November 2018

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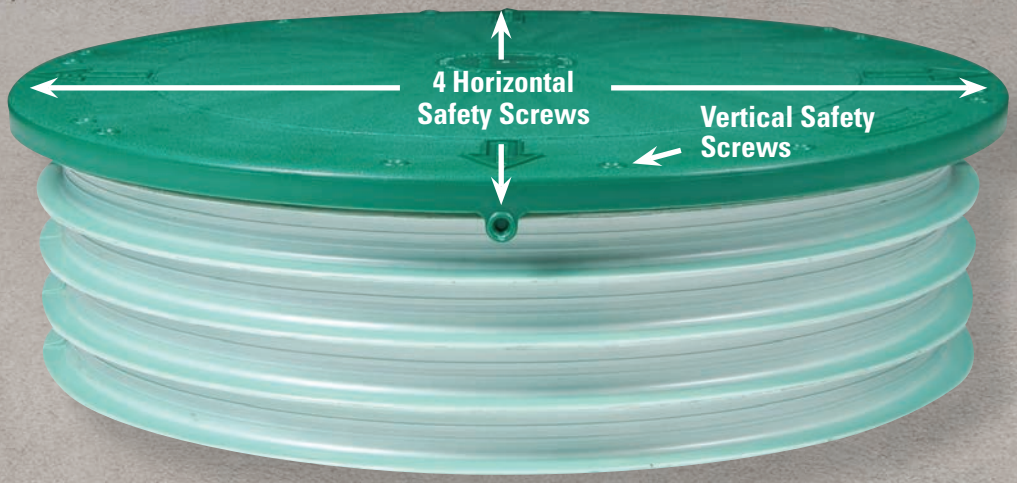

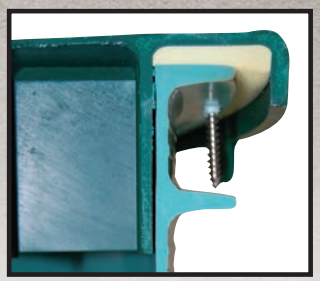

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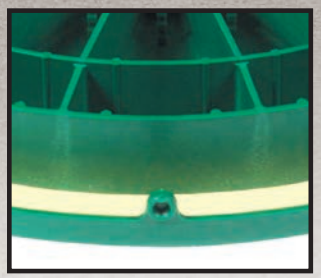

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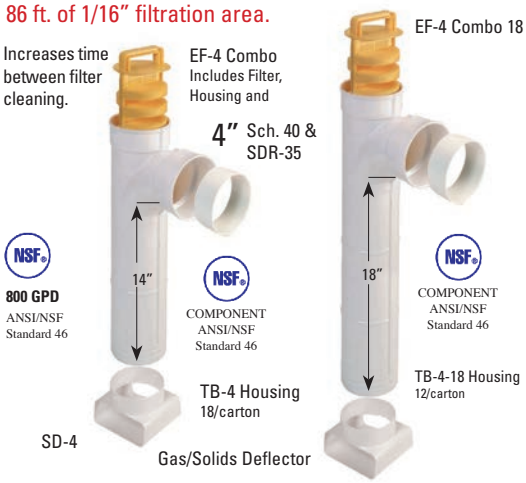

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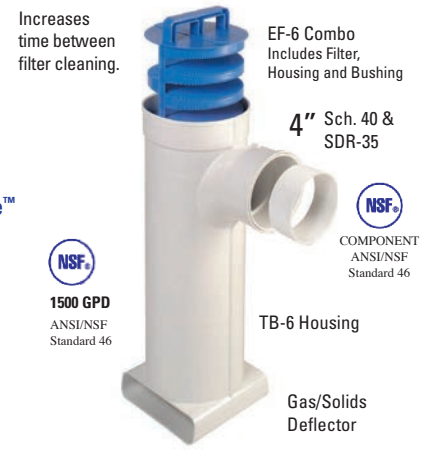

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Minnesota Muscle By David Steinkraus

ON THE COVER:
John R. Bruender (left), founder of J.R. Bruender Construction, is shown with his grandson, Joshua Bruender (center) and son Steve Bruender, the company's current owner. The company has been installing septic systems around Mankato, Minnesota, for more than 50 years. (Photo by Brad Stauffer)

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ADVERTISER INDEX

November 2018

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.

Jim Kneiszel

Identifying Failing Onsite Systems on Lake George

Diving for algae and an IBM clean-lake monitoring program — along with professional installers — are helping preserve New York's freshwater jewel

Engineers working on Lake George in upstate New York believe they're about to crack the code to protect water quality on bodies of water with developed shorelines … and onsite installers will play an important role in keeping these waterways clean and safe.

Sophisticated monitoring of underwater conditions — which includes diving to identify pollution-caused algae growth and a new IBM program placing data sensors throughout the lake — is showing early, promising results to identify environmental issues and correct failing septic systems.

Lake George Waterkeeper Chris Navitsky snorkels at the bottom of Lake George in New York to collect algae samples that help identify failed septic systems. (Photos courtesy of Lake George Waterkeeper)

Lake George is 32 miles long and 2.5 miles wide at its widest, is fed by surrounding mountain streams, and has a maximum depth of 190 feet. The headwaters lake has exceptional water quality overall, providing drinking water for thousands and with water clarity to depths of 35 to 40 feet.

But like the situation across much of North America, there is concern that water-quality conditions are changing. The lake is surrounded by roughly 6,000 septic systems, with an estimated two-thirds considered old or outdated. There is little oversight of these systems and no required routine maintenance or pumping interval established by the local government or the state of New York, not even time-of-sale inspections.

So local groups and Lake George Waterkeeper Chris Navitsky, an engineer who formerly designed onsite systems but now concentrates on clean-water advocacy, decided to take a deeper dive — literally — into the lake's pollution situation.

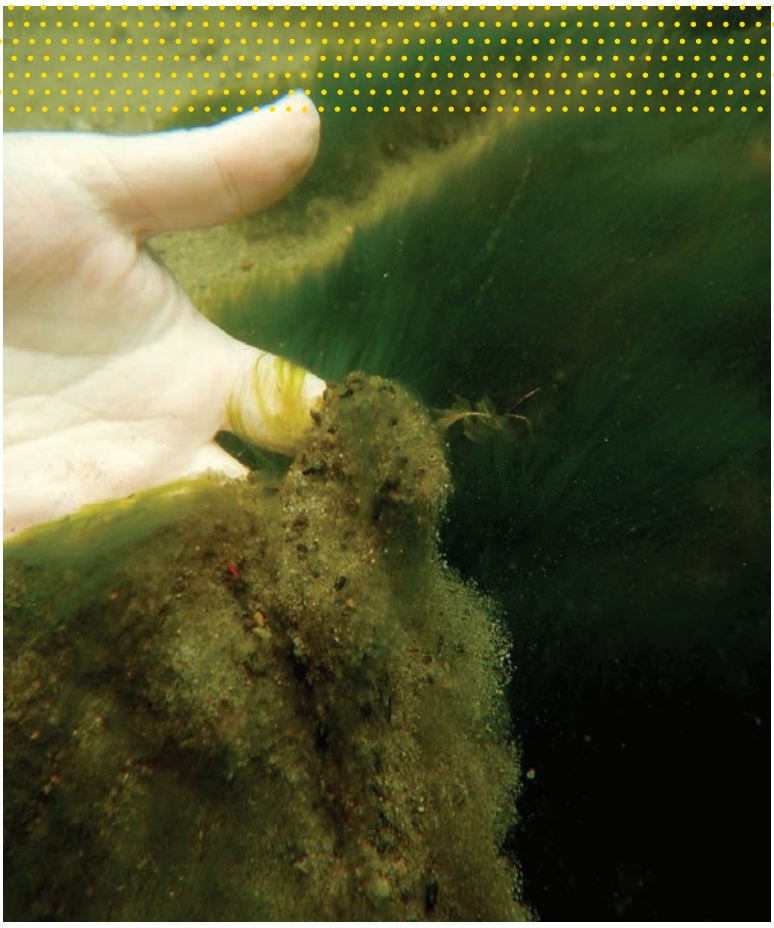
"What we've seen is an increase in algae across the lake. It's the canary in the coal mine," Navitsky says. "That's why we're focused on it. The algae are telling us something."

