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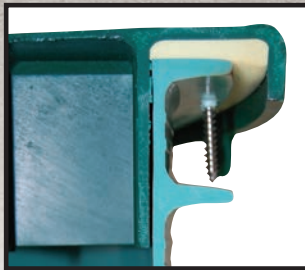
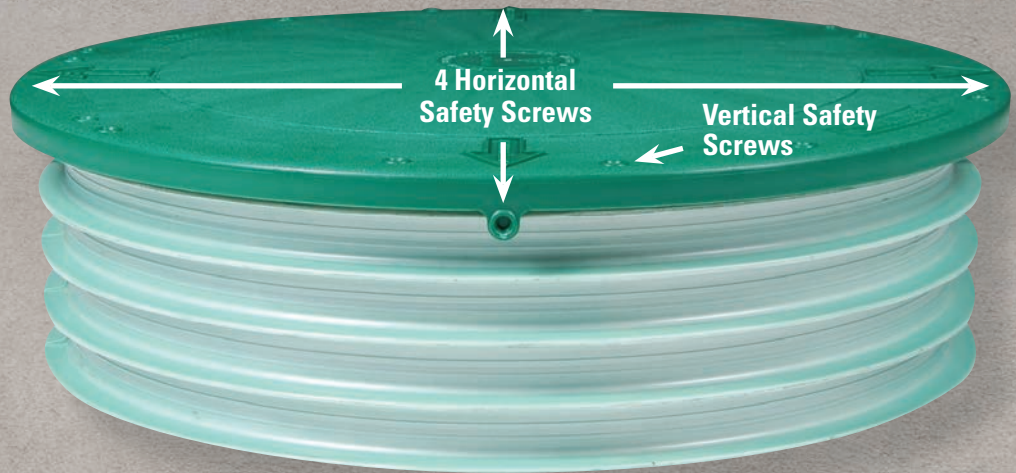
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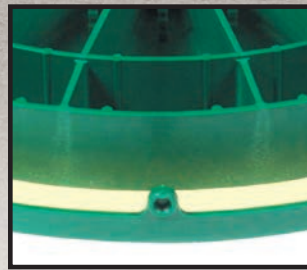
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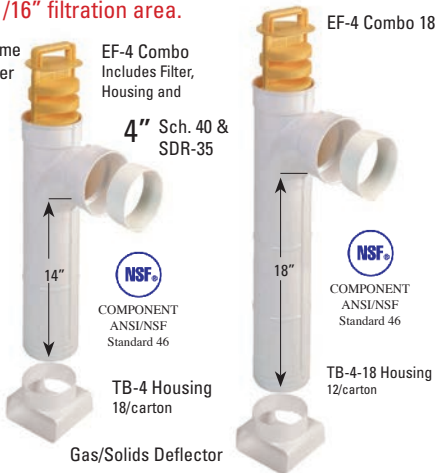


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### INSTALLER PROFILE:

**Fantastic Fixes** By Ted J. Rulseh

### ON THE COVER:

The crew at Legacy Septic & Excavation enjoys making a difference for customers and the environment when completing tough onsite system repair jobs around their Westminster, Maryland, home. Owner George Schooley is shown with a John Deere backhoe in the company yard. (Photo by Jenny Walsh)

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Be sure to check out our exclusive online content.

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# One Girl's Battle to End Straight Pipe Sewage Dumping

The story of Stella Bowles and her work to upgrade wastewater systems along a Nova Scotia river should inspire our industry

**W**ith kids like Stella Bowles on the case, the future of the onsite industry will be in very good hands. This one-girl environmental wrecking crew is single-handedly pushing Nova Scotia provincial officials to eliminate illegal straight pipes that dump waste directly into waterways including the LaHave River where she lives.



▲ Stella Bowles, 13, is shown along the LaHave River with her water-testing equipment. (Photos courtesy of Stella Bowles)

At age 13, Stella has twice won Nova Scotia's science fair for her age group and just represented the province at a Canada-wide science fair in Regina, Saskatchewan. She's started a water quality monitoring program from her front yard on the LaHave River and the results of her fecal bacteria testing have caught the attention of local and regional government officials, going all the way up to Canada's prime minister, Justin Trudeau.

## WHEN THEIR SYSTEM FAILED

After reading about Stella's efforts recently, I had to give a call to the plucky teen to find out how she became so interested in the state of decentralized wastewater. On the phone from their home on the river, Stella and her mom, Andrea Conrad, explained that her passion for clean water started with the family's septic system.

When their leachfield failed a few years ago, a septic designer explained how the family would have to replace the very old septic system. Now that their system was reported as failed, they would have three months to replace it. But, the way things go, there was nobody to check if they installed the new system and, by the way, neighbors were continuing to use straight pipes to convey waste directly in the river, which has been illegal since 1974.

Andrea was mystified that anyone would knowingly continue to send pollution into the river. The family hired an installer for the new system right away, borrowing money to pay for it.

"It's part of being a responsible homeowner," Andrea explained. "I could never live in a house where I was flushing my toilet into the river. I'm living in a house my grandfather built 70 years ago and when he put in a bathroom, he installed a septic system."

Grandpa was a commercial fisherman and he understood that clean water was necessary for his business to flourish.

The new septic system was installed and working fine, but Stella never forgot listening in on the conversation with the engineer talking about the straight pipes. She was deeply troubled with the image of homeowners, in essence, relieving themselves directly into the river.

## FIGHT THE PIPES

"I was really disgusted. It blew my mind that people could actually put their sewage in the river," she recalled. She thought about how kids could no longer swim in the river and pets that drank from it became sick. She was determined to do something about the straight pipes and set off to work.

Stella started sampling water up and down the river for fecal bacteria



A sign on the dock at Stella Bowles' home warns of unsafe water.

"I'm going to keep going until the straight pipes are gone. I definitely want to be able to swim in the river. **Hopefully it will be clean enough by the time I have children, because it's a beautiful spot.**"

**Stella Bowles**

levels, setting up a lab in her basement and publishing findings and other information on her science project website, [earlgrey5.wixsite.com/stellab/more-testing](http://earlgrey5.wixsite.com/stellab/more-testing). The results showed that at many times and in many locations the water in the river is not safe for swimming or even touching.

Long-term testing by Bluenose Coastal Action Foundation has backed up Stella's testing results. The group has been monitoring the river for a decade, and reports that the waterway often exceeds Health Canada guidelines for recreational water quality, causing substantial health risks with swimming in the water.

Stella has given many presentations to government, environmental and student groups. She has become something of a media celebrity in Canada, giving interviews about her ongoing project. Her mom laughed about Stella spending spring break from school this year touring a wastewater treatment plant.

Stella was even introduced to Prime Minister Trudeau and had a short chat with him about the environment. "I gave him a card with my information. It was pretty cool and I'd love to sit down and talk with him," said the unintimidated young lady.

## A LONG ROAD

There are an estimated 600 straight pipes dumping into the LaHave River in the local stretch where Stella lives. This part of the river that empties into the ocean is well populated with residential and commercial lots, with about 300 feet of frontage and the area served mainly by decentralized wastewater systems as opposed to municipal sewers. Stella reports that she can sometimes smell the human waste at low tide and has found used toilet paper during her testing.

She is advocating for the provincial government to close loopholes that allow straight pipes to continue to flow. She's asked legislators to force upgrades to approved septic systems when properties are sold.

Local officials are on board, and a grant and loan program has been approved to help homeowners pay for the upgrades. But the provincial government is needed for enforcement and officials have yet to get on board. A letter to Stella from Nova Scotia Environment said legislation to eliminate

straight pipes "was not supported due to the potential impact on the sale of properties."

Stella countered that the Nova Scotia Association of Realtors gave her an award for her work. "They want a cleaner environment and good working septic systems for the houses they sell. I think home prices will go up if the water is cleaner," she replied.

A homeowner, Wayne Mulock, speaks about the plight of the LaHave River in a video on Stella's webpage, echoing her message. "We've come so far in regards to advancements in the environment that I feel today the technology is such that there is no reason we should be polluting the river and expecting people to swim in fecal bacteria," he said.

Stella and some of her enlightened neighbors understand the important role onsite installers can play in cleaning up their river. They know our industry has the tools to make their waterways safe again for recreational activity, and they are frustrated that the solution to this wastewater crisis is within their grasp, but still eludes them.

