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Keep the HAMMER DOWN

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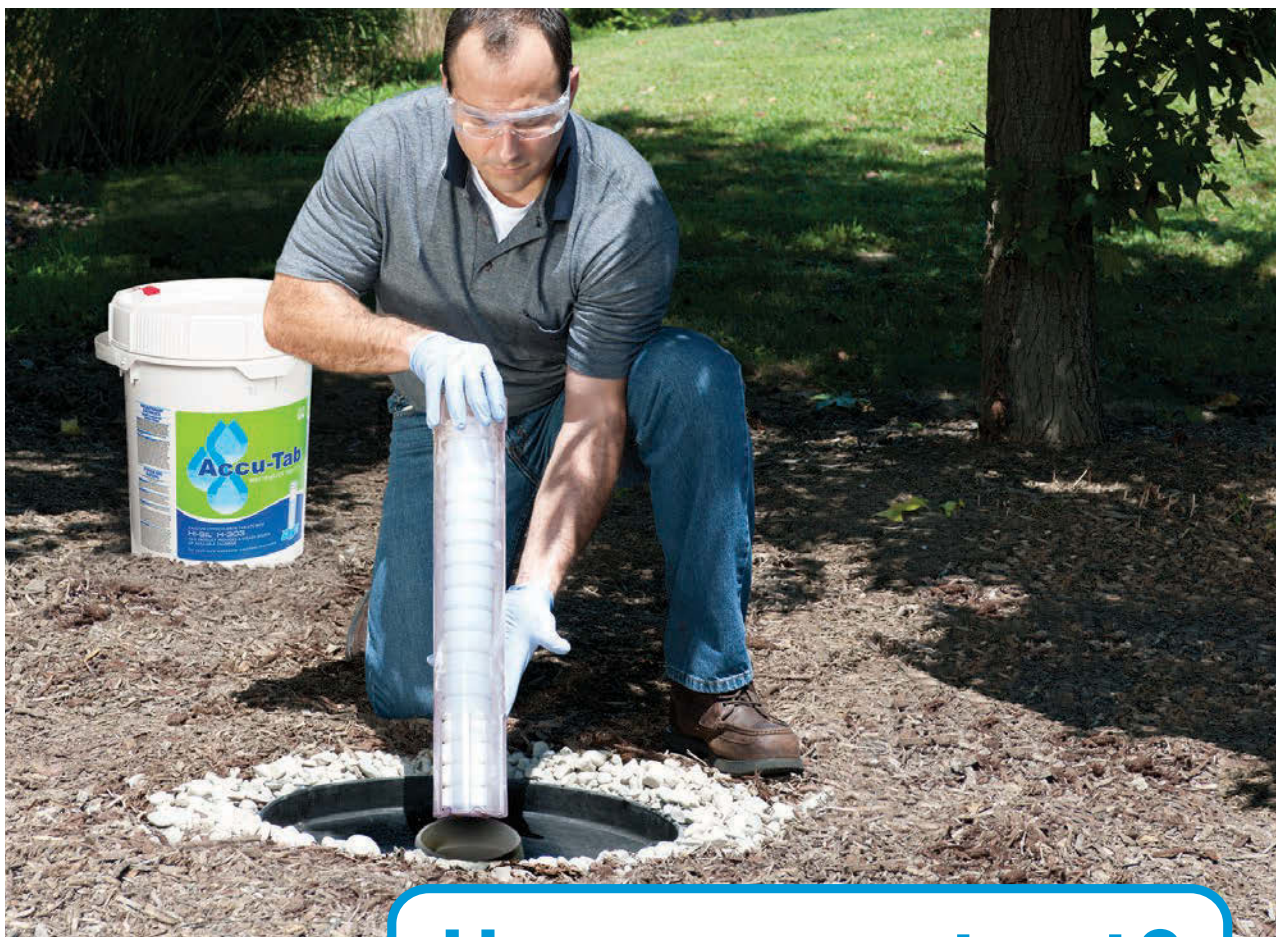


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Onsite System Prices Slashed; Still No Takers

In a sensitive South Carolina watershed area, the government can't seem to give away sizable grants aimed at helping homeowners repair their failing septic systems

By Jim Kneiszel



How do you persuade people to care about the environmental impact of their failing septic systems when they turn down offers to replace them for free or at a greatly reduced cost?

That's exactly what's happening in part of South Carolina, where homeowners are eligible for federal money to cover 60 percent of onsite system repair or replacement, a figure that jumps to 100 percent with additional grants covering low-income residents.

The Greenville County Soil and Water Conservation District, administering Federal Clean Water Act grants in the Middle Saluda Watershed, has only been able to convince two homeowners to take the money over the past year. There are funds to fix about 60 systems, but homeowners with failing systems have resisted making repairs, according to Kirsten Robertson, the district manager.

"We try our best to disseminate the information, but a lot of these old country folks don't want the government involved in their lives, regardless of if it helps them 60 percent or 100 percent. I've been told that several times."

David Reid

The Saluda River is one of more than 1,000 polluted waterways in South Carolina targeted for cleanup by the state and the U.S. Environmental Protection Agency. Of the 1 million septic systems in South Carolina, the EPA estimates that 10 percent fail in any year. Systems in the watershed are antiquated and neglected and fixing or replacing them would make a big difference in water quality in the region.

YOU CAN'T MAKE ME

So why the resistance to long-overdue onsite improvements? The answer is plain and simple to onsite professionals in the area: People just don't care and they see the program as a government intrusion.

"We try our best to disseminate the information, but a lot of these old country folks don't want the government involved in their lives, regardless of if it helps them 60 percent or 100 percent. I've been told that several times," says David Reid, a repair and installation technician for Upstate Septic, in Greer, S.C., the company contracted to assess systems for the conservation district.

Reid finds all sorts of failures in the sensitive watershed, routinely encountering backyard ponding of sewage or backups in the home indicating drainfields that were built to bare-minimum standards and have reached the end of their useful life. And just like many homeowners ignore recommendations to inspect and pump systems, they refuse to replace drainfields or upgrade systems to make them function better for the long term ... because they're not required to.

South Carolina, like Florida to its south, doesn't have a statewide requirement for periodic maintenance, inspection or pumping of onsite systems. When systems ultimately fail, it's up to the homeowner to decide what to do about it.

"We pump some tanks that have never been pumped from the day they were installed, and they're 20 to 30 years old," Reid says. "The bottom of the outlet baffle is backed up with sludge and there's nothing left but for suspended solids to go from the baffle to the drainfield."

Lack of maintenance is a driver of the failures, Reid says. But better oversight of installers who put in substandard gravel pits for drainfields and an improved system for the state to accept newer onsite technologies would be steps in the right direction.

Often, developers stretch the onsite system capacity limits by putting four- and five-bedroom houses on half-acre lots that don't always have the best site conditions. Also, regulations favor traditional gravity systems and make it costly for homeowners to explore alternative treatment systems. And the state doesn't require two-compartment septic tanks or effluent filters, setting drainfields up for early failure, Reid explains.

EMERGENCY SERVICE

Because of all of these factors, onsite professionals are almost always working in a crisis mode with customers. For Upstate and its sister companies, Dr. Flush Inc. and Pumping Service Inc., 80 percent of service calls are for emergencies, while only about 20 percent of customers choose to be on a routine pumping schedule, says Ken Howard, the owner of the three companies.

"The mindset of a lot of people is that you don't ever have to [inspect the



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system]. That waste goes away and the septic tank will take care of it forever,” Howard says. He shares an example of a customer who had lived in his house for 52 years without having the system inspected. Howard spent more than two hours freeing up the sludge. “It was pure black crud. I didn’t make any money on that one,” he recalls.

Both onsite professionals would like to see a minimum pumping standard of every 3 to 5 years imposed for residential systems, but they don’t hold out much hope of that happening. Howard’s companies provide a lot of grease trap service, which is subject to mandated maintenance intervals, so he wonders why similar rules don’t apply to septic systems.

“I’m not a big-government man – the less government the better for me – but it would be nice if there were some regulations that people have to maintain them,” Howard says. Ultimately, routine pumping would help homeowners avoid major drainfield repair bills, but customers have proven they won’t pursue preventive maintenance if it’s not required, he says.

While the government isn’t legislating onsite maintenance, Howard is seeing the private sector is driving maintenance to a degree. He gets a lot of business from mortgage bankers and real estate professionals who order inspections before approving loans or allowing home sales to go through.

BETTER PROMOTION

Despite an inability to disburse the EPA funds for onsite upgrades, Robertson remains optimistic that her agency can convince more homeowners about the value of fixing their systems and doing their part to help the environment along the river. She’s changing the approach to outreach with more face-to-face meetings in, of all places, rural churches.

“We’re redoubling our efforts. It works best to get out and talk to people. Sending out flyers isn’t going to do it,” she says. The people they need to reach are often older, have older onsite systems and limited income to fix them. “The church is their meeting place. It’s home to them, and so it’s a good place to meet people with older systems.”

I wish I shared Robertson’s optimism. But I’ve heard countless onsite installers tell me that, to homeowners, the septic system is “out of sight and out of mind.” Short of minimum required pumping or inspection intervals, as long as the toilet flushes the waste away, sadly, most people don’t want to think about where it goes.

And sadder still, in a place as beautiful as the hill country of South Carolina, the rivers are pretty to look at, but you better not go swimming.



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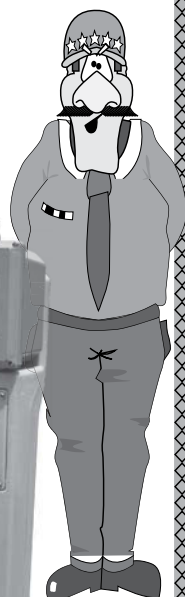
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WINTER WOES

Frozen Tanks, Oh My!

What a winter! In some parts of the country, deep frost lines and little snow cover created a perfect storm for septic system disasters. In Iowa, Jody Forest from Forest Septic Tank Service, reported ice in nearly every riser he opened. "When someone has 2 feet of ice in his tank, what do you do?" he says. Learn more about the challenges of a harsh winter and how businesses across the country were affected.

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STARTUP ISSUES

New Tank, New Problems

In new construction, everything is supposed to be bright, shiny and trouble-free. So why would effluent screens plug prematurely following new construction or remodeling? The answer could come from what's being flushed into the system. Find out what might hinder the anaerobic digestion process in this troubleshooting guide from expert Jim Anderson.

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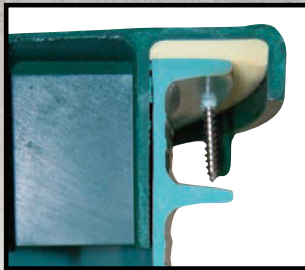
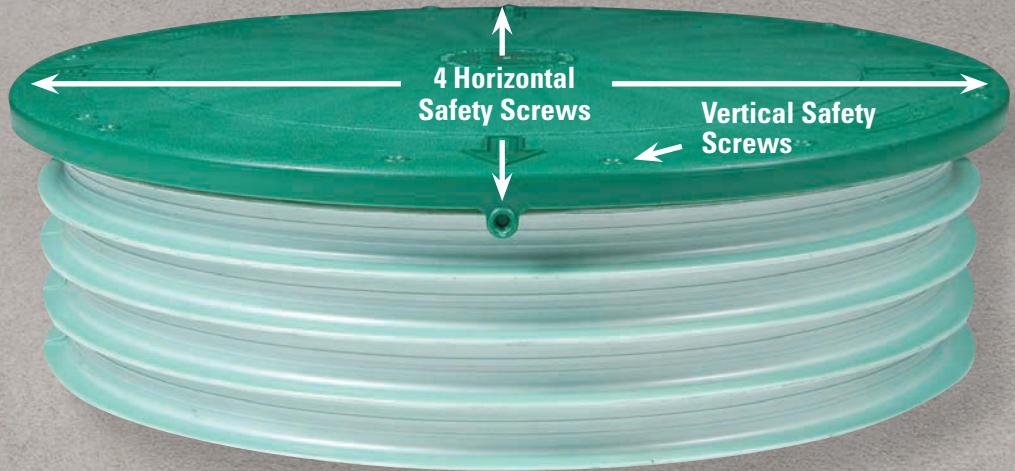
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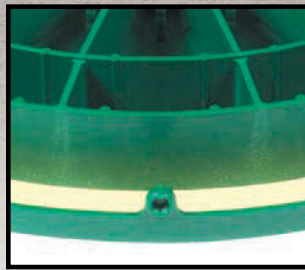
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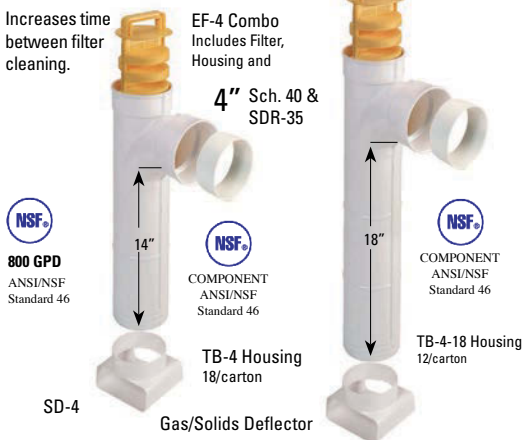
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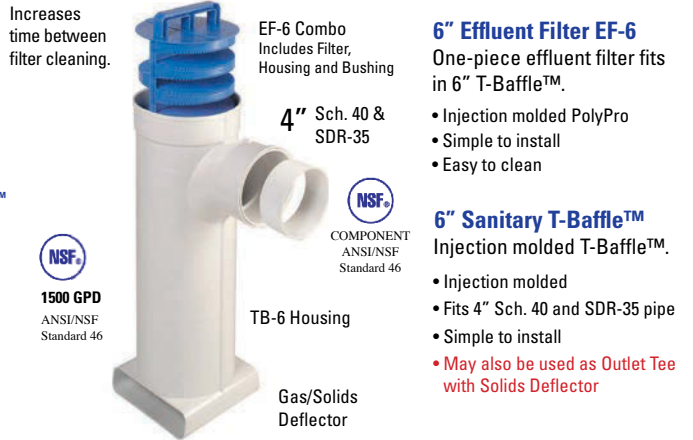
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Geared up in a reflective vest and hardhat, Green shows that site safety is a priority when he's working on a project. (Photos by John Marinelli)

