

On-site Wastewater Treatment for Golf Courses



Waterloo Biofilter Systems Inc.



A first-class golf course deserves a first-class wastewater treatment system.

This modular treatment has the flexibility to be customized to your unique needs...

The Technology

The Waterloo Biofilter® is an aerobic trickle filter designed for the biological treatment of wastewater. The patented process utilizes a non-biodegradable, light-weight synthetic filter medium optimized for a high loading rate and a compact size. Wastewater is sprayed intermittently over the filter medium and as it drains through by gravity, beneficial microbes degrade the organic pollutants, coliform bacteria, ammonium and other contaminants in the septic tank effluent.



Treatment Unit Options



Above Ground PE Treatment Units The foam filter medium is contained in modular polyethylene tanks, ideal for scaling up as the business increases. They are housed in a heated building to ensure optimal performance year round. Above ground tanks allow easy access for maintenance.

Above Ground SC Treatment Units The foam filter medium is contained in custom built shipping containers, which allow for easy transportation and installation. These containers function as a Biofilter and permanent housing. They include a control room and roof access hatches for maintenance and servicing.



Below Ground Treatment Units The Biofilter medium is contained in mesh baskets in underground concrete tanks to keep them out of sight. They can be scaled up from small facilities to larger ones.

Remote Comfort Stations The Biofilter treatment unit is housed in the back room of an attractive and welcoming structure compete with a flush toilet, sink and mirror. This eliminates the need for service intensive portables in outlying areas of a golf course.



Advantages

Excellent Treatment The following table summarizes the expected effluent quality with treatment as determined by NSF and ETV third party testing. Higher quality treatment is available for re-use options.

High Hydraulic Loading The Biofilter® has high hydraulic abilities — not likely to plug or flood by infiltration caused by groundwater or leaky toilets.

Handles Strong Wastewater The Biofilter can handle wastewater strength as high as 500-1700 mg/L of cBOD. In addition, weekend and tournament surge flows are easily treated.

Recoverable Easy to recover if the septic tank fails or dies. Stop poisoning, and within 1-2 weeks, septic tank fermentation is back, and optimum Biofilter treatment starts again. A complete recovery will occur within 2-3 months.

No Aerobic Sludge Production Our unique aerobic-anoxic trickle filter process produces no aerobic sludge to pump out, just like natural soils.

Easy Maintenance The non-biodegradable filter medium normally does not require cleaning or changing (expected life span is 20 years).

Pollutant	% Removal
BOD, cBOD	90 – 99
TSS	90 – 99
Fecal Collform	99
TN	20 – 40*
	50 – 65**

* Single Pass

** 50% Recirculation

Wastewater Re-Use

Advanced Treatment Re-use for surface discharge involves more stringent effluent quality criteria. The Biofilter system provides consistent phosphorus and nitrogen removal to meet the high restrictions and provide high quality irrigation water.

Re-Use for Irrigation Several golf courses in Ontario are currently re-using wastewater for irrigation. The effluent from the Biofilter system can be disposed of in irrigation ponds for later use. Some Biofilter systems even use the treated effluent to flush toilets.



System Monitoring Re-use systems are closely monitored to ensure optimum water quality. They are monitored remotely by a custom “Sitewatch” system which records treatment data and pages the operator if any serious alarm goes off.



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Influent and Effluent Quality

Rocky Crest Golf Club & Delta Resort Muskoka Lakes ON, Commissioned June 2000

Peak flow: 148 m³/day (39 200 gpd) | Average Flow: 88 m³/day (23 300 gpd)



	Raw Sewage (# of samples = 11-13)				Final Effluent (# of samples = 48-53)				
	cBOD ₅	TSS	TKN	TP	cBOD ₅	TSS	NH ₃ -N	TP	E. Coli
2001	367	107	52	4.6	3.5	2.5	0.3	0.6	1
2002	194	74	25	3.0	1.5	2.8	0.5	0.6	<1
2003	263	116	38	7.9	3.0	8	0.5	0.4	1
2004	59	23	19	0.8	2.5	3.5	0.4	0.2	<1

Blue Springs Golf Club Acton ON, Commissioned May 1999

Tournament Peak flow: 40 m³/day (10 600 gpd) | Normal Peak Flow: 30 m³/day (7900 gpd)



	Raw Sewage (# of samples = 11-12)				Final Effluent (# of samples = 51-52)				
	cBOD ₅	TSS	TKN	TP	cBOD ₅	TSS	NH ₃ -N	TP	E. Coli
2001	155	111	30	2.4	2.0	3	0.4	0.6	1
2002	118	123	17	4.0	1.0	2	0.2	0.6	<1
2003	73	75	15	2.0	0.9	2.5	0.03	0.7	<1
2004	41	66	18	1.1	2.5	2.5	0.2	0.5	<1

Rattlesnake Point Golf Club Milton ON, Commissioned May 1999

Tournament Peak flow: 125 m³/day (33 100 gpd) | Normal Peak Flow: 60 m³/day (15 900 gpd)



	Raw Sewage (# of samples = 11-13)				Final Effluent (# of samples = 48-53)				
	cBOD ₅	TSS	TKN	TP	cBOD ₅	TSS	NH ₃ -N	TP	E. Coli
2001	153	133	21	2.4	2.1	5	0.2	0.6	1
2002	278	104	28	3.9	1.0	2.5	0.2	1.1	<1
2003	158	91	27	3.7	3.6	6.5	1.4	0.7	<1
2004	107	82	23	2.4	2.5	8.5	0.2	0.5	<1

King's Riding Golf Club King City ON, Commissioned June 2000

Peak flow: 37 m³/day (9800 gpd) | Average Flow: 15 m³/day (4000 gpd)



	Raw Sewage (# of samples = 10-13)				Final Effluent (# of samples = 51-53)				
	cBOD ₅	TSS	TKN	TP	cBOD ₅	TSS	NH ₃ -N	TP	E. Coli
2001	577	292	56	11.1	2.0	4	0.2	1.0	1
2002	252	476	33	7.8	1.8	3	0.5	0.8	<1
2003	336	375	40	6.4	0.8	5	0.04	0.8	<1
2004	181	54	33	1.9	2.5	2.5	0.03	1.2	<1

Unless otherwise specified,

- All cBOD₅, TSS, TKN, TP, NH₃-N samples are measured in mg/L
- All E. Coli samples are measured in cfu/100 mL



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