A group of 70 property owners around the small Dunham's Bay formed the North Queensbury Wastewater District and began working with Navitsky and the FUND for Lake George to monitor the lake bottom in search of indicators of untreated sewage.

UNDERWATER INVESTIGATION

The Lake George Waterkeeper group began snorkeling near the shore, in 3 to 6 feet of water, using a syringe to take samples of algae growth from rocks and sand and having it analyzed to look for a type of algae (among

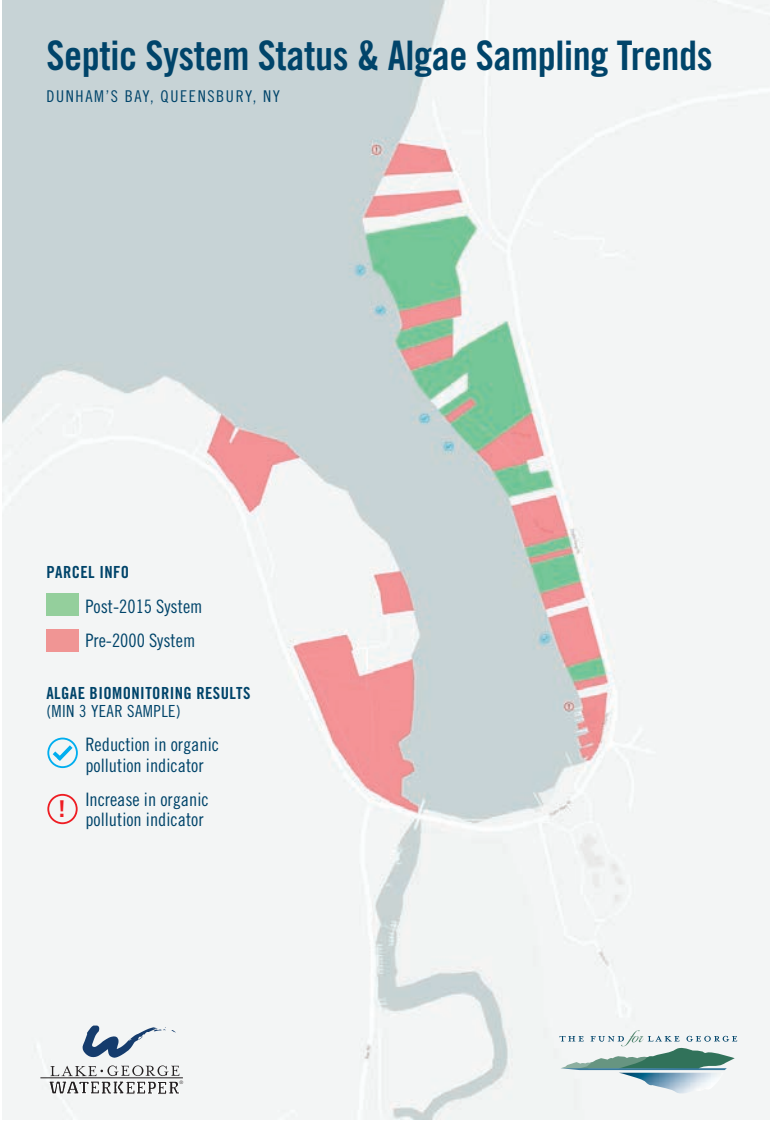
"What we may find doesn't mean (the organic algae) is associated with a particular home's system. Because of fractures and fissures in the bedrock, the wastewater can trickle through the fissures and could go 200 feet north or south, taking the path of least resistance."
Chris Navitsky



This algae develops because of organic pollution conditions associated with human waste.

Much of Lake George's bottom is extremely clear and free of algae caused by poor septic systems.

This map shows Dunham's Bay monitoring information.



20-30 species typical in the lake) that grow in organic pollution conditions associated with human waste. They also take GPS readings, make notes on substrate and shoreline conditions, and take photographs.

When they identify algae that would point to possible failing septic systems, they don't point fingers at homeowners, but allow the wastewater district to inform residents of the situation.

"I've always been cautious with the algae collection. What we may find doesn't mean (the organic algae) is associated with a particular home's system," Navitsky says. "Because of fractures and fissures in the bedrock, the wastewater can trickle through the fissures and could go 200 feet north or south, taking the path of least resistance."

Residents of Dunham's Bay have been cooperative since the sampling started in 2014 … and it's paid off in improved water quality. The Lake George Waterkeeper group offers matching grants of up to $8,000 per homeowner for system upgrades, and 11 of the 15 systems upgraded since the program started took advantage of the financial help.

Enhancements have cost between $14,000 and $20,000 and typically involve replacing septic tanks and adding an ATU component, as well as a UV unit downstream of the tank and before the drainfield. Regulators have usually allowed the existing drainfield to remain.

"The overall trend appears that the bay has improved, and we've seen a reduction of 25 percent in algae species associated with organic pollution," Navitsky says.

PROGRAM EXPANSION

The inventory of septic systems in the 14-acre Dunham's Bay is probably reflective of the rest of the lake properties, Navitsky says. Many of the cottages go back to the 1940s and were second homes or camps. Of the 70 properties, 21 percent had permitted systems with drawings on file at the town, 14 percent might have had a rudimentary sketch on file, and the rest

continued >>

were undocumented. Navitsky believes two-thirds of septic systems around the lake are undocumented.

That should be changing. As word spreads about the water-quality improvements on the small bay — as well as the grant program — more residents are asking to get involved. Receiving the Lake George Waterkeeper money comes with some stipulations that will help in the overall inventory of lake systems, Navitsky explains.

Lake area owners can petition the local town to form a wastewater district to tap into available monitoring and matching grants as septic system upgrades become necessary. To be part of a wastewater district, homeowners must agree to:

- Municipal oversight and management
- Professionally engineered septic system plans
- Town approval of wastewater system improvements
- Implementing water conservation fixtures to reduce flows
- System inspections and service contracts for advanced systems.

To bolster interest in the program, local groups organized a Septic Summit education event in 2017. Decentralized wastewater manufacturers came to showcase their technologies, and designers and installers were offered continuing education credits through the state to attend and learn.

SMART LAKE

Beyond the work in Dunham's Bay, the Jefferson Project of IBM Research, the Rensselaer Polytechnic Institute, and the FUND for Lake George will make this body of water "the smartest lake in the world," Navitsky says. A collection of 50 computer sensors have been installed throughout the watershed to collect data to show water runoff patterns, how the water enters and circulates in the lake, and how weather patterns and precipitation impact the lake.

"It's quite amazing what this project is doing. It's groundbreaking," Navitsky says. "The sensors talk to each other and sense weather events coming in. The deployed sensors will be used to predict what stressors can do to an ecosystem and use modeling to predict into the future. The sensors can determine that the replacement programs we've implemented and funded are clearing up water quality the way we think algae changes are showing."

The IBM program has been developing at the same time as the algae identification in Dunham's Bay and is expected to produce results in a year or two, he says.

ONSITE INDUSTRY IS KEY

Knowledge of water-quality issues and maintenance and care of septic systems are continuing to improve, but there is much more to do, Navitsky says. And wastewater professionals in the region — installers and pumpers — are poised to help out as issues are identified and systems need maintenance and upgrading, he says.

"The most important thing anybody can do is pump your system out every two to three years. That's how we gain 80 percent of the knowledge on the condition of our systems," he says, noting the opportunity to inspect baffles, filters, looking for cracks in tanks, the drainfield. That pumpouts are not required, "is surprising, but it is what it is. That's why we're trying to promote this. You'd think common sense would fall into place and you should require pumpouts."