Keep the HAMMER DOWN

Connecticut's Mark Green is a hands-on, cash-buying, race-lovin' installer who keeps the pedal to the metal to grow his start-up business

By Scottie Dayton

Relying on family and friends helped Mark Green grow Green Construction Management from a small residential firm to one capable of handling large commercial, industrial and municipal projects. Opened in 2010, the Waterbury, Conn., company removes fuel oil

tanks, does general commercial/industrial construction on a small scale, and installs commercial and residential onsite systems throughout the state and southern Massachusetts.

Green's business acumen and resolve never to refuse a job enabled him to triple the company's revenue – split 50/50 between environmental remediation and onsite installations – in three years. He attributes much of the growth to not having full-time employees and paying cash for everything. Green has no financial backing or credit cards. If he initially lacked money to fund a project, he did the work anyway, gambling that clients would honor their commitments. They did.

The company's success has propelled Green, 41, to a crossroad. He must decide whether to expand the company to meet customer demand, or reject work to retain absolute control of its quality. His ultimate goal is to spend more time with his wife and young daughter. It's a workaholic's dilemma.

TASTE OF SUCCESS

Green spent his childhood riding heavy construction equipment with his maternal grandfather Joseph Paparazzo, owner of Joseph Paparazzo and Son. The pair installed Green's first onsite system when he was 13. After graduating from high school, he tried working for Coca-Cola like his father. "I lasted a week," says Green. "Construction was in my blood."

The 22-year-old withdrew all his savings, bought a 1986 dump truck,

Green Construction Management, Waterbury, Conn.



OWNER:	Mark Green
YEARS IN BUSINESS:	3
EMPLOYEES:	2
MARKET AREA:	50-mile radius
SPECIALTY:	Onsite system design and installation, environmental site remediation and construction management
AFFILIATIONS:	Connecticut Onsite Wastewater Recycling Association
WEBSITE:	www.greenconstructionmanagement.com



ABOVE: Wayne Green uses a Spectrum LL500 laser/target (Spectra Precision) to confirm the proper height of a double row of CULTEC Contactor 100 chambers at a work site.
BELOW: Mark Green's young company serves customers in a 50-mile radius around Waterbury, Conn. Here he poses on a work site with his Volvo 250 excavator in the background.

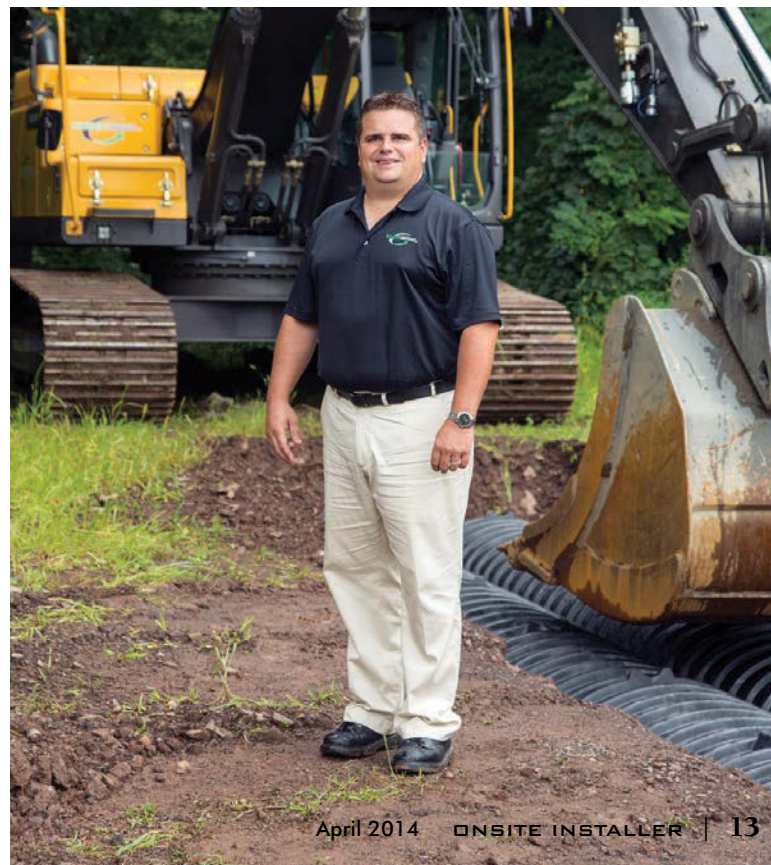
and opened Green Enterprise in 1994. Everywhere he hauled gravel, sand and contaminated soil, he found contractors needing more trucks. Green eventually rounded up 30 independent truckers, receiving a 10 percent finder's fee for each one. "I did almost \$1 million in revenue my first year," he says. "Then I began brokering trucks and paying the truckers."

"I never knock on doors. All the calls come to me, and we discuss projects over lunch. Clients trust me. I can't afford hired help screwing up a job and tarnishing my company's reputation."

Mark Green

However, the success and responsibilities overwhelmed the young entrepreneur and he returned to the family business. Green married Victoria in 2001 and Kaitlyn arrived in 2003. With a family to support, he curbed his independent spirit until 2010 when the urge to strike out on his own again hit hard. "I had enough clients who believed in me to find work, but it was slow the first year," says Green.

Lacking equipment, Green found projects suitable for subcontracting to cousin James Harrison and his company, HLC Excavation and Tank Removal in Woodbury, Conn. Green functioned as project manager. Although he made a good profit, cash flow the first year remained his biggest challenge. "I refused to carry credit, yet I wanted a reputation for paying subcontractors within 30 days," he says.



Meanwhile, Wayne Green retired from Coca-Cola and joined his son in the field a few days a week. In 2011, Wayne became the company's project supervisor and the only other full-time employee besides Mark Green. "Working together has elevated our relationship," he says. "Dad has become one of my closest friends."

GAINING A Foothold

The company's first environmental remediation job was subcontracting for GeoQuest, a full service environmental management and consulting firm in Bloomfield, Conn. GeoQuest's client had a leaking No. 2 fuel oil tank. Harrison's crew saw-cut and ripped out the asphalt, excavated the contaminated soil,

"Working together has elevated our relationship. Dad has become one of my closest friends."

Mark Green

stockpiled and covered it onsite, backfilled with structural material, and restored the paving. "Once the analytical and sampling reports were in the manifest, Jimmy hauled the soil to a landfill," says Green.

GeoQuest became a regular client, enabling Green to meet more people in the environmental field. Those associations led to a six-month project at Westover Air Reserve Base in Springfield, Mass., removing 22 550- to 5,000-gallon underground fuel oil storage tanks and remediating the site. Green and Harrison's crew worked 14-hour days, slept in a hotel on base, and went home on weekends. Green hired local truckers to transport the materials.

After the second remediation, Green became bonded and began bidding on municipal projects. He won the Town of Southington, Conn., contract to remove two underground No. 2 fuel oil storage tanks, remediate contaminated soil and install an above-ground combo concrete storage tank. "I managed the job and Jimmy's crew did the work," says Green. "During the project, I became friends with the town engineer, who gave me more tank jobs. With those two clients, the work really started rolling in."

COMMERCIAL CLIENTS

For the first two years, Green used HLC exclusively. As the scope of projects broadened, he subcontracted Tom Dauti, owner of Dauti Masonry in Prospect, Conn., for masonry work, and Vincent Noad of R V Noad Construction in Goshen, Conn., to install municipal sewer and water mains. Green relied on Herb Holden of Herb Holden Trucking in Broad Brook,



Mark Green (center) and daughter Kaitlyn Green are shown with driver David Gravel and his car. (Photo courtesy of Mark Green)

The race is on

Mark Green, owner of Green Construction Management in Waterbury, Conn., has been involved with modified class auto racing on asphalt tracks since his teenage years. He worked on the cars as a hobby, while his father helped on modified tours and even ran televised races. "Before marrying, I went to the local speedway once or twice a week," says Green.

After becoming a husband and father, Green abandoned his hobby for 10 years. Then his father joined the company in 2011 and reignited their love of racing. "Racing brought me closer to my father and now we're doing more things together outside of work," says Green.

Green never had the financing to become a driver, but now he enjoys sponsoring newcomers like David Gravel. The 20-year-old World of Outlaws STP Sprint Car Series competitor from Watertown drives No. 89G. "His father and I have been friends since high school," says Green. "We're proud of Dave. He was the 2008 360-Sprint Car Rookie of the Year and he's always a top-10 finisher. He'll be a national contender one day, and I'm pleased to help make his dreams come true."

Conn., to transport equipment and supplies. "We've known each other for 20 years and work well together," he says.

In 2013, Green bought a Volvo 250 excavator and EC35 rubber-tracked mini excavator, a Caterpillar 277 tracked skid-steer, Komatsu 380 wheel loader, and a Ford F-550 mason dump truck, and stored them in a rented garage. Father and son maintain the equipment, from oil changes to major repairs.

The company's onsite branch installs three to five residential systems a year plus an occasional system for a restaurant. Most designs are conventional with gravelless chambers in trenches. He sometimes utilizes CULTEC chambers for the work. Then the Town of Litchfield, Conn., posted a bid for an onsite system servicing a snack shop with restrooms on Sandy Beach. Green won the contract calling for a 1,000-gallon grease interceptor,



Mark Green is at the controls of his workhorse Volvo excavator installing a new drainfield.

2,000-gallon septic tank, and a 2,000-gallon pump tank discharging 800 feet uphill to a splitter box dosing a 100- by 300-foot chambered drainfield.

"The logistics were incredible," says Green. "We brought in the septic gravel while the sand was frozen, enabling the trucks to cross the beach and run up the hill to the drainfield area." With the beach still somewhat frozen that spring, HLC excavated holes for the tanks, but groundwater rushed in and collapsed the walls. Workers shored the excavations and the two dewatering pits where pumps ran continuously.

"When the truck arrived with the tanks, it couldn't get traction on the sand, so we pulled it with the excavator," says Green. The next challenge was maneuvering the truck close enough to set the tanks without settling it in the sand. Strong winds off the lake whipped water and sand in workers' faces and numbed exposed flesh. Despite everything, the job convinced Green that he could manage large commercial systems.

EXPANDING HORIZONS

The opportunity emerged from a small septic job Green did for DYMAR Corp. Its engineer, Mark Lancor, was designing a 27,476 gpd onsite system at a college preparatory school in South Kent, Conn., and invited Green to bid on it. "I thought I was in over my head, but it was just opening-night jitters," he says. After completing the job with HLC, Dauti Masonry, and his father, Green worked with DYMAR on commercial onsite systems, stormwater drainage improvements, and repairing sediment ponds and catch basins.

While Green faces challenges familiar to most installers – high groundwater, small lots and bedrock – he also encounters homes built on

land reclamations. One such client with a small lot was building an addition and needed to upgrade his onsite system. "I excavated what resembled a city dump from his backyard, which had bedrock running through the middle," says Green. "The only leaching system that fit with inches to spare was the S-Box from Geomatrix Systems." The 50-inch-long self-contained modules have serpentine filter fabric with septic sand packed into the voids.

