July
2008

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PROMOTING WASTEWATER TREATMENT QUALITY AND PROFESSIONAL EXCELLENCE www.onsiteinstaller.com

Suiting the Site

Graves & Son takes on the challenge of tailoring systems for property limitations

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Coming Next Month: August 2008

Special Issue: Commercial and Large-Scale Systems

- Basic Training: Knowing the meaning of soil texture
- System Profile: Moving bed biological reactor for a community of homes
- Overheard Online: Options for fixing a failed system
- Machine Matters: Improving machine productivity

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ADVERTISER index

July 2008

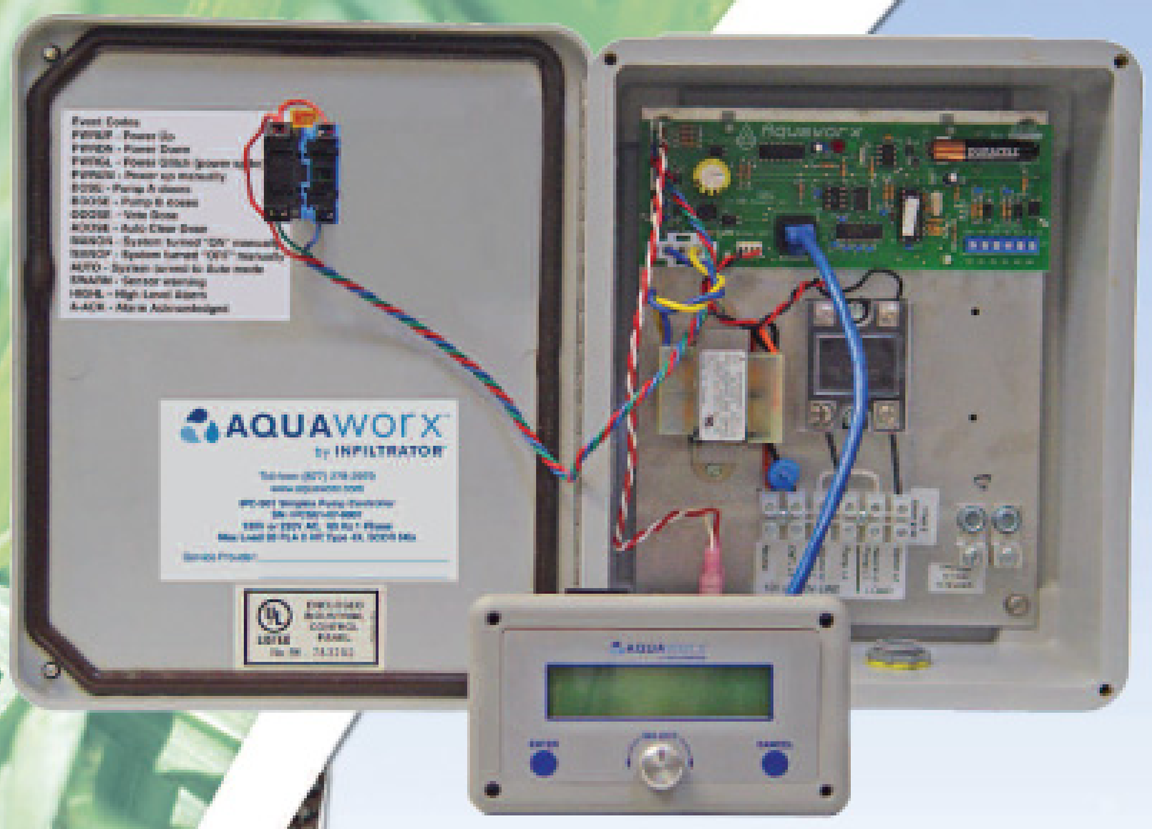
INDUSTRY news

July 2008

Infiltrator Systems Launches Wastewater Web Site

Infiltrator Systems Inc. has launched its updated web site, with an emphasis on wastewater treatment. The site (www.infiltratorsystems.com) includes information on product lines, downloadable performance data, case studies, owner's manuals and product catalogs. ■

No Floats = No Problems



- *Eliminate Floats*
- *Record Data*
- *Save Time*

Aquaworx Intelligent Pump Control (IPC) Panel

The original floatless pump control technology. The IPC Panel leverages simple pressure transducer technology for accurate pump system control and data logging, allowing enhanced performance and monitoring capability. Designed specifically for the onsite industry, the panel offers timed dosed technology. Wastewater is distributed in smaller, evenly spaced doses over a 24 hour period, thereby promoting unsaturated flow through the soil.

Advantages:

- Floatless technology – Easy to install
- Track system performance – Data logging provides years of data
- MARC handheld controller – Easy to operate unique user interface
- Liquid level displayed for draw-downs – No tape measure required
- Accurate timing – No stopwatch required

As an Infiltrator company, Aquaworx has the sales and distribution support – and the leading-edge technologies – to help grow your business. Partnering with us means you can offer your customers products that are reliable, innovative and environmentally sound.

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Feedback

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That Something Extra

Don't be afraid to offer add-ons to your systems. If you add items that help customers in the long run, they'll be forever grateful.

By Ted J. Rulseh

Three years ago I bought a new fishing boat, upgrading from a 14-foot bench-seater to a 16-footer with more amenities. As I worked with the salesman to put the package together, he offered me several upgrades to the basic unit I had picked out.

Spare tire for the trailer? Custom boat cover for traveling? Foot control for the electric trolling motor? Middle swivel seat? And so it went. I bought these and a few more add-ons. Of course, the price crept up, a little at a time.

Was this salesman being pushy? Well, he was certainly increasing his commission every time I said yes. But I never resented his offering me these goodies. I am most grateful of all for the special switch that operates the outboard motor's power trim.

The dealer recommended it. I think it cost about $75. Now, instead of a switch on the motor that I have to reach around to activate, I have a switch mounted right next to the seat from which I operate the tiller.

Suppose I encounter some shallow water on the way out of the boat landing area. I just put my right hand down to my side, feel for the switch, and toggle up to raise the motor. Once past the trouble spot, I toggle it back down. Almost every time I use that switch I find myself thanking that boat dealer for that little extra convenience. Sometimes it's the little things that help us appreciate things we own.

The right shoes

Of course there's a moral to this story. You have opportunities all the time to do for your customers what that boat salesman did for me. True, your customers aren't making discretionary purchases for their leisure time. They're buying a necessity and, furthermore, one they'd really rather not think about.

At first blush, customers want a septic system that's as cheap as possible, because they'd rather spend money on a fireplace in the family room. But whether they know it or not, they also want things like convenience, peace of mind, and more assurance of having a system that will last.

But the reality is that sooner or later they will have to think about it, such as when it's time for pumping, or when for whatever reason something goes wrong. That's when the extras you offered at the time of sale can save the customer headaches and make him or her remember you favorably.

Do you feel hesitant about selling add-ons? If so, you're not alone. Many people in sales roles try to put themselves in the customer's shoes — except it turns out to be the wrong pair. Maybe you think back to a time when you bought something and a salesman basically bullied you into expensive options you didn't need and later resented having bought (like automotive rust-proofing). So you don't want to do that to someone else.

It's better to think of a time when a salesperson did for you what my boat dealer did for me, which essentially was a big favor. Those are the shoes your customer most likely is wearing. Because, let's face it, few people really prefer the stripped-down version of anything. And most people do appreciate value.

What they want

So it helps to think about what your customers want. Oh, sure, at first blush they want a septic system that's as cheap as possible, because they'd rather spend money on a fireplace in the family room. But whether they know it or not, they also want things like convenience, peace of mind, and more assurance of having a system that will last.

So make a point of offering extras that make a good system great.

"If I install a riser with a lid, then when it's time for maintenance, your pumper won't have to dig up the tank. That will save time for him and money for you."

"If you add a locking lid, then you'll never have to worry that vandals, or kids playing in your yard, will be able to open the tank."

"I can include an effluent filter. It keeps pieces of material from getting out to the drainfield, so it makes your system last longer. You have it serviced just once a year."

"This little device is a high-water alarm. If something goes wrong that causes water to back up, it alerts you and your maintenance provider. So you correct the problem before something bad happens."

"These artificial rocks will hide your riser lid and vent pipe — they'll look like just another part for your landscaping."

Offering these items doesn't mean you're pushy. It means you're looking out for your customer's interests.

Keep it working

The ideal add-on, of course, is a maintenance contract, if you do that kind of work. Professional service is the best assurance you can give a customer that the system you install will provide long and reliable life. (If you don't include maintenance as part of your business, is there room for selling contracts to your customers on behalf of someone who does, in return for a commission?)

In any case, there is no need to be shy about offering add-ons. No salesperson really enjoys selling "plain vanilla." And for that matter, customers don't much like buying it, either. So try adding things that make your systems better and more appealing. You'll be doing yourself and your customers a favor. ■

"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.*

Maryland County Adopts Onsite Mandates

New regulation requires owners to have septic systems pumped every five years and requires nitrogen removal for homes built near Chesapeake Bay

By Scottie Dayton

Queen Anne's County recently passed Maryland's first law requiring regular septic tank pumping every five years, and became the first county to require nitrogen removal systems for new homes built near Chesapeake Bay, which forms the county's western border. The ordinance would likely require onsite owners to maintain records and the county to conduct random audits.

Some residents argue that there is no third-party scientific proof that the changes will affect the health of the bay. The county's top environmental health officer, John Nickerson, says it's unclear how much nitrogen from onsite systems reaches the bay, and says the environmental impact is debatable.

The five-year pump-out requirement, however, could help pinpoint the few homeowners who divert septic waste into nearby ditches rather than pay to have their tanks maintained. Many of the 11,000 properties with onsite systems are summer homes, and angry residents insist that their tanks don't require pumping as often.

They also took exception to a provision in the law that allows county officials to charge residents a fee to cover compliance checks, even though the officials claim they won't need additional taxes to pay for the septic law. The ordinance is at www.qac.org/depts/cmnrs/ord8/cor0809.pdf.

California

The Central Coast Regional Water Quality Control Board amended its septic code, requiring onsite systems to be inspected every two to five years, pumped out every five years, and operated on alternating drainfields.

Homeowners would have to maintain records of inspections and pumping, while the county would have to track them to ensure compliance. The amendments also suggest that San Luis Obispo County construct a processing facility instead of sending septage out of the county. The changes would prohibit onsite systems for single-family homes on less than one acre, and homes with secondary units would be limited to two-acre lots. Previously, those limits were merely recommended.

The California State Water Resources Control Board released its draft programmatic environmental impact report (EIR), and the California Onsite Wastewater Association is consolidating comments for an official response. The EIR process is complex. Board members must identify the potential environmental effects of the state regulation, then compare them with 58 individual sets of regulations — one for each county — plus nine for the Regional Water Quality Control Boards, and several more from special districts and cities.

The process also does not address speculative conditions, such as when a county adopts the new law at the local level, since each jurisdiction may keep its own setbacks and other prescriptive measures. In effect, the state regulation will become a hybrid in at least 58 different ways once applied at the local level.

The EIR allows the installation of biomechanical treatment systems in areas where conventional onsite systems cannot meet environmental protection requirements. The regulation applies to discharges of less than 3,500 gpd.

Pennsylvania

The Department of Environmental Protection ordered Northampton Township to sewer more than 400 homes and businesses with failing onsite systems. In 1997, the DEP approved a multimillion-dollar central sewer plan proposed by the township, but no construction occurred.

Last year, the township voted unanimously not to enter an agreement with the department to do what it agreed to 10 years ago. However, the township did allow new homes to be built with onsite systems.

The DEP order stipulates that construction of the sanitary sewer must begin by Oct. 1 and be completed by Oct. 1, 2012. Residents won't be billed until the project's true cost is known. Hookup is estimated to cost $15,000 to $40,000. A lien will be placed on properties and interest charged if owners don't pay. The township promised not to pursue foreclosure on those homeowners.

Ohio

After Fairfield County residents attacked the state Department of Health Groundwater Protection Program, the agency presented an alternative. The original plan proposed monitoring streams and ditches to detect failed onsite systems, and collecting an annual $30 fee from the 17,500 homeowners not on municipal sewers. Residents with onsite systems already pay a $40 fee under the agency's house-to-house program.

The alternative plan proposes inspecting 6,000 of the targeted homes yearly. Inspections will cost $45 and must be repeated every three to five years. Residents with aerobic systems would be charged $22.50 if they provide proof that a licensed contractor inspected the system in the same year the township is inspecting. The alternative plan, at http://codes.ohio.gov/orc/3718, must undergo three readings to be approved.

Wisconsin

Code changes awaiting approval by the state legislature include deadlines for counties to develop comprehensive onsite maintenance programs, implement maintenance tracking programs, and inventory all onsite systems within their borders.