## BRIGHT FUTURE

Stella's story should give us all great hope for the future. Her hard work — combined with the efforts of scientists, environmentalists and onsite industry leaders — will eventually tip the scales and force the dismantling of straight pipes on the LaHave and other threatened waterways.

More good news is that Stella is hoping to pursue a career in science, and maybe politics. I put in a plug for the wastewater industry, knowing it will remain instrumental in improving the environment and smart development of our land for many years to come. For now, she remains focused on the problem in her own backyard.

"I'm going to keep going until the straight pipes are gone," Stella said. "I definitely want to be able to swim in the river. Hopefully it will be clean enough by the time I have children, because it's a beautiful spot." ▣

Send your comments, questions or opinions to Jim Kneiszel at [editor@onsiteinstaller.com](mailto:editor@onsiteinstaller.com).

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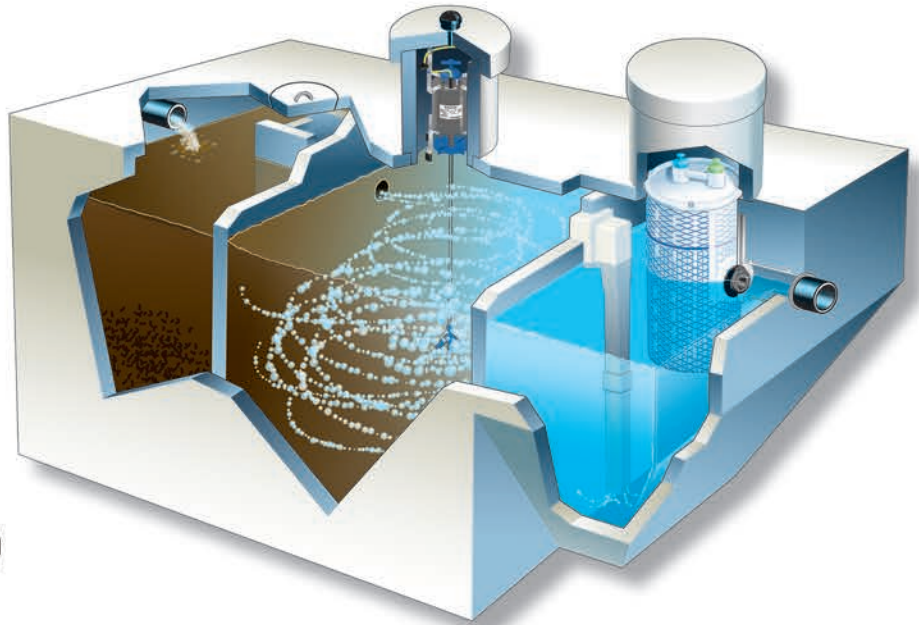
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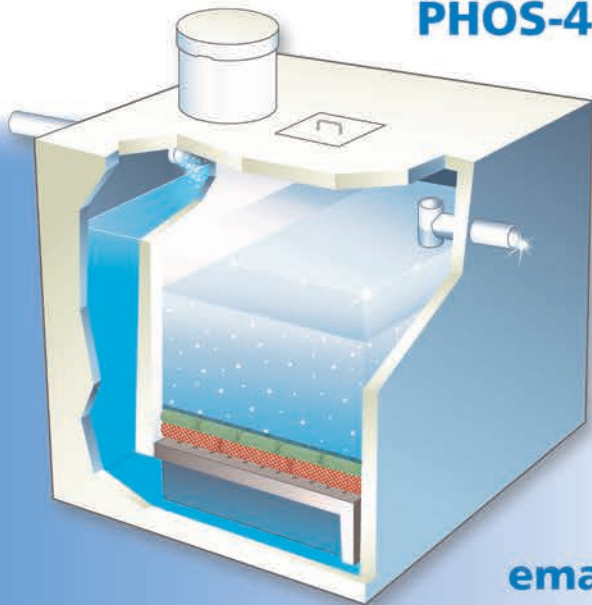
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# FANTASTIC FIXES

George Schooley loves the challenge of repairing and replacing troubled treatment systems on sites with cramped spaces and difficult soils and terrain

By Ted J. Rulseh

**A** mountain home needed a replacement onsite treatment system. There was just one problem: The property around the house was largely solid rock, and the only available drainfield sites were at 100 feet higher elevation.

That didn't stop George Schooley and his team at Legacy Septic & Excavation. They managed to dig a trench, run a pipe up the mountain, and install a pump big enough to deliver the septic tank effluent to the drainfield.

Tough system repairs (well, not all quite *that* tough) are the specialty of Legacy Septic, based in Westminster, Maryland. The company does installations for new homes and small businesses, but Schooley much prefers devising fixes on sites with tight spaces, tricky soils, difficult terrain and other obstacles.

◀◀ The Legacy Septic crew includes, from left, Steve Hannon, Ernesto Sanchez Fernando, George Schooley, Craig Peeling and Isidoro Benitez Coyal. (James Robinson photo)

“New construction is not a challenge at all,” says Schooley, who runs this business with his wife, Jenny Walsh, accounting and marketing director. “It’s all been laid out for you. It’s all on paper. The repair work is what I love doing. Anything that’s challenging, where somebody says it can’t be done, we can do it.”

The company also operates a thriving septic tank pumping business and goes to market with an array of promotions that include online presence, community education seminars, and visible support for multiple community organizations serving youth.

### FAMILY LEGACY

The roots of Legacy Septic go back to 1963. Schooley’s father, George Sr., started in business as a house painter in Loudon County, Virginia, and later took to building homes. In time he bought equipment to dig foundations and prepare driveways and roads.

“When I was about 13, he hired a guy to install septic systems,” Schooley says. “I looked up to him, and anytime I could, on weekends and after school, I helped him install the septic systems, and water and sewer lines.” By age 17, Schooley was supervising a crew.

Several years later, after attending night school and nearly finishing a degree in electrical and mechanical engineering at Montgomery Community College, he left the family business and went to work for an HVAC contractor.

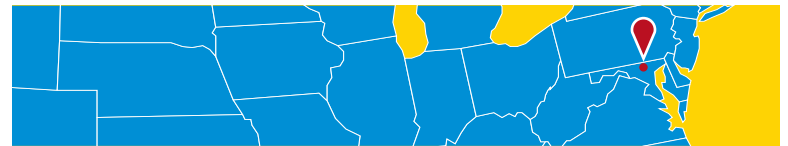
He rose through the ranks to chief engineer and project manager, working on large and complex projects in commercial facilities. Along the way, in the late 1980s, he met his wife, who was managing a million-square-foot commercial office space in Rockville, Maryland, for one of the nation’s largest property management firms.

After his father died from cancer in 2001, Schooley, along with Walsh, came back to the family business. At first they continued with a diverse construction and excavating business, but they gradually refined the focus, and by 2013 were in the onsite business exclusively, having started the pumping service in that year.

“I learned the onsite business at a young age, and I always liked to design and install,” Schooley says. “It isn’t like digging a basement, putting in a road or grading a yard. It’s parts and pieces that you put together, and you’re helping the environment. I love being able to help people who have failing systems.”



▲ George Schooley, left, reviews onsite system plans with technician Ernesto Sanchez Fernando. (Jenny Walsh photo)



## Legacy Septic & Excavation

- Location:** Westminster, Maryland
- Founded:** 1963
- Owners:** George Schooley and Jenny Walsh
- Employees:** Seven
- Service area:** 45-mile radius
- Specialty:** Onsite system installation, repair, pumping, inspection
- Business mix:** 80 percent residential, 20 percent commercial
- Annual revenue:** \$900,000
- Affiliations:** Maryland Onsite Wastewater Professionals Association (board member)
- Website:** [www.legacyseptic.com](http://www.legacyseptic.com)



Ernesto Sanchez Fernando operates the excavator, while Isidoro Benitez Coyol looks on during a system installation. (James Robinson photo)

“New construction is not a challenge at all. ... The repair work is what I love doing. **Anything that’s challenging, where somebody says it can’t be done, we can do it.**”

**George Schooley**

### DIVERSE CHALLENGES

Schooley is licensed in Carroll, Baltimore, Frederick, Howard and Montgomery counties and has state certifications for drip systems, sand mounds and sand bed systems. Leads for repairs come in directly from customers, but also from engineering groups. On drip systems he collaborates with longtime friend Tom Ashton of American Manufacturing, a major drip equipment supplier.