LOOKING AHEAD

Having achieved his goals of fully paying subcontractors promptly and retaining control over every project, Green is reluctant to relinquish a single responsibility or business contact. "I never knock on doors," he says. "All the calls come to me, and we discuss projects over lunch. Clients trust me. I can't afford hired help screwing up a job and tarnishing my company's reputation."

Like many small business owners, Green faces a major challenge of chasing success and growth while balancing the need for family time. His family has been great about understanding that challenge.

"They've been tolerant of my absence so far, but I can't allow the business to dominate my life forever," he says. Rather than turn down jobs and give competitors an opening to court his clients, Green knows the ultimate solution is to find qualified managers who will maintain his standards of excellence. ▣

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Jim Anderson, Ph.D, and David Gustafson, P.E., are connected with the University of Minnesota onsite wastewater treatment education program. David is Extension Onsite Sewage Treatment Educator. Jim is former director of the university's Water Resources Center and is now an emeritus professor, as well as education program coordinator for the National Association of Wastewater Technicians. Readers are welcome to submit questions or article suggestions to Jim and David. Write to ander045@umn.edu.

Choosing Ground Cover

The right vegetation and proper ongoing maintenance of these plantings can make the difference between success or struggles for an onsite system

By Jim Anderson and David Gustafson

Last month we considered some aspects of landscaping and planting around soil treatment areas. This month we take a little closer look at planting and landscaping guidelines for onsite systems.

If you're establishing ground cover, topsoil should be added to a minimum of a 6-inch depth. Keep in mind applying more than the 6 inches, in effect, buries the system just that much deeper below the surface, working against the principle of keeping systems shallow for good water and oxygen exchange.

So while you may need to apply more soil to smooth contours and make the system fit in, add no more than 36 inches of total cover over the drainfield media, and less is better. Therefore, if the drainfield media were at a 24-inch depth before applying topsoil, the depth of topsoil should be a minimum of 6 inches and no more than 12 inches over the area. Recognize also that adding soil to the surface may require extending risers and inspection ports to the surface.

In general, there should be a minimum of tilling or surface preparation when planting. At the same time, the goal is to get vegetation established as quickly as possible to prevent soil erosion. Likewise, maintaining vegetation should not require working the soil excessively. Homeowners often ask us if they can plant vegetables. The answer is no, for two reasons: the potential for contact with the sewage, which can cause illness; and maintaining vegetable gardens requires extensive tillage.

EASY-CARE GRASSES

If the choice is turf grass, there are two ways to establish the lawn: through sodding or seeding. One obvious advantage of sod is immediate cover over the system, and it can be laid any time during the growing season. The disadvantages are expense and there is probably not the variety of grass material found when seeding.

The broad selection of grasses is the big advantage for seeding. You can move from the high maintenance Kentucky bluegrass to fine fescues that are more drought-tolerant and require little mowing during the year. There are also mixes of bluegrass and fescues available. Depending on the slopes at the site and the location of the mound or at-grade system, a combination of seeding and sod application can be employed to help prevent erosion.



ABOVE: This mound system was just completed and needs proper ground cover.
BELOW: A mound with a grass cover established.



Whether seeding with turf grass or establishing native grasses or wildflowers, erosion control is important to keep the soil in place and to establish uniform cover. While the grasses or perennials are being established, some type of erosion control blanket or mulch should be used. Mulch is appropriate for level sites, while erosion control blankets are good for side slopes of mound or at-grade systems. The blankets are composed of numerous types of materials, depending upon your location. They can be made up of straw, coconut, jute or other materials that will biodegrade over time. The blanket is staked in place covering the entire surface area to be protected. Holes can then be cut in the material to plant the wildflowers or perennials.

Use of native vegetation, including wildflowers and perennial grasses, is becoming more popular across the country. In Minnesota, where we live, this reflects a desire to have some flowers and color along with lower maintenance requirements of native plants. In more arid regions, the choice is more by necessity. Native plants are uniquely adapted to the drier climates and they will do well

Native plants are uniquely adapted to the drier climates and they will do well with little attention. They also fit the desire for plantings with fibrous root systems rather than tap roots.

with little attention. They also fit the desire for plantings with fibrous root systems rather than tap roots and they like drier sites, so are less likely to seek out water and interfere with the system.

HOMEOWNER TIPS

Here are a few points to emphasize with homeowners so they don't harm the system or themselves while caring for native plants:

Wear gloves for personal protection when working in these areas. And discourage frequent working of soil in a treatment area or where the septic tank is located. Suitable native vegetation will do well without constantly working the soil, which could result in compaction problems. Cold regions require continuous ground cover to help insulate the system, so cleaning up the perennial bed in the fall should be discouraged. That material should be left in place.

Any type of traffic over the system should be discouraged to protect the soil and the system from compaction and, in cold climates, from forcing frost deeper into the ground causing freezing problems. We see this condition a lot with mound systems, where the higher spot on the lawn makes an ideal parking place for ATVs or snowmobiles. In drier, warmer areas, these open areas seem to attract cars or RVs. Any of this activity can have a negative impact on the system.

In humid climates, shrubs and trees around systems can create numerous problems. They fail to provide the year-round erosion control and require

additional maintenance, which can create compaction problems and interfere with piping and sewage tanks.

From a landscaping standpoint, shrubs and trees – if kept away from the system – can be used to frame the area. Shrubs should be at least 20 feet away and trees at least 50 feet away from onsite systems. In drier areas, it's even more important to keep trees and shrubs away. In the desert southwest, we are often presented with pictures of root intrusion from a variety of vegetation types searching for water. Of particular note are nonnative species of ornamental palm trees and others. They are aggressive at seeking water to survive and are not a good fit for dry sites.

As always, the key is talking through homeowner preferences for the site and then working with the plant materials that fit the environment. □

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Wheels vs. Tracks

Compact track and skid-steer loaders each offer working advantages for onsite installers. Asking the right questions can help you decide whether to choose either one – or both.

By Peter Kenter

Compact track loaders (CTL) and skid-steer loaders (SSL) have become essential earth-moving tools for onsite installing professionals. Making an intelligent choice between a CTL and an SSL requires potential buyers to assess just what they want the vehicle to do, and under what conditions it will need to operate.

Bobcat Company's first SSL was introduced in 1959. Its first CTL was launched in 1999, a relatively recent addition to the product lineup. Mike Fitzgerald, loader product specialist with Bobcat, says customers are driving the evolution of loaders.

"We keep adding attachments that allow the equipment to do something different, but whether we use tires or rubber tracks that convert the skid-steer into a dedicated CTL, we never change the cab, upper frame, engines lift-arms or the hydraulic and hydrostatic pumps," he says. "The main difference is that on the skid-steer, the chain case drives the axle and the axle drives the wheels. On track loaders, two motors drive the sprockets that drive the rubber tracks."



Compact track loaders are a great choice if your terrain is loose and sandy. Tracks float better over the ground, which can extend your work season in the wet spring and fall months.



Contractors requiring a machine to handle a myriad of attachments, such as pallet forks, grapples and this auger, are generally best served by a skid-steer loader. (Photos courtesy of Bobcat Company)

CHOOSE FOR THE JOB

Fitzgerald says onsite installers don't generally come into a dealership conflicted over a tough decision between an SSL and a CTL.

"They walk in saying they have a job to do and want to know what will do it best, given the application and the ground condition of the projects," he says. "In the most general sense, leveling and digging and excavating primarily lend themselves best to a CTL, while multiuse machines that may require pallet forks, grapples or trench loaders, for example, are generally best served by an SSL."

The capital cost of the equipment is an obvious consideration. Buyers will need to calculate the advantage of buying one type of loader over another and factor cost into the type of contracts they'll be able to complete with it.

"Buyers will look to spend 25 to 35 percent more for a CTL over a skid-steer," says Fitzgerald. "For contractors who know just how they're going to

use them, they can make up the extra cost by excavating a few more septic tanks or extending their construction season by weeks or months because they have those tracks at their disposal.”

SSLs are somewhat lighter and faster than CTLs. However, the type of terrain in which the loader will be operating is also a significant consideration. Fitzgerald says contractors performing the same type of work in two different states might choose differently.

“If you’re working in the sandy soil of Florida or your region has its share of mud and slopes, you’d be better off with a track loader, where more track on the ground gives you better traction and flotation” he says. “If you’re excavating septic tanks in California, New Mexico or the adobe clay of Arizona, the hard ground will favor a skid-steer. Rocks, abrasive soil and even consistent contact with asphalt will cause premature wear to CTL tracks.”

“If you’re excavating septic tanks in California, New Mexico or the adobe clay of Arizona, the hard ground will favor a skid-steer. Rocks, abrasive soil and even consistent contact with asphalt will cause premature wear to CTL tracks.”

Mike Fitzgerald

While CTLs are more maneuverable on soft or muddy soils, SSLs are more versatile on firm soils, allowing installers to more easily work on septic tanks to be built in tight locations. CTLs, on the other hand, can move in on wet soil during spring thaws or after rain, without disturbing customer landscaping.

MENU OF ATTACHMENTS

Although all attachments for the CTL and SSL are mechanically interchangeable, Fitzgerald says it’s best to check which attachments are approved and recommended for each machine by the manufacturer. Common attachments include buckets, dozer blades, augers, trenchers and levelers.

Removable tracks: the best of both worlds?

While installers may find themselves choosing between skid-steer loaders and compact track loaders, some suppliers offer removable tracks that can be fitted over skid-steer wheels.

While they don’t offer the same maneuverability as a full-fledged CTL, or “float” quite as effectively on soft soils, the removable tracks can provide installers with a niche solution that may offer the best of both worlds.

Mike Fitzgerald, loader product specialist with Bobcat, reckons it will take two to three hours for an installer to fit the tracks over the wheels the first time. A specialized tool offered with each set of tracks helps to connect the track ends efficiently.

“After the first time, the steel tracks can be installed in under a half hour and removed in less than 10 minutes,” he says.

“Perhaps 5 to 10 percent of the attachments aren’t interchangeable,” he says. “A CTL weighs more than an SSL and can better take advantage of attachments that require a pushing force. A good example is a dozer blade that works best on a CTL because of the way that the track engages with the ground to create friction. Occasionally, attachments such as certain combination buckets are recommended only for the skid-steer.”

Much of the maintenance of CTLs and SSLs is entirely similar from greasing to oil changes to changing oil filters. However, the chain case on SSLs and the drive motors on track loaders require individualized attention. The loader tracks need to be cleaned of muck, rocks and grime daily.

“You also need to ensure that the track tension on CTLs is set properly,” says Fitzgerald. “We have a recommended track tension to provide the loader with best performance. If it’s too loose, the track could jump, but if it’s too tight, you will require more power to turn the track and could potentially cause premature wear to the sprockets.”

Fitzgerald says that while SSLs continue to outsell CTLs at Bobcat, the CTL market continues to grow.

“That doesn’t mean we expect the compact track loader to replace the skid-steer,” he says. “It means that buyers are beginning to understand the way they can use CTLs to maximize business opportunities. Into the near future, one machine will never handle all of your possible needs, so there’s plenty of room in the market for both types of loaders.” □

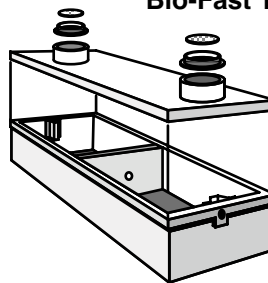
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Field technicians Jeremy Glover, Salvador Cisneros and Eddie Murillo from Southern Water and Soil level and compact sand around the Netafim drip tubing. (Photos courtesy of Greg Mayfield)



Linked In

Hooking up more and more units to a North Carolina trailer park prompted installation of a new advanced treatment system employing recirculating compartments and denitrification

By **Scottie Dayton**

As demand for sites at a mobile home park in Cedar Point, N.C., developed, the owners added more spaces with sewer connections. The increasing volume eventually overwhelmed the low-pressure pipe drainfield in the center of 96 lots.

Pumping the 5,000-gallon septic tank every other day prevented ponding and odors. During the system's permit renewal, the Carteret County Health Department inspector identified the situation and issued a consent decree.

President Greg Mayfield of Southern Water and Soil in Zephyrhills, Fla., worked with Orenco Systems' distributor Steve Barry of AQWA in Wilson,

SYSTEM PROFILE

Location:	Cedar Point, N.C.
Facility served:	Mobile home park
Certifying engineer:	Kevin Davidson, P.E., Agri-Waste Technology, Raleigh, N.C.
Installer:	Greg Mayfield, Southern Water and Soil, Zephyrhills, Fla.
Site conditions:	Fine sand, long-term acceptance rate of 1.0 gpd per square foot, high water table at 6 feet
Type of system:	Denitrification with drip irrigation
Hydraulic capacity:	12,000 gpd



Operator/project manager Drexyl Brewer and field technicians Salvador Cisneros, Eddie Murillo and Josh Wilkins from Southern Water and Soil prepare the grade for the AdvanTex AX-Max treatment module.

