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BASIC TRAINING:
Tiptoe Through
the Trenches p. 16

CAREER EVOLUTION

Gilbert Herrera started out as a new-construction plumber, but then followed a successful path into onsite installation, repair and service **p. 10**



SYSTEM PROFILE
A big system for
New York school **p. 18**

PRODUCT FOCUS
Large-Scale and Commercial Treatment Systems **p. 30**



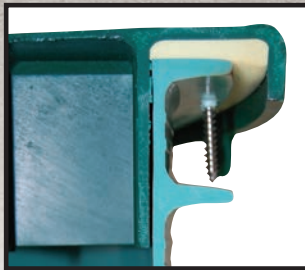
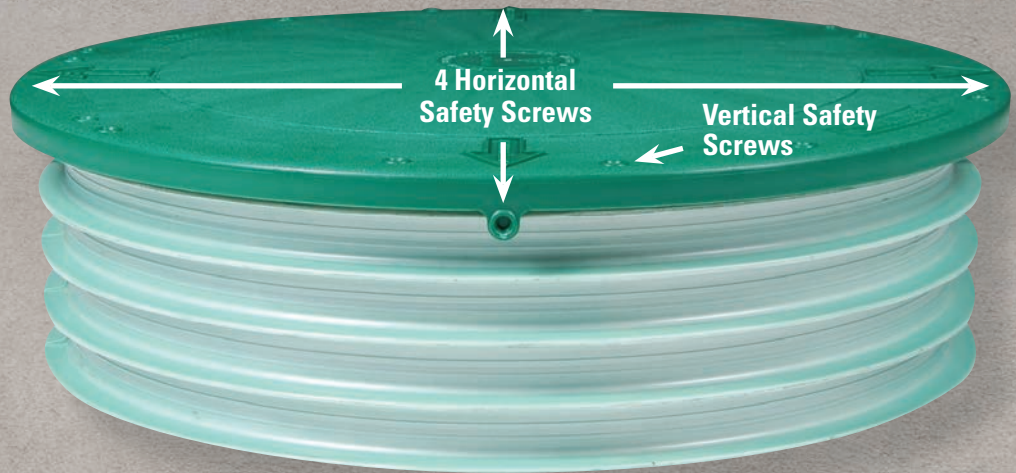
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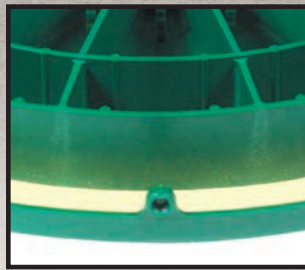
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INSTALLER PROFILE:

Career Evolution

By Ted J. Rulseh

ON THE COVER:

In a fast-growing Bakersfield, California, territory, plumber Gilbert Herrera naturally migrated into the onsite industry, then started Superior Septic with his wife, Kari in 2020. Herrera is shown on an installation location with a workhorse New Holland B95 backhoe. (Photo by Matt Dayka)

6 Editor's Notebook:

Massachusetts Wastewater Projects Aim for Clean Water and Resource Preservation

Researchers look at the value of recycled effluent and limiting phosphorus runoff into sensitive waterways.

By Jim Kneiszel

8 @onsiteinstaller.com

Be sure to check out our exclusive online content.

16 Basic Training: Tiptoe Through the Trenches

Compaction from foot traffic may restrict the performance of your drainfield and shorten the life of your septic system.

By Jim Anderson and Dave Gustafson

18 System Profile:

New York School Receives an Expansive Replacement System

Pressure distribution and large storage capacity with enhanced biological pretreatment brings better waste treatment to serve hundreds of students and teachers.

By Scottie Dayton

24 Taking On the 'Other' Pollutant at a Massachusetts Onsite Treatment Center

Phosphorus joins nitrogen as researchers attack nonpoint pollution sources impacting the nation's waterways.

By David Steinkraus

26 Rules and Regs:

Missouri Court Determines Pumpers Must Charge Sales Tax on Portable Restroom Rentals

By David Steinkraus

28 Snapshot:

Selling Service, Not Price Will Keep Your Company in the Black

Mississippi's Chris Hodge cautions pumpers and installers to value their time and hard work when confronted with a bargain-happy customer.

30 Product Focus: Large-Scale and Commercial Treatment Systems

By Craig Mandli

34 Case Studies: Large-Scale and Commercial Treatment Systems

By Craig Mandli

38 Industry News

39 Product News:

Product Spotlight: AirCarb device controls onsite system odors

By Tim Dobbins

40 Associations List

Coming Next Month

ISSUE FOCUS: Annual Buyer's Guide

System Profile: Big job at a North Carolina RV park

Profile: Boots on the ground in Wisconsin

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Send your comments, questions or opinions to Jim.Kneiszel@editor@onsiteinstaller.com.

Massachusetts Wastewater Projects Aim for Clean Water and Resource Preservation

Researchers look at the value of recycled effluent and limiting phosphorus runoff into sensitive waterways

Protecting water quality and conserving a precious water resource are two topics that should be top-of-mind for everyone in the onsite system installation community. Effective wastewater treatment serves both of these goals, and installers are on the leading edge of using proven methods and new technologies to achieve the better results the world is counting on.

We know how important your work is. So we're pleased any time we can bring industry advances into focus. We do that every month through our *Installer* profiles, System Profile features, updates from trade association members and our Basic Training team of Jim Anderson and Dave Gustafson.

I'm sure all pumpers and installers have faced frustrating experiences trying to communicate with customers. Homeowners are often not on site during a service call, or don't listen or fail to understand what they are being told about their system's performance.

But this month we're giving even a greater emphasis to onsite industry research. In this issue, we're running the first of a two-part series about important ongoing research being conducted at the Massachusetts Alternative Septic System Test Center on Cape Cod. Writer David Steinkraus visited with Brian Baumgaertel, the center's director, to learn about how experiments with new techniques could enhance the value of recycled wastewater and help improve water quality across the nation.

Inside we learn about the center's phosphorus removal project that aims to reduce runoff that feeds algae in sensitive bodies of water. Baumgaertel outlines how industry manufacturers Waterloo Biofilter, Geomatrix, Oakson, FujiClean and Norweco have donated \$150,000 in equipment for tests and how the U.S. Environmental Protection Agency is supporting the effort. Soon the researchers hope to install experimental systems at several homes to get a real-world picture.

In May we outline how the test center has launched the Waste No Water campaign, which experiments with wastewater recycling through hydroponics. Sand columns have been constructed in a greenhouse where treated wastewater is used to grow diverse plantings, including tomatoes, peas, cosmos and marigolds. While the produce items are not intended for human consumption at this time, officials hope states will eventually allow effluent to be used for agricultural purposes.

I hope you enjoy the back-to-back features out of Massachusetts. We're open to more of this type of coverage in the future. If you have an onsite technology topic you would like us to delve into, please contact me at editor@onsiteinstaller.com. I'm anxious to hear your ideas.

In the category of other news and views, I'll add my two cents on a few items that have crossed my desk in recent months:

Don't make clean-water compromises in Indiana

In a recent letter to the editor in the Brown County Democrat in Indiana, Jerry Lee Pittman, a county commissioner, asked many questions about a proposed septic ordinance. "Brown County citizens have a right to clearly understand exactly how this ordinance differs from Indiana state law," he wrote. "It is understood that Brown County must comply with state law, but it does not have to have a septic ordinance that is more rigid or demanding than state law."

Pittman goes on to request the health department explain how each element will provide benefits or present hardships to (1) Existing residents of Brown County, (2) Prospective residents of Brown County and on (3) Economic development. As he put the question, "Will any of the proposed differences make living or providing employment in Brown County more difficult or less desirable than living or locating a business in a surrounding county?"

Pittman is making a valid point in one regard. The government should answer any and all questions from interested parties when it intends to make changes like instituting onsite regulations. We all want responsive local officials who take their duty to inform the public seriously.

However, I do take issue with Pittman in one area. His letter seems to imply that health department officials should consider the potential sacrifices of some groups over the optimal health and safety of the entire community. I'm sorry, but clean water is clean water, and ensuring a safe water supply and

clean environment might have to come at a cost to all parties that benefit.

Whether you live in central Indiana or anywhere across North America, we should all strive to provide a cleaner environment for all of us and for future generations. Consider in this case that the local health department raising the community standard will make Brown County a more desirable place to live. In the future, you can bet that clean water supplies and cleaner recreational water bodies will improve quality of life and attract more people to want to live in the community.

The ability of our industry to play a vital role in a cleaner environment should be a source of pride for all installers.

How often must you warn the customer about an unsafe situation?

In 2013, an onsite service provider in Wisconsin warned a customer to address the safety of his rusting metal septic tank. Then, after the customer fell through the rusty lid in 2016, he sued the pumper for not continuing to notify him of the safety issue. Well, recently a three-judge appeals court panel upheld the decision of a lower-court judge to throw out the homeowner's lawsuit.

So the question is, to what lengths should a septic service provider be required to go to warn a customer of an issue like this? In this case, homeowner David Steinke, of Hayward, Wisconsin, clearly thought the pumper, Scott Poppe, of Scott's Septic Pumping, should have brought it up again. And the courts said Poppe was not responsible for medical bills and ongoing emotional distress Steinke suffered after he struggled five hours to get out of the tank.

The situation seems like it would not be uncommon to pumpers and maintenance providers. Poppe reported that he pumped the tank in 2013 and had a conversation with the homeowner, explaining the need for a new lid. Three years later, he pumped the system again, and went looking to tell the homeowner the lid was continuing to deteriorate. But nobody was home. He notified the county zoning and sanitary office, as usual, that he pumped the tank and there was no ponding on the ground.