Walsh runs the office and generates the work orders. “She has exceptional phone skills in talking to customers,” Schooley says. “When somebody calls, she can usually sell the job. If it’s something where I need to get involved before it becomes a job, she’ll let me know and I’ll either call the customer or go out on site and meet with them.” Once work orders are generated, projects are divided between two field crews.

Legacy installs mainly conventional pipe-and-rock drainfields with concrete septic tanks, using plastic tanks (Infiltrator Water Technologies) in rare cases where a truck can’t access the site for concrete tank placement. When aerobic treatment units are required, Schooley relies on Singular Model TNT systems (Norweco). “We size them by number of bedrooms,” he says. “The TNT 600 (600 gpd) is good for up to five bedrooms. We’ll go up to the TNT 1000 for houses with more than five bedrooms and for commercial systems.”

Legacy rents equipment for commercial projects and difficult jobs from Mid Maryland Rentals. The company’s own fleet includes:

- 2007 John Deere 310J backhoe
- 2005 New Holland 75.B backhoe
- 2002 Kobelco SK35SR mini-excavator
- 2007 New Holland C185 track skid-loader
- 1994 GMC Topkick sewer jetting truck with 1,000-gallon aluminum tank built in-house, and Conde SDS Ultra Power Pak pump (Westmoor)
- Three Ford Super Duty service pickup trucks (2002, 2003 and 2005)



## DIAGNOSIS FIRST

Repair starts with finding out why the system failed. If a customer reports sewage surfacing in the yard or a backup into the house, Schooley goes out to investigate, sometimes pumping the tank immediately to provide temporary relief. Then it's a question of devising a lasting solution, usually working with a county sanitarian.

The existing system is uncovered and examined. Measurements are taken to help identify a proper replacement drainfield location that meets setback requirements from wells on the site and neighboring properties. A perc test is completed and Schooley develops a design and pricing for the new system, which requires a county permit.

Sometimes the fix doesn't require a system replacement. "We often find distribution boxes out of level," Schooley says. "All the effluent has been going into one line and overloading that line. The solution might be as simple as putting in a new distribution box, and maybe turning that overused line off to let it rest and rejuvenate itself, while running off the other line for four to six years. Then we can go back and turn the line back on that we turned off, and the system will work again."

If there's no such simple answer, replacement systems are often challenging. Small lots may pose difficulty meeting well setbacks, typically 100 feet. The northwest part of Legacy's territory has red clay soils that typically require sand mounds or sand beds. "We have a few low-lying areas where the water table is high," says Schooley. "In those areas, Tom Ashton will design a drip system, and we'll install it."

## TOUGHEST TEST

In practice, things can get much more complicated. The mountainside site began with a "treatment system" that failed a real estate transfer inspection because it was nothing more than a tank with a pipe leading to a creek. The property itself was big enough for a drainfield, but the shallow bedrock ruled that out.

"We got permission from a neighbor to enter the property from the back and do perc testing on top of the mountain," Schooley says. "We found a good site, but

the problem was getting from the lower to the higher elevation, which was probably 100 feet difference." They set a Singlair TNT 600 ATU and a 2,000-gallon pump chamber near the house, and the tanks were water-tested because the lot was near a stream. The pump was a Pentair SKHD150 with 127 feet of head.

The team found a route for the pipe that wasn't as rocky and steep as most of the mountainside, and dug a trench for a 1,020-foot run of piping up to the distribution box. "We had to hold the trackhoe on the side of the mountain using a cable and a track loader so we could dig the trench for the force main," Schooley says. "Then we hauled in dirt and covered that over." The drainfield had two 71-foot trenches 8 feet deep with 4 feet of stone.

In another case, a couple bought a home and six months later had to sell it because the husband got a job transfer. The septic system failed the inspection. "The lot was small, and a previous owner had put about 7 feet of fill in the lot," Schooley says. "Onsite systems don't work in fill. We dug test pits down 26 feet and never hit groundwater. We put trenches 17 feet in the ground. It was a very expensive ordeal, but we were able to get a system installed and save the sale of the property."

Technician Craig Peeling prepares to fill a septic tank with water to test a system. Legacy Septic owns two International vacuum trucks built out by the company and using National Vacuum Equipment pumps. (James Robinson photo)



## PUMPING UP PROFITS

The Legacy Septic pumping business has grown to some 800 customers in just four years, and it's not because the company offers the lowest price.

Legacy's service includes providing customers with complete records on their systems. "Once a customer chooses us, we contact the local health department and request the property's septic system records," says co-owner George Schooley.

On the day of service, the technician draws a map of the septic system location, records any notable features of the property like access issues and presence of pets, takes site measurements, and makes recommendations as needed.

Later, the customer receives a report containing information from the National Onsite Wastewater Recycling Association (NOWRA), the county property record, and other information. Over time, the company tailors the pumping frequency to the number of people living in the home and the system's usage history.

Schooley built his own vacuum trucks, both on International chassis with 3,000- and 2,500-gallon-capacity steel tanks and National Vacuum Equipment Challenger vacuum pumps. Legacy also has maintenance contracts to service about 150 aerobic treatment units twice a year.

On a job in the red clay area, septic systems at three side-by-side homes had failed; effluent was leaching into a pond. Legacy installed an ATU for each home, all three discharging to one large pump chamber. The pump then delivered effluent to a two-zone drip system on higher ground.

## GETTING THE BUSINESS

Helping bring projects like these to fruition are technicians Steve Hannon, Ernesto Sanchez Fernando and Craig Peeling. Theresa Saunders handles many office duties, including charitable giving and scheduling of community education events. Ryan Schooley is a 2017 summer intern supporting marketing campaigns.

Legacy runs a multifaceted marketing program. A mainstay is a series of educational presentations in public libraries in Carroll County, the



▲ As a worker looks on, George Schooley installs a valve in a trench system. (James Robinson photo)

company's home base. The approach is strictly educational, although one lucky attendee at each presentation receives a certificate for a free septic system pumpout.

"It was Theresa's idea to go to the libraries," says Walsh. "George gives really sound advice. The libraries asked us to provide child care, and so our teenage daughters, Ryan, Logan and Cameron, wear Legacy T-shirts and sit with the kids and read to them, assemble puzzles or play in the puppet theater."

Schooley adds, "I have a little model that shows a septic tank. I explain that they need to have a riser on their tank. I show them the different types of systems, and I tell them what it could cost to repair their system if they don't take care of it."

Legacy's new website includes customer testimonials. A Facebook page attracts significant attention. "All the time I hear other businesses owners say, 'Facebook didn't do anything for me — do you really think it works?'" says Walsh. "We've gotten so much business through community group pages on Facebook."

### HELPING ON THE HOMEFRONT

"We're very community-oriented. Carroll County is a community county. A lot of people know each other. Our daughters are in 4-H, and that has been a great resource for us. We financially support the 4-H Foundation and the annual cake auction. We do book fairs, Girl Scouts, Boy Scouts. We exhibit at the county Home Show and local business expos.

continued >>

## ROUGH-AND-TUMBLE RACING

When not tackling tough onsite system repair jobs, George Schooley "relaxes" by powering extreme four-wheel-drive vehicles on off-road courses in a national racing circuit.

It all started with an old, abandoned Jeep he saw on a job site. "Years ago I had a project manager, Clinton Bates, who often talked about Jeep racing," Schooley recalls. "While working on a job I saw this old Jeep sitting in the weeds and asked the customer what he was doing with it. He said, 'If you want it, take it.'"

Schooley put it on a trailer and gave it to Bates. The two worked together to restore it. Bates then began running it on a local Jeep racing circuit. "He kept trying to get me to go to a race, and I just didn't because I knew I'd be hooked," Schooley says. "I'm a very competitive person. I raced motocross when I was young, and I did truck and tractor pulling.

"Finally, there was a race where all the events were timed, so Clinton could race the Jeep and I could race it, too. I agreed to go with him, and I won every event that weekend."

One thing then led to another. Schooley bought the Jeep and started racing, then built a faster one in which he won a couple of 2015 racing series on the East Coast. Later, with wastewater industry friend Bob Wimmer and other friends, they bought the Ultra4 vehicle that had won the 2016 King of Hammers race, the world's toughest one-day off-road race, held in Johnson Valley, California.