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THE HEAT IS ON

Dealing with Fire Damage

Wildfires have become a year-round fact of life in California and other parts of the western United States. Onsite systems may seem protected because so much is buried in the earth, but that isn't the case for some components and anything that's above ground is at risk. Here's how septic professionals out West help customers deal with fire damage. onsiteinstaller.com/featured

TANKS & RISERS

Troubleshooting Tips

When troubleshooting, always check that the septic tank is watertight and carefully examine any risers or inspection ports to prevent a host of issues. The tank should be examined for any cracks or holes where water can infiltrate or leave the tank depending on soil conditions. Check out more tips from expert Jim Anderson in this online series. onsiteinstaller.com/featured

Overheard Online

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GO-TO TOOL

Pinpoint Precision

Making sure pipes are clear and draining properly is especially important in cold climates. This online story highlights the favorite inspection camera for Minnesota's J.R. Bruender Construction, featured in this issue, and how it's improved customer service on both septic repairs and installations. onsiteinstaller.com/featured

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MINNESOTA MUSCLE

Three generations of excavation pros at J.R. Bruender Construction have been pushing dirt and installing innovative septic systems for satisfied customers

By David Steinkraus

The J.R. Bruender Construction team includes (from left) Loren Olson, Cliff Vaske, Kara Boughey, John Kahnke, Steven Bruender, Dane Wendland, John R. Bruender, Matt Kahnke, Joshua Bruender and Richard Ybarra. (Photos by Brad Stauffer)

Minnesota is known as the Land of 10,000 Lakes, and a fair number of those are scattered across the countryside near Eagle Lake, Minnesota, where J.R. Bruender Construction is located. The high water table around the lakes adds its own challenge to the company's installation business.

J.R. Bruender Construction overcomes that challenge as it has overcome others. About half a century after it was started by John R. Bruender, the company is still going strong. Bruender is "retired," but still helps with projects. His son Steven Bruender runs the company, and Steven Bruender is planning for the transition to his 24-year-old son Joshua.

There are nine employees, and although the word "construction" is in the company name and company excavators dig basements, J.R. Bruender Construction has always offered a full range of wastewater services.

CREATIVE SOLUTIONS

The most challenging system the company installed was a community cluster system, and it was a project the Bruenders financed. "If we were going to get these done, then financing it ourselves seemed the only way to do it," John Bruender says.

This has been his "retirement" project, and he's done six such systems, from finding the land to helping homeowners set up a nonprofit corporation to manage the finances for their system.

People are interested in these cluster developments, but they are reluctant to put down money based on an idea, Bruender says. That's why it was important for the Bruenders to finance. Money means ground is broken, and once people see action, they are willing to join.

"As people had a need for it, we sold them a share of our investments, and they bought into the cluster," John Bruender says.

"That was a very wet area with lakes on one side and swamps on the other side of the road," Steven Bruender says.

"And the lots were very small," John Bruender says.

The poor soils dictated a mound system and the only suitable soil and area for final treatment was about a mile and a quarter away. There was also about a 90-foot change in elevation. Because the Bruenders prefer having septic tanks at each house for initial treatment, they led effluent from tanks through collection pipes to a couple of small substations that pumped to a main lift station. From there, they ran a 3-inch line to the mound field.

"I think I worked 12 or 15 years in the factory — nights — and did construction in the daytime. It did not bother me to leave the factory. **I was raised on a farm, and I had to get back out and work outside"**

John R. Bruender

Dane Wendland uses a CST/Berger ALGR grade laser, while John Kahnke operates a Case CX130 excavator on a job site.

J.R. Bruender Construction

Location: Eagle Lake, Minnesota
Owner: Steven Bruender
Founded: 1965
Employees: 9
Service area: 40-mile radius from Eagle Lake
Services: Septic service, installation, design, compliance inspection and repairs; portable sanitation and storage rental; general excavation; landscaping; dump truck hauling; snow removal and ice control
Affiliations: Minnesota Onsite Wastewater Association, NOWRA - National Onsite Wastewater Recycling Association, Land Improvement Contractors of America
Website: www.jrbruender.com, www.port-o-john.com

"We crossed our fingers and hoped everything was going to work," John Bruender says.

It has for about 10 years, and the company still holds the maintenance contract for the system.

More advanced technologies, such as aerated systems, are not common in this area. They have been approved by the state, but not all counties have approved.

"We've been working with our local counties to help them understand the benefits of these new technologies, and hopefully they will come around and be more in tune," Steven Bruender says.

Because of the high water table, mound systems are the most common type of onsite system they install. Small lot sizes are the biggest challenge the company must overcome in its installations, he says.

In many cases, these are 50-foot lots sized for a weekend cabin, and now people have converted those cabins into year-round homes, John Bruender says. That's where cluster systems are useful, he says. "No matter how small the lot, you can always pump it to a treatment area."

STARTED WITH A BACKHOE

Bruender began the business in 1965 when he was also farming and working at a factory job. He had purchased a small Ford backhoe for farm work. When the factory job became full-time, he stopped farming.

"I was only working eight hours a day. I didn't want to twiddle my thumbs, so I traded my Ford backhoe for a new Case in 1965. I think I worked 12 or 15 years in the factory — nights — and did construction in the daytime," Bruender says.

The business kept growing and eventually allowed him to quit working at the factory. "It did not bother me to leave the factory. I was raised on a farm, and I had to get back out and work outside," he says.

Joshua Bruender, a third-generation installer for the Minnesota company, secures a Kubota track loader for a trip to another onsite job.

Kara Boughey, office manager, confers with John R. Bruender, company founder, about upcoming projects.

Business now consists of about 40 percent installations and repairs, 40 percent general excavating, about 10 percent on portable restrooms, and about 10 percent on portable storage. In winter, they do snow removal when other outside work slows down.

In addition to the 530 Case backhoe Bruender still has from the start of the business, the company has a wide selection of equipment to work with. A 2009 Case 130 excavator and a 2016 Kubota SVL75-2 tracked skid-steer handle most of the installations.

Service work is handled by two Ford vans. These are also large enough to hold power tools, generators and other necessary equipment. They have a jetter, but it's not a machine purposely made for that work. It's a pressure washer with a Honda engine and a hose reel. It produces about 3,000 psi and is used primarily for troubleshooting or de-icing pump lines.

The main vacuum truck is a 2000 Freightliner FL112 with a 3,875-gallon aluminum tank, a hoist and 36-inch hatch, and a Battioni WPT 720/P liquid-cooled pump. For tight spots, or on days when the volume of work demands a second vacuum rig, or when the primary truck is out for maintenance, they have a 2000 Freightliner, single-axle truck with a 2,500-gallon steel tank and a Battioni pump.

Last spring they bought a 2018 Ford F-550 pickup for the portable restroom business. It carries a Satellite Industries 625-gallon waste and 325-gallon freshwater stainless steel tank and Conde (Westmoor) SDS pump.

In addition, the company maintains a variety of equipment, including a 2004 Kobelco SK210 excavator and SR45 mini-excavator; a Takeuchi TB800

Loren Olson, the portable sanitation technician, inspects Satellite Industries restrooms. His service truck was also built by Satellite Industries.

RESTROOMS AND STORAGE

J.R. Bruender Construction recently bought a Ford F-550 vacuum truck to serve the company's portable restroom operation. The company's inventory of 100 Satellite Industries restrooms is not a large number, but it's enough.

"Mostly dad started this as a side business to add to the other services we offer," says Steven Bruender, who owns the company started by his father, John R. Bruender, more than 50 years ago. "We are geared for weekend events at people's homes, and we get a lot of orders for construction sites."

It's not a part of the business that Steven Bruender has pushed, and the company has been doing so well with its other work that he hasn't had time to think about whether to add more units.

A construction project gave a push to another side business. The project was a large amount of commercial building work in nearby Mankato, Minnesota, and John Bruender bought a few portable storage containers and offered them to contractors who needed to secure equipment on site.

Containers have also been used by people who had a flood or fire in their homes and needed to move goods out of the house while repairs were in progress. People doing extensive remodeling find containers useful for temporary storage of their belongings. People who are moving can load goods into it at the old home, and Bruender will deliver it to the new home. If there's a gap between moving out and moving in, the company will store the container at its yard.

The company bought 50 storage units. Usage is split about 50-50 between residential and commercial customers.

Together the storage and portable restroom services require the attention of one employee full time.

mini-excavator; Case 580K and 530 backhoes, 1140 and 560 bulldozers, and W24 and 621 front end loaders; Kubota SVL95 and SVL75-2 track loaders; a Dynapac CA15 sheepsfoot roller; Freightliner semitractor with Fontaine Trailer low-boy hauling trailer; and Freightliner, Mack, Volvo, GMC and International dump trucks with bodies from Crysteel, J-Craft, and R/S-Godwin Truck Body of Allen, Kentucky.

