



Final Report

Evaluation of the Clearpod Technology

Submitted to:

Island Water Technologies

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Ontario Rural Wastewater Centre

Université de Guelph-Campus d'Alfred

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Experimental Setup

The Clearpod technology was installed in an existing 5600 L Septic tank at the Ontario Rural Wastewater Centre's Onsite Technology Testing Facility located at the Alfred Campus of the University of Guelph in Alfred, Ontario. The sampling campaign took place from July to October 2013.

The wastewater source is raw domestic wastewater from the Alfred, ON municipal sewer line, which is pumped into a mixed dosing tank with continuous overflow return to the sewer line. The technology is dosed following a daily distribution of wastewater loading consistent with the NSF-40 Standard and described in Table 1 (NSF/ANSI, 2010). A daily flow rate of 2800 L/d was used for the first month of the study, followed by a daily flow rate of 900 L/d for the remainder of the study.

Table 1. Daily Flow Distribution

Time frame	Percent of Total Daily Flow
6:00 a.m. to 9:00 a.m.	35 %
11:00 am – 2:00 pm	25%
5:00 p.m. to 8:00 p.m.	40 %

Sample Collection & Analysis

Water quality samples were collected every 2 weeks. The influent wastewater was collected as a flow proportional composite sample. The tank effluent samples were comprised of three grab samples collected at 9:00, 13:00 and 18:00 and mixed together to produce a daily composite sample. Tank pH is measured *in-situ* in the influent wastewater as well as the outlet the septic tank. All influent and effluent samples were analysed for BOD₅, TSS and TKN, while a subset of effluent samples were also analysed for NH₃, NO₃⁻ and O-PO₄. All samples were analyzed at the ORWC's Alfred Campus Environmental Quality Laboratory following Standard Methods.

Results and Discussion

Water quality results are described in Table 2, with raw data presented in Appendix A. Very good removal of both BOD₅ (47-55%) and TSS (78-92%) was observed. Little to no nitrogen was removed from the system.

Table 2a. Water Quality Results - 2800 L/d

Parameter	Influent	Effluent	% Removal
BOD ₅	438 ± 272	230 ± 55	47
TSS	568 ± 534	48 ± 28	92
TKN	43.3 ± 11.8	40.0 ± 2.6	8
NH ₃ -N	-	33.5 ± 6.1	-
OPO ₄	-	-	-
pH	6.8 ± 0.4	6.5 ± 0.4	-

Table 2b. Water Quality Results - 900 L/d

Parameter	Influent	Effluent	% Removal
BOD ₅	261 ± 63	117 ± 77	55
TSS	296 ± 99	64 ± 20	78
TKN	52.0 ± 18.8	44.3 ± 2.8	15
NH ₃ -N	-	33.5 ± 6.1	-
OPO ₄	-	4.8 ± 0.5	-
pH	6.8 ± 0.4	6.5 ± 0.4	-

Appendix A – Water Quality Data

Sample Date	Flowrate (L/d)	BOD5 (mg/L)		TSS (mg/L)		TKN-N (mg/L)		NH3-N (mg/L)		NO3-N (mg/L)		pH		OPO4	
		Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
12-Jul-13	2800	751	246	1180	80	57.0	42.0		26.9		1.2	6.35	6.63		
25-Jul-13		305	168	324	30	37.0	37.0		39.0		1.3	6.91	6.91		
07-Aug-13		257	275	200	34	36.0	40.9		34.6			6.98	6.06		5.54
23-Aug-13	900	279	253	340	58	46.9	43.8		19.0			7.31	6.15		5.10
5-Sep-13		245	152	332	50	41.0	42.1					7.35	6.54		4.58
17-Sep-13		183	107	148	48	89.3	47.7					7.47	6.87		4.10
1-Oct-13		285	64	304	100	44.0	40.2					7.38	6.84		5.42
16-Oct-13		361	46	432	55	51.9	45.3					7.57	6.60		5.01
30-Oct-13		211	77	220	75	38.9	46.7					7.40	6.76		4.69