



Maintain Your Septic System to Protect Well Water

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If your home or business uses an onsite wastewater treatment system, commonly known as a septic system, you need to know how to operate and maintain it properly. Otherwise, sewage could back up into your house, enter surface water such as rivers and lakes, or contaminate your water well.

About 25 percent of the homes being built in the United States have onsite wastewater treatment systems. To keep from polluting the environment and posing health hazards to people, the property owners must maintain their septic systems regularly.

The underground water that supplies wells and springs is called groundwater. It is the source of drinking water for many Texans. Millions of gallons of groundwater may be located under a typical home site, farm, or ranch.

Groundwater can become contaminated by materials seeping down from septic systems, fuel tanks, livestock pens, and fertilizer and pesticide storage areas.

The decisions you make about maintaining your property can significantly affect your family's health and your drinking water. They can also affect your property values and your legal liability.

Consider the questions in Table 1. If you answer yes or don't know the answer to any question, you may have a high-risk situation on your property. Information on how to address each question follows.

How septic systems work

To understand how to operate and maintain your onsite wastewater treatment system, it helps to know how it works and what factors affect it. Information on the design and operation of different types of systems is available on the website of the Texas A&M AgriLife Extension Service Bookstore at www.agrilifebookstore.org. You may also consult the manufacturer's literature for your specific system.

The most common onsite wastewater treatment system is the conventional

Table 1. Questions to help owners determine whether their septic systems are not functioning properly.

YES	NO	QUESTIONS
<input type="checkbox"/>	<input type="checkbox"/>	1. Is your septic tank less than 50 feet from a water well?
<input type="checkbox"/>	<input type="checkbox"/>	2. Have you noticed wet or smelly areas in your yard?
<input type="checkbox"/>	<input type="checkbox"/>	3. Has it been more than 3 to 5 years since the septic tank was pumped?
<input type="checkbox"/>	<input type="checkbox"/>	4. Is your septic tank too small to accommodate the number of people living in your home?
<input type="checkbox"/>	<input type="checkbox"/>	5. Do you dispose of chemicals, fats, or trash down the drain?
<input type="checkbox"/>	<input type="checkbox"/>	6. Do you use moisturizers, conditioners, or chemical cleaning materials, or is back-flush water from a water softener discharged to the septic system?
<input type="checkbox"/>	<input type="checkbox"/>	7. Have you built structures or do you drive vehicles or heavy equipment over the septic system?
<input type="checkbox"/>	<input type="checkbox"/>	8. Are you concerned about water conservation?

septic system (Fig. 1). This system consists of a septic tank and a soil absorption field, which is also called a drainfield.

When wastewater leaves a home or business, it goes first to the septic tank, an enclosed watertight container where the solids are separated from liquid wastes. There, microorganisms (also called microbes) begin consuming the nutrients and organic matter in the wastewater.

Next the partially treated wastewater (also called effluent) moves to the drainfield. The effluent travels through perforated pipes to a bed of gravel or other similar material, where microbes consume more of the waste.

Finally, the effluent moves into the soil where it will evaporate, be used by plants, or drain deeper into the soil and potentially into groundwater.

Onsite wastewater treatment systems come in many types and sizes. The operation and maintenance

requirements of your system depend on:

- The treatment method used to remove contaminants from the wastewater
- The amount of wastewater that the system must handle
- The strength of the wastewater, which is the amount of contaminants it contains. Wastewater contains solids, nutrients, organic matter, and pathogens (disease-causing microorganisms).