The court determined that the pumper's role was "to make sure that everything is done in a sanitary manner, that there is not any dangerous spills of the refuse that is in the septic tank, and to make sure that there is not any standing water on the drainfield, or anything like that." The court further stated that Poppe's first warning about the lid was "just good business practice" and that any warning fell outside of his responsibility as a pumper.

I find this really interesting for a few reasons. First of all, I'm sure all pumpers and installers have faced frustrating experiences trying to communicate with customers. Homeowners are often not on

site during a service call, or don't listen or fail to understand what they are being told about their system's performance. Second, the court decided the pumper went above and beyond what was required of him and yet he still faced a lawsuit.

Have you had a similar experience? If so, I'd like to share it with our readers. Drop me a line at editor@onsiteinstaller.com and share the details.



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SELECTING PROPER PIPE Common Conduit for Onsite Systems

As the conduit of wastewater, the piping you choose for an onsite system is so important. Then proper installation techniques need to be followed to ensure long-term performance of the system. Check out this introduction to selecting and installing pipe materials for onsite treatment systems to get up to speed. onsiteinstaller.com/featured

Overheard Online

“A little amount of time spent inspecting and treating an undercarriage every day can lead to longer undercarriage life and saved time and costs when it comes to undercarriage repair and replacement.”



– *Maintenance Tips for Extending the Life of Excavator Undercarriages*
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USING GRAVITY Drop or Distribution?

Gravity distribution of septic tank effluent has been the most common design over the history of onsite treatment in the U.S. The biggest variant is how the effluent is delivered to the trenches: Do you use a drop box or a distribution box? Site characteristics and application will determine whether a serial or parallel

system is the right choice. Learn more in this exclusive online article from Sara Heger. onsiteinstaller.com/featured

TOUGH QUESTIONS

Should You Require Employees Get Vaccinated?

As an employer, you may worry about the legal fallout of requiring vaccines, but some legal experts say that not having a sound vaccine policy in place can leave you vulnerable to legal challenges, specifically related to OSHA violations. From a legal standpoint, there isn't a clear-cut answer, but making a decision is a reality that all employers will have to face. There isn't one right way to approach vaccines, but it's important to do due diligence. onsiteinstaller.com/featured

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CAREER EVOLUTION

Gilbert Herrera started out as a new-construction plumber, but then followed a successful path into onsite installation, repair and service

By Ted J. Rulseh



▲ Greg Shields uses a New Holland B95 backhoe to move excavated soil on a job site. (Photos by Matt Dayka)

The great Yankee catcher Yogi Berra supposedly said, “When you come to a fork in the road, take it.”

One could say Gilbert Herrera followed that advice. A plumber by training, and at a young age the owner of a plumbing business, he gradually worked his way into the onsite treatment sector and left his original profession behind.

The transition became official in January 2020 when he created Superior Septic Service in Bakersfield, California. He and his wife, Kari, and their three team members install, repair and pump septic systems throughout Kern County. They also make sewer connections for homeowners on Bakersfield’s fringes who are transitioning away from septic systems.

The Bakersfield area is growing, and jobs take the Superior Septic crews from “county islands” within the city, to the city’s developing fringes, and to the mountain foothills to the west.

IN THE FAMILY

Herrera got an early start in plumbing, working summers during high school for a new-construction plumbing business in San Diego. After high school he worked there full time for a spell, but found San Diego’s cost of living too high and so moved to Bakersfield, where his mother was living.

“I worked for a couple of plumbing outfits,” he says. “Then I got my contractor’s license

when I was 23 and started doing service plumbing. It just got bigger and bigger.” When he met Kari, she owned Robo Plumbing, a company she had founded.

“Her family is all plumbers,” Herrera says. “She has three brothers who have their own companies. She has a sister who has her own company. So do her dad and four uncles. Her mother has a contractor’s license. When we got together in 2010, we combined our businesses. We stuck with the Robo Plumbing name because she’d been around a bit longer than I had.”

About 10 years ago, the company became more active in the onsite business, mainly with pumping and basic service. “In the last several years we really got into doing repairs and installs,” Herrera says. “We just got so big with the septic business that it was a little hard for Kari and me to handle both sides. So my stepson Cody Graves took over the plumbing part, and we branched off and started Superior Septic.”

Robo Plumbing has six plumbers and three service vans. Two-member crews do residential and commercial service plumbing, drain cleaning and sewer line replacements. The companies are based on the same property but have separate yards and offices; they share referrals. “Robo Plumbing still gets a lot of calls for septic services from past customers,” Herrera says. “They take the information and send it over to us.”

» The Superior Septic crew includes, from left, Gilbert Herrera, Kari Herrera, Greg Shields, Josey Keeney and Caleb Morris. They are shown with the company's 2020 Peterbilt 10-wheel dump truck with an Ox Bodies dump body.

NATURAL TRANSITION

The move into the onsite sector happened naturally and gradually. "We started getting called out for plumbing by people who said their drains were backed up," Herrera recalls. "We would get there and find out it was a septic backup. For a while we would sell the job, dig the tank up and then have another company come and pump the tank. We started getting so many that I built our first truck." After a few years, he bought a second vacuum truck and started selling more repairs and tank replacements.

Davidson Enterprises built both pump trucks: a 2012 Freightliner with 2,000-gallon aluminum tank and National Vacuum 607 Pro 380 gpm pump; and a 2018 Hino with 2,000-gallon steel tank and National Vacuum 304 Challenger 210 cfm pump.

As he learned more about onsite systems, Herrera moved into complete system installations and replacements. It has been a profitable move, since California's strict permitting requirements tend to discourage potential competitors.

Besides Herrera and his wife, who handles the office duties, the Superior Septic team includes helpers Caleb Morris and Hector Rodriguez, along with Greg Shields, a third-generation onsite installer who previously owned his family's business. "He retired a couple of years ago, and after he got bored, he called me up and asked about a job," Herrera says.

DIVERSE CONDITIONS

The company installs at least two new or replacement systems per week. A 2020 Peterbilt 10-wheel dump truck tows the company's primary machine, a 2018 four-wheel-drive New Holland B95 backhoe with extend-a-hoe. For work in tight spaces, a 2018 Kubota M62 loader backhoe fits the bill. A 2019 Kubota tracked mini-excavator with a 12-inch bucket comes into play for trenching sewer lines. A 2017 Kubota BX23 mini-backhoe handles assorted small jobs.



Superior Septic Service Bakersfield, California



- Owner:** Gilberto (Gilbert) Herrera
- Founded:** 2020
- Employees:** 5
- Service area:** Bakersfield and surrounding Kern County
- Specialties:** Onsite system installation and repair, seepage pits, system inspections, septic tank pumping, sewer connections
- Website:** www.septictankrepair.com



◀◀ Gilbert Herrera, right, oversees employees Greg Shields, left, and Caleb Morris as they use a well-drilling rig during a test pit excavation for a commercial septic tank.

On the outer fringes of the county, especially in the mountains, clay and rocky soil make installations challenging. “We’ve replaced a lot of teeth on backhoes doing jobs up there,” Herrera says.

Steep slopes can also be difficult: “We’ve done jobs where we had to put the tank on one side of the house and put the leach line on the other side at the bottom of the slope where it levels out. We find ways to get it in. We don’t do any mound systems.” On the other hand, in and around Bakersfield, “You can always hit sand, it just depends on what depth. There’s always sand down there; you just have to find it.”

Superior Septic installs only conventional systems, mostly using rock and pipe in the trenches. “If we have an issue with getting gravel into certain areas, then we use EZflow media (Infiltrator Water Technologies).” The drainfields consist of what California calls special trenches, 3 feet deep and 3 feet wide. In sandy soil, a drainfield for a home with a 1,000-gallon septic tank requires about 50 feet of special trench; heavy clay soils may require 190 feet or more.

TINY LOTS

Within Bakersfield there are a number of “county islands” — residential areas surrounded by the city but never annexed and not sewered. Many homes in those areas have front yards as small as 20 by 20 feet, leaving no room for a drainfield; they tend to be served by aging seepage pits that eventually fail.

GETTING THE PERMITS

Permitting for onsite treatment systems in California is more challenging than in most states. Under rules set by the California State Water Resources Control Board and administered by the Kern County Environmental Health Department, even residential systems and drainfield replacements require soil testing and a site plan done by a civil engineer.

“The engineer will test the soil and then send a report telling us where the leach lines need to go, what kind of soil it is, and how many feet of lines to put in,” says Gilbert Herrera of Superior Septic Services. “We send that to Environmental Health with a permit application, and then we get our permit and do our installation. They’re very particular about staying at certain distances from canals, public water mains, all sorts of easements.”

For the past eight years, Superior Septic has worked with civil engineer Karl Schwartz with The Dirt Guys geotechnical engineering firm. “We tell him how deep the outlet line of the septic tank is,” Herrera says. “He estimates where the bottom of the leachfield trenches will be and drills an 8-inch hole with a hand auger.

“He drills it 12 feet deeper than the trench bottom to make sure there is no groundwater. Then he drills two more test holes to the level of the trench bottom and does a percolation test.” He pre-saturates the holes for about an hour and then calculates the perc rate with help from a computer software program.

“A lot of older houses have brick-lined seepage pits,” says Herrera. “They were dug out and handmade with bricks. They’re not very deep, and on many of them that we run into, the bricks have rotted out. We install a new seepage pit. We drill a 4- or 5-foot-diameter hole down 20 to 50 feet. We fill it partially with gravel, and the top of the pit has concrete liners that we stack up 10 feet high. Then we put a lid on it and connect the septic tank to it.”

Meanwhile, the outskirts of the city are developing on septic systems. “They’re building tract houses, running trunk lines in the streets and installing laterals up to the houses, but the sewer system there hasn’t reached the point of going live,” Herrera says.

