

April 2019

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**SNAPSHOT:**  
Apprenticeships  
would help in  
Ontario  
p. 28

**EDITOR'S NOTEBOOK:**  
How do you attract more  
workers to the trades? p. 6

## FAMILY REUNION

Raymond Harrison Septic Services has undergone many changes over three generations, but the one thing that remains constant is the integrity of its entrepreneurial founder p. 10

**SYSTEM PROFILE**  
Tight spaces for  
an Arizona project  
p. 20



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





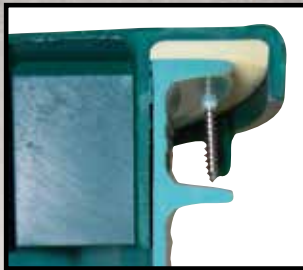
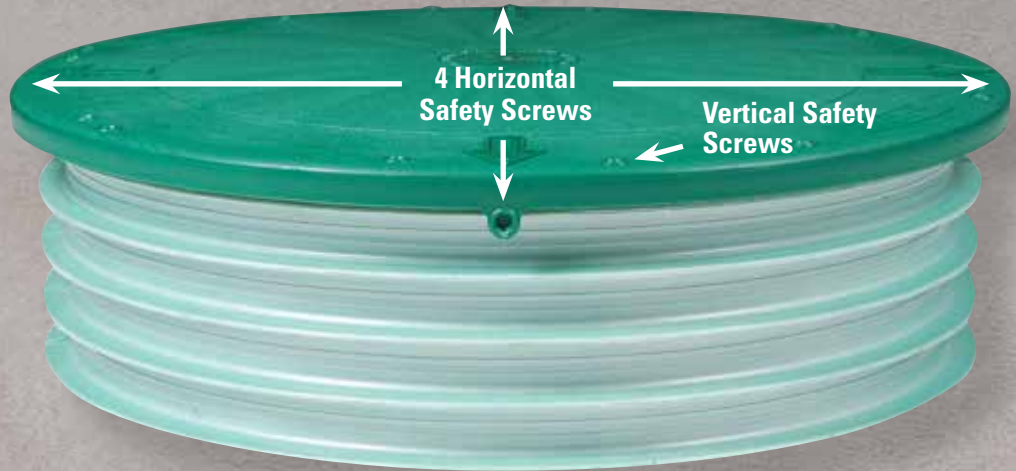
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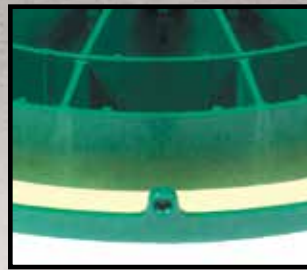
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- Simple to install
- May also be used as Outlet Tee with Solids Deflector

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### INSTALLER PROFILE:

**Family Reunion** By David Steinkraus

#### ON THE COVER:

Raymond Harrison Septic Services has been serving Maryland residents' wastewater needs for generations. Partners David Stoltzfus (left) and Ray Harrison are shown with their vacuum truck, a 2008 International from National Truck Center and carrying a Jurop/Chandler pump. (Photo by Kaitlin Newman)

### 6 Editor's Notebook:

#### How Do You Attract Workers to the End of a Shovel?

An upbeat message about working in the trades will help restock the industry with quality customer service-minded professionals.

By Jim Kneiszel

### 8 @onsiteinstaller.com

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### 18 Basic Training:

#### How Many Bedrooms Does This House Have?

Onsite system sizing standards are usually based on how many people occupy a dwelling. What do you need to know?

By Jim Anderson and David Gustafson

### 20 System Profile:

#### Tight Space Creates a Design Puzzle in the Arizona Desert

When an assisted living facility retrofit requires added wastewater treatment capacity, a pair of ATUs and a chambered drainfield do the trick.

By Scottie Dayton

### 24 Rules and Regs:

#### Florida Legislature Revisits Onsite Inspection Requirement

By David Steinkraus

### 28 States Snapshot:

#### Recognize Septic System Installation and Pumping as Professional Trades

'Implementing an apprenticeship-based system that incorporates hours worked and schooling would be beneficial to the industry's reputation.'

### 30 Product Focus:

#### Large-Scale and Commercial Treatment Systems

By Craig Mandli

### 34 Case Studies:

#### Large-Scale and Commercial Treatment Systems

By Craig Mandli

### 36 Associations List

### 38 Product News

### 38 Industry News

## Coming in May 2019

### ISSUE FOCUS: Annual Buyer's Guide

Contractor Profile: Pennsylvania company provides extra special care  
System Profile: Visit an Iowa community onsite system

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### EDITORIAL CORRESPONDENCE

Send to Editor, *Onsite Installer*, P.O. Box 220, Three Lakes, WI 54562 or email [editor@onsiteinstaller.com](mailto:editor@onsiteinstaller.com).

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## ADVERTISER INDEX

**April 2019**

<b>ALTA</b>	
Alita Industries, Inc.	33
Anua	26
<b>BIO MICROBICS</b>	
BioMicrobics, Inc.	23
<b>Seal-R</b>	
BrenLin Company, Inc.	16
Clarus Environmental	19
Crest Precast, Inc.	25
<b>delta</b>	
Delta Treatment Systems, LLC	39
<b>eljen</b>	
Eljen Corporation	13
<b>FujiClean USA inc</b>	
Fuji Clean USA	25
Hoot Systems, LLC	17
<b>INFILTRATOR</b>	
Infiltrator Water Technologies, LLC	3
<b>Jet</b>	
Jet Inc.	25

Kistner Concrete Products, Inc.	33
Knight Treatment Systems	35
Meaty-Delivery	37
<b>NPCA</b>	
National Precast Concrete Assoc.	27
<b>norweco</b>	
Norweco, Inc.	9
<b>POLYLOK</b>	
Polylok, Inc.	40
<b>Presby Environmental Inc. (PEI)</b>	
Presby Environmental Inc. (PEI)	5
<b>Roth</b>	
Roth North America	33
<b>SALCOR</b>	
SALCOR, Inc.	15
<b>SPI</b>	
Septic Products, Inc.	19
<b>SIM/TECH</b>	
Sim/Tech Filter Inc.	37

<b>Simple Solutions</b>	
Simple Solutions Distributing	37
<b>SJE RHOMBUS</b>	
SJE-Rhombus®	7
<b>T&amp;T TOOLS</b>	
T&T Tools Inc.	35
<b>TUF-TITE</b>	
TUF-TITE, Inc.	2
Wholesale Septic Supply	8
<b>WIESER CONCRETE</b>	
Wieser Concrete	16
<b>Classifieds</b>	38

## Enjoy this issue!

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







# How Do You Attract Workers to the End of a Shovel?

An upbeat message about working in the trades will help restock the industry with quality customer service-minded professionals

**T**he phone is ringing again. It's not the clang of the cash register, but the closest thing to it for an onsite installer. Like many in the excavation-related trades, you used to get pretty excited on spring days when the phone rings off the hook with customers looking to get on your job board.

But now that sound may trigger a little feeling of foreboding. Your first thought might be: How am I going to satisfy this customer's construction timeline? Where am I going to come up with the technicians and equipment operators to get another job done?

You used to love it when the calls came rolling in as the construction industry woke from its winter slumber. But now it's a constant reminder of your staffing shortcomings. The truth is many installing companies reflect a nationwide trend in the trades:

- The owners, crew supervisors and work hands are aging out. Many installers are nearing retirement and they don't have the good health and energy to tackle as many jobs. You used to jump in the trenches and move dirt with the best of them. You still have the skills and expertise, but you can't do quite as much and might have to take a few mornings off to visit the doctor.
- A surging economy means a plentiful workload, but you're having trouble coming up with the staff to meet the demand. The thing about the construction industry is that when you are busy, so is every other subcontractor on a project. Competition for hard workers and skilled tradesmen and -women is fierce. You have to pay more and train a less-experienced workforce.

**If Americans are growing fat and old sitting behind a desk all day, what better antidote is there than getting outside and using all your muscles putting in a septic system?**

You'll no longer need that expensive gym membership to manufacture exercise or a closet full of expensive clothes if you join the trade worker revolution.

## GENERATION NEXT

We need a new generation of installers to carry the decentralized wastewater industry forward. We have to develop young leaders who want implement advanced technologies that will be demanded with new development in an environmentally conscious world. Older installers want to leave the industry in capable hands someday.

And you'd love to add another crew and build more revenue, but to do that, you need to recruit workers you can trust and sustain their interest in an installing career. But in a world of college-bound young adults, how do you make it look appealing to trade a suit and tie for overalls and work gloves? So many prefer Armani over Carhartt and a smartphone over a shovel handle.

It might seem easy to paint a pretty grim picture of the labor market for the trades. But I don't believe the outlook is as dark as all of that. I think there are ways to promote the onsite industry as an attractive career choice for a broad spectrum of young people, from the high school graduate looking to start out at the bottom to the sharpest college graduates with science and business degrees. It's just a matter of educating them about the potential we see for this industry.

Let's say you advertise for new employees or you meet with undecided students at your local tech school. Here are a few talking points you can use to sway newcomers to our side:

### **There is good pay in the trades.**

Many people equate a briefcase and a corner office with financial success. But we know you're just as likely to earn a good living at the controls of a backhoe or assembling components of a wastewater system. More than 25 percent of people in the United States require a functioning septic system, and a limited number of people know how to build and maintain those systems. Onsite installers and maintainers provide a necessary service and earn a good living doing it. And to lure new, young professionals, you can pay a professional wage, offer incentives like sign-on and profit sharing bonuses and free continuing education. Corporations downsize, the demand for their products wax and wane, but there will always be a need for septic systems. That translates to high wages and job security.