BELOW: Field technician Jeremy Glover from Southern Water and Soil connects the plumbing between the two AdvanTex AX-Max modules.

RIGHT: Eddie Murillo from Southern Water and Soil checks elevations to ensure the proper height of an AdvanTex AX-Max module.



N.C., to design a replacement system. They chose AdvanTex technology partially due to space restrictions, but primarily to reduce nutrient loading to protect sensitive aquatic life in the adjacent Intercoastal Waterway. Kevin Davidson, P.E., of Agri-Waste Technology in Raleigh, N.C., was the certifying engineer.

“Total nitrogen from the denitrification system had to be less than 20 mg/L,” says Mayfield. “The AdvanTex AX-Max matched up well, averaging 80 percent nitrogen reduction.”

According to Barry, the installation was the first of its kind in the state.

SITE CONDITIONS

Soils are fine sand with a long-term acceptance rate of 1.0 gpd per square foot and high water table at 6 feet.

SYSTEM COMPONENTS

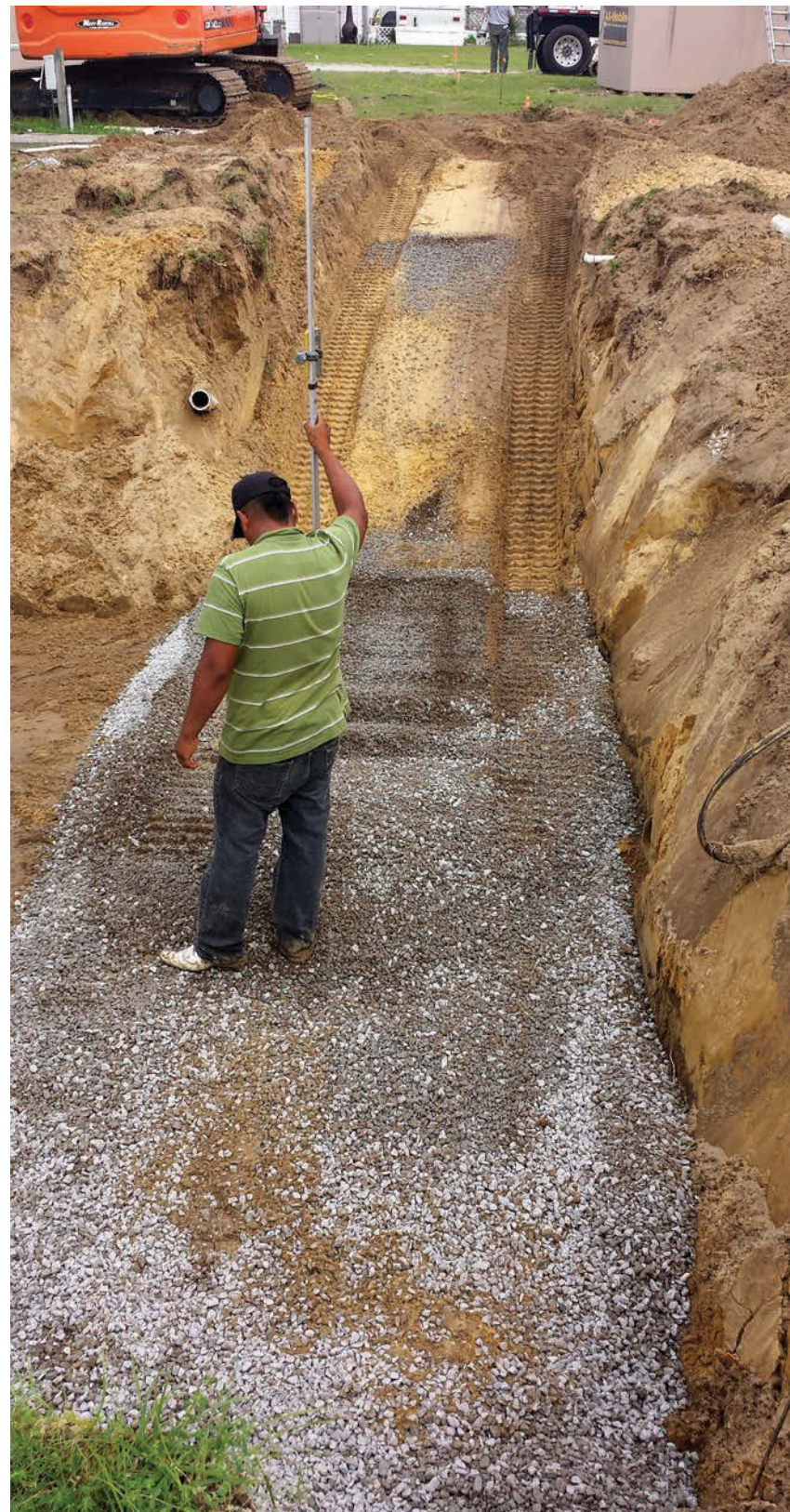
Major components of the 12,000 gpd system are:

- Primary 8,000-gallon dual-compartment concrete septic tank (All tanks from Shoaf Precast Septic Tank, Lexington, N.C.)
- Secondary 8,000-gallon dual-compartment septic tank with two 15-inch Biotube pump vaults, Orenco
- Existing 5,000-gallon single-compartment concrete tank converted to a tertiary septic tank
- 5,000-gallon dose tank with alternating 1/2 hp effluent pumps, Orenco
- 12,000-gallon AdvanTex AX-Max packed bed filter module, Orenco
- 12,000-gallon AdvanTex AX-Max denitrification module, Orenco
- 9,600 feet of 1/2-inch drip tubing, Netafim Irrigation
- TCOM control panel, Orenco

SYSTEM OPERATION

A lift station on the property pumps wastewater through a 2-inch force main to the septic tanks. The primary tank has effluent return lines from the recirculation pump in the treatment module and in the denitrification module. “When denitrifying, the septic tanks provide additional residence time to reduce nitrogen,” says Mayfield.

At preset intervals, pumps in the dose tank deliver 136 gallons to the three-compartment, 42-foot-long treatment module. As influent enters the



5,500-gallon recirculation-blending chamber, it mixes with filtrate dripping from the hanging textile media. A pump in a walled-off area sends 150 gallons per minute to a manifold above the media. A portion of each dose drips into the recirculation-filtrate chamber.

A baffle divides the flow between the recirculation-blending and recirculation-filtrate chambers, and a recirculation return valve controls liquid levels. No wastewater passes into the second chamber without first flowing through the media.



Effluent gravity flows through a 6-inch drainpipe to the denitrification module packed with 10 cubic yards of 1-inch tire chips. Bacterial action on the aggregate reduces nitrate to nitrogen gas released through the ventilation assembly. Recirculation is timed. When activated, the 1/2 hp recirculation pump sends 20 percent of the liquid back to the septic tank.

“Total nitrogen from the denitrification system had to be less than 20 mg/L. The AdvanTex AX-Max matched up well, averaging 80 percent nitrogen reduction.”

Greg Mayfield

Every 100 minutes, the pump doses the 11,360-square-foot drainfield, feeding 500 gallons at 25 gpm to two of the four 30- by 100-foot zones. Each zone has 24 laterals on 14.2-inch centers. Laterals combine in a manifold before returning to the headworks in the rear of the treatment module. To handle seasonal flows, the operator changes the rest cycle time. The system also has an emergency generator.

INSTALLATION

Mayfield and a crew of seven staged their equipment in a boat storage area after removing the vessels. The original drainfield provided a 150- by 250-foot-wide work area.

While waiting for the modules to arrive, the team used a rented Kubota

An AQWA employee helps guide an AdvanTex AX-Max module into place as Superior Cranes lowers it.

U25 compact excavator and two Bobcat T190 compact excavators to remove 30 inches of existing drainfield and stockpile the good sand. “After pumping the system for a year, the substandard 12-inch stone had no biomat,” says Mayfield. “Using stone undersized by six inches probably caused some of the system’s problems. However, the curtain drain was working, so we kept it.”

W.A. Page and Sons in Swansboro, N.C., removed unsuitable soil to a landfill, then brought in 40 loads of quality beach sand to build the new drainfield adjacent to the old one. To eliminate stratification, workers mixed the beach sand and stockpiled sand together with the T190s, then operator/project manager Drexyl Brewer used the Doosan DX140LC excavator to homogenize it further. They compressed each layer of sand spread on the drainfield until the bed was 6 to 8 inches above grade. After laying the drip tubing, they covered it with 12 inches of sand.

In total, installing the drainfield took two weeks. Mayfield’s father-in-law fielded questions from park residents and kept them a safe distance away. “They were fascinated with the project and excited about having a system that worked,” says Mayfield.

The crew returned two weeks later to set the tanks in the old drainfield. “The health department allowed us to set them above ground to avoid excavation problems below the water table,” says Mayfield.



From left to right: Greg Mayfield, R.S. (registered sanitarian), Southern Water and Soil; soil scientist Tom Hinson; Kevin Davidson, P.E., Agri-Waste Technology; and Steve Barry, R.S., AQWA.

Using the Doosan, Brewer excavated 4.5-foot-deep holes and partially filled them with gravel. Phillip Shoaf brought the tanks and Superior Cranes in Rockingham, N.C., set them. After the septic tanks were installed, the 100-ton crane became stuck in the sand while changing locations. Stabilization mats under the wheels freed the vehicle, then workers repositioned them until the crane reached the AX-Max installation site.

"It took from 9:30 a.m. to 3 p.m. to set and backfill the tanks to the lids with compacted sand," says Mayfield. "We worked until 9 p.m. with a team from AQWA installing the pre-plumbed treatment units. For a system this size, though, the installation was easy."

The modules shipped with integrated lugs and lifting cables. After Brewer excavated 3.5-foot-deep holes and laborers bedded them with 12 inches of compacted gravel, Superior Cranes set the containers. Working under lights, Brewer used the Doosan to lift 1-ton bags of tire chips over the tank in the denitrification module. AQWA workers standing on the module's scaffolding, cut open the bags, then Brewer moved the bucket back and forth to spread the aggregate as it fell out. Each bag contained two cubic yards.

Mayfield's team backfilled with sand around the modules to final grade. After the system was finished, park management fenced off the area.

MAINTENANCE

AQWA holds the two-year maintenance agreement. The state requires a certified operator with a subsurface operator license and backup operator for the system. Dan Fortin, a Grade IV wastewater operator, visits the system periodically to check the nozzles and clean the Biotube filters. "While the AX-Max is extremely robust, all wastewater treatment systems require a certain level of operation and maintenance to achieve their treatment goals," says Barry. □

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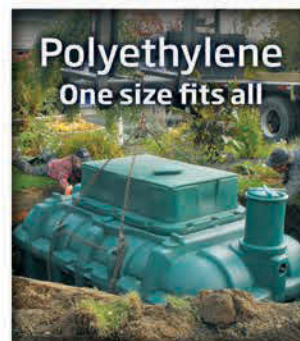
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New Florida plan calls for massive government payout for septic tank replacements

By Doug Day and Sharon Verbeten

Replacing failing septic tanks is one part of a broad bill to improve water quality in Florida. The \$380 million cleanup plan proposed by five lawmakers is expected to receive attention this year in the legislature. A septic tank inspection law passed three years ago was later repealed after public opposition.

As drafted, the new bill would require the state's Department of Environmental Protection and local governments to identify leaking septic systems and replace them – with the state paying the entire bill. The proposal would also require wastewater treatment plants to cut nitrogen from their effluent, require slow-release fertilizers for lawns, require best management practices for agriculture that are now encouraged but not mandated, and ban new water withdrawal permits if they would have a negative effect on water flow in springs, rivers and aquifers.

OHIO

State health officials will try again to enact new septic standards, six years after their last attempt was rescinded when homebuilders and Ohio lawmakers complained they were too expensive. The new proposal would offer homeowners more and lower-cost options, according to the state's Department of Health.

The rules would require adequate amounts of soil in different regions of the state to treat home sewage. If soil is deemed inadequate for a new or replacement septic system, homeowners would have to install more-expensive treatment equipment or additional soil. The state feels it is necessary because Ohio's septic-tank law, enacted in 1977, did not set a clear standard for how much soil is needed. The new rules would not force homeowners to replace working systems, but would apply to new houses and replacements for failed septic systems.

State data reveals 4,031 new septic systems were installed statewide in 2012; more than half were standard septic systems with an average cost of less than \$8,000.