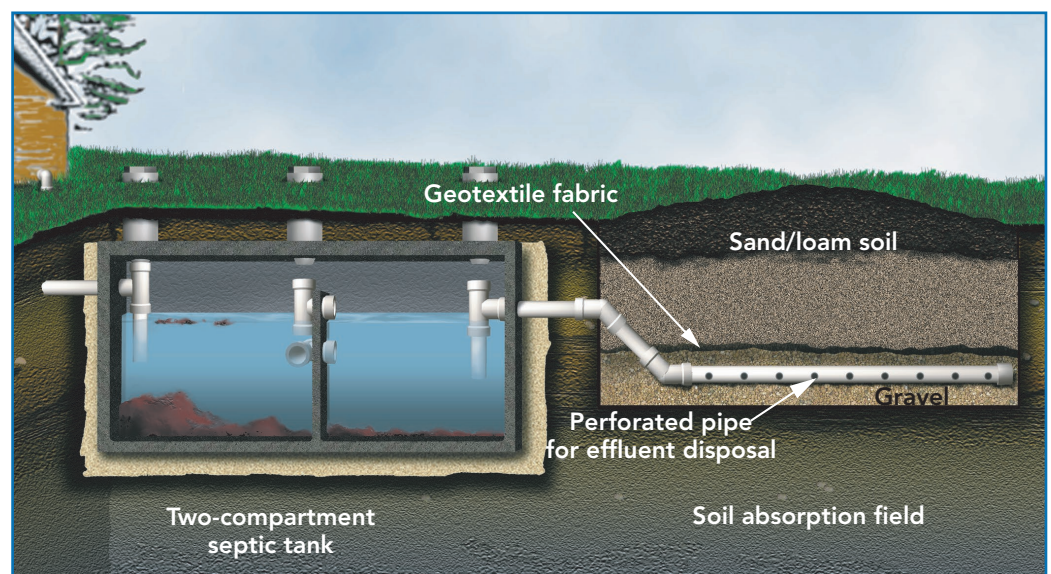


Figure 1. Conventional onsite wastewater treatment system.

Table 2. Minimum required separation distances (in feet) from specific site features to the soil absorption field or spray system.

Feature	Separation distance (feet)		
	Soil absorption field	Spray	Tank
Private water well	100	100	50
Private water well (pressure cemented or grouted to 100 ft or cemented or grouted to the water table if it is less than 100 ft deep)	50	50	50
Streams, ponds, lakes, rivers (as measured from normal pool elevation water level); salt water (high tide only)	75 Reduced to 50 if using an advanced system	50	50
Foundations, buildings, surface improvements, property lines easements, swimming pools, and other structures	5	None, except 10 ft* from property lines and 25 ft from swimming pools	5
Public water well	150	150	50
Public water supply line	10	10	10

*A separation distance of 10 feet is required for spray systems controlled by a timer. A separation distance of 20 feet is required for uncontrolled spray systems, which spray effluent whenever the pump tank is full.

1. Is your septic tank less than 50 feet from a water well?

To reduce the risk of contamination, onsite wastewater treatment systems must be located away from vulnerable water sources and other environmental features. The amount of separation is called the setback distance.

Table 2 lists some of the setback distances required for septic systems in Texas. For more information on setback distances, see the AgriLife Extension Service publication *Onsite Wastewater Treatment Systems: Selecting and Permitting* (available at www.agrilifebookstore.org).

2. Have you noticed wet or smelly areas in your yard?

If your system is not maintained properly, it will malfunction (Fig. 2). Follow the maintenance instructions for the equipment installed for your system. A poorly designed, constructed, or maintained system can fail and return contaminated water to the surface of your property and to lakes, streams, and well water.



Figure 2. Surfacing effluent around a failing septic tank. Excessive vegetation, foul odors, stained soils, and saturated ground can indicate that the septic system is failing.

3. Has it been more than 3 to 5 years since your septic tank was pumped?

Bacteria cannot completely break down all the solids in the tank. Over time, scum and sludge will build up and reduce the amount of solids that the tank can hold. If enough accumulate, solids will be discharged into the drainfield, and it will become clogged or plugged.



Figure 3. Inspecting scum and sludge layers inside the tank.

Follow these steps to help the microbes in the septic tank treat the wastewater properly:

- Have the septic tank pumped when the combined depths of the scum layer and sludge layer reach one-fourth to one-third of the total tank volume. If risers have been installed in the system, you or your maintenance provider will have easier access to monitor the accumulation of solids and to determine when pumping is required (Figs. 3 and 4).
 - The sludge layer should not accumulate higher than 12 inches from the bottom of the tank’s outlet device.
 - The scum or floating layer should not extend to within 3 inches from the bottom of the tank’s outlet device.
 - If sludge or scum accumulates to those points, solids will leave the tank with the liquid and can clog or plug the soil in the drainfield. Sewage will then surface to your lawn or back up into your house through the plumbing fixtures.



Figure 4. Cleaning an effluent screen over the inlet side of the tank. The riser installed on this tank allows quick access for maintenance activities.

- If your system has an effluent screen (Fig. 4) on the outlet side of the septic tank to prevent solids from entering the drainfield, have it cleaned every year or two.
- If you have an aerobic treatment unit or other advanced treatment system, monitor and maintain the mechanical components and treatment processes regularly.
- Do not disable or interrupt electrical service to an onsite wastewater treatment system that has mechanical components or alarms.

Bacteria are present naturally in wastewater to decompose the waste. A septic tank does not need chemical or biological additives to operate. Some additives may even harm the tank’s operation.

