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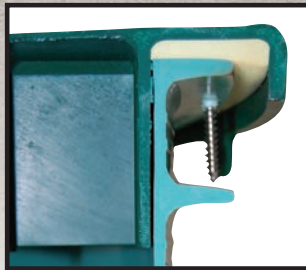
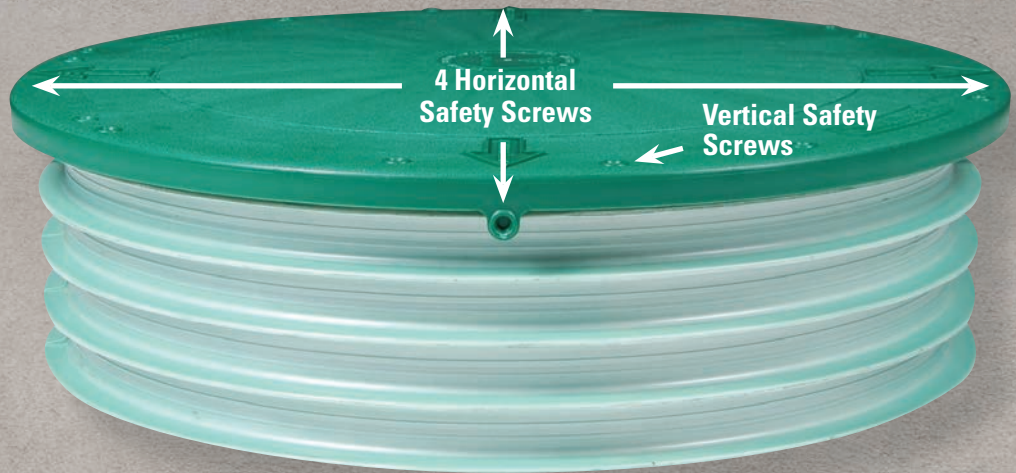
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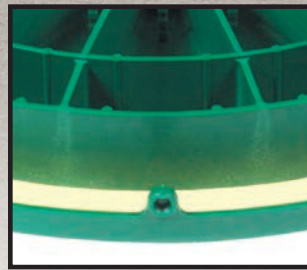
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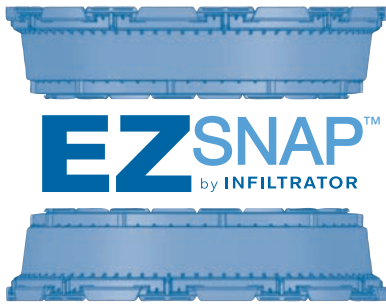
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INSTALLER PROFILE:

Divide and Conquer By Scottie Dayton

ON THE COVER:

SCS Systems in Haslett, Michigan, is a family business in which father Larry Stephens, P.E., designs onsite systems and son Mike Stephens maintains them. Mike Stephens is shown inspecting a custom telemetry panel, or TCOM, with cellular capability, from Orenco Systems at the River Rock Landing community wastewater treatment facility. (Photo by Amy Voigt)

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Enjoy this issue!

Established in 2004, *Onsite Installer*™ fosters higher professionalism and profitability for those who design and install septic systems and other onsite wastewater treatment systems.





How Can Installers Benefit From the Gig Economy?

It's near impossible to find young workers who seek a career in the wastewater industry. But there are ways for contracting companies to utilize millennials who prefer to work as independent contractors.

Onsite installers hire folks with strong backs to perform heavy labor, sometimes six days a week, for an hourly wage. Your crews get down and dirty and learn the nuances of the wastewater industry as they toil in the field. Technicians and equipment operators develop special skills, to be sure, and it's recognized that finding talented people to work in the field can be a challenge.

Such a traditional small-business work environment seems out of step with many modern employment concepts preferred by young people of the millennial generation. Not many young people seem to want to work 60 hours a week, 50 weeks a year for a regular, reliable paycheck and a 401(k) retirement plan. They want a flexible work schedule, decent pay when they do put in long hours, and more control over their lives day to day.

In short, more young people are becoming part of the "gig economy," taking on work by the project and choosing who they work for and when they work. The concept is also referred to as "alternative work," which the management website Quartz says includes independent contractors, workers provided by contract firms, on-call workers, and temp agency workers.

Many wastewater contractors have attempted to build a website, for example. **But how many of them launched with great success?**

DYNAMIC CHANGES

According to Quartz, research from Harvard University and Princeton University economists shows the percentage of American workers engaged in alternative work rose from 10.7 to 15.8 percent between 2005 and 2015.

"We find that 94 percent of net job growth in the past decade was in the alternative work category," Quartz quotes Princeton's Alan Krueger. "And over 60 percent was due to (the rise) of independent contractors, freelancers and contract company workers."

The statistic is staggering. Quartz concluded the majority of 10 million new jobs created during that period were not traditional employment situations.

So that makes me wonder. ... How will businesses like installing companies take advantage of the gig economy? There are two answers. First, I would say that in some ways many of you already are supporting the alternative workforce. Second, I think there may be untapped areas where an independent project worker could fit nicely in your business plan.

How are installers already involved in the gig economy? Have you added an extra helper during busy construction periods? I know of many installers who hire people to work more hours during the busy season and leave them to pursue other work or time off during slow periods. A young worker may appreciate a schedule that allows him to take on more hours and earn overtime pay for short spurts of time followed by weeks of downtime where he can pursue other interests or different types of work.

Do you sometimes rely on subcontracted specialists — for instance a licensed plumber or an operator with special equipment you only need a few times per summer? You've learned that sometimes it makes sense to hire workers for a specific project.

GET CREATIVE

Now you need to look beyond the excavator bucket and explore the value of hiring alternative workers in other areas of the business. You may find that you'll save money and get better results with a contractor-worker than you would by training an employee to handle a variety of tasks. Here are a few examples:

- **Marketing and sales.** Aspects of small-business promotion can be easily done by independent contractors. Many graphic artists, writers and marketers work as freelancers and cater to the needs of a variety of clients. The specialized help of website production and marketing campaigns are something you will need only occasionally. And these are tasks that are more efficiently left to professionals who perform that type of work every day. Many wastewater contractors have attempted to build a website, for example. But how many of them launched with great success?
- **Bookkeeping and accounting.** It might make more sense to pay an hourly fee for a CPA for 10 hours a month to keep your finances in order than hiring and training a bookkeeper for this important task. An outside accountant is insured and responsible for the accuracy of the work, while your bookkeeper may be more or less skilled or qualified for the task.
- **Equipment maintenance.** You may already hire a local mechanic rather than handle these duties in-house. But beyond the big stuff like



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repairing a transmission or rebuilding an engine, are there other routine maintenance tasks you could pay for on a project basis? What about hiring a contractor to wash your equipment at the end of every week? Every maintenance project you can job out will keep your onsite technicians working in the field longer and concentrating on their areas of expertise.

- **Reception.** Do you want a live voice to answer your phone rather than having customers listen to voicemail prompts? I know the personal touch is a priority for many service providers. But some small businesses can't justify having a receptionist on the staff. If that's you, maybe there's a compromise between the recorded message and a full-time receptionist waiting to respond to phone calls. You might be able to find an independent contractor who can run a call center from home and charge you only for the time spent answering customer questions and relaying important information to you in the field.

MORE TEMP WORKERS

According to the Harvard and Princeton research, the greatest percentage of alternative workers are contract workers provided by a temp agency or staffing service. Temp workers are attractive to companies because they are only called on when the job requires it. And the staffing company, not the company providing the work, is responsible for benefits and other costs associated with employees.

But there are human resources advantages to a small company when hiring temp workers or any type of independent contractor. What if you overestimate the need for more workers and have to cut back on labor? Or what if a new member of your crew doesn't turn out to be a good fit for whatever reason? It's simpler to part ways with a freelancer than a permanent employee.

Researchers believe the trend of independent workers is going to continue, to the benefit both of worker flexibility and company efficiency. And as it gets tougher to find good people who want to spend a career working in any one area — and that includes the wastewater industry — it might be time to look for ways to take advantage of this trend. □

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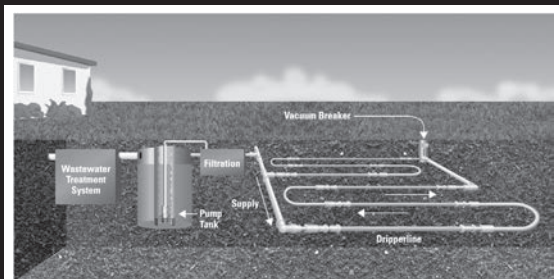


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NEW TECHNOLOGY

System Monitoring

A recent online series explores four products available to monitor septic system performance. As technology continues to evolve and costs come down, these tools provide more in-depth information to be considered by designers, regulators, installers and service providers. If you're in the market for new monitoring options, look no further. onsiteinstaller.com/featured

DESIGN TIPS

Maintenance-Friendly Systems

The father/son team of Larry and Mike Stephens operates this month's featured companies. Larry runs Stephens Consulting Service and Mike manages SCS Systems, the operations and maintenance branch. They work together to design systems that are easy for service providers to access and maintain. Read some of their tips in an exclusive online story. onsiteinstaller.com/featured



Overheard Online

“There are two potential ways a furnace can deliver extra water that can cause problems for the septic system: by running with an automatic humidifier and with the condensate from the operation of high-efficiency furnaces.”