The proposed changes also allow counties to establish a different maintenance frequency for onsite systems serving properties occupied for less than 120 days per year. A new section makes homeowners responsible for ensuring that access covers remain secured except for inspections, evaluations, maintenance, and servicing.

Homeowners with systems installed before July 1, 2000, are

responsible for maintaining them according to code. The changes are at http://commerce.wi.gov/SBdocs/SB-CodeDevComm8187LegDraft0208.pdf.

The governor signed into law a bill prohibiting county regulators with duties related to the onsite industry from competing in the private sector to do soil testing, onsite installations, repair, design, or sales work. The ruling takes effect Nov. 1.

Virginia

Loudoun County officials in Leesburg are considering banning aerobic treatment units (ATUs) because 18 of 1,200 systems failed within seven years. The measure also would require the 12,800 owners of conventional systems to have their septic tanks pumped and inspected every five years.

ATUs would need an annual inspection by a licensed professional. After hearing from property owners, homebuilders, and sewage treatment businesses that opposed the ban, the Board of Supervisors sent the ordinance back to the Public Safety and Human Services Committee for further study.

Washington

Responding to complaints about costs from rural homeowners, the Whatcom County Council approved changes to state-mandated onsite inspection rules, which require homeowners to have conventional systems inspected every three years and alternative treatment systems every year.

Under the amendments, homeowners can do their own inspections provided they take a course and submit their inspection reports to the county. After a licensed inspector does the first inspection, qualified homeowners may do their own for six years before another professional visit is required. However, self-inspections may not apply to systems whose manufacturers require licensed professionals. ■

Jim Anderson and David Gustafson are with the University of Minnesota's widely recognized onsite wastewater treatment education program. Anderson is Director of the university's Water Resources Center and Gustafson is the university's Extension Onsite Sewage Treatment Educator. Readers are welcome to submit questions or article suggestions to them at ander045@umn.edu.

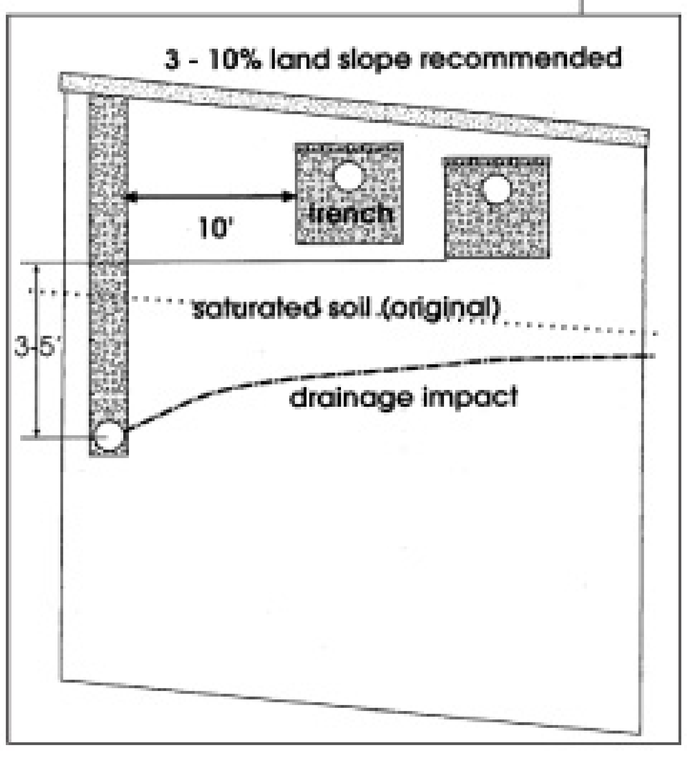
High Water

Agricultural drain tile can be a workable solution for a site with a high seasonal water table, but it needs to be used selectively and with care

By Jim Anderson, Ph.D., and David Gustafson, P.E.

Seasonal high water tables are among the toughest challenges onsite installers face. The challenge is to ensure adequate separation between the bottom of the infiltrative surface for septic tank effluent and the saturated soil.

Separation is necessary to provide for unsaturated flow from the trench and to enable oxygen exchange, which results in effective treatment of the effluent. Our preferred solution is to install an at-grade or mound treatment system to avoid the water problems. However, we are always asked about using artificial drainage as a way to solve the problem, and in some instances this can be a preferred solution.



One effective method is to use a curtain drain on a sloping site to intercept water and allow for the installation of shallow trenches.

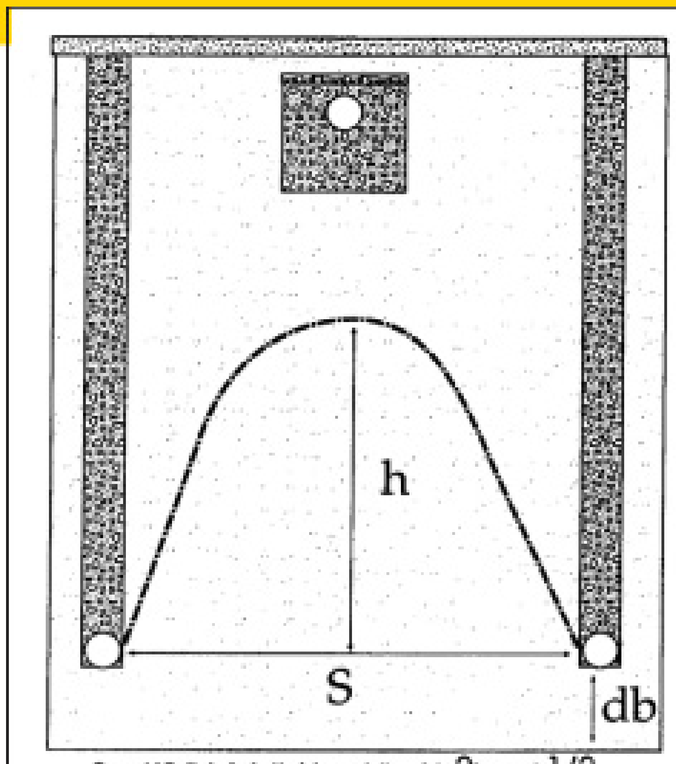
Misconceptions

There is a common misperception that if we install drain tile around a system, as in agricultural drainage, we will lower the water table to the depth of the tile across the entire area. What actually happens is that the water is drawn down to the tile, but there is mounding in the area between the tile lines. The drawdown is actually similar to a cone of depression caused by a pumping well. This makes it very difficult to predict the appropriate depth of the drain tile to provide for separation.

Under certain conditions, agricultural drain tile can help intercept and drain off excess water from the site. However, the purpose of agricultural drain tile is not to lower the water table in the field but to drain away excess water so that the crops can survive. This is much different from an overall lowering of the water table.

Typical designs for agricultural tile systems will allow saturated soil conditions to come up to the level of the redoximorphic (soil mottles) features, but for a much shorter duration than if the tile were not in place. Research has shown that the water table returns to this level during the course of a wet season, but will not stay there as long.

In an onsite system, the drainage situation is not acceptable if the water table is within three feet of the bottom of the system. This is because a lack of oxygen in saturated soil reduces treatment efficiency and promotes formation of a thicker and more resistive biomat. These systems are expected to work 365 days a year at high treatment efficiencies. That means some changes in drain tile installation are necessary.



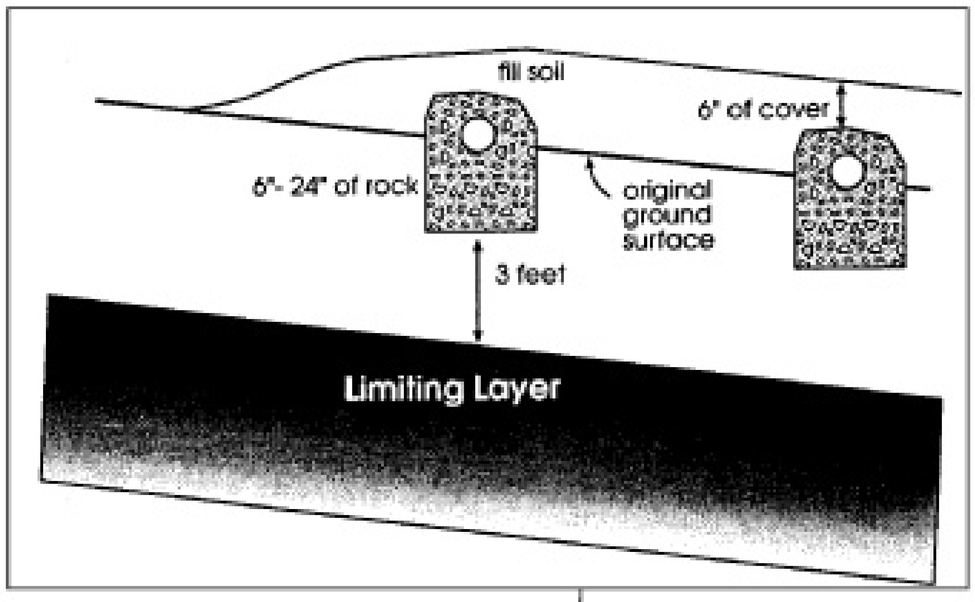
One problem with draining a site is groundwater mounding. (Illustrations courtesy University of Minnesota On-Site Sewage Treatment Program Manual)

Zone of influence

When drain tile is used to lower a water table, a drawdown curve or zone of influence is apparent. The steepness of this curve is determined by the soil texture and permeability. In sandy soils, the curve is flatter and the area affected by the tile is much greater. In heavier-textured clay loam soils, the slope is steeper and the area affected is far smaller.

The way to increase a zone of impact is to place the tile lines deeper and closer together. This can be very costly, and it presents installation problems of being able to fit the system to the site. There is also the issue of establishing an outlet. Care needs to be taken not to divert large amounts of water onto the neighboring property.

The most effective places to use drain tile are in areas of seasonal high water tables where the land is sloping. Here, you can install interceptor or curtain drains upslope to catch the water and direct it away



Using shallow trenches is one way to avoid drainage if there is enough separation distance.

from the system. You should locate interceptor drains with at least 10 feet of undisturbed soil between the sidewall of the soil treatment unit and the drain tile.

A variety of materials have been used to construct such drains. These include concrete or clay tiles. Now, plastic drainage tubing is the norm. The usual size is four inches, but that depends on the flow. Wrap the tile in a geotextile fabric and install it so as to maintain the 3-foot separation between the system and the groundwater. This depth varies according to the site conditions.

The trench to place the drain tile should be at least six inches wider than the outside diameter of the tile. Place an envelope of pea gravel or inspected and approved clean gravel around the tile. Use the same material, or clean sand, to backfill the trench to within one to two feet of the top.

The grade on the pipe should be no flatter than 1 1/4 inches per 100 feet and the inside pipe diameter no smaller than four inches. You can connect the curtain drain to an existing tile drain when depth and grade permit and when approved by the local unit of government. Use a factory-manufactured tee or Y to make the connection.

Surface drainage

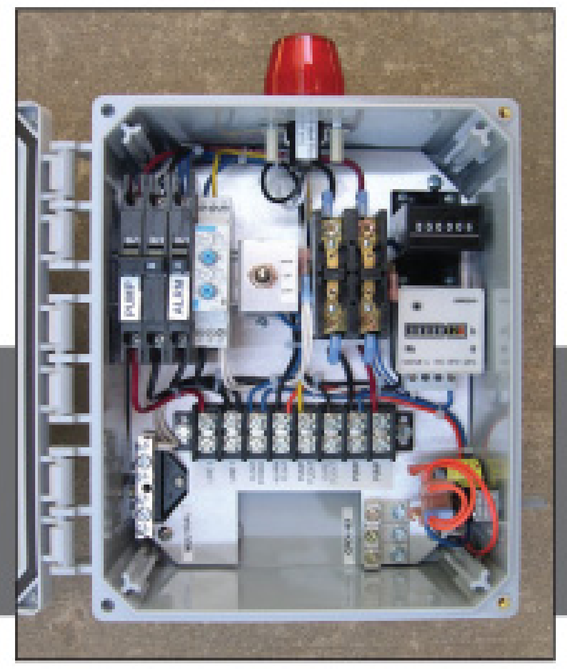
When the drain must outlet to the surface, use a corrugated metal pipe at least 12 feet long and a solid animal guard or outlet gate. Locate the outlet where water can flow away from it as fast as it is discharged. There should be at least six inches of clearance between the bottom of the outlet pipe and the surface of the ground or the water beneath it. Use only one outlet for the curtain drain. The water must exit onto the owner's property or into a drainage easement.