Herrera and his team take pride in doing jobs right: “We’re not the cheapest in town, but we do the extras. We’re turnkey, so nobody has to do anything when we’re done except sit and watch the grass grow back. If we’re installing a system and something doesn’t look right, we’ll fix it.”



▲ Gilbert Herrera uses a Husqvarna K770 concrete saw to cut through asphalt to drill a test pit for a septic system for a commercial customer.

“We started getting called out for plumbing for people who said their drains were backed up. We would get there and find out it was a septic backup.”

Gilbert Herrera

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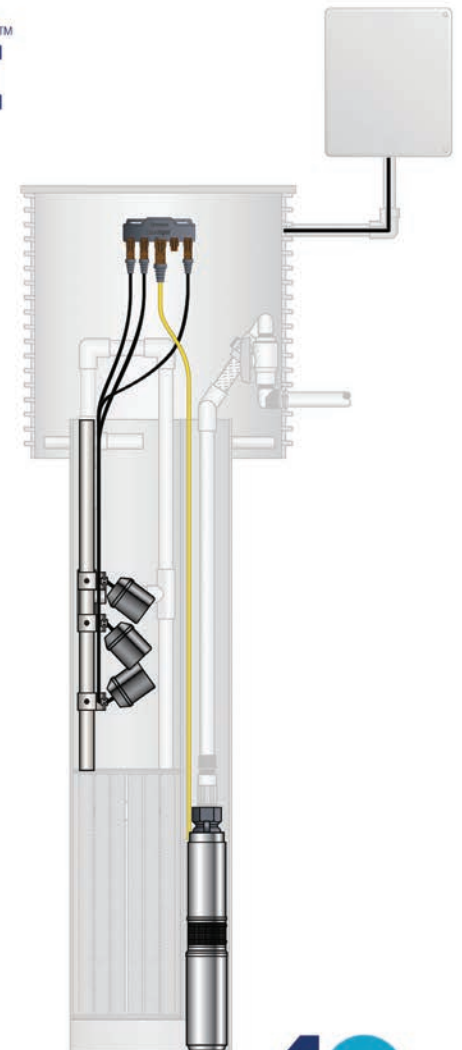
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«Greg Shields uses a New Holland B95 backhoe to load spoils from a test pit into a 2020 Peterbilt 10-wheel truck with an Ox Bodies dump body.

“We’re not the cheapest in town, but we do the extras. We want the customers to be happy.”

Gilbert Herrera

“We work especially hard to clean up the yard when we’re done. We want the customers to be happy. A lot of our jobs are at existing houses where the systems have failed. We have to tear the yard up pretty good, but before we leave, we make sure it’s level and compacted so it won’t settle too much. We tell the customer that if it settles, or if we leave it high and it doesn’t settle, call us back and we’ll come out and fix it.”

MORE THAN PUMPING

Superior Septic maintains a focus on solving problems. Herrera observes, “A lot of our calls are, ‘My tank has been pumped three times in the last six months; I’ve got to find out what’s going on.’ If there is a problem, we need to find out what it is.

“We always verify if somebody has a seepage pit or a leach line, because if something is backing up, they’ve got a seepage pit, and they’re not pumping it, it’s going to back up again. We find out what kind of

saying, ‘Hey, my tank backed up already.’ I let them know the first time I visit: You’ve got a problem and you need to fix it or it’s going to keep backing up.”

To help restore plugged drainfields, Superior Septic often relies on acid treatment. “We use 95% sulfuric acid; we keep four 5-gallon jugs on each truck,” Herrera says. “Typically, we do a 10-gallon treatment. After we pump the tank, we stick a hose and a funnel down the outlet side of the tank into the leachfield and just pour it down. It works 80% to 90% of the time. The acid kills the organic matter. It will burn away any sludge or solids that got through the tank and into the leach line. When we pour it down there, it gets everything draining again.”

Right now, both the installing and pumping sides of the business are humming along; the company does the bare minimum of advertising because the crews are maxed out. It certainly appears that Gilbert Herrera took the right fork in the road. □

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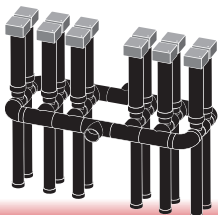
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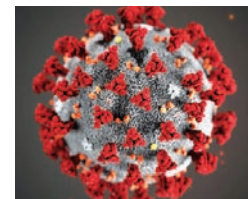
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Tiptoe Through the Trenches

Compaction from foot traffic may restrict the performance of your drainfield and shorten the life of your septic system

By Jim Anderson and Dave Gustafson

Recently we were sent a few pictures of an installation by a reader that showed two workers walking back and forth in an excavated trench between two and three feet into the soil. They were using rakes to rake the bottom and sidewalls of the trench to repair some apparent smearing from the backhoe bucket.

With this, we felt it was time to revisit some of our “principles for good installations.” If you recall those principles are keep it dry (KID), keep it natural (KIN) and keep it shallow (KIS).

KID means not working the soil when the moisture content is at or near the plastic limit, which is the point where the soil can be manipulated or formed into the 1/8-inch diameter wire. Under this moisture condition, the soil is likely to be compacted or smeared.

WALK AROUND IT

During compaction, weight from a single intense force or small repeated forces pushes soil particles together, causing them to compact. Compacted soils have reduced macro and micro pore space, which results in limited air and water movement, restricted root growth, reduced infiltration rates and decreased biological activity. Therefore, highly compacted soils are greatly limited in their ability to accept sewage effluent.

KIN means maintaining any soil structure at the infiltrative surface in an uncompacted and unsmeared condition. Soil structure should be maintained in as natural condition as possible. Treat this surface like you would if it consisted of eggs and you didn't want to break them. Generally, the soil located at or near the land surface — KIS — is best for treatment and dispersal due to soil structure and oxygen transfer potential.

In addition, any benefits from evapotranspiration and natural biological activity are greatest near the surface. If natural structure is destroyed through smearing (spreading and smoothing particles and structure by sliding pressure) or compaction, the result will be reduced acceptance of sewage effluent and transfer of oxygen around the system, limiting biological activity.

The higher the clay content in soils, the more susceptible they are to compaction and smearing. They also hold water more tightly. If it rains, the installer may be able to work on a new system the next day in sandy soils. But for heavier soils, it may take another day or two before the soil is at a suitable moisture content to proceed.

We are not the only professionals working with soils who worry about compaction and smearing problems. Landscapers also see compaction and smearing as huge problems, which can affect the ability to grow plants including grasses, ornamental shrubs and even trees depending on the severity of compaction. The reasons for these problems are the same, reduced air and water movement in their case limiting root development affecting the plants' ability to grow. We deal with other associated problems as well, including increased runoff and erosion due to lower water infiltration during precipitation events.

TRENCH TIPS

We highlight this because foot traffic creates one of the largest compaction problems. It is an example of small, repeated forces that can cause significant damage.

So, when we see photos of installers walking on unprotected infiltrative surfaces, particularly when they are trying to repair some smearing problems, we feel they are likely doing more damage than good for the ability of the trenches to accept sewage effluent. With smearing and if the moisture content is high enough, there is a risk of soil compaction simply by walking on the trench bottom.

Since we assume the installer has spent time and effort to maintain soil structure at the trench bottom, they could be undoing all of their efforts to maintain a natural soil condition. Another note here is the trench or bed bottom does not need to be raked. It should be left in the rough condition. The bottom line is do not walk on the trench bottom during installation unless it is necessary and then limit any back-and-forth traffic.

Here are recommendations to avoid compaction and smearing:

- Installation should not proceed if the soil is frozen or thawing.
- Excavation equipment or other vehicles should not be driven on the infiltrative surface. Eliminating this possibility is just one of many advantages for seepage trenches over seepage beds.
- Where possible, use tracked and low-pressure equipment when working around the soil treatment area.
- Pay close attention to how materials are delivered and placed in the trench and bed due to the heavy weight of some distribution media (rock) or other materials. □

Tight Timeline and Job Site No Match for Precast Concrete



Photos courtesy of Jensen Precast

Challenge: An event venue near Lake Tahoe needed to upgrade its gravity grease interceptor system to meet increasing demands. The project team was up against a condensed timeline and several site restrictions due to the location of the previous system.

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PRECAST PROUD





New York School Receives an Expansive Replacement System

Pressure distribution and large storage capacity with enhanced biological pretreatment brings better waste treatment to serve hundreds of students and teachers

By **Scottie Dayton**

▲ Workers from TJ Fiacco Construction run 0.75-inch air lines to 9-inch fine-bubble diffusers at the base of White Knight Microbial Inoculator Generator towers (Knight Treatment Systems). Topcon Positioning Systems laser in foreground. (Photos courtesy of Onsite Engineering)

An 18,000-gpd legacy system served a K-12 public school in Brushton, New York. Wastewater from the school and bus garage flowed to a 12,000-gallon septic tank discharging to five 12-by-50-foot dry wells. The school needed the dry well space for a classroom addition

The school district hired an engineering firm to design the replacement system, but the New York State Department of Environmental Conservation rejected three different proposals. Then a health official suggested the district contact Eric Murdock of Onsite Engineering in Syracuse.

“Before beginning the design, I asked the official why he rejected the previous proposals,” Murdock says. “It was simple. The agency wanted pretreatment with denitrification because of the fast percolation rate and the plans didn’t have them.”

Design complications included an 8.2-foot-deep building sewer and fluctuating inflow levels. Murdock designed a pressure distribution system that included lift stations to bring components closer to the surface and different recirculation rates. “When the level is low during school breaks and summer vacations, the controller increases the recirculation rate,” he says. “When the level is high, it reduces the recirculation rate.”

Aerobic treatment units were beyond the district’s budget, so Murdock compensated with large storage capacity and enhanced biological pretreatment, which saved the district more than \$250,000. The agency approved the plans without revisions. The new system serves several hundred students and teachers.



