Texas On-Site Insights
Information about On-Site Wastewater Treatment Systems in Texas
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RFP allows local regulatory authorities to apply for funding of monitoring and evaluation studies

The On-Site Wastewater Treatment Council has issued a request for proposals (RFP) to support monitoring and evaluation of on-site wastewater treatment and disposal systems by local authorities.

The RFP gives priority to innovative (existing or proposed) sewage treatment and disposal technologies that do not meet or are not addressed by current State construction standards.

On-site treatment and disposal systems that serve one or more homes, businesses, or institutions are eligible for funding. These include artificially constructed wetlands, anaerobic upflow rock media filters, recirculating dosed or intermittent sand filters, aerobic treatment units, disinfection processes, modified conventional trenches or beds, lowpressure dosing systems, evapotranspiration and/or absorption beds, surface or spray irrigation, drip irrigation, gravel-less systems, mounds, and other innovative systems.

Proposals must include the following components: 1) a review of the literature, 2) a detailed site evaluation including climate conditions, soil conditions, topography, and a site plan, 3) a detailed system description; 4) installation of equipment for monitoring and evaluation, 5) measurement of parameters and water use, 6) evaluation of project data for the regulation, design and evaluation of these systems, and 7) the preparation of regularly scheduled reports.

Monitoring of treatment systems must monitor water and wastewater flows and the levels of 5-day Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), and fecal coliform in influent and effluent. In addition, data on other parameters such as temperature, nitrate/nitrogen, total Kjeldahl nitrogen, phosphorous, and other contaminants could also be included.

Monitoring of disposal systems could include the loading rate, ground and surface water quality and quantity, and other parameters.

To be eligible for funding, applicants must demonstrate specific application of the research to protect potable water supplies, the environment, or public health and welfare. Applicants must also show there is a need for funds, and that the project does not

duplicate previously conducted or on-going research. Monitoring and evaluation funds are not to be used to install on-site wastewater treatment facilities or to support State-required testing of a proprietary system.

Proposals will be rated for the need for the research, qualifications of project staff, budgets and time schedules, and other factors.

Contact Ted Johns or Sherman Hart of TWC at 512-834-6663 for additional details.

Symposium will focus on individual and small community on-site wastewater treatment

The Texas On- Site Wastewater Treatment Council will sponsor its first annual symposium August 9-11 in Austin. The meeting headquarters is the Austin Marriott at the Capitol. Their phone number is 512-478-1111.

The conference will focus on research and applications of individual and small community on-site wastewater treatment technologies and alternative disposal methods in Texas. Topics that will be covered include the performance of treatment units, alternative disinfection and distribution methods, management of innovative systems, and management and regulatory issues.

The keynote speaker will be Congressman J.J. "Jake" Pickle of Austin, while the luncheon speaker will be Congressman Greg Laughlin of Georgetown.

Poster sessions, exhibits and displays are also planned. Exhibit space was still available as of late June. A proceedings with all the papers presented at the Symposium is also being prepared.

For a detailed copy of the program or for additional details about the meeting, contact Maureen McReynolds, the Conference Coordinator, at 512-322-2960.

On-site systems needed to help Colonias

Finding solutions to on-site wastewater treatment and disposal is a critical need in the Colonias near El Paso, according to Lawrence Nickey of the El Paso City-County Health District. Nickey spoke to the Council during a meeting in El Paso earlier this year. One of the problems is rapid population growth (nearly 7 million people live near the border now) that led to the development of Colonias. Colonias are areas without drinking water or wastewater disposal systems. Nickey said that El Paso County includes 350 colonias with a combined population of roughly 68,000.

One of the main problems is that people drink contaminated water from shallow wells where untreated wastewater is disposed. In the Colonia of San Elizario, one study showed that more than a third of the children had been infected with hepatitis by age 8. By age 35, as many as 90% of the residents had become infected. Those rates are five times the national average.

To develop solutions to these problems, the Council is now funding a project by Anthony Tarquin of the University of Texas at El Paso that is looking into improved on-site wastewater systems for the Colonias.

LCRA offers benefits to septic tank users who conserve water

In the near future, almost all of us will become increasingly aware of the need to conserve water.

For example, a new State law requires that only water conserving toilets (those that use 1.6 gallons per flush), shower heads, and faucets will be sold in Texas. Obviously, this will impact people trying to build or remodel any residence, including those with on-site systems, after it takes affect this summer.

One question that's often asked is, "how will conservation directly affect individuals that utilize on-site wastewater systems?"