Locate the curtain drain on the treatment system plans and submit it with the as-builts to the permitting authority. Include the elevations of the curtain drain with respect to the drainfield, initial and proposed topography, trench widths, spaces, details of the tubing, and placement and depth of drain material and cover.

Remember, approach the use of drain tile cautiously, and use it only in areas where it will achieve the desired result. Our bias is to stay away from it if at all possible. ■

Under certain conditions, agricultural drain tile can help intercept and drain off excess water from the site. However, the purpose of agricultural drain tile is not to lower the water table in the field but to drain away excess water so that the crops can survive. This is much different from an overall lowering of the water table.

Environmental Watchdogs



Model 217MNT NEMA 4X from Ecological Tanks Inc.

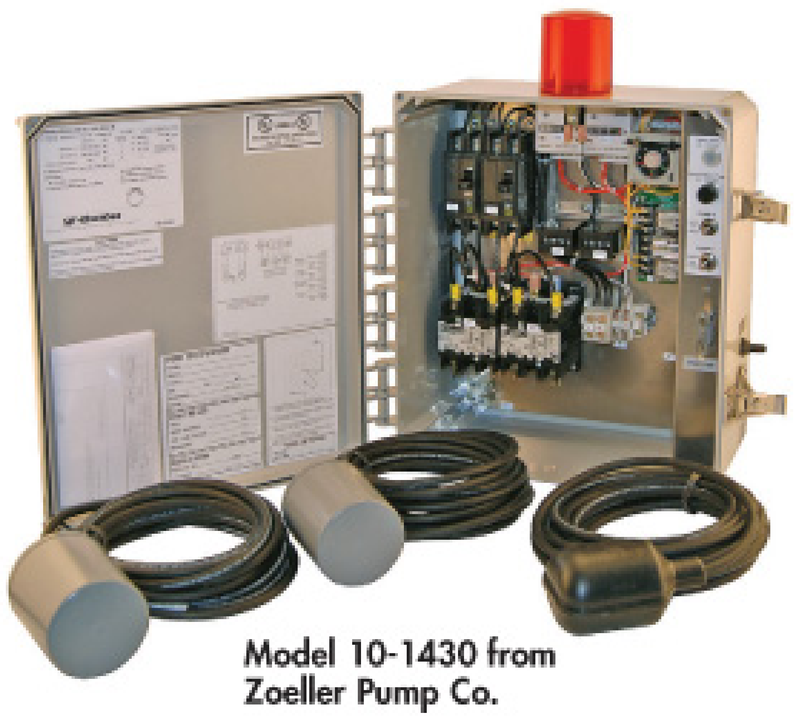
Alarm, control, and monitoring devices facilitate effective operation and maintenance of onsite treatment systems

By Scottie Dayton

Onsite treatment systems can benefit from a variety of electronic devices. They range from controls that operate timed or demand dosing in advanced systems, to simple alarms that alert homeowners and maintenance providers to potential problems before they erupt in basements or back yards.

A range of technologies enable professionals to match the best device with each installation. Here is a sampling of the latest in control, alarm, and monitoring products from onsite equipment manufacturers.

MVP from Orenco Systems Inc.



Model 10-1430 from Zoeller Pump Co.

Programmable logic modules

MVP control panels are designed for one- or two-pump systems that time-dose to sand filters or drainfields. A digital programmable logic module with an LCD display and programming keys enable operators to adjust timer settings in the field quickly and accurately. Visual float position indicators, an elapsed time meter, and counters for alarms and power faults make operation, maintenance and troubleshooting easier. Panels differentiate high- and low-level alarms, and reactivate silenced alarms after 12 hours. **Orenco Systems Inc.: 800/348-9843; www.orenco.com.**

Duplex control panel

The **Model 10-1430** control is a time-dosing, duplex control panel for single-phase pumps. When enabled by a float, the programmable timer activates twin motor contactors that power the pumps on alternating cycles. A high-water condition prompts an audio/visual alarm and overrides the timer until water recedes to normal levels. In low-water conditions, a redundant off circuit protects the pump.

Alternating duplex systems spread the wear evenly between two pumps in time-dosing applications such as recirculating media filters, pressure distribution, and mounds. An event counter, elapsed-time meter, and three mechanically activated, variable level float switches are included. **Zoeller Pump Co.: 800/928-7867; www.zoeller.com.**

Repeat cycle timer

The UL-Listed **Model 217MNT NEMA 4X** control panel provides repeat cycle timed control for water pumps. On and off times are set independently from 0.1 second to 100 hours. The panel includes a timer override, audible (90 dB) and visible high water alarms, and hand-off-auto switch. An hour meter and cycle counter monitor pump operation. The panel can be used with single-phase 120- or 240-volt AC pumps up to 1 hp. **Ecological Tanks Inc.: 800/277-8179; www.etiaquasafe.com.**

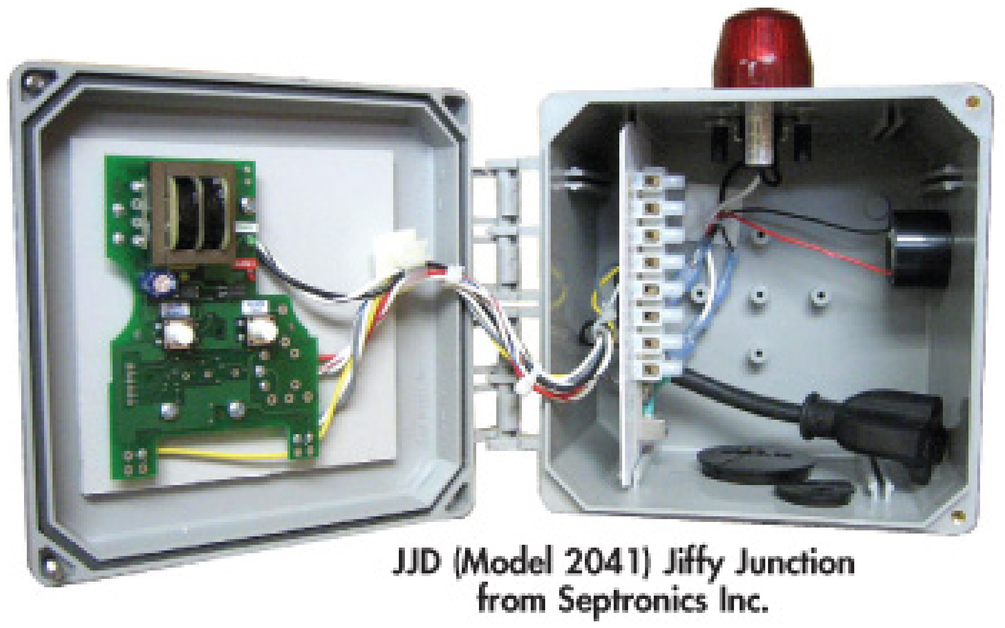
Enhanced design

Enhanced **Installer Friendly Series** single-phase simplex and duplex pump control panels come standard with a digital display showing elapsed time, pump cycles, alarm counts, float errors, float status, and override on/off times. A touch pad on the inner door makes it easy to operate pumps, view the display, and change system settings. LED lights, along with graphics of pumps and floats, simplify monitoring. Technicians can convert the UL/cUL listed panels to demand or timed dose application in the field. **SJE-Rhombus: 888/342-5753; www.sjerhombus.com.**

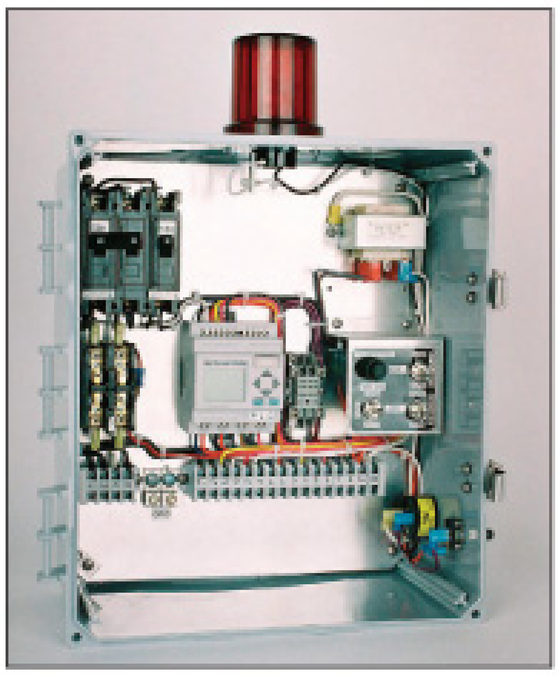
Junction box alarm

The **JJD (Model 2041) Jiffy Junction** unit has a control switch, pedestal, and watertight junction box with exterior dual alarm and pump control. Horn silence, alarm test, and color-coded alarm LEDs on the internal board handle up to two alarms. The pump control terminal strip is on a removable board for easy, clean hookups. **Septronics Inc.: 888/565-8908; www.septronicsinc.com.**

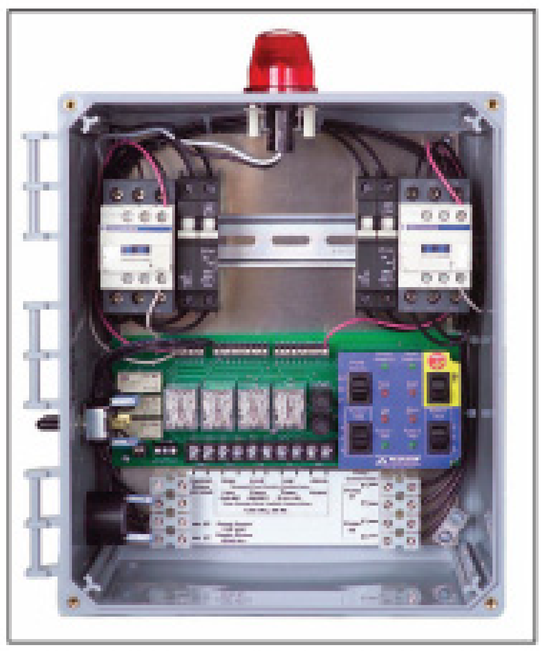
Installer Friendly Series from SJE-Rhombus



JJD (Model 2041) Jiffy Junction from Septronics Inc.



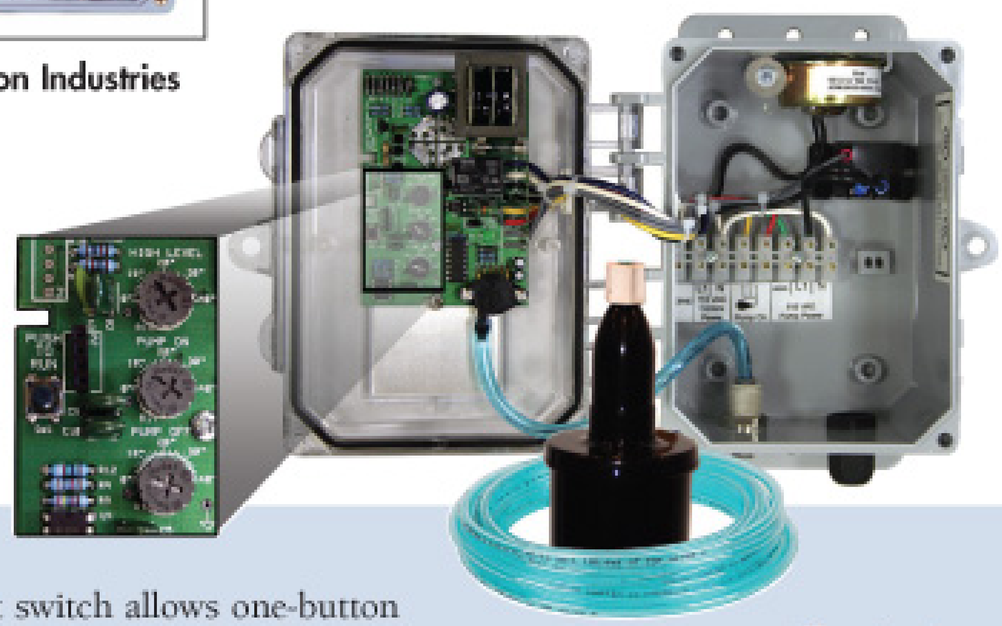
50A807-Drip1 from Septic Products Inc.



Check It from Alderon Industries

LB50 alarm from Septic Services Inc.