– Troubleshooting: Don't Forget About the Furnace
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DESIGN AND MANAGEMENT

Measuring Flow

Determining the actual flow for a system, rather than an estimated amount, is one of the most important aspects of troubleshooting a problem. It's very easy to add flow measurement, such as a running time clock in combination with an event counter in septic systems with a pump. Read up on tips for measuring flow from our expert Sara Heger. onsiteinstaller.com/featured

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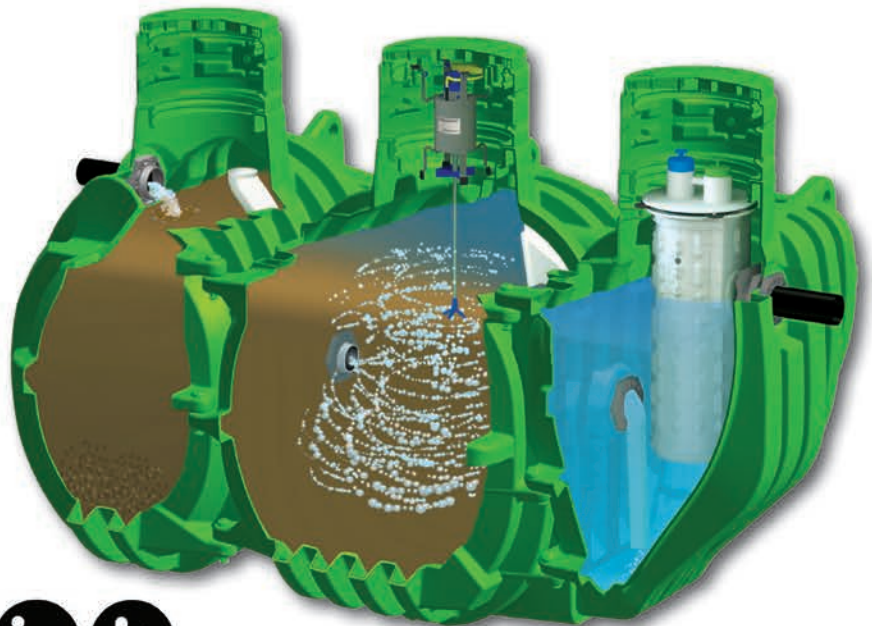


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DIVIDE AND CONQUER

Father Larry Stephens designs the systems, and son Mike Stephens maintains them. Together they find ways to improve performance for their customers.

By Scottie Dayton

Mike Stephens joined his father's onsite system engineering firm in 1998 as business manager and field technician, and soon afterward it became apparent that maintenance was going to play an important role in the business. That realization led father Larry Stephens, P.E., and Mike to form a companion operation, SCS Systems, to care for a wide variety of residential and community wastewater systems.

It proved to be a sound strategic move, as demand for operations and maintenance assistance has grown continually over the years. System engineering was the backbone of the business when *Onsite Installer* profiled Larry and design company Stephens Consulting Services a decade ago. Since then, Mike's service side of the business has taken off while Larry continues to lend his design expertise to clients covering a large area in Lower Michigan.

◀ Mike Stephens checks the condition of float switches during an annual onsite system inspection. (Photos by Amy Voigt)

▶ Technician Ben Bogner uses a CorePRO sludge sampler to check the solids depth in a septic tank during an inspection.

“State regulations required operation and maintenance on sand filters, so we trained contractors how to install and maintain them,” Mike Stephens says. “However, it wasn’t profitable for contractors to have a backhoe sitting idle or to pull a heavy-equipment operator off a job to answer alarm calls.”

The younger Stephens threw himself into filling the void. Today, SCS Systems has signed contracts for 105 individual residential systems, 28 community systems serving more than 490 single-family homes, eight mobile home parks, and 19 commercial systems. Community systems with STEP or STEG collection account for an additional 300 individual on-lot tanks and pumping systems.

“We’re unique because we’re one of very few companies in the state to service single-family and community wastewater systems,” says Stephens, 47. “In 2016, community and cluster systems were 52 percent of our income, mobile home parks were 7 percent, and commercial were 20 percent.” The remainder, or 21 percent, were single-family homes.

KEEPING BUSY

Initially, there weren’t enough maintenance contracts to fill 40-hour weeks. Maintenance was annual and included cleaning effluent filters, measuring sludge and scum layers, inspecting alternating valves (K-Rain), flushing laterals, and providing comprehensive operational reports to homeowners and regulatory agencies.

Stephens used spare time to earn his Class SC (special classification for recirculating sand filters), Class L1 and L2 (stabilization and aerated lagoons), and Class D (small municipal wastewater treatment plant operator) certifications. He also computerized the accounting system for both companies.

Stephens performed surveying and construction staking and inspecting single-family, engineered onsite systems during installation to ensure they were design-compliant.

For nine years, Stephens worked alone or with summer help. “I was on Dad’s company payroll until 2006 when I drew my first paycheck from SCS Systems,” he recalls. Both companies share the same building, and father and son work in adjoining cubicles.



SCS Systems

Location: Haslett, Michigan

Owners: Mike Stephens and Larry Stephens, P.E.

Years in business: 17

Employees: 6

Specialties: Operation and maintenance, repairs, discharge and permit management

Market area: 20 counties in Lower Michigan

Affiliations: National Onsite Wastewater Recycling Association, Michigan Onsite Wastewater Recycling Association, Michigan Water Environment Association

Website: www.scssystemslc.com

“Depending on the systems, maintenance takes 30 to 60 minutes, often with a crew of two tackling different tasks simultaneously. **It’s a highly productive strategy, especially for safety assurance and maintaining complex components.**”

Mike Stephens



By 2009, Mike Stephens had more work than he could handle, but not enough to afford a full-time employee. Gambling that more contracts would come, he hired Matt Sawyer. Today, Sawyer holds Class SC, Class LI, and Class L2 certifications.

A year later, Stephens’ “grow or go home” attitude led to purchasing the service contracts of Sierra Consultants, a consulting and operations company in Grand Rapids. The contracts included community and commercial systems and mobile home parks. “We’d been struggling to establish a presence in the Grand Rapids area, but now the door to the west side of the state was open, the explosion in growth was substantial,” Stephens says.

In 2017, inspections, troubleshooting, and maintenance accounted for 94 percent the workload, while repairing or replacing components was 6 percent. Stephens and three full-time technicians maintained 28 community/cluster systems and a combined 45 service contracts for AdvanTex (Orenco Systems) and Norweco advanced treatment units. Ben Bogner joined the crew in 2014, and Tommie Johnson arrived in February 2017. Mike Stephens’ mother, Berneda Stephens, and his wife, Marsha Roudabush, provide office and bookkeeping support.

“Our contract renewal rate is 96 percent,” Mike Stephens says. “Some clients have been with us for more than 20 years. Contracts we lose are usually due to new management preferring the lowest bidder over the proven provider.”

WINDSHIELD TIME

The expansion emphasized the importance of routing to maximize mileage and travel time — it’s 75 miles to Grand Rapids — and to ensure everyone is home nightly and over weekends. “We spend three to four days a month in the Grand Rapids area, hitting five or six projects per day,” Stephens says. “Depending on the systems, maintenance takes 30 to 60 minutes, often with a crew of two tackling different tasks simultaneously. It’s a highly productive strategy, especially for safety assurance and maintaining complex components.”

▲ Technician Matt Sawyer records information from a control panel during a system inspection.

▼ Field tech Tommie Johnson gets equipment he needs for an onsite system inspection, including a CorePRO sludge sampler. Mike Stephens is at the right.



The company owns two 2010 Ford Transit Connect cargo vans. One van has shelving and storage for repair parts and tools, such as a Hach HQ40d dissolved oxygen/pH meter, Honda gas-powered 35 gpm suction pump, and various Ryobi 18-volt cordless power tools. The other van is open to transport larger equipment and parts. “Our goal is to repair the problem in one visit, thereby reducing our overhead and homeowner

expenses,” Stephens says. The vans cover 32,000 miles annually and get 22 to 26 mpg fully loaded.

Within two weeks of spending \$800 to have vinyl graphics added to the vehicles, Stephens heard from a homeowner with a pump problem. “He was 70 miles away and driving behind one of our vans,” he explains. “The labor-intensive repair paid for the lettering and graphics.”

Most community systems are inspected monthly, quarterly, or biannually depending on equipment, permit requirements, risk, and build-out rates. Typical inspections include calculating flow and verifying pump and control operations. Technicians check tank water levels and inspect pumps, filters, valves, audiovisual alarms and observation ports. Periodically they measure sludge and scum levels, amp draws and pump drawdown rates.

The visits generate so much paperwork it’s become problematic. Technicians use more than three dozen specific forms to cover different system configurations and equipment. In 2017, Stephens purchased RealTime Forms and helped Famhost Apps customize the software.

Maintenance reports are one of the only tangible items technicians give most homeowners. “They must be comprehensive, accurate, informative and meet regulatory requirements,” Stephens says. “Reports also must be easy for my guys to complete via check boxes, drop-down menus and self-populating common fields. For example, one mouse click inserts sentences such as: ‘Septic tank doesn’t need to be pumped this year.’”

“We seem to get some of the most difficult problems, but if they were all easy, everyone would be doing it.”

Larry Stephens, P.E.

INDUSTRY COOPERATION

Managing the large-scale and commercial systems designed by his father seldom raises Stephens’ eyebrows. The challenge is managing complex systems designed by other engineers and using different equipment. The latest example was taking over a constructed wetland serving a motel. “It’s been a learning curve,” he says. “Dawn Rheinhold, the wetland specialist at Michigan State University, was a primary source of information, as they have a constructed wetland on campus.”

The Michigan Department of Environmental Quality had cited the motel owner for wetland neglect and failure to file O&M reports for 20 years. “We cut and tamed a 10-foot-tall jungle of unwanted vegetation and trees growing in the cells,” he says. “The system, designed to treat 15,000 gpd, averages 2,000 to 4,000 gpd, so it still produces high-quality effluent.”

Recently, the state Department of Transportation asked Stephens to evaluate five of its 53 rest areas with onsite systems. “They want a maintenance program for them, but accepting the work would seriously stretch our resources,” he says. “Some locations are 4 1/2 hours from the office.”

Because SCS Systems covers many geographical areas, Stephens relies on a network of contractors for excavating repairs or pumping, and to offer as references. “The list is short, and we’re very selective,” he says. “There are five names or less in our highly recommended column. Adding the contractors with whom we’ve worked might push it up to 12 names.”



▲ Mike Stephens inspects an Orenco Systems AX100 unit at the River Rock Landing community wastewater treatment facility.

BEST OF THE BEST

Mike Stephens doesn't look for wastewater industry experience when hiring workers for SCS Systems. “My best hires are individuals with a strong work ethic, personable and willing to learn,” he says. “I can teach the core job, but I rarely can teach someone how to put in an honest day’s work or to engage confidently with customers.”

New employees spend three to five years learning the daily routines. About 30 percent of the learning curve is staying current with changes in technology or best practices, and overcoming surprises in the field.