### **The aging workforce creates immense opportunity.**

According to the U.S. Bureau of Labor Statistics, the average age of workers in the construction industry in 2018 was about 43 years old. But



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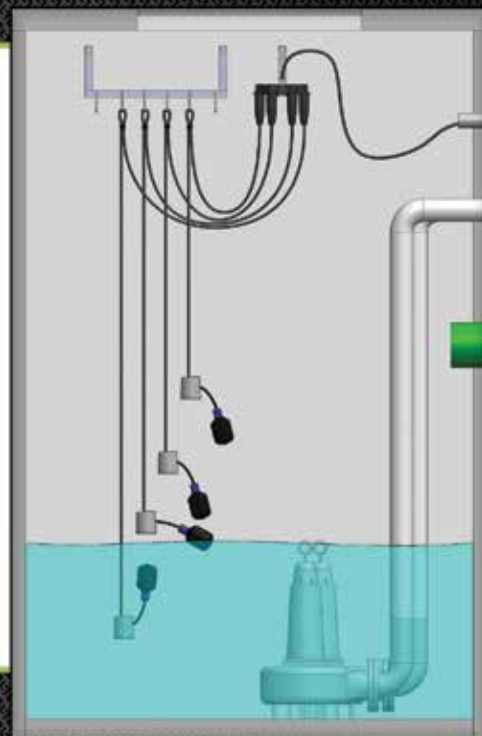


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anecdotally, I know there are a vast number of business owners in the installing industry in their late 50s and 60s. I talk to them every week. These folks are looking to slow down and turn over their operations to younger people. Let job candidates know about the great potential to advance in this industry. With hard work and a will to learn, they can quickly move into supervisory positions and someday even own their own businesses. In fact, be open to providing project bonuses and options for part-ownership for your star workers and they may stick with you for many years to come.

### You don't have to dress to impress.


Hey, some folks might prefer to ditch the suits and the cubicle existence for a chance to get dirty and work in the great outdoors. In fact, it may be time for this trend to take root. You know the day goes fast when you're moving from project to project in the onsite industry. If Americans are growing fat and old sitting behind a desk all day, what better antidote is there than getting outside and using all your muscles putting in a septic system? You'll no longer need that expensive gym membership to manufacture exercise or a closet full of expensive clothes if you join the trade worker revolution.

### Be part of a helping profession — the solver of problems.

Talk to someone who works as a spoke in the wheel of a major corporation. Their day is consumed with raising widget sales 1.8 percent this quarter. Or they have to sit in soul-sucking meetings all day talking about a new human resources project or brainstorming ideas for a PowerPoint presentation on production efficiency at a plant they'll never visit. So many people toil in work they feel is meaningless because they don't see who they are benefitting. That's not the onsite profession. When

you design or repair a septic system, you know precisely who is benefitting. You work directly with the client, and they appreciate your expertise. You are helping families and small businesses. You are protecting groundwater and the environment. You see exactly how you make a difference and can feel good about it.

### STAFFING STRATEGY

Does your messaging to attract and retain new workers cover some of these points? Do you have other ideas to share about promoting the wastewater industry to the next generation coming up? We need to think about the health of the industry moving forward so onsite installers will be prepared when the phone starts ringing. 

## GIVE US YOUR FEEDBACK!

We want to know your thoughts, comments and questions about *Onsite Installer*. What's your favorite section? How can we improve?  
Email Jim Kneiszel [editor@onsiteinstaller.com](mailto:editor@onsiteinstaller.com).



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## PROTECT YOUR HEALTH

### Cytotoxin Warning

Did you know septic tanks could hold dangerous levels of cytotoxins if an occupant of the residence is undergoing chemo? Septic professionals should inquire if anyone is undergoing chemotherapy when troubleshooting or inspecting systems. When working directly with sewage, for instance while sampling or cleaning septic tanks, it is best to err on the side of safety and assume the tank could be contaminated.

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## CHLORIDE CONCERNS

### Water Softener Use

Increasing chloride levels in many surface waters pose an emerging environmental concern since elevated chloride levels are harmful to aquatic life. A major source of chloride is water softening. Large amounts of discharge from water softeners can also damage septic systems. Here are tips for your customers to help reduce usage.

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## Overheard Online

"The thing that's ultimately going to keep your business afloat, and bring in new referrals, is the integrity with which you serve your clients."

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## SLAUGHTERHOUSE SEPTIC

### System Variables

Slughterhouse wastewater is not covered under most state septic regulations, as septic system sizing is based on research of typical flows and wastewater characteristics from domestic residences. If you are designing or maintaining a septic system for an animal processing facility there are several variables to consider. This exclusive online article explains more. [onsiteinstaller.com/featured](http://onsiteinstaller.com/featured)

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# FAMILY REUNION

Raymond Harrison Septic Services has undergone many changes over three generations, but the one thing that remains constant is the integrity of its entrepreneurial founder

By David Steinkraus

**R**aymond Harrison Septic Services has been around for more than 75 years. It's been a fixture in eastern Maryland for more than 50, and it is still in business because it adapted.

If you live near Chesapeake Bay or follow news coverage about its water quality, you know the issues Harrison Septic faced. Water quality in the bay was in decline. The fishing industry was in trouble, and wildlife was suffering. When water regulations changed in an effort to heal the bay, it meant change for installers who work in the area.



◀◀ Ray Harrison connects PVC pipes during construction of a new septic system in Chestertown, Maryland. (Photos by Kaitlin Newman)

▶▶ Ray Harrison measures an excavation for a system install while David Stoltzfus waits at the controls of a 2007 416D Cat backhoe.

The advantage Harrison Septic had was Harry Harrison, the late father of Ray Harrison, who now owns the company with his wife, Anna Harrison, and David and Jayme Stoltzfus. The elder Harrison saw the new regulations coming, and starting in 2006, he prepared his company for a new future, Ray Harrison says.

## ENVIRONMENTAL WAKE-UP

Chesapeake Bay was the first estuary targeted by Congress for restoration. That started in the late 1980s after a study fingered excess nutrient loads as the cause of the loss of marine creatures and wildlife. Since then, a partnership among several states, about 1,800 local governments, more than 20 colleges or universities and more than 60 businesses and nonprofit groups has worked to reduce the nutrient load. In 2010, the U.S. Environmental Protection Agency established a total maximum daily load of nutrients and sediment for the bay.


In 2006, Maryland regulations began requiring best available technology for onsite systems within the Chesapeake Bay Critical Area. This is the strip of land within 1,000 feet of tidal waters and tidal wetlands, and it comprises about 11 percent of the state. It was the latest step in the process that Harry Harrison saw coming.

“When the new advanced technology systems came out, a lot of the old-timers were set in their ways and were skeptical of the advances with nitrogen-removal tanks. Dad saw this is what we would be doing in the future, so why not get as much information from each manufacturer as he could? And we’re glad he did that, because advanced systems are pretty much all we install now,” the younger Harrison says.

Only 5 to 10 percent of installations are standard septic systems. The rest use some kind of nitrogen-removal technology.

Harrison Septic installs the occasional commercial application but primarily installs domestic systems. Some of those can still be large. Kent and Cecil counties on the north end of Chesapeake Bay have a lot of old money, and many farms now house riding horses or are preserved for hunting.

In addition to installations, Harrison Septic handles the operation and maintenance for systems in the ground. Because that involves a single technician and minimal equipment, the company’s radius of service is greater than for installing or pumping.



### Raymond Harrison Septic Services, Chestertown, Maryland

---

**Owners:** Ray and Anna Harrison,  
David and Jayme Stoltzfus

**Founded:** 1942

**Employees:** 3


**Service area:** Maryland's eastern shore

**Services:** Advanced treatment unit operation and maintenance, line jetting, camera inspection, septic inspections and repairs, septic and ATU installation, pumping, excavating

**Affiliations:** Maryland Onsite Wastewater Professionals Association, NOWRA - National Onsite Wastewater Recycling Association

**Website:** [www.harrisonseptic.com](http://www.harrisonseptic.com)



A full-page photograph showing a worker in a blue shirt, jeans, and rubber boots kneeling in a dirt trench. The worker is guiding a large, flexible, corrugated pipe into a circular manhole opening. The pipe is being fed from the left side of the frame. The trench walls are made of loose soil. In the background, there's a green structure, possibly a storage tank or part of a vehicle.

**"It's like a rolling billboard going down the road. If it's parked for an hour for lunch at McDonald's, whoever drives by, it jogs their memory that they need their tank pumped."**

**Ray Harrison**

## ALWAYS ON CALL

There are ways to boost any business. Management gurus talk about them — controlling costs, marketing, finding a niche. But gurus seldom seem to address the one universally necessary quality: hard work. It's what Ray Harrison has going for him as he seeks to rebuild his family company. And hard work doesn't necessarily mean 16-hour days. It can mean simply being available when the job needs to be done.

In his rural area — and he grew up there so he knows — many people are difficult to reach after 4:30 p.m. When hunting season comes, some people disappear for weeks. "All of that has been good for us because I was brought up to work hard no matter what time of year it is," Harrison says.

There are jobs he won't do — also part of good service. In early spring and summer, when house sales are at their peak, Harrison refers inspections to a specialist company. It may look odd for his company to do an inspection and then undertake repairs at the same property, he says.