Installer Friendly Series from Quanics



Power Zone Jr. from CSI Controls

PLC system

The **50A807-Drip1** panel has a hard-wired configuration and uses a programmable logic controller (PLC) to activate the pump cycles, flush valves, and spin filter. Easy to install, maintain, and troubleshoot, the unit has elapsed time meters, cycle counters, peak time and power failure event counters, high level alarms, NEMA 4X enclosure, large red alarm light, 90 dB buzzer, circuit breakers, and hand-off-auto switches. It is wired to a UL 508A specification. **Septic Products Inc.: 419/282-5933; www.septicproducts.com.**

Self-diagnosing panel

The **Check It** panel is a self diagnosing, installation-friendly control panel used for pump control and supervision of onsite wastewater systems. The Check It switch allows one-button self diagnosing of the electrical wiring, pumps, panel and floats. The panel is rated for 2 million electrical cycles and 30 million mechanical cycles. Features also include auxiliary contacts, float switches, a lead pump selector switch, and indicator lights for the floats, pumps and incoming power. **Alderon Industries: 218/483-3034; www.alderonind.com.**

High-water alarm

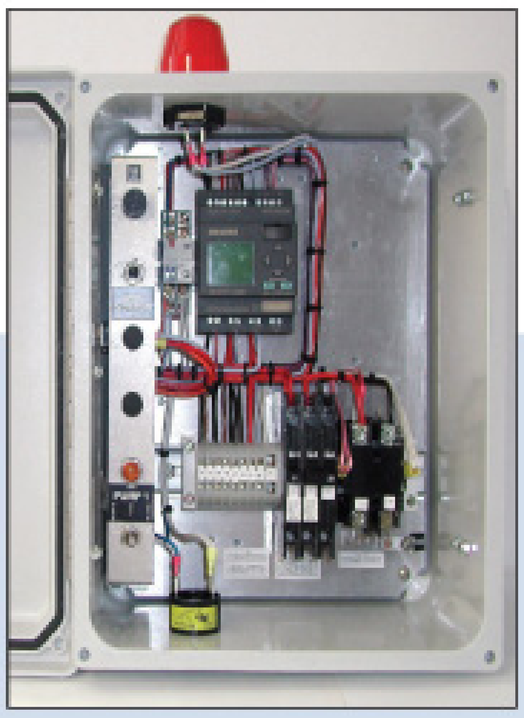
The economical indoor or outdoor **LB50 alarm** with level control includes a warning light, audible alarm, remote alarm for commercial systems, and three-position toggle switch for operate, silence, and test. To install, technicians connect the level control switch to the terminal blocks, then plug the unit into a 115-volt outlet. The unit is fused for circuit protection and has a remote alarm for switches that close on signal (0.4 amps at 115 volts AC). **Septic Services Inc.: 800/536-5564; www. septicserv.com.**

Easier to operate

The **Installer Friendly Series** drip and timed dose controllers are easy to operate, monitor, and service because of the touch-pad display on the inner door. With one touch, the user can program rest for standard time, rest for peak enable time, spin filter flush time, dose time, field flush time, and field drain time. At a glance, technicians can monitor system cycles, float status, and pump run status. Simplex and duplex versions are available. **Quanics: 877/782-6427; www.quanics.net.**

Floats or air pressure

The **Power Zone Jr.** simplex pump controller has flashing red LED alarm lights, hand run button, pump run indicator light, NEMA 4X outdoor enclosure, latching door that can be locked, and an exterior audible alarm silence/test. Units operate by floats or air pressure — a single air bell replaces all the float



SEPR/DEPR Series from American Manufacturing Company Inc.

switches. When using the air system, knobs inside the panel let the user adjust the pump off, pump on, and high-level set points without entering the tank. **CSI Controls: 800/363-5842; www.chandlersystemsinc.com.**

Timer control panels

Simplex and duplex equalization repeat cycle **(SEPR/DEPR)** timer control panels handle pretreatment pumping to dispersal control. They are available in two-, three-, or four-float configurations including peak enable or override options. Standard units allow operators to adjust run times and standard and peak rest times, and view internal counters, elapsed time meters, and 30-day logging data without special accessories. Options include web-based alarm reporting, temperature sensor alarms, and dialers. **American Manufacturing Company Inc.: 800/345-3132; www.americanonsite.com.** ■

Machine Matters is designed to help readers get the most from excavators, backhoes, skid-steers and other mechanical equipment through proper maintenance, operation and financial practices. Readers are welcome to submit ideas for this column and can send them to Ted J. Rulseh, editor, by calling 800/257-7222, or e-mailing to editor@onsiteinstaller.com.

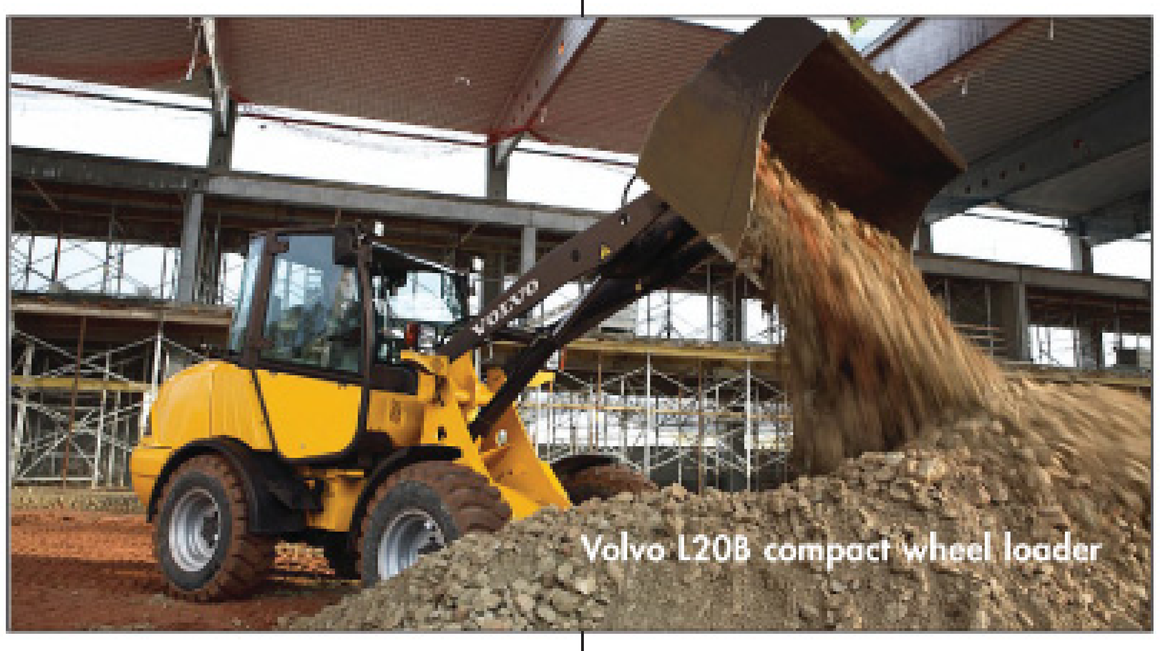
Muscle and Hustle

Compact wheel loaders combine high productivity, low operating costs, and operator comfort in versatile machines with tight-space capability

By Greg Northcutt

When it comes to working quickly and easily in a small space, it's tough to beat a skid-steer or compact track loader for its ability to turn completely around within its own length. But if you need a compact machine to handle backfilling, lift-and-carry, and loading chores along with a wide range of attachments, and you're not constrained by space, you might get more done more comfortably in a day with a compact wheel loader.

"Sometimes a full size tractor-loader-backhoe or other equipment may be too large for your work site, a skid-steer or track loader too small to handle the job, and a compact tractor too awkward to work efficiently in the available space," says Keith Rohrbacker, construction equipment product manager for Kubota Tractor Corp. "Compact, easy-to-maneuver wheel loaders can fill these gaps."



Volvo L20B compact wheel loader

Some pros and cons

Compact wheel loaders are usually in the 40- to 80-hp range. They are larger and weigh more than a skid-steer or compact track loader with comparable lifting and digging performance. Depending on your truck and trailer, that could be a drawback. But, it also means a larger cab with easier entry and exit, a more comfortable seat with a higher vantage point for the operator, and a 360-degree view of the jobsite.

While top travel speed for skid-steer loaders is about 12 mph, compact wheel loaders typically can travel up to about 18 mph, or faster.

"Just as there is a place for skid-steers and compact track loaders on a jobsite, there is also a place for compact wheel loaders," says Joel Powell, product specialist group manager of compact equipment for Volvo Construction Equipment. "Like these two compact counterparts mentioned, compact wheel loaders may be present at the onset of a job until its completion. From groundbreaking to ribbon-cutting, from initial lot clearing to final landscaping, these continue to grow as a viable, productive alternative."

You'll pay more to buy a compact wheel loader. Depending on brand, model and options, they typically cost $40,000 to $90,000 for models up to 80 hp or so. One manufacturer's models in the 40- to 50-hp range cost $40,000 to $50,000. That compares to a popular compact track loader in the 60-hp range that costs about $42,000.

Also, a compact wheel loader needs room to make a three-point turn or to change direction in about an 11- to 14-foot radius turn. But, manufacturers say, in the right situation, the added productivity and comfort of a compact wheel loader can outweigh its higher price tag.

More production

Much of the extra productivity stems from the ability of a compact wheel loader to use power more efficiently. Generally, a skid-steer or compact track loader requires a bigger engine to do the same amount of work as a compact wheel loader.

"With a compact wheel loader, performance goes up, while fuel costs go down," says Brian Rabe,

Mustang ML28 compact wheel loader

product specialist for Mustang Manufacturing Company Inc. "Higher ground speeds, more bucket capacity, and similar cycle times to skid-steer and compact track loaders lead to significantly more productivity."

Rohrbacker has compared some of the features and performance of two Kubota compact wheel loader models — the R420 and R520 — with various skid-steer and compact track loaders in the accompanying tables on the facing page. As these figures show, the compact wheel loaders have the advantage in terms of lifting ability, bucket capacity, digging power, and travel speed. When it comes to reach and dump height for loading, the compact wheel loaders offer similar if not better performance.

Steering choices

The more comfortable ride of compact wheel loaders reflects dif-

PERFORMANCE COMPARISONS

	R420	Skid-Steer Loader	Compact Track Loader
Operating Load	1,925 lbs.	1,251 to 1,351 lbs.	1,601 lbs. or more
Horsepower	43	44 to 50	31 to 50
Bucket Capacity	0.5 cu yd	0.38 to 0.47 cu yd	0.4 cu yd
Weight	7,450 lbs.	4,500 to 5,300 lbs.	6,400 lbs.
Breakout Force	6,550 lbs.	2,800 to 3,500 lbs.	3,300 lbs. or less
Travel Speed	12.5 mph	6 to 7 mph	6 to 8 mph
Dump height @ discharge	88 inches	82 to 88 inches	89 inches or less
Reach	30.8 inches	23 to 25 inches	Not published

	R520	Skid-Steer Loader	Compact Track Loader
Operating Load	2,205 lbs.	1,601 to 1,751 lbs.	2,201 to 2,701 lbs.
Horsepower	49	47 to 60	60 to 70
Bucket Capacity	0.75 cu yd	0.47 to 0.57 cu yd	0.47 cu yd
Weight	8,980 lbs.	6,000 to 7,000 lbs.	7,500 to 8,000 lbs.
Breakout Force	7,425 lbs.	3,200 to 4,100 lbs.	3,700 to 6,700 lbs.
Travel Speed	12.5 mph	7 to 8 mph	6 to 8 mph
Dump height @ discharge	108 inches	86 to 94 inches	88 to 98 inches
Reach	34 inches	20 to 30 inches	20 to 34 inches

ferent steering and a longer wheelbase. They eliminate the vibration caused by the short wheelbase, which contributes to the pitching of skid-steer loaders when traveling.

Many compact wheel loaders have an articulating frame that allows the front or rear unit to swivel horizontally up to about 45 degrees right or left. The front or rear unit of articulated wheel loaders also oscillates vertically as much as about 10 degrees to follow the terrain while keeping all four wheels on the ground. Others have a one-piece frame that uses two steerable axles to angle up to 80 degrees for turning with the rear axle oscillating vertically as much as 11 degrees.

Increased versatility

"Auxiliary hydraulics, hydraulic quick couplers, and the ability to use many skid-steer attachments add to the versatility of compact wheel loaders," says Powell. For example, Volvo offers more than 60 different attachments for its compact wheel loaders.

Some also can be equipped with high-flow hydraulics, although the flow rate is typically lower than the high-flow hydraulics on skid-steers and compact track loaders. Some tools designed for skid-steer and compact track loaders may not withstand the higher breakout forces produced by compact wheel loaders. For example, buckets designed for compact wheel loaders are usually larger, more heavy duty, and shaped differently than those used with the other machines.


Kubota R520S compact wheel loader

"Sometimes a full size tractor-loader-backhoe or other equipment may be too large for your work site, a skid-steer or track loader too small to handle the job, and a compact tractor too awkward to work efficiently in the available space. Compact, easy-to-maneuver wheel loaders can fill these gaps."