All Texans, regardless of whether or not they're served by on-site wastewater systems, can save a considerable amount of water and money by using conserving devices. For example, a newsletter produced by the Texas Water Resources Institute suggests that using water conserving devices could reduce an average 3-person family's water and energy bill by more than $300 per year. On a larger level, that article also showed that using low flow toilets throughout Texas could reduce overall water use in the state by 200 million gallons of water a day. Single copies of that newsletter, titled "Indoor Water Conservation", are available by calling the Institute at 409-845-1851.

Implementing conservation measures will enable your septic system to produce a higher quality effluent and will produce less effluent that needs to be treated or disposed . It should help increase the life of your system.

In areas in Central Texas served by the Lower Colorado River Authority (LCRA), water conservation may also save considerable amounts of money by reducing the amount of land needed for absorption drainfields or evapotranspiration systems.

Since 1988, LCRA has given septic tank users the option of using low flow devices to reduce the land area required for drainfields. Since 1991, the LCRA has required the use of low-flow, water

efficient toilets, shower heads and faucets in new construction. When residences are remodeled, the LCRA requires these devices to be retrofitted so they meet low flow standards or to be replaced with the new water-saving fixtures.

As an incentive to promote conservation, the LCRA reduces the area needed for absorption system drainfields by 22% and evapotranspiration beds by 15%. This would decrease the amount of land a person would to set aside for septic tank system and could free up land for other uses. People can also add a bedroom without enlarging the septic system if they retrofit inefficient fixtures with low flow devices. For new homeowners,

the rules reduce the amount of land that has to be purchased, and could save considerable amounts of money.

Conservation may also reduce clogging and reduce detention times, extending the life of the drainfield. The LCRA also has a program to rewards those who conserves, and awards a medallion and a certificate of appreciation to everyone that installs water saving fixtures.

Of course, this is only one example of how a region is merging conservation programs with on-site wastewater systems. Other areas may find their own approaches are more workable.

For information on the LCRA program, call 800-776-5272.

Areas with poor soils and high water tables may want to consider subsurface trickle irrigation systems

By Bobby Carlile, B.L. Carlile and Associates, College Station, TX
and A. Sangines, Geoflow, Inc., San Francisco, CA

Many homes, communities, businesses, and schools, do not have access to public wastewater treatment facilities and must treat and dispose of sewage through on-site disposal systems.

In the past, the system chosen most often was a conventional septic tank followed by soil trenches. However, these systems often failed in areas with poor soils, high water tables, excessive slopes, and distribution problems caused by large flows.

As a result alternatives were sought that were simple and reliable, efficient and inexpensive, produced minimal negative environmental impacts, and had the potential to reuse water.

Currently, low pressure pipe systems are used widely throughout Texas to dispose of effluents on marginal sites. However, surface irrigation systems are not widely used.

Subsurface trickle irrigation systems may provide safer and more effective disposal than either of those systems.

These systems integrate improved dosing and distribution of effluents, which is comparable to low pressure pipe systems approved and utilized in many states. They are also an effective irrigation system and allows reuse of treated wastewater in home and landscape settings, but do not expose humans or pets to direct contact with the effluents.

The subsurface trickle irrigation system consists of many components including primary and secondary treatment, disinfection, filtration, and subsurface irrigation. First, the wastewater is passed through an anaerobic settling tank to achieve primary treatment. Then, effluents receive some form of secondary treatment. After primary and secondary

treatment, more than 90% of suspended solids and organic contaminants should be removed. Disinfection is not required, but it can be accomplished with chlorination, ozonation, or ultraviolet radiation. Effluents are filtered before being used for irrigation. Ozonation could be a logical choice for systems installed near lakes or in areas with high groundwater tables. Finally, the relatively clean effluent is injected 6 to 10 inches below the soil surface through trickle emitters located throughout the disposal area. The effluent is applied in several pulses per day at rates that will not exceed the soil's capacity to absorb water. A typical system would be dosed 5 to 8 times per day at 50 gallons per dose. A submersible effluent pump that can control water levels will be used in most systems.

The estimated cost of such a system will be slightly higher than a typical low pressure pipe or surface irrigation disposal system. However, this system is suitable for irrigating lawns and landscapes, unlike the low pressure pipe system. While surface irrigation systems are now limited to remote or low use areas, the subsurface system can be used much more widely. One of the system's main advantages is that it decentralizes the treatment process and produces a safe effluent that makes reuse attractive. Reusing disinfected effluents instead of potable water for subsurface irrigation of lawns, flower beds, and shrubs, reduces the cost of the system and lowers per capita water demands.

EPA Small Flows Clearinghouse is an excellent resource for information on onsite systems

If you're looking for a lot of up-to- date information about on-site wastewater treatment and disposal systems, you may want to contact the EPA Small Flows Clearinghouse at West Virginia University.