IDAHO

The state Department of Environmental Quality is working on changes to its regulations on the design, construction and operation of septic systems. The revisions will address the installation and use of in-trench sand filters and the development, recording and surveying of septic system easements for local health districts in Idaho. □

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

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Anua PO Box 77457 Greensboro, NC 27417 800-787-2356 336-547-9338 Fax: 336-547-8559 info@anua-us.com www.anua-us.com See ad page 2 	Platinum SAF	480 to 955	2011	Platinum Submerged Aerated Filter (SAF) gives owners flexible and economical choices for protecting critical water resources. Key product benefits include: Strong fiberglass tank for underground installation (including blower and low-profile access covers), submerged aerated filter with high surface area and no bypass of media, integrated biomass return from clarifier to primary tank and small footprint for an environmentally sensitive installation in residential, small neighborhood and commercial applications. Platinum's unique design and three-step treatment system features a submerged aerated filter that reduces the level of BOD and TSS in the effluent to secondary standards. Platinum also provides nitrogen reduction exceeding 50 percent.	Most States and Canada
Bio-Microbics, Inc. 8450 Cole Parkway Shawnee, KS 66227 800-753-3278 (FAST) 913-422-0707 Fax: 913-422-0808 sales@biomicrobics.com www.biomicrobics.com See ad page 7 	MicroFAST	500 to 9,000	1996	Simple-to-install and maintain, the Fixed Integrated Treatment Technology (FITT) of the MicroFAST systems allow for robust, aerobic treatment inside the tank. These systems create an optimized environment with consistent aeration and mixing throughout the media for maximum biomass generation to withstand periods of high and low input. These residential onsite wastewater treatment systems meet most state requirements and provide advanced wastewater treatment options. Technology certifications include NSF Std 40 class 1 and 245 (nitrogen reduction). The FAST technology received Frost & Sullivan Technology Innovation Awards in 2010 and 2011 for commercial applications. Larger systems available for multi-family and commercial applications.	All US States and Territories
	RetroFAST	150 to 375	2000	Easily installs in new or existing tanks, requires minimal cost to operate/maintain, and avoid digging up your yard, the RetroFAST is offered for the S.O.S. -Save Our Septic Remediation Program (with Homeowner's Warranty). With "Fixed Integrated Technology" (FITT), the RetroFAST systems allow for robust, aerobic treatment inside the tank to deliver high levels of treatment! Certifications include: EPA ETV, EPA's approved system for project sites, and "2009 EPA: Reduction of Nitrogen in Domestic Wastewater from Individual Residential Homes." The RetroFAST also exceeded U.S. EPA's "Economic Analysis of Final Water Quality Standards for Nutrients for Lakes & Flowing Waters in Florida."	
	BioBarrier	500 to 9,000	2007	Ideal for even direct discharge with no additional disinfection, the BioBarrier MBR and HSMBR (1,500-9,000+ gpd) technology can make the most difficult sites usable: BOD <2 mg/L, TSS <2, Ammonia <1, and reduces Fecal Coliform & E. Coli: <10 cfu (colony forming units). As the first system to achieve NSF/ANSI Std 350 (Water Reuse), the BioBarrier system met Water Quality Standards for interior water usage or above surface discharge. Technology certifications include NSF Std 40 class 1, 245 (nitrogen reduction), and the only system certified NSF Std 350 (Water Reuse). Larger systems available for multi-family and commercial applications.	
Clarus Environmental Products/Zoeller Company 3649 Cane Run Rd. Louisville, KY 40211 800-928-7867 502-778-2731 Fax: 502-774-3624 www.zoeller.com See ad page 25 	Fusion Series	450 to 800	2006	Fusion Series Treatment Systems combine both anaerobic and aerobic treatment processes in one small tank utilizing plastic media to culture large populations of bacteria to enhance treatment. Treated effluent is recirculated back to the first chamber which reduces total nitrogen through the process of denitrification. Automatic backwashing of the aerobic media and sludge return reduces excess biofilms and accumulated sludges, which are returned to the first chamber for redigestion. One small linear air pump utilizing 60 watts of power controls all treatment, backwash, and sludge return processes.	AL, AR, AZ, CA, GA, HI, IA, IN, KY, MD, MI, MN, MO, NM, NY, OH, TX, VA, WA, WI, WV
Delta Environmental Products 8263 Florida Blvd. Denham Springs, LA 70726 800-219-9183 225-665-6162 Fax: 225-664-9467 www.deltaenvironmental.com 	DF Series	500 to 1,500	1993	The process occurs entirely within the self-contained treatment unit which is comprised of outer mixing tank and a cone-shaped settling chamber. Raw, unsettled domestic wastewater enters directly into the mixing tank where mixing occurs through an air distribution system. The mixed liquid then enters the settling chamber from the bottom. The settling chamber maintains a quiet condition which allows solids to settle down and re-enter the mixing chamber for more processing. The liquid is hydraulically displaced upward and is discharged as a clear, odorless treated water which meets or exceeds state water quality standards.	AL, AK, AZ, BC, BWI, CA, CO, FL, GA, HI, ID, IL, IN, IA, KY, LA, ME, MI, MD, MN, MO, MS, MT, NC, NM, NV, NY, OH, OK, ON, OR, TN, TX, UT, VA, WA, WI, WV
	Ecopod-N Series	500 to 1,500	2006	Wastewater enters a pretreatment/settling tank similar to conventional septic tanks. In this tank, debris and settleable solids settle to the bottom and are decomposed by anaerobic bacteria. The effluent leaves the pretreatment tank and enters the Ecopod-N Fixed Film Wastewater Treatment System reactor tank, where it is introduced to an oxygen-rich environment. In this oxygen-rich environment, a colony of bacteria, called the biomass, develops and is capable of digesting biodegradable waste into carbon dioxide and water.	
	Enviro-Aire Series	500 to 1,500	2005	The plant achieves treatment by a flow through process. Raw sewage enters a primary chamber, which has a hydraulic capacity of 346 gallons, providing a retention time of 16.6 hours. This chamber provides for separation of heavy, easily settled solids as well as floatable materials such as grease. Settleable solids accumulate on the bottom and floatable solids accumulate on the surface. Effluent from the clear layer flows into an aeration/mixing chamber with a 28-hr retention time. An aeration system provides for oxygenation of the primary effluent with the wastewater in the aeration/mixing chamber. Air is introduced by passing from the air pump to the air drop-line located in the chamber. The mixed liquor enters the settling chamber at the bottom and travels upward toward the discharge pipe. The quiet condition allows solids to settle down and re-enter the mixing chamber.	IL, LA, MS, TX

MANUFACTURER	BRAND	GPD	RELEASED	DESCRIPTION	DISTRIBUTORS
Eliminite, Inc. 845 Glider Ln., A & B Belgrade, MT 59714 888-406-2289 406-581-1613 tjk@eliminite.com www.eliminite.com	Eliminite	50,000	1999	The Eliminite C-Series is suitable for residential, community, commercial, industrial and resort applications, including high-strength waste applications and oil and gas development applications, up to 50,000 gpd.	CA, CO, MI, MT, NM, more pending
Eljen Corporation 125 McKee St. East Hartford, CT 06108 800-444-1359 Fax: 860-610-0427 info@eljen.com www.eljen.com See ad page 29 	Passive Geo-Textile Sand Filter System		1985	The Geotextile Sand Filter (GSF) product from Eljen Corporation is an advanced wastewater treatment and dispersal technology. The Eljen GSF's unique design provides treatment and dispersal in the same footprint while keeping installations easy and maintenance minimal. Independent testing has shown that the Eljen GSF's performance is compliant with NSF/ANSI Standard 40 Protocol and provides advanced treatment of septic tank effluent to better than secondary levels.	US and Europe
Hoot Systems, LLC 2885 Highway 14 E Lake Charles, LA 70607 888-878-4668 337-474-2804 Fax: 337-477-7904 questions@hootsystems.com www.hootsystems.com 	LA-Hoot	500 to 1,000	2001	LA-Hoot is an improved version from the original Hoot Treatment System introduced in 1984. Results are better than 10/10 mg/L on CBOD and TSS, with more than a 95% reduction of the wastewater influent. Two-year warranty/NSF Standard 40 certified.	AL, AZ, CA, CO, FL, KS, LA, MA, MD, MN, NJ, OH, OK, PA, TX, VA, WI
	H-Series	500 to 1,200	1995	Five-stage, one piece system with a pretreatment tank, aeration chamber, final clarifier, optional disinfection device and a pump tank. Results are better than 5/5 mg/L on CBOD/TSS. A 99 percent reduction on CBOD and TSS. Marketed as BNR in MD and FL with Biological Nitrogen Reduction of >50%. Three-year warranty/NSF Standard 40 certified.	
	ANR	450 to 675	2007	Adds Advanced Nutrient Reduction to the Hoot System. Results of 5.8 mg/L on TN, better than 10/10/10 mg/L on CBOD/TSS and Total Nitrogen. Areas where 10 mg/L is the discharge limit for Total Nitrogen, the federal level for drinking water. Three-year warranty/NSF Standard 40 and 245 certified.	
Jet, Inc. 750 Alpha Dr. Cleveland, OH 44143 800-321-6960 440-461-2000 Fax: 440-442-9008 email@jetincorp.com www.jetincorp.com See ad page 31 	J 1500 BAT Media Plant; J 500-800 PLT	500 to 1,500		Jet's residential wastewater treatment plants employ the Jet BAT Process Media which provides the ideal environment for nature's own bacteria to thrive and grow. Great numbers of these living microorganisms attach themselves to this submerged structure to create a "biomass" that rapidly treats wastewater. The Jet 700++ Aerator provides the mixing and fresh oxygen the microorganisms require to live while the Jet BAT Process Media provides the environment to support the microorganisms that allow natural filtration and biological reduction to take place. Available in concrete and plastic.	US and International
Norweco, Inc. 220 Republic St. Norwalk, OH 44857 800-667-9326 (NORWECO) 419-668-4471 Fax: 419-663-5440 email@norweco.com www.norweco.com 	Hydro-Kinetic	500 to 1,500		The Hydro-Kinetic wastewater treatment system employs innovative Hydro-Kinetic filtration technology to produce the cleanest, most consistent effluent quality available. They Hydro-Kinetic system uses the extended aeration and attached growth processes to treat wastewater, and features innovative nitrification-denitrification technology. The Hydro-Kinetic FEU system is the only NSF/ANSI Standard 40 and 245 certified residential wastewater treatment system to pass two consecutive back-to-back tests without performing routine maintenance for a full 12 months. It quietly, efficiently and automatically pretreats, aerates, flow equalizes and filters all wastewater returning only the purest effluent back to the environment.	North America, Central America, South America, Europe, Africa and Middle East
	Singulair	500 to 1,500		The Singulair system is the state-of-the-art alternative to a troublesome septic tank for domestic wastewater treatment. Employing the extended aeration process, the Singulair plant provides flow equalization, pretreatment, aeration, clarification, tertiary filtration and optional chemical addition within a single precast concrete tank. Designed for domestic wastewater flows ranging from 500 to 1,500 gpd, performance of the Singulair system is certified by NSF International (Standards 40 and 245) and the Canadian Standards Association.	
	Singulair Green	500 to 1,500		The Singulair Green aerobic treatment system incorporates Norweco's advanced aerobic treatment process into a durable, watertight polyethylene tank. It is ideal for new or retrofit applications and can be installed easily in the most difficult jobsite with just a backhoe. Incorporating patent-pending support ribs and in herently strong arch shape, the durable Singulair Green tank will provide decades of reliable performance. Designed for domestic wastewater flows up to 600 gpd, with treatment performance meeting or exceeding the strictest state and county requirements, Singulair Green is certified by NSF International.	
Premier Tech Aqua 1 avenue Premier Riviere-du-Loup, PQ G5R 6C1 Canada 800-632-6356 418-867-8883 Fax: 418-862-6642 pta@premiertech.com www.premiertechaqua.com See ad page 23 	Ecoflo	460 to 960	1995	Ecoflo is a wastewater treatment system that can be installed in different site conditions. It features a fiberglass, concrete or polyethylene tank, high-resistance plastic distribution system and integrated pump vault (when the treated effluent has to be pumped out to a surface disposal). It uses a patented quality-controlled filtering media to treat wastewater coming from the septic tank. No electric power is required to achieve treatment which exceeds standards. Filtering media and mechanical components are accessible for routine maintenance and verifications. Compact and modular, Ecoflo can be used for residential, commercial and small community projects.	US and Canada

