DARRYL M. ROBINS
CONSULTING INC.
CIVIL & ENVIRONMENTAL ENGINEERING

M09010

June 5, 2018

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
Wiarton, Ontario
N0H 2T0

Re: 2017 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 2017. The following report outlines key elements of the sewage system and provides a brief discussion of the Consultant's observations at the site inspections. Please find attached to this report, the Inspection Reports dated January 18, 2018 and May 22, 2018 respectively, 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 January 18, 2018, 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 January 18, 2018 which resulted in the following sewage flow rates for the effluent pumps (See Table 2 below).

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Table 2: Pump Test Flow Rates

Pump	Flow Rates (L/min)
1	191.8
2	205.5

During normal operation it appears that the pumps are dosing the tile field with an average volume of approximately 7,189 L/day based on the respective pumping rates determined by the pumping tests conducted by OCWA and DMRC at the site meeting of January 18, 2018. These 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 2017 (7,189 L/day) is approximately 9% lower than the flows determined for 2016 (7,598 L/day).

The maximum daily sewage flow rate experienced in 2017 was 11,676 L/d which is substantially lower than the theoretical daily sewage flow of 44,400 L/d for the 37 dwellings on-line in 2017.

Sampling Results:

OCWA took a sample of the sewage effluent on December 13, 2017. 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 2017 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 a separate inspection on May 22, 2018 due to the snow cover in January. More significant bare spots were observed on the slopes and the top 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 in the inspectors report.

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. 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.

Photos of the the splitter valve chamber were provided by OCWA for inspection 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 tile bed should be topsoiled and seeded.
5. 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.

Laura Swanson, P.Eng.

Civil-Environmental Engineer
LAS/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)

DARRYL M. ROBINS CONSULTING INC.
CIVIL & ENVIRONMENTAL ENGINEERING

INSPECTOR'S REPORT:

Project Title:	Lakewood Subdivision	**Inspection Date:**	Jan 18, 2018
Inspector:	Laura Swanson, P.Eng	**Inspection Time:**	1:00 PM
Location:	Lakewood Subdivision Sewage System	**File No.:**	M09010

- The writer met with Mr. Billy Shearer (Operations, OCWA) on January 18, 2018 at 1:00 pm.

- There was only a detectable septic odour encountered at the facility when the dosing chamber lid was lifted.

- Pumping rate tests were conducted on the effluent pumps at this inspection. Each pump ran for four (4) minutes. Ms. Swanson recorded the readings anc completed the calculations in the office. The resulting effluent pump rates were calculated to be: :

  Pump No. 1: 191.8 L/min
  Pump No. 2: 205.5 L/min

- The elapsed time meter readings were noted at:

  Pump No. 1 1031.69 Hrs
  Pump No. 2 879.81 Hrs

- Mr. Shearer advised that no high level alarms had been recorded recently. A pump fault alarm was issued due to a rag stuck in the pump. The rag was removed. No other issues were noted by Mr. Shearer. 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.

  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. Wiarton Water Treatment Plant: 519-534-1610

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- 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. Please see the attached photo below.

- 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.

- 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.

- Samples of the sewage effluent from the dosing chamber were taken in December 2017. The results have been received.

- Not able to review the condition of the tile field due to the snow. The writer will return following a snow melt.

Report finalized on May 23, 2018.

DARRYL M. ROBINS CONSULTING INC.

LAS

Laura Swanson, P.Eng
Civil – Environmental Engineer

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Dosing Chamber – Discharge Control Valve Stems (not operable)

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INSPECTOR'S REPORT:

Project Title:	Lakewood Subdivision	**Inspection Date:**	May 22, 2018
Inspector:	Laura Swanson, P.Eng	**Inspection Time:**	5:00 PM
Location:	Lakewood Subdivision Sewage System	**File No.:**	M09010

- The writer visited the site to complete the inspection of absorption bed, since there was snow at the time of the original inspection.

- Photos were taken are attached below. Grass cover appears to be sparse in some areas of the absorption bed. It is recommended that the absorption bed be topsoiled (50mm) and cast seeded.

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Report finalized on May 22, 2018.

