

SYSTEM PROFILE



The job site near Paw Paw, Michigan, needed a different approach because of proximity to the lakeshore and to a neighboring property. A SludgeHammer unit combined with a GeoFlow drip field solved the problem. (Photos courtesy Lucian Witmer, Dig-It Excavating)

A Day at the Beach

Tiny cottage lot with impossible setback issues spurs a training day featuring an aerobic treatment solution

By David Steinkraus

The homeowner on Lake Cora near Paw Paw, Michigan, was not in a good situation.

“He had been running quite a few years on holding tanks,” says Dervin Witmer, owner of Dig-It Excavating in Cassopolis, Michigan, who was hired to create an onsite system for the house.

The owner had purchased the home and then realized frequent holding tank pumping was not what he wanted. Local health officials told him that was his only option, Witmer says. “According to code, that’s all they could do because they were thinking traditional system.”

Local code says an onsite system must be at least 50 feet from a lake and 10 feet from property lines, but on this parcel a new system would be 15 feet from the water and 3 feet from the boundary, he says. “Plus, he even had a well on the property, but thankfully the well was over in one corner, so he had a lot of beach area available.”

The system

Installing the system consisted of refitting a pair of 1,000-gallon holding tanks to provide treatment and installing a drip system to disperse effluent.

Wastewater exits the house in a 4-inch PVC pipe and enters the first 1,000-gallon tank, which contains a SludgeHammer S46 aerobic treatment unit. A baffle and a short pipe connects the first tank to the second 1,000-gallon tank.

This second tank provides equalization and acts as a clarifier. On its outlet is a Sim/Tech filter. This protects the 1/3 horsepower Myers pump inside a 100-gallon fiberglass pump vault that was added to the train. A Sim/Tech bag filter after the pump screens effluent heading to the drip field.



◀ Dan Wickham, center, inventor of SludgeHammer, walks the drip field during the educational outing for the Paw Paw job.

▼ James Sanders from Dig-It Excavating lowers the SludgeHammer unit into place during the educational outing at the Paw Paw job.

From the dosing tank, effluent flows to a 750-square-foot bed holding about 700 linear feet of GeoFlow dripline. The L-shaped bed bends around the house. One section is about 60 feet long, the other is 30, and the bed is about 8 feet wide.

The GeoFlow product is not the usual dripline for clear water but is designed to prevent fouling from bacterial growth, Witmer says. This product also has emitters engineered for effluent and has an herbicidal liner to discourage root intrusion.

An SJE Rhombus panel controls the system. Risers and lids were replaced with Dig-It's custom branded products from RomoTech.

To do the job, technicians used a 2020 Caterpillar 306CR mini-excavator fitted with an Engcon EC206 tiltrotator, a 2018 Cat 299D3 track loader and a Harley Rake to finish the topsoil.

Lobbying for technology

The first challenge in doing this project was using the SludgeHammer technology. Local health officials were unfamiliar with it, so Witmer says he turned the project into an educational demonstration.

Witmer knows the sanitarian who oversees the local health department. "I explained the SludgeHammer system to him and the idea that up north, around Traverse Bay and Traverse City (near SludgeHammer headquarters), they're permitting these a lot closer because the final effluent is so clean."

The official later called back and said he would allow SludgeHammer in the county, but not for the property Witmer was working at. The sanitarian said this project would have to go through a board of appeals because a code change was involved. A Zoom meeting was set up with the board of appeals bringing in system designer Justin Sorenson and Dan Wickham, the Ph.D. biologist who invented SludgeHammer. Wickham gave board members copies of the plan and test results from other systems.

"And I said, 'Hey, guys, listen. We're in the 21st century. People will continue to build houses on these lakes with small lots if they have options. We have dirty lakes. We want to clean up our lakes. The final effluent that we're putting on the ground is cleaner than most inland lakes,'" Witmer says.

The benefit of dripline is capillary action that pulls water in all directions, Witmer says. Water outflow around a dripline is spherical, not mostly down. "There were a few people on the board who were like, 'Hey, guys, listen. You and I both know how many 55-gallon drums there are sitting



System Profile

Location: Paw Paw, Michigan

Facility served: Single-family home

Designer: Sorenson Engineering, Traverse City, Michigan

Installer: Dig-It Excavating Inc., Cassopolis, Michigan

Type of system: SludgeHammer aerobic system with drip irrigation

Site conditions: High water, sand, limited space

Hydraulic capacity: 400 gpd

SYSTEM PROFILE



◀ Dervin Witmer, center, of Dig-It excavating, talks with a group of onsite professionals invited to look at the Paw Paw job. Because area sanitarians and others were not familiar with the SludgeHammer technology, Witmer created an educational outing when the system was in place.

▼ The GeoFlow drip tubing used in the Paw Paw project is not the tubing used for clean water. Because effluent may still have some bacteria, this tubing has a lining that prevents bacterial growth, special emitters and an herbicidal liner to discourage root intrusion.



“If we would encourage alternative technologies like this, that have very clean effluent, **you’re only going to come up with cleaner lakes as a result.**”

Dervin Witmer

around putting sewage right into lakes. This guy wants to do something that’s environmentally responsible,” Witmer recalls. Approval came the same day.

Working on the plan with Sorenson and the staff at SludgeHammer took a couple of months, and approval required about another month.

Onsite field day

After Witmer’s crew installed the system, and before they covered it, he invited area sanitarians, designers and other interested people to learn about it during an education day at the Dig-It shop. Wickham gave a presentation on his aerobic bacterial generator systems, and then the group of about 20 went to the lake property to see the completed installation, Witmer says.

“We turned on the pump, and you could see the drip emitters. We adjusted them to three drips per second,” Witmer says.

Emitters run for 20 minutes at 0.34 gallons per minute, then turn off for 26 minutes.

During installation, Witmer found someone had connected an overflow line from the holding tanks to a perimeter drain around the building. “His sump pumps were running every couple of minutes,” Witmer says. “So I’m sure all the vegetation out there was caused from high bacterial levels.” Sealing the overflow line will be a huge step in cleaning the lake, he adds.

The pump vault had to be anchored because it was about a foot into the water table, he says. The vault has lips on top and bottom, so his technicians put bags of Sakrete around the bottom and then backfilled.

The drip field was about 3.5 feet above the water table, and code requires 2 feet, he says.

Performance

After three months of operation the system was producing effluent with:

- BOD of 9 mg/L (NSF-40 reduction standard is 25 mg/L or less).
- TSS of 26 mg/L (NSF is 30 mg/L or less).
- Total inorganic nitrogen of 3.04 mg/L (NSF is 30 mg/L or less).

The results were great, but not unexpected because other SludgeHammer systems show similar results, Witmer says.

The health department sanitarian was quite right in saying that a lot of contaminants are going into the lake, Witmer says. “If we would encourage alternative technologies like this, that have very clean effluent, you’re only going to come up with cleaner lakes as a result.” ◻

featured products

GeoFlow, Inc.
800-828-3388
www.geoflow.com

Pentair
888-416-9513
www.femyers.com

Sim/Tech Filter Inc.
888-999-3290
www.simtechfilter.com
(See ad on page ?)

SJE Rhombus®
888-342-5753
www.sjrhombus.com
(See ad on page ?)

SludgeHammer
231-348-5866
www.sludgehammer.com

Romotech
574-831-6450
www.romotechplastics.com