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UNIVERSITY OF ILLINOIS

# Septic Systems

## A Homeowner's Guide



UNIVERSITY OF ILLINOIS  
EXTENSION

College of Agricultural, Consumer and Environmental Sciences

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# Chapter 1

## Protecting Your Health and Home

There can be plenty of joys in moving from the congestion and noise of the city to the relative peace of a rural or suburban area. Unfortunately, a septic system is not one of them. But it's an obvious necessity.

If you're in a rural or suburban area not served by municipal or community sanitary sewers, you have no choice: You must turn to on-site sewage

disposal for treating and disposing of your household waste. Of course, you'll want to keep your on-site sewage disposal system out of sight . . . but not out of mind. For instance, you'll need to take some basic precautions to prevent costly and sometimes slimy problems.



Proper operation and maintenance are critical. Wise practices increase the longevity of your disposal system and prevent sewage from polluting your groundwater, not to mention any lakes, rivers, and streams in the area.

The bottom line: Proper operation and maintenance protects your investment in home and property, as well as the health of your family and community.

### Reasons to Care

If your system fails or someone doesn't follow safety precautions around a septic system, the consequences can be serious. Here's what can result:

- ✘ **Odors.** A malfunctioning septic system can create terrible smells.
- ✘ **Mosquitoes.** Your septic system can become mosquito heaven—a breeding area for these annoying and disease-spreading pests.
- ✘ **Damage to the septic system.** Lousy maintenance can lead to damage, resulting in expensive repairs or replacement costs of a new system.
- ✘ **Damage to your home.** When sewage backs up, it can do costly damage to your home. In the worst-case scenario, you would have to leave your house, or it might be condemned.
- ✘ **Contamination of drinking water.** Wastewater carries disease-causing bacte-

ria, viruses, and other pathogens, as well as nitrogen, phosphorus, and organic wastes. If pathogens contaminate drinking water, the risks to human health include the spread of many sewage-borne diseases, such as hepatitis, dysentery, shigella, giardiasis, and, more commonly, acute gastroenteritis.

If nitrogen reaches the water supply and the nitrate level in drinking water rises, this can be especially risky for infants. High nitrate levels can affect the ability of an infant's blood to carry oxygen.

Also, when soaps, detergents, bleaches, drain cleaners, and other materials typically used in a house are added to a failing septic system, the products may reach groundwater or nearby lakes and rivers. Many of these materials can be toxic to humans, pets, and wildlife.

- ✘ **Algae problems.** If your septic system fails to treat sewage properly, excess nitrogen, phosphorus, and organic wastes can make their way to nearby lakes and streams, leading to an increase in algae



and weed growth. This abundant growth can threaten water quality for fish and wildlife by using up the oxygen that fish need to survive. It also fouls the water for recreational activities.

- ✘ **Contamination due to saturated soil.** If your septic system becomes overloaded with water, the soil-treatment part of the septic system (the absorption field) can become saturated. And when the absorption field is saturated with water, nearby lakes, rivers, and streams can be contaminated.



Even if a system seems to be working or meets local codes, it may be allowing nutrients or bacteria to get into the groundwater. If you get your water from a private well, test it at least once a year to ensure safety.

Under normal conditions, the soil contains air pockets, where beneficial microbes can destroy bacteria and viruses in the effluent (partially treated liquid). Also, nutrients are absorbed by soil particles or taken up by plants. But when the soil is saturated with water, these processes don't work. Nutrients can move greater distances, sometimes hundreds of feet from the absorption field—possibly into surface water.

### Safety Precautions

Here are some safeguards to protect you and your family around your septic system:

- ✘ Never enter the septic tank. The tank contains very little oxygen and has high levels of hydrogen sulfide, methane, carbon dioxide, and other life-threatening gases. The tank has access for cleaning and inspection *from the outside only*.
- ✘ Do not breathe or inhale gas emitted from an open septic tank. This gas can be toxic, so take precautions to minimize exposure to it.
- ✘ Never use electrical lights, appliances, or tools in or close to the water or wet ground near the septic tank or absorption field. This can result in explosion or electrical shock.
- ✘ After working on any part of the septic system, always wash your hands thoroughly before eating, drinking, or smoking, and change clothes before coming into contact with food or other people. The liquid and solid contents of the system can cause infectious diseases.
- ✘ Do not drive a vehicle or heavy equipment over the septic system before, during, or after construction. The tank and other components may collapse due to weakness from corrosion. Heavy equipment also can compact the soil, reducing soil permeability.
- ✘ Never smoke near a septic tank opening. The gases that may be present, such as methane, are potentially combustible.
- ✘ Keep children and other spectators away from the septic system when it is being cleaned or excavated.
- ✘ If a sewer gas odor is present, first pour water into any dry traps. If the odor persists, evacuate the building. Call a plumber or other qualified person to identify the source and correct it.