FINDING GOOD HELP

Finding good equipment operators has been difficult in south-central Minnesota (Eagle Lake is about 90 miles southwest of Minneapolis and St. Paul). "There's quite a labor shortage everywhere," Steven Bruender says. "We work with a lot of other trades, and we hear the same thing: It's hard to find a good helper or any help at all."

Sometimes they find a person looking for a different work environment, and they're lucky if they find someone coming from a different type of construction work. "Mostly we want someone with a positive attitude and who is willing to learn," he says.

"Also," John Bruender adds, "if we hire someone with a little bit of aptitude, we can train them the way we want. Sometimes people who have a lot of experience don't work out because their experience was bad."

continued >>

"There's quite a labor shortage everywhere. We work with a lot of other trades, and we hear the same thing: It's hard to find a good helper or any help at all."
Steven Bruender

Joshua Bruender operates a Kubota track loader on a job site.

John R. Bruender lifts a lid at a pump station that is part of an innovative cluster system he designed and installed in rural Minnesota.

His dad always used to hire farm boys because they had a good work ethic, Steven Bruender says. Today there are fewer farm boys, and many seem more interested in having jobs involving computers rather than getting outside to run equipment.

The company doesn't provide health insurance. That's a really tough deal for small businesses to handle, Bruender says. They do provide a competitive wage, 401(k) plan with a company match, and paid vacations. When employees need days off, they work it out, which may mean trading days around. A couple of the employees are farmers, and the Bruenders are happy to let them borrow equipment for farm work.

MARKETING STRATEGY

The company's marketing efforts were through a website and some of the larger local phone books, but the cost seemed to exceed the benefits. They are currently taking a new direction and building a new website for the construction side. Also, a Facebook page set up a few years ago produces some contacts.

They found a local web designer who works with auto dealers and some of the larger companies in nearby Mankato. He is redesigning the company website and has a number of marketing ideas, Bruender says. One is an online store for the portable restroom and storage container business. The vision is to allow customers to see the offerings, get prices and book service online. Through the new website, they will be able to track the results of electronic marketing to know what is working and what isn't.

They also do some advertising in local publications such as the magazines published for lake associations in the area.

Expansion into a bigger company is not a goal. "We'd like to stay kind of the size we are," Bruender says. His son will be 24 this fall and is working toward more state licenses so he can be more involved in the business. In a few years, he'll probably move into the office and work with bids with the hope that he will eventually take over the business.

"There's a lot of opportunity out there for work, and I think the biggest challenge is finding the people who want to do this kind of work. I don't know if that's a phase we're in or if it's a long-term problem," Steven Bruender says. "At this point, we just concentrate on good customer service and being as efficient and profitable as we can and work with the people we have. I think that's a pretty good goal for now."

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California Pushes Recycling Wastewater to Potable Water

By David Steinkraus

The state of California is pushing development of recycled wastewater as another source of water for the thirsty state, but not everyone is eager to pursue the option. In July the city of Ventura decided not to undertake direct potable reuse.

One reason, reports the *Ventura County Star*, is that no other city in the state is doing direct potable reuse. There is a bill in the legislature to spur development of direct potable reuse of water in onsite systems, and in the fall of 2017, Gov. Jerry Brown signed a bill ordering the state Water Resources Control Board to adopt regulations for augmenting raw water with recycled water.

The Ventura City Council said it was more comfortable pursuing indirect potable reuse in which treated wastewater is channeled to a basin from which it is drawn and treated again before being sent to customers. The city is under court order to reduce the amount of its discharge to 500,000 gallons per day. Ventura is on the Pacific coast, about 70 miles northwest of Los Angeles, and it was sued by several groups that say its large discharges — more than 6 million gallons per day — were harming habitat in the Santa Clara River estuary.

Water Research Foundation Grants

After several months of preparation, the Water Research Foundation is accepting proposals to research water recycling. Money for the research is coming from a $4.5 million grant from the California State Water Resources Control Board. Some of the money will be used for research into potable uses and some for nonpotable uses.

Among the topics to be investigated are: developing monitoring systems for microorganisms in potable reuse operations, assembling evidence for pathogen reduction when recycled water is discharged into an aquifer, reviewing how industrial contaminants affect potable reuse, looking at the amount of wastewater available for recycling in California, studying the effects of recycled water irrigation of agricultural crops, and considering the potential for recycling water from oil fields.

New York

Residents of Glen Lake in Queensbury are objecting to a proposed law that would have the town test septic systems when a property in the waterfront residential zone is sold.

The idea is that some proceeds from the sale would provide money to repair or replace a failing system, reports *The Post-Star* of Glens Falls. But residents tell town officials that when a property changes hands after a death, there is typically no exchange of money. Residents also worry that required repairs or installation of a new system would delay property sales.

A few lake residents spoke in favor of the proposed law with some suggesting all systems near the lake should be inspected regularly.

Funds help replace New York systems

The Catskill Watershed Corp. removed the distance limit on funds to help homeowners and small businesses repair or replace failed septic systems. Previously a property had to be within 700 feet of a watercourse.

The residential program reimburses 100 percent of the cost of repair or replacement for permanent residents and 60 percent for part-time residents. Small businesses with 100 or fewer employees may receive 75 percent of cost.

The corporation began its septic repair program in 1995. To date, it has helped repair more than 5,000 failed systems.

Florida

Recent news stories focused on the contribution that failing onsite systems make to algae blooms and how state government may have made the problem worse.

In 2010 the Legislature passed a law requiring inspections of onsite systems every five years. But citizens objected, and two years later the law was repealed after an effort led by former state Sen. Charlie Dean, R-Inverness. He tells the *Tampa Bay Times* he is now not sure that repeal was right.

"In my opinion, septic tanks are a major contributor," Dean says in an interview. "If we repealed the wrong thing, then yes, it's our fault."

Gov. Rick Scott, who signed the repeal, disagrees. "It's absurd to say that a bill that the Legislature passed with an overwhelming, bipartisan majority to save homeowners money six years ago has somehow caused the algal bloom problem that's been plaguing the state for decades," a spokesman tells the newspaper.

Scientists interviewed for the stories say agriculture is the primary cause of the blooms, but onsite systems contribute to the problem.

Connecticut

The town of New Fairfield is considering regulations to govern Airbnb online home rentals. In New Fairfield, the draw is properties on Candlewood Lake, which has a long history of renting properties.

The problem for Evan White, the zoning officer in New Fairfield, is that some Airbnb rentals bring in so many people that it puts a strain on septic systems.

The audience at a public hearing was split between those who say online rentals have helped them keep or improve their homes, and those who object to large crowds that strain wastewater systems and disturb neighbors.

John Moran, who chairs the zoning commission, tells *The News-Times* of Danbury that commissioners will take a few months to decide what action would be appropriate.

Oregon

The Eugene Water & Electric Board has restored funding for its septic system program in the McKenzie River watershed. The river is the only source of drinking water for the city of Eugene.

Money is available for cost sharing and zero-interest loans to help people maintain their systems or repair or replace failing systems.

Under cost sharing, homeowners upstream of the city's drinking water intake may receive 50 percent of the cost of an inspection and pumpout, and 50 percent of minor repairs that cost up to $300.

Zero-interest loans are available for significant repairs or system replacements. The maximum loan amount is $10,000 with a maximum repayment term of 60 months.

Prince Albert, Saskatchewan

The city of Prince Albert punished a pumping company for what it alleges was illegal dumping, but a judge quashed the punishment saying the process was unfair to the company.

After it hired a private investigator to look into charges against C & D Septic, the city denied the company access to the city wastewater plant to dump septage and to the city landfill to dispose of biosolids. In addition, it sent letters to 18 people who are not connected to the sewer system and informed them they would not be eligible for a 50 percent pumping cost reimbursement if they hired C & D Septic.

In his opinion, Court of Queen's Bench Justice Gary Meschisnick says it was clear the city made decisions without notice to the company. Although there was no detailed evidence of financial harm, he says it was also clear the company had lost business as a result of the city action. He ordered the city to outline its concerns to the company and to specify the evidence it has. ◻

"Rules and Regs" is a monthly feature in *Onsite Installer*™. We welcome information about state or local regulations of potential broad interest to onsite contractors. Send ideas to editor@onsiteinstaller.com.