They qualified for the 2017 King of Hammers and placed 36th in a field of 140 entries — one of only 50 vehicles that finished the race. They plan to enter about half a dozen additional races this year. It's one way to shake off the tension from those challenging onsite projects.



>> George Schooley is shown with his Ultra4 off-road vehicle that competed in the King of Hammers race in Johnson Valley, California. (Jenny Walsh photo)

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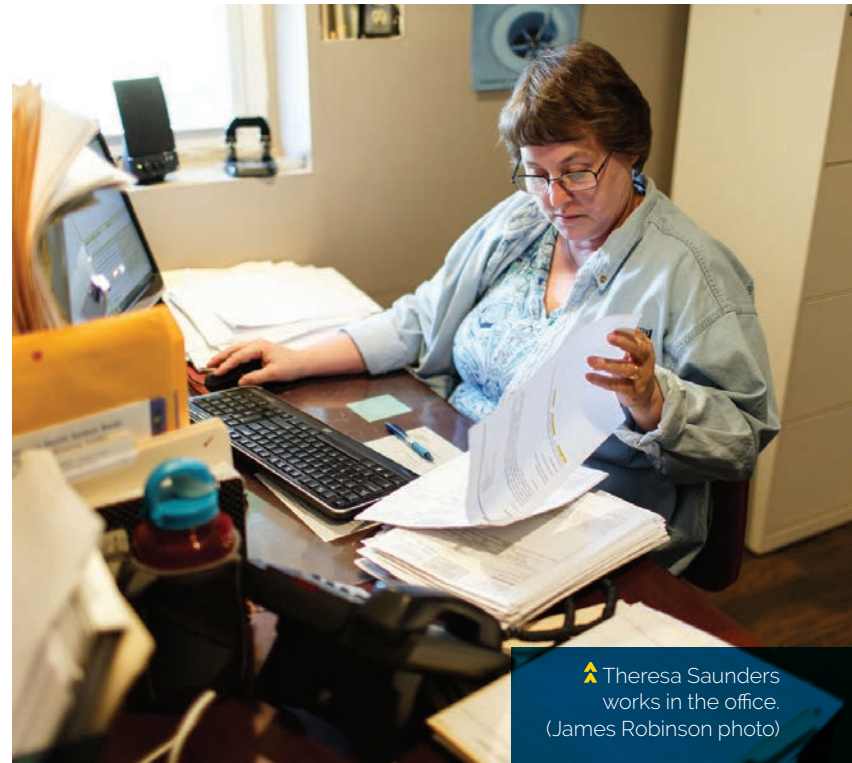
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Theresa Saunders  
works in the office.  
(James Robinson photo)

"I always liked to design and install. It isn't like digging a basement, putting in a road or grading a yard. **It's parts and pieces that you put together, and you're helping the environment.**"

**George Schooley**

"The University of Maryland Extension Master Gardener Series is a dream demographic. The members typically have septic systems. They care about the environment," Walsh says. "When George spoke to them, about 50 people attended, and it was a very receptive audience. We've had customers come to us because they see us in the community so much."

Walsh credits Carroll County's Small Business Development Center and the Miller Center for Small Business there with helping Legacy Septic develop a sound marketing approach. She encourages other onsite service companies to make use of similar resources in their areas.

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# California Prepares for Direct Potable Reuse of Wastewater

By David Steinkraus

California's multi-year drought was officially declared over this spring, but the legislature is on the verge of making the state a pioneer in the direct reuse of wastewater for potable consumption.

A bill in the General Assembly would require the state Water Resources Control Board to formulate uniform state standards for potable reuse by Dec. 31, 2021. By June 2018, the board would have to adopt a framework for the regulation of potable reuse projects.

AB 547 is sponsored by Rep. Bill Quirk (D-Hayward), who chairs the legislature's Environmental Safety and Toxic Materials Committee. According to a fact sheet prepared by committee staff, the bill has the support of 42 environmental groups, utilities and municipalities. Among them are the U.S. Green Building Council, the Metropolitan Water District of Southern California and the California Association of Sanitation Agencies.

There are no regulations in the country governing direct potable reuse, and California will need to expand its use of recycled water in order to meet projected demand. A report on the issue to the legislature by the water board says the state's population is expected to increase from the current 39 million to about 50 million by the year 2049. The board's report found only two direct potable reuse projects operating in the world, one in Namibia and the other in Texas.

While the legislature is working on the bill, water board experts are working on concerns raised in the report to the legislature, said board spokesman Andrew DiLuccia. Those include developing methods to monitor pathogens in raw wastewater and establish maximum counts for recycled water, and developing methods to identify unknown contaminants that may not be removed by advanced treatment.

As part of the response to the most recent drought, California Gov. Jerry Brown ordered a statewide cut of 25 percent in urban water use.

## FLORIDA

A bill before the state legislature was stripped of a provision mandating time-of-sale septic system inspections. The bill's sponsor, Rep. Randy Fine (R-Palm Bay), changed the bill to require only that a seller tell a buyer whether a property has a septic system. Buyers would have to sign a form saying they understand systems need to be inspected and pumped every three to five years because they can contribute to the pollution of groundwater. Inspections would be voluntary. News reports said Fine altered the bill after it attracted opposition from other lawmakers and the real estate industry.

The bill would also order the Florida Department of Health to create,

by January 2019, a statewide database and map of existing septic systems. Fine said there are an estimated 2 to 3 million septic systems in the state, and an estimated 10 percent of them are malfunctioning.

## TENNESSEE

A bill in the state Legislature would roll back state regulations on farms so that only those with animal waste actually polluting groundwater would be subject to state oversight. If it passes, the bill would make Tennessee rules consistent with federal regulations.

Tennessee regulations currently require farms with 200 or more dairy cows to obtain state permits that govern the storage and disposal of animal waste. Farms with pigs, chickens and other animals would also be affected.

News reports quoted Tish Calabrese Benton, director of water quality at the state Department of Environment and Conservation, as saying the department's ability to protect waterways would be reduced if the state adopts the less strict federal standard. The department currently permits 332 animal feeding operations. Only 15 of those have permits under the federal Clean Water Act.

For the agricultural industry, it's a matter of cost and competitiveness. Plans for waste disposal facilities can cost \$8,000 to \$10,000. But according to state and federal statistics, agricultural businesses are the leading cause of pollution of the 27 miles of impaired waterways in Tennessee.

## WYOMING

To help educate the public about water quality, the Teton Conservation District is offering a subsidy for cleaning septic systems.

The conservation district is in Teton County, which lies in the northwestern corner of the state and incorporates land around Grand Teton and Yellowstone national parks. The program offers homeowners a 50 percent reimbursement, up to \$150, for cleaning systems that have not been maintained for at least five years.

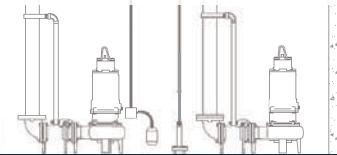
"We're doing it because septic systems pose a threat to human and environmental health," says Carlin Girard, a water resources specialist for the conservation district. "Septic system maintenance is an opportunity to mitigate that risk, and by offering the reimbursement we are hoping to raise awareness about the topic."

No one knows how many septic systems are in the county or where they are located. A recent U.S. Geological Survey study found septic systems account for about 4 percent of the nitrogen and 5 percent of phosphorus in the watershed of Fish Creek.



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## ONTARIO, CANADA

As part of a wide-ranging revision of its building code, the province is proposing a stricter rule for pumping septic tanks. Present rules require pumping when sludge and scum occupy one-third of working capacity. The proposed change would require pumping at the one-third level or every five years, whichever comes first. Anyone who operates a septic system would be required to keep records of the cleanings.

Provincial officials acknowledge this will impose costs on property owners and on municipalities that will manage enforcement, but they also say current code does not require regular pumping.