◀ Thomas Fiacco III (left) and Peter Arcadi from TJ Fiacco Construction apply butyl rope sealant to the bottom half of Tank 5. Barry Cook is in the background.

▼ Danny Stone (left) and Barry Cook from TJ Fiacco Construction help guide a riser onto the manhole base.

Site conditions

Soils are sand and trace gravel with a loading rate of 1.2 gpm per square foot.

System components

Murdock designed the 10,000-gpd system to include:

- Two 2,500-gallon single-compartment lift stations with duplex 1.5 hp pumps (Zoeller). All concrete structures from Camp Precast Concrete Products. Risers from TUF-TITE.
- Model 10-1108 control panel (Zoeller)
- Tank 3: 10,000-gallon single-compartment concrete septic tank
- Tank 4: 10,000-gallon concrete single compartment with six White Knight WK-200 Microbial Inoculator Generator towers (Knight Treatment Systems)
- Tank 5: 10,000-gallon concrete single compartment with six towers and three WW4 effluent filters (Clarus Environmental)
- Tank 6: 10,000-gallon concrete single-compartment pump tank with four towers
- Duplex 0.3 hp recirculation pumps (Zoeller)
- Duplex 2 hp turbine effluent pumps (Clarus)
- Four precast manholes with four-outlet zone valves
- 2,376 feet of 2-inch distribution piping
- Duplex Logic control panel (Clarus Environmental)
- Three RP145c turbine fans (RadonAway)
- Four HP-200 linear diaphragm air pumps (HiBlow USA)
- 18 Quick4 Equalizer 36 chambers (Infiltrator Water Technologies)

System operation

All piping is Schedule 40 PVC.

Wastewater from the garage (30 employees) flows through a 6-inch pipe to Lift Station 1. Wastewater from the school and kitchen flows to Lift Station 2. On-demand pumps in both tanks send 240 gallons per dose through 3-inch force mains to the septic tank.

Six-inch piping connects the four treatment tanks set in series. Tanks 4, 5 and 6 each have four microbial breeding columns and a 0.75-inch feeder line delivering air to the 9-inch fine-bubble diffuser at the base. The columns remove a combined 70.89 pounds of BOD daily.

The recirculation ratio in Tank 6 is 3:1 effluent to dispersal. During low



System Profile

Location: Brushton, New York

Facility served: K-12 school

Designer: Eric Murdock, Onsite Engineering, Syracuse, New York

Installer: TJ Fiacco Construction, Norwood, New York

Type of system: Pressure distribution to drainfields

Site conditions: Sand and trace gravel; loading rate 1.2 gpm per square foot.

Hydraulic capacity: 10,000 gpd

flows, the recirculation pumps run three times an hour, sending 208 gallons to the septic tank for a total of 15,000 gpd. During high-peak flows, the pumps recirculate 417 gallons for a total of 30,000 gpd.

Every 30 minutes, the dispersal pumps in Tank 6 run for two minutes, sending 350 gallons via a 6-inch line to the distribution manhole. An alternating valve in the manhole feeds three manifolds, each centered between

SYSTEM PROFILE



◀ Dave Daggett steadies the ladder as Barny Cook directs the Komatsu PC160LC excavator operator as he lowers the second riser into position.

▼ Thomas Fiacco III (left), Peter Arcadi and Dave Daggett insert a ball valve to control air supplied to the White Knight Microbial Inoculator Generator towers (Knight Treatment Systems). The riser is from TUF-TITE.



“We had trench boxes, manhole boxes and ladders in the trenches. Safety was paramount.”

Tom Fiacco



two 200-foot-long absorption beds. The three zones, spaced 10 feet apart, have 2-inch distribution lines with 5/32-inch orifices every 3.5 feet. A field is rested every third year.

In-line turbine fans connected to 4-inch PVC piping convey vapors from tank risers to chambers in a 48-by-13-foot-wide venting bed (biofilter). The two rows of paired chambers, three per side, have a 4-inch perforated pipe at the bottom. Escaping vapors diffuse up through 36 inches of wood chips that trap odor-laden moisture and purify the air.

An 8-by-10-foot shed shelters the fans, air pumps and electric service.

Installation

Tom Fiacco, owner of TJ Fiacco Construction in Norwood, New York, and four to six workers pumped the existing septic tank by the bus garage and the wet wells, and removed the absorption beds. Sludge and material from the beds were landfilled, while effluent was discharged in a city sewer. Then they broke up the tank walls and removed the pieces. “The site has beautiful sand that we used to backfill the holes,” Fiacco says. “Compaction tests read 98% to 100%.”

Using Komatsu PC160LC, 210, and 390 excavators and a Kobelco SX290LC excavator, half the crew dug the force main trenches, while the remainder dug the 60- by-80-by-8.6-foot-deep hole for tanks 3-6. From the garage, the 8.6-foot-deep main ran 310 feet to Lift Station 1. The 3.6-foot-deep school lateral ran 24 feet to Lift Station 2, then the force main made 10 45-degree bends covering 271 feet to the septic tank. “We had trench boxes, manhole boxes and ladders in the trenches,” Fiacco says. “Safety was paramount.”

continued >>

▲ Dave Daggett fuses 2-inch distribution lines while Thomas Fiacco III uses a Topcon Positioning Systems laser to double-check grades.



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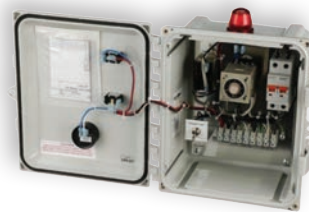
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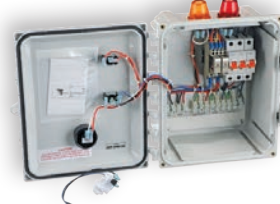
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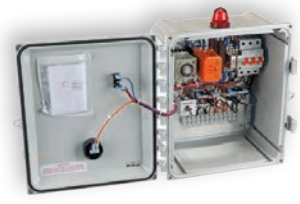
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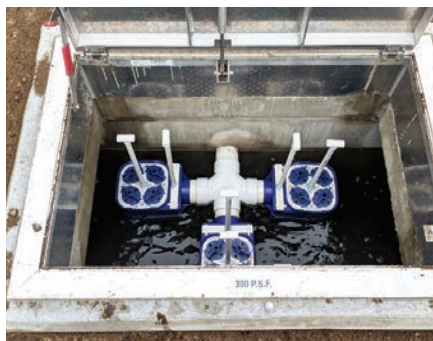


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▲ Closeup of WW4 effluent filters from Clarus Environmental.

After workers bedded the tank hole with 6 to 8 inches of stone, Camp Precast delivered and set four tank halves per day with a Wilcox 120-ton crane. Meanwhile, other workers prepared the 200-by-113-foot-wide drainfield and bedded the trenches with 8 inches of stone. “The septic segment required 1,400 tons of stone from a quarry 25 minutes away,” Fiacco says. “We also

installed stormwater drains for the parking lot and roof leaders, and that required 1,600 tons of stone.”

Teams also assembled the ball valve pits, affixing the 5-foot-diameter manhole bases, risers and cones with butyl rope sealant. “Each component weighted less than 2 tons, enabling us to set them inside the manhole boxes with the 160 excavators,” Fiacco says. “The valves were 4 feet below grade and didn’t need insulation.”

The install went smoothly. While some workers finished backfilling, seeding and mulching the drainfield, others built forms for the shed’s foundation slab and managed the pour. They also connected the five 4-inch PVC vent lines from tanks 4-6 to the air compressors, and the 3/4-inch air lines from the towers to the fans.

In five weeks, the system was ready for the beginning of the 2019-20 school year.

Maintenance

Quarterly, technicians from Onsite Equipment in Syracuse, New York, check the pumps, fans, air pumps and control panels. They also submit water quality samples to demonstrate compliance with subsurface discharge permit limits. “It’s a low-maintenance, efficient system that is working great,” Murdock says. □

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Taking On the ‘Other’ Pollutant at a Massachusetts Onsite Treatment Center

Phosphorus joins nitrogen as researchers attack nonpoint pollution sources impacting the nation's waterways

By David Steinkraus

All across the country, people interested in water quality have been talking about nitrogen, where it's coming from and how to control it. But there is another nutrient just as important but less often in the spotlight, and now it's due for attention.

“Phosphorus has been one of those issues kind of sidelined by nitrogen,” says Brian Baumgaertel, director of the Massachusetts Alternative Septic System Test Center. “There aren't a whole lot of technologies looking to remove phosphorus.”

On Cape Cod, where the center operates as a division of the Barnstable County Health Department, phosphorus is a problem along with nitrogen. “A lot of our ponds have some increased eutrophication issues in the last five to 10 years,” he says.

PUSHING FOR PROGRESS

Freshwater bodies are especially vulnerable to phosphorus pollution. Baumgaertel says science has found phosphorus is typically the limiting nutrient in freshwater, whereas algae are usually nitrogen-limited along the ocean shore. Phosphorus has been a problem around the country, too, he says, for example as the cause of widely publicized algae blooms in the Great Lakes.

As a result of renewed public attention, he says, there is a push to solve the phosphorus problem. The center is using that attention as the starting point to experiment with new phosphorus-removal technologies in the hope that one or more can be added to the tools wastewater professionals use. Massachusetts currently allows only two such technologies, he says. Another goal of the experiments is to gather performance data on technologies already in the marketplace.

Phosphorus on the cape comes from two main sources, Baumgaertel says. Depending on which study you read, he says, septic systems could account for as little as 4% of the problem or as much as 60%. The other contributor is fertilizer and linked to that is land use.

“A lot of people who live around ponds like to cut down all the trees from their house to the waterline so they have the nice view,” he says. But people replace the trees with lawns and fertilize them. Trees take in a lot of phosphorus, he says, and once they're removed the lawns generate phosphorus-containing runoff that flows into the water and feeds algae.