Harrison also makes sure it's easy to reach someone at his company. A dispatcher answers calls between 7 a.m. and 5 p.m. Monday through Friday. After 5 p.m. and on weekends, many calls are routed to the home of his partner David Stoltzfus. But because he is a certified technician for several advanced treatment unit manufacturers and his number is available through them, those calls for service go directly to his cellphone.

## COMPACT DRIP JOB

Pumping and installations are done in the central and northern counties of Maryland's eastern shore. Service technicians cover the state's entire eastern shore along the Chesapeake, plus Anne Arundel County, which includes the city of Annapolis and touches the edges of Baltimore and Washington, D.C., on the western shore of the bay.

"I was getting so many calls from Anne Arundel County that I had to go over there. It was definitely worth it to make that trip," Harrison says.

The most interesting project they did recently was a drip system. It was 800 feet of small drip tubing set in 8- to 10-inch-deep trenches. Much of the work had to be done by hand.

A trencher did the initial digging, but after that it was hand labor. Tubing had to be laid by hand and fill sand had to be raked by hand, Harrison says. "You can't have any machines driving on that area because of compaction. Pretty much your own footprints are the only thing allowed on that soil."

The dripline ran back to a SeptiTech system. It was also the smallest drip system the company has done. Most have more than 1,000 feet of tubing. But some opportunities for large systems are disappearing.

Rural subdivisions are transitioning to municipal sewer because there is diminishing space for onsite systems. So the subdivisions are connecting to nearby small towns that operate their own wastewater systems.

The business breaks down like this: 60 percent installations, 25 percent pumping and 15 percent maintenance.

## IN THE GARAGE

Harrison Septic gets a lot done, and the equipment list reflects that.

The company's vacuum truck is a 2008 International formerly used as a road tractor. When Harrison was looking for a truck, there was a shortage



◀ Shaun Williams pumps a septic tank on an existing system while the rest of the crew prepares to install a new treatment solution.

▶ Ray Harrison works on installation of an AdvanTex Treatment Systems AX20RT from Orenco Systems for a new onsite system.

of used rigs on the market. They hired National Truck Center to extend the tractor's frame, add another dual axle, make a 4,000-gallon steel tank, put on the Jurop/Chandler pump and paint it.

In addition the company has a:

- 2007 International single-axle dump truck
- 2007 416D Cat backhoe
- 2015 277D Cat tracked skid-steer
- 1999 Ford F-350 dually service truck
- 2005 Freightliner 10-wheel rollback that hauls the backhoe or skid-steer
- 2009 GMC Canyon service truck.

They have a jetter, but not a purpose-built machine. Instead they use a hose and heads from MyTana Mfg. connected to a Stihl pressure washer.

Their camera is a General Pipe Cleaners/General Wire Spring Gen-Eye SD.



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◀◀ From left, Ray Harrison, Shaun Williams and David Stoltzfus pose on a work site. The company's vacuum truck is 11 years old, from National Truck Center, and carries a Juro/Chandler pump.

## BRING BACK PUMPING

Harrison Septic Services had its origin with Ray Harrison's grandfather (also Raymond Harrison) in Greenville, South Carolina. It was a large company running six pump trucks. In the 1950s, he moved north to Maryland and set about building a new septic business in an area where the company name was unknown.

Harrison Septic has always been an installation company, but the pumping division has come and gone. It was sold around 2000 but repurchased a couple of years later. In 2007 the pumping division was sold to Service Energy in Delaware, which kept the company name and pumped locally. When Harry Harrison died in 2016, both men were working for Service Energy to do pumping. In addition, Ray Harrison was working for Harrison Septic Solutions that he and Anna Harrison founded in 2012. Just after his father died, Service Energy approached Ray Harrison and asked if he would like to buy the company name back.

"That was very decent of them," Harrison says. The pumping business had dropped from three vacuum trucks to one, but Harrison has plans to change that. When the pumping company came back to the family in 2017, it was under a new name — Raymond Harrison Septic Services, which unified both the pumping and installation businesses. A new partner, David Stoltzfus, joined the team. It was good timing for both of them, Harrison says.

Stoltzfus was just getting out of his family business and was looking for other opportunities. He had worked in construction and acted as a general contractor building houses, so he was familiar with excavation and onsite systems. At the same time, Harrison was picking up more work and needed help if the company was to remain manageable. And they're both the same age: 34.

They divide work by skills. Harrison does most of the operations and maintenance work. Stoltzfus handles the vacuum truck scheduling, and together they do the installations. Pumping is handled by a full-time driver.

"We're still in the rebuilding stage, and we'll need more help soon," Harrison says.

"When the new advanced technology systems came out, a lot of the old-timers were set in their ways and were skeptical of the advances with nitrogen-removal tanks.

**Dad saw this is what we would be doing in the future. ... Advanced systems are pretty much all we install now."**

**Ray Harrison**

A big plus is the company name, which never disappeared from the area since his grandfather established the company. Service Energy had continued to use it. "If it wasn't for the name that's been here forever and the fact that a lot of people know me and knew my father, it would have been a lot harder," Harrison says.

## MAKING CONNECTIONS

Growing the business means making sure its presence is consistent and reaches people where they are. For the Harrison team, that means electronic referrals plus word-of-mouth.

A new website is in the works because the current one says Harrison's Septic Solutions, and while one of the Facebook pages is labeled the same way, the goal is to unify operations under a single name: Raymond Harrison Septic Services. The Facebook pages need updating, too.

"Facebook has been a huge benefit to us," Anna Harrison says.

Every month a couple of people message the company through Facebook and ask for a pumpout. For Labor Day weekend, they ran a Facebook ad (that reached about 4,000 people in their area) telling people the company is available for emergency calls if an onsite system backs up from overuse at a holiday picnic. That single \$10 ad brought in a pumping job, which more than covered the cost, she says.

continued >>



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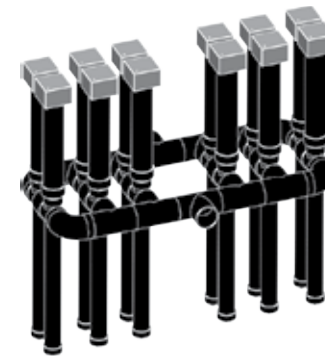


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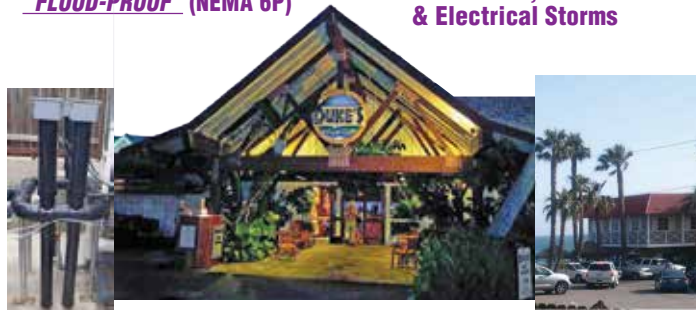


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▲ Ray Harrison guides the AdvanTex AX20RT from Orenco Systems into its resting spot.

There are also Facebook pages for various area communities where residents ask for referrals for pumping companies. Friends can like for the Harrison Septic page.

Aside from the online efforts, the company truck is an effective marketing tool.

"It's so big that it's like a rolling billboard going down the road. If it's parked for an hour for lunch at McDonald's, whoever drives by, it jogs their memory that they need their tank pumped," Ray Harrison says. If they pump one tank in

one neighborhood, it's likely they'll have three or four calls from the same neighborhood in the next week. Occasionally people won't wait to call but will approach the driver on the spot and ask for service.

The company also has good relationships with area real estate agents, and they're usually the first people on site when a house is to be sold and there are questions about its onsite system.

## ON THE GROW

Within a year Harrison would like to have two pump trucks running. Even if it's not used full time, a second truck would provide backup for the primary truck and would enable the company to add some extra services, such as jetting.

He would like to assemble a crew who could work independently on an installation site, while he and Stoltzfus attend to other tasks. In addition to Harrison, one service technician is on duty once a month and another is about to come on part time. Harrison expects that part-timer to be full time within a few months.

Harrison is always trying to craft forward-thinking strategies like his father before him. With hard work, perseverance and future generations willing to stick with the wastewater industry, folks around Chesapeake Bay may see trucks emblazoned with the Harrison Septic name for many years to come. □

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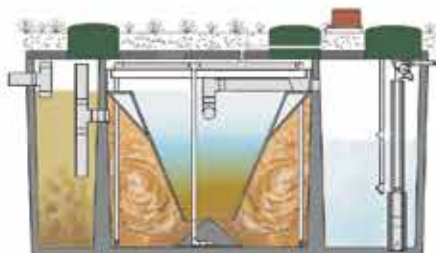


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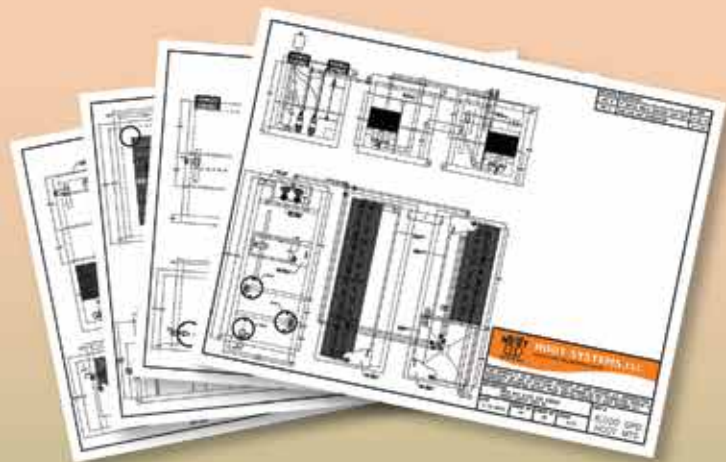
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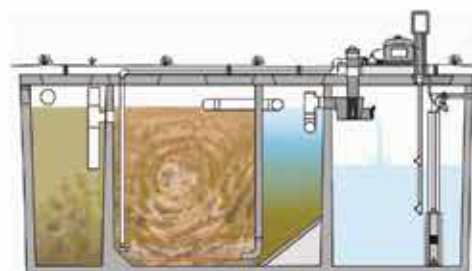