Never enter a septic tank. The gases inside are deadly.





## Chapter 2 Septic Systems: The Way They Work

There are all kinds of septic systems, designed to fit a wide range of soil and site conditions. However, all septic systems are made up of two primary components—the septic tank and the absorption field (see Figure 1).

### *The septic tank.*

Household wastes flow into the septic tank. When operating properly, the septic tank is always “full” to the level of the bottom of the outlet pipes. The septic tank retains the wastewater

for approximately 24 hours, allowing the solids to separate and settle out. This also allows bacteria to partially decompose and liquify the solids. A scum layer, consisting of fats and oils, floats on the surface of the wastewater. Heavy, partially decomposed solids, called sludge, are retained in the septic tank and must be removed periodically.

### *The absorption field.*

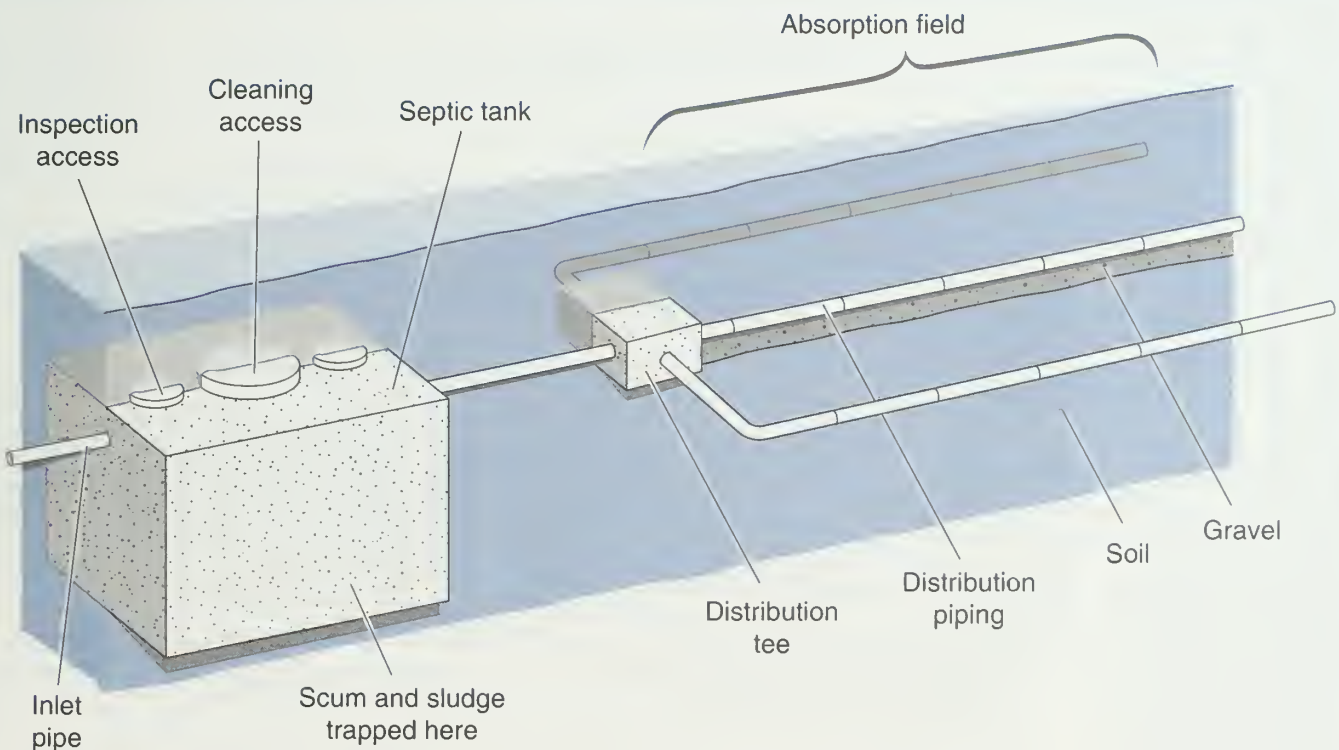
Partially treated liquid, called effluent, flows out of the septic tank to the distribution lines (sometimes

through a distribution box), where it is evenly distributed throughout the absorption field. As effluent moves through the soil, impurities and pathogens are removed.