FINDING THE TOOLS

Another goal of the center's phosphorus project is to provide hard numbers that help show what the sources of phosphorus pollution are on the cape and what difference various technologies can make, he says.

Remedies previously tried on the cape include adding iron to ponds to precipitate phosphorus, and using SolarBee solar-powered mixers to circulate water as a water quality improvement tool.

Seven or eight SolarBees were installed on one pond, and they seemed to work for several years, but now pond algae is growing vigorously again, he says.

Baumgaertel is new to his position, and he says the phosphorus removal project first came up during a talk with George Heufelder, the center's former director, about what the center's next steps should be. Heufelder had already contacted vendors of phosphorus technology and asked for donations for an experiment to install equipment in the field on Cape Cod.

“Phosphorus has been one of those issues kind of sidelined by nitrogen. There aren't a whole lot of technologies looking to remove phosphorus.”

Brian Baumgaertel

◀◀ Brian Baumgaertel, director of the Massachusetts Alternative Septic System Test Center, is shown at the site of phosphorus project. (submitted photo)



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“Most of the vendors really jumped at the opportunity,” Baumgaertel says.

Waterloo Biofilter, Geomatrix, Oakson, Fuji Clean USA and Norweco donated equipment, he says. Their donations were worth about \$150,000 and also counted toward the matching funds required for a U.S. Environmental Protection Agency 319 grant of about \$200,000 that is funding the work.

REAL-WORLD TESTS

Technologies will be installed at homes on the cape. Test sites are focused in one area, primarily to make sample collection easier, he says. Hopefully, some sites will also be near ponds and will be year-round residences to test the effects on freshwater, he says.

The EPA grant provides enough money to give a \$5,000 subsidy to five homeowners. Equipment promised by vendors will probably be enough for another five to seven homes, Baumgaertel says.

Installations were on track to happen in 2020, but the COVID-19 pandemic stalled those plans.

“We have some willing folks lined up and some candidate sites identified,” he says.

EPA 319 grants last typically for two years, but the agency has also been willing to extend them, he says. At minimum the center is planning to track the test systems for 12 to 18 months, he says. □



▲ Part of the water-recycling demonstration at the Massachusetts Alternative Septic System Test Center is this garden, which receives treated wastewater from an adjacent greenhouse.



This is the first in a two-part series about research projects being conducted by the Massachusetts Alternative Septic System Test Center in Sandwich, Massachusetts.

To learn more, visit the Cape Cod organization's website at www.masstc.org

Missouri Court Determines Pumpers Must Charge Sales Tax on Portable Restroom Rentals

By David Steinkraus

A portable restroom operator lost his tax case before the Missouri state Supreme Court and now faces thousands of dollars in penalties. Charlie Gott, who owns Gott's to Go in Springfield, was accused by the state of not paying sales tax on rentals of his 240 portable units. Under state law, money paid to rent personal property is subject to sales tax, but money paid for a service is not, reported the *Missouri Independent*.

The question the court decided was whether Gott was renting property (the portable units) or charging for a service. Although Gott charges for servicing units, that occurs only at long events, Jason Lewis, an assistant deputy attorney general, wrote in a brief to the court. Everything Gott does occurs because a customer rented a portable unit, he wrote.

The court agreed. "Without providing the portable toilets to its customers," wrote Chief Justice George Draper, "Gott's has no service to provide."

The state had demanded \$56,905 from Gott for unpaid sales tax, plus \$201 in unpaid use taxes for out-of-state rentals, for 2014 through 2016. The court's ruling did not address Gott's final cost, but he would also be subject to interest and penalties on the unpaid taxes. He told the newspaper he has also not been charging sales tax since 2016.

Arkansas

Hot Springs is revising its septage disposal fee, but it will also phase in the changes.

Prior to the city's action, septage haulers were charged \$20 per load to discharge into the city's wastewater treatment plant. A letter from Monty Ledbetter, the city's utilities director, said this amounted to a charge of 1 cent per gallon. From January 2019 to August 2020, the fee generated \$35,240. That was not enough to cover the operation and maintenance cost of providing the service, Ledbetter wrote.

He proposed a fee of 5 cents per gallon. For that same period of time, the city would have collected \$173,824. But because the city has no way to meter the volume of septage discharged, the fee will be applied to the total volume of the truck discharging.

The city's board of directors agreed to the fee but decided it will be phased in over two years. That decision followed a request from Darius Melton, who sits on the board of the Arkansas Onsite Wastewater Association.

"I didn't know any of this was going on," Melton told the board, according to *The Sentinel-Record*. "A 5 cent-a-gallon increase at this time, in my opinion, is a little strong." Melton also said the city's method of charging by total volume would result in a particularly large increase in cost for customers because haulers must pay for a full load even if a truck isn't full.

The fee will be 3 cents per gallon this year and increase to 5 cents in

2022. The ordinance changing the fee also allows the city to charge an annual permit fee of \$75 for each truck discharging, and city officials said each truck would be inspected before a permit is issued.

Washington

Citizen opposition sank a proposal to dissolve the joint Tacoma-Pierce County Health Department in the state of Washington and create a county health department in its place. Republican members of the county council said the joint city-county department was overseen by a board that did not fairly represent county interests, news reports said.

But the *Tacoma News Tribune* raised another point: The health department is responsible for issuing onsite wastewater system permits necessary for development, and the Republican chairman of the county council told the newspaper that "streamlining" the development process played a large role in his support of the change. Another member of the council, a commercial subcontractor, also mentioned the health department's permit role in a Twitter post but did not respond to the newspaper's request for comment.

Citizens took a dim view of the idea. Dozens gathered outside the City-County Building in Tacoma near the end of 2020 to protest the proposed dissolution of the department. They objected to making a major change in the midst of the coronavirus pandemic. During a council meeting, when the ordinance dissolving the department was considered, public comments consumed about four hours, and the majority of citizens commenting opposed the change.

In the end, the ordinance failed on a 3-3 tie vote when the council member who sponsored the ordinance joined two Democratic members in voting against it. (One member of the council excused herself from the meeting.)

Florida

Miami-Dade County Mayor Daniella Levine Cava told county commissioners late last year that converting all county septic tanks to municipal sewer service will cost more than \$4 billion. The cost estimate is part of her action plan to address water pollution in Biscayne Bay, which is formed between Miami on the mainland and the barrier island holding Miami Beach.

There are about 120,000 septic tanks in the county, Cava's plan says, and the cost to use municipal sewer instead of onsite technology is estimated to cost each homeowner between \$7,500 and \$40,000. Cava wants financing help for homeowners and recommended prioritizing the most vulnerable onsite systems such as those most likely to fail or those in flood-prone areas.

New York

Nassau County Executive Laura Curran announced an onsite system replacement program for residences and small businesses. The program will provide money to replace a conventional or failing septic system with an advanced treatment unit to remove nitrogen. Grants would pay for 50% of the replacement cost, up to a maximum of \$10,000.

Tens of thousands of buildings in the county are served by cesspools. The county is on Long Island and next to New York City. To the east is Suffolk County where hundreds of thousands of homes and businesses are served by cesspools, and where the county and local governments have spent several years creating programs to use advanced treatment technologies in order to reduce nearshore water pollution.

In Suffolk County, grant amounts have increased for replacement of onsite wastewater systems. Homeowners were eligible for up to \$20,000, but a state-required engineering review could cost between \$2,000 and \$5,000. So the county added \$5,000 to grants to cover those engineering costs, county legislator Rob Calarco told *The Long Island Advance*.

Suffolk County occupies the eastern end of Long Island and includes the wealthy Hamptons communities. It also has hundreds of thousands of cesspools and has spent several years creating programs to replace them with nitrogen-removing advanced treatment units. Beginning in July, all new construction in the county will require such technologies.

Also in New York, a group of public and elected officials, environmental organizations and citizens is calling on Gov. Andrew Cuomo to implement an inspection and maintenance program for onsite systems near the shores of lakes. The group was created by the Assembly Point Water Quality Coalition following an algae bloom in Lake George last fall, reported the *Post-Star of Glens Falls*, New York.

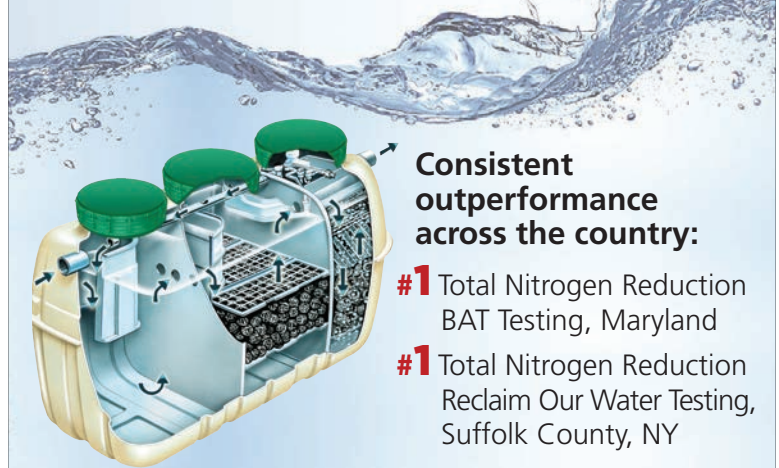
“Because there are eight towns and one village within three counties in the Lake George watershed, it is critical that a septic inspection program be implemented lake-wide by the state of New York,” says a letter from the group to Cuomo. “A proactive approach would be cost-effective in comparison to the economic expense of reversing a polluted Lake George.”

News reports said cyanobacteria appeared on the surface of the lake and spread through several bays on its south end. The lake is part of the tourism-heavy Adirondack Park region and is known for its water clarity. There are also about 6,000 onsite systems in the lake watershed.