MANUFACTURER	BRAND	GPD	RELEASED	DESCRIPTION	DISTRIBUTORS
Presby Environmental 143 Airport Rd. Whitefield, NH 03598 800-473-5298 603-837-3826 Fax: 603-837-9864 info@presbyeco.com www.presbyenvironmental.com See ad page 6  Presby Environmental, Inc.	Advanced Enviro-Septic	Varies		Advanced Enviro-Septic is the only Passive Treatment and Dispersal product of its kind that has earned third-party certification from NSF Class 1, Cebedeau, and BNQ. AES is designed for residential, commercial and community use, and proven to remove up to 99 percent of wastewater contaminants without use of electricity or replacement media. Advanced Enviro-Septic quickly and naturally establishes an ecosystem that breaks down and digests wastewater contaminants leaving the septic tank. The system discharges highly purified wastewater, preventing groundwater contamination and soil clogging.	US, Canada, France, Belgium, Australia
RH2O North America Inc. 268 Woolwich St., S Breslau, ON N0B 1M0 Canada 519-648-3475 info@rh2o.com www.rh2o.com 	WSB clean WSB clean pro	400 to 1,800 1 to 100,000	2002	WSB clean is the first moving bed biofilm reactor (MBBR) wastewater treatment system available for decentralized wastewater treatment systems. WSB clean uses patented plastic media to provide the ideal housing for microorganisms as a thin biofilm. The media is self-cleaning and never has to be cleaned or replaced. System is NSF Standard 40 class 1 certified up to 1,500 gpd. All WSB clean systems come standard with control panels with 24/7 remote management offering full operational surveillance of each system with instant notification sent via email and SMS. Control panels come standard with current sense and room for spare outputs for controlling pump stations (no extra control panels required). Our wastewater treatment process and control system translate into easy operation, low energy, maintenance and life cycle costs. WSB clean pro systems are custom designed for high strength wastewater and larger flow systems up to 100,000 gpd. Add-ons for phosphorus removal and nitrogen removal are available.	18+ Countries, Seeking Distributors in USA and Canada
SeptiTech - a subsidiary of Bio-Microbics, Inc. 69 Holland St. Lewiston, ME 04240 800-318-7967 207-333-6940 Fax: 207-333-3944 info@septitech.com www.septitech.com 	SeptiTech STARR Residential Systems SeptiTech STARR Commercial Systems	500 to 4,500+ 500 to 150,000+	1996	<p>The simple, automatic and reliable equalization and clarification process of the SeptiTech STAAR (Smart Trickling Anaerobic/Aerobic Recirculation) Residential Filter Systems treat 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. The "Smart" controller of the STAAR" systems recognizes situations dealing with peak, low, intermittent or no flow conditions. SeptiTech's "Smart" technology allows the system to go into a sleep mode that will dial down activity and eventually shut all power off until normal flow conditions are detected. This allows the STAAR system to achieve lower operating costs and power requirements. Additional features are also available to further enhance quality and dependability.</p> <p>SeptiTech's STAAR Commercial Filter Systems utilize a biopack plastic media to treat high organic loads that integrate with other technologies and accessories. The simple, automatic and reliable equalization and clarification process of the STAAR 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. The "Smart" controller of the STAAR systems recognizes situations dealing with peak, low, intermittent or no flow conditions. SeptiTech's "Smart" technology allows the system to go into a sleep mode that will dial down activity and eventually shut all power off until normal flow conditions are detected. This allows the STAAR system to achieve lower operating costs and power requirements. Additional features are also available to further enhance quality and dependability.</p>	All US States and US Territories
Waterloo Biofilter Systems Inc. PO Box 400 Rockwood, ON N0B 2K0 Canada 519-856-0757 Fax: 519-856-0759 info@waterloo-biofilter.com www.waterloo-biofilter.com  Waterloo Biofilter Systems Inc. on-site wastewater treatment	Waterloo Biofilter	300 to 50,000	1995	The Waterloo Biofilter is an efficient, low maintenance trickle filter for treating residential & commercial wastewater. There is no aerobic sludge management and very low power consumption. Due to our substantial field experience since 1994, the patented absorbent filter medium has a 20-year warranty. We offer a variety of small to large plug-and-play configurations for ease of installation. This includes attractive self-contained modules in 5,000 and 10,000 gpd ISO shipping container units, and remote camp units transportable by helicopter. During the latest term at an example school, the patented WaterNOx denitrification system removed 95% TN with cBOD & TSS < 5 mg/L. The new Waterloo EC-P is shown to remove TP to <0.3 mg/L as retrofits to houses with conventional soil beds and Waterloo Biofilters. Tested under the stringent NSF-EPA Environmental Technology Verification Program and proven in Canada's harsh environment with thousands of systems operating.	MA, MI, MO and Canada

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Winning By a Whisker

South Dakota's Avery Zahn wins the National Roe-D-Hoe competition by a few seconds as top machine operators face off in Indianapolis

By Ed Wodalski

Avery Zahn, 31, leaves little doubt what he plans to do with the \$1,000 he pocketed for winning the 2014 National Backhoe Roe-D-Hoe in Indianapolis. "It's going towards the restoration of my '67 Camaro," he says.

Zahn's combined time of 55 seconds was the best among 11 finalists that included the top 10 qualifiers and Iowa State Champion Tim Rozendall of Otley, Iowa, who placed seventh. The event took place at the Pumper & Cleaner Environmental Expo International in February.

Sponsored by the National Onsite Wastewater Recycling Association, 86 contestants made 127 attempts at placing bowling pins into PVC tubes and setting a golf ball atop a safety cone from behind the controls of a mini-excavator.

This was Zahn's second year in the competition. He didn't have much time to savor the title. Returning from the Expo, he



Pictured (from left) are sponsors of the National Backhoe Roe-D-Hoe and the top three finishers: Zak Sherman, Infiltrator Systems Inc.; Chris Mandich, Jet Inc.; Mark Shepard, third place; Jenny Borgeson, Norweco; Avery Zahn, champion; Annette Simon, Norweco; Rodney Kyler, runner-up; Robin Cassidy, Norweco; and Rick Kirkpatrick, Infiltrator. (Photo courtesy Tom Fritts)

"I think some of these guys have setups in their garages because we had some amazing times."

Jessi Wood

faced 16-hour days jetting out frozen water lines during a tough, long winter.

The owner of Infra Track, a jetting, hydroexcavating and sewer televising company in Worthing, S.D., Zahn has been operating excavators since age 19. In January he sold his septic and excavating business to Nick See, who finished ninth in the Roe-D-Hoe.

Rodney Kyler of Malta, Ill., placed second with a time of 58 seconds and received \$500. Mark Shepard of Overland Park, Kan., last year's Kansas State Champion, received \$250 for his third-place time of 1 minute, 4 seconds. The top three finishers also received commemorative belt buckles.

Jeremy Yates of Lenexa, Kan., placed fourth with a time of 1 minute, 6

seconds and David Haney of Bradford, Ohio, was fifth in 1 minute, 8 seconds. Rounding out the finalists were Mathew Weaver of Ephrata, Pa.; Josh Reading of Grant Park, Ill.; Troy Himes of Fort Valley, Ga.; and Ron Miller of New Brighton, Pa., who had a record-breaking time of 35 seconds in the bowling event.

"Most of the contestants this year had very quick times, which is another reason we had the ability to get more contestants through and not have a lot of wait time," according to Roe-D-Hoe chair Jessi Wood. "I think some of these guys have setups in their garages because we had some amazing times."

Several father/son competitions highlighted the event, including Kyler, 56, who battled his son Matt, 21. The elder Kyler never doubted he would finish ahead of his son, even if Matt turned a faster time during qualifying. "I guess I always figured I would beat him, just because I have 40 years experience and he's only got a couple. You always wish your kids do as well as you, but a lot of that takes experience."



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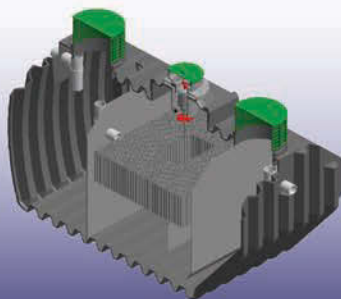
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Although they didn't place in the finals, Jon Houseknecht, 52, of Sunset Septic & Excavating in Rolling Prairie, Ind., and his sons Cody, 25, and Colt, 15, have competed in every Roe-D-Hoe since 2010. Cody came out on top this year, placing 68th with a time of 1 minute, 55 seconds.

"Cody and Colt both started out running equipment at 9 years old," Houseknecht says. Each family title includes bragging rights for the year.

Another father/son team was Tom Krueger of Traverse City, Mich., and his son Levi. Tom placed 76th with a time of 1 minute, 56 seconds and Levi was 93rd.

Benjamin and Mathieu Leblanc of Quebec, Canada, added an international flavor to the event. Benjamin had the better time of the French-speaking brothers, placing 64th in 1 minute, 51 seconds.

Among the familiar faces in the competition was Josh Reading, last year's runner-up. Reading and his brother Mike have been annual entrants, although Mike was unable to compete this year.

Contributing sponsors for the Roe-D-Hoe included Advanced Drainage Systems (ADS), Norweco, Jet Inc. and Infiltrator Systems Inc., with space and seating donated by COLE Inc. ■

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Joining Forces

In Wisconsin, pumpers and installers work together for the betterment of the decentralized wastewater industry

By Doug Day

The Wisconsin Onsite Water Recycling Association provides many continuing education opportunities for its members. For those who strive to excel in their profession, WOWRA also offers a two-day course that goes beyond the basics of onsite wastewater and gets into ethics, customer relations and professionalism.

Since February 2012, George Klaetsch and Katie Boycks have managed WOWRA as executive director and association manager, respectively. WOWRA was formed in 1974 to represent installers in the Badger State as well as soil testers, designers, manufacturers and related governmental and education personnel. Through Klaetsch Public Affairs Strategies, the two also represent the state's Wisconsin Liquid Waste Carriers Association (WLWCA), and Wisconsin Precast Concrete Association (WPCA).

While the groups have individual issues and interests, they usually converge somewhere along the line.

What impressed you most when you took over the management function?

Klaetsch: About five years ago, WOWRA created the Private Onsite Wastewater Treatment System (POWTS) Evaluator Training and Certification Program. It is totally voluntary; there is nothing in state laws or rules that require onsite professionals to take the course. It is for those who want to become stronger and build their expertise in the proper techniques for conducting evaluations of private onsite wastewater treatment systems. About 50 people have been certified. We're now doing outreach to the Upper Peninsula of Michigan because onsite professionals there have expressed some interest.

Boycks: It also helps create consistency when evaluating POWTS. One day is classroom work; the second day is spent out in the field evaluating actual systems. It covers ethics and requirements, evaluator/client relationship and responsibilities, evaluation procedures from data collection through final reports, and procedures for evaluating POWTS. They have to pass an exam to receive certification and an ID card they can display to show customers that they've taken the extra step to excel in their profession.

Klaetsch: It was created from the ground up by four WOWRA members: Todd Stair, Rick Apfel, Rich Halverson and Susan Schambureck. They created everything from the curriculum and instructional material to the test and procedures needed to offer 16 continuing education credits to help onsite professionals excel. The certification tells everyone in the housing



Reach George Klaetsch and Katie Boycks at 608/441-1436 or info@wowra.com.

industry, installers, pumpers, home inspectors and real estate agents, that the resident of that home can be confident and secure in the knowledge that their POWTS is operating correctly.

You are relatively new to WOWRA; what stands out to you at this point?

Klaetsch: The ability of the membership to coalesce during the time of the transition. The board of directors, and a tremendous number of members, were very dedicated and loyal to the organization. It took a lot of time to select a new management firm, move the offices, and do all the work needed like changing checking accounts, transferring the books and website. We had to rely on them, especially President Aaron Ausen. They were very patient and willing to work with us.

What does your WOWRA membership look like?

Boycks: We have 152 members, primarily installers, with a few pumpers. We have 22 associate members who are mainly suppliers. We provide them with an electronic newsletter every two weeks along with a quarterly newsletter that gets mailed to them.

Our annual winter conference is held in January in association with the liquid waste haulers group. Attendees can get a combined 28 continuing education credits for both the Department of Safety and Professional Services and the [state] Department of Natural Resources.



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How about the other two organizations you manage?

Boycks: WLWCA has 172 members and there are 55 in WPCA. WLWCA is doing a great job with their summer conference, which is a new approach versus the classroom training they did in the past. For the past two years, they've held the conference at trucking companies and received hands-on training on brakes, blowers and doing truck walk-around inspections. They also had stations for continuing education credits on testing, calibrating and logging pH meters and test strips, understanding pH meter temperature correction, and when to repair or replace different types of valves.

WPCA is doing something new this year by providing rigging and signaling training for compliance with OSHA [Occupational Safety and Health Administration] regulations. We are bringing in an outside trainer to train company reps who can then go back and train the rest of the employees at their shops.