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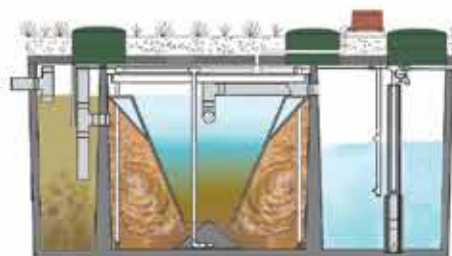


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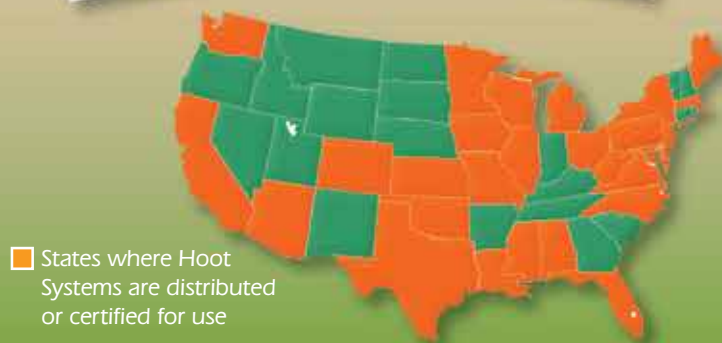


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# How Many Bedrooms Does This House Have?

Onsite system sizing standards are usually based on how many people occupy a dwelling. What do you need to know?

By Jim Anderson and David Gustafson

**D**uring workshops covering time-of-sale real estate inspections, we talk about how wastewater flows can change dramatically when a property changes ownership. One contributing factor for the change is when a residence initially rated as a two- or three-bedroom house is put on the market as a four- or five-bedroom dwelling.

There are many reasons this may happen over time. Space that was unfinished when the house was built is finished with additional rooms, some of which can be used as bedrooms. Rooms built and used for other purposes are converted into bedrooms by new homeowners. Whatever the reason, when a family moves in and all of those “new” bedrooms are used, the system is often too small to accept higher flows associated with increased occupancy.

As an onsite system inspector, you cannot always anticipate whether this will happen or not. But if you compare the initial permit for a sewage treatment system with what is reported in the real estate offering, you get a good idea whether this is something to comment on or not. When the permit says three bedrooms and the real estate listing says five bedrooms, this should raise a red flag to you and the permitting authority that there could be problems in the future.

If you raise this issue, expect to get some immediate pushback from the real estate agent and the selling homeowner. After all, who wants to get less money from the sale by having to update the now-inadequate septic system? Knowing what constitutes a bedroom will be helpful when it's time to have a difficult conversation about the property.

## WHAT IS A BEDROOM?

In new construction scenarios, it is also handy to know the bedroom definition. Certainly, the regulatory person issuing the permit for a new system should be aware of the potential for more bedrooms being available. Additional bedrooms call for increased system size and perhaps additional pretreatment requirements. Another related issue that can affect system size and choice of components is when the residence is also the primary location for a business. That designation would result in other flow volume and waste-strength issues.

It seems that the question of what constitutes a bedroom would be straightforward, but there are complicating issues. First, the older the dwelling, the less likely it was built under current building codes. Over the last few decades, specific bedroom requirements have appeared for new construction. Using the new code requirements to help define the

**As an inspector, you cannot nor should you be expected to make a regulatory statement about whether a room is a bedroom and meets the code requirements. But you may note discrepancies in information where they can be problems and highlighted those concerns to the client.**

number of bedrooms means rooms currently used as bedrooms in older construction would not count as bedrooms today.

The Minnesota code, for example, defines a bedroom as “a room designed for or used for sleeping or a room or area of a dwelling that has a minimum floor area of 70 square feet with access gained from the living area or living area hallway.” It allows use of other architectural features to help determine whether the area is a bedroom or not. If it looks like a bedroom, is used as a bedroom or could logically be used as a bedroom without interference, it counts as a bedroom.

## LOOK FOR CLUES

Extenuating circumstances, such as an adult child who has temporarily moved in during construction or an occasional guest sleeping on a sofa bed in a common living area, do not require those rooms to be designated as bedrooms.

Sources to determine whether a room is a bedroom include the real estate and sewage permit information indicated above or the number of bedrooms listed with the local assessor's office. In new construction, if it is labeled a bedroom on the house plans, if there is a smoke or carbon monoxide detector and all rooms that are on a different level than the primary living area, offer clues to the actual number of bedrooms.

Legal egress is a feature indicating potential use of a space as a bedroom. This is especially important in areas where add-on basement living spaces are common and require at least two escape routes in case of fire. Closets in rooms indicate the primary purpose would be a bedroom;



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however, those rooms may also be used as a den, office or sewing room. Rooms adjacent to three-quarter bathrooms may also be considered bedrooms.

Some features that would indicate the room would not be considered a bedroom for onsite design purposes include the obvious, such as a kitchen, living room, dining room, laundry room or storage area. Rooms and areas that have low ceilings or have half walls (an exception here would be lofts, which are often used as bedrooms), rooms that lack a door, areas with no privacy, areas without access outside, rooms without light or ventilation to the outside, or areas that are passages to other rooms all would indicate general living space and not bedrooms.

## REALISTIC SYSTEM SIZING

As an inspector, you cannot — nor should you be expected to — make a regulatory statement about whether a room is a bedroom and meets the code requirements. But you may note discrepancies in information where they can be problems and highlight those concerns to the client.

When designing or installing an onsite system for new construction, it is appropriate to have a discussion with the homebuilder and homeowner about increasing the system size if it is obvious more rooms could be converted for use as bedrooms in the future. Larger systems can improve longevity of service. And it is much more cost-effective to expand the size of a system now than to try and add capacity when more bedrooms are added later. 

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# Tight Space Creates a Design Puzzle in the Arizona Desert

When an assisted living facility retrofit requires added wastewater treatment capacity, a pair of ATUs and a chambered drainfield do the trick

By Scottie Dayton

▲ Boulders placed around the pea gravel pad protect the treatment modules from collisions. The two risers below mark the dose/recirculation tank, and the riser with a dome lid houses the drainfield manifold. (Photos courtesy of American Septic Service)

**T**ransitioning a residential institution in Hereford, Arizona, to an assisted living facility required upgrading the onsite system.

The new owner hired Dawn Long, field coordinator and onsite designer for American Septic Service in nearby Sierra Vista, to inspect the system. She found a leaking 10,000-gallon homemade concrete block septic tank and, more than 300 feet from the three buildings, a 7,000-gallon septic tank with drainfield on a 332-by-188-foot-wide easement. “The easement ran through the middle of 10 acres and was barely visible,” Long says. “I saw very little room for expansion.”

Long worked with Peter Livingston, P.E., the engineer of record from Bosque Engineering in Atascadero, California, to comply with Arizona’s nitrogen density loading requirements. He recommended AdvanTex treatment modules from Orenco Systems. Pretreatment also reduced the drainfield’s footprint from 400 to 250 chambers, enabling the designers to fit it between the lower parking lot and existing absorption bed.

“This was our largest installation to date,” says Zak Long, foreman for American Septic Service. “Besides the breadth of the work for a small company, the monsoon season threatened to wash us out.” The project took two months.

### Site conditions

Soils are sandy clay loam with 30 to 35 percent rock and a loading rate of 0.4 gpd per square foot. The 6.69-acre property has an upper and lower parking lot.

### System components

Livingston and Dawn Long designed the system to handle 7,625 gpd. Major components are:

- Existing 1,000-gallon tri-compartment precast grease interceptor
- Existing 4,000-gallon single-compartment precast septic tank
- 4,000-gallon and 2,000-gallon single-compartment oval concrete septic tanks in series (Padilla Precast)

◀ Foreman Zak Long (left) of American Septic Service attaches a guide rope to the sling on the 4,000-gallon septic tank. Jared Struse, owner of Sierra Vista Plumbing.







▲ Backfilling the two septic tanks one-quarter of the way up with pea gravel. Lids and risers are from TUF-TITE.

➤ Foreman Zak Long digs another drainfield trench for Infiltrator Water Technologies chambers using a Caterpillar 315FL excavator.

- EF-6 effluent filter in the second tank and four 24-inch risers with heavy-duty lids (TUF-TITE)
- Existing 7,000-gallon single-compartment precast dose/recirculation tank with two Biotube pump vaults (Orenco Systems)
- Two AdvanTex AX100 textile treatment modules (Orenco Systems)
- Four five-hole distribution boxes (TUF-TITE)
- 204 existing 6-foot-long high-capacity chambers in Zone 1 (Infiltrator Water Technologies)
- 250 4-foot-long Quick4 high-capacity chambers in Zone 2 (Infiltrator Water Technologies)
- TCOM remote telemetry control panel (Orenco Systems).