Stephens holds his subcontractors to the same rigorous standards. He says they all possess identical characteristics to ensure total customer satisfaction and loyalty. “They understand the value of relationships and always show their professionalism by wearing clean clothes, being neatly groomed, and taking time to educate clients,” he says.

He further stresses promptness, saying his workers and subcontractors often arrive five minutes before scheduled appointments. They make an effort to learn about and understand each engineered system they service. “We take every opportunity at wastewater conferences to find such contractors working in our geographical areas,” Stephens says. “They are the people we subcontract for tank pumping and excavating repairs, or recommending to our clients.”



▲ Berneda Stephens, wife of Larry Stephens does bookwork for the family company.

► Working in the home office in Haslett, Michigan, Larry Stephens reviews plans for a system he is designing.



To learn more about SCS Systems, take a look at a video profile of the company at www.onsiteinstaller.com.

TROUBLESHOOTING GURU

Of course, Dad remains his favorite partner. Although Larry, 72, has downsized Stephens Consulting Services since 2007 and now works alone, designing fewer than 20 projects per year, he remains his son's primary consultant. "When we can't figure out why large commercial and community systems have unexpected treatment levels, Dad will find the answer," Mike says.

For example, technicians were finding septic tank effluent samples in larger systems, especially those with grinder pumps ahead of the tanks, to indicate higher-strength wastewater than expected. Previously, engineers assumed three-day retention times would produce similar strength effluent whether systems had one large community tank or a smaller tank at each home.

"Instead, sampling indicated that effluent from large community tanks was often two to three times the strength of individual septic tank effluent," Mike says. "Effluent screens maintain the solids content at normal or below normal, but they won't remove soluble BOD." This discovery led Larry to place more emphasis on designing systems for organic loading, not just hydraulic loading.

The elder Stephens improved results in some existing systems by adding aeration to the tanks, thus generating biological growth and reducing BOD levels. However, unexpected repairs and replacements strain homeowners' limited financial resources, occasionally causing father and son to be a bit innovative in their problem-solving.

For example, when a subdivision on advanced treatment units connected to the newly available municipal sewer, Mike salvaged the valuable equipment for nonprofit clients and low-income families. "The units are so robust that it's a shame to see them in landfills when they still have usable life," he says.

Phone "alarm triage" is another way the company helps customers save money. By talking homeowners through several steps at the control panel, Mike has identified the reason for the alarm without visiting the site. "Several owners were so happy to save the cost of a service call that they offered to pay for my time on the phone with them," he says.

GOING STRONG

Larry Stephens' reputation continues to attract major projects. "We seem to get some of the most difficult problems, but if they were all easy, everyone would be doing it," he says. Stephens recently designed the largest community system of his career — a 100,000-gpd facility for a seasonal resort. Then the client asked him to upgrade the design to treat 350,000 gpd. Another client hired him to design a 30,000-gpd replacement system for a mobile home park in Ohio, so he registered as a licensed engineer in that state.

Mike Stephens' goal is to make SCS Systems an enjoyable place to work, with incomes capable of supporting workers' families and retirement plans. He never wants to grow so big that employees lose their personal time. As for Larry working in the cubicle next door, he's contented to continue to share expertise in system design.

"Dad has no plans to go anywhere soon," Mike says. "He finds pleasure in the work and enjoys speaking at conferences and other venues to share his knowledge." □

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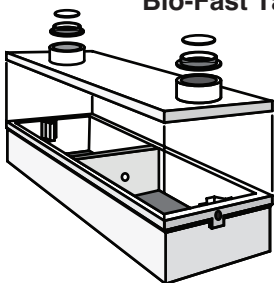
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Q&A on Mound Design and Installation

Assess your site and select materials carefully when constructing your next mound system

By Jim Anderson and David Gustafson

We constantly receive questions on aspects of mound design and installation. One common question is: What soil problems or conditions warrant installation of a mound?

Initial research on mounds began as a solution for slowly permeable soils with high water tables. In Minnesota, there is a long history of using mound treatment systems to overcome specific soil and site limitations. These limitations include slowly permeable soils with percolation rates of 61 to 120 minutes per inch or slower, as well as rapidly permeable soils with percolation rates of 1 to 5 minutes per inch, and shallow soils over bedrock or high water tables, either seasonal or permanent.

While each of these conditions requires a unique set of design criteria, the basic components of a mound system are the same: a clean sand fill over the original, intact, undisturbed soil surface; a pressure distribution system to deliver the effluent; and soil cover over the top of the system that will support vegetative growth.

SIZING WITH ROCK FRAGMENTS

Another common question we get — particularly in more mountainous areas — is whether the presence of rock fragments in the soil can affect mound design and installation. The answer is yes because there is essentially no flow of effluent through the rock fragments. This is the case in any soil with rock fragments, so it is not only a problem in mountainous regions. As the effluent moves around the fragments, there is not much of an opportunity for the effluent to be treated through contact with soil particles. Think of it as the rock fragments taking up space in the soil that would be taken up by soil particles (sand, silt and clay). Opportunity for treatment is reduced proportional to the percentage of rock fragments in the soil.

A common rule of thumb is to require additional absorption area under the mound if the percentage of rock fragments exceeds 50 percent. As a note, this is the number most often seen in state codes that address this issue. Here is an example to illustrate the concern: If the absorption area is 50 feet by 70 feet by 1 foot of soil depth or 3,500 cubic feet, half of the volume is taken up by rock fragments, which means only 1,750 cubic feet are available for treatment of the effluent as it moves through the soil.

Another common set of questions involves characteristics of the sand fill that forms the treatment part of the mound. Often the questions reflect that there are mounds in their area constructed of fill materials that are not clean sand. This is usually followed by comments that these mounds seem to leak or fail very often.

The original recommendation for mound fill under the absorption bed or trenches in contact with the original soil was to use a medium sand without significant amounts of silt- and clay-size particles. In fact, it was suggested that some fine particles were desirable because treatment would be improved. However, the definition of “not significant amounts,” was left to the designer to determine. A variety of soil mixtures or textures were used in other states. In our state, we landed on no more than 10 percent fines (silt and clay), and there were literally thousands of mounds installed with success using this criterion.

A BALANCING ACT

As more research was conducted and a number of the failures mentioned above were looked at in detail, the medium-sand designation remained, but the percentage of fines could not be more than 5 percent. It was also noted that fine sands could also be a problem since they are very close in size to silt particles. So fine sand as a fraction of the medium sand material was limited to less than 30 percent.

The bottom line is that a balance is desired between the treatment occurring in the sand and maintaining permeability in the fill that allows the effluent to infiltrate in the absorption bed, move through the sand, and be distributed over the absorption area of the mound to the original soil surface where treatment is completed. To do this, a material with fewer fines operates better in the long term. Of course, the downside of having fewer fines allowed means sand meeting this criterion is harder to find or the sand needs to be washed. Either of these increases the price of the system.

Another common question is about the proper material to finish over the top of the mound. Filter fabric is placed over the top of the absorption bed to prevent soil from entering the bed and clogging the infiltrative surface. It is then recommended that a cap (soil) be placed over the top to a depth of 6 inches over the outer edge of the absorption bed, crowned in the center to 1 foot of depth. Then another 6 inches of topsoil is placed over the entire mound area to allow for establishing good grass cover.

Cap material and topsoil are recommended to have soil textures such as sandy loam or silt loam. It is recommended to stay away from clay loam or clay textures due to difficulty in placing materials, as well as maintaining the ability for water and oxygen movement through the soil cover.

In coming months, we will continue to comment on additional mound or at-grade system questions; if you have a specific question or area you would like to see addressed, send us an email at ander045@umn.edu. □

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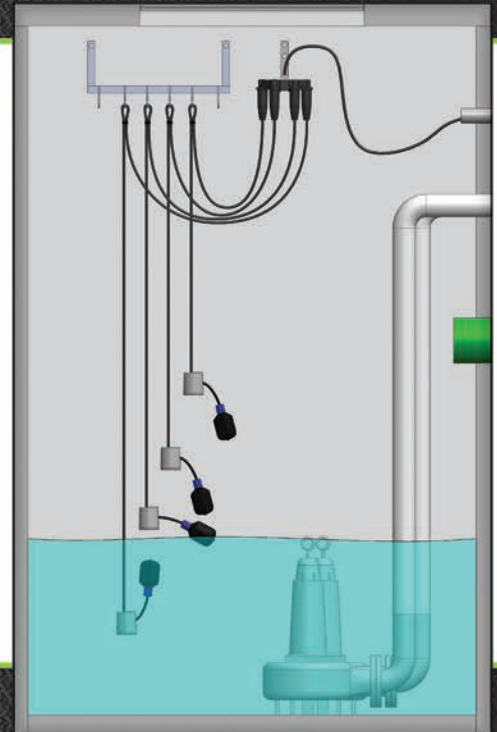
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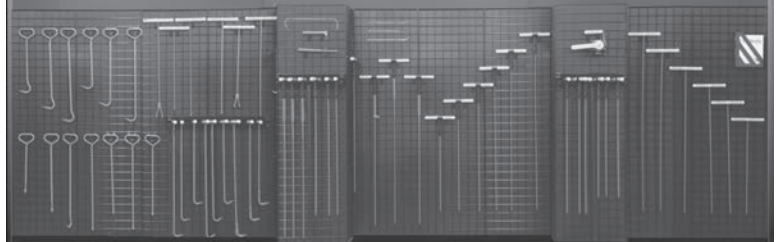


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Arizona Expands Reuse Options for Graywater

By David Steinkraus

In January, new Arizona regulations took effect expanding the use of reclaimed water to meet various demands including, under limited circumstances, human consumption.

It's no surprise reclaiming water is a focus of attention in one of the nation's driest states. The effort has been underway for several years. For example, the governor's Blue Ribbon Panel on Water Sustainability was formed in 2009 and issued its final report in 2010. Nor is the work complete.

In its introduction to the rule approved last November, the state's Department of Environmental Quality says it will make other modifications to water rules in the future. This staged approach will allow people to adjust to changes, enable them to make comments that improve rules gradually, and will inspire actions now instead of years from now, which may be the case if all the rules were modified in one giant step. In particular, the department writes, permits for graywater reuse are now seldom used, and by changing those regulations now, the department hopes to spur increased use and innovation.