What are your main membership services?

Klaetsch: The primary services we provide for all three groups are programming, information and legislative representation. Programming for WOWRA includes access to around 60 total CEUs a year that can be applied to maintaining their certifications. Our information resources include what's happening at the state capital or within the regulatory agencies, and lobbying on behalf of our members. We cover the state legislature and administration, so that includes other issues like worker's compensation and unemployment. We also have a political involvement program called Wisconsin Industries for Environmental Protection. It is a conduit program; members voluntarily donate money and can direct their funds to the campaigns of candidates of their choice. It is done jointly with the waste haulers and precast concrete groups to represent the entire onsite wastewater community.

It is interesting that you manage all three groups.

Are there benefits to that?

Klaetsch: There really are. It gives us a really strong understanding of how the installer and pumper businesses are interrelated and we have a better appreciation of the manufacturers' side. They were all under the same umbrella before, too. When they made the decision, individually, to transition to a different firm for association management and lobbying, they worked together to create their requests for proposals and did all the screening, interviewing and selection as one unit. They do work very well with one another. □

Here's the course outline for the WOWRA Private Onsite Wastewater Treatment System (POWTS) Evaluator Training and Certification Program:

- **Purpose of training program**
 - Standard of practice
 - Code of ethics
- **Program basics**
 - Evaluator/client relationship
 - Professionalism
 - Evaluation agreement
 - Winter POWTS evaluations
 - Hydraulic testing policy
- **Safety**
- **Data Collection**
- **Procedures for evaluating**
 - Septic tanks
 - Dose tanks
 - Pretreatment
 - Soil absorption areas
 - Biological clogging mats – process and interpretation
 - Soils
 - Holding tanks
- **General procedures and knowledge**
 - Terminology
 - Calculations – area, tank volume
 - Setbacks
 - Frozen POWTS
 - The POWTS biological environment
- **Reporting**
 - Determination of function
- **Field demonstrations and practice**
- **Written exam**
- **Practical exam**

Advanced Treatment Units

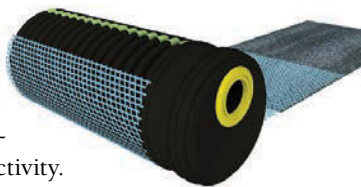
By Craig Mandli

A growing demand for installation and maintenance of advanced treatment units reflects a trend toward more and more regulations governing septic systems. Here are aerobic systems, recirculating filters, peat systems and nitrogen removal systems designed to provide wastewater treatment alternatives.

AEROBIC SYSTEMS

HDPE pipe-leaching system

The GEO-flow HDPE pipe-leaching system from Advanced Drainage Systems promotes an oxygen-rich environment for increased biomat activity. It utilizes a 10-inch-diameter, single-wall high-density polyethylene (HDPE) corrugated pipe, surrounded in a polypropylene grid, with both encased in geotextile fabric. This creates equal distribution and enhances biological reduction of wastewater before it leaves this gravelless pipe system. The system's test-proven treatment capability supports system-sizing reductions in many states. 800/821-6710; www.ads-pipe.com.



Suspended-aeration aerobic treatment system

The Hydro-Action aerobic treatment system from AK Industries is NSF 245 certified at 400 and 500 gpm. It uses suspended aeration and an activated sludge design with engineered recirculation to achieve consistent denitrification without media filters or carbon additives. 800/370-3749; www.hydro-action.com.



Wastewater treatment system

MicroFAST wastewater treatment systems (500 to more than 9,000 gpd) from Bio-Microbics are recommended for individual, small community and commercial applications. The fixed, integrated treatment technologies are integrated into standard septic tanks and do not require additional space. Alternate modes of operation include recirculation of wastewater to the primary settling chamber for denitrification and (with the SFR feature) intermittent operation of the blower to reduce electricity usage up to 45 percent and to improve nitrogen performance (in specific situations). They provide onsite wastewater treatment for new construction or system retrofits. The effluent meets secondary quality requirements and can be distributed to soil treatment systems or for water reuse applications. 800/753-3278; www.biomicrobics.com.



Advanced treatment unit

The B-600 advanced treatment unit from Bluewater ATU can treat 600 gpd, suiting small commercial applications. It produces low BOD and TSS numbers, and is NSF/ANSI Standard 40 approved. It has no moving parts and is simple to maintain. The unit is self-contained and lightweight to install and ship, and the effluent processed is nearly colorless and odorless. 877/702-4634; www.bluewateratu.com.



Fixed-film treatment system

The Pentair ECOPOD-N wastewater treatment system from Delta Environmental reduces BOD, TSS, fecal coliform and nutrients. Nitrification and denitrification occur in a single tank. It uses a fixed-film process and meets ANSI/NSF standards 40 and 245 – Class 1. The completely submerged reactor disposes of wastewater quietly, efficiently and with no odor, as effluent has the typical quality of 9 mg/L BOD5 and 8 mg/L TSS. It has no inner tank filters, screens or diffusers to service. Units are manufactured to specification according to wastewater flow requirements, and are available from 500 to 1,500 gpd flows, in fiberglass or concrete. 800/219-9183; www.deltaenvironmental.com.



Versatile treatment system

The 620C advanced treatment unit from Eliminate can be used for high-strength waste applications including RV parks, ski resorts, golf resorts, microbreweries, taverns, churches, schools, restaurants, convenience stores and highway rest areas. It is also designed to serve residential community developments where a centralized treatment solution is preferred. The system is engineered to satisfy stringent nitrogen removal requirements, and is proven to function optimally under adverse cold-weather, high-altitude conditions, requiring little maintenance and virtually no active operation effort. Systems can be fit to unique site requirements. 888/406-2289; www.eliminate.com.



Compact treatment system

The G7-Series 1200 GPD install-anywhere treatment system from Envirocycle USA exceeds ANSI-NSF 40/245/350 performance requirements with no extra trash or dose tanks needed. It requires no preventive maintenance and is safe for drip tube dispersal. Lightweight and compact, it can be airlifted to remote installation sites. Full remote monitoring and control is standard. Up to 3,600 gpd can be treated in a footprint of less than 98 square feet. EnviroSentry remote monitoring and control protects the environment, keeps service expense to a minimum and allows for efficient, low-cost regulatory compliance. 530/888-6480; www.envirocycleworldwide.com.



Accelerated treatment media plant

The 1500 Series BAT Media Plant from Jet Inc. reduces wastewater to a clear, odorless liquid in 24 hours. It is available in seven sizes (two plastic) from 500 to 1,500 gpd. It has been tested to NSF Standard 40 criteria for Class I NSF Listing. It utilizes biologically accelerated treatment (BAT) where millions of microorganisms attach themselves to the media. An aerator supplies the oxygen utilized by the microorganisms to convert the waste to colorless, odorless liquids and gases. 800/321-6960; www.jetincorp.com.



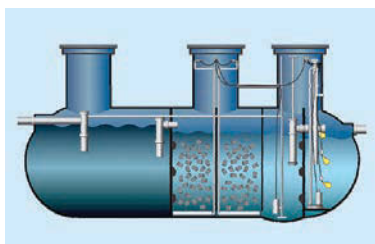
Microbial inoculator generator

The White Knight Microbial Inoculator Generator from Knight Treatment Systems introduces, cultivates and releases task-specific selected microorganisms for the enhanced biological augmentation of onsite treatment systems. The system is designed to provide aggressive nonpathogenic bacteria to wastewater to assist in the metabolism of waste. Initially developed for the rehabilitation of organically clogged septic absorption systems, it can also be used to retrofit outdated ATUs and package treatment plants. 800/560-2454; www.knighttreatmentsystems.com.



Aeration treatment system

The EnviroServer ES hybrid, fixed-film, suspended-growth, extended aeration wastewater treatment system from MicroSepTec has an adjustable two-stage biological process to optimize denitrification. A single five-compartment fiberglass tank incorporates a primary settling/septic chamber, two aerobic chambers, a final settling chamber, and an effluent



chamber to house optional disinfection units and/or effluent pumps. The single-tank design requires only one excavation so it can be installed on small or sloped lots. The heavy-duty tank is light to transport and can be maneuvered with typical installation equipment. For ease of maintenance, components are accessible at grade. It is available in three residential sizes: ES6 (600 gpd), ES12 (1,200 gpd) and ES25 (2,500 gpd). 877/473-7842; www.microsepte.com.

Single-tank aerobic system

The Singulair Green aerobic wastewater treatment system from Norweco can be installed in new or retrofit applications with just a backhoe. The durable, watertight polyethylene single-tank system contains pretreatment, aeration, clarification, filtration, flow equalization and optional disinfection and dechlorination. The durable tank incorporates support ribs and an inherently strong arch shape. It is designed for domestic wastewater flows up to 600 gpd, with treatment performance meeting or exceeding the strictest state and county requirements. It is certified by NSF International. 800/667-9326; www.norweco.com.



Plug-and-play treatment unit

AdvanTex AX20 and AX20-RT treatment systems from Orenco Systems are ideal for small commercial projects in rural areas with flows up to 2,000 gpd. They make raw wastewater up to 98 percent cleaner, meeting stringent regulatory requirements, and can also reduce nitrogen significantly, depending on influent and configuration. They provide reliable treatment, even under peak flows. The units are modular and installed in arrays to produce clear, odorless, reuse-quality effluent. They have low maintenance requirements and low power costs. And they provide UV disinfection if needed. The plug-and-play systems can be installed in half a day on top of a septic tank. 800/348-9843; www.orenco.com.



Microbial Culture Treatment System

Easy to install and maintain, MarineFAST Wastewater Treatment Systems for light marine (workboats and float homes), heavy marine (commercial and portable) and land applications are certified by U.S. and Canadian Coast Guards for inspected vessels; and meet all known standards worldwide from 4 to 2,700 persons. The process supports a complex microbial culture to handle any combination of black/greywater, ground food waste, freshwater, seawater, and vacuum/conventional toilets. 314/756-9300; www.sciencofast.com



(continued)

RECIRCULATING FILTERS

Leaching system

The GeoMat leaching system from Geomatrix Systems consists of a core of fused, entangled plastic filaments surrounded by a high-capillary geotextile fabric. When sized accordingly, it is compatible with pretreated wastewater or septic tank effluent. Uses also include subsurface irrigation and evapotranspiration systems. It is 1 inch high and available in 6-, 12- and 39-inch widths. A pressurized distribution pipe typically runs the length of the lateral for uniform application of wastewater. Additionally, it can be configured with a time-dose pump station for flow equalization. The combination of pressure dosing and flow equalization reduces peak hydraulic loading. The thin, narrow profile, shallow burial depth and uniform hydraulic loading maximize efficiency of oxygen transfer. It has complete surface contact with the soil and is not reliant on complex valving and filtration systems. The distal head pressure is fully adjustable through manual zone valves. 888/764-5247; www.geomatrixsystems.com.



Sand filter package

Sand filter packages from Quanics are complete turnkey, ready-to-assemble kits suitable for single family residential to large-scale applications. With the exception of the media, each kit includes all necessary components required to site-build a complete sand filter. Kits include pumps, controls, liner, pre-drilled laterals, drains, sweep assemblies and other accessories. Each kit is pre-assembled at the factory, then disassembled for shipment to the job site. Both standard-sized and completely customizable kits are available. Combined with locally sourced media, the kits are quick and easy to install and reassemble. Kits are available for residential and commercial applications from 500 to 40,000 gpd. 877/782-6427; www.quanics.net.



Anaerobic/aerobic filter system

STAAR Systems from SeptiTech integrate with other technologies and accessories to treat high organic loads. Smart controllers recognize situations dealing with peak, low, intermittent or no-flow conditions to either slow, stop or restart the system and include many additional features to enhance quality and dependability. A dual-purpose recirculation pump sprays wastewater over an unsaturated media filter and draws in outside air through use of venturis. The smart biological trickling filter technology maintains low levels of Nitrate-N. Systems treat 100 to 150,000 gpd with all below-grade components that fit available concrete, plastic or fiberglass tanks. 800/318-7967; www.septitech.com.



PEAT SYSTEMS

Peat fiber biofilter

The Puraflo peat fiber biofilter from Anua can be designed and installed as a combined treatment and effluent dispersal system. Treated effluent exits the modules via weep holes around the perimeter at the module base, and flows into the dispersal system situated directly beneath the modules. System options include an in-ground or mounded pad. It provides passive treatment suitable for properties occupied full or part time. The peat media provides biological, physical and chemical treatment, with a high level pathogen and nitrogen reduction. It has the ability to overcome severe site limitations such as a seasonal high water table, shallow soils or restrictive layers, and is suitable for environmentally sensitive sites, such as waterfront properties. Its timed dosing system provides siting flexibility. 336/547-9338; www.anua-us.com.