4. Is your septic tank too small to accommodate the number of people living in your home?

Four factors affect how fast solids will accumulate in the septic tank: the strength of the wastewater, the

type of system, the size of the system, and the number of people using it.

An aerobic treatment unit typically must be pumped every 2 to 3 years; a conventional system, every 3 to 5 years. You may need to have it pumped more often than normal if more people live in the house than the system was built to handle. See Table 3 for the recommended pumping frequency for various sizes of households and septic tanks.

5. Do you dispose of chemicals, fats, or trash down the drain?

Septic systems are not designed to break down trash. And they can be harmed if harsh or caustic chemicals are disposed of down the drain. Take these steps to help your system work properly and to extend the amount of time between pumpings:

- Do not treat an onsite wastewater treatment system as if it were a normal centralized (city) sewer system. Your onsite system must treat everything that is flushed down the toilet or poured down the drain.
- Avoid or limit your use of in-sink garbage disposals. They send more solids to the septic tank, causing it to need pumping more often. If you use a garbage disposal, you may need to either enlarge the system to handle the additional load or have it pumped 1 to 2 years sooner than normal.
- Do not pour excessive fats, grease, or oils down the drain.
- Do not flush trash—such as cigarette butts, cleaning tissues, condoms, diapers, eggshells, nut shells, paper towels, rags, sanitary napkins, tampons, and wet wipes—down the toilet. These items do not degrade and will cause solids to accumulate in the septic tank faster.
- Do not pour paint or other chemicals into drains or toilets. Many communities have household hazardous waste disposal events that accept these materials.
- Some prescription drugs and antibiotics can affect proper functioning of the system and may

Table 3. Recommended number of years between septic tank pump-outs according to size of the tank and household. If a garbage disposal is used in the house, the tank must be pumped more often.

Tank size (gallons)	Household size (number of people)									
	1	2	3	4	5	6	7	8	9	10
500	5.8	2.6	1.5	1.0	0.7	0.4	0.3	0.2	0.1	–
750	9.1	4.2	2.6	1.8	1.3	1.0	0.7	0.6	0.4	0.3
1,000	12.4	5.9	3.7	2.6	2.0	1.5	1.2	1.0	0.8	0.7
1,250		7.5	4.8	3.4	2.6	2.0	1.7	1.4	1.2	1.0
1,500		9.1	5.9	4.2	3.3	2.6	2.1	1.8	1.5	1.3
1,750			6.9	5.0	3.9	3.1	2.6	2.2	1.9	1.6
2,000			8.0	5.9	4.5	3.7	3.1	2.6	2.2	2.0
2,250				6.7	5.2	4.2	3.5	3.0	2.6	2.3
2,500					5.9	4.8	4.0	4.0	3.0	2.6

increase the frequency of needed maintenance. Do not flush unused medications down the toilet. Many communities and pharmacies offer medication disposal options.

- Treated toilet paper, such as the type that contains lotion, does not settle well and forms a thick layer of scum at the top of the tank.

6. Do you use moisturizers, conditioners, or chemical cleaning materials, or is back-flush water from a water softener discharged to the septic system?

Protect the system by modifying your use of bath and cleaning products in the home:

- Heavy use of bath and body oils can raise the fats, oils, and grease (FOG) values in the system. Removal or reduction of these can improve the system's performance. Use moisturizers, conditioners, and bath oils in moderation. They increase the amount of fats, oils, and grease in the septic system.
- Avoid excessive use of cleaning materials, toilet bowl disinfectants, and disinfecting soaps and detergents. They may harm the microbes in the wastewater system.

- Toxic drain cleaners kill the bacteria, limiting the microbial activity in the tank and impairing the separation of oils and water.
- Always read the labels of the products you buy and use to ensure that they are safe for septic systems. Although many products are advertised as septic safe, make sure by checking for these key words on the label:

Danger: The chemical will kill the bacteria; minimize or stop using it.

Warning: Limited use of the product should have a minimal impact on the system.

Caution: The product will have little effect on the system.

- Do not route the back-flush water from a water softener or the discharge water from a whole-house reverse osmosis system into the pretreatment component of your onsite wastewater treatment system. You may want to consider alternatives such as routing back-flush water into the final pump tank or directly into the drainfield, or disposing of it using other means suggested by your local permitting authority.
- To avoid overloading the treatment system, spread out the daily flows of wastewater. For example, don't wash all your laundry in one day.
- Do not connect the roof drains, basement sump pump, or condensate drain from an air conditioning unit or commercial icemaker to your onsite system.