Keith Rohrbacker
Kubota Tractor Corp.

Lower operating costs

Despite the higher purchase price, compact wheel loaders cost much less to operate. "They have a much longer operating life than skid-steer and compact track loaders," Rabe says. "Because the engines of compact wheel loaders typically run at a lower rpm, there's less stress on their hydraulic systems. The overall ruggedness and longer wheelbase of compact wheel loaders means longer service intervals. And, they have a better resale value."

With their articulated or four-wheel steering, compact wheel loaders don't tear up turf as skid-steer and compact track loaders do when turning. That reduces the need for repairs when working on lawns and other sensitive surfaces. Plus, it results in much longer tire life for compact wheel loaders than skid-steer loaders.

A closer look

Manufacturers offer various features to enhance operation and productivity of their compact wheel loaders.

Kubota compact wheel loaders are equipped with a load-sensing hydrostatic transmission. It shifts from high speed/low torque to low speed/high torque as load conditions vary. A travel speed limiter reduces maximum travel speed with the push of a button, while maintaining full performance of auxiliary hydraulics for working efficiently in tight spaces. Standard front and rear auxiliary hydraulics add to versatility, including the ability to use a backhoe attachment.

The Volvo line of wheel loaders includes four compact models, from the 54-hp L20 with a 6,070 pound-feet of bucket breakout force, to the 75-hp L35B Pro, with 13,600 pound-feet of breakout force. A multi-function lever controls machine direction, hydraulic functions, and the front and rear differential locks, providing optimum traction on difficult terrain. Options include a hand inch valve for maximum working power at reduced travel speed, and optional air conditioning/heating systems.

The all-wheel-steer, rigid-frame design of Mustang's four compact wheel loader models maintains their center of gravity. This results in no loss of lift capacity and stability while turning. Articulated units can lose up to 20 percent of their lift capacity when going from straight to a full turn, Rabe says. An infinitely variable high-speed gearbox, available on three of the models, provides a top travel speed of 25 mph.

Greg Northcutt is a freelance writer based in Port Orchard, Wash. He can be reached by e-mailing this publication at editor@onsiteinstaller.com. ■

Charting the Course

As the new executive director of NOWRA, Alan Gale strives to help make the national organization and its affiliates more effective on members' behalf

By Ted J. Rulseh

Alan Gale

Alan Gale uses just a few words to sum up his first impressions of people in the onsite industry: educated, honest, friendly, open, down-to-earth.

He'll have ample opportunity to enjoy those qualities as executive director of the National Onsite Wastewater Recycling Association (NOWRA). Gale assumed the director's chair on Nov. 1. He is a partner of the BTF Enterprises Inc. association management firm in Santa Cruz, Calif.

Gale joined the firm just over three years ago and has dedicated himself to helping NOWRA increase its revenue, expand membership, and deliver programs that members will find valuable.

Before joining BTF, Gale worked several years with Cisco Systems in logistics, customer service, manufacturing, and management. While there, he earned an MBA degree from the University of Phoenix to go with his bachelor's degree in political science from San Jose State University.

In an interview with *Onsite Installer,* Gale shared perspectives based on his first several months of involvement with the onsite industry and his aspirations for NOWRA.

***Installer*: What is your first impression of NOWRA as an organization?**

Gale: I think NOWRA is very relevant. It's a cutting-edge association in terms of its importance to environmental quality, which of course is a major issue today. I think we are very well poised to expand in the future and help provide real-world solutions to current problems.

***Installer*: What does the NOWRA membership picture look like today?**

Gale: We have about 4,500 members. Of those, about 60 percent are system installers and designers, 25 percent come from academic institutions, and 15 percent are government regulators.

***Installer*: How would you assess the installers' level of involvement in NOWRA?**

Gale: I see installers starting to get a clearer idea of how NOWRA can be valuable to them. They're looking for the organization to demonstrate what it can do. They're the "show me" kind of members. So far, their reactions have been very positive.

Our third annual Installer Academy grew by 100 attendees this year, to a total of 250. From the time I came on board until the academy was held last December, we had very limited time to market the event. We were quite gratified with how well the installer community responded.

I was highly pleased at the quality of the people who attended. NOWRA is a highly educated group of people who do the work they love, with all its challenges. I found them really intelligent, friendly, open, down-to-earth. The way I would describe it is that I get absolute honesty — and then somebody hands me a beer.

> **"NOWRA is a highly educated group of people who do the work they love, with all its challenges. I've found them really intelligent, friendly, open, down-to-earth."**
>
> — Alan Gale

***Installer*: What would you say is the association's greatest need?**

Gale: NOWRA needs a solid association foundation so that it can go further in the future. That is what we are working to build. At the outset, we saw the volunteer board members and other members doing a great deal of operational work. At BTF, we have the technology and know-how to assume those tasks and free the members to do what they want to be doing, which is working on industry issues.

We can provide advice on basics such as organizational structure and how to run committees efficiently. We intend to improve the planning and marketing of the annual technical conference. We're also looking to give more support to NOWRA's local affiliate groups.

***Installer*: How exactly do you see the national organization helping the affiliates?**

Gale: It's the local affiliates that do much of the work NOWRA members need done and deliver many of the tangible benefits they want. I think the national organization is very well positioned to support those groups.

I've been amazed at how hard the volunteer boards work at just running the operations of their groups. We can provide real benefits that enable these people to step back from those tasks. We won't do it with more manpower. We'll do it with technology.

***Installer*: Exactly how might technology come into play?**

Gale: Take annual conferences, for example. Right now, almost every local affiliate group holds a conference. The volunteer boards or the executive directors spend a great deal of time processing the registrations and handling the finances. People fax and mail in registration forms, and someone enters all that manually into a spreadsheet.

We have the technology to make online registration available to these groups. We have a database that we use for other organizations and could easily put to work on behalf of NOWRA and its affiliates. Our technology can help free the group leaders and members from those administrative tasks so they can do what they should be doing – working with their local governments, lobbying, building programs for their members. Of course, there's also the Septic Locator, which we regard as the industry's leading online directory.

***Installer*: NOWRA has built good working relationships with various related industry groups. Where do you envision those relationships going?**

Gale: We do have connections with other organizations in the

industry, and also with the EPA. I see value in making those connections even stronger. That's part of the value NOWRA can bring to its members.

I've had the pleasure of meeting key people from almost all these groups. We're at the stage of building relationships. I've talked with Tom Ferrero (executive director of the National Association of Wastewater Transporters) about matters such as how we can better integrate our web sites and communicate more effectively with our members.

With Christl Tate (onsite wastewater program coordinator with the National Environmental Health Association), I've explored the possibility of collaborating in some way on conferences in the future.

Installer: On the national stage, how can NOWRA increase its influence on behalf of the industry?

Gale: I see us ratcheting up par-ticipation on issues of national concern, with help from other industry groups. I see us getting more involved in the bigger picture of decentralized, distributed and integrated water resource management, through legislative initiatives, grant seeking and conducting of joint studies.

> **"It's the local affiliates that do much of the work NOWRA members need done and deliver many of the tangible benefits they want. I think the national organization is very well positioned to support those groups."**
>
> — Alan Gale

Issues that concern NOWRA members — public health, intelligent development, environmental quality — are very relevant on the national agenda and on local agendas as well. Together we have an opportunity to make a real difference. ■

NOWRA Seeks Training Proposals

The educational program is taking shape for the Fourth Annual Installer Academy, scheduled for Dec. 8-10 in Las Vegas

The National Onsite Wastewater Recycling Association is seeking training proposals for the Fourth Annual Installer Academy.

This year's Academy, Dec. 8-10 at the Riviera Hotel on the strip in Las Vegas, Nev., will focus on specialized installer training programs. "The Installer Academy is our premier education and training program," says NOWRA executive director Alan Gale. "Attendance and interest continues to grow.

"We are asking onsite professionals to share their knowledge and experience in design, installation, inspection and operation and maintenance of systems, and to share practical skills needed to run a successful design, installation or service business." NOWRA is looking for trainers in four areas:

Technical

Suggested topics include:

- Introductory topics
- Design of conventional and alternative systems
- From design to construction
- Installation: Time is Money
- Operation and maintenance of conventional and non-conventional systems
- Inspection of conventional and non-conventional systems
- Troubleshooting of conventional and alternative systems

Practical

Suggested topics include:

- Safety training
- Basic wiring
- Equipment operation, safety and maintenance

Business

Suggested topics include:

- Bidding projects
- Tools for running a small business
- Incentive programs for employees
- Contract development
- Establishment of a responsible maintenance entity (RME) business around EPA model program guidelines.

Vendor-specific or state-specific training. These programs will be presented in a Vendor Training Room. There is a $500 fee for each four-hour block of training, and the training entity must purchase a booth at the conference.

"It is important that we offer a range of topics of interest to onsite professionals during the three days of training," says Gale. Professionals who would like to share knowledge in any of the topic areas, or who have an idea for another topic, should submit a proposal as soon as possible. Proposals should include:

- The category of training (technical, practical, business or vendor/state-specific).
- The nature of the training session (one to six hours). Include the title, a brief description of the topic, and the length. For multiple topics, include an outline of the training with estimated length and names of speakers.
- Description of any handout materials that will be given to attendees.
- Any costs to NOWRA for the proposed program.
- Background information that describes each trainer's area of expertise and experience. (This will be used to meet CEU requirements and to introduce speakers.)

E-mail your proposal to Judy Sims, Installer Academy Education Chair, at jlsims@engineering.usu.edu. Questions may be directed to Sims. For more information about the Installer Academy, visit www.nowra.org. ■

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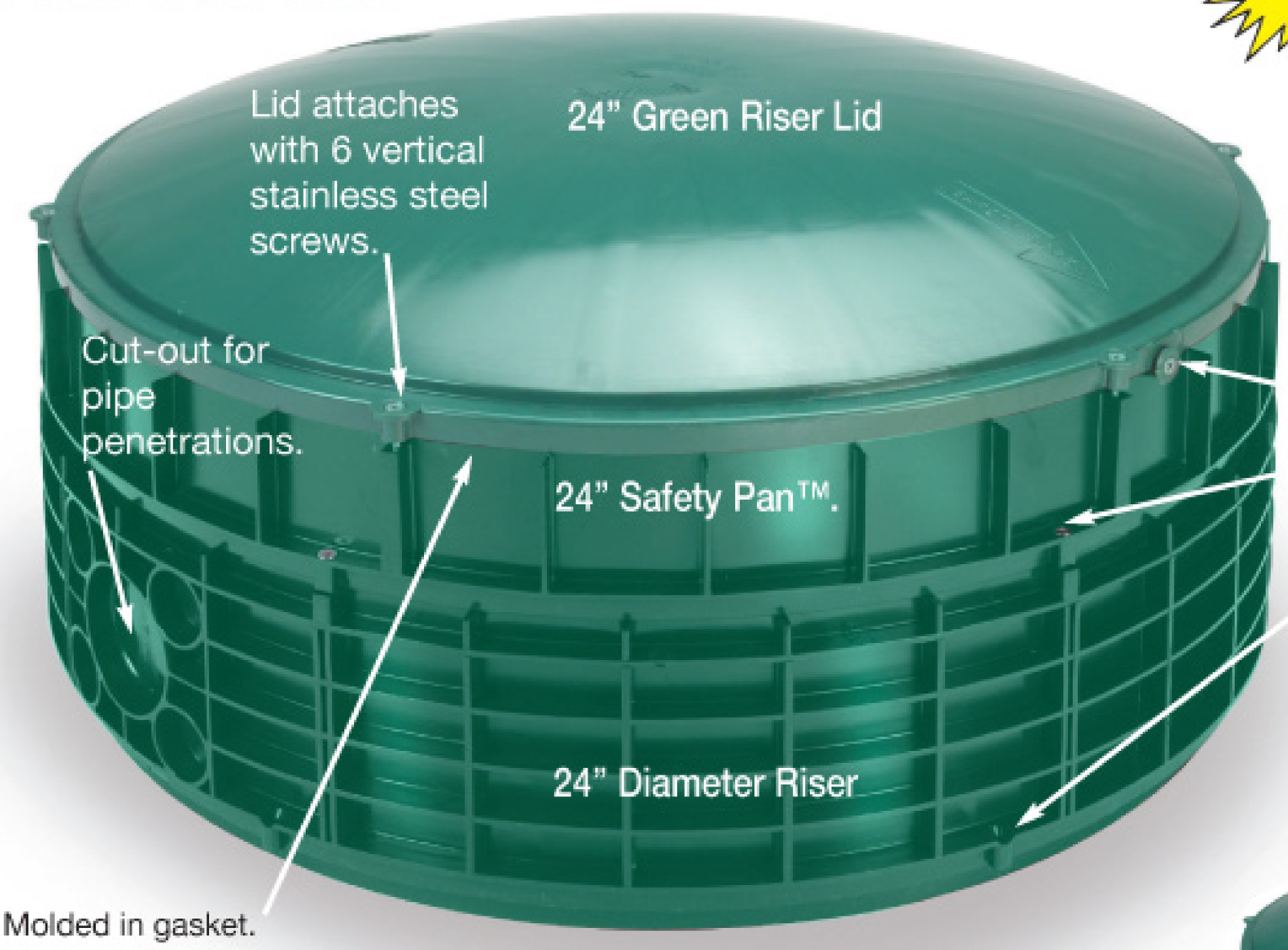