All six rural communities surrounding Thunder Bay, Ontario, on the northern shore of Lake Superior, passed resolutions opposing the proposal. News reports said the communities are asking the province to exempt rural residential homeowners. □

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## SYSTEM PROFILE



◀ Technician Isidro Bocanegra (center) and owner Scott Kellogg (right) discuss how to install the automatic distribution valve while technician Jason Policarpo looks on. (Photos courtesy of Douglas County Septic)

▼ Sister company Kellogg Contracting imported 318 cubic yards of C33 concrete sand to fill the depression to a depth of 18 inches and build a 102- by 36-foot sand filter with 4-foot separation from groundwater.



# Sand Filter Solution Fixes What a Transfer Inspection Missed

When a Colorado system failed right after the new homeowners moved in, Douglas County Septic switched out drainfields to save the day

By Scottie Dayton

**S**hortly after purchasing a five-bedroom home in Centennial, Colorado, the buyers received a shock. The Tri-County Health Department red-tagged the onsite system because the saturated drainfield had effluent surfacing in several areas.

The homeowner called pumper/installer Scott Kellogg, owner of Douglas County Septic in Franktown, Colorado, to pump the septic tank every 10 to 14 days during the replacement process. “We were surprised the system — installed in 1993 — had passed the recent title transfer inspection,” says Kellogg. “Groundwater and all the runoff from the property collected in a low area containing the drainfield.”

Kellogg referred the project to designer Kate Carney, P.E., of CHURCH Onsite Wastewater Consultants in Golden, Colorado, then worked with her to make the new sand filter fit in the existing drainfield’s footprint. “There wasn’t enough space in the backyard for the replacement field,” says Carney. “That left using the same location as the existing 4,600-square-foot nonpressurized drip disposal system.”

Kellogg says his crew has installed many more challenging systems than this one, but the constricted workspace made it a seven on a difficulty scale of one to 10. The normal four- to five-day installation took 12 days.

## SITE CONDITIONS

Soils are sandy clay loam with a blocky, weak structure and acceptance rate of 0.3 gallons/square foot/day. Groundwater is 74.5 to 82 inches below grade. The 2.2-acre lot is fronted on the south by a road and on all other sides by private developed parcels.



▲ The automatic distribution valve (Orenco) feeds six manifolds in the 102-by-36-foot sand filter.

**“We were surprised the system ... had passed the recent title transfer inspection.** Groundwater and all the runoff from the property collected in a low area containing the drainfield.”

**Scott Kellogg**

## System Profile

- Location:** Centennial, Colorado
- Facility served:** Five-bedroom home
- Designer:** Kate Carney, P.E., CHURCH Onsite Wastewater Consultants, Golden, Colorado
- Installer:** Scott Kellogg, Douglas County Septic, Franktown, Colorado
- Type of system:** Sand filter with nonpressurized drip disposal
- Site conditions:** Sandy clay loam with blocky weak structure, acceptance rate 0.3 gallons/square foot/day, groundwater 74.5 to 82 inches below grade
- Hydraulic capacity:** 675 gpd

### SYSTEM COMPONENTS

Carney designed the system to handle 675 gpd. She doubled the size of the drainfield to prevent future failure. Major components are:

- FLXX 2,000-gallon, three-compartment monolithic concrete tank (Front Range Precast Concrete)
- Biotube FT Series 4-inch effluent filter (Orenco Systems) in second compartment
- 1/2 hp PF5005 pump in flow inducer tower (Orenco) in third chamber
- 300 Quick4 Plus low-profile chambers with drip dispersal (Infiltrator Water Technologies)
- S Series demand-dose simplex control panel (Orenco)

### SYSTEM OPERATION

Wastewater flows 54 feet from the house through a 4-inch Schedule 40 PVC sewer (with clean-out) to the tank. The on-demand pump in the third compartment sends 84 gallons per dose 23 feet through a 1.25-inch PVC supply pipe to the Orenco automatic distribution valve. An air vacuum relief valve just before the ADV facilitates drainage in both directions between pump cycles. The ADV alternates between six proprietary manifolds dosing six zones in the 3,672-square-foot mounded drainfield. Zones have two 102-foot-long rows of 25 chambers each. Suspended 1.25-inch PVC laterals in the chambers have 1/8-inch holes drilled on 36-inch centers, oriented at the 12 o'clock position.

### INSTALLATION

Kellogg left the homeowners on the existing system until the new tank was ready. Site preparation and digging the tank hole took two days.

Kellogg's team of three removed the deck over the existing sewer pipe, then cut down trees and uprooted stumps using a Bobcat E55 track mini-excavator and

»» Lead installer Adrian Lopez from Douglas County Septic joins 20-foot lengths of Cresline 1.25-inch Schedule 40 PVC pipe to form the suspended drip disposal laterals.





◀ Foreman Efrain Jimenez from Douglas County Septic uses 12-inch plastic zip ties to suspend a lateral inside a Quick4 Infiltrator chamber.

▼ Risers on the 2,000-gallon, three-compartment tank are protected from frost by 2-inch-thick high-density foam board.



**“The corroded tanks were structurally unsound, and infiltration could have contributed to the system’s failure.”**

**Kate Carney**



T650 track skid-steer. They also grubbed out shrubs and bushes in the path of the new trench to the tank. “The owners were going to remove the deck anyway, and the trees were almost dead,” says Kellogg.

The sewer trench, supply trench and the tank hole were dug on the second day. “We hit groundwater while excavating the 18- by 6- by 7-foot-deep hole and had to stop until the tank arrived,” says Kellogg. “The muddy material was unsuitable for backfill, so we exported it and imported cleaner fill.” Sister company Kellogg Contracting made six trips hauling off debris, soil and vegetation using a PJ 7-cubic-yard dump trailer.

Front Range delivered the tank on day three. Kellogg’s team finished excavating the hole, then raced to stay ahead of incoming groundwater as they set the tank and backfilled around it. The tank required no anti-flotation anchors, but workers insulated the three risers with 2-inch-thick high-density INSULBoard (Higgins Insulation) before sealing them to the lid.

Once workers connected the sewer pipe, they switched the family to the new system and demolished the existing tanks using a hydraulic concrete breaker attached to the excavator. “The corroded tanks were structurally unsound, and infiltration could have contributed to the system’s failure,” says Carney.

On the fourth and fifth days, Kellogg Contracting hauled in 705 cubic yards of common fill and built a berm around the entire system. “We basically created a bathtub to hold the imported sand,” says Kellogg. “My guys were stockpiling material everywhere they could to stay 10 feet away from the driveway and the neighbor’s property line on the opposite side.”

Next came 318 cubic yards of C33 concrete sand to fill the “bathtub” to a depth of 18 inches and build a 102- by 36-foot sand filter with 4-foot separation from groundwater. Over these two days, two Kenworth tandem-axle dump trucks with 15-cubic-yard Colt boxes each made 12 runs to the quarry 28 miles away.

Kellogg brought in a fourth laborer to help install the chambers. “Working within those constrictive boundaries was difficult enough, but we also

had to maneuver around four mature trees serving as a privacy barrier between properties,” he says. Setting the chambers took two days.

On day six, the crew plumbed the chambers and built the manifolds, flushing assemblies (Slip x FTP female adaptor, 10-inch HDPE hand-hold, 1.5-inch ball valve and PVC spool, and PVC long-sweep 90-degree bend pipe), and connections to the automatic distribution valve. To protect the ADV from freezing, the crew placed it in a riser, then insulated the outside of the structure and the lid with foam board.

The project’s second phase was backfilling and grading the site to divert runoff away from the drainfield. The crew constructed a swale along the east edge of the property and another around the west side of the system. Both drained to culverts near the road.

They installed four drainpipes in the east swale to collect roof runoff in the area of the sewer line and tank. “Doing the underground piping and making the connections was challenging,” says Kellogg. “We also graded against the foundation to achieve the proper slope away from the house. That was above and beyond the septic install.”

The crew then laid a 60-foot, 12-inch-diameter culvert lengthwise in the toe of the mound and parallel to the concrete driveway. This pipe spilled into an existing culvert that channeled drainage under the driveway and away from the mound. Including spreading topsoil, final grading and seeding, the work took another four days.

## MAINTENANCE

There is no maintenance contract. Douglas County Septic technicians will monitor the septic tank yearly and pump it when the scum and sludge thickness reaches 18 inches. They will pull the effluent filter every six months for the first 18 months to establish a cleaning frequency, and check the effluent pump, ADV and float system twice a year. The surface area around the drainfield will be observed monthly.