The Clearinghouse has produced a number of related publications including brochures and reports. Some of the brochures available from them include *So Now You Own a Septic Tank, Care and Feeding of Your Septic Tank*, and *Groundwater Protection.* A number of larger, more technical reports are also available from them including *Septic Tanks and Ground-Water Systems: A Guide for Decision Makers,*, and *Septic Systems: A Guide for Homeowners.* A publications list is also available.

The Clearinghouse also performs services other than distributing publications that are available. For example, they can perform computer searches on specific topics. They also have a computer bulletin board that users with a modem can dial into and retrieve information.

For details, call the Clearinghouse at 1-800-624-8301.

TAEX fact sheets describe why septic systems fail; prescribe proper maintenance

Fact sheets describing why septic systems fail and septic tank maintenance have recently been produced by the Texas Agricultural Extension Service at Texas A&M University.

The 2-page fact sheets were co-authored by John Sweeten, an agricultural engineer with TAEX, and Karen Mancil of the Ohio Cooperative Extension Service.

Septic Tank Maintenance (L-2356) includes information on cleaning the tank. Estimated pumping frequencies are shown based on the size of the tank and the number of people in the household. Why *Do Septic Systems Fail?* (L-2355) covers such common problems as using too much water, physical damage, improper design and construction, and lack of maintenance. Corrective actions are also outlined.

The fact sheets are available free by contacting TAEX at 409-845-7451. The address is TAEX, 303 Scoates, Texas A&M University, College Station, TX 77843.

Report examines septic systems impact on groundwater pollution

Septic Systems and Groundwater Protection: An Executive's Guide contains information for decision makers about ways to improve the management of onsite wastewater units.

The report discusses such issues as groundwater contamination from septic tanks and associated health risks and how owners and managers of septic tanks can maintain and safely operate their systems. Information is also included on how to establish standards and regulations for systems than can be used in site-specific conditions, and ways that local governments can work with public health officials and land use planners.

The report suggests that site evaluations be required before systems are approved, that alternative systems be encouraged where conventional systems may not be effective, and that water conservation should be used to improve system performance.

The report was produced by the Environmental Protection Agency's Office of Groundwater Protection in 1986 and is available from the EPA Small Flows Clearinghouse at West Virginia University. Their toll free number is 1-800-624-8301.

How to take care of your domestic septic tank system

By Burt Carter, Lower Colorado River Authority

When you look for ways to protect and extend the life of your septic system, consider these four guiding principles:

1. Be careful about what goes into the system
2. Maintain the system properly
3. Conserve water so that loads to the system are reduced
4. Have the system properly installed to avoid creating health hazards.

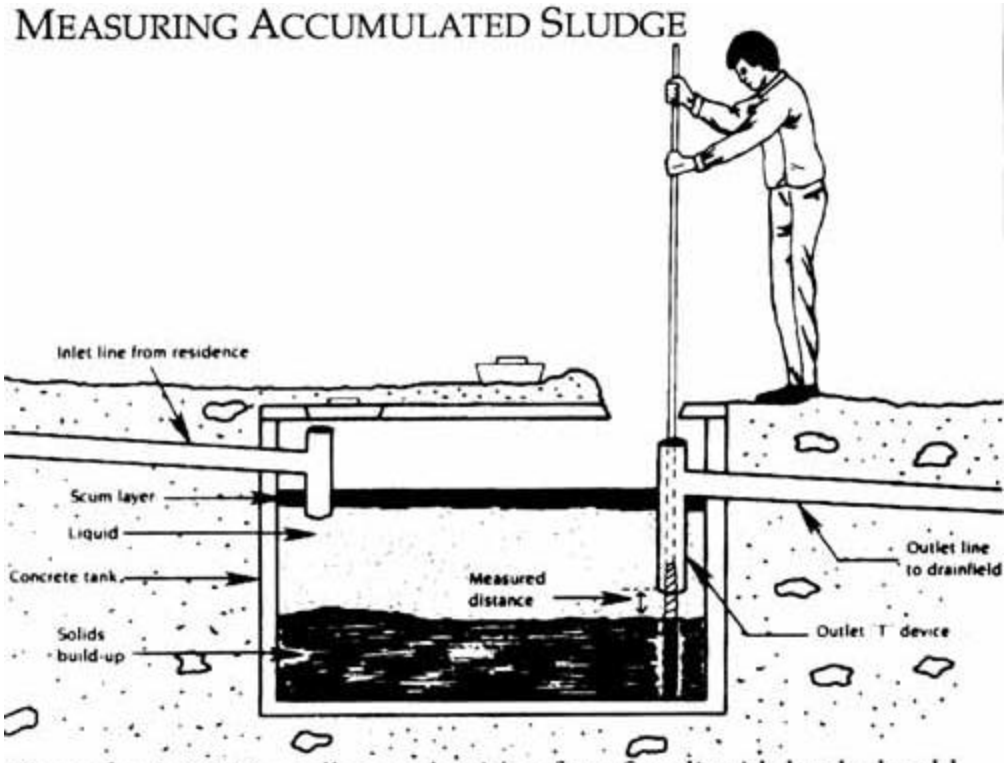
HOW SEPTIC SYSTEMS WORK

Wastewater entering the system includes human waste as well as kitchen, laundry, and bath water. These wastewaters are collected in a water-tight tank called a septic tank. The

size of the tank varies according to how much waste is being produced. Two tanks in series usually provide better service than a single tank.

