

# Under Siege

**A single-container advanced treatment system enables a Canadian resort owner to expand on the shores of Georgian Bay**

By **Scottie Dayton**

**T**he Sunport Beach Resort Motel on Georgian Bay in Perkinsfield, Ont., was built in the early 1970s. Most guests arrive in June through August.

A septic tank and 1,000-foot trench bed encased in 12 inches of stone was providing adequate treatment, but owner Roger Neil wanted to build additional efficiency suites. The Ministry of Municipal Affairs and Housing told him that to become eligible for a building permit he had to enlarge the drainfield.

Onsite Septic Solutions in Wyevale is the only advanced treatment specialist in Tiny Township and the surrounding area. Neil knew of the company's reputation and contacted Cathy Marcellus for a site consultation. The area had potable wells, and the site lacked sufficient space to expand the drainfield, which faced the bay.

"This entire shoreline community is in a septic inspection program, and Balm Beach is protected by stringent regulations," says Marcellus. "Any system I designed had to emit tertiary-quality effluent with the required nitrogen removal, and pass regular monitoring." She selected a proven-reliable attached growth aerobic system able to handle peak and valley flows.

### Site conditions

Balm Beach, on the east shore of Georgian Bay, is part of the world's longest freshwater beach. Sunport Beach Resort, 90 minutes north of Toronto, occupies a 100-foot-wide lot. Six residential properties separate it from Tiny Beaches Road South. Each home overlooks 100 feet of beach. Soils are pure beach sand with a percolation rate of six minutes per inch.

## System Profile

<b>Location:</b>	Perkinsfield, Ont.
<b>Facility served:</b>	Sunport Beach Resort Motel
<b>Installer:</b>	Onsite Septic Solutions, Wyevale, Ont.
<b>Site conditions:</b>	Beach sand with a percolation rate of six minutes per inch
<b>Type of system:</b>	Recirculating absorbent trickle filter, Waterloo Biofilter Systems, Rockwood, Ont.; drip tubing, Ipex Inc., Don Mills, Ont.
<b>Hydraulic capacity:</b>	2,100 gpd



Above, (from back to front) Mike Pauze, Allan Lalonde, and Kirk Hastings set the bottom of the biofilter container tank. At right, a technician secures the quick disconnect for discharging and recirculating the treated effluent.



### System components

Marcellus designed the system to handle 2,100 gpd. Its major components are:

- 4,800-gallon, two-compartment concrete septic tank with Zabel 100 effluent filter. All tanks from Brooklin Concrete Products, Wyevale.
- 1,250-gallon, single-compartment concrete balancing tank with 1/2-hp vortex pump. All pumps



A crane operator places the top of the biofilter container tank over the foam media and distribution system.

from Monarch Industries, Winnipeg, Man.

- 4,800-gallon, single-compartment concrete container tank for the biofilter (Waterloo Biofilter Systems, Rockwood, Ont.) and 1/2-hp vortex pump.
- 80 feet of Schedule 40 280 psi 2-inch PVC force main.
- 550 feet of 3-inch PVC drip tubing from Ipex Inc., Don Mills, Ont.
- Timed-dosed control panel duplex from SJE-Rhombus Controls, Detroit Lakes, Minn.

### System operation

Sewage gravity flows into the septic tank, then into the balancing tank. Every 25 minutes, the pump sends 40 gallons through an inline pressure screen to the biofilter's manifold. Two helical nozzles evenly spray the effluent at 10 psi onto two 8- by 7-foot steel mesh cylinders. Inside them are specially engineered 2-inch-square synthetic foam cubes totaling 500 cubic feet of treatment area. The system is designed for 24-hour detention.

A fan circulates air through the foam to ensure aerobic conditions. As

the effluent trickles down, microorganisms living in the medium consume the organic components. Effluent is captured in a 3-inch-high partition on the floor for dispersal. The pump, tied to a variable ball valve, returns 50 percent of the liquid to the first compartment of the septic tank and 50 percent to the header for the distribution piping.

Recirculation produces the required 10mg/l total nitrogen removal. The effluent quality is 15 mg/l BOD, 10 mg/l TSS, and 98 to 99 percent fecal coliform removal. The 54- by 33-foot drainfield has an 8-inch bed and 2-inch cover of clean gravel between 3/4 and 2 inches. Lines are spaced 4 feet on center on a 1/2 percent slope from header to footer.

### Installation

"Our first challenge was getting to the jobsite," says Kirk Hastings, owner of Onsite Septic Solutions. "The only way to reach it was from the beach. However, the owner of the second property in from the road had built a fence to within 15 feet of the water, blocking our access."

A 12-foot-wide public footpath to the beach paralleled the fourth property in from the road. Hastings received permission from the municipality to trim the trees and use the walkway to

reach the beach. "Our 70,000-pound John Deere 330 excavator, which we used to move the 17,000-pound septic tank halves, is 11 feet, 3 inches wide," he says. "The machine just squeaked through."

The trucks and their heavy loads quickly bogged down in the sand. Hastings used his 450 John Deere bulldozer to drag them in and out. "It was quite a performance," he says. "This was the first week in June, and the fair

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Kirk Hastings distributes 1-inch washed stone over the drainfield, while Allan Lalonde oversees the proper grades.

weather attracted sunbathers. They were like little land mines we had to avoid."

At the resort, two 4-foot-high stepped retaining walls elevated the drainfield from the beach. Neil refused to let Hastings tear down the walls, so he built access ramps from beach sand. Hastings had intended to clean and reuse the drainfield's original 150 tons of stone. However, after exposing the gravel, distribution piping, and biomat at 12 points, he determined that the drainfield was too contaminated to salvage. The stone was dried before being distributed around the new drainfield.

As excavation of the old drainfield continued, they unearthed an abandoned 36-inch-diameter shallow well. "Regulations require a 100-foot separation from all potable wells," says

Hastings. "It was quite a shock to see the weeping stone directly on top of the concrete casement. We know that groundwater from the shallow aquifer was seeping onto Balm Beach."

Work on the drainfield stopped until a licensed well abandonment technician arrived and processed the well. The worksite was very cramped. The old drainfield stone was in one corner, in the center was the well awaiting decommissioning, and the excavation and spill piles for the tanks consumed most of the remaining space.

The tanks, shipped in halves on flatbed trucks, were installed in one day.

### Maintenance

Onsite Septic Solutions holds the four-year maintenance agreement. A technician samples the effluent quality



**Above, Kirk Hastings recalibrates the drainfield's elevation, while Allan Lalonde adjusts the slope laser. At right, spray foam insulation was applied 3 inches thick over the concrete components to prevent the microbes from freezing in winter.**

in the biofilter once in the first six months, then every two years. Sludge and scum accumulation calculations are made as needed.

The technician cleans the helical spray nozzles, flushes the effluent filter, and recalibrates the recirculation. "We monitor the biology in the septic tank to make sure that disinfectants haven't slaughtered it," says Hastings. The sys-



tem is working flawlessly after Hastings adjusted the dosing rate to accommodate the peak flows from summer guests. ■