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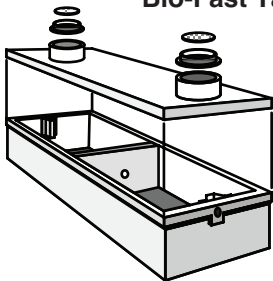
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# Can You Work Around Daily Estimated Sewage Flow Numbers?

System sizing rules become an issue when homeowners invariably focus on reducing onsite system costs during a building project

By Jim Anderson and David Gustafson

**R**ecently we were asked about estimating daily sewage flows. The questioner wondered if there is an accepted method to reduce the estimate from published regulatory numbers. The person was concerned that the numbers for their situation would require a system that was too large and expensive.

We thought it would be a good idea to spend a couple of columns discussing where those numbers come from and elaborate on different approaches that can be used to estimate average daily sewage flows.

The onsite system design process starts with estimating average daily sewage flows, and that — along with the estimated loading capacity for soils at the site — determines system size. Every state code we have looked at over the years has some type of table or listing of daily sewage flow for residences as well as other establishments.

For residences, a typical first-level approach is to determine a per-person per-day figure based on various research studies and published numbers in engineering manuals. In Minnesota, the number used to estimate flow is 75 gallons/day/person. For design purposes, it is assumed each bedroom will be occupied by two people. This means the estimated average daily sewage flow is 150 gallons/bedroom multiplied by the number of bedrooms. For example, a four bedroom residence would have an estimated flow of 4 bedrooms x 150 gallons/day/bedroom = 600 gallons/day.

## **RULES WILL VARY**

As we've traveled around the country, we have seen variations to this formula. For instance, in Arizona the base number is 80 gallons/day/person, so 5 gallons per day a person higher than the Minnesota estimate. In other places we have seen lower numbers based on water-use studies and published data. The 150-gallon-per-bedroom number has been in use in Minnesota since the 1970s. Arizona's rule was published in 2005.

In general, the studies these numbers are based on have occurred during the past 30 years and show typical average daily flows between 50 to 70 gallons/person/day. Not unexpectedly, there is a lot of variability within each study and variation between different areas of the country. In addition, some small studies show the numbers are somewhat smaller in predominantly rural areas served only by individual wells versus more suburban areas using public water.

One of the most comprehensive studies published in 2000 indicated per person per day water use was 54-67 gallons. For design purposes, building in a safety factor is an accepted good engineering practice. Our observation

**It's the responsibility of the designer to provide the supporting data for a change in the (daily flow) estimate.** It is not going to be enough to say to the state regulator, "I don't think we use this much water."

has been that while 75 or 80 gallons/person/day may be a little high based on these numbers, it is certainly in an acceptable range for a design factor. An Arizona study found in the Phoenix area an average daily water use of 77 gallons/person/day. This, at least on the surface, would indicate their 80 gallons/person/day figure is not far off the average and does not provide much of a safety factor.

The question posed to us involved allowable variation to these numbers based on additional information or mitigating factors. The answer depends on what is written into your state code and whether there is an opportunity to prove your design numbers are accurate for the intended use and type of system to be installed.

## **APPLIANCES ARE A FACTOR**

Using the same two states as examples, the opportunity for using different numbers was addressed in two different ways.

In Minnesota, we addressed this issue in the 1970s and established four dwelling classifications that were determined by overall size of the dwelling, number of bedrooms and expected water-using appliances. Water-using appliances are washing machines, dishwashers, bathtubs with greater than a 40-gallon capacity, garbage disposal and self-cleaning furnace humidifiers. This approach remains in effect. Beyond this, there is still opportunity to make a case to the local regulatory authority or the state to use a different number based on data or published studies.

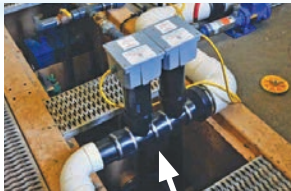
Arizona addressed this question in two ways. There is the opportunity to estimate daily sewage flows based on water fixtures and water-using devices. This gives an opportunity to make the case for reduced flows and allows a way to calculate estimated flows for atypical residences, something probably everyone should think about incorporating in their codes if they



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haven't already. They also provide the opportunity to make the case to the state regulatory agency for a different basis for calculation.

The direct answer to their question is yes, there is usually the opportunity to make a case for calculating estimated daily flow for a residence in a different way. Each state approaches the question differently based on the same studies and data. So the bottom line is that it's the responsibility of the designer to provide the supporting data for a change in the estimate. It is not going to be enough to say to the state regulator, "I don't think we use this much water." Monitoring data or a reference to published studies will be required to make your case.

Next month we will take a closer look at the issue for nonresidences and other establishments. □

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# We Need More Flexible Regulations

Pumpers, installers and their customers would benefit if state and local health officials would give latitude to solve septic system challenges

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 leaders in the Connecticut Onsite Wastewater Recycling Association.*



**Bill Coffey, president;**  
**Billy Coffey, vice president**

**Business:** Pembroke Pumping Services Inc., Danbury, Connecticut

**Age:** Bill 72, Billy 46

**Years in the industry:** Bill 47, Billy 26

## Our crew includes:

- Judy Coffey (founder), treasurer
- Kelli Coffey, secretary
- Sara Coffey and Erica Carboni, office staff
- Bill Conlea (lead foreman), Dave White and Will Coffey, installation and repair
- Greg Corso, mechanic
- Diego Lesmes and Jesus Mendieta, pumping
- Andy Pankulis, Bob Barnwell and Rob Dzamko, portable sanitation

## BILL COFFEY:

### Association involvement:

Connecticut Onsite Wastewater Recycling Association (COWRA). We have been members for over 30 years, 12 of which I have held the position of vice president.

### Benefits of belonging to the association:

COWRA is a legislative organization employing a lobbyist who works with the state of Connecticut regarding rules and regulations affecting septic installations and repairs. Two representatives from COWRA meet with the state Department of Health on a regular basis. These representatives have input on state codes, which benefit the organization's members. The importance of COWRA is to keep its members current to the constantly changing health code.

### Biggest issue facing your association right now:

FOG (fats, oils and grease) seems to be the trending topic right now. It's a very sore subject for most cities because it's such a detriment to sewer lines, septic systems and lift stations. City infrastructures are clogging with grease, and businesses and government are battling on how to solve this problem. The Department of Energy and Environmental Protection is now mandating restaurants pump grease traps every three months instead of a couple times a year and local governments are enforcing this now more than ever. The biggest issue is where to dispose of the grease because many facilities don't have frac tanks to take it. In our district we are allotted one grease day a week for 3,000 gallons. This becomes difficult to manage the increasing customer demand.

## BILLY COFFEY:

### Typical day on the job:

The guys come into the office and grab work orders or contracts we have scheduled for the day. We go over important details/specifics of the job and then send out the separate crews. I will help on jobs when needed, but I find myself much more productive in the office generating and scheduling work for the week. In the past I would spend many hours on the job, in the hole, but more recently I've learned to let others do the labor so I can stay on top of the endless paperwork in the office.

▼ The Pembroke Pumping crew includes (back row, from left) Bill Coffey, Kelli Coffey and Billy Coffey; front row, from left, Judy Coffey, Erica Carboni and Sara Coffey.

► In a recent job, the crew delivered a Kubota KX121-3 Super Series Excavator by crane to a cliffside residential site.



### **Helping hands – indispensable crew member:**

I can't choose one member, as all contribute an important role. It is a difficult industry to maintain good help, so the turnover rate can be high. The crew members we have presently have been with us for several years and each brings something different to the table. Our lead foreman has been with us 35 years and his knowledge is irreplaceable.

### **The job I'll never forget:**

Every job has its story. The most recent one is a residential site where we had to crane all the equipment and materials in and out due to the slope of the property on the side of a mountain. The yard was probably 50 feet below the road with no accessibility. It was a tedious process but the cranes, combined with the talent of the crew, got the job done. The customer, neighbors, sanitarians and all involved were very impressed with the final product.

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

The Camel truck from Super Products. Repairing broken waterlines is a large part of our business, which used to require digging and repairing by hand. Once we purchased the truck 10 or 15 years ago, this process became simplified by using hydroexcavation instead. It's a timesaving piece of equipment.