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TABLE 3
LAB ANALYSIS RESULTS OF SEPTIC TANK EFFLUENT
LAKEWOOD SUBDIVISION SEWAGE SYSTEM
2017 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
Dec. 13/17	70	26	7.62	<0.06	56.20	66.70	9.20
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 (2009-2017)

N/A - sample parameter result not provided

TABLE 1
DOSING PUMP RECORDS
(ELAPED TIME METER READINGS)
LAKEWOOD SUBDIVISION
NOVEMBER 14, 2016 - JANUARY 18, 2018

DATE	TIME	Time (dec)	diff in hours	PUMP NO. 1 RECORDED RUN TIME (hrs)	PUMP NO. 1 ELAPSED PUMP TIME (hr)	PUMP NO. 1 VOLUME PUMPED (L)	PUMP NO. 1 ELAPSED TIME (days)	PUMP NO. 1 AVERAGE DAILY FLOW (L/d)	PUMP NO. 2 RECORDED RUN TIME (hrs)	PUMP NO. 2 ELAPSED PUMP TIME (hr)	PUMP NO. 2 VOLUME PUMPED (L)	PUMP NO. 2 ELAPSED TIME (days)	PUMP NO. 2 AVERAGE DAILY FLOW (L/d)	COMBINED AVERAGE DAILY FLOW (L/d)	OPERATOR'S NOTES
02-Nov-16	4:42:00 PM	0.00	0.00	898.55					748.40						
14-Nov-16	12:02:00 PM	12.03	12.03	901.99	3.44	39,588	12.50	3,167	751.64	3.24	39,949	12.50	3,196	6,362	HL FLOAT/ALARM TEST
22-Nov-16	1:30:00 PM	13.50	1.47	904.10	2.11	24,282	8.06	3,012	753.67	2.03	25,030	8.06	3,105	6,117	
29-Nov-16	10:05:00 AM	10.08	-3.42	905.99	1.89	21,750	6.86	3,172	755.47	1.80	22,194	6.86	3,236	6,408	OK
02-Dec-16	11:00:00 AM	11.00	0.92	906.71	0.72	8,286	3.04	2,727	756.23	0.76	9,371	3.04	3,084	5,812	OK
06-Dec-16	10:15:00 AM	10.25	-0.75	907.54	0.83	9,552	3.97	2,407	757.36	1.13	13,933	3.97	3,511	5,917	
23-Dec-16	10:00:00 AM	10.00	-0.25	911.33	3.79	43,615	16.99	2,567	761.10	3.74	46,114	16.99	2,714	5,281	OK
28-Dec-16	11:10:00 AM	11.17	1.17	913.22	1.89	21,750	5.05	4,308	763.14	2.04	25,153	5.05	4,982	9,290	OK
29-Dec-16	12:53:00 PM	12.88	1.72	Not Recorded					Not Recorded						HL FLOAT/ALARM TEST
06-Jan-17	11:57:00 AM	11.95	-0.93	916.14	2.92	33,603	7.96	4,221	765.89	2.75	33,908	7.96	4,259	8,480	
13-Jan-17	3:24:00 PM	15.40	3.45	918.19	2.05	23,591	7.14	3,302	767.93	2.04	25,153	7.14	3,521	6,823	OK
23-Jan-17	7:55:00 AM	7.92	-7.48	920.80	2.61	30,036	9.69	3,100	770.38	2.45	30,209	9.69	3,118	6,218	HL FLOAT/ALARM TEST
31-Jan-17	2:51:00 PM	14.85	6.93	923.15	2.35	27,044	8.29	3,263	772.71	2.33	28,729	8.29	3,466	6,729	OK
07-Feb-17	8:53:00 AM	8.88	-5.97	924.81	1.66	19,103	6.75	2,830	774.40	1.69	20,838	6.75	3,086	5,916	OK
15-Feb-17	9:06:00 AM	9.10	0.22	926.67	1.86	21,405	8.01	2,673	776.33	1.93	23,797	8.01	2,971	5,644	OK
23-Feb-17	1:15:00 PM	13.25	4.15	929.33	2.66	30,611	8.17	3,745	779.23	2.90	35,757	8.17	4,375	8,121	OK