A study by the nonprofit FUND for Lake George looked at a sample of about 400 septic systems within 500 feet of the shore or within 100 feet of tributaries to the lake. One-third of those systems had been installed within the previous 25 years. Another third was at or beyond the 30- to 40-year life expectancy for a system. The age of the remaining third was unknown. □

“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.

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Selling Service, Not Price Will Keep Your Company in the Black

Mississippi's Chris Hodge cautions pumpers and installers to value their time and hard work when confronted with a bargain-happy customer

Compiled by Betty Dageforde

In Snapshot, we talk to a member of a state, provincial or national trade association in the decentralized wastewater industry. This time we visit a member of the Mississippi Pumpers Association and Alabama Onsite Wastewater Association.



Chris Hodge

sales manager, certified septic installer and pumper

Business: B Clean, Laurel, Mississippi

Age: 52

Services we offer: Our septic work includes pumping tanks and cleaning lines for homeowners and municipal customers, and pumping grease traps. We also rent portable restrooms and roll-off containers. We have a plumbing division. We do hydroexcavation, pressure washing, and municipal sewer line cleaning and inspection. And we do a lot of drainline cleaning for poultry processing plants (because chicken fat coats the inside of drainlines).

Years in the industry: The company was started in 2000, and I've been here since April 1, 2008.

Association involvement:

We've been involved in the Mississippi Pumpers Association and the Alabama Onsite Wastewater Association. We're only about 40 miles from the Alabama border and to provide portable restrooms in Alabama, you have to be licensed and a member of the Association.

Benefits of belonging to the association:

These associations provide lobbying efforts with legislators and keep members informed of changes and new trends in the industry.

Biggest issue facing your association right now:

In Alabama, one of our biggest concerns is unnecessary legislation. For example, they're requiring more on-the-job training for someone trying to get their license. So, you have to work for somebody for so long and then you get your license, which means you pretty well have to be deceptive when you're working for them as to why you're working for them. I don't think it was thought through very well.

Our crew includes:

We have about 100 employees, of which about 25 work in the septic, portable restroom and plumbing area.

Typical day on the job:

I'm mainly talking to customers helping identify their problem and putting together the best possible solution at the least cost. Someone might call in thinking their tank needs pumping because the commode won't flush, but I'll talk to them and find out if that's really the problem. So, I do a lot of troubleshooting prior to sending a crew out and maybe even doing a site visit myself.

The job I'll never forget:

Sometimes we have to rent a vacuum truck from someone if we need more than we have. One time when I returned one to the place I had rented it from, I opened up the back of the tank and out came a load of you-know-what into their parking lot. The crew was supposed to have cleaned the tank and emptied it out. I cleaned it up — all by myself.

My favorite piece of equipment:

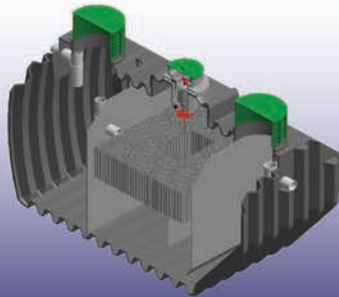
We're known in our area for our ability to identify problems with our camera systems, both residential and commercial. Our sewer camera from

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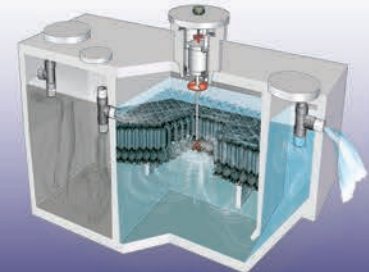
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IBAK does a really good job. Most of the time we use it for municipal work but occasionally we will have to run it for an individual. That's our main system and then we have smaller RIDGID SeeSnake cameras.

Most challenging site I've worked on:

We pumped a septic tank that was full of paper towels. Paper towels set up like concrete. We had to break it up, chop it up with an axe and shovel. I had to call in a Vactor 2100 with a hydroexcavation pump on it to get it cut up. One thing I told people on social media during the COVID crisis, when it was hard to get toilet paper, is do not flush paper towels. But we did see quite a bit of that.

Oops, I wish I could take this one back:

One of my guys was pumping a grease trap at a high-end white-tablecloth restaurant just before lunch time and accidentally dumped a load of grease in the parking lot. He used the Vactor 2100 to add water on it and had to wash it all down and vacuum it up real quick before the restaurant started serving lunch.

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

One of the goofiest questions I get, when I tell people I have to dig their yard up, is, "Why can't you just go through the clean-out?" — which, of course, is only four inches. It's one of the biggest misconceptions about pumping septic tanks. People don't realize you actually have to dig the dirt off the top of the tank and then pump it.

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

I would move to having recertification be every five years instead of every year. It's aggravating and the equipment and regulations don't change that fast.

Best piece of small business advice I've heard:

Never drop your prices — stick to them. I learned that at a seminar. We sell a service, not a cheap price. It's all about selling a service, providing a good product, and your price is what your price is.

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

I have a Bachelor of Science degree in poultry science so I'd probably be working solely in the chicken business. I currently have a chicken farm with 88,000 capacity. I started in that industry when I was 16 years old.

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

We had a lot of change in Mississippi about 10 years ago, so we've come a long way, but since then it's been just steady, business as usual. I don't see a lot of change going forward any time soon here. We change really slowly. Our State Board of Human Health has been largely defunded so any change would have to be driven by federal regulations. But hopefully in the future this will be a full professional business with people who have knowledge about what they're doing. □

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

ALARM SYSTEMS/COMPONENTS

Septic Products Observer 400

The Observer 400 system-monitoring device from Septic Products is a 120-volt indoor/outdoor high-water alarm that includes a 15-foot alarm float for high levels. It includes a large 360-degree indicating light and 85 dB at 10 feet audible alarm. It comes with a test-normal-silence switch, automatic alarm reset, auxiliary contacts and 120-volt circuit power for the pump. It has easy access to the interior components for a repairable design. The alarm can be adapted for use as either a high- or low-level alarm. It is built and labeled to UL 508A. 419-282-5933; www.septicproducts.com

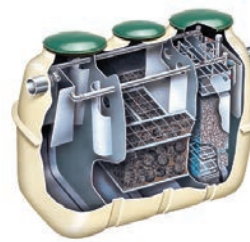


SJE Rhombus PS Patrol

The PS Patrol from SJE Rhombus is an outdoor pedestal high-water alarm system that provides a convenient location to connect all wiring required for a pumping station application. It employs a receptacle for easy connection of a 120-volt pump and piggyback pump switch. The sleek, angled design of the clear enclosure includes a removable cover for easy access for field wiring and viewing components. The enclosure meets Type 3R watertight standards for outdoor use. The design allows the controller to accept a 5-inch square plastic post or 4-inch pipe/conduit for mounting. All internal components are sealed within the cover for protection from the elements. The red LEDs illuminate the top of the cover in an alarm condition for easy 360-degree visual identification. It is available with or without a 32-inch mounting post. It is CSA certified. 888-342-5753; www.sjrhombus.com



ATUS



Clarus Environmental Fusion

Clarus Environmental's Fusion systems are drop-in wastewater treatment units designed for decentralized applications where effluent quality must meet or exceed secondary treatment standards. They are designed for residential, commercial and small community applications and are available in 450- to 4,000-gpd treatment capacities. All models up to 800 gpd are NSF/ANSI Standard 40 certified to produce effluent quality of 9 mg/L CBOD5 and 9 mg/L TSS. The design enables installation without a pretreatment tank, making it suitable for 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

Eljen Geotextile Sand Filter

The GSF, or Geotextile Sand Filter, advanced wastewater treatment and dispersal system from Eljen is designed to provide treatment and dispersal in the same footprint while keeping installations easy and maintenance minimal. This product is used for both commercial and residential applications. Utilizing a two-stage pretreatment process, the geotextile modules apply filtered septic tank effluent to the soil, increasing the soil's ability to accept the effluent and increase the long-term acceptance rate. Its design provides increased surface area for biological treatment that greatly exceeds the module's absorption area. Open-air channels within the module support aerobic bacterial growth on the module's geotextile fabric interface, surpassing the surface area required for traditional absorption systems. The result is simple installations in a smaller soil absorption area. The system is tested and certified by NSF to NSF/ANSI Standard 40. 800-444-1359; www.eljen.com



COMMERCIAL TREATMENT SYSTEMS

Fuji Clean USA Model CE6KG

The Model CE6KG from Fuji Clean USA is a one-tank system with built-in septic tank and treated effluent pump station chamber. It has a hydraulic capacity of 6,000 gpd, treating to NSF 40 standards. It has a compact overall footprint of 36 feet 3 inches by 9 feet 7 inches, with a height of 7 feet 3 inches. Risers and covers are included. Seven access ports allow for comfortable access for operation and maintenance. It has a power draw of 12.2 kWh/day. Systems are delivered to the job site fully assembled for plug-and-play installation. A total system weight of 2,900 pounds allows off-load and setting with basic excavation equipment or a boom truck. Multiple controller options are available based on site requirements. 207-406-2927; www.fujicleanusa.com



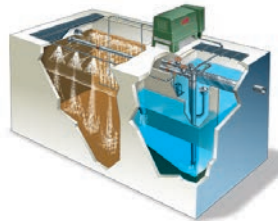
Jet Inc. Extended Air Plants

Commercial wastewater treatment Extended Air Plants and newer MBBR plants from Jet Inc. are modular in design, can treat varying strengths and flows from 1,500 to 300,000 gpd and allow for phase build out. This makes it possible for convenience stores, motels, shopping centers and service stations to be constructed along interstate highways far from any town. These systems can also be used for pretreatment before discharging into central systems to reduce overall system load. They allow for people to live and work in isolated areas, as well as in the world's deserts, deep valleys and mountain ranges. The plants, utilizing a variety of controls, treat wastewater through the aerobic digestion process that enables microscopic living organisms to transform wastewater into a clear, odorless liquid. Jet offers assistance with design, engineering and construction, as well as tech support, plant start up commissioning and operator training. 800-321-6960; www.jetincorp.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