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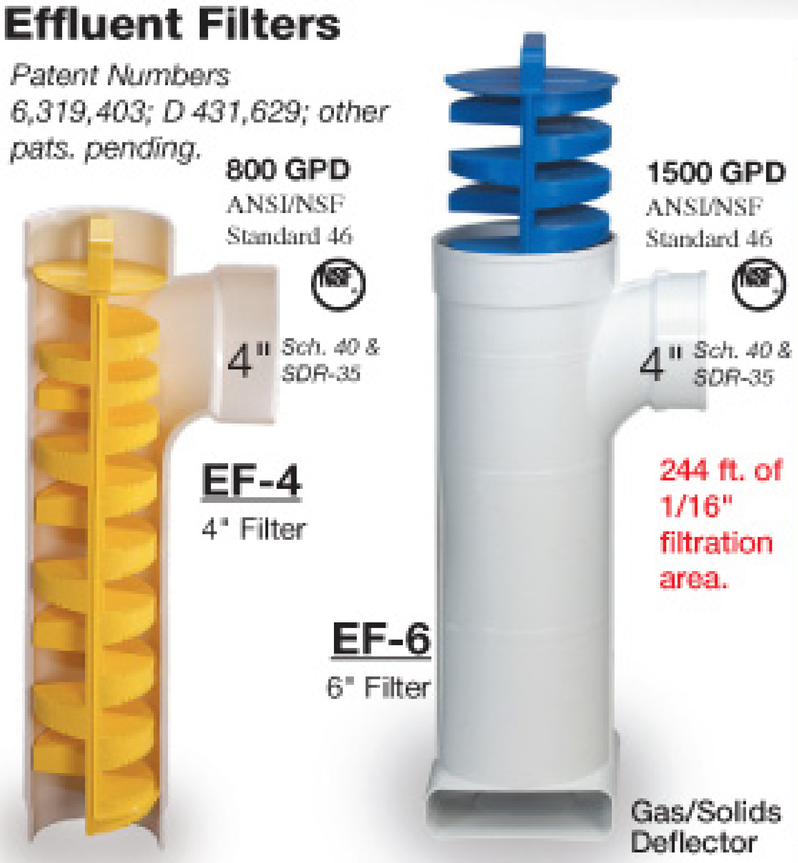

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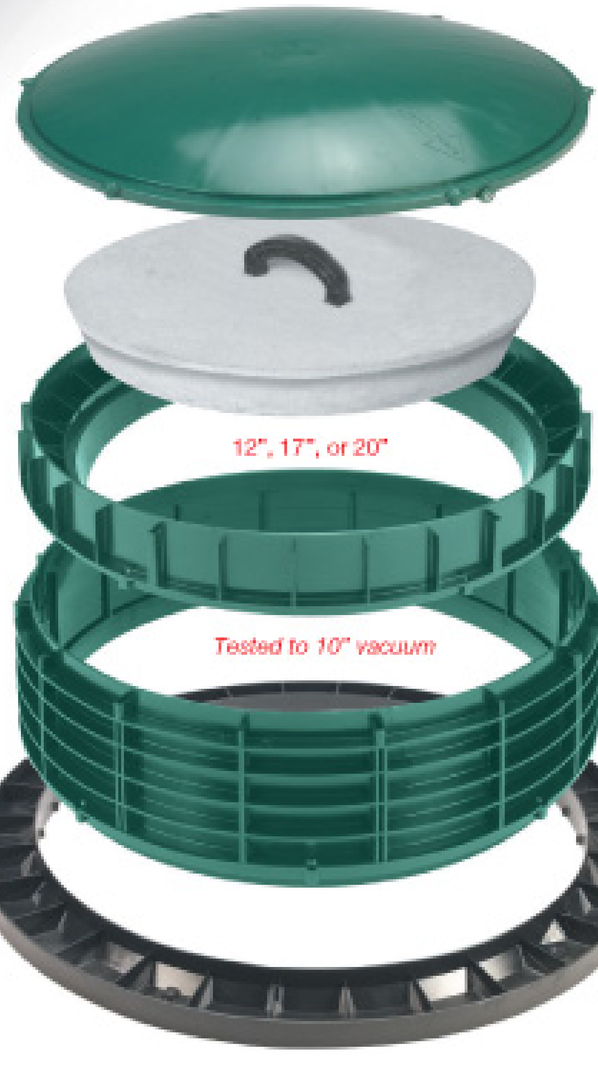

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John Graves Jr., owner of Graves & Son Inc. in Sunbury, Ohio, works a Bobcat mini-excavator on a drip system site. (Photography by Laura Sauer)

Suiting the Site

Graves and Son thrives on the challenges of tailoring onsite systems to properties with high seasonal water tables and other limitations

By Gil Longwell

Graves and Son Inc., Sunbury, Ohio

OWNER: John Graves Jr.
YEARS IN BUSINESS: 48
MARKET AREA: 100-mile radius
ANNUAL REVENUE: $600,000
SPECIALTIES: Installations on challenging sites
EMPLOYEES: 3

John Graves Jr. loves a challenge, and that may be one reason he is successful as an onsite installer in Delaware County, Ohio.

"Seasonal high water tables at depths of 12 to 18 inches are common in this area, and people are starting to recognize the relationship of a high water table and system performance," says Graves, a second-generation installer based in Sunbury, about 28 miles north of Columbus.

History says that when it's time to innovate, Graves is there. His company, Graves and Son Inc., in business for 48 years, installed the first mound systems and the first drip irrigation systems in the county.

Graves prides himself on working carefully to fit the system to the site. The business is tightly focused on installation — services like operation, maintenance and repair are not on the company's menu. He does take time consistently to educate himself and his two employees, and to serve the industry by supporting training and advocating for progressive onsite regulations.

Following father

His father, John Graves Sr., started the business in 1960 to pursue the American dream. The company started in pipeline installation but soon shifted its focus to onsite system installation. John Jr. chose to follow in his dad's tire tracks. "I'm like the kid who grew up in a sand box," he says. "I liked it, and I stayed."

Today, Graves and Son regularly covers a 30-mile radius, and for selected jobs the firm will travel up to 100 miles. Graves finds that by controlling the number of employees, he can keep his overhead low and focus on his market niche.

> **"I'm like the kid who grew up in a sand box. I liked it, and I stayed."**
> — John Graves Jr.

Ed Pearl, the only full-time employee, is an equipment operator and supervisor. He and Graves work some jobs together, both supervise subcontracted equipment and short-term laborers. This approach leaves Graves to handle both busy and slack periods without having to find "keep busy" work. Kim Bear works part-time as bookkeeper.

> "More and more, folks want a system that is sited, designed, and operated to meet the sewage needs of their lifestyle while overcoming the site's limitations and 'disappearing' into the landscape."
>
> — John Graves Jr.

John Graves adjusts drip lines at a residential onsite system installation.

Overcoming challenges

Graves was there when mound systems were introduced to Delaware County in the mid-1990s as a way to gain vertical separation from seasonal water tables. Graves' first mound installations became training events for regulators, introducing them to the field realities of mound construction.

Before 2000, Graves estimates he installed about 80 percent of the mounds in the county. While he has enjoyed success with mounds, that has not always been the case with conventional systems.

In 2000, Graves installed several conventional systems in a small community. The county health department approved each site and each system design, yet not long after installation, several failed. Looking at these systems, and drawing on his knowledge of the connection between seasonal high water tables and system performance, Graves proposed drip irrigation as a replacement technology. His drip installations were another first and also doubled as regulator training sites.

Graves does not work in the tract housing market, preferring to work with owners who want upscale, distinctive homes. "More and more, these folks want a system that is sited, designed, and operated to meet the sewage treatment needs of their lifestyle while overcoming the site's limitations and 'disappearing' into the landscape," he says.

Leadership role

Graves' strength is in coordinating the building site with the property's soils and wooded areas and with the future homeowner's vision. Also on the team is a soil scientist, and Graves prefers to work with one scientist for all his jobs. "We get to know each other and how the other thinks," he says. "Keying off each other, we discuss options, potential sites, technologies, and the opportunities and obstacles each presents."

In his meeting with the designer and future owner, and sometimes an engineer, Graves applies construction practicality to the project. These meetings produce win-win results. 'The meetings are not the starting point," he says. "They are the culmination of field investigations, and of preliminary discussions with the builder and homeowner and, most important, the soil scientist."

Regulatory Seesaw

A byproduct of onsite education in Ohio was a recognition among authorities that the state onsite regulations were inconsistent from county to county. To address this weakness, the Ohio Department of Health (ODH) appointed an ad hoc committee to develop a consensus report addressing statewide regulatory issues.

This committee, on which John Graves served, found that consistency is necessary and that any regulatory proposal should be science-based. Next, the ODH rules committee drafted and released a set of statewide onsite system regulations, which were signed by the governor and scheduled to become effective in 2007.

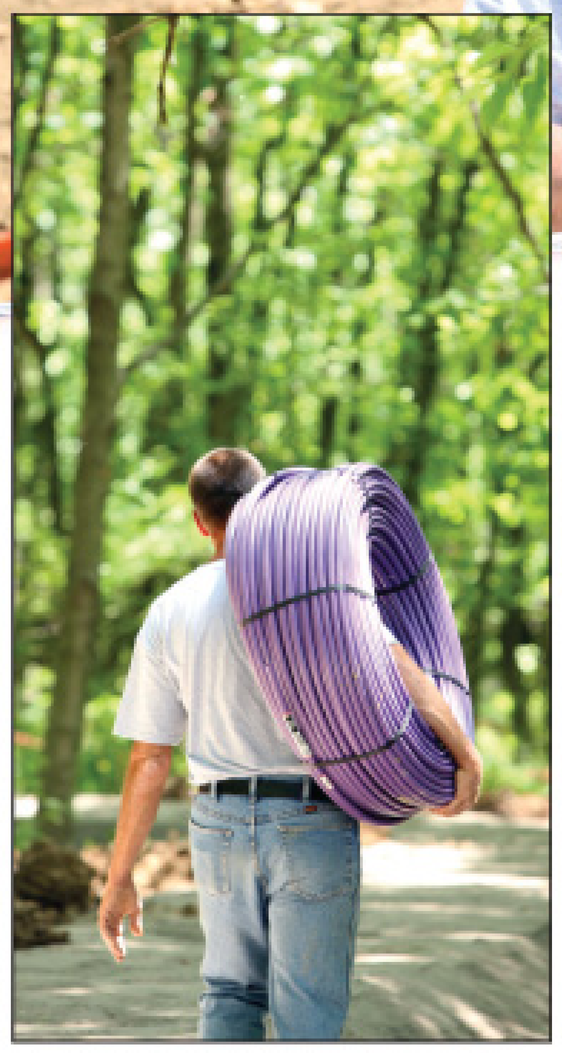
Shortly after the effective date, the state legislature rescinded the rules, causing great concern among those who worked hard to craft them. Graves and many others are committed to the new regulations, and Graves has testified before a legislative committee in support of the regulations. He feels confident the regulations will soon be adopted.

"That's because when the proposed regulations were rescinded, counties still had the option of enacting them," he says. "More than 50 percent of them have done so." When they are eventually adopted, counties still may choose to adopt even stronger rules. However, the state regulations will become the starting point.

The problems now are two-fold. Not all counties have adopted the 2007 regulations as they were enacted. Some have reverted to their prior regulations. "The absence of state minimums and the diversity of county regulations have created a new kind of confusion for anyone connected with the onsite industry," Graves says.

John Graves

Local regulator James Lynch (right) converses with John Graves about an in-progress installation.



Graves & Son team member Ed Pearl totes a supply of drip tubing.

The county health department reviews and approves every design, and Graves also submits each design to the treatment equipment manufacturer for review. The manufacturer is also part of Graves' team.

Graves and Son takes pride in serving customers well during installations, but the company does not offer service contracts. Treatment equipment vendors provide that service, and Graves is happy with that arrangement. Occasionally he is called in to assist when a vendor's personnel are stretched and a client has a problem. "We help out our vendors, just like they help us out," Graves says.

