOW RATE: 6,480 L/d

TABLE 3
 LAB ANALYSIS RESULTS OF SEPTIC TANK EFFLUENT
 LAKEWOOD SUBDIVISION SEWAGE SYSTEM
 2016 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	0.20	58.80	75.80	10.70
Sept. 7/04	82	22	7.35	0.10	62.40	70.90	9.88
Sept. 19/05	53	44	7.41	<0.1	63.90	75.50	10.60
Sept. 22/06	93	90	7.47	0.10	63.40	74.60	9.65
Nov. 26/07	64	18	7.7	<0.1	59.10	67.40	9.49
Nov. 18/08	81	32	8.12	0.10	68.50	71.10	9.60
Nov. 24/09	62	44	N/A	<0.05	74.50	73.90	9.59
Oct. 19/10	74	23	7.77	<0.06	69.90	66.30	10.10
Nov. 15/11	74	10	7.85	<0.05	63.10	63.70	8.85
Oct. 16/12	89	98	8.00	<0.05	68.50	70.30	10.20
Nov. 1/13	46	26	7.88	<0.06	76.20	84.00	10.40
Nov. 17/14	57	18	7.49	<0.06	60.80	70.10	8.55
Dec. 15/15	72	19	7.59	<0.06	64.60	67.00	8.59
Nov. 14/16	53	26	7.59	<0.06	71.30	66.50	7.80
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 was 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 (2009-2016)

N/A - sample parameter result not provided

DARRYL M. ROBINS CONSULTING INC.
CIVIL & ENVIRONMENTAL ENGINEERING

INSPECTOR'S REPORT:

Project Title:	<u>Lakewood Subdivision</u>	Inspection Date:	<u>Nov. 14, 2016</u>
Inspector:	<u>Darryl Robins, P.Eng</u>	Inspection Time:	<u>12:00 PM</u>
Location:	<u>Lakewood Subdivision Sewage System</u>	File No.:	<u>M09010</u>

- The writer met with Mr. Charles Theriault (Operations, OCWA) on November 14, 2016 at 12:00 pm.
- There was only a detectable septic odour encountered at the facility when the dosing chamber lid was lifted.
- Pumping rate tests were not conducted on the effluent pumps at this inspection. There have been no pump upgrades or modifications to the system; therefore, it was decided to forego pump tests at this inspection and use those determined in 2015:

Pump No. 1:	219.2 L/min
Pump No. 2:	219.2 L/min
- The elapsed time meter readings were noted at:

Pump No. 1	901.99 Hrs
Pump No. 2	751.65 Hrs
- Mr. Theriault advised that no high level alarms had been recorded recently. 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. Mr. Theriault noted that the alarm dialer was now powered by the pump control circuit rather than the facility's GFI power outlet circuit which has reduced false alarms and related issues at the facility.

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 Northern Bruce Peninsula Operator On-call cell phone: 519-372-4807
2. Lion' Head Water Treatment Plant: 519-793-6900

3. Warton Water Treatment Plant: 519-534-1610

- The septic tank's influent chamber was inspected. The tank liquid appeared to be at the proper operating level. Mr. Theriault checked the depth of sludge in the bottom of the septic tank and no sludge accumulation was observed. He advised that little sludge was noted. Pumping out the septic tank did not appear to be required.
- The discharge control valve stems (dosing chamber) that control discharge to the tile fields were not operable, the handles and support brackets are severely rusted 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, but the valves were above the water level. The water was clear and was assumed to be from infiltration. A poly-seal (bowl) had been installed.
- 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 and the maintenance holes are in satisfactory condition. OCWA agreed to provide the inspection report. There is a condition in MH2 that requires review as there appears to be potentially sewage-contaminated water in the structure.
- 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. Theriault took samples of the sewage effluent from the dosing chamber at the facility for lab analysis at 12:32 pm.
- The writer walked over the tile field looking for any signs of vandalism, rodent infestation, erosion or breakouts. Minor bare spots were observed on the slopes of the tile bed. There were signs of minor erosion at the top of slope at the southwest and southeast corners of the tile bed. It is suggested that these areas be topsoiled and seeded in the spring. There appeared to be some minor growth of mullein, milkweed and sumac that should be controlled appropriately. Please refer to the attached photos.

Report finalized on January 23, 2016.

DARRYL M. ROBINS CONSULTING INC.


Darryl Robins, P.Eng
Civil – Environmental Engineer

DARRYL M. ROBINS CONSULTING INC.
CIVIL & ENVIRONMENTAL ENGINEERING

November 14, 2016

Lakewood Subdivision – Sewage System – Annual Inspection

Photo ID: IMG_2016114 - 131559: Dosing Chamber – Effluent pump bracket and operator valve stem corrosion.



Handle Operator Missing (Typ.)

Operator Shaft Corroded Into Bracket (Typ.)

Severely Corroded Brackets and Valve Operator Shaft

Photo ID IMG_20161114 - 132202: Corrosion of safety chain attachment point on the dosing lid.



Photo ID IMG_20161114 - 125659: Topsoiling required on south slope of tile field.
Southwestern corner of tile field shown in photo.



Photo ID IMG_20161114 – 125617: Topsoiling required on south slope of tile field.
Southeastern corner of tile field shown in photo.