Generally the rules forbid human consumption of reclaimed water unless the facility producing it obtains a special permit that requires submission of engineer-designed plans, an explanation of the technologies to be used, and proof of the concept from a pilot project.

Graywater rules were altered to allow private residential reuse for a flow of less than 400 gpd under certain conditions. Among those are use only on the property for watering lawns, gardens, or composting; prohibiting human contact with soil watered with graywater; and prohibiting the inclusion of water used to wash diapers or other similarly soiled garments because disinfection is too complicated for home systems.

Reclaimed water now accounts for 3 percent of Arizona's total demand. The cities of Mesa, Chandler, and Gilbert have water reclamation programs to replace potable water with a nonpotable source to irrigate golf courses, landscaping and other green spaces. The cities also recharge aquifers with reclaimed water. Another water reclamation plant owned by several municipalities reclaims water for a variety of uses including cooling at the Palo Verde Nuclear Generating Station.

Some municipalities are working creatively to educate the public about potable reuse. The Pima County Regional Wastewater Reclamation Department won a \$250,000 prize to use recycled wastewater for brewing craft beers. About 30 breweries competed in the event held in September 2017, and the winner was the Dragoon Brewery of Tucson for its Clear Water Pilsner.

Head brewer Eric Greene told KGUN-TV that he was originally shocked when the water was delivered, even though it had gone through multiple stages of processing to remove all contaminants including pharmaceuticals.

"It tastes perfect," he says. "There is nothing in this water."

Michigan

Beginning in January, property owners in six counties must have their septic systems inspected as part of a sale. The rule from the Central Michigan District Health Department was sent to the boards of Arenac, Clare, Gladwin, Isabella, Osceola, and Roscommon counties. All are in the north-central part of Michigan's Lower Peninsula.

The rule was the result of about a year of debate over the need for such a change. It began when *E. coli* contamination was found in an area river, reports *The Morning Sun* in Alma, Michigan. There are some exceptions in the rule, such as for foreclosures, property transfers among immediate family members, and demolition of the structure served by the system.

Real estate agents opposed the rule, saying the problem was not proven and the solution would be a burden for buyers and sellers of affected properties. A number of real estate agents suggested changes to the rule. The health department says similar ordinances in other state communities have led to the identification and repair of thousands of failing onsite systems.

The Michigan Department of Environmental Quality has estimated that at any given time, at least 10 percent of the state's 1.2 million onsite systems are failing.

Ohio

The Adams County Health Department is asking residents to voluntarily sign up for onsite wastewater system inspections.

Inspections are part of an operation and maintenance program that requires sanitarians check all onsite systems to ensure they are functioning properly and not impairing the water quality of streams and lakes, reports the *Ledger Independent* of Maysville, Kentucky.

The county will also issue permits for operation and maintenance. For alternative treatment systems and those with aeration, permits will be issued for two years. Sand filter systems will be inspected every five years, and those with leach lines or drainfields will be inspected every 10 years. Inspections will cost \$50.

Minnesota

Mower County revised its ordinances in December to allow more advanced treatment technologies. The action helped the owner of an apartment building and may provide help to other property owners.

The county voted to allow what Minnesota classifies as Type IV systems. Those have additional pre- or post-treatment equipment. Examples are the microFAST systems from Bio-Microbics and those from Hydro-Action.

Jason Korfhage, who owns a 20-unit apartment building in a rural township, asked for the change, reports the *Austin Daily Herald* in Austin, Minnesota. The mound system serving his building has never worked properly and now is failing, and he says the use of a Type IV system would provide a long-term fix for his property. About 25 other property owners in the area have failing systems.

While the state allows Type IV systems, they were prohibited by the county. Officials say the primary reason for this was a lack of staff to monitor the systems.

Florida

The family of a boy who drowned in a septic tank has filed a lawsuit against two contractors for the city of Jacksonville.

Three-year-old Amari Harley died Oct. 22 after he wandered away from a family birthday party at a city park and fell into a tank on the park grounds. His family believes he removed the tank's plastic lid and then fell in. Since then, the city has replaced all plastic lids with concrete lids, reports WTLV-TV news in Jacksonville.

The lawsuit claims Environmental Remediation Services and A1 Septic Service were negligent because they failed to register the tank properly, failed to supervise their employees, and failed to report the condition of the tank lid. A statement from the family's attorney says the city knew of the risk because it had received reports that the tank lid was not secured.

New York

In keeping with the efforts to clean up the nearshore waters of Suffolk County, the Southampton Village Board approved a law to require advanced onsite systems for homes.

The law, which takes effect in March, requires an advanced system for new construction, or a remodeling project with an increase in the number of bedrooms, on properties near a body of water. Advanced systems will also be required if a property owner plans substantial changes to an existing system. The systems used must be those approved by the county Health Department.

Suffolk County occupies the eastern tip of Long Island and includes several wealthy communities. Local leaders and others are concerned about the amount of nitrogen flowing into the ocean from cesspools, which are a common method of wastewater treatment in the area.

South Dakota

A former county official convicted for violating wastewater rules will have a new trial.

George Ferebee was found guilty last fall of having a septic system that lacked an operating permit. County ordinances require systems to be pumped, inspected, and issued permits regularly, reports the *Rapid City Journal*. Ferebee comes from Hill City in the Black Hills and served as a commissioner for Pennington County. His term ended Dec. 31.

After a trial, Ferebee was found guilty and ordered to pay a \$200 fine. At his trial, he says his property is exempt because it totals 250 acres, and the ordinance exempts holdings of more than 40 acres. The state says his property is comprised of four parcels and the system is on a lot of about 12 acres.

State law allows people to appeal verdicts from the magistrate court to circuit court. Ferebee did that, claiming there were errors of law before and possibly during trial. A judge agreed there were grounds to reconsider the case and scheduled a new trial for May. □

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◀◀ The mound system is finished off using a Takeuchi 126 skid-steer. Technicians spread anti-erosion mat on top of the mound and sprinkled grass seed. (Photos courtesy Jon Houseknecht)

A Mound System Preps Marshy Lot for Industrial Use

An Indiana company relies on Sunset Septic & Excavating to help convert an abandoned property for a trucking operations hub

By David Steinkraus

Land can be marshy around lakes. Combine that with a restricted site and you have the problem that Sunset Septic & Excavating was called in to solve in Michigan City, Indiana.

The wetland was about 2 miles from the shore of Lake Michigan and covered between 50 and 100 acres, says Jon Houseknecht, who owns Sunset Septic & Excavating with his wife, Gale. At one time, the property was the site of a lumberyard for the 84 Lumber store. The new owner wanted to convert the property into the base for a trucking operation. He built an octagonal office building from a kit, and Sunset Septic & Excavating connected wastewater lines to the building. The shop also had new bathrooms constructed by the owner.

The designer had few choices about where to site the mound absorption system. There was the large wetland, which ended up being 210 feet from the mound system and much closer to the tanks, and there was a well on the property that came with its own 100-foot setback zone.

Moving the effluent

Wastewater exits the office building in a 6-inch SDR pipe that runs about 340 feet and discharges into a 1,250-gallon, single-compartment concrete tank from Farmer Tank of Elkhart. This tank settles debris and provides primary treatment.

A 4-inch SDR pipe collects wastewater from the shop and runs about 60 feet before connecting with the 6-inch line from the office.

A Polylok Inc. / Zabel PL-525 filter removes debris before the water flows to a second 1,250-gallon concrete tank, also from Farmer Tank, which acts as the pump chamber for the mound. A BE270 pump from Zoeller Pump sends water through about 210 feet of 2-inch Schedule 40 pipe to the mound. Because of the distance to the mound, an electrician was called in to run a 240-volt power line for the system.

In the mound, the 2-inch line enters a four-line manifold. There are no valves. The manifold splits the flow into two 1 1/2-inch lines, and each of those divides into

"The owner of the property is a strong environmentalist, so he has instructed his guys to be careful about what they pour down the drain."

Jon Houseknecht



◀ Blake Johnson and Cody Houseknecht lay a wastewater line to the mound system with the aid of the Takeuchi mini-excavator. Pipes were buried only about 2 feet below grade to keep the tanks as far above the high water table as possible.

✔ Because of truck traffic, the line running to the mound system was also sleeved. The 2-inch wastewater pipe was sheathed in foil-faced insulation and placed inside a 4-inch Schedule 40 PVC pipe.



System Profile

Location: Michigan City, Indiana
Facility served: Worldwide Shippers
Designer: McMAHON Engineers/Architects
Installer: Sunset Septic & Excavating, La Porte, Indiana
Type of system: Mound system
Site conditions: Wetland; sand, heavy clay, muck
Hydraulic capacity: 600 gpd

a pair of 1 1/4-inch line that doses the mound. Each dose line is 30 feet long for a total of 120 feet of line.

The mound covers about 30 by 100 feet. It consists of 24 inches of sand laid at grade and covered with a layer of geotextile fabric. Next is 6 inches of septic slag below the pipes, then 2 inches of slag around the pipes and 2 inches on top. About 6 inches of sand and about 6 inches of topsoil were spread on top of the mound.

Pumping is controlled by floats. Sunset Septic & Excavating installed an AlarmBot system from CSI Controls. Houseknecht found the system at the Water & Wastewater Equipment, Treatment & Transport (WWETT) Show and appreciated its plug-and-play simplicity.

➤ The industrial mound comes together at Worldwide Shippers in Michigan City, Indiana. On top of a sand bed, technicians from Sunset Septic & Excavating spread septic slag to surround the distribution lines. The slag is a porous stone byproduct of the steel industry.



SYSTEM PROFILE

» With a designated wetland nearby, a high water table was a challenge. Technicians added water to the tanks to hold them in place; and just to make sure the tanks stayed that way, before leaving at the end of the day, technicians rested the bucket of the Hitachi 120 excavator on top of the tank.

▼ Cody, left, and Jon Houseknecht check on the mound system during winter.



Attention to detail

When the job was finished, the crew covered the mound with an anti-erosion mat like those used by highway crews, added some spikes to hold it in place, and sprinkled grass seed on the soil to provide cover.

The company used a Takeuchi 125 mini-excavator, Takeuchi 126 skid-steer and Hitachi 120 excavator to complete the earthwork.