7. Have you built structures or do you drive vehicles or heavy equipment over the septic system?

To function properly, a septic system must be surrounded by good-quality, non-compacted soil. Follow these guidelines to protect your system:

- Place markers around the septic system to highlight its location.
- Do not build a driveway, storage building, or other structure over the treatment components or drainfield. They block access to the system for maintenance, prevent water from evaporating from the soil, and restrict air movement into it.

- Reduce soil compaction by keeping vehicles, equipment, and livestock off the wastewater treatment area. If the soil is compacted, the wastewater cannot seep into the drainfield.
- Grow grass over the drainfield. Plant warm-season grasses that use a lot of water; in the winter, overseed the area with cool-season grasses. Grasses stabilize the soil above the treatment components and remove significant amounts of water and nutrients from the area within and around the drainfield.
- Avoid planting shrubs, trees, or other woody vegetation near any components that could be disrupted by deep roots.
- Divert any rainwater coming off driveways, roofs, and other hard surfaces away from all system components. Septic systems are designed to manage a specific amount of water. Rainwater can fill the system, leaving no room for wastewater. Design your landscaping to carry runoff water away from the soil treatment area and pretreatment components.
- Do not come into contact with the liquid from the system. Some pathogens (disease-causing organisms) are resistant to disinfection. The final treatment occurs in the soil.

8. Are you concerned about water conservation?

You can greatly reduce the amount of water entering your onsite wastewater treatment system by adopting water conservation practices:

- When buying water fixtures, choose those with the Environmental Protection Agency's "Water Sense" label. For appliances that use water, look for the Department of Energy's "Energy Star" label.
- Take showers instead of baths.
- Install a water-saving shower head that uses less than 2 gallons of water per minute.
- Don't fill the tub for baths. If you have a whirlpool tub, make sure that your septic system can accept the additional water. When you use the tub, drain it slowly over time.
- Repair leaky faucets and faulty toilet-filling mechanisms as quickly as possible.
- Check for toilet leaks by adding a few drops of food coloring or a leak detection tablet to the

tank. Do not flush the toilet immediately. If color appears in the bowl within a few minutes, adjust or repair the toilet fill valve or flapper.

- Reduce the amount of water used for flushing by installing a new toilet (1.28-gallon) or a toilet tank dam. Or place water-filled, capped plastic bottles in the tank of an existing 3.5-gallon or larger toilet.
- Operate the dishwasher only with a full load.
- Do not leave the water running continuously when shaving, brushing your teeth, washing your hands, rinsing kitchen utensils, or cleaning vegetables.
- Use faucet aerators that restrict water flow to no more than 1.5 gallons per minute.
- Keep a container of drinking water in the refrigerator instead of running the faucet until the water cools.
- Insulate all hot-water pipes to avoid wasting water while waiting for heated water.
- Ask your city, county, or local government about their programs to conserve water.

Summary

To protect your well water, your onsite wastewater treatment system must be designed, installed, and maintained properly. Ensure that it is at least the minimum separation distance from buildings, water wells, and surface water, such as a pond, lake, creek, or river. Monitor and periodically pump the septic tank. Keep harmful and unnecessary materials out of the system.

These actions can extend the life of your system, protect your well water, reduce your maintenance costs, help prevent other property damage and cleanup caused by system backups, and protect surface water and groundwater.

For more information

To function properly, a septic system must be surrounded by good-quality, non-compacted soil. Follow these guidelines to protect your system:

On-Site Sewage Facilities website: ossf.tamu.edu

Local county Extension office: <http://counties.agrilife.org/>

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*Tex*A*Syst: Reducing the Risk of Ground Water Contamination by Improving Household Wastewater Treatment.* By B. L. Harris, D. W. Hoffman, and F. J. Mazac Jr. 1997. Texas A&M AgriLife Extension Service. 12 pp.

*Tex*A*Syst: Reducing the Risk of Ground Water Contamination by Improving Well-Head Management and Conditions.* By B. L. Harris, D. W. Hoffman, and F. J. Mazac Jr. 1997. Texas A&M AgriLife Extension Service. 12 pp.

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Texas Well Owner Network: <http://twon.tamu.edu/>.

Texas Well Owner Network: Texas Well Owner's Guide to Water Supply. By K. Uhlman, D. Boellstorff, M. L. McFarland, B. Clayton, and J. W. Smith. 2013. Texas A&M AgriLife Extension publication B-6257, 96 pp.

Texas Ground Water Protection Committee website: <http://www.tgpc.state.tx.us/index.php>.

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