## System operation

Liquid from the kitchen grease interceptor discharges 100 feet through a 4-inch line to the dose/recirculation tank. Wastewater from the first two buildings flows through a 6-inch pipe to the septic tanks, then through the 4-inch mainline 250 feet down a hill to the D/R tank. Wastewater from the third building flows through a 4-inch pipe to the existing 4,000-gallon tank, then to the D/R tank. All piping is Schedule 40 PVC.

Each on-demand 3/4 hp pump in the D/R tank sends 1,000 gallons at 50 gpm to a dedicated treatment module. The aboveground units sit higher than the tank and parallel to it. A gravity-flow collections system at the bottom of the modules returns polished water through a 4-inch pipe to the D/R tank.

From the tank, water gravity flows 18 inches through a 4-inch pipe to a manifold enclosed in a 24-inch riser. Two 4-inch lines send 2,940 gpd to Zone 1, and three lines send 4,685 gpd to Zone 2. Spaced 60 feet apart, both zones have 100-foot-long trenches. Zone 1 has 12 trenches of 17 chambers, and Zone 2 has 10 trenches of 25 chambers.

**"This was our largest installation to date.**

Besides the breadth of the work for a small company, the monsoon season threatened to wash us out."

**Zak Long**



## System Profile

- Location:** Hereford, Arizona
- Facility served:** Assisted living facility
- Designer:** Dawn Long, American Septic Service, Sierra Vista, Arizona; Peter Livingston, P.E., Bosque Engineering, Atascadero, California
- Installer:** Zak Long, American Septic Service, Sierra Vista, Arizona; Jared Struse, Sierra Vista Plumbing
- System repair:** Gravity-flow system with pretreatment
- Hydraulic capacity:** 7,625 gpd



## SYSTEM PROFILE

### Drainfield installation

The first week, Zak Long, Alex Mills, his helper and Jared Struse, owner of Sierra Vista Plumbing, laid out the drainfield and distribution boxes, then Long used a rented Caterpillar 315FL excavator to dig the trenches for delivery lines, recirculation lines and manifold connections. They bedded all piping and system components on compacted pea gravel.

Rocks and tight setbacks made excavating difficult. “The field was 5 feet from a property line, and the trench for the 6-inch line and first distribution box were 12 inches from the southeast corner of the lower parking lot,” Long says.

As Long dug the 3-by-4.5-foot-deep trenches 10 feet on center, he checked their elevations with a GRL 250 HV self-leveling rotary laser (Robert Bosch Tool). Mills installed the chambers and an inspection port at the end of each trench.

Long also operated a rented Caterpillar 924 wheel loader to sift excavated material through a Grizzly rock screen separator to produce topsoil. He needed 6 to 12 inches to cover the trenches, then backfilled them to grade with native soil. The work took a week. Minutes after they finished, a downpour drenched the area.



▲ Foreman Zak Long of American Septic Service and Jared Struse, owner of Sierra Vista Plumbing, assemble plumbing for the recirculating valve and Biotube pump package (Orenco Systems). Both wear Chill Pad cooling towels to work in temperatures above 100 degrees F.

➤ Plumbing for the recirculating valve and Biotube pump package (Orenco Systems) in the dose/recirculation tank.



### Tank installation

To ensure the facility’s uninterrupted sanitary service for a week, Struse bypassed the homemade tank. Long exposed the 6-inch line from the buildings and dug a hole for a 100-gallon sewage basin with 1/2 hp grinder pump (Zoeller). Struse severed the pipe, allowing wastewater to drain into the basin. From the basin, he ran a 2-inch line 75 feet through the upper parking lot and spliced it into the 4-inch mainline.

“We joined the bypass sections with rubber couplings, enabling us to lift or move the line whenever machinery and traffic came or went,” Struse says. “The motion loosened the couplings and rocks fell on the pipe each time a load of spoil material left. We repaired the line a lot.”



**“Only metal plates covered the boxes, and everything from bees to kangaroo rats had nested in them.”**

**Jared Struse**

Long then exposed the homemade septic tank, enabling Tom Van Wart, owner of A-1 Pumping, to clean it. Decommissioning the tank produced 144 tons of spoil that Joshua Flores, owner of J&D Roll Off and Hauling, disposed of in 12 trips over two days.

Flores then trucked in 176 tons of pea gravel, 47 tons of aggregate base course, 178 tons of clean fill and 20 tons of decorative rock at 12 tons per trip. He stockpiled the material on the lower, unused parking lot.

Meanwhile, Struse’s sons, Jesse and Jake, filled 100 sandbags to secure the safety fencing around the site and delay monsoon runoff from reaching the excavation. “HOOK Crane Service in Tucson planned to set the 4,000-gallon tank on Friday, but a large storm was predicted that morning,” Long says. “It had the potential to destroy our hole.”

He rescheduled the delivery for Thursday, but the tank arrived without the inlet penetration. Minutes after setting the tank, rain fell in torrents for five hours. While Struse and Long drilled the 6-inch inlet and connected the delivery line, Mills returned to the shop for 30 feet of 4-inch pipe and couplings. With them, Struse temporarily connected the tank to the mainline, eliminating the bypass system.

◀◀ Foreman Zak Long of American Septic Service uses a Caterpillar 461F2 backhoe loader to unload a 2,000-pound AdvanTex AX100 module (Orenco Systems).





▲ The vent fan assembly for the AdvanTex AX100 modules (Orenco Systems).

After setting the second septic tank on Monday, Struse plumbed them both to the mainline. Long backfilled the tanks one-quarter of the way up with pea gravel followed by ABC to cover and topsoil to grade. The second and third layers were soaked with a hose and settled by frequent rains.

### Easiest phase

Installing the treatment modules was straightforward. Long built a pea gravel pad and set them on it. "The only thing different was enlarging the two holes in the D/R tank lid for the Orenco Systems risers with recirculating valves and Biotubes," he says. The tank was directly below the pad.

To avoid damaging the maze of piping, Mills and Dawn Long shoveled sand over the lines. Zak Long then added topsoil, bringing the total depth to 3.5 feet. Although the area is secluded, Dawn Long ordered five boulders placed around the pad to protect the modules from collisions.

Before leaving, Struse jetted the existing distribution boxes using a trailer-mounted 55VL hydro vacuum cleaner (Ring-O-Matic). "Only metal plates covered the boxes, and everything from bees to kangaroo rats had nested in them," Struse says. He also jetted the 6-inch line to ensure no debris remained from the grinder pump.

### Maintenance

American Septic Service holds the maintenance contract. □

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# Florida Legislature Revisits Onsite Inspection Requirement

By David Steinkraus

A new state Legislature is in office in Florida, and one of the early bills introduced in Tallahassee would establish inspection standards for onsite wastewater systems.

HB 85 came from Rep. Will Robinson, R-Bradenton, who says one of his campaign issues was solving the problem of the Indian River Lagoon. The lagoon is formed by the Indian River where it runs between the mainland and barrier islands on the state's eastern shore. It stretches about 100 miles from about Orlando south to near Miami, and it has been plagued by algae blooms in part attributed to untreated wastewater from onsite systems.

"I heard about nothing else more than red tide during the course of my campaign," Robinson tells *Florida Politics*. "Even at my victory party, a supporter said to me, 'Will, do something. Big or small, do something about red tide.'"

Robinson's bill would require the state Health Department to identify all onsite systems in the state and compile that information in a database. Beginning in 2022, the bill would require onsite systems to be inspected at least every five years unless the system is covered by an operating permit.

A companion bill in the state Senate (SB 214) has already picked up an endorsement from the *Naples Daily News*. The newspaper writes such rules are a necessary step in the struggle to improve the state's water quality. And while there are numerous causes of water pollution, the paper writes, "It's unreasonable to assume that septic tanks aren't part of the problem as well."

The bill contains a couple of surprises, says Roxanne Groover, executive director of the Florida Onsite Wastewater Association.

One is the existence of that companion bill in the Senate. It's unusual to have bills moving simultaneously in both houses of the Legislature, she says. This may indicate that the thinking of legislators has moved beyond where it was a couple of years ago when a similar bill failed to pass.

In the meantime, Florida news has been full of stories about algae blooms and red tides, and that may have built public demand for action. The danger with HB 85 is that people will heap too many expectations on it, Groover says. Lawmakers think requiring maintenance will take care of the blue-green algae blooms and the red tide, she says. Everyone agrees maintenance is good, she says, but "everyone knows from the science of nitrogen reduction that it's hard to find what causes red tides. This (bill) is not the silver bullet."

Groover says that while the state Health Department would be required to compile information about onsite systems, it could do so only from existing information such as plans on record. The bill expressly forbids department staff from making a site visit.

A possible obstacle to HB 85 is in the history Groover mentioned. Two years ago, a bill was introduced that would have mandated onsite system

inspections when a property is sold. The bill didn't make it in the face of complaints from the real-estate industry, which worried that inspections could slow home sales and burden homeowners with unanticipated costs. Required inspections were dropped in favor of a form telling buyers that systems should be inspected every three to five years. The watered-down bill passed the House 117-2, but it died in a Senate committee.

## South Dakota

A petition questioning the ability of municipalities to regulate onsite systems will be withdrawn, says a new majority of the West Dakota Water Development District. Early this year, the board voted 6-3 to end its petition to the State Water Management Board.

Last summer, the former district board voted to ask the state board whether onsite systems installed before 1975 are subject to local regulations. Later the district board voted to spend up to \$7,500 for a lawyer to advocate for the petition before the state board. The money and petition aided former Pennington County Commissioner George Ferebee who has spent years opposing local regulation of onsite systems. He got into legal trouble with the county over his own system.