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

There was a septic system we installed about 20 years ago on the side of a cliff on Lake Candlewood. It was on a small lot with a narrow road and all work had to be done over a wall with a steep drop. This was before we discovered cranes on a job, which made this very challenging. This job was not for anyone with a fear of heights. The drop was terrifying. Since



that time, we have returned to pump the septic tank a half-dozen times, and to date I am still a bit queasy when I do this job.

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

Why is my grass the wrong shade of green? I had a customer who did not like the color of her grass. The job came out beautiful and she calls and complains about the color of the grass. I chuckled and said, "I'm sorry, that's the color Mother Nature gives you. I can't do anything about that."

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

Municipalities — a little more flexibility, a little less rigidity. Our engineering departments don't allow any on-the-job changes that could ultimately be better and more cost-effective for the town and the customer. Things can happen on the job that differ from the original plan and there is not enough flexibility for changes. OSHA is the largest and most necessary of industry regulators. As essential as they are for every employee's safety, they can be challenging, as well.

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

My father always said, "Stick with what you're good at." A lot of guys want to diversify in business and sometimes that'll sink a ship. My father started with one septic truck back in 1970 and then we expanded into portable toilets, then we expanded into the electric snaking and the jetting. It all fell right in line with septic and sewer, so that's pretty much where we've stayed.



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## STATES SNAPSHOT

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

I always said I wanted to be a lawyer, but I never had the staying power for school. I knew I would follow in my father's footsteps, expanding and growing the family business, just as I have. In hindsight, I wouldn't have changed a thing.

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

I've seen things change from when I was younger, backing up to a pond and blowing your septic truck off and looking at the biggest tomatoes you've ever seen grow in what they call lagoons! Today we have to give samples when we go to the treatment plant since the technology with dewatering has changed so drastically. Technology has become a game-changer in our industry in terms of snaking and cameras and things of that nature, and the key is to stay on top of the constant changes. Some people don't like change. I am all for it. I want the latest and greatest products and equipment available that are going to save me time and the customer money. □

### 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](mailto:editor@onsiteinstaller.com).



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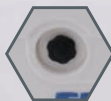
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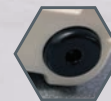
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# Alarms, Controls and Monitoring Systems

By Craig Mandli

## ALARMS



### Polylok 3014AB Filter Alarm

The 3014AB Filter Alarm (Smart Alarm) from Polylok is a wired indoor/outdoor filter alarm that provides audio/visual warning for home or business owners that their tank filter needs cleaning. The Smart Alarm Switch activates when the filter cartridge is near capacity (approximately 90 percent full) with solids built up through the filtering process. The Smart Alarm

Switch, installed in the filter, sends a signal to the panel, activating the audible and visual alarm to alert the home or business owner that the filter needs servicing. It offers a manual alarm test switch and horn silence, an alarm horn rated to 82 dB at 10 feet and 15 feet of cable with longer lengths available. 877/959-7751; [www.polylok.com](http://www.polylok.com).



### Septic Products Observer 500

The Observer 500 indoor/outdoor high-water alarm from Septic Products includes a NEMA 4X (watertight) polycarbonate enclosure rated for indoor or outdoor use, 360-degree red alarm light, alarm horn, alarm test and horn silence toggle switch, and a 6-foot 120-volt AC power cord. External cord grips and a large terminal block allow for easy installation. A mechanical float with a 15-foot cord is included standard, with other cord lengths, as well as mercury floats, also available. 419-282-5933, [www.septicproducts.com](http://www.septicproducts.com).

### Sump Alarm Wi-Fi Version

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



## LEVEL CONTROLS

### Aquaworx by Infiltrator IPC Panel

The Intelligent Pump Control (IPC) Panel from Aquaworx by Infiltrator uses simple pressure transducer technology to enhance pump system performance and is easy to install. Powered by an embedded microprocessor in the pump controller and a floatless pressure transducer in the pump chamber, it monitors liquid levels, controls pumping time intervals and logs events in real time. The panel calculates daily system flow and stores up to 4,000 events in a date/time-stamped event log. The Mountable and Removable Controller (MARC) user interface is a hand-held device designed to program the product line. Installers and service providers have the option of removing the MARC unit to use on multiple panels. 800/221-4436; [www.infiltratorwater.com](http://www.infiltratorwater.com).



### Environment One iota OneBox

The iota OneBox telemetry system from Environment One allows for complete command of a fleet of pressure sewer grinder pumps from an office desktop or smartphone. It can be integrated seamlessly into a SCADA network to provide information about tank storage capacities, power failures, blockages and faults instantly, according to the maker. It provides real-time diagnostics for individual properties, streets or whole networks. It enables remote control and monitoring of individual grinder pumps, alerts before the customer becomes aware of any faults, trend analysis, report generation, peak flow demand determinations and flow smoothing, and maximized efficiency of downstream infrastructure. 518/346-6161; [www.eone.com](http://www.eone.com).



### Gorman-Rupp Integrinex

The Integrinex line of lift station controls from Gorman-Rupp is designed to ensure system performance through precise matching of controls to pumps and motors. Customers have four choices in liquid level controls when they select a Gorman-Rupp ReliaSource solids-handling pump package. Basic offers simple, reliable plug-and-play performance and is designed for accurate start/stop operation in a duplex

alternation pump system. Standard includes duplex and triplex alternation, level sensors, pump delay and alarms. Advanced control systems include soft starters and VFDs to manage electric inrush, hydraulic shock, and matching starting and stopping torque-based management and monitoring. Remote View includes all the functionality of the advanced system with remote tablet-based management and monitoring. 419/755-1011; [www.grppumps.com](http://www.grppumps.com).



### Orenco Controls 4-in-1 Controller

The 4-in-1 Controller from Orenco Controls supports numerous electrical configurations and dosing schedules within a single panel. Both simplex and duplex

models are available, and can be configured in the field for timed or demand dosing. While the control circuit operates on 120-volt power, the pump circuit is dual-rated for both 120- or 240-volt power, meaning installers and service providers can reduce their panel inventories for new installations and repairs. The panels include a programmable logic unit with multiple timing intervals for changing flow conditions and a built-in elapsed-time meter and counter. It displays float position and has a float-error indicator. Each panel includes a reference chart to assist with troubleshooting during installation and testing, as well as wiring diagrams. 877/257-8712; [www.orencococontrols.com](http://www.orencococontrols.com).



### See Water Simple Simplex

Simple Simplex control panels from See Water can alert of a high liquid level and are designed to control a 120-volt single-phase pump. Applications include sewage pump chambers, sump pump basins, lift stations and onsite installations. The controls are housed in an 8- by 6- by 4-inch NEMA 4X indoor/outdoor polycarbonate enclosure and are UL listed in the U.S.

and Canada. 888/733-9283; [www.seewaterinc.com](http://www.seewaterinc.com).

### SJE-Rhombus EZ Series In-Site CL

The EZ Series In-Site CL data-logging control panel from SJE-Rhombus is designed to control one or two 120-, 208- or 240-volt single-phase pumps. It includes a Bluetooth Smart Ready module for wireless connection to a smartphone or tablet, allowing users to configure the panel, view system status or download data via the EZ Connect Mobile App. This enables safe and secure access to the control panel in all weather conditions, without having to bring a laptop to the job site and open the panel door to access information. It uses a C-Level sensor for continuous level monitoring and records up to 4,000 system events, including pump runtimes, pump cycles, alarm conditions, HOA settings, power outages and service calls. In-Site software



formulates system data, creating reports quickly and easily so system conditions can be identified and corrected. Each panel is UL/cUL listed. 888/342-5753; [www.sjrhombus.com](http://www.sjrhombus.com).

## MONITORING DEVICES

### Alderon Industries DoubleMax Pump Switch

The DoubleMax Pump Switch from Alderon Industries provides a pumping range of 2 to 60 inches via a single connection. It monitors liquid levels for water and wastewater applications and is shipped with a set of mounting brackets for quick and easy adjustments. The system includes two float switches (on/off), main enclosure and a power cable. It is available in Pump Up, Pump Down, 120 or 230 volts AC, and with bare leads or piggyback plug. The enclosure is fully encapsulated in epoxy and is a waterproof unit that should not be submerged where humans or animals can contact the water. The unit can be installed in a tank with a submersible pump, is completely waterproof and can be submerged. 218/483-3034; [www.alderonind.com](http://www.alderonind.com).