NITROGEN REDUCTION SYSTEMS


Nitrogen removal system

The WaterNOx nitrogen removal system from Waterloo Biofilter Systems can be installed following any aerobic treatment unit. Featuring a nontoxic carbon source, nitrified effluent from the treatment unit is then 100 percent denitrified in the system. It uses a permanent, absorbent filtration medium, can be installed above or below ground, uses very little energy, and requires little maintenance and no backwashing. It recovers quickly from upsets such as disinfectant use at the facility. Ideal for both new installations and to retrofit underperforming systems, total nitrogen concentrations of less than 5 mg/L can be consistently achieved with proper design and maintenance. 866/366-4329; www.waterloo-biofilter.com.

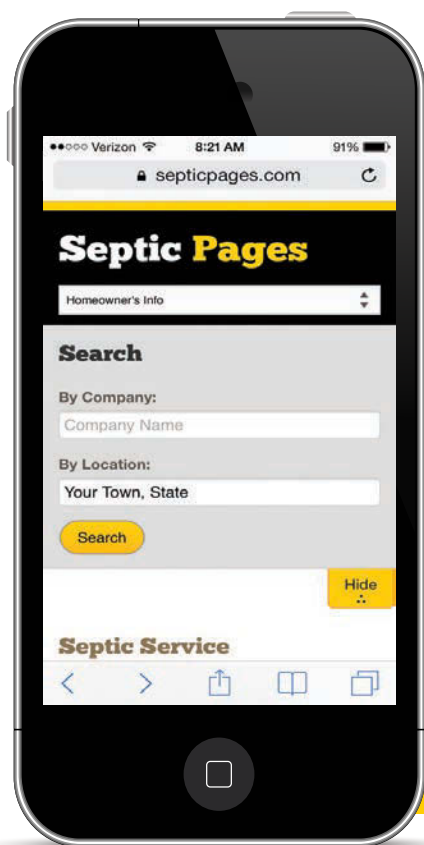


DISINFECTION

UV disinfection unit

The 3G UV Unit from Salcor Inc. is proven for residential use, and a reliable building block for larger wastewater disinfection systems. Rated at 9,000 gpd gravity flow, it features a fouling-resistant Teflon lamp covering, two-year lamp warranty, speedy installation, minimal (annual) maintenance and low energy use. Parallel/series arrays for larger flows are easily assembled with readily available ABS pipe fittings. Gravity flow is equalized without distribution boxes. Identical modular units increase plant reliability, reduce the need for spare parts and facilitate plant expansion when necessary. Systems of up to 100,000 gpd capacity have been installed. 760/731-0745. 





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Advanced Treatment Units

By Craig Mandli

Treatment system helps retail center comply with water-quality regulations

Problem: The Locust Grove, Va., Town Center houses more than 20 businesses, including a gas station, dry cleaner, laundromat, multiple restaurants and a market. The commercial site had a high-strength waste output, and the water directly discharged above grade into a tributary of Flat Run Pond, connected to the main lake as part of the Lake of the Woods residential subdivision two miles to the northeast. The Virginia Department of Environmental Quality required the facility to upgrade its 4,500 gpd wastewater treatment tank to comply with water quality regulations.

Solution: The retail center owner selected the Magellan Wastewater Treatment System from Contech Engineered Solutions that uses steel-reinforced polyethylene (SRPE) technology. Contech partnered with AppTech Solutions, a Virginia-based engineering firm specializing in SRPE products for sustainable water-quality systems.

Result: After submitting plans to the state DEQ, Contech constructed the 8-foot-diameter, 37-foot-long system in six weeks and shipped it in one truckload to the job site. Local contractor Titan Construction installed the system. The day prior, they excavated the site. The entire installation was in the ground and backfilled in four hours. 800/338-1122; www.conteches.com.



Passive advanced treatment used for family's dream lake home

Problem: The owner of a lake lot in Lakemont in Rabun County, Ga., dreamed of building a home on the parcel deemed unbuildable since the 1940s. Two major challenges with the site were having Lake Rabun border one side of the property, and the lot being divided by a public road. The lot is 0.36 of an acre, with a 30- to 65-percent slope.

Solution: Harold Kilgore of Gravelator Systems and Ward Cleveland of A & W Soils combined their knowledge to offer a solution for the property owner. The decision was the installation of a low-maintenance, Georgia Class 1-approved, Eljen GSF system to provide the needed performance for the extreme topography and the property's soil conditions. A duplex grinding station allowed wastewater to be pumped across the road to a 1,500-gallon traffic-rated combination septic/pump tank that needed to be placed in the home's parking area. From that point, the effluent was lifted higher up on the lot, where a 3-foot-wide Eljen GSF Sand Trench System was installed.



Result: After planning and site preparation was completed, a septic permit was issued and construction began. The system was installed in November 2013, allowing the owners to move into their dream home. 800/444-1359; www.eljen.com.

Biofilter system provides treatment solution for RV park

Problem: Cape Lazo RV and Campground is an ocean-side property located a short distance from Comox, B.C., Canada, on Vancouver Island. The park, originally developed in the early 1970s, went through a complete upgrade with modern landscaping and new onsite facilities. This project also required replacement of the original septic system, which would not accommodate the renovated property. The solution needed to offer a small footprint with a strong emphasis on sustainability and environmental protection, and be practically maintenance-free.

Solution: In collaboration with Yellow Truck Septic in Comox, Premier Tech Aqua provided a cluster of nine fiberglass ST-750 Ecoflo Biofilters with 100-percent-organic



filtering media. The modular design offered the required low footprint, as well as all maintenance, discharge and budgetary requirements. The system provides a permanent and durable solution that treats wastewater without requiring relocation or excavation. At the end of its useful life (up to 15 years), the used filtering media is removed and replaced via the cover and its 10-year warranty is automatically renewed.

Result: Supported by an annual maintenance program, the treatment station steadily produces a quality effluent of less than or equal to 10 mg/L in CBOD and less than or equal to 10 mg/L in TSS. 800/632-6356; www.premiertechaqua.com.

Community installs cluster system for passive treatment

Problem: The Blodgett Landing Treatment Plant in the southwestern part of New Hampshire would routinely have parts of its treatment system freeze, hindering operation. The cold weather was also affecting treatment levels and inhibiting the nitrification and denitrification process. The facility had a 34,000-gallon Imhoff tank that was nearly 50 years old and needed to be replaced. The system was also not large enough to deal with the increased capacity.

Solution: The community chose the Enviro-Septic System from Presby Environmental. The passive wastewater treatment system is tested and proven to remove up to 99 percent of wastewater contaminants such as BOD, TSS, TN, TKN and fecal coliform. It uses fabrics and fibers to naturally establish multiple bacterial treatment environments throughout the system that break down and digest wastewater contaminants without the use of electricity or additives. Systems have proven effective in cold weather, which made it ideal for this location. The warm effluent combined with the biological process within the pipe generates enough heat to prevent system freezing.




Result: The Blodgett Landing Treatment Plant is designed as a recirculating system with the multilevel configuration, handling flows ranging from 2,500 to 88,000 gpd. "Since it was installed in 2011, the system has consistently exceeded the required effluent treatment levels," says Tim Mulder, Blodgett Landing Treatment Plant manager. "The upfront cost-saving of this technology, along with its ability to perform with minimal ongoing cost and maintenance makes it truly exceptional." 800/473-5298; www.presbyenvironmental.com.

System provides nitrate control

Problem: When owners of a condominium complex in Harbor Springs, Mich., discovered 20 years of septic effluent had increased their groundwater nitrate concentrations, the state required them to upgrade their system.

Solution: The condo's aerobic bacterial generator seemed to change the microbiology in both the treated septic tanks and in the surrounding soils. Facultative bacteria prevented nitrate from forming in the tank, but when the ammonia reached the soils, it was converted to nitrite – then to nitrogen gas directly – even with oxygen present. They installed a test system with SludgeHammers and a Geoflow drip system, then monitored leachate with lysimeters to confirm that it only took 18 inches of soil to reduce total inorganic nitrogen to less than 5 mg/L.

Result: After seven years of operation and a comprehensive review of data from both old and new groundwater monitoring wells, tests showed a steady reduction of nitrate over the period of system operation. The condominium owners have been able to retain existing septic tanks with the SludgeHammer upgrade for nitrogen reduction. They have also been able to remediate long-term contamination of groundwater with the combined SludgeHammer and Geoflow drip system at a financial savings. 800/426-3349; www.sludgehammer.net. 



Mustang RT Series track loaders

RT Series 1750RT NXT2 and 2100RT NXT2 radial lift track loaders from Mustang are powered by Tier IV Yanmar diesel engines. The 69.9 hp 1750RT delivers 179 ft-lbs of torque, while the 72 hp 2100RT delivers 217 ft-lbs of torque. The 1750RT has a fully raised height of 127.5 inches, operating capacity of 1,750 pounds at 35 percent tipping load and operating weight of 8,605 pounds. The 2100RT has a fully raised height of 128 inches, 2,100 pounds of operating capacity and operating weight of 9,890 pounds. 800/628-0491; www.mustangmfg.com.



Liberty Pumps duplex grinder system

The ProVore 680 duplex system from Liberty Pumps is powered by two 1 hp grinder pumps and features V-Slice cutter technology. The unit shreds feminine products, rags and other unwanted debris. Operating on 115 or 230 volts, the system can be plugged into a standard 20-amp circuit. The unit is 24 inches tall and ships complete with alternating pump control unit. 800/543-2550; www.libertypumps.com.



Brentwood stormwater shield

The StormTank stormwater shield from Brentwood Industries is designed to improve sumped inlet treatment and reduce pollutant discharge through gross sediment removal and oil/water separation. The shield prevents debris from directly exiting the outlet pipe, increasing flow length and settling time, while reducing pollutant discharge. 610/374-5109; www.brentwoodindustries.com.



SJE panel-mounting post, accessory kits

The panel-mounting post and three accessory kits from SJE-Rhombus are designed to improve control panel installation. The polyethylene post can accommodate control panel enclosures with a minimum depth of 6 inches and overall dimensions of 14 by 12 by 6 inches. It includes four stainless steel mounting bolts with gaskets and drilling template. The post can be mounted into the ground or over a 4- by 4-inch post or conduit. The riser mounting kit includes 2-inch hub assembly, 2- by 6-inch PVC pipe, connecting hardware and conduit. The simplex and duplex kits provide weatherproof installation. 888/342-5753; www.sjerrhombus.com.



RIDGID laser distance meter

The micro LM-400 Advanced Laser Distance Meter from RIDGID can read distances up to 229 feet. Features include backlit, four-line display screen, inclination angle measurement system for indirect measurements in hard-to-reach areas, advanced calculation to instantly adjust units to inches, feet or meters and storage for saving up to 20 measurements. The meter is IP 54 dustproof, splash proof and has an auto shut-off after three minutes of inactivity to prolong battery life. 800/769-7743; www.ridgid.com. □



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Maine Association Of Site Evaluators;
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Maine Association of Professional Soil Scientists;
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Maryland Onsite Wastewater Professionals Association;
www.mowpa.org;
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Michigan Septic Tank Association;
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Granite State Designers and Installers Association;
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Professional Onsite Wastewater Reuse Association of New Mexico;
www.powranm.org;
505/989-7676

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

North Carolina Portable Toilet Group;
www.ncportabletoiletgroup.org;
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North Carolina Pumper Group;
www.ncpumpergroup.org;
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Ohio Onsite Wastewater Association;
www.ohioonsite.org;
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Oregon Onsite Wastewater Association;
www.o2wa.org;
541/389-6692

Pennsylvania

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

Pennsylvania Onsite
Wastewater Recycling
Association;
www.powra.org

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

Tennessee

Tennessee Onsite
Wastewater Association;
www.tnonsite.org

Texas

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

Virginia

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

Washington

Washington On-Site
Sewage Association;
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253/770-6594

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Wisconsin Onsite Water
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Wisconsin Liquid Waste
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NATIONAL

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National Association of
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www.nbaowp.ca;
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Nova Scotia

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

Ontario

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

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

Saskatchewan

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

Canadian Regional

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

industrynews

BJM Pumps hires financial and accounting manager

BJM Pumps hired Jeff Kulas as financial and accounting manager. He has 20 years experience in accounting and financial reporting.

Grundfos, Hydraulic Institute sign training agreement

The Hydraulic Institute and Grundfos USA formed a training agreement that enables both organizations to present co-branded educational programs designed for pump end-users, distributor and engineering consulting firms. Partnership programs include technical webinars and e-learning courses. □

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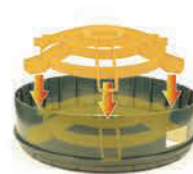
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