SYSTEM PROFILE

A Pioneer Farm Received a Modern Wastewater Treatment Solution

As New York's Long Island replaces cesspools, a nonprofit educational farm chooses a constructed wetland as a cleaner alternative

By David Steinkraus

With its extensive history of settlement, Long Island, New York, also has a lengthy history with cesspools. Nitrogen pollution is now pushing local officials to declare an end to cesspool use, and the next issue is what can replace them.

One solution is a constructed wetland like the pilot project conducted at Sylvester Manor on Shelter Island near Long Island's northeastern tip. The manor has a history almost as long as the island itself and now may be pointing a way toward its onsite future.

The manor started in 1652 as a plantation to supply provisions for the sugar trade with Barbados. Today, after 10 generations in one family, the manor has been gifted to the nonprofit Sylvester Manor Educational Farm. It has shrunk to a 240-acre farm dedicated to promoting sustainable agriculture and educating people about the connections between land and food. This focus on the future made it a natural place to showcase wastewater solutions.

Good timing

"We came along with the desire to adopt a wastewater alternative at the same time the county was looking for a site to construct a pilot project wetland," says Sara Gordon, the farm's planning and conservation consultant.

Ed Bennett, left, of Natural Systems Utilities, and Steve Dickerson, contractor at Dickerson Electric, set up the IFS control panels (SJE-Rhombus) that control a pair of pumps (Goulds Water Technology, a Xylem brand) for the Sylvester Manor constructed wetland. (Photos courtesy Sara Gordon/Sylvester Manor)

Ed Bennett (top) of Natural Systems Utilities and Peder Larsen (bottom), installer at Shelter Island Sand & Gravel, establish the point where the inflow pipe will enter the constructed wetland at Sylvester Manor.

The Sylvester Manor wetland bed with base gravel layers, laterals, and Infiltrator Water Technologies chambers in place.

System Profile

Location:	Shelter Island, New York
Facility served:	Sylvester Manor Educational Farm
Designer:	Natural Systems Utilities Engineering, Hillsborough, New Jersey
Installer:	Shelter Island Sand & Gravel
Type of system:	Constructed wetland with groundwater recharge
Site conditions:	Loam transitioning to sand
Hydraulic capacity:	1,830 gpd

That was the fall of 2014, and the farm staff was moving its worker kitchen and restrooms to temporary structures on the property to reduce the impact of the resident farm staff on the old manor house. The system went into operation in 2017.

Funding came from the Suffolk County Water Quality Protection and Restoration Program, a Community Capital Assistance Program grant from the state, an education grant from the Long Island Community Foundation, and donations from the community.

Sylvester Manor staff teamed up with Natural Systems Utilities in Hillsborough, New Jersey, to design the project as well as manage construction and startup.

The system

Water leaves the restrooms in a 4-inch pipe and empties into the first of two 2,500-gallon concrete septic tanks connected in series and spaced about 6 feet apart. Tanks were supplied by Coastal Pipeline Products from Calverton, New York.

Kitchen waste runs first through a 1,500-gallon tank that serves as a grease trap before flowing into the first septic tank.

The two tanks are the simplest pretreatment possible to begin reducing BOD, says Mike Zavoda, P.E., one of the Natural Systems Utilities engineers who designed the system.

On the way out of the second tank, effluent passes through a Polylok filter before heading into a 3,000-gallon recirculation tank. A pair of Goulds Water Technology, a Xylem brand, pumps controlled by IFS panels from SJE-Rhombus push effluent through about 12 feet of 2-inch schedule 40 PVC lines to the constructed wetland bed that is 14 by 30 by 5 feet deep.

"Basically we built an old-fashioned swimming pool, but used a pond liner instead of vinyl," says Ed Bennett, a construction manager for Natural Systems Utilities.

The bed started with a plywood form to provide rough dimensions. The inside was lined with Firestone Building Products PondGard. It's an EPDM rubber just like the rubber used on flat roofs but without the added algicides and fungicides. Filter fabric between the liner and the plywood provided some cushion to protect the liner.

The finished wetland at Sylvester Manor Educational Farm on Shelter Island, New York, has native plants to provide treatment. Although the wetland was built a couple of feet above grade, finish work created a gentle slope up to the edge of the bed.

Tanks are set near the Sylvester Manor temporary kitchen and restrooms seen at top right. Closest to the building is a grease trap to catch kitchen waste. Next are two septic tanks connected in series. At bottom left is the dosing tank for the constructed wetland.

"We took standard plumbing components — Ts, 90-degree elbows, traps — and used a shower drain sealed with a piece of vinyl to create an 18-inch collection area. **Then we ran a pipe up to the top of the bed so students can open the cap and sample the water."**

Ed Bennett

Penetrations of the liner for pipes were sealed using the liner manufacturer's recommended system of pipe flashings, adhesives, and clamps, Bennett says.

At the bottom of the bed is 18 inches of 1-inch-diameter gravel. On top is about 2 1/2 feet of 3/8-inch-diameter pea gravel. On top of that are low-profile Infiltrator Water Technologies chambers, and inside are the laterals. There are 10 laterals, fed from a manifold and built with 2-inch Schedule 40 PVC. Chambers are covered with about 2 inches of pea gravel and topped with about 6 inches of mulch.

At the bottom of the bed, a 4-inch perforated pipe collects water flowing through the system and carries it to a 6-foot-diameter tank. This has a float so operators can control the depth of water in the wetland and maintain an anoxic zone for some denitrification.

An Orenco Systems recirculation ball valve controls whether water flows back through the wetland or on to three leaching chambers about 40 feet downslope from the wetland. The chambers are concrete, 10 feet in diameter, 16 feet deep, and with open bottoms so treated water can disperse into the soil.

Given the sandy soils on the island, the leach pits take up much less room than a typical drainfield and are as effective, Zavoda says.

Although the bed was built a couple of feet above grade, finish work included grading soil so there is a continuous gentle slope to the top of the bed, making it look like a part of the landscape rather than a special installation.

Multiuse pilot

Most of the treatment happens in the gravel inside the bed, Zavoda says. As plant roots grow into the gravel, they will provide more attachment sites for bacteria and some extra oxygen. What plants are used is not critical, he says. They just need to be tolerant of a wide range of conditions.

For the farm project, all the plants are Long Island natives, Gordon says. Farm staff consulted with experts at the Cornell Cooperative Extension of Cornell University to choose varieties from the engineer's list that are also resistant to browsing by deer and rabbits.

The system is in seasonal use now. Farm staff will keep just a bit of water flowing in the winter to keep the system from drying out, Zavoda says.

That is another part of the pilot project, too. A large number of homes in the area are in seasonal use, so the farm's project will provide insight into operating similar systems on other properties, Gordon says. Later, as the farm grows, its system will expand to year-round use, and that will provide another insight.

At the beginning of a season, it will probably be good to add some cultured bacteria to the system to give it a boost, Zavoda says.

Because this is a pilot project, additional inspection ports were added to monitor the system. Public health workers will be checking on the system,

but so will students from the Center for Clean Water Technology at nearby Stony Brook University. The center has a project to develop better wastewater treatment technologies for Long Island.

"Basically we took standard plumbing components — Ts, 90-degree elbows, traps — and used a shower drain sealed with a piece of vinyl to create an 18-inch collection area. Then we ran a pipe up to the top of the bed so students can open the cap and sample the water at the various layers in the bed," Bennett says.

Stony Brook University students were in charge of installing those, and gaining practical construction skills provided a good experience for them, he says.

There are plans to expand the system. There is space for another wetland cell next to the existing one as the farm repurposes nearby buildings. With the completion of this project, and the promise of more, Sylvester Manor is proof that a 366-year history can be the beginning of future contributions.

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Jim Anderson, Ph.D., and David Gustafson, P.E., are connected with the University of Minnesota onsite wastewater treatment education program. David is extension onsite sewage treatment educator. Jim is former director of the university's Water Resources Center and is now an emeritus professor. Readers are welcome to submit questions or article suggestions to Jim and David. Write to ander045@umn.edu.