### Anua i/o.site

The i/o.site system from Anua provides performance monitoring of electromechanical components, while keeping everyone connected to information through a simple, easy-to-use web interface. It can be integrated to remotely monitor any blower, aerator, pump, float switch or motor, regardless of type or model. It tracks water use, catches motor issues before failure, uses any mobile device or computer, and monitors any powered onsite system. 336/547-9338; [www.anuainternational.com](http://www.anuainternational.com). ■

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## PRODUCT NEWS

### Franklin Electric SubDrive Connect

Franklin Electric's SubDrive Connect variable-frequency drive now offers surface pump functionality for residential, commercial, small municipal and irrigation applications. It has basic and advanced setup by either DIP switches or the FE Connection mobile app to achieve constant water pressure from compatible 230-volt three-phase surface pumps with an overload current rating from 2 to 17.8 amps. The product family features a NEMA 3R Type 3 enclosure rated for indoor and outdoor use, providing a degree of protection against rain or sleet. 260/824-2900; [www.franklinwater.com](http://www.franklinwater.com).



### SJE-Rhombus Tank Alert Solar Alarm

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



### Felling Trailers Blackwood decking

Felling Trailers added Blackwood Lumber to its trailer options. The lumber starts with treated southern yellow pine, and each board has 1/4 inch milled out of the topside. Once milled,

the rubber from reground tires is infused into the boards 6 mm thick. The rubber is above flush with the surface of the lumber so the rubber always makes the first contact with equipment. The rubber doesn't fade, crack or stain, and can be cleaned with water. 800/245-2809; [www.felling.com](http://www.felling.com). □

## INDUSTRY NEWS

### Deriu appointed COO at Advantage Funding

Advantage Funding has named Joseph Deriu chief operating officer. With a background in technology and operations, he will focus on streamlining operations and efficiency of company systems.



Joseph Deriu



Richard Fox-Marrs

### Fox-Marrs named president of JCB North America

JCB announced the appointment of Richard Fox-Marrs as president and CEO. He will be responsible for JCB operations in North America, including sales and support for the construction, agricultural, rental, government and defense industries. Additionally, he will oversee production at JCB North America's Savannah, Georgia, headquarters.

### Manitou Americas partners with Yanmar

Manitou Americas has partnered with Yanmar to offer remanufactured engines under the XPRT Genuine Parts brand. The engines are designed to fit any Gehl or Mustang machines in North America.

### SJE-Rhombus receives ESOP award

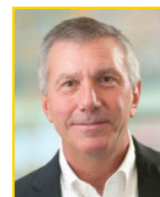
SJE-Rhombus was awarded the 2017 ESOP Company of the Year award for the Minnesota/Dakotas Chapter of the ESOP Association. The award is presented to one of over 100 employee-owned companies in the local chapter for displaying a strong commitment to employee ownership and promotion of the benefits and unique culture common among successful employee-owned companies.

### Felling Trailers earns ISO 9001 in Minnesota locations

Felling Trailers received ISO 9001:2015 certification for its quality management system at its Sauk Centre, Minnesota, and Litchfield, Minnesota, operations. The certification process included a detailed assessment of the company's facilities.

### Kenney named Franklin Electric president

Franklin Electric appointed Donald Kenney as president, North America Water Systems. He is responsible for all aspects of the NAWS business that supports the sale of Franklin Electric products in Canada, the U.S., Mexico and Central America. □



Donald Kenney

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Alabama Onsite Wastewater Association;  
www.aowainfo.org;  
334/396-3434

## ARIZONA

Arizona Onsite Wastewater Recycling Association;  
www.azowra.org; 928/443-0333

## ARKANSAS

Arkansas Onsite Wastewater Association;  
www.arkowa.com

## CALIFORNIA

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

## COLORADO

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

## CONNECTICUT

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

## DELAWARE

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

## FLORIDA

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

## GEORGIA

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

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

## IDAHO

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

## ILLINOIS

Onsite Wastewater Professionals of Illinois;  
www.owpi.org

## INDIANA

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

## IOWA

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

## KANSAS

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

## KENTUCKY

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

## MAINE

Maine Association of Site Evaluators;  
www.mainese.com

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

## MARYLAND

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

## MASSACHUSETTS

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

## MICHIGAN

Michigan Onsite Wastewater Recycling Association;  
www.mowra.org

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

## MINNESOTA

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

## MISSOURI

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

## NEBRASKA

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

## NEW HAMPSHIRE

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

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

## NEW MEXICO

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

## NEW YORK

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

## NORTH CAROLINA

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

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

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

## OHIO

Ohio Onsite Wastewater Association;  
www.ohioonsite.org;  
866/843-4429

## OREGON

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

## PENNSYLVANIA

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

Pennsylvania Onsite Wastewater Recycling Association;  
[www.powra.org](http://www.powra.org)

Pennsylvania Septage Management Association;  
[www.psmna.net](http://www.psmna.net); 717/763-7762

## TENNESSEE

Tennessee Onsite Wastewater Association;  
[www.tnonsite.org](http://www.tnonsite.org)

## TEXAS

Texas On-Site Wastewater Association;  
[www.txowa.org](http://www.txowa.org); 888/398-7188

Education 4 Onsite Wastewater Management;  
[www.e4owm.com](http://www.e4owm.com); 713/774-6694

## VIRGINIA

Virginia Onsite Wastewater Recycling Association;  
[www.vowra.org](http://www.vowra.org); 540/377-9830

## WASHINGTON

Washington On-Site Sewage Association;  
[www.wossa.org](http://www.wossa.org); 253/770-6594

## WISCONSIN

Wisconsin Onsite Water Recycling Association;  
[www.wowra.com](http://www.wowra.com); 888/782-6815

Wisconsin Liquid Waste Carriers Association;  
[www.wlwca.com](http://www.wlwca.com); 888/782-6815

## NATIONAL

Water Environment Federation;  
[www.wef.org](http://www.wef.org); 800/666-0206

National Onsite Wastewater Recycling Association;  
[www.nowra.org](http://www.nowra.org); 800/966-2942

National Association of Wastewater Technicians;  
[www.nawt.org](http://www.nawt.org); 800/236-6298

## CANADA ALBERTA

Alberta Onsite Wastewater Management Association;  
[www.aowma.com](http://www.aowma.com); 877/489-7471

## BRITISH COLUMBIA

British Columbia Onsite Wastewater Association;  
[www.bcossa.org](http://www.bcossa.org); 778/432-2120

WCOWMA Onsite Wastewater Management of B.C.;  
[www.wcowma-bc.com](http://www.wcowma-bc.com);  
877/489-7471

## MANITOBA

Manitoba Onsite Wastewater Management Association;  
[www.mowma.org](http://www.mowma.org); 877/489-7471

Onsite Wastewater Systems Installers of Manitoba, Inc.;  
[www.owsim.com](http://www.owsim.com); 204/771-0455

## NEW BRUNSWICK

New Brunswick Association of Onsite Wastewater Professionals;  
[www.nbaowp.ca](http://www.nbaowp.ca); 506/455-5477

## NOVA SCOTIA

Waste Water Nova Scotia;  
[www.wwns.ca](http://www.wwns.ca); 902/246-2131

## ONTARIO

Ontario Onsite Wastewater Association;  
[www.oowa.org](http://www.oowa.org); 855/905-6692

Ontario Association of Sewage Industry Services;  
[www.oasisontario.on.ca](http://www.oasisontario.on.ca);  
877/202-0082

## SASKATCHEWAN

Saskatchewan Onsite Wastewater Management Association;  
[www.sowma.ca](http://www.sowma.ca); 877/489-7471

## CANADIAN REGIONAL

Western Canada Onsite Wastewater Management Association;  
[www.wcowma.com](http://www.wcowma.com);  
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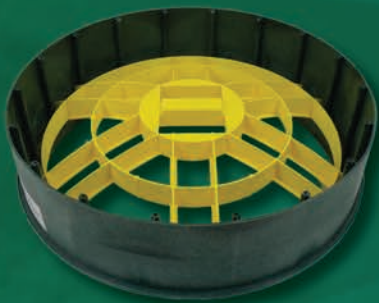
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- 20" Riser Pan - 3009-RP
- 12" x 6" Riser - 3017-R



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