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 multi-unit 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%, depending on configuration, and can be operated with a part-time operator. They are easy to ship and set and can be installed in a variety of soils and climates. 800-348-9843; www.orenco.com



CONTROL PANEL

Alderon Industries Duplex Intrinsically Safe Pump Control Panel

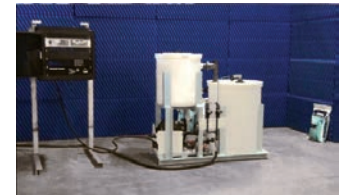
The Duplex Intrinsically Safe Pump Control Panel from Alderon Industries is designed to operate two pumps based on control switches mounted at predetermined levels and system information entered into the programmable logic controller. A human-machine-interface touch screen allows the user to program email and text alerts for when alarm conditions occur. The panel includes door intrusion switches, inner dead front doors with mounted indicators and controls, battery backup for power outages, and an insulated enclosure with heaters for cold weather protection. 218-483-3034; www.alderonind.com



DISINFECTION EQUIPMENT

Scienco/FAST - a division of BioMicrobics SciCHLOR

SciCHLOR from Scienco/FAST - a division of BioMicrobics is a sodium hypochlorite generator designed to give a large span of markets a safe and effective way to disinfect. With salt, water and electricity, the system with multipass SciCELL electro-chemical activation, or ECA, technology will produce an available supply of 10 to 60 pounds chlorine-equivalent/day sizes. Connected to an incoming water source and with multiple operating modes, the brine solution makes multiple passes through the low-voltage DC electrolytic cell to provide a reliable method for the needs of medium to large onsite disinfection applications. Its recirculation method keeps control of desired chlorine concentration while the assembly minimizes maintenance downtime. 866-652-4539; www.sciencofast.com



NITROGEN-REDUCTION SYSTEMS

BioMicrobics HighStrengthFAST

HighStrengthFAST wastewater treatment systems from BioMicrobics are scalable wastewater solutions for commercial properties of all sizes. They are engineered to treat wastewater containing high BOD concentrations and often having higher FOG levels than standard sanitary-strength sewage. Models are available to treat 900 to 9,000 gpd and are designed for extreme environments such as specialty food/beverage/agriculture applications. 800-753-3278; www.biomicrobics.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 is 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



PUMPS

Franklin Electric NC Series

NC Series nonclog pumps from Franklin Electric are available in single- and three-phase power options to provide a rugged, maintenance-friendly wastewater transfer solution with flows up to 610 gpm. A field-adjustable wear plate minimizes downtime while maximizing profit without the need and additional cost of a replaceable wear ring. Factory standard dual silicon carbide mechanical seals have low thermal expansion and higher abrasion resistance, providing up to six times greater wear life than commonly used carbon versus ceramic seals. 800-348-2420; www.franklinengineered.com



Liberty Pumps ProVore

The ProVore grinder from Liberty Pumps is designed for use in applications where the addition of a bathroom or other fixtures below sewer lines requires pumping. It has the same V-Slice cutter technology used in the Omnivore series, brought down to a more cost-effective level. Powered by a 1 hp motor, this smaller grinder is designed to operate on a standard 115- or 230-volt circuit, requiring only a 20-amp breaker. No special wiring is needed. The pump comes with a 2-inch vertical-style discharge and a standard leg pattern matching the LE Series. This allows for an easy retrofit into existing systems. Compact factory-assembled systems are available in both simplex and duplex versions: the ProVore 380 and ProVore 680. 800-543-2550; www.libertypumps.com



UV DISINFECTION

Polylok PL-UV1 UV Disinfection Unit

The PL-UV1 UV Disinfection Unit from Polylok reduces bacteria levels from secondary effluent to achieve strict water-quality standards. Every component of the compact unit is engineered and constructed to provide reliable disinfection and long operational life, according to the manufacturer. It has a dual-pass design, a long-life UV bulb, weatherproof electrical components and no chemical residual or harmful byproducts. It is easy and inexpensive to install and operate, and it has low electrical usage. Flow rates for gravity flow only are 100 through 8,640 gpd, with 100 through 4,320 gpd with 30 mg/L BOD and 30 mg/L SS, and 4,321 to 8,640 gpd with 10 mg/L BOD and 10 mg/L SS. It offers a UV dose greater than 40,000 microwatt-seconds per square cm at 254 nanometers, with transmissivity of 65%. 888-765-9565; www.polylok.com



SALCOR 3G UV Wastewater Disinfection Unit

The 3G UV Wastewater Disinfection Unit from SALCOR is used for residential, commercial and municipal applications, and it 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 meant as a reliable building block for large water recovery/reuse systems. When installed in 12-unit parallel/series arrays with ABS pipe fittings, systems can disinfect more than 100,000 gpd. Gravity flow equalizes without distribution boxes. Each unit has a foul-resistant Teflon lamp covering, two-year long-life lamp with efficient installation, minimal annual maintenance and energy use of less than 40 watts. 760-731-0745; www.salcor.world □



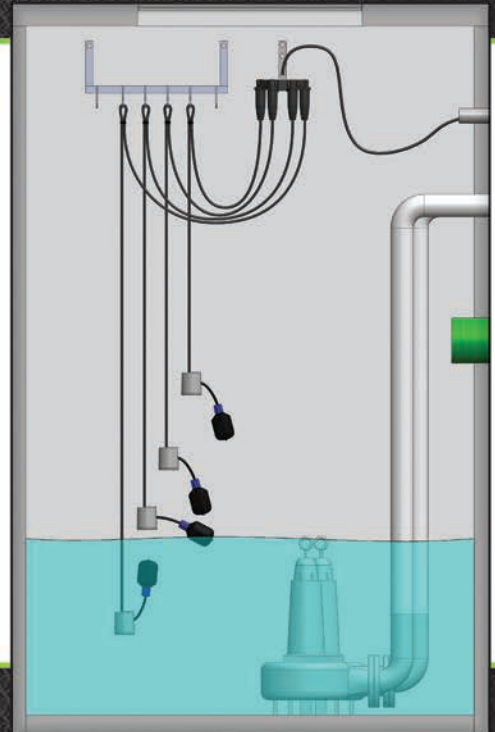
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Water Tight Structures



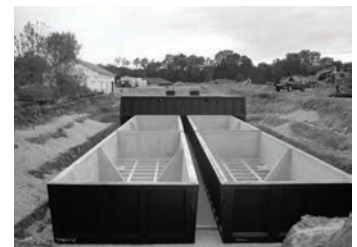
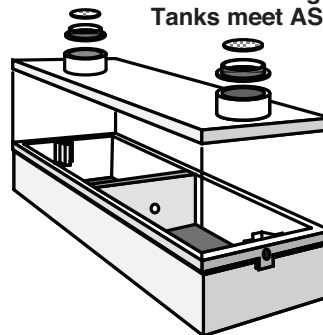
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Large-Scale and Commercial Treatment Systems

By Craig Mandli

Extended aeration units solve challenge at resort



Problem: The Lauloa Ma'alaea Resort in Hawaii was required to update its wastewater treatment unit due to tighter effluent requirements required in a forthcoming permit update. The existing treatment unit was installed below grade in the resort's parking lot. Due to limited space on the site, this was also the only possible location for a new system.

Solution: To meet the new regulation requirements and handle the design flow of 21,000 gpd, the resort selected a **Delta Extended Aeration Treatment Unit**. The old treatment unit was removed from the site, followed by the placement of a foundation on which the new treatment system was installed. To ensure the treatment unit was out of sight, secure and aesthetically pleasing, a building was built around the unit. The extended aeration process selected for this system utilizes aeration followed by clarification and disinfection. The flow equalization chamber receives incoming wastewater, and then duplex pumps discharge the wastewater into the aeration chamber. A duplex positive displacement blower and distribution manifold system supplies all the air needs to the system including air diffusers, airlift pumps and a scum skimmer. The influent characteristics were typical domestic waste loadings, with effluent requirements of less than 20 mg/L BOD/TSS.

Result: Installation of the factory-built ATU went smoothly and the system is performing as expected. 800-219-9183; www.deltatreatment.com

System eliminates biomat clogging issue



Problem: A Connecticut convenience store had long dealt with failures in its leachfield receiving high-strength wastewater. The existing system contained a septic tank, grease trap and two concrete chamber leachfields. Both had experienced failures within 12 years of installation and required frequent pumpouts.

Solution: In 2017, Geomatrix was engaged to investigate. Analysis determined the failures were due to high-strength wastewater biomat clogging. A **SoilAir** system was installed to rejuvenate the existing chambers and handle the future high-strength wastewater flows. This solution eliminated the need to excavate, repair or replace the existing chamber systems, which were intertwined with the fuel dispensers, piping, tanks and parking, all directly in front of the store. The direct and indirect costs of disturbing the fuel system would have been many times the cost of the septic system. Construction took less than a week, and store traffic was not impacted.

Result: For three years, the system has operated utilizing less than 50% of the leaching capacity. Geomatrix continues to remotely monitor the system through a logic-based control system that can react to issues before they become problems. 860-510-0730; www.geomatrixsystems.com

Treatment system used to moderate flow within limits



Problem: Registered sanitarian Jon Maass of JMI OSSF Consulting was contracted to help with a challenging mixed-use site of an office complex serving more than 300 people and a culinary training facility with corporate housing/condos for trainees in Dripping Springs, Texas. When all the uses of the property were added up, they were looking at 5,400-gpd flow on weekdays, with just the condos on the weekends at 2,700 gpd. In Texas, systems discharging more than 5,000 gpd aren't permitted at the local level under TAC 285. State permits can take up to a year to obtain and at much greater expense in both equipment and permit/design fees, and this site was well under construction and expected to be occupied within six months.

