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# Advanced Wastewater Treatment Can Conquer High Groundwater, Poor Soil Conditions

University of Dayton

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March 29, 2000  
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## **NEWS RELEASE**

### **ADVANCED WASTEWATER TREATMENT CAN CONQUER HIGH GROUNDWATER, POOR SOIL CONDITIONS**

DAYTON, Ohio — Sewer systems aren't found everywhere they're needed, and natural conditions don't always lend themselves to traditional septic tank set-ups.

Steve Safferman, assistant professor of civil and environmental engineering and engineering mechanics at the University of Dayton, is working on an advanced on-site wastewater treatment system to improve wastewater treatment in areas such as the Florida Keys, where traditional septic systems and on-site aeration systems are often inadequate at removing all of the significant pollutants because of high groundwater levels and poor soil conditions.

It's a low-cost, low-maintenance solution to what has become a big problem — too many by-products that end up where they're not wanted.

"It's a design add-on that gets rid of nitrates and phosphorous economically and it doesn't require a lot of maintenance," Safferman said. Traditional systems don't adequately remove these compounds. Excessive nitrates and phosphorous are suspected health hazards and, when flushed into waterways by surface water run-off, cause extreme plant growth that can choke out native plants and aquatic life.

Safferman's design attaches two additional tanks to the one normally used in an on-site system. Wastewater flows by gravity and the effluent recirculates through the multiple

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passages. Microbiology is used to convert nitrates into nitrogen gas, which is inert and can be safely vented into the environment. Filters used to absorb phosphorous will last about a year before they will need to be replaced.

Used filters can be used as landscaping materials, Safferman said.

The whole apparatus is buried, with nothing more than manhole covers showing above ground. "If you've got to have the backhoe on site anyway, it doesn't cost too much more to dig a bigger hole," he said. He estimates a 20 to 40 percent increase in cost to a typical on-site aeration system for individual houses, trailer parks and small office buildings where sewers aren't available.

Safferman is testing his design in the Montgomery County Eastern Regional wastewater treatment plant, which treats 13 million gallons of wastewater a day. Real wastewater runs through the system, with high flow rates periodically created to simulate someone doing a load of laundry or flushing a toilet.

Results are expected in early summer. "The nutrient issue is a huge issue for the industry. They're desperate for this technology," he said.

Sponsor of the \$16,100 project is Consolidated Treatment Systems Inc. of Franklin, Ohio. The company hopes to fast-track the project into production.

"We'll go to market as soon as the research is done," said Robert Parker, president of the company. "There is a great need for reduction of nutrients in various parts of the country, a need to keep these nitrates and phosphorus out of certain types of waters. In the Keys, for example, they want to protect the reefs. Regulatory officials have created a real demand for this."