Watch Out for Soils at Risk of Slip, Sliding Away

Besides shoring, trench safety relies on effective soil testing and best practices for running your heavy equipment on the installation site

By Jim Anderson and David Gustafson

This month we continue our discussion on Occupational Safety and Health Administration soil standards and the need to provide worker protection during excavations. Last month we discussed some conditions that lead to soil failure and how OSHA rules address them. Before we leave the subject, we would like to highlight some additional complicating factors installers may encounter and provide a quick reminder of field test methods used to identify the OSHA soil classes.

Among complicating factors to be aware of, soil composition may vary significantly from one area of a project to another. As the soil composition changes during an excavation, the safe slope for trench wall excavation also changes. The slope of the bank may need to be different.

Sliding and other failures can also occur in soils that are not densely compacted. For example, a trench that is made close to a previously dug trench is very unstable. If uncompacted soil is discovered, the normal safe slope for dense soil will not be enough to prevent sliding. Bracing or further sloping may be necessary.

If cracks are observed in rocky types of soil, sliding has already occurred. These cracks should signal the need for a more gradual slope for excavation because the rocky soil is very susceptible to slides and other types of failure.

Excavations that have been stable for long periods are also subject to sliding types of failure. After prolonged exposure to the elements, the moisture content in the soil may increase. This increase in moisture may be due to various causes, such as rainfall or a broken waterline. The extra soil moisture tends to speed up sliding soil failures.

Soil failure can occur for any number of reasons. Factors that increase the chances of soil failure are excessive vibration, surface encumbrances and weather conditions.

WATCH FOR SITE DISRUPTION

Anything that causes extra stress on the soil can result in soil failure. This can include vibration from moving your heavy machinery (backhoe) near the excavation. Other construction traffic can also cause this, which means your work site should be protected from this additional traffic. Sandy soils in general are more susceptible to failures due to vibration. Add water to sands with the vibration and they will flow and slide.

Similarly, having heavy loads next to the excavation can result in failure. This can be the spoil piles we discussed previously, the presence of your equipment, or stockpiles of rock and other materials. They can place more stress on the sides of the excavation. The best approach is to keep these materials away from the excavation. Where space is limited and heavy loads must be located near an excavation, the trench walls should be braced or shored.

Weather is an important factor in determining soil conditions. Excess water from rain or melting snow increases pressure on the excavation. If there have been heavy precipitation events and the excavation was left open, additional precautions (shoring or sloping) may be needed before work continues. Treatment trenches should be allowed to dry before working on them again.

Dry conditions can also be dangerous. As moisture content decreases, some dry soils lose their ability to stick together. This lack of cohesion may result in a sliding type of soil failure. With soils high in sand and silt content, the lack of cohesion between particles and where soil structure is not well-developed, sliding failures may occur.

As moisture content decreases, some dry soils lose their ability to stick together. **This lack of cohesion may result in a sliding type of soil failure.**

FIELD METHODS EXPLAINED

Installers may follow field methods to determine soil type (A, B or C) and requirement for sloping. They are use of a pocket penetrometer, thumb test, dry strength test and wet thread test.

Pocket penetrometers are direct-reading, spring-operated instruments used to determine the unconfined compressive strength of saturated, cohesive soils. Pushed into the soil, an indicator sleeve displays the reading. They are calibrated by tons per square foot, providing a direct reading to use to determine sloping requirements. The downside is penetrometers have large error rates in the range of plus or minus 20 to 40 percent.

The thumb penetration procedure involves pressing the thumb firmly into the soil in question. If the thumb makes an indentation in the soil only with great difficulty, the soil is probably Type A. If the thumb penetrates no

further than the length of the thumbnail, it is probably Type B soil. And if the thumb penetrates the full length, it is Type C soil. The thumb test is probably the least accurate, but absent better information, it can be useful.

Dry soil that crumbles freely or with moderate pressure into individual grains is granular. Dry soil that falls into clumps that subsequently break into smaller clumps (and the smaller clumps can be broken only with difficulty) is probably clay in combination with gravel, sand or silt. If the soil breaks into clumps that do not break into smaller clumps (and the soil can be broken only with difficulty), the soil is considered Type A unless there is visual indication of cracking.

The wet thread test is conducted by molding a moist soil sample into a ball and attempting to roll it into a thin thread approximately 1/8 inch (3 millimeters) in diameter (thick) by 2 inches (50 millimeters) in length. This is similar to our field test to see if the soil is dry enough to excavate for sewage treatment trenches. The soil sample is held by one end. If the sample does not break or tear, the soil is considered cohesive.

In addition to tests to determine cohesiveness, the installer should conduct a visual evaluation of the site. A visual test is a qualitative evaluation of conditions around the site. In a visual test, the entire excavation site is observed, including the soil adjacent to the site and the soil being excavated. The installer should note potential problems before excavation begins.

Hopefully this series has provided useful information about OSHA requirements and will save lives.

'We Are All Conscientious of Protecting Our Environment for the Future'

Wisconsin wastewater professionals band together to network, improve business practices, and lobby for sensible and smart regulations

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 Wisconsin Liquid Waste Carriers Association.

John Bowen
president

Business: Ken-Way Services of Rice Lake Inc., Rice Lake, Wisconsin
Age: 64
Years in the industry: 30

Association involvement:

The Wisconsin Liquid Waste Carriers Association was established in 1972. I joined in 1987 and three years later became president and served four years. I've been on the board for 20 years and two years ago became president again.

Benefits of belonging to the association:

I have very high regard for this association. It has helped me grow personally and has really helped our company grow into being a very respected professional business. There are many benefits. We have input on legislative rulings and code revisions involving our industry. We have upfront knowledge about what is in the works from the Wisconsin Department of Natural Resources and the U.S. Environmental Protection Agency. I feel we are more professional and profitable from the knowledge we gain from other pumpers. There are the friendships. Insurance is another thing — finding out where everyone is getting insurance. We have a couple conventions each year, which are well-attended. I cannot imagine not belonging to this association.

Biggest issue facing your association right now:

The Wisconsin Liquid Waste Carriers Association is a strong group with 140 out of 404 registered liquid waste businesses, but with many older member companies retiring or merging with other companies, we are having some difficulties recruiting new members.

Our crew includes:

My partner is my son, Cory. We have two full-time and two part-time office staff, eight full-time service technicians/drivers, and two part-time laborers.

Typical day on the job:

I usually start my day around 4 or 5 a.m., before all the other crew members come in, by hauling industrial liquid waste out of landfills or industrial plants. I like to start early to get a load or two out before everyone comes in. I then return to the shop to see the service technicians/drivers begin their day. I check in with my office staff to see if telephone calls need to be returned or if they have questions that need my attention. I then go out on service calls, which may include any or all of the following: clearing, jetting, and/or televising lines; septic- and holding tank-pumping; and portable toilet deliveries.

Helping hands – Indispensable crew member:

All our employees are valuable. There are two that stand out. One is my son, Cory, who grew up with the business and then after college graduation returned full time. I made him a partner so he can take over when I decide to retire. The other is our office manager, Cheryl Mlejnek, who has been with us for 18 years.

The job I'll never forget:

Believe it or not, I have a very weak stomach and have been known to lose my "cookies" on certain jobs. I have to keep reminding myself of my

motto: It smells like money! But one job I will never forget is when I was at the home of an elderly woman unplugging the line from the lift pump to the main sewer line. I had unhooked the pipe from the lift pump and was clearing the line. The homeowner was very interested in seeing what I was doing, so she was bent over behind me. She accidentally hit the float for the lift pump and got sewage all over her. Her final comment was, "I should know better than to watch what you are doing." We both laughed.

My favorite piece of equipment:

Our five vacuum trucks because they are the bread and butter of our business — 2006 to 2017 Internationals with tanks ranging in size from 3,800 to 5,500 gallons from Imperial Industries (steel) and Advance Pump & Equipment (stainless steel), all with Wittig (Gardner Denver) pumps.

John Bowen and 2017 International with an Advance Pump & Equipment 4,300-gallon stainless steel tank and Wittig (Gardner Denver) pump.

Most challenging site I've worked on:

We dredge a lot of sludge ponds for municipalities where we are floating on a barge in the pond and trying to remove sludge from the bottom. The challenge is to not take any more water than we have to, so you've got to keep the barge moving and maximize the amount of sludge being loaded into the vacuum trucks.