The firm rarely undertakes system repairs. Graves spends the winter months working with designers, builders and homeowners, and in good economic times he sells two-thirds of the upcoming season's construction by late March. "Repair work is terribly disruptive to a fully committed construction schedule," he says. In slower times, he may take on a repair or two to fill unsold time.

Involved in the industry

Graves believes in the value of training, and staying small helps him afford to take full advantage of opportunities for himself and Pearl. "Ed and I participate in every available training opportunity, and that lets Graves and Son put a fully qualified person on every jobsite," he says.

He believes a full understanding of technology is essential when making installation decisions. His expertise sets him apart from many competitors.

When not learning himself, Graves gives back. The onsite industry in Ohio is regulated by county health departments, which means great diversity of site evaluation and installation standards. Believing that "better educated regulators raise the bar for the entire industry," he has opened his installations for regulator training. Competitors are welcomed to the sites, as well.

His open-site approach to peer training caught the attention of Dr. Karen Mancl, co-director of the Soil Environment Technology Learning Lab (SETLL) at The Ohio State University. The lab serves designers, contractors and installers, regulators and landowners, with the goal of eliminating nonpoint source pollution from onsite systems in rural Ohio.

An integral part of the SETLL training program is installation, operation and demonstration of various onsite technologies. The installations use sewage from occupied houses on the OSU research farm near the campus.

At the farm Graves has installed an elevated mound and a drip dispersal system. A third demonstration system includes a waste stabilization pond (sewage lagoon) that discharges to spray irrigation. All three are used for training throughout the year.

Well equipped

Graves has controlled his business destiny through personal education, paying attention to what sites tell him, and installing technologies that overcome site limitations. Another component of his success is found in his equipment yard.

To minimize loading pressures, all his equipment moves on rubber tracks. A Bobcat T190 skid-steer loader and a Bobcat 437 mini-hoe do most of the small or lighter work. Attachments include a soil conditioner used to prepare sites for final seeding and a Brushcat for initial brush removal.

Other often used equipment includes a 1995 Ditch Witch 400SX articulated plow, a 2004 Cat 312 trackhoe, and two Chevy pickup trucks. To move equipment, a 1996 International tractor pulls any one of several flatbed or low boy trailers. Also in the inventory but seldom used is a 1997 Cat D4 dozer left over from Graves' mound-building days.

Equally selective when specifying technologies, Graves routinely installs drip technologies from Active Aeration Systems Inc. and American Manufacturing Company Inc.

Graves' narrow menu of services has allowed him to focus on a niche and enjoy success employing processes that routinely work in an ever-evolving industry. ■

MORE INFO:

247 **Active Aeration Systems Inc.**
614/873-4400

27 **American Manufacturing Company Inc.**
800/345-3132
www.americanonsite.com

216 **Ditch Witch**
800/654-6481
www.ditchwitch.com

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www.hootsystems.com

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NSF Certified to NSF/ANSI Standard 40

NSF Onsite Monitoring Ready

Now that the manufacturing community has begun to embrace On-Site Nitrogen Reduction, Hoot would like to educate you on what they have done.

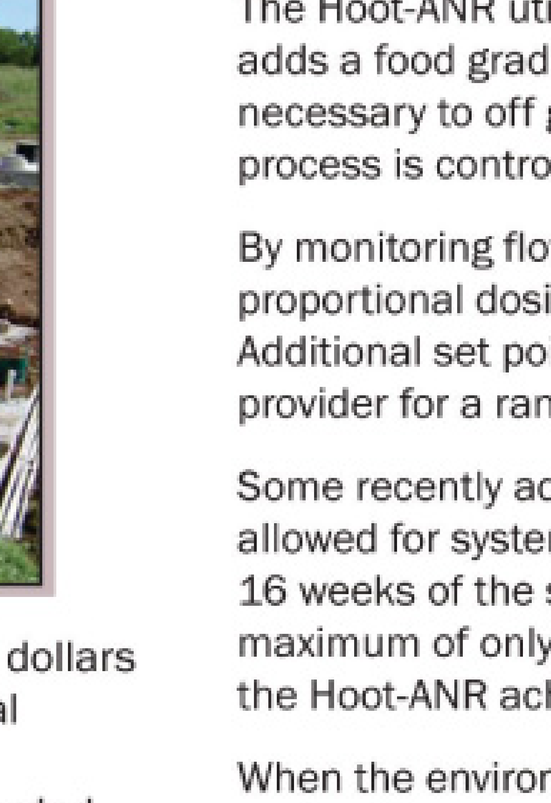
In 1999, Hoot began their Nitrogen Reduction work in response to regulatory concerns they identified in Florida. There was a "Key's Standard" that was being largely ignored.

Since then, no less than 10 companies have tried to enter that market, some with as few as 6 samples to "Justify" system performance to below 10 mg/L TN, the level determined necessary to protect the critical springs area's.

Initial research at Baylor University focused on utilizing 4 different configurations of Hoot systems.

Hoot has spent the last 6 years and millions of dollars in Research & Development working to get Total Nitrogen below 10 mg/L. During this time the Nitrogen issue has been marginalized and regarded by some as "less important than making sure a riser is screwed down."

Hoot set out to prove that cost effective Nitrogen Reduction could be achieved, and the technology made available at a price that people could afford.



In 2006, Hoot began 3rd Party NSF testing to "Prove" what was previously discovered through research. Cost effective, efficient Nitrogen Reduction to below 10 mg/L can be achieved.

As result the first (and only) system certified below 10 mg/L was born.

The Hoot-ANR is just one of a series of three treatment systems by Hoot that perform <10 $CBOD_5$ & <10 TSS at the lab and in the field. Additionally, Hoot offers two Nitrogen Reduction Technologies; one utilizing timed recirculation and another that achieves the maximum Nitrogen Reduction, for the most sensitive environments, that reduces Total Nitrogen as far as possible (5.8 mg/L under the Standard 245).

The Hoot-ANR utilizes a "patent pending" process that adds a food grade additive to provide additional carbon necessary to off gas as much Nitrogen as possible. This process is controlled by a controller, not homeowners.

By monitoring flow through the system, it ensures flow proportional dosing to provide reliable performance. Additional set points can be selected by the maintenance provider for a range of influent from of 35 to 75 mg/L TN.

Some recently advertised studies, NOT certifications, have allowed for system performance to be ignored for the first 16 weeks of the study. The NSF Standard 245 allows a maximum of only a 3 week startup. At the end of week 4, the Hoot-ANR achieved a 92% reduction. (2.7 mg/L TN)

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Bundle of Hope

A hybrid experimental geosynthetic aggregate pipe system faces tough challenges in southwest Missouri

By Scottie Dayton

A contractor was subdividing agricultural land in Joplin, Mo., but soil limited onsite system options to drip distribution. Three-bedroom homes required 1,800 feet of drip tubing, which meant the drainfield would occupy about one-quarter of the one-acre lots. Missouri's sanitary code specifies reserving equal space for a replacement drainfield.

The Jasper County Health Department was working with Theo Terry, manager of technology for Ring Industrial Group in Oakland, Tenn. The company had developed a new MD5 pressure distribution geosynthetic aggregate drainage bundle and was looking for a test site. The worst of the subdivision lots was chosen for the MD5 drainfield with experimental zones. Ring Industrial retained the rights to monitor the system through the University of Missouri.

The recirculating system was installed in September 2007, and monitoring was scheduled to begin the following spring.

Soil conditions

The site has 8 inches of topsoil, then a 4-foot-deep dense clay layer. The design hydraulic loading rate was 0.1 gal./sq. ft. per day.

System components

Terry designed the system to handle 360 gpd. Its major components are:

- 1,000-gallon, single-compartment concrete septic tank with two risers. All tanks made by Henson Septic Tanks & Supplies, Neosho, Mo.
- EF-6 Combo effluent filter from Tuf-Tite, Lake Zurich, Ill.
- 1,000-gallon single-compartment pump tank with STEP system from Quanics, Crestwood, Ky.
- 6606-RCW hydrostatic valve from K-Rain, Riviera Beach, Fla.
- 1,800 feet of MD5 geosynthetic aggregate drainage bundles in six zones of four laterals from Ring Industrial Group.
- Installer Friendly Series timer control panel from SJE Rhombus, Detroit Lakes, Minn.

MD5 aggregate bundles, 75 feet long, are installed two to a trench on 18-inch centers.

System operation

Wastewater gravity flows through a 4-inch PVC pipe to the septic tank, through the effluent filter, and into the pump tank. The STEP

System Profile

Location:	Joplin, Mo.
Facility served:	3-bedroom home
Designer:	Theo Terry, Ring Industrial Group, Oakland, Tenn.
Installer:	Vaughn Terry, A-Quality Excavating, Joplin, Mo.
Site conditions:	Dense clay with 8 inches of topsoil
Drainfield:	MD5 drainage bundles, Ring Industrial Group
Hydraulic capacity:	360 gpd

package inside contains a 44-inch filtered pump vault, 1/2-hp high-head turbine pump, risers and lids, and time-dose control panel. The pump runs for 2 1/2 minutes every four hours, sending 32 gpm into a zone determined by the hydrostatic valve. Each zone has four 75-foot-long bundles installed in two 24-inch-wide trenches.

The dosing sequence is in numerical order, but the zones are staggered — 1-4, 2-5, 3-6 — to spread the effluent out as much as possible in the dense clay. "At design load, it takes at least 16 hours before Zone 4 is dosed," says Terry. "At actual flow, it may take 20 or more hours before Zone 4 is dosed."

The MD5 drainfield can be considered a hybrid between drip dispersal and a low-pressure pipe (LPP) system. The long, narrow bundles, developed specifically to work in shallow soils, increase the infiltrative surface area, while pressurization maintains a constant, equal distribution.

"Because of the clay, we're hoping that adding a little oxygen will jumpstart the biological activity in the trenches. We're sampling the return lines to determine what percentage of dissolved oxygen is in the effluent."
— Theo Terry

Zones 1, 4, 2, and 5 continually flush into the sewer line through individual 3/4-inch PVC pipes. The bottom zones, 3 and 6, have experimental passive aerators. Effluent from those zones returns through separate lines to a sampling area inside the second riser on the septic tank.

"We could have sized the drainfield much smaller, but because it is an experimental application, we retained the original specified 1,800 feet," says Terry. The drainfield's footprint is 75 by 46 feet.

The 4-inch bundles have 3/4-inch tubing with 5/32-inch orifices every 40 inches. Expanded polystyrene aggregate encased in netting surrounds the tubing, providing storage capacity. The product is made in 150-foot-long continuous coils that installers can cut to length. Internal couplers splice the sections together.


The septic and pump tanks are shown installed and ready for backfilling. The drainfield was later installed to the right of the position of the mini-excavator.


Tuf-Tite Inc. supplied the EF-6 Combo effluent filter.

Installation

Vaughn Terry and Adam and Kyle Carden of A-Quality Excavating in Joplin. Mo., installed the system. During excavation for the tanks, the dense clay came out in large chunks.

Excavating for the trenches went more smoothly because the drainfield bundles were installed 8 inches deep in the topsoil. "We used a 2-foot bucket on a trackhoe so the operator could work without compromising the site," says Terry. "Not having to dig in that clay made life a lot easier."

They installed a venturi at the head of Zones 3 and 6 to test the effect of aerating effluent in the trenches. The pressure in the lines operates the venturi. "Because of the clay, we hope that adding a little oxygen will jumpstart the biological activity in the trenches," says Theo Terry. "We're sampling the return lines to determine what percentage of dissolved oxygen is in the effluent. If it proves beneficial, the venturi will become an MD5 option."

Vaughn Terry installed a curtain drain of 6-inch EZflow bundles to deflect subsurface water from the drainfield. He also tied all the downspouts from the house into the drain.