Many members of the public were outraged at the district water board's use of taxpayer dollars in this way, and in the fall election they replaced three members of the board with people who opposed the petition and the expenditure.

## Massachusetts

The health board for the town of Westport is debating whether to require homeowners to spend money on denitrifying onsite systems. The board has been asked to consider such a regulation as part of continuing work to reduce nitrogen pollution in the east branch of the Westport River.

At a December meeting, opinion was split on when and whether the board should take action. Chairman William Harkins suggested stormwater runoff may be a larger problem than onsite systems. Some town officials say action should wait until the results of a \$180,000 study are in. The board's vice chairman Maury May says homes in more affluent areas should be required to install denitrifying systems, but not homes whose owners are financially stretched, reports *The Herald News* of New Bedford.

Westport is located on the south coast of Massachusetts and borders Rhode Island.

## New Jersey

Gov. Phil Murphy is dropping a proposed rule that would have allowed

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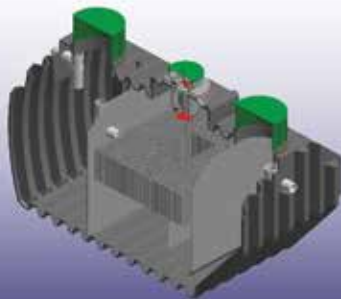
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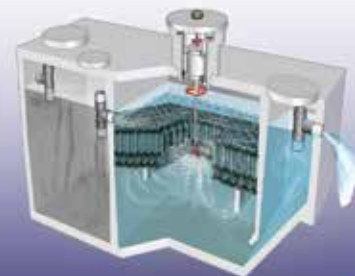
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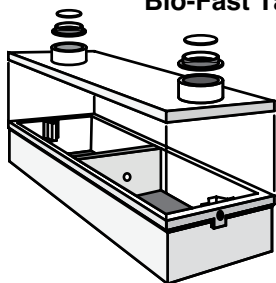
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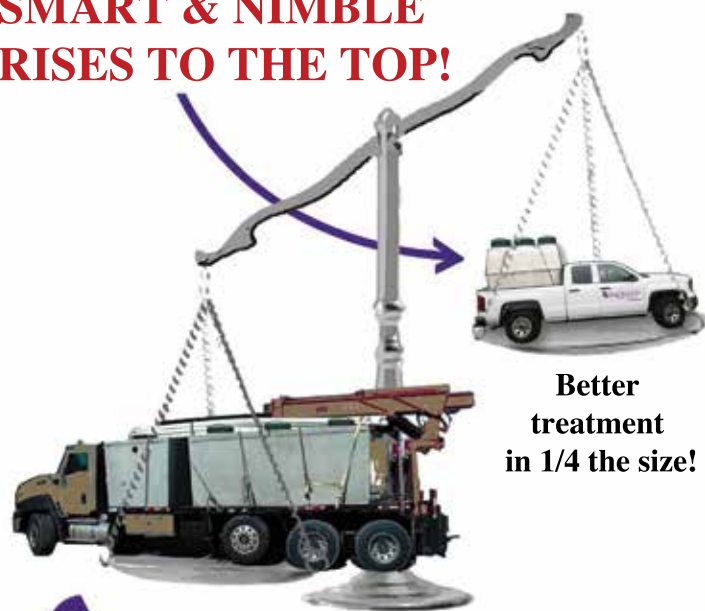


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more development in the Highlands region by increasing the density of onsite systems. This region of northern New Jersey is the source of drinking water for Newark and Jersey City, among other areas.

Former Gov. Chris Christie proposed the rule to allow one onsite system per 25 acres of forested land instead of the one system for each 88 acres allowed under a 2004 law. That law, the Highlands Act, was applauded by conservationists but opposed by people who say it unfairly reduced the value of their property.

The Christie rule was already in jeopardy when Murphy killed it. In a rare use of their constitutional power, the state Senate and Assembly voted in January 2018 to invalidate the Christie rule, saying it violated the intent of the Highlands Act.

Yet the standard may still change. Some lawmakers say the 2004 density rule retards growth of the Highlands' economy. The state Department of Environmental Protection says it would re-evaluate the evidence compiled by the Christie administration and consider what onsite density standard is appropriate.

## New York

East Hampton Village is considering a code amendment that would require advanced onsite systems for new homes and large home expansions. The proposal follows actions by other communities in Suffolk County, and the county itself, that require denitrifying systems.

Suffolk County, which occupies the eastern end of Long Island and includes the wealthy Hamptons communities, has thousands of homes that use cesspools for onsite treatment. Laws to require advanced onsite systems are intended to help solve water-quality problems along the county's shore.

At a working meeting, former Village Administrator Larry Cantwell told the East Hampton board he supports the code amendment, but he said it falls

short because it would allow people to replace existing systems without upgrading to advanced technology systems.

In a related matter, nearby Shelter Island is considering requiring a denitrifying onsite system for any real-estate sale. The island is on the north side of Long Island, while East Hampton is on the south shore. It will be up to the Shelter Island board to decide whether the requirement would apply to all property transfers or only sales, who would be responsible for the cost and whether property owners would have a required time to comply.

## Indiana

Allen County is considering changes to its onsite ordinance that could increase costs for homeowners by several hundred dollars. The county is in northern Indiana and includes the city of Fort Wayne. "A good portion of what we've proposed are clarifications on the intent of the rules," says Health Department Administrator Mindy Waldron, according to *The Journal Gazette*.

She says the department looked at 14 years of data from the county's water management district in compiling its suggested changes. Most of those include best practices used in the industry for 25 years, she says.

There would be a ban on flexible couplings secured to sewer pipes by steel hose clamps unless the connection is to an existing sewer pipe made of a material not compatible with the pipe installed. Onsite systems would require a clean-out for a visual inspection.

"There is, to be honest, potential for some requirements to be several hundred dollars more for certain types of systems, to make sure they have the right type of electrical panel or junction box, those types of things," Waldron says. "But when you amortize that over the life of the system, about 10 to 30 years, a few hundred dollars is a drop in the bucket compared to one sewage backup into your home or the potential for early (system) failure." ■



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# Recognize Septic System Installation and Pumping as Professional Trades

'Implementing an apprenticeship-based system that incorporates hours worked and schooling would be beneficial to the industry's reputation'

Compiled by Betty Dageforde

*In States Snapshot, we visit with a member of a state, provincial or national trade association in the decentralized wastewater industry. This time we learn about a member of the Ontario Onsite Wastewater Association.*



**David White**  
president and owner

**Business:** Ken White Construction, Carp, Ontario

**Age:** 53

**Years in the industry:** Ken White Construction was founded in 1968. We're in our 50th year of business, and I have been working with the company for 35 years.

## Association involvement:

I have been a general member of the Ontario Onsite Wastewater Association since its incorporation in 1998.

## Benefits of belonging to the association:

Firstly, it gives our industry a voice with government agencies. This is something that would be daunting to tackle as individuals, but as members of an association, you are genuinely listened to and heard. It also provides opportunities for continued education, which I think is excellent. It

increases professionalism in the industry as a whole and the expertise of the individuals who partake. As a family-run, small-business owner, I also find the networking opportunities extremely beneficial. You get to meet with and learn from various industry players who you wouldn't come into contact with in your daily operations. Finally, the association also keeps its members up to date on industry news and advancements. This allows me to stay on top of trends and information that may not otherwise have come to my attention. Overall, belonging to the Ontario Onsite Wastewater Association is a great learning experience and opportunity for growth.

## Biggest issue facing your association right now:

New member acquisition is our biggest challenge. I think this is true of membership-based associations as a whole. There are so many benefits to being a member. However, without an inside perspective, it can be hard to fully grasp the value and opportunity. The cost versus benefit analysis may be skewed. I believe the association can address this issue by creating more awareness as to what it means to be a member or by hosting open events to give people a chance to test it out.

## Our crew includes:

Taylor White, sales manager; Valerie Black, office manager; Gabrielle Davis, head of marketing; Corey Lurette, site coordinator; Craig Findlay, truck driver; and equipment operators Phil Wallace, Ken Turcot and Alan Proulx

## Typical day on the job:

My day usually starts at a job site before I head into the office. I make sure I am there early with my crew so I can confirm the expectations, roles and requirements for the task at hand. It is crucial that the entire team is on the same page. This allows us to work efficiently and, most important, keeps everyone safe with clear communication. I then head to the office and take care of my work there. This typically includes emails, quotes, phone calls and meeting with clients regarding future work. To end my day, I head back to the site(s) and make sure everything is proceeding as planned. This helps my team and me prepare for what's to come the following morning.

## The job I'll never forget:

We were asked to do some excavation work for a high-tech business during the high-tech boom. It wasn't until two years later that we finally





◀ In a 1984 photo, David White and his father, company founder Ken White, are working with a Caterpillar D3B bulldozer. (Photos by Taylor White and Gabrielle Davis)

✔ David White and his son Taylor are shown with a 257D2 Caterpillar skid-steer, Western Star tandem dump truck, Volvo tandem dump truck, Komatsu 450 wheel loader, Komatsu 170 excavator and John Deere 450 dozer.



finished all the work that needed to be done. What began as a small excavation job ended up being a full site rebuild. We gained a lot of knowledge through our work with this client. Things happened fast — the work increased with the surge in the client's business. It was a priceless experience that pushed us out of our comfort zone. As a result, that job helped us branch out and take on new types of work.