Heavier SDR pipe was used because of traffic on the site. The Sunset Septic & Excavating crew encased the 4-inch shop line with Bubble Wrap insulation and put that combination inside a 6-inch pipe. They did the same with the 2-inch line feeding the mound. It was wrapped with foil-faced insulation, and the combination was placed inside a jacket of 4-inch Schedule 40 PVC.

Pipes were buried only about 2 feet below grade to keep the tanks as high as possible above the water table.

“The line was shallow, and we knew we would have heavy traffic on top of it because of the driveway. We were also worried about freezing,” Houseknecht says.

Septic slag is a product common to this part of Indiana but not the rest of the country. It is a byproduct of the process that converts iron ore into steel, Houseknecht says. Slag looks like volcanic rock, with many pores and many sites for bacteria to attach. The company selling it washes and sizes the rock for use in wastewater applications.

Although river rock is typically used in installations, Michigan City is only about 40 miles from the steel-producing city of Gary. Given the cost of hauling other alternatives to the site, septic slag is a more economical solution, Houseknecht says.

Because the site had been previously occupied, there was a grease trap in place collecting wastewater from the shop. Sunset Septic & Excavating technicians took samples to make sure the trap was doing its job and would not feed high-strength shop waste into the system. That could always be undone by the customer’s use, but not in this case.

“The owner of the property is a strong environmentalist, so he has instructed his guys to be careful about what they pour down the drain,” Houseknecht says.



“Before we left for that evening, we set our excavator bucket on top of the concrete tank to make sure it didn’t shift before we backfilled it.”

Jon Houseknecht



Securing the tanks

The high water table was a challenge during construction. The crew had to do some pumping to keep the excavations dry during construction.

To keep the tanks in place, Sunset Septic & Excavating technicians first placed the bottom half of a tank in its hole and poured in water. Then they applied the seal and put on the top half of the tank.

“Before we left for that evening, we set our excavator bucket on top of the concrete tank to make sure it didn’t shift before we backfilled it,” Houseknecht says.

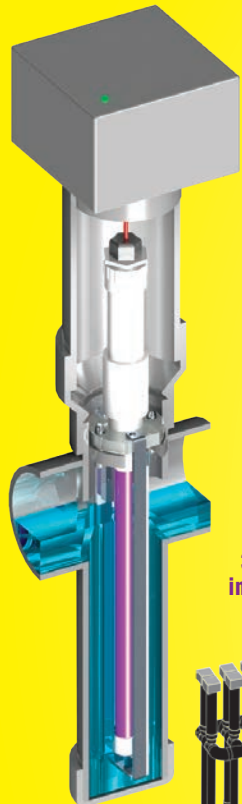
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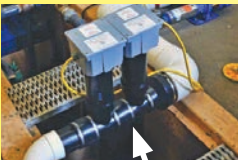
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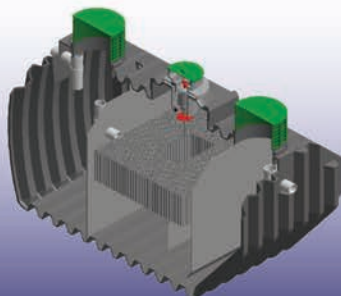
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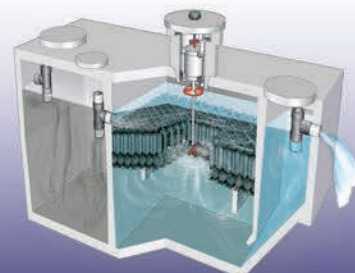


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We Must Reverse the Aging of the Wastewater Industry

As many pumpers and installers approach retirement, the need to bring younger people into our service companies is reaching a critical stage

Compiled by Betty Dageforde

In States Snapshot, we visit with a member of a state, provincial or national trade association in the decentralized wastewater industry. This time we learn about a member of the North Carolina Septic Tank Association.



Jerry Pearce
president

Business:
Pearce Environmental Technologies, Rolesville, North Carolina

Age: 46
Years in the industry: 37
Yes, I started at a young age in the family business — Pearce Backhoe & Septic Tank Service — riding around in the truck and helping out.

Association involvement:

North Carolina Septic Tank Association for 11 years — president, board of directors. North Carolina Onsite Wastewater Contractor Inspector Certification Board for approximately seven years — state-appointed board member.

Benefits of belonging to the association:

The North Carolina association is a respected group that educates and mentors members of the legislative body when needed. By doing so, we are able to collaborate for equal government to all involved with the onsite industry.

Biggest issue facing your association right now:

There's a lack of reputable and knowledgeable incoming youth to replace aging members in the trade. With a room of over 900 at our annual convention three or four years ago, less than one percent was younger than

35, and a lot of the others were 60-plus. We try to assist with things like business succession through various programs, helping young people get exposure. When I was growing up, a lot of people thought of the trades as being the last thing on their list, but I think people are starting to see a little bit more the importance of it. It's becoming more recognized and respected. Not everybody is made out to be a computer information technology guy or to sit in an office all day. So, I think we're gaining ground. Certainly the emphasis from the industry is that in five or eight years, it'll be a supply and demand issue, and if you're in the right spot at the right time, you'll have access to a good living if you do the right thing.

Our crew includes:

There's several people who work with me on a shared basis with the family business — brother Stacy Pearce, nephew Graham Pearce, and college student James Bullock.

Typical day on the job:

It's dependent on the phone calls received and the priorities encountered. We're a complete service provider — anything from inspections for point-of-sale to installations, operations, repairs, pumping, subsurface operator for low-pressure pipe systems and other types of systems. I'm also a licensed public utility contractor for specialty systems — building dewatering facilities or large-scale pretreatment systems on commercial sites.

Helping hands - indispensable crew member:

I rely on family members, including my parents Frank and LaFon Pearce. Their business and mine work closely together. Accountability is key, and I have much less to worry about when they are involved. We are hands-on in our approach and do not have to rely on subcontractors except in specialty applications. When we do, it usually involves someone we have known for an extended time.

The job I'll never forget:

What stands out is my very first commercial job because this was the first "big job" when I started my own company 10 years ago. It was for a large-volume septic tank replacement at a public school due to deterioration and age on an existing sand filter bed. They had to update the baffle tanks. We were referred by a local engineer, got on the short preferred list and

competitively bid the job. That was one of the things that involved having a public utility license because of the dollar amount of the job.

My favorite piece of equipment:

The vehicle setup I have provides efficiency. My service truck (a 2008 Dodge 4500) is the main “hub.” That’s what I spend time in every day. And then I have a couple specialty cargo trailers that I hook up to it depending on the job. One is specifically for septic service with all different size pumps from small to 5 hp, as well as all the supplies for electrical components for control panels and floats. I’m also a well pump contractor so my other specialty trailer carries all that equipment. For pumping jobs, we’ve got a 1999 Freightliner with a 3,800-gallon Lely Tank & Waste Solutions tank. Our intention is, when we pull up to a site for any kind of issue, other than a long extended project, we have what we need. We don’t pull up, see what we need, leave and come back three hours later. Efficiency is what I grew up doing, learning from my dad — investing a little bit upfront gets you a return in the future.



▲ A 1999 Freightliner carrying a Lely Tank & Waste Solutions tank. (Photos courtesy of Jerry Pearce)

►► The graphics on one of Jerry Pearce’s service trailers.



Most challenging site I’ve worked on:

It was an E-Z Treat pretreatment system for a commercial manufacturing facility that involved multiple large tanks. It was in an area that had unsuitable soils for conventional technology. We had some unknown obstacles, as you do with any commercial site that’s 50 years old and nobody knows exactly what’s below ground. There were old ducts to waterlines that were inactive and old railroad car tie-downs because it was a manufacturing plant. All those things were buried, so you just dealt with each obstacle when you got to it — with prayers, patience and excellent employees.

The craziest question I’ve been asked by a customer:

“Why did you go into this business?”

If I could change one industry regulation, it would be:

More oversight of the regulatory agencies tasked with regulating and enforcing the regulations of the private sector contractors. Also, a formal regulatory board that closely governs pumpers. This could be an add-on to the North Carolina Onsite Wastewater Contractor Inspector Certification Board that has already proven to be beneficial to our industry and operates at a phenomenal rate of efficiency.

Best piece of small-business advice I’ve heard:

“If it’s worth doing, then it’s worth doing right. The cheapest way is not the best way, and it will not last” — by multiple people and respected members of our association.

If I wasn’t working in the wastewater industry, I would:

Actually, believe it or not, a job that I still work in is critical care medicine. I’ve been a critical care nurse for 26 years, and I’m a former flight nurse. It’s hard to explain, but that’s what I still do on a part-time basis at a large hospital. I’ve kept that because I’ve been in it so long. But I really love the outside work I do for my business, whether it’s snowing, cold and raining, or 95 degrees F. That’s what I thrive on. I really do love what we do. When I work for myself, I don’t really consider it work: I like it too much.

Crystal ball time – this is my outlook for the wastewater industry:

In 2008 North Carolina initiated the certification program for installers and the point-of-sale inspectors. Knowing the industry prior to this, I have definitely seen the bar raised. In North Carolina, the industry is now more respected, knowledgeable and educated. There is still more to do, and there are still occasional rotten apples in the basket that are being addressed by our licensing board. This assists with protecting not only our environment, but also the consumers. □

Would you like to see someone in your state or provincial wastewater trade association profiled in Snapshot?

Send your suggestions to Jim Kneiszel at editor@onsiteinstaller.com.

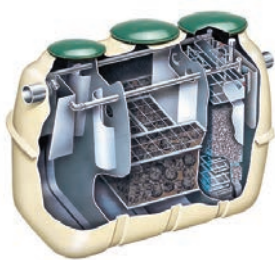
Large Scale and Commercial Treatment Systems

By Craig Mandli

ADVANCED TREATMENT UNITS

Bio-Microbics HighStrengthFAST

Ideal where there may or may not be infrastructure available, High-StrengthFAST wastewater treatment systems from Bio-Microbics are engineered to treat wastewater containing high BOD concentrations often having higher FOG levels than standard sanitary-strength sewage. Systems are integrated with the SFR feature of the FAST technology. Alternate modes of operation include intermittent operation of the blower to reduce electricity usage up to 45 percent and recirculation of nitrified wastewater to the primary settling chamber for extra denitrification. The stability of the FAST treatment process with fully submerged, fixed-film media and the effectiveness of activated sludge treatment helps in certain applications where a facility may have additional challenges due to the unique characteristics of the wastewater. 913-422-0707; www.biomicrobics.com.