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

"Did you always dream of doing this job when you were growing up?" I have been asked that question by more than one customer.

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

I would like to see the pumpers able to gain larger volume of storage for the waste. We need to be able to store more gallons. The big issue in Wisconsin is getting enough sites to field-apply on. A lot of farms are cash-cropping now, and during the summer or in real wet conditions, a lot of pumpers don't have a place to go. And especially in the northwest part of the state, the smaller pumpers don't have treatment plants that can accept it so sometimes they have to put business off until they can field-apply it. It doesn't make for a good relationship with their clients when they can't give them emergency service. We've been working on that for a few years with the DNR, trying to get them to lighten up a little bit. Right now they've got what they call small storage where we can go up to 25,000 gallons. We're trying to get that raised to a higher volume.

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

Some bits of advice I have received from many seasoned business owners and would like to pass on are: Do what you say you are going to do. Show up to the job at the time you told the customer you would be there. Always be positive to customers; negativity gains nothing.

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

After high school graduation, I operated heavy equipment, then owned my own solid waste company and now a liquid waste business. Any of the above.

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

We have made big strides in attaining professionalism in our industry and I only see that continuing. We are all conscientious of protecting our environment for the future and I believe that will also continue.

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.

New Technology/Installation Tools

By Craig Mandli

EXCAVATION EQUIPMENT

Bobcat R-Series

R-Series excavators from **Bobcat** offer a 15 percent increase in over-the-side stability with the dual-flange track roller system, allowing placement of larger pipes. Strengthened hinges and latches and more rigid, aligned panels reduce vibration in the cab. Along with having large cab openings, the cab has been redesigned with 29 percent more floor space and 15 percent more glass surface area, which includes an improved top window and narrower side pillars for visibility. They have blades with increased downward angles for greater stability when digging on uneven surfaces or trenching at an angle, and a boom swing greaseless pin joint for enhanced uptime protection. **800-743-4340; www.bobcat.com.**

Case Construction Equipment N Series

N Series backhoe loaders from **Case Construction Equipment** have a Pilot Control hydraulic system for precision and smoothness, offering more control in critical applications. Improvements have also been made to the hydraulic system in order to reduce cab noise for greater operator comfort. The fuel economy package is standard and includes ECO mode switches for both the loader and backhoe functions. The package also includes the Auto Engine Idle feature, which brings the engine revolutions per minute down to idle when backhoe controls are not used for a set period of time. The engine will also shut down if the machine idles for a set period of time. Externally adjustable Extendahoe wear pads allow for easier maintenance and serviceability while keeping tight tolerances, reducing strain and wear on components, according to the manufacturer. **866-542-2736; www.casece.com.**

Ditch Witch HT275

The **HT275** heavy-duty trencher from **Ditch Witch** has a Cummins 275 hp T4 engine and a hydrostatic trencher-chain drive with a variable displacement motor, allowing operators to match chain speeds to soil conditions. The trencher can do installations up to 10 feet deep and 26 inches wide, and it has four hydraulic quick-disconnect blocks that reduce the time it takes to change attachments. The suspension mounts to the center of each track frame, providing the ability to float each track independently, taking stress off the main frame. **800-654-6481; www.ditchwitch.com.**

Hyundai Construction Equipment Americas R35Z-9AK

The **R35Z-9AK** compact excavator from **Hyundai Construction Equipment Americas** is a 3 1/2-ton-class machine with a zero-tail swing design for maneuverability in confined spaces. It includes thumb brackets, large dozer blades, hydraulic quick couplers for attachments and hydraulics-ready auxiliary piping to support a range of attachments. The machine's hydraulic system improvements result in a more responsive, productive machine, according to the manufacturer. Its boom swing capability allows the operator to offset the boom 75 degrees to the left and 50 degrees to the right, facilitating close work alongside foundations and other structures, especially in congested areas. It is powered by a 23.7 hp Yanmar engine. The maximum digging depth is 10 feet 3 inches, with a bucket breakout force of 6,900 ft-lbs. **877-509-2254; www.hceamericas.com.**

John Deere G-Series

G-Series large-frame skid-steers from **John Deere** include the EH Boom Performance Package. The electronic self-level feature automatically keeps the bucket, pallet forks or attachment level so the operator does not need to make adjustments when raising or lowering the boom to prevent material spillage. The EH Boom Performance Package also includes updated joysticks with built-in detent positions to activate the operator programmable boom and bucket functions. The return-to-dig feature allows the operator to automatically reset the bucket or attachment into a ready-to-work position. The return-to-carry feature allows the operator to automatically reset the boom and bucket into an operator-designated ready-to-carry position for quick transport of materials. The boom height kick-out feature allows the operator to set the boom height based on a low ceiling in an indoor application, or the height above a truck sidewall or a hopper. **800-503-3373; www.johndeere.com.**

Komatsu America PC390LCi-11

The **Komatsu America PC390LCi-11** 3D semiautomatic hydraulic excavator comes standard with machine-control enhanced joysticks designed to increase operator comfort and convenience. Intelligent Machine Control features a sensor package, including stroke-sensing hydraulic cylinders, an IMU sensor and GNSS antennas. It utilizes 3D design data loaded into the machine's monitor to accurately display machine position relative to target grade. When the bucket reaches the target surface, automation kicks in to limit overexcavation. It comes with a 257 hp, EPA Tier 4 Final SAA6D114E-6 engine and KOMTRAX Level 5 technology that powers the operator machine data. **847-437-5800; www.komatsuamerica.com.**

Volvo Construction Equipment ECR355E

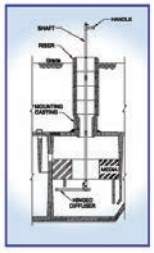
The **Volvo Construction Equipment ECR355E** short-swing radius excavator is designed for more confined spaces. The machine is powered by a 241 hp Volvo D8 Tier 4 Final engine that combines high torque and low revolutions per minute for more horsepower and torque. It is equipped with an X-frame undercarriage built with forged steel top rollers and rugged boom arms for sustainable uptime. Wide-opening compartment doors allow unobstructed ground-level access to maintenance points, including pump pressure taps, filters, and the cooling package. Auto Idle and Auto Engine Shutdown features, as well as integrated work modes, allow for an exact amount of power and controllability. **828-650-2000; www.volvo.com.**

HAND/POWER TOOLS

Crust Busters agitator

The hand-held power agitator from **Crust Busters** has an 80-inch shaft and two- or three-blade propeller designed to mix a 1,000-gallon septic tank in five minutes. Options include 2-, 4-, 6- and 9-foot extensions and a short three-blade shaft that adapts to the two-blade unit. **763-878-2296; www.crustbusters.com.**

Jet Inc. BAT Media Cleaning Tool



The **BAT Media Cleaning Tool** from **Jet Inc.** allows efficient compressed air delivery below the effluent surface while service technicians remain above grade. The original swivel design can be used with readily available air pumps, vacuum trucks or the Jet Catalog compressor. Proper service removes accumulated solids with coarse bubbles, without a washing wand or harsh chemicals. The biologically treated solids then settle in the aeration chamber to reveal more BAT Media surface area for a new biological colony to form. **800-321-6960; www.jetincorp.com.**

Milwaukee Tool winter insulated gloves

Winter insulated gloves from **Milwaukee Tool** are designed to provide warmth and all-day comfort. They are EN 511-rated for warmth in cold environments and have knitting that provides the protection necessary at ANSI/ISEA-rated Cut Level 1. A warm, acrylic terry liner helps users keep their hands warm in the coldest conditions. A secure dual liner is designed to ensure that it does not separate from the gloves after extensive use on the job site. The gloves work for material handling and general-purpose remodeling applications. They are constructed with 15-gauge nylon outer liner for overall breathability and high dexterity in the fingertips, and they have a 10-gauge inner liner. They also have a half double-dipped latex micro finish for improved water resistance and warmth. **800-729-3878; www.milwaukeetool.com.**

