

Tight Fit

A low-profile, narrow-trench system provides treatment for a mobile home on a small lot with creeks and a high water table

By **Scottie Dayton**

Infiltration, poor soils, and a high water table overwhelmed the chamber drainfield serving a two-bedroom mobile home in Clayton, Ga. Knowing the owner could not afford to replace it, the Rabun County Environmental Health Department contacted Georgia Conservancy, an environmental organization that secured a \$3,300 grant.

Harold Kilgore of Gravelator Systems in Talmo won the design/installation bid. After accounting for setbacks, he found that 2,500 square feet remained for a replacement system. “Three-quarters of the 1.5-acre lot was floodplain with creeks running through it,” he says. “Even what soil evaluators called usable was the best of the worst.”

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County manager and onsite inspector Steve James of the environmental health department met with Kilgore to discuss treatment options. “We’ve been installing Eljen In-Drain geotextile sand filters for four years, so I recommended them to Steve,” says Kilgore. The low-profile, narrow-trench drainfields require minimal maintenance; Kilgore found that such a system could be installed above the site’s high water table.

When Eljen Corp. representative Jim King learned of the project, he donated a system. Kilgore contacted his other suppliers and, with their cooperation, limited the price of the replacement to the amount of the grant. The state Department of Public Health allowed the installation to qualify as a CEU course.



Field technician Justin Kilgore scarifies sand with a rake to ensure that effluent will move freely into it. (Courtesy of Twins Productions)

Site conditions

Soils are Dellwood and Dillard with percolation rates of 35 minutes per inch and a loading rate of 0.45 gallons per square foot per day. The water table is 20 to 32 inches below grade. *(continued)*



ABOVE: Gravelator Systems owner Harold Kilgore (right) and senior field technician Heath Kilgore apply the second coat of tar and polyethylene film to the dose tank to waterproof it. RIGHT: A crew installs primary treatment modules with orifice sleeves atop them. Eljen representative Jim King explains the procedure to other contractors.



System components

Kilgore designed the system to handle 300 gpd. Major components (donated or price-reduced) were:

- 1,000-gallon IM-1060 dual-compartment plastic septic tank with 4-inch PolyLok effluent filter in second chamber, both from Infiltrator Systems
- 500-gallon low-profile concrete dose tank with 22-inch TuE-Tite riser from Nix Septic Tank Co., Gainesville
- 290 Series 3/4 hp effluent Liberty pump from Chambered Leaching Products
- 21 A-42 In-Drain sand filter modules from Eljen Corp.
- ASTM C-33 sand from River Sand
- Installer Friendly Series control panel from SJE-Rhombus

System operation

Wastewater flows by gravity through a 4-inch PVC lateral to the septic tank, then to the dose tank. Every two hours, the pump runs for 50 seconds, sending 35 gallons through 90 feet of 1.5-inch PVC pipe to the manifold, which distributes effluent to four 32- to 34-foot-long trenches in a 528-square-foot drainfield.

The first three trenches have five 24- by 48-inch, 7-inch-high treatment modules; the fourth has six modules, the last one in a dogleg. Centered atop them is a 4-inch PVC pipe with flat endcaps that suspend the low-pressure pipe in the middle of the sleeve. The 4 feet of pipe passing through the sleeve has one upward-facing 0.25-inch hole drilled at 24 inches. The sleeves have nine holes drilled every six inches at alternating 5 and 7 o'clock positions.

Effluent drips through the sleeves and onto the modules, each with an interleaved plastic cusped core and 64 square feet of biofabric. "Compared to conventional absorption systems, the media has approximately eight times more surface area per square foot to trap biomat," says King.

Effluent seeps through the modules to 6 inches of washed sand with a long-term acceptance rate two times that of conventional drainfields. "Pre-treated effluent and enhanced surface area enable these drainfields to be up to 50 percent smaller than traditional pipe-and-stone beds," says Kilgore. Effluent discharges to the soil.

SYSTEM PROFILE

Location:	Clayton, Ga.
Facility served:	Two-bedroom mobile home
Designer/Installer:	Harold Kilgore, Gravelator Systems, Talmo, Ga.
Site conditions:	Dellwood and Dillard soils with percolation rate of 35 minutes per inch, loading rate of 0.45 gallons per square foot per day, water table 20 to 32 inches below grade
Type of system:	In-Drain sand filter system from Eljen Corp.
Hydraulic capacity:	300 gpd

Installation

To avoid dewatering, the Gravelator crew installed the system during the driest part of the year. Equipment and labor were provided by James Simpson of Simpson Trucking in Gainesville, Ricky Sinclair of Sharpton Electric in Dacula, and Chris Motes of Chris Motes Pumping Service in Cleveland, Ga.

Installers, soil scientists, and regulators from five counties, including consultant Virgil Fancher from the state Department of Public Health, attended an education day at the site. King explained the In-Drain system, and Richard Crumley and John Ford from Infiltrator Systems set the injection-molded septic tank.

Motes pumped the existing septic tank, and Gravelator workers crushed and abandoned it while Kilgore excavated holes up to 60 inches deep for the septic tank and 46-inch-high dose tank. The depth was necessary to meet the state's minimum cover requirement of 6 to 12 inches.

The biofabric's ability to transfer oxygen in the modules depends on the system being watertight. County code also requires that concrete tanks in



Harold Kilgore (left) and Justin Kilgore drill 0.25-inch orifices in 1.5-inch PVC low-pressure pipe.

position, but Kilgore reinforced them with 0.5-inch-wide plastic cable ties. "When the pump comes on, effluent flowing at 25 psi could jerk or roll the pipes off center," he says. "Redundancy is always wiser than digging up systems to fix them."

The crew covered the modules with geotextile fabric, running it down the sides and flaring it into the trenches before using sand to hold it in place. They installed the 1.5-inch PVC backflush line while Sinclair wired the system.

A ball valve in the valve box enables Kilgore to reduce flow to meet the 2 to 4 feet of distill pressure requirement on any portion of the low-pressure bed. A second ball valve sends the backflush to the septic tank. After the final inspection, the crew backfilled and built a berm around the tanks to divert stormwater runoff.

Maintenance

Gravelator holds the state-required service contract. Twice a year, a technician downloads information from the control panel, backflushes the system, and checks for problems. The effluent filter is cleaned annually. □

free-water environments be sealed. Therefore, the pump tank arrived spray-coated with tar. To ensure it was waterproof, Kilgore and son Heath rolled a second layer of tar over the tank as the delivery truck driver suspended it overhead.

The driver then set the tank in the middle of a 20- by 20-foot piece of 6 mil polyethylene film. "We coated the sides of the tank so the Visqueen would adhere, pulled up the film, and folded the ends back just like wrapping a present," says Kilgore. The lid received the same treatment.

Although the septic tank did not require bedding, Kilgore put 6 inches of C-33 sand into the hole. The crew set the tank with enough pressure to compress the sand, creating a mold to stabilize it. As nephew Justin Kilgore filled the tank with water, Kilgore and Heath backfilled around it with 8 inches of sand, then compressed it to remove voids that could allow internal tank pressure to distort the plastic.

After excavating the 4-foot-wide trenches and bedding them with sand, the crew set the 2-foot-wide modules 18 to 24 inches apart. The drainfield has 132 square feet of trench surface area per state code, or 48 more feet of trench than the modules require based on the loading rate.

Front and rear steel U-clamps driven through the modules and into the sand held the sleeves in

MORE INFO:

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