Solution: Working with the sanitarian, **Hoot Systems** devised a plan to provide additional flow equalization and stack the excess waste generated Monday through Friday, adding this to the weekend flows to utilize the entire week's capacity limits. The flows from the condos were residential strength, however the office building and training kitchen generate higher strength waste. This combined flow required a 12,500-gpd MTS treatment system to properly treat the waste stream.

Result: Technicians from Hill Country Wastewater were able to get the system installed on budget and in time for the grand opening and are the current operators. The daily flow to the drainfield has kept at or below 4,800 gpd and is in compliance with the TAC 285. 888-878-4668; www.hootsystems.com

Pretreatment system used for high FOG wastewater



Problem: The Cottage Hotel is a historic tavern and restaurant at the center of town in Mendon, New York. The one-third acre parcel presents major challenges for a septic system, as space at the site is mostly limited to the footprint of the buildings and parking. Wastewater is treated and then discharged into a nearby stream. Pretreatment had historically been accomplished through an aerobic treatment unit with polishing through a single-pass sand filter with SPDES-permitted surface discharge. Although the ATU and sand filter are good treatment technologies, at this particular site, the fats, oils and greases generated from the kitchen waste were too much for the system to handle, causing the sand filter to clog routinely. Regulatory authorities mandated the failing system be upgraded to be better suited for handling the high strength of commercial wastewater.

Solution: The owner hired Onsite Engineering to design a commercial septic system to handle the high strength restaurant wastewater — and treat it to the high level needed for a permitted surface water discharge. The redesigned system uses the **White Knight Microbial Inoculator Generator** from **Knight Treatment Systems**. The system inoculates and pretreats the wastewater with select bacteria that aggressively digest the FOG and other organic constituents prior to passing through the rebuilt single pass sand filter.

Result: The system has been working well since its 2017 installation. 800-560-2454; www.knighttreatment.com

System a fit for tight space and high-water table



Problem: The owners of the Bald Eagle Golf Course in Washington State wanted to develop a condominium complex that required onsite treatment and dispersal. The two challenges for this project were lack of area and the results of the groundwater mounding analysis. The area available for dispersal had enough soil for a standard subsurface drip system, but a groundwater mounding analysis determined the winter water table would not provide enough vertical separation.

Solution: A determination was made to use the OSCAR system from Lowridge Onsite Technologies. The OSCAR can be installed at-grade, so all of the soil profile can be used to determine vertical separation. This meant there was enough area and vertical separation for the project to be approved. The project was broken up into three 3,500-gpd segments. Each segment had two zones, each at either 1,700 or 1,800 gpd. Because of regulatory requirements, each zone had an upslope curtain drain, a 10-foot downslope setback to the OSCAR primary, and adjacent reserve area, and then a 30-foot setback to the next curtain drain.

Result: Even with the 30-foot setback for each of the zones, the OSCAR technology required less space than the next best option. The system allowed for the development of the complex. 877-476-8823; www.oscaronsite.com

National park service research station uses combined treatment and dispersal system to protect sensitive environment



Problem: An upgrade of the existing, inadequate potable water and onsite sanitary sewer system was required to serve the existing lodge, houses and cabins at the University of Wyoming's AMK Ranch research center. The center is adjacent to Jackson Lake in Grand Teton National Park and is owned by the U.S. National Park Service's Grand Teton National Park. The new wastewater treatment system design had to comply with all federal wastewater regulations for national parks and had to preserve the pristine Jackson Lake environment. Additionally, solution had to be compatible with the extreme cold and frost depths prevalent in area winters.

Solution: A 6,500-gpd combined treatment and dispersal Advanced Enviro-Septic (AES) system from Presby Environmental with 3,120 linear feet of AES pipe was specified because it removes up to 99% of wastewater contaminants without using electricity or replacement media. The depth of allowable cover over the system was a contributing factor in the selection of the system, given the extreme winter conditions. Construction of the new system could only begin once the AMK Ranch was closed for the season and it needed to be completely operational for the 2020 season.

Result: Materials were delivered by Ferguson Water Works, which provided the AES Pipe. The small footprint of the passive AES system as compared to conventional wastewater treatment systems resulted in minimal impact and disturbance of the site during installation. 800-473-5298; www.presbyeco.com □

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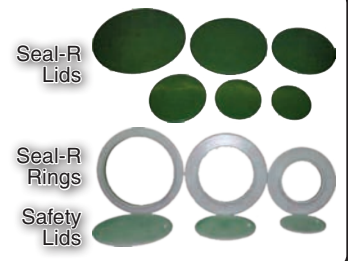


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Magers retires from equipment industry

Felling Trailers' southwestern regional sales manager, Roger Magers, who has been a part of the equipment industry for 45 years, retired at the end of 2020. He joined the company in 2009 as the Western U.S. regional sales manager. He provided dealer support for as many as 11 states.



Roger Magers

Orenco Systems announces company changes

The year 2021 marks four decades of protecting the world's water for Orenco Systems. After 40 years, founder Hal Ball announced his retirement from day-to-day involvement in the company. Co-founder and former executive vice president Terry Bounds will serve as both chairman of Orenco's board of directors and president over the research and development, operation and maintenance, and facilities departments of the company. In addition, the company will now operate in three distinct divisions. Jeff Ball will serve as president of Orenco Water, while Eric Ball has been named president of Orenco Composites. Travis Wood, former president of Franklin Control Systems, is the new president of Orenco Controls. And former legal counsel Scott Saulls will serve as corporate president. The company's wastewater-focuses operations will now be known as the Orenco Water division.

Industry leader, Hoot Systems executive Ron Suchecki, passes away

Ron Suchecki Jr., research director and general manager for Hoot Systems and partner in Central Texas Precast, passed away Feb. 8 of COVID-19. He was 50. Suchecki was active in onsite research programs and served in many capacities for state and national trade associations over the years.



Ron Suchecki Jr

Suchecki, of China Springs, Texas, received a degree in environmental science from Baylor University and remained active with the university's Wastewater Research Program throughout his life. He was on the school's Wastewater Treatment Advisory Board and an advisor to the Public Health Master's Program.

Suchecki was a member of the National Onsite Wastewater Recycling Association (NOWRA) board of directors and served on its Model Code Committee. He worked on the NSF International task force that developed NSF/ANSI Standard 245 to evaluate the performance of individual onsite nitrogen reduction treatment systems. He also served on the NSF Industry Forum, numerous committees and groups and was a member of its Wastewater Joint Committee.

He also served on the board of the Texas Onsite Wastewater Association (TOWA), including as president and on conference planning committees for TOWA and the Texas Environmental Health Association (TEHA). He was a three-term member of the Texas Onsite Wastewater Treatment Research Council. He also gave many industry presentations on several onsite topics.

Suchecki held seven patents in bioremediation and onsite wastewater treatment. He worked for Hoot Systems and associated companies for more than 25 years.

Sara Heger, Ph.D., an engineer, researcher and instructor with the Onsite Sewage Treatment Program in the Water Resources Center at the University of Minnesota, often presented at the same national conferences as Suchecki. She said he worked tirelessly for advances in the onsite industry.

"He deeply cared about bringing credibility to our industry through advocacy, education, standards and support," Heger said. "Ron was known to always have a smile on his face and work hard to solve any problems in front of him, even though he was often over-committed. He was full of energy, somehow making time for his work, family, friends, faith and anyone who needed a helping hand."

Suchecki is survived by his wife, Melinda, four children and his parents. □

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PRODUCT NEWS

PRODUCT SPOTLIGHT

AiraCarb device controls onsite system odors

By Tim Dobbins

Odor may be a concern with any onsite treatment system, decentralized system, treatment plant or municipal collection system. Fortunately, as advancements in technology continue to improve onsite treatment practices, developments in odor control have also come a long way.

AiraCarb Odor Control Systems are built to rid any onsite or decentralized wastewater treatment or municipal collection applications of foul odors using Anua's high-capacity activated carbon media.

"Any application using aeration is particularly well-suited for an AiraCarb system as off-gassing of hydrogen sulfide occurs anywhere wastewater is disturbed," says Sean Martin, president of Anua.

The AiraCarb system comes in two sizes, providing 75 or 175 cfm to best suit the application at hand, and can either be set up as passive vent systems or customers may choose to utilize a fan-based option where foul air is drawn from the headspace to achieve proper empty bed residence times.

"The beauty of the AiraCarb odor control systems is in their simplicity and low operation and maintenance costs," Martin says.

"We have designed them with operators in mind so that they can be installed and left alone to resolve any odor issue."

Standard features include a corrosion-proof vessel with removable lid and 4-inch-diameter PVC inlet and outlet. Each unit also has an attached 1/2-inch-diameter PVC condensate drain with ball valve. A top-mounted cast-aluminum blower with 120V direct-drive motor can be installed as an option and customers can also request specialized carbon medias.

The AiraCarb 75 measures 22 inches in diameter by 38 inches tall and the 175 model shares the same height but measures 26 inches in diameter. The units are also designed utilizing components and color schemes that are familiar to onsite wastewater professionals, so they blend into the surroundings and go unnoticed.

"In the odor control business, the best feedback that you can receive is none at all, which means that the system is performing exactly as it was designed," Martin says. "When we have asked customers, who are using the systems on applications where they had previously heard complaints, the response has been that the AiraCarb system is working perfectly, and the odor complaints ceased the day the system was installed." 336-547-9338; www.anuainternational.com □



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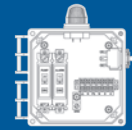
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