### **My favorite piece of equipment:**

That would be my 170 Komatsu excavator. We are able to complete a lot of our jobs with this one piece of equipment. This is true for septic systems and a lot of our site jobs. It is versatile and allows us to work more efficiently. It also becomes more cost-effective for us when we don't have to float in multiple pieces of equipment to complete a job.

### **Most challenging site I've worked on:**

A septic tank and treatment system installation where we had to deal with groundwater and 13 feet of peat moss on the site. We had a tight area to work in so we could only use smaller equipment. This restriction required us to excavate our machine to a lower grade in order to reach the required solid ground. At that point, we had to haul in a large amount of granular material and compact to 98 percent proctor. This was to ensure the new septic tank and treatment unit wouldn't experience any settling after installation. It was challenging because of the extra steps required to get the job started. These extra steps were not foreseen and made for a bit of a headache.

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

From time to time we get asked, "Can I pay you next year?" It's comical to me because there are very few services where you would even consider asking such a question. Harmless, of course, but it never fails to surprise me.

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

There's a portion of the design process that calculates the daily flow for residential septic systems. I believe living space should be excluded from these calculations. There are several instances where we see the living space square footage require a septic system be much larger than necessary. If the residents are unable to produce enough waste to meet the minimum sewage and bacteria requirements for the septic system's design, these systems aren't functioning efficiently and create a much greater cost than necessary.

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

My father always said, "Be honest, be reliable and surround yourself with good people. The work will come and you will feel good about the way you live." This advice has stuck with me, and I continue to run the business with these words in mind.

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

Still be involved in the construction industry, probably something heavy equipment-related. Growing up surrounded by the industry has given me a variety of experiences and made me very comfortable. It's what I know. I also really enjoy working with new and different people. You can learn something from everyone you meet. Construction is dynamic and allows me to interact with different people every day.

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

I hope to see the wastewater industry move toward becoming a more recognized, professional trade. For example, I think implementing an apprenticeship-based system that incorporates hours worked and schooling would be beneficial to the industry's reputation. Such a shift would benefit both the customers and industry players because it would be easier to recognize professionals. I do believe the wastewater industry will adopt apprentice-based education eventually. More prominently, I think we will notice the wastewater industry becoming more technology-based and environmentally friendly. These are two trends we are seeing in society as a whole and I believe the industry will follow suit. The most prominent ways we will start to see that will be increased environmentally friendly materials, practices and online remote system monitoring. □

# Large-Scale and Commercial Treatment Systems

By Craig Mandli

## AEROBIC TREATMENT

### Jet Inc. commercial wastewater treatment plant

Commercial wastewater treatment plants from Jet Inc. are modular in design, can treat wastewater flows up to 300,000 gpd and allow for phase build-out. This makes it possible for motels, shopping centers and service stations to be constructed along interstate highways far from any town. Subdivisions can be developed miles beyond sewer lines. Factories can be erected in rural areas. The plants treat wastewater through the aerobic digestion process that enables microscopic living organisms to transform wastewater into a clear, odorless liquid. The company offers assistance with design, engineering and construction, as well as onsite 24/7 tech support, plant startup commissioning and operator training. 800-321-6960; [www.jetincorp.com](http://www.jetincorp.com).



kit includes a control panel, floats, pre-drilled siphon pipe, PVC pipe stands, siphon/sludge pump, aerator and a drainfield pump. It can be used for new construction or retrofitted into existing tanks to renovate biologically failed trenches or sand mounds. It uses a batch process where the treatment steps are done in a timed, sequential manner. The process is energy-efficient since treatment occurs as needed, using intermittent aeration, mixing and settling. It is certified to NSF/ANSI 40 Class I and to NSF/ANSI 245 (nitrogen reduction). Residential and commercial configurations are available. 336-547-9338; [www.anuainternational.com](http://www.anuainternational.com).

### BioMicrobics MicroFAST

MicroFAST wastewater treatment systems or MicroFITT-ee (energy-efficient version) systems from BioMicrobics are integrated into a standard septic tank. With the SFR feature, alternate modes include intermittent operation of the blower to reduce electricity usage up to 45 percent and recirculation of nitrified wastewater to the primary settling chamber for added denitrification. Biosolids treatment and sludge digestion are designed to reduce treatment cost and maintenance. Available in 500- to more than 9,000-gpd configurations, technology scales up for larger residential and commercial flows. A stable treatment process with fully submerged, fixed-film media and the effectiveness of activated sludge treatment help in certain difficult applications and where infrastructure may not be available, according to the maker. The effluent meets secondary quality requirements and can be distributed to a soil treatment system or water reuse applications. Larger MyFAST and MacroFITT configurations can offer up to 2 million-gpd flow. 913-422-0707; [www.biomicrobics.com](http://www.biomicrobics.com).



## ALARM SYSTEM/COMPONENT

### Sump Alarm SludgeBoss Float Switch

The SludgeBoss Float Switch from Sump Alarm is self-orienting and mercury-free. It can hang freely into a septic tank (or be tethered) and will orient automatically when the water level rises. It is rated up to 250-volt operations at up to 13 amps or 1/2 hp. It is suitable for 20 degrees below zero to 140 degree F conditions and is offered in piggyback and wire lead versions. 314-787-8059; [www.sumpalarm.com](http://www.sumpalarm.com).



## ADVANCED TREATMENT UNITS

### Anua PuraSys sequencing batch reactor

The Anua PuraSys sequencing batch reactor ships in a boxed kit that can be installed in hours in any standard septic tank, requiring no additional space. The



### Clarus Environmental Fusion



Clarus Environmental's Fusion treatment 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 CBOD<sub>5</sub> 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](http://www.clarusenvironmental.com).



## NextGen Septic Community Septic Systems

NextGen Septic Community Septic Systems are advanced multihome sewage treatment systems, hybrids between a packaged treatment plant and an advanced septic system. The system design eliminates the need for large septic tanks in each yard, creates a stand-alone treatment system that removes traditional contaminants, plus nitrates and phosphorus, and provides graywater irrigation usable for community green space. The system has small collection tanks located throughout the neighborhood, which collect sewage and wastewater from each house. From these tanks, a system of local vacuum sewer lines and secondary collection tanks transmits the sewage to the treatment system. The system uses Septigen technology, a multi-stage treatment process including simultaneous aerobic and anoxic treatment, high-capacity aeration, membrane separation and disinfection. The system pumps the treated water into soil leach lines or a holding area, which can be used for irrigation. 513-673-3583; [www.nextgenseptic.com](http://www.nextgenseptic.com).



## COMMERCIAL TREATMENT SYSTEM

### Orenco Systems AdvanTex AX-Max

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



## CONTROL PANEL

### SJE-Rhombus Model 32S

The Model 32S control panel from SJE-Rhombus is designed to alternately control two three-phase pumps in industrial and commercial water and sewage systems using the DPC-4F Pump Control Four Float Controller for pump sequence, alternation, selection, lag pump



delay time and alarm. If a high-water alarm condition occurs, the high-water alarm float activates the audible/visual alarm system along with auxiliary contacts for remote alarm. Common applications include lift stations and pump chambers. Models are available with an intrinsically safe relay for circuit extension into hazardous locations. It is UL/cUL listed. 888-342-5753; [www.sjerhombus.com](http://www.sjerhombus.com).

## DRAINFIELD MEDIA/COMPONENTS

### Eljen GSF

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. Utilizing a two-stage pre-treatment 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, according to the maker. The system is tested and certified by NSF to NSF/ANSI Standard 40. 800-444-1359; [www.eljen.com](http://www.eljen.com).



### Infiltrator Water Technologies EZflow

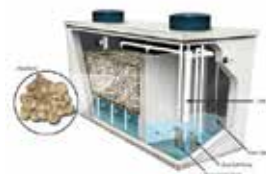
The EZflow septic system from Infiltrator Water Technologies is an environmentally friendly replacement to traditional stone and pipe drainfields. The lightweight, easy-to-transport and quick-to-install engineered geosynthetic aggregate modular units improve drainfield performance by eliminating the fines and reducing compaction and embedment associated with stone, according to the maker. Preamsembled units include a 3- or 4-inch perforated pipe surrounded by aggregate held in place with durable, high-strength netting. Engineered flow-channels increase void space, creating improved water flow and greater storage. They are available in a range of easy-to-contour bundle configurations and diameters including 5- and 10-foot lengths and diameters of 7, 8, 9, 10, 12, 13 or 14 inches with simple snap internal couplers. The system is suitable for shallow applications, septic system repairs, and constricted or sloping sites. Frequently specified for commercial, community or cluster systems, additional applications include use with aerobic treatment units and in serial distribution, at-grade and pressure distribution systems. 800-221-4436; [www.infiltratorwater.com](http://www.infiltratorwater.com).



## NITROGEN-REDUCTION SYSTEM

### Eliminite Commercial C-Series

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



### SeptiTech STAAR

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



## PUMPS

### Ashland Pump AGP-HC200

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



### Delta Treatment Systems ECOFILTER Pump Vault

Filter media in the ECOFILTER Pump Vault from Delta Treatment Systems reduces biological loading and clogging, prolonging the life of downstream drainfields and other treatment systems. Quick to install in new or existing tanks, it is a completely integrated system for pumping effluent from single- or double-compartment tanks. It draws effluent from the clarified zone of the tank to minimize suspended solids passing through the pump system.