Maintenance

Because the system is experimental, monitoring will continue as long as necessary. Randall Miles, Ph.D., associate soil science professor at the University of Missouri, and his students are conducting the study. "One objective of our continuous recirculating design is to reduce the need to manually flush the laterals," says Terry. ■

MORE INFO:

246 **Henson Septic Tanks & Supplies**
877/451-1880
www.hensonseptictanks.com

245 **K-Rain**
561/844-1002
www.krain.com

130 **Quanics Inc.**
877/782-6427
www.quanics.net

22 **Ring Industrial Group**
800/649-0253
www.ezflowlp.com

41 **SJE-Rhombus**
218/847-1317
www.sjerhombus.com

10 **Tuf-Tite Inc.**
800/382-7009
www.tuf-tite.com

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BUSINESSES

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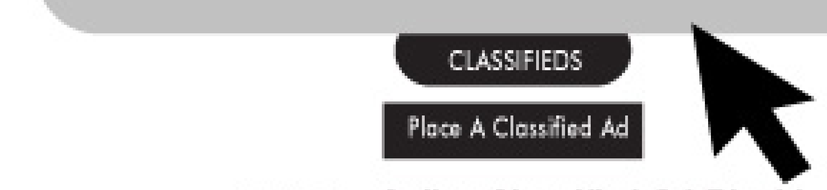

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ASSOCIATION news

By Scottie Dayton

July 2008

New water softener study

A preliminary study by researchers at North Carolina State University found spikes in sodium and chlorine in septic tanks that receive backwash from salt-regenerated water softeners. The Water Quality Association (WQA), representing water treatment dealers, and the National Onsite Wastewater Recycling Association (NOWRA) funded the study of 13 homes in a North Carolina community.

The main value of the research, says team leader Nancy Deal, is that it helped identify which variables determine onsite failures. WQA and NOWRA will plan a full study after agreeing on protocols established by the university team and locating funding.

WOWRA funds pharmaceutical research

The Wisconsin Onsite Water Recycling Association has earmarked $3,500 to support research examining the prevalence of pharmaceuticals in water, wastewater, and soils around septic and mound systems.

Throughout the summer, Joe Piatt, associate professor of chemistry and environmental science at Carroll College in Waukesha, Wis., will sample 12 residential onsite systems to determine if anecdotal reports from pumpers are correct. They state that homes with high pharmaceutical use significantly degrade the bacteria's ability to process waste in the septic tank, which in turn affects the drainfield.

WOWRA is asking members and others to contribute another $3,500 to help stay on the forefront of the research affecting the industry. Mail checks, payable to WOWRA, to 16 N. Carroll St., Suite 900, Madison, WI 53703.

Onsite troubleshooting form

The Missouri Smallflows Organization has a residential survey form for troubleshooting onsite problems in its online April newsletter. The 34 questions cover laundry habits, cooking preferences, pharmaceuticals and chemicals, water usage, and system maintenance. Download it at www.mosmallflows.org/newsletters/2008-4w.pdf.

CALENDAR OF EVENTS

Aug. 8-9

Georgia Onsite Wastewater Association Annual Meeting, Unicoi State Park and Lodge, Helen. Call 770/817-4692 or visit www.onsitewastewater.org.

Aug. 22-23

Wisconsin Liquid Waste Carriers Association Summer Convention, Radisson Paper Valley Hotel, Appleton. Call 608/255-2770 or visit www.wlwca.com.

Sept. 10-11

Septage/Grease Trap Waste Treatment Symposium, Holiday Inn at Six Flags, Eureka, Mo. Call 800/236-6298 or visit www.nawt.org.

Oct. 12-15

Virginia Onsite Wastewater Recycling Association Conference and Trade Show, Blacksburg. Call Trapper Davis at 804/966-9190 or visit www.vowra.org.

Oct. 14-15

Delaware Onsite Wastewater Recycling Association Conference and Exhibition, Dover Downs Hotel and Casino, Dover. Call 302/739-9331 or visit www.dowra.org.

Oct. 23-26

Ontario Association of Sewage Industry Services Conference and Exposition, Best Western Conference Centre, Orillia. Call Don Kelloway at 877/202-0082 or visit www.oasisontario.on.ca.

Dec. 4-5

Kentucky Onsite Wastewater Association Conference, Sloan Convention Center, Bowling Green. Call 270/715-0043 or visit www.kentuckyonsite.org.

Jan. 8-10

Michigan Onsite Wastewater Recycling Association Conference and Exhibit, Kellogg Hotel and Conference Center, East Lansing. Call Chanin Frank at 989/773-6985, ext. 258 or visit www.mowra.org.

Jan. 13-14

Iowa Onsite Waste Water Association Conference, Polk County Convention Center, Des Moines. Call 515/225-1051 or visit www.iowwa.com.

Jan. 13-15

Michigan Onsite Wastewater Conference, Kellogg Hotel and Conference Center, East Lansing. Many sessions count for required CEU hours. Call Mark Scott at 989/275-5011 or e-mail mscott@i2k.com.

Jan. 19-21

Missouri Smallflows Organization Conference and Exhibition, Holiday Inn Select, Columbia. Call 417/739-4100 or visit www.mosmallflows.org.

Jan 30-31

Wisconsin Liquid Waste Carriers Association and Wisconsin Onsite Water Recycling Association Joint Convention, Marriott West Hotel, Madison. Call 608/255-2770 or visit www.wowra.com.

TRAINING & EDUCATION

Septic tank education

The University of Alaska-Fairbanks Cooperative Extension Service is developing an educational campaign for communities on Kenai Peninsula, targeting real estate agents and landowners who have not owned onsite systems before.

The program includes workshops, flyers, and TV and radio commercials. The Extension will partner with the city and borough of Kenai and the Department of Environmental Conservation to develop the program, which may be used in other areas of the state. Contact Fred Sorensen at 907/786-6311.

Pump information

The Sump and Sewage Pump Manufacturers Association (SSPMA) has publications about *Sizing Guidelines for New or Replacement Sewage Pumps and Recommended Installation and Maintenance for Sewage Pumps*. Installers also may purchase a pocket-size calculator to determine the required sewage pump capacity, total dynamic head, and basin size.

The 32-page *Recommended Guidelines for Sizing Effluent Pumps* provides general and technical information about pump selection and sizing. It also covers types of onsite treatment systems, design of distribution fields, and sizing for enhanced-flow STEP and low-pressure pipe systems. An appendix contains installation drawings and sizing tables. Order at www.sspma.org/pubs/index.html.

Ohio Vendors Day Training Program

The Ohio Onsite Wastewater Association (OOWA) is sponsoring its first Vendors Day at the Roberts Conference Centre in Wilmington. A Sewage Rule Updates Workshop presented by the Ohio Department of Health on Thursday, July 31, is for installers, service providers, septage haulers, and pumpers.

The basic and advanced level exams for the NEHA Certified Installer of Onsite Wastewater Treatment Systems credential also will be given that day. Vendors Day on Friday, Aug. 1, enables groups of 10 to 12 people to spend 30 minutes with each of 12 manufacturers, who will present educational information on one product. Call 866/843-4429 or visit www.ohioonsite.org/vendorsday.html.

National Association of Wastewater Transporters

NAWT has scheduled sessions in the following locations:

- July 17-18 – Operation and Maintenance Training, northern California. Call 707/579-4882; www.cowa.org.
- Aug. 6-7 – Operation and Maintenance Training, central California. Call 707/579-4882; www.cowa.org.
- Aug. 26-27 – Inspector Training and Certification, Tucson, Ariz. Contact Kitt Farrell-Poe at 928/782-3836; kittfp@ag.arizona.edu.

- Sept. 9 – Vacuum Truck Technician Training, Holiday Inn at Six Flags, Eureka, Mo. Call NAWT at 800/236-6298 or visit www.nawt.org
- Sept. 18-19 – Operation and Maintenance Training, southern California. Call 707/579-4882; www.cowa.org
- Oct. 14 – Inspector Training and Certification, Tucson, Ariz. Contact Kitt Farrell-Poe at 928/782-3836; kittfp@ag.arizona.edu
- Oct. 23-24 – Inspector Training and Certification, central California. Call 707/579-4882; www.cowa.org
- Nov. 5-6 – Operation and Maintenance Training, northern California. Call 707/579-4882; www.cowa.org

Alabama

Licensing classes are the joint effort of the Alabama Onsite Wastewater Association (AOWA) and University of West Alabama (UWA). Courses are at UWA's Livingston campus:

- Aug. 7-8 – Continuing Education
- Sept. 3-5 – Advanced Installer Level 1

Call Allen Tartt 205/652-3803 or visit www.aowatc.uwa.edu.

California

Certification courses are sponsored by the California Onsite Wastewater Association and NAWT.

- July 17-18 – Operation and Maintenance, Part 1
- Aug. 6-7 – Operation and Maintenance, Part 2
- Sept. 18-19 – Operation and Maintenance, Part 1

Call Cliff Trammel at 707/579-4882 or visit www.cowa.org.

Florida

Courses are at the Florida Onsite Wastewater Association's Training Center in Polk City unless stated otherwise.

- July 8 – Master IV-Design Considerations & Dosing Systems, Jacksonville
- July 9 – Master IV-Design Considerations & Dosing Systems, Tallahassee
- July 15 – Septage & Grease in Florida, Sarasota
- Aug. 7 – Enhanced Nutrient Reduction, southeast Florida (TBD)
- Aug. 18-19 – *Master III-Basic Florida Soils
- Aug. 20-21 – *Master I-System Design & Function
- Aug. 21-22 – *Master II-System Materials & Regulation Requirement
- Aug. 25 – Aerobic Treatment Units, Part I
- Aug. 26 – Aerobic Treatment Units, Part II
- Aug. 27 – Artificial Media Treatment Technologies
- Aug. 28 – Natural Media Treatment Technologies
- Aug. 29 – What's New at the Training Center?

Contact FOWA at 407/830-4381 or www.fowaonsite.com.

Iowa

The Iowa Onsite Wastewater Training Center at Ankeny offers a course on At-Grade and Mounds on Aug. 21. Call Annette Adams at 800/362-2127, ext. 6464 or e-mail Dennis Hayworth at dahayworth@dmacc.edu.

Michigan

The Michigan Onsite Wastewater Training and Education Center at MSU Tollgate Center in Novi is offering these courses:

- Aug. 12-13 – Existing Systems Evaluator Training
- Aug. 20 – Pumped Systems Evaluator Training

Contact Barb DeLong at 517/355-4720 or visit www.egr.msu.edu/age, then Extension & Outreach.

Missouri

The Department of Health and Senior Services is offering the following training professional CEU courses:

- July 15-16 – Drip and Pumps/Panels/Electrical, Branson
- July 22-23 – Operation and Maintenance, Popular Bluff
- Aug. 19-20 – Troubleshooting and Hydraulics, Clinton
- Aug. 26-27 – Drip and Pumps/Panels/Electrical, Springfield
- Sept. 9-10 – Troubleshooting and Hydraulics, Cape Girardeau

Call Terri at 417/739-4100 or visit www.mosmallflows.org.

North Carolina

The North Carolina Soils and On-Site Wastewater Training Academy is offering the following courses:

- July 16 – Installation of Pump Systems, Williamston
- July 17 – Installation of Advanced Systems, Williamston
- July 18 – Installer/Inspector Exam, Williamston
- Sept. 16-18 – Subsurface Wastewater Operator Training, Bolivia

Call Joni Tanner at 919/515-1678 or visit www.soil.ncsu.edu/training.

Pennsylvania

The Pennsylvania Septage Management Association offers the following training:

- July 16-17 – Advanced Onlot Wastewater Treatment System Inspection, Chester County
- July 16-17 – Basic Onlot Wastewater Treatment System Inspection, Bordentown
- Sept. 17-18 – Basic Onlot Wastewater Treatment System Inspection, Williamsport, Pa., or West Chester, N.J.
- Sept. 24-25 – Basic Onlot Wastewater Treatment System Inspection, Apollo

New Jersey Septage Management Association members qualify for PSMA member tuition fees. Call Jackie at 610/350-0590, press 3, or visit http://psma.net.

Rhode Island

The University of Rhode Island's Onsite Wastewater Training Center offers these professional development workshops at its Kingston campus:

- July 10 – Innovative and Alternative Systems Field Tour
- July 15 – Surveying Techniques for the Wastewater Professional
- July 17 – Microbiology for Wastewater Professionals
- July 30-31 – Advanced Soil Morphology: Understanding wet soil conditions (contact Mark Stolt)
- Aug. 7 – Surveying Basics for the Onsite Wastewater Contractor
- Sept. 4 – Conventional Onsite Wastewater Treatment Basics for Installers
- Sept. 10 – Innovative and Alternative Technology Overview

Call Holly Meehan at 401/874-5950 or Mark Stolt, when directed, at 401/874-2915 or visit www.uri.edu/ce/wq.

Virginia

The following courses by the Virginia Center for Onsite Wastewater Training (VCOWT) and Southside Virginia Community College are in Blackstone.

- July 16-17 – Effluent Dispersal Systems
- July 23-24 – Basic Installation Practices for Conventional/Pump OWTS, (VOWRA)
- Aug. 5-6 – National O&M Training, (VOWRA)
- Aug. 12-13 – Designing with Easy/Fast CAD

For VCOWT classes, contact Debbie Campbell at 434/736-2011 or visit www.southside.edu/programs/wastetreat. For VOWRA courses, contact Trapper Davis at 804/966-9190 or visit www.vowra.org. ■

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