Clarus Environmental Fusion Series

Fusion Series treatment systems from Clarus Environmental are drop-in wastewater treatment units designed for use in decentralized applications where effluent quality must meet or exceed secondary treatment standards. It is designed for residential, commercial, and small community applications with treatment capacities from 450 to 4,000 gpd. All models up to 800 gpd are NSF Standard 40 certified to produce effluent quality of 9 mg/L CBOD₅ and 9 mg/L TSS. The design enables it to be installed without a pretreatment tank on sites with limited space. Effluent disposal options include conventional trenches, dosed systems, drip irrigation or disinfection with direct discharge. 800-928-7867; www.clarusenvironmental.com.

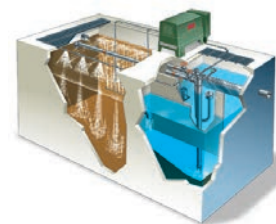
Knight Treatment Systems White Knight Microbial Inoculator Generator

The White Knight Microbial Inoculator Generator from Knight Treatment Systems offers an enhanced form of aerobic treatment technology that introduces, cultivates and releases selected microorganisms. It is designed to be simple to install in most septic tanks. It can be used to retrofit outdated ATUs and package treatment plants and enhance the performance of community and high-strength wastewater treatment systems in addition to septage processing facilities. 800-560-2454; www.knighttreatment.com.



Norweco Modulair

The Modulair package wastewater treatment system from Norweco is designed as a maintenance-free method of wastewater treatment with system capacities ranging from 1,500 to 500,000 gpd. Plants employ the extended aeration treatment process to quickly and efficiently oxidize organic compounds, according to the maker. The system can be easily enlarged or modified and has the flexibility for any treatment requirement, including pretreatment, AFE, ASH, tertiary, disinfection, denitrification, and phosphorus removal. Nonclog Evenair diffusers reduce plant maintenance, and the air-lift surface skimmer simplifies maintenance. Heavy-duty reinforced precast concrete tanks provide durability and long life. The complete system is installed and serviced by licensed, factory-trained distributors. 800-667-9326; www.norweco.com.



Presby Environmental EnviroFin

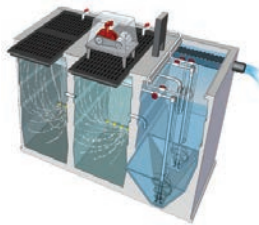
EnviroFin from Presby Environmental is a passive onsite wastewater treatment and dispersal system designed with a small footprint, to ship easily, and to exceed NSF/ANSI Standard 40 treatment. The effluent enters a fin distribution unit, or FDU, where it settles and breaks down suspended solids. Skimmer tabs located at the FDU's perforations prevent grease and suspended solids from leaving the FDU. The FDU distributes the effluent into the treatment fins, which are filled with coarse green plastic fibers, creating a massive bacteria treatment area. Perforated air duct pipes run across the top of each treatment fin, providing oxygen to promote bacterial growth. 800-473-5298; www.presbyeco.com.



COMMERCIAL TREATMENT SYSTEMS

Jet Inc. commercial wastewater treatment plant

Commercial wastewater treatment plants from **Jet Inc.** are modular in design, can treat flows up to 300,000 gpd and allow for phase build-out. This makes it possible for motels, shopping centers and service stations to be constructed along interstate highways away from municipal treatment systems. Subdivisions can be developed beyond sewer lines. Factories can be erected in rural areas. The plants treat wastewater through an aerobic digestion process that enables microscopic living organisms to transform wastewater into a clear, odorless liquid. 800-321-6960; www.jetincorp.com.



Orenco Systems AdvanTex AX-Max

AdvanTex AX-Max wastewater treatment systems from **Orenco Systems** are containerized, fully plumbed plug-and-play units sized for larger commercial and municipal applications. Units come in a variety of configurations, measuring up to 42 feet long by 8.5 feet wide. They can be installed as a single unit or in multiunit arrays, either above-ground or buried to grade. Systems use an attached-growth treatment method to produce clear, odorless effluent with significant nutrient reduction, suitable for subsurface irrigation or surface discharge after disinfection. One unit can process up to 5,000 gpd of raw sewage or 15,000 gpd of primary-treated effluent. Units reduce nitrogen up to 90 percent, depending on configuration, and can be operated with only a part-time operator. They are easy to ship and set and have been installed in a variety of soils and climates worldwide. 800-348-9843; www.orenco.com.



TUF-TITE Distribution Box with Speed Leveler

The noncorrosive **TUF-TITE Distribution Box with a Speed Leveler** in each outlet provides a simple, stable, reliable and permanent means for dividing septic tank effluent flow. Distribution boxes come in four sizes — four-, six-, seven- and nine-hole. Risers are available

on the four-, seven- and nine-hole boxes. All boxes come with a one-piece watertight seal that accepts 1.5-, 2-, 3- and 4-inch SDR 35 or Schedule 40 pipe, including corrugated, for ease of installation. 800-382-7009; www.tuf-tite.com.

CONTROL PANELS

Alderon Industries control panel

Custom control panels from **Alderon Industries** have a Type 3R rating and include inner doors for easy access to control and power components. Incoming single-phase power is 208 volts for the pump and 120 volts for control. A PLC with touch screen allows for easy configuration of the timers and gallons per minute pumped to the drainfield for 11 motors, while alarm events activate an email to three separate addresses, data log levels and gallons pumped per 24 hours. It can trend graph levels for the past three months and connect remotely via a secure Ethernet connection to the touch screen for monitoring. The levels in five different tanks can be monitored with 4-20mA transducers or floats. In the case of power outages, a 24-volt battery backup keeps alarm and pump functions active. 218-483-3034; www.alderonind.com.



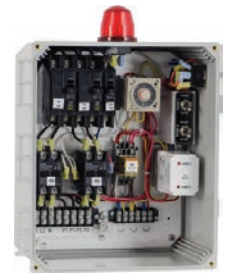
See Water Parabola VFD Panels

Parabola VFD Panels from **See Water** are advanced pre-engineered simplex, duplex and triplex control panels with a user-friendly HMI control interface. The panels are designed for pump down, constant pressure or commercial pressure booster applications. 888-733-9283; www.seewaterinc.com.



Septic Products 50B019-120-240DD

The 50B019-120-240DD control panel from **Septic Products** is a duplex time-dosing panel for use in residential or commercial applications. It can be used with 120- or 240-volt incoming power, and it accommodates two dosing pumps controlled by a repeat cycle timer. It has a durable, weather-resistant, NEMA 4X polycarbonate enclosure with SST latches; large, easy-to-access terminal block; circuit breakers for the pumps and control circuits; a rugged, externally mounted, UV-resistant alarm light; audible alarm and run-mute-test switch with UV-resistant sealing boot; definite purpose motor contactors; alternating relay; and pump hand-off-auto switches. Compressor hookups are available. Wiring schematic and detailed connection diagrams are provided, as well as mounting feet for the enclosure. It is UL listed. 419-282-5933; www.septicproducts.com.



DISINFECTION

Premier Tech Aqua Ecoflo Coco Filter UV option

Installers now have a UV disinfection option integrated as a kit in most Ecoflo Coco Filter models from Premier Tech Aqua. Factory prewired and easy to install, this simple disinfection option ensures convenient maintenance and bulb replacement. A single alarm box is needed for both the UV kit and the pump. Through regulated flow, the UV disinfection option offers robust treatment performance, according to the maker. 800-632-6356; www.ecoflbiofilter.com.



SALCOR 3G UV Wastewater Disinfection Unit

The 3G UV Wastewater Disinfection Unit from SALCOR is proven for residential, commercial, and municipal uses, according to the maker, and is UL-certified NEMA 6P flood-proof and NSF/Washington State Protocol six-month tested (with 21 upstream treatment systems). It inactivates bacteria/virus pathogens, including superbugs. Rated at 9,000-gpd gravity flow, it is a reliable building block for large water recovery/reuse systems. When installed in 12-unit parallel/series arrays with ABS pipe fittings, systems are disinfecting over 100,000 gpd, the manufacturer reports. Gravity flow equalizes without distribution boxes. Each unit has a foul-resistant Teflon lamp covering, two-year long-life lamp with speedy installation, minimal annual maintenance, and energy efficiency of less than 30 watts. 760-731-0745.

Scienco/FAST - a division of Bio-Microbics Inc. SciCHLOR

The SciCHLOR sodium hypochlorite generator system with multipass SciCELL electrochemical activation technology from Scienco/FAST - a division of Bio-Microbics Inc. can produce an available supply of disinfectant solution. It is available in sizes of 10 to 60 pounds chlorine equivalent per day to provide a reliable method of safely producing liquid chlorine for medium to large onsite disinfection applications while surpassing operational efficiency performance requirements, according to the manufacturer. Connected to an incoming water source and with operating modes of batch, continuous, clean, setup, and diagnostic, the brine solution multipasses through a low-voltage DC electrolytic cell to produce the sodium hypochlorite. When it reaches the low-level float setpoint, the system automatically restarts to replenish its water supply. If no solution is used, the system shuts down to save power. With an 800 ppm FAC sample taken from the generator, the solution killed 100 percent of the *Staphylococcus aureus* and *E. coli* organisms within 30 seconds, according to the maker. 866-652-4539; www.sciencofast.com.



Sim/Tech Filter pleated filter units

Pleated filter units from Sim/Tech Filter provide gravity effluent filtration in septic tanks and turbine pump filtration in pump tanks. The filtration size is 3/32 inch in two dimensions. Flow channels in the pleated material result in increased longevity. All filter types start at over 2,000 square inches of filtration area. The 45 percent open area (over 900 square inches) is equivalent to 800 linear feet of 3/32-inch slots. Various configurations and larger units are available. 888-999-3290; www.simtechfilter.com.