The easy-access design maximizes the filter surface area and simplifies filter inspection and maintenance by enabling filter cartridge removal without pulling the pump or vault, according to the manufacturer. Featuring a dual-compartment housing for simplex or duplex applications, the unit is constructed of high-density polyethylene with UV inhibitors for longevity. The float stem bracket allows easy removal and adjustment of the float assembly. The unit is customizable for any project need, including septic tank effluent pump collection systems. 800-219-9183; [www.deltatreatment.com](http://www.deltatreatment.com).

### Polylok PL-PS40

The PL-PS40 prepackaged basin assembly from Polylok comes ready to assemble. It is made of high-density polyethylene and is lightweight and compact. To install, glue three pieces of PVC and connect the inlet and outlet pipes, and then provide power. The design allows for an adapter ring to add up to 24 inches of risers. The basin assembly is easy to access and disconnect for servicing. It includes a 24-by-40-inch basin, 24-inch heavy-duty cover, 0.4 hp effluent pump with a piggy-back float for automatic on/off operation, indoor/outdoor audible and visual alarm with float, internal piping system (2-inch PVC piping and a gate, check and union all in one valve assembly), three grommets, a 4-inch inlet, 2-inch discharge, a 1 1/2-inch inlet for electrical, and a junction box with three watertight connectors. 877-765-9565; [www.polylok.com](http://www.polylok.com).



### Sim/Tech Filter STF-100A2

The STF-100A2 pressure filter from Sim/Tech Filter helps maintain proper and efficient year-round operation of mounds, sand filters and other pressurized distribution systems. The low-headloss (0.21 psi) pressure filter mounts on the discharge side of an effluent pump, acting as a last line of defense to prevent plugged holes and reduce effluent TSS. This mounting location also extends the time between servicing. The vortex action created by the pump scrubs the screen and the backflow through the filter after the pump shuts off, washing debris out. A single 2-inch filter can handle flow rates up to 83.8 gpm. It can be designed to handle almost any flow rate or load. Larger 3- and 4-inch filters are available. The standard screen filters to 1/16-inch, and optional socks allow for additional filtration to 0.024, 0.007 or 0.004 inch. 888-999-3290; [www.simtechfilter.com](http://www.simtechfilter.com).





## UV DISINFECTION EQUIPMENT

### Norweco Model AT 1500

The Norweco Model AT 1500 UV disinfection system helps reduce bacteria levels from secondary effluent to achieve strict water-quality standards. Compact design and rigid construction minimize the required excavation for quick and easy installation, according to the maker. It is equipped with an internal current-sensing circuit that continuously monitors the performance of the UV lamp. This self-diagnostic feature is designed to protect the disinfection process from disruptions and maintains treatment quality. 800-667-9326; [www.norweco.com](http://www.norweco.com).



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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, according to the maker. 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](http://www.salcor.world). □



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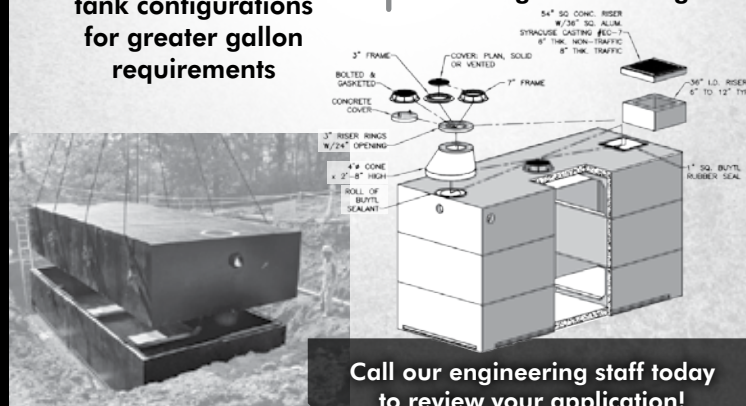
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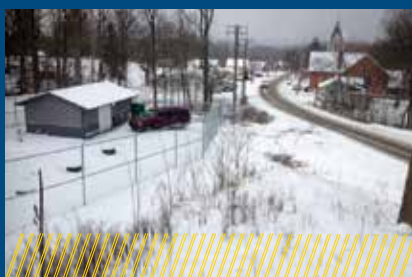
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# Large-Scale and Commercial Treatment Systems

By Craig Mandli

## Sequencing batch reactor solves village's failing septic system problem

**Problem:** The village of Mifflin is a small community located in Ashland County, Ohio, upstream of Charles Mill Lake. The village's home septic treatment systems were failing and causing water-quality problems in nearby waterways leading into the lake. As part of Ohio Environmental Protection Agency nutrient reduction efforts, a new wastewater treatment collection and treatment system was needed.



**Solution:** The village hired an engineer who designed a gravity collections system with a lift station. The engineer evaluated several treatment options, eventually selecting a **Sabre** sequencing batch reactor from **Earthtek Environmental**. The system is designed to provide excellent effluent quality and is simple to operate. The plant also used buried fiberglass tanks, which are out of sight and minimize odors. This was a concern as the plant is located on the village's main road and surrounded by homes. The plant included a buried 30,000-gallon, 10-foot-diameter, two-compartment primary treatment tank, a buried 30,000-gallon, 10-foot-diameter SBR tank for secondary treatment, mechanical tertiary filtration, ultraviolet disinfection, effluent flow monitoring and post aeration. Controls included a PLC with touch-screen operator interface, remote control and monitoring capability via the internet, and was installed inside a small building constructed on the site.

**Result:** The treated effluent has met the regulatory discharge permit limits of 10 mg/L BOD, 12 mg/L TSS, 1 mg/L ammonia and 126 colonies/100 ml *E. coli* since the startup period. 812-528-8784; [www.packageplants.com](http://www.packageplants.com).

## Unit provides solution for convenience store chain

**Problem:** A mid-Atlantic convenience store chain had drainfield failure at close to all of its stores being served by onsite systems. Since initial permitting, they went from a traditional grab-and-go that offered handmade sandwiches to a full food service menu, introduced a line of 12 coffee decanters (that must be dumped every 4 hours), baking in-store bread, making smoothies, soft serve ice cream, milkshakes, all while disposing of substantially more disposable wipes, installing low-flow fixtures and moving from chlorine to quaternary ammonium for disinfection. The client was unwilling to change standard operating practices for stores with onsite systems, so the client needed systems to meet the needs.



**Solution:** **Hoot Systems** collaborated with the maintenance providers and engineers on developing modifications to dosing times of the equalization tank, automating the aeration system to vary carbon dioxide delivery based on wastewater strength and calibrating cycle times to ensure proper retention intervals in each stage of the treatment process. In addition, they stabilized alkalinity using pH boosters, added specific chemicals to the neutralize disinfectants and used carbon for the completion of the nitrogen-reduction cycle.

**Result:** With the redesign and operational modifications, Hoot Systems and the collaboration team brought these decentralized wastewater systems into compliance without changing the owner's day-to-day standard operating procedures. 888-878-4668; [www.hootsystems.com](http://www.hootsystems.com).

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## Treatment system effective against FOG

**Problem:** The historic Cottage Hotel in Mendon, New York, has been a popular spot since its opening in 1822. The 1/3-acre parcel presents major challenges for a septic system. Space at the site is mostly limited to the footprint of the buildings and parking. Wastewater is treated



and discharged into a nearby stream. Pretreatment had historically been accomplished through an aerobic treatment unit with polishing through a single-pass sand filter. Although the ATU and sand filter are good treatment technologies, fats, oils and greases generated from the kitchen waste were too much for the system to handle, causing the sand filter to clog routinely.

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

**Result:** The system installed in 2017 has been working well. 800-560-2454; [www.knighttreatment.com](http://www.knighttreatment.com).

## Passive treatment unit used to replace failed system

**Problem:** A failed sand filter overboard discharge system on a shoreline needed to be replaced in Southport, Maine.



**Solution:** With the suggestion of the installer, the site evaluator decided on placing **EnviroFin** onsite treatment system from **Presby Environmental Inc. (PEI)** in the same location as the previous sand filter system, as the sand was of the quality needed for the EnviroFin system. The treatment system is 100 percent passive and treats the effluent better than NSF Standard 40 standards. The installation includes two EnviroFin units at 270 gpd.

**Result:** The customer has the benefits of a treatment system without the large expense, maintenance contracts or electricity. 800-473-5298; [www.presbyeco.com](http://www.presbyeco.com). □



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## PRODUCT NEWS



### Felling Trailers IT-I Series trailers

Felling Trailers IT-I Series has a refined design incorporating additional standard features, structural strength and ease of operator use. The new IT-I design will be seen on Felling Trailers' 2020 model year IT-I tilt trailers. Advanced standard specifications include a redesigned hitch area with a more user-friendly, integrated nose plate; additional structural integrity for cylinder crossmembers; dual stop, turn and taillights located on the rear of the fenders that have been incorporated into the standard design; D-rings that were once located on the topside rail behind the fender on the rear of the tilt deck that are now located on the side of the trailer bed; and an operator-friendly tilt-deck latch design. 800-245-2809; [www.felling.com](http://www.felling.com). □

## INDUSTRY NEWS



### SJE opens new facility in Ohio

SJE opened a new 51,000-square-foot facility in Ashland, Ohio. About 60 employees work at the facility designed with both time and energy efficiency in mind. It replaces the company's older, multilevel building.



### Hoot Systems welcomes new sales director

Hoot Systems announced that Mike Catanzaro was named sales director and has joined its residential and commercial wastewater team. He has more than 25 years' experience in the commercial and residential decentralized wastewater markets and holds four wastewater-related patents. He is a member of both the Water Environment Foundation and National Onsite Wastewater Recycling Association. □



Mike Catanzaro

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