03-Mar-17	3:29:00 PM	15.48	2.23	931.47	2.14	24,627	8.09	3,043	781.78	2.55	31,441	8.09	3,885	6,928	OK
09-Mar-17	10:27:00 AM	10.45	-5.03	933.00	1.53	17,607	5.79	3,041	783.12	1.34	16,522	5.79	2,853	5,894	
16-Mar-17	1:49:00 PM	13.82	3.37	935.33	2.33	26,814	7.14	3,755	785.00	1.88	23,180	7.14	3,246	7,002	OK
21-Mar-17	12:44:00 PM	12.73	-1.08	936.11	0.78	8,976	4.95	1,812	786.31	1.31	16,152	4.95	3,260	5,071	OK
28-Mar-17	12:25:00 PM	12.42	-0.32	937.64	1.53	17,607	6.99	2,520	787.81	1.50	18,495	6.99	2,647	5,167	OK
03-Apr-17	11:45:00 AM	11.75	-0.67	939.75	2.11	24,282	5.97	4,066	789.12	1.31	16,152	5.97	2,705	6,770	HL FLOAT/ALARM TEST
12-Apr-17	10:00:00 AM	10.00	-1.75	941.50	1.75	20,139	8.93	2,256	791.43	2.31	28,482	8.93	3,191	5,446	OK
20-Apr-17	11:25:00 AM	11.42	1.42	944.34	2.84	32,683	8.06	4,055	794.30	2.87	35,387	8.06	4,391	8,446	OK
28-Apr-17	11:15:00 AM	11.25	-0.17	946.45	2.11	24,282	7.99	3,038	796.28	1.98	24,413	7.99	3,054	6,092	OK
03-May-17	9:10:00 AM	9.17	-2.08	948.06	1.61	18,528	4.91	3,771	798.04	1.76	21,701	4.91	4,417	8,188	
08-May-17	2:35:00 PM	14.58	5.42	949.20	1.14	13,119	5.23	2,511	799.42	1.38	17,015	5.23	3,256	5,767	OK
15-May-17	2:30:00 PM	14.50	-0.08	950.67	1.47	16,917	7.00	2,418	800.99	1.57	19,358	7.00	2,767	5,185	OK
31-May-17	1:10:00 PM	13.00	-3.50	955.63	4.96	57,080	15.85	3,600	805.75	4.76	58,691	15.85	3,702	7,302	OK
03-Jun-17	11:00:00 AM	13.75	2.75	956.48	0.85	9,782	3.11	3,141	806.91	1.16	14,303	3.11	4,592	7,733	OK
06-Jun-17	1:45:00 PM	14.25	0.50	957.29	0.81	9,321	3.02	3,086	807.58	0.67	8,261	3.02	2,735	5,820	OK
13-Jun-17	2:15:00 PM	13.25	-1.00	960.09	2.80	32,222	6.96	4,631	809.00	1.42	17,509	6.96	2,516	7,147	-
15-Jun-17	1:15:00 PM	12.33	-0.92	960.52	0.43	4,948	1.96	2,522	809.50	0.50	6,165	1.96	3,143	5,665	-
30-Jun-17	12:20:00 PM	7.92	-4.42	965.48	4.96	57,080	14.82	3,853	814.20	4.70	57,951	14.82	3,911	7,764	-
6-Jul-17	7:55:00 AM	13.08	5.17	967.78	2.30	26,468	6.22	4,259	816.56	2.36	29,099	6.22	4,682	8,940	-
11-Jul-17	1:05:00 PM	8.00	-5.08	970.08	2.30	26,468	4.79	5,528	818.79	2.23	27,496	4.79	5,742	11,270	-
20-Jul-17	8:00:00 AM	14.08	6.08	973.12	3.04	34,984	9.25	3,781	821.68	2.89	35,634	9.25	3,851	7,632	-
24-Jul-17	2:05:00 PM	10.00	-4.08	974.49	1.37	15,766	3.83	4,117	823.19	1.51	18,618	3.83	4,861	8,978	-
1-Aug-17	10:00:00 AM	8.42	-1.58	977.47	2.98	34,294	7.93	4,322	825.96	2.77	34,154	7.93	4,305	8,627	-
8-Aug-17	8:25:00 AM	14.50	6.08	980.94	3.47	39,933	7.25	5,505	829.59	3.63	44,758	7.25	6,171	11,676	-
14-Aug-17	2:30:00 PM	12.25	-2.25	983.64	2.70	31,072	5.91	5,261	832.39	2.80	34,524	5.91	5,845	11,106	-