WEDECO - a Xylem Brand Duron

The Duron UV system from WEDECO - a Xylem Brand helps meet the disinfection needs of midsized to large wastewater treatment sites. To maximize disinfection efficiency and hydraulic performance, it uses staggered 600-watt Ecoray lamps at a 45-degree angle. Simple to install and operate and validated for a diverse range of water characters, it can be designed to meet any site's specific disinfection requirements. No lifting device is required and maintenance is made easy with fully automatic UV module lifting. Energy savings come from providing the required dose based on integrated OptiDose control, which is based on real-time lamp aging, fouling and water parameters. It provides closed-loop monitoring of UV intensity, UVT and flow rate to quickly adapt to water quality changes. 855-995-4261; www.xylem.com.



LARGE-CAPACITY HOLDING AND TREATMENT TANK

Infiltrator Water Technologies IM Series

IM-Series tanks for septic, pump, and potable water applications from Infiltrator Water Technologies are designed to be lightweight, durable, watertight, and strong. The two-piece tanks are available in a variety of sizes including the large-capacity IM-1530 septic tank and the IM-1760C potable water tank. Enabling a wide range of installation options including shallow, multiple and serial tank configurations, tanks have integral heavy-duty lids that interconnect with the watertight click-and-lock EZsnap Riser or the TW-Riser system. They have structurally reinforced access ports, reinforced structural ribbing and fiberglass support posts for added strength. Inboard lifting lugs make delivery and handling easy. No special installation, backfill, or water-filling procedures are required, and tanks can be pumped dry during pumpouts. The two-piece design nests for efficient shipping and reduced freight costs. 800-221-4436; www.infiltratorwater.com.



LEVEL ALARMS

SJE-Rhombus Tank Alert Solar

A rechargeable battery via a 12-volt DC, 10-watt solar panel powers the Tank Alert Solar alarm from SJE-Rhombus. In full alarm, the unit will run for about 24 hours. Idle use without solar charging will run for about five days. It features a NEMA 4X indoor/outdoor-rated enclosure with integral mounting tabs for convenient installation and features LED indicators to show power on, reverse battery polarity and battery charging. Lithium-ion batteries provide backup power. 888-342-5753; www.sjerhombus.com.



Sump Alarm Wi-Fi version outdoor tank alarm

The Wi-Fi version outdoor tank alarm from Sump Alarm provides email, text and voice notifications for up to five numbers. The unit can call installers when a client's tank is full. The weatherproof high tank alarm requires no on-site wiring and includes a 90 dB horn and 1-inch LED indicator. Versions are available for high- and low-level detection and available in 120 or 220 volts. It joins the household's Wi-Fi network. It is completely preassembled and suitable for extreme temperatures. 314-787-8059; www.sumpalarm.com.



NITROGEN-REDUCTION SYSTEMS

Anua Puraflo Dn

The Puraflo Dn peat fiber biofilter system from Anua provides enhanced denitrification below 20 mg/L through recirculating 50 percent of the treated effluent back to the front end of the septic tank, according to the maker. Flow proportioning is accomplished through simple adaptations to external plumbing, allowing for a single-pump system with no aerators. In recirculation mode, each module is rated for domestic strength at 240 gpd total hydraulic loading equivalent and 120 gpd forward flow. It can be designed and installed as a combined treatment and effluent dispersal system. Treated effluent exits the modules via weep holes around the perimeter at the module base, and flows into the dispersal system situated directly beneath the modules. Available dispersal system options are in-ground pad or mounded pad. 336-547-9338; www.anuainternational.com.



Eliminite Commercial C-Series

The Commercial C-Series system from Eliminite is designed to provide reliable treatment with emphasis on total nitrogen reduction for high-strength waste applications such as worker camps, RV parks, restaurants, ski and golf resorts, breweries, mines and agricultural operations. It is designed to work with locally sourced tanks and components when possible. MetaRocks treatment media are designed to withstand a variety of high-strength waste-loading scenarios, particularly where clogging and odor control are major considerations. The system is scalable and may be adapted to suit specific phasing requirements, site constraints and unique demands. 888-406-2289; www.eliminite.com.



SeptiTech STAAR

SeptiTech STAAR (Smart Trickling Anaerobic/Aerobic Recirculation) filter systems are designed for both multifamily domestic and high-strength commercial wastewater from 100 to more than 150,000 gpd. Systems use partially submerged media to treat high organic loads that integrate with other technologies and accessories. The biological trickling filter also maintains low levels of Nitrate-N with all below-grade components that fit in available concrete, plastic or fiberglass tanks. Smart technology allows the system to go into a sleep mode that will dial down activity and eventually shut all power off until normal flow conditions are detected. This allows for reduced operating costs and power requirements. 207-333-6940; www.septitech.com.



PUMP STATION

Polylok Inc. / Zabel PL-PS40

The PL-PS40 prepackaged basin assembly from Polylok Inc. / Zabel comes ready to assemble. It is made of high-density polyethylene and is lightweight and compact. To install, glue three pieces of PVC and connect the inlet and outlet pipes, and then provide power. The design allows for an adapter ring to add up to 24 inches of risers. The prepackaged basin assembly is easy to access and disconnect for future servicing. It includes a 24-by-40-inch basin, 24-inch heavy-duty cover, 0.4 hp effluent pump with a piggyback float for automatic on/off operation, indoor/outdoor audible and visual alarm with float, internal piping system (2-inch PVC piping and a gate, check and union all in one valve assembly), three grommets, a 4-inch inlet, 2-inch discharge, a 1 1/2-inch inlet for electrical, and a junction box with three watertight connectors. 888-765-9565; www.polylok.com.



PUMPS

Ashland Pump AGP-HC200

The AGP-HC200 grinder pump from Ashland Pump has a radial portion that grinds waste into fine slurry, as well as a cutting-edge axial portion that cuts and chops stringy solids and other forms of nonhuman waste into pieces that will pass through the small-diameter discharge pipe. Fibrous materials get chopped and cut, while the soft solids become slurry, minimizing downstream solids and preventing clogging. The engineered design prevents wrapping at the inlet. The cutters are made of case-hardened 440 stainless steel and are easy to sharpen and adjust clearances, according to the maker. 855-281-6830; www.ashlandpump.com.

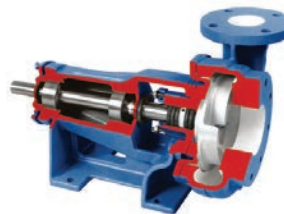


Gorman-Rupp ReliaPrime

Designed to deliver the benefits of sound-attenuated silent pumps, the ReliaPrime emergency bypass station from Gorman-Rupp operates on natural gas. The engine-driven pump comes with autostart and level controls that allow it to start and stop in response to the liquid level. The unit includes a 3-inch Ultra V Series pump capable of passing a 3-inch spherical solid, and it offers a soundproof, lightweight aluminum enclosure with lockable door panels that can be removed for maintenance of the pump or engine. The unit is a complete backup package ready for hookup for emergencies and power outages, primary pump repair, and additional pumping capacity. 419-755-1011; www.grpumps.com.

Liberty Pumps LSG-Series Omnivore

LSG-Series Omnivore grinder pumps from Liberty Pumps have V-Slice cutter technology for shredding performance in demanding sewage applications, according to the manufacturer. The hardened stainless steel cutting system shreds jeans, shop rags, diapers, sanitary napkins and other difficult solids into fine slurry with infrequent jamming. Models are available in single- or two-stage designs, providing maximum pumping heads to 180 feet. Complete pre-designed grinder systems are available in a variety of basin sizes. 800-543-2550; www.libertypumps.com.



Vertiflo Pump 1400

The Vertiflo Pump 1400 horizontal end suction pump has a heavy-duty cast-iron frame that incorporates integrally cast support and ribbed mounting feet, which assure a solid, dependable pump installation and operation. One frame fits all pump sizes. The frame has a back pullout design that allows for easy inspection or service/maintenance without disturbing the piping to the pump. It offers ease of maintenance with external impeller adjustment. Its semiopen impeller design accommodates passage of solids or fines. All impellers have balance holes near the hub, which reduce thrust load and pressure in the packing or seal area. Wiping vanes reduce axial loading and prevent dirt from entering the sealing area. Packing or various mechanical seal arrangements are available. It is offered in cast iron, 316 stainless steel fitted, all 316 stainless steel, or CD4MCu. Capacities range up to 3,600 gpm, with heads of 275 feet and temperatures of 250 degrees F. 513-530-0888; www.vertiflopump.com.

Webtrol Pumps MVPS-RE1

The MVPS-RE1 drop-in package for existing progressive cavity systems from Webtrol Pumps has a progressive cavity pump at its center, which provides reliable operation and nearly constant flow, and is easily able to adjust for pressure variations in any system setting, according to the maker. The package is powered by a 1 1/2 hp motor, spinning at 1,750 rpm to provide grinding torque. With all package parts readily available and easily replaceable, it can quickly and easily be serviced in the field. 800-769-7867; www.webtrol.com. □



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Large Scale and Commercial Treatment Systems

By Craig Mandli

System provides treatment for new commercial plaza

Problem: When a developer wanted to build a new commercial plaza in Orleans, Massachusetts, adjacent to the town's off-ramp from the Mid-Cape Highway, the state Department of Environmental Protection required that a wastewater treatment and disposal facility be installed onsite to protect local groundwater. This commercial center generates up to 20,000 gpd of moderate- to high-strength wastewater. The system was permitted under Massachusetts Groundwater Discharge pollution control regulations requiring the system to meet a standard of less than 10 mg/L total nitrogen.



Solution: The project engineer selected a Bioclere treatment system from Aquapoint for its nitrification and denitrification performance capability, energy efficiency, ease of operation and small footprint. Units are preceded by a preaeration stage to condition the high-strength wastewater and to strip off VOCs, which can impair treatment efficiency if present in high concentrations. Effluent from the plant is discharged through a conventional pressure-dosed drainfield.

Result: The system provided the commercial development with an affordable and flexible treatment system that has achieved BOD, TSS, total nitrogen and NH3 removal levels of greater than 90 percent, exceeding allowable permit levels. 508-985-9050; www.aquapoint.com.