PUMPS

Delta Treatment Systems ECOFILTER Pump Vault

The **ECOFILTER Pump Vault** filter media from **Delta Treatment Systems** reduces biological loading and clogging, prolonging the life of downstream drainfields and other treatment systems. Quick to install in new or existing tanks, it is a completely integrated system for pumping effluent from single- or double-compartment tanks. It draws effluent from the clarified zone of the tank to minimize suspended solids passing through the pump system. The easy-access design maximizes the filter surface area and simplifies filter inspection and maintenance by enabling filter cartridge removal without pulling the pump or vault, according to the manufacturer. Featuring a dual-compartment housing for simplex or duplex applications, the unit is constructed of high-density polyethylene with UV inhibitors for longevity. The float stem bracket allows easy removal and adjustment of the float assembly. Customizable to meet any project need, it is ideal for septic tank effluent pump collection systems. **800-219-9183; www.deltatreatment.com.**

Franklin Electric FPS PowerSewer System

The **FPS PowerSewer System** from **Franklin Electric** is a low-pressure sewer system available in 60-, 72-, 84- and 96-inch basin sizes that is compatible with the entire line of FPS 2 hp grinder pumps. The basin's internal C-channel assembly releases from the top of the unit, simplifying accessibility to and maintenance of its components. The updated tank design provides easy access and replacement of all other internal components. The float tree is spring-loaded and easily removable with a lift handle to simplify pump removal. **866-271-2859; www.franklinengineered.com.**

Laborde Products LPI-F-HH6X3C

The **LPI-F-HH6X3C** diesel-powered centrifugal pump from **Laborde Products** is designed for high-head applications where pressure is more important that flow. Max total dynamic head is 375 feet. Cornell Pump supplies the pump end and FPT Industrial North America, a division of CNH Industrial, supplies the powertrain. For simplicity, the current engine is a Tier 3 FLEX mechanically governed engine. Its fuel overflow system is designed to reduce, if not eliminate, any fuel spilled due to expansion. The solution centers around a custom-vented overflow containment chamber. As fuel expands in the fuel tank, it's routed to the overflow tank, preventing it from escaping onto the ground or into the atmosphere. As it cools, return lines channel the fuel back into the fuel tank. **800-628-9882; www.labordeproducts.com.**

Polylok PL-CPE5A

The **PL-CPE5A** from **Polylok** is a submersible 1/2 hp, 115-volt, single-phase effluent pump with a 2-inch NPT vertical discharge. It has a maximum head of 48 feet and a maximum flow of 64 gpm. It is designed with a 3,450 rpm, oil-filled permanent split-capacitor motor and has an amp rating of 8.5 for 115 volts, cast iron housing, and volute equipped with a cast iron vortex impeller that passes 3/4-inch-diameter solids. The stainless steel shaft is supported by two single-row, oil-lubricated ball bearings. The shaft seal is an inboard design with a secondary exclusion V seal. Construction materials are carbon for the rotating face and ceramic for the stationary face. All elastomers are Buna-N, and the hardware is 300 Series stainless steel. It has a 20-foot UL/CSA-listed power cable that's suitable for submersible service and fitted with a three-prong plug. It is supplied with an integrated clip on its piggyback mechanical float switch for automatic operation. **888-765-9565; www.polylok.com.**

Vertiflo Pump Series 800

The **Series 800** industrial vertical immersion sump pump from **Vertiflo Pump** can be used for sump drainage, flood control, cooling towers, and process drainage to meet EPA and OSHA requirements. It's designed for severe service, pumping hazardous, toxic and inflammable liquids at heads to 230 feet, temperatures to 350 degrees F, pit depths to 26 feet and up to 3,000 gpm. It includes carbon line shaft bearings, a semiopen impeller with external adjustment, a high-thrust angular contact ball bearing, 416 stainless steel shafts to 1 15/16 inches and a standard NEMA C face motor. Available construction materials include 316 stainless steel fitted, all 316 stainless steel, Alloy 20, Hastelloy, CD4MCu and cast iron. **513-530-0888; www.vertiflopump.com.**

SLUDGE SAMPLING EQUIPMENT

Sim/Tech Filter TruCore

The **TruCore** from **Sim/Tech Filter** is a large-diameter, accurate, user-friendly sludge sampler that's designed for use in the thicker sludge common to septic tanks. It allows samples to be taken quickly without creating excessive turbulence, as there are no restrictions caused by valves, stoppers or flaps. With a 1 3/8-inch I.D., the capacity per foot is almost 10 ounces. The straight-through design allows the sample to be effortlessly returned to the tank. The unit is made of a polycarbonate sampling tube (marked every foot) and PVC fittings. It comes as a single-piece, 8-foot unit or as two 4-foot units that slip together. Custom sizes and configurations are also available. A simple and customizable extension kit is available for deeply buried tanks. **888-999-3290; www.simtechfilter.com.**

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Jason Worley joins Felling Trailers as sales manager

Jason Worley

Felling Trailers hired Jason Worley as the new regional sales manager for the Southeast. He is responsible for all sales development, activity, and dealer support in Tennessee, Louisiana, Mississippi, Alabama, Florida, Georgia, South Carolina, North Carolina, and Virginia. Worley has experience in the underground horizontal directional drilling equipment and environmental products industry.

Premier Tech Aqua opens new office in Pennsylvania

Premier Tech Aqua opened a new office in Quakertown, Pennsylvania. The company has 4,200 employees in 25 countries and 42 plants. "We have laid the groundwork for growth and expansion in the Northeastern, Central and Western U.S. We are creating more jobs and we look to fill them," says Eric Marceau, general manager.

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BUSINESSES

Septic Tank Service Business for Sale: Owner wishes to retire. Located in Callahan, FL (Nassau County) north of Jacksonville - fastest growing county in Florida. 33 years in operation with loyal customer base. Includes: **1996 International 4900** w/DT466E, 5-speed transmission, 2-speed axle. 2,500-gallon capacity truck. 302k miles, fresh in-frame, new transmission, excellent condition. **2000 Freightliner FL70** w/8.3 Cummins diesel, 6-speed transmission. 2,400-gallon capacity truck. 198k miles, excellent condition. **Also included:** Complete DEP-approved lime stabilization site and facility for land application. Owner will train and assist with licensing. For more information contact K.A. "Kenny" Farmer at 904-879-4701 or 904-545-0357; farmer613259@aol.com (P11)

Septic pumping business for sale in Dutchess County, NY. Family-owned for 22 years. Computer-organized customer list. Business comes with phone number. Excellent opportunity to start your own business or grow an already existing business. Call 845-656-5572. (P11)

For Sale - Full-service septic company, Citrus County, Florida. Includes 2008 International 4300, 2,500-gallon tank built in 2016. Built in 200-gallon water head, PTO-driven jetter 10gpm @ 4,000psi. 10 yrs. of receipts. Excellent residential and commercial base. Also office/living 1,300 sq. ft. 2 bdrm, bath, living room with wood fireplace, all appliances included. W/D. Real estate zoned commercial has billboard, excellent location. For details contact 888-401-6181 or Clearflowtech@gmail.com (P11)

TRUCKS

1998 Mack CH613, 330-350 horsepower, 10-speed, tandem axle, including Shaddix 16' set bed system, used for septic tank installation with 12,000 pound winch. Asking $28,500. Please call for more information if interested. 251-747-1956 (P11)

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Arkansas Onsite Wastewater Association; www.arkowa.com

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

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

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

DELAWARE

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

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

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Georgia Onsite Wastewater Association; www.onsitewastewater.org; 706-407-2552

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

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

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Onsite Wastewater Professionals of Illinois; www.owpi.org

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

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

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

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

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

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

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

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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

MISSISSIPPI

Mississippi Pumpers Association; www.mspumpersassociation.com, 601-249-2066

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.psma.net; 717-763-7762

TENNESSEE

Tennessee Onsite Wastewater Association;
www.tnonsite.org

TEXAS

Texas On-Site Wastewater Association;
www.txowa.org; 409-718-0645

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www.e4owm.com; 713-774-6694

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Washington On-Site Sewage Association;
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WISCONSIN

Wisconsin Onsite Water Recycling Association;
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NATIONAL

Water Environment Federation;
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National Onsite Wastewater Recycling Association;
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Alberta Onsite Wastewater Management Association;
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www.wwns.ca; 902-246-2131

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877-202-0082

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Saskatchewan Onsite Wastewater Management Association;
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