16-Aug-17	12:15:00 PM	11.58	-0.67	984.20	0.56	6,444	1.97	3,268	832.76	0.37	4,562	1.97	2,313	5,581	-
23-Aug-17	11:35:00 AM	9.25	-2.33	986.90	2.70	31,072	6.90	4,501	835.52	2.76	34,031	6.90	4,930	9,431	-
29-Aug-17	9:15:00 AM	8.50	-0.75	989.19	2.29	26,353	5.97	4,415	837.67	2.15	26,509	5.97	4,441	8,857	-
7-Sep-17	8:30:00 AM	14.00	5.50	992.03	2.84	32,683	9.23	3,541	840.59	2.92	36,004	9.23	3,901	7,442	-
15-Sep-17	2:00:00 PM	14.67	0.67	994.59	2.56	29,460	8.03	3,670	842.90	2.31	28,482	8.03	3,548	7,218	-
20-Sep-17	2:40:00 PM	10.67	-4.00	995.96	1.37	15,766	4.83	3,262	844.51	1.61	19,851	4.83	4,107	7,369	-
26-Sep-17	10:40:00 AM	11.25	0.58	997.67	1.71	19,679	6.02	3,267	846.03	1.52	18,742	6.02	3,111	6,378	-
3-Oct-17	11:15:00 AM	13.17	1.92	999.35	1.68	19,333	7.08	2,731	847.93	1.90	23,427	7.08	3,309	6,040	-
10-Oct-17	1:10:00 PM	13.67	0.50	1001.96	2.61	30,036	7.02	4,278	850.27	2.34	28,852	7.02	4,110	8,388	-
16-Oct-17	1:40:00 PM	14.42	0.75	1003.95	1.99	22,901	6.03	3,797	852.20	1.93	23,797	6.03	3,946	7,743	-
24-Oct-17	2:25:00 PM	14.00	-0.42	1006.26	2.31	26,583	7.98	3,330	854.45	2.25	27,743	7.98	3,475	6,806	-
31-Oct-17	2:00:00 PM	11.00	-3.00	1008.52	2.26	26,008	6.88	3,783	856.60	2.15	26,509	6.88	3,856	7,639	-
7-Nov-17	11:00:00 AM	12.83	1.83	1010.56	2.04	23,476	7.08	3,318	858.53	1.93	23,797	7.08	3,363	6,680	-
15-Nov-17	12:50:00 PM	13.17	0.33	1012.64	2.08	23,937	8.01	2,987	860.66	2.13	26,263	8.01	3,277	6,264	-
20-Nov-17	1:10:00 PM	13.75	0.58	1014.15	1.51	17,377	5.02	3,459	862.25	1.59	19,605	5.02	3,902	7,361	-
27-Nov-17	1:45:00 PM	12.08	-1.67	1016.23	2.08	23,937	6.93	3,454	864.25	2.00	24,660	6.93	3,558	7,012	-
4-Dec-17	12:05:00 PM	13.83	1.75	1018.07	1.84	21,175	7.07	2,994	866.33	2.08	25,646	7.07	3,626	6,620	-
11-Dec-17	1:50:00 PM	11.50	-2.33	1020.00	1.93	22,210	6.90	3,218	868.16	1.83	22,564	6.90	3,269	6,486	-
18-Dec-17	11:30:00 AM	12.17	0.67	1021.80	1.93	22,210	7.03	3,160	869.85	1.69	20,838	7.03	2,965	6,125	-
27-Dec-17	12:10:00 PM	10.75	-1.42	1024.79	1.80	20,714	8.94	2,317	872.70	2.85	35,141	8.94	3,930	6,247	-
8-Jan-18	10:45:00 AM	12.77	2.02	1028.62	2.99	34,409	12.08	2,847	876.65	3.95	48,703	12.08	4,030	6,878	-
15-Jan-18	12:45:00 PM	0.00	-12.77	1031.00	3.83	44,076	6.47	6,814	878.97	2.32	28,606	6.47	4,423	11,237	-

PUMP #1 191.8 L/min
PUMP #2 205.5 L/min

PUMP 1

YEARLY AVERAGE DAILY FLOW:	3,488	3,154	L/d
MAX. DAILY FLOW RATE:	6,814	6,814	L/d
COMBINED AVERAGE DAILY FLOW RATE:		7,189	L/d
COMBINED MAXIMUM DAILY FLOW RATE:		11,676	L/d
ASSUMED ERRONEOUS READINGS		0	

PUMP 2

YEARLY AVERAGE DAILY FLOW:	3,387	L/d
MAX. DAILY FLOW RATE:	6,171	L/d