Sand filter system used to increase capacity

Problem: A gas station in Clare County, Michigan, had a septic system sized for 4,000 gpd based on meter readings, but an upturn in the economy saw increased meter readings of up to 9,000 gpd. An addition to the drainfield was needed to meet surge capacity on weekends.



Solution: County Wide Septic installed an Eljen GSF, or Geotextile Sand Filter, system provided by Milan Supply. The addition is comprised of 80 B43 GSF units and was installed in a bed configuration on a base of ASTM C33 sand. The effluent is pumped up to a distribution box, which then gravity-feeds four zones.

Result: The system is able to keep up with the increased business traffic flow, meet the site constraints and treat the effluent to NSF Standard 40. 800-444-1359; www.eljen.com.

Communal treatment serves oceanside community

Problem: Due to aging infrastructure and lack of access to municipal sewers, the Municipality of Chester required a new onsite wastewater treatment system to service an existing residential community in Nova Scotia, Canada. Surface discharge to the Atlantic Ocean required a solution providing superior quality treatment. Low ongoing operational costs and a small footprint to reduce disruption on the existing community were also essential.



Solution: A communal system was designed for a peak daily design flow of 39,630 gpd and consists of a poured-in-place concrete tank for anaerobic digestion and flow balancing, followed by four Waterloo Bio-filter Systems biological filtration treatment units in belowground fiberglass tanks, and finally UV disinfection. The treatment system is equipped with a smart panel for remote monitoring and control for advanced operation and maintenance.

Result: The tanks speeded installation and reduced costs in a compact footprint within close proximity to the residential development. The energy-efficient and technologically advanced treatment units are fully data-logged, helping to optimize performance, and can be diagnosed and operated remotely, further reducing operating costs and unnecessary site visits for alarms. 866-366-4329; www.waterloo-biofilter.com. □

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ARKANSAS

Arkansas Onsite Wastewater Association;
www.arkowa.com

CALIFORNIA

California Onsite Wastewater Association;
www.cowa.org; 530/513-6658

COLORADO

Colorado Professionals in Onsite Wastewater;
www.cpow.net; 720/626-8989

CONNECTICUT

Connecticut Onsite Wastewater Recycling Association;
www.cowra-online.org;
860/267-1057

DELAWARE

Delaware On-Site Wastewater Recycling Association;
www.dowra.org

FLORIDA

Florida Onsite Wastewater Association;
www.fowaonsite.com;
321/363-1590

GEORGIA

Georgia Onsite Wastewater Association;
www.onsitewastewater.org;
678/646-0379

Georgia F.O.G. Alliance;
www.georgiafog.com

IDAHO

Onsite Wastewater Association of Idaho;
www.owaidaho.org;
208/664-2133

ILLINOIS

Onsite Wastewater Professionals of Illinois;
www.owpi.org

INDIANA

Indiana Onsite Waste Water Professionals Association;
www.iowpa.org; 317/889-2382

IOWA

Iowa Onsite Waste Water Association;
www.iowwa.com; 515/225-1051

KANSAS

Kansas Small Flows Association;
www.ksfa.org; 913/594-1472

KENTUCKY

Kentucky Onsite Wastewater Association;
www.kentuckyonsite.org;
855/818-5692

MAINE

Maine Association of Site Evaluators;
www.maine.com

Maine Association of Professional Soil Scientists;
www.mapss.org

MARYLAND

Maryland Onsite Wastewater Professionals Association;
www.mowpa.org; 443/570-2029

MASSACHUSETTS

Yankee Onsite Wastewater Association;
www.maowp.org; 781/939-5710

MICHIGAN

Michigan Onsite Wastewater Recycling Association;
www.mowra.org

Michigan Septic Tank Association;
www.msta.biz; 989/808-8648

MINNESOTA

Minnesota Onsite Wastewater Association;
www.mowa-mn.com;
888/810-4178

MISSOURI

Missouri Smallflows Organization;
www.mosmallflows.org;
417/631-4027

NEBRASKA

Nebraska On-site Waste Water Association;
www.nowwa.org; 402/476-0162

NEW HAMPSHIRE

New Hampshire Association of Septage Haulers;
www.nhash.com; 603/831-8670

Granite State Designers and Installers Association;
www.gsdia.org; 603/228-1231

NEW MEXICO

Professional Onsite Wastewater Reuse Association of New Mexico;
www.powranm.org;
505/989-7676

NEW YORK

Long Island Liquid Waste Association, Inc.;
www.lilwa.org; 631/585-0448

NORTH CAROLINA

North Carolina Septic Tank Association;
www.ncsta.net; 336/416-3564

North Carolina Portable Toilet Group;
www.ncportabletoiletgroup.org;
252/249-1097

North Carolina Pumper Group;
www.ncpumpergroup.org;
252/249-1097

OHIO

Ohio Onsite Wastewater Association;
www.ohioonsite.org;
888/294-0084

OREGON

Oregon Onsite Wastewater Association;
www.o2wa.org; 541/389-6692

PENNSYLVANIA

Pennsylvania Association of Sewage Enforcement Officers;
www.pa-seo.org; 717/761-8648

Pennsylvania Onsite Wastewater Recycling Association;
www.powra.org

Pennsylvania Septage Management Association;
www.psmna.net; 717/763-7762

TENNESSEE

Tennessee Onsite Wastewater Association;
www.tnonsite.org

TEXAS

Texas On-Site Wastewater Association;
www.txowa.org; 888/398-7188

Education 4 Onsite Wastewater Management;
www.e4owm.com; 713/774-6694

VIRGINIA

Virginia Onsite Wastewater Recycling Association;
www.vowra.org; 540/377-9830

WASHINGTON

Washington On-Site Sewage Association;
www.wossa.org; 253/770-6594

WISCONSIN

Wisconsin Onsite Water Recycling Association;
www.wowra.com; 888/782-6815

Wisconsin Liquid Waste Carriers Association;
www.wlwca.com; 888/782-6815

NATIONAL

Water Environment Federation;
www.wef.org; 800/666-0206

National Onsite Wastewater Recycling Association;
www.nowra.org; 800/966-2942

National Association of Wastewater Technicians;
www.nawt.org; 800/236-6298

CANADA ALBERTA

Alberta Onsite Wastewater Management Association;
www.aowma.com; 877/489-7471

BRITISH COLUMBIA

British Columbia Onsite Wastewater Association;
www.bcossa.org; 778/432-2120

WCOWMA Onsite Wastewater Management of B.C.;
www.wcowma-bc.com; 877/489-7471

MANITOBA

Manitoba Onsite Wastewater Management Association;
www.mowma.org; 877/489-7471

Onsite Wastewater Systems Installers of Manitoba, Inc.;
www.owsim.com; 204/771-0455

NEW BRUNSWICK

New Brunswick Association of Onsite Wastewater Professionals;
www.nbaowp.ca; 506/455-5477

NOVA SCOTIA

Waste Water Nova Scotia;
www.wwns.ca; 902/246-2131

ONTARIO

Ontario Onsite Wastewater Association;
www.oowa.org; 855/905-6692

Ontario Association of Sewage Industry Services;
www.oasisontario.on.ca; 877/202-0082

SASKATCHEWAN

Saskatchewan Onsite Wastewater Management Association;
www.sowma.ca; 877/489-7471

CANADIAN REGIONAL

Western Canada Onsite Wastewater Management Association;
www.wcowma.com; 877/489-7471 □



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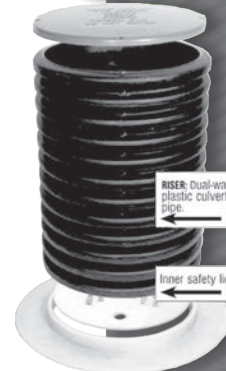
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PRODUCT NEWS

Sewer Skewer XL vent defroster

Villella Products, the corporation behind Sewer Skewer, has a new line of extra-long sewer vent defrosters. The Sewer Skewer XL comes with an attachment that can extend the copper pipe to reach more deeply into sewer vents. When assembled, the device extends 47 inches. The defroster uses copper technology and solar heat to free sewer vents from ice blockages that cause sewer gas buildup in homes during low temperatures. The copper T-pipe is placed into any size sewer vent and can be left in year-round. With the copper pipe in place, vents will be kept free of ice at temperatures as cold as 25 degrees below zero. 701-371-2327; www.sewerskewer.com.



Water Cannon Inc. - MWBE Easy Start Unloader Plumbing Kit

The Easy Start Unloader Plumbing Kit from Water Cannon Inc. - MWBE ensures water goes where it should and keeps excess water inside the pressure washer. The preassembled unit includes a brass valve body with a stainless steel ball and seat. It adjusts from 100 up to 5,650 maximum psi and has an easy-to-adjust ergonomic handle with a tamper-resistant setting. The kit has two inlet and bypass ports and a built-in easy-start feature so the pump can start without static back pressure. It must be mounted in a vertical position. 800-333-9274; www.watercannon.com. □



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Septic business for sale. Western WI. 2 older pumper trucks, 400 ft. of hoses, roofer, hot-water washer/jetter. Extra Cummins engine, pumps, parts, jacks, stands, etc. 30-year business, phone # and customer introduction. \$75,000. 715-491-3828 (P04)

Septic Company for Sale. Highly-reputable brand for two generations. Long contracts, servicing wealthy neighborhoods. Long Island, NY. Contact sfer1024@gmail.com; 516-567-2603 (P06)

Septic business for sale, New York watershed. Includes trucks and equipment. 20+ years with same phone number. \$250,000. hacksaw12481@gmail.com (PBM)

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TERRALIFT WANTED: We are in need of a Terralift machine, new or used. Contact A Advanced Septic and Construction, Joshua Gunia 253-579-6769; Joshua@advancedservices.com (P04)

INDUSTRY NEWS

Felling Trailers names new sales manager

Felling Trailers named Nathan Uphus as sales manager. He joined the company in 1999 and most recently was a territory manager in Tennessee. He will take an active role in day-to-day operations at the company's Sauk Centre, Minnesota, headquarters.



Nathan Uphus

Hyundai Construction Equipment Americas names new vice president of distribution/marketing

Hyundai Construction Equipment Americas appointed Stan Park vice president of distribution/marketing. He is responsible for leading the teams in charge of building and supporting the company's dealer network and overall marketing efforts. □

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