Heavier material entering the tank will sink to the bottom and form sludge. Lighter materials that float to the top of the tank are called scum. Naturally occurring bacteria help digest the solids.

Liquids in the tank will fill to the outlet level, which is located on the opposite side of the tank from the inlet. As wastewater enters the tank, an equal volume of effluent exits through the outlet. It is then routed to a soil absorption drainfield, evapotranspiration fields or some other disposal system.



Example: A 1,000 - gallon tank with a four-foot liquid depth should be cleaned out when the solids contained are within six inches of outlet device bottom.

PROPER MAINTENANCE

Septic tanks should not be treated as if they were a city sewer where large amounts of water are allowed to go down the drain. Water conservation should be employed to prevent overloading of the drainfield.

Garbage disposals should be used sparingly or not at all to avoid rapid buildup of scum or sludge. This buildup could clog the soil which could lessen absorption and could threaten ground and surface water quality by creating a greater biological wasteload.

Toilet paper substitutes should not be flushed into a septic tank. Paper towels, newspapers, wrapping paper and rags do not decompose in the tank and are likely to lead to clogging of the plumbing and disposal system. Disposable paper diapers, sanitary napkins, tampons, grease, coffee grounds and cigarette butts should also not be disposed of in septic tanks.

PUMPING OUT SEPTIC TANKS

Septic tanks should be pumped out before too great a volume of sewage solids accumulate. If solids or scum come too close to the outlet device, particles will be scoured into the absorption system. If this continues, the solids may eventually clog the absorption system and cause it to malfunction.

CHEMICALS

Chemicals should not be used for cleaning septic tanks. Some products that claim to clean up septic tanks contain sodium hydroxide or potassium hydroxide as the active agent, which acts as a caustic lye or drain cleaner. These compounds may result in sludge bulking and increased alkalinity which can interfere with digestion. Although many enzymes are marketed to clean septic tanks, few have been proven beneficial.

It should be noted that small amounts of chlorine bleaches, soaps, detergents, and drain cleaners normally used around the house can be used to clean septic tanks and will not usually have any adverse effects on the system.

HOW TO KNOW WHEN THE TANK NEEDS PUMPING

Tanks should be inspected at least once a year and cleaned when needed, usually once every two or three years.

The depth of sludge and scum in the tank can be measured with a six-foot pole which is similar to a broom handle (see Figure 1). Wrap one end with a white rag and lower it into the bottom of the tank. After several minutes, remove the stick. The sludge line can be distinguished by black particles that stick to the towel.

The following steps can be used to measure solids build-up.

1. Measure the downspout below the water level.
2. Calculate the total depth of the tank.
3. Measure the build-up of solids as indicated on the towel.
4. Add the downspout length to the height of solids build-up.
5. Subtract the sum from the total liquid depth of the tank.
6. Look at the following table to determine if you exceed the allowable sludge build-up.

ALLOWABLE SLUDGE ACCUMULATION CHART

Tank Capacity Gallons	Tank Depth Measured from Outlet 2.5ft	3ft	4ft	5ft	
750	5 in.	6 in.	10 in.	13 in.	Inches of clearance
1000	4	4	6	8	between bottom of
1250	-	4	4	6	outlet device and
1500	-	-	4	4	top of sludge layer.

Note: Tanks smaller than listed will require more frequent cleaning.

EVAPOTRANSPIRATION AND ABSORPTION FIELD CARE

Fields should be slightly mounded with sandy loam soils so that the center of the field is roughly four inches above the normal ground elevation to provide drainage. A berm on the uphill side may also improve drainage.

Field surfaces, especially evapotranspiration fields, should be covered with perennial grasses to increase transpiration. If grasses with dormant periods are planted, overseeding with winter grasses is advised.

Evapotranspiration fields should be monitored and alternated to prevent saturation. It is important that these fields be exposed to as much as sunlight as possible.

REFERENCE

This article is a condensed version of a brochure titled *How to Take Care of Your Domestic Septic Tank System* which was produced by the Lower Colorado River Authority in 1992. Contact LCRA at 800-776-5272 if you need a few copies or more information.