With this in mind, let’s look more closely at the three key steps in septic system treatment:

1. Wastewater collection
2. Wastewater treatment in the septic tank
3. Wastewater treatment in the absorption field

**Figure 1. The Anatomy of a Septic System**





## Wastewater Collection

Septic systems are designed to treat and dispose of the normal wastewater generated in a household. Wastewater includes the drainage from household plumbing fixtures (toilet, sink, and shower) and the washing machine. In most cases, the septic system can also handle discharges from a water softener.

Wastewater does *not* include water from foundation footing drains. The absorption field is not designed to handle this much water. It can become overloaded, reducing its ability to accept effluent. Likewise, water from roof drains, basement drainage sump pumps, hot tubs, and swimming pools should *not* be put into the septic system. These large volumes of clean water will also overload the system.

Drains leading to the septic system should have strainers to reduce the amount of food particles, hair, and lint entering the system.



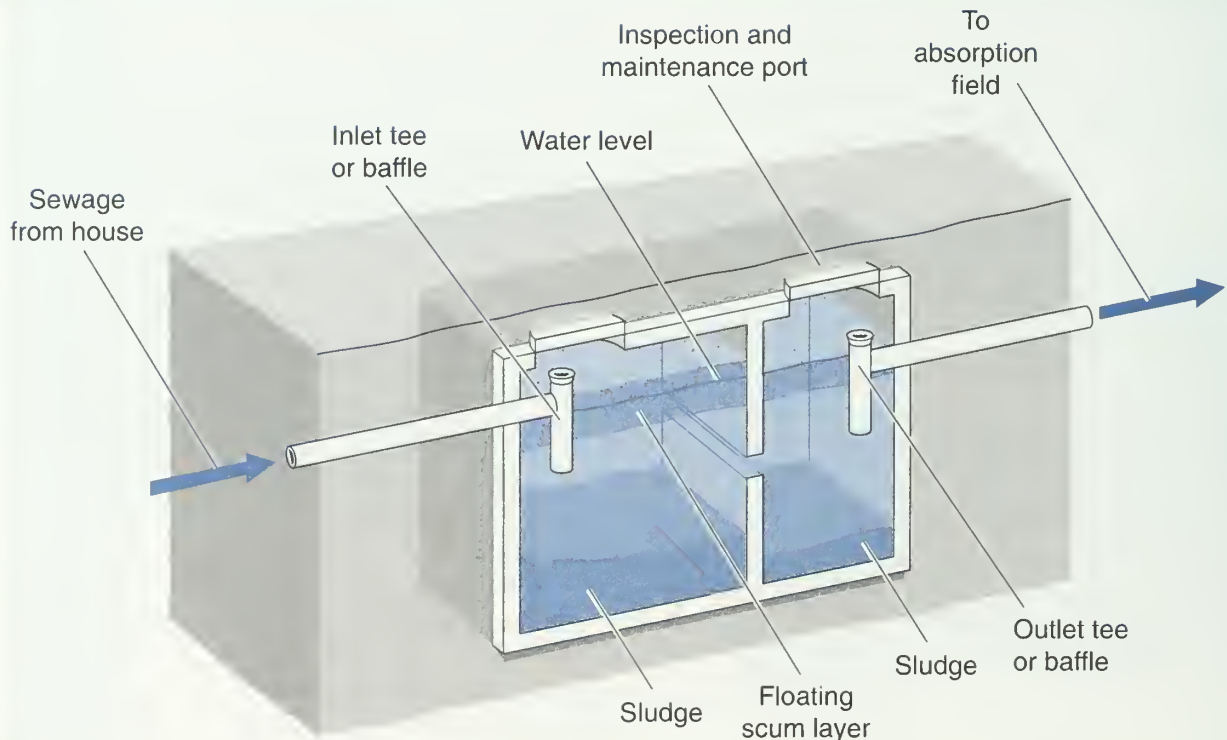
Before remodeling, think about how any changes will affect your septic system.

## Wastewater Treatment in the Septic Tank

The septic tank, commonly made out of concrete, fiberglass, or polyethylene, is water-tight to keep sewage from leaking out and groundwater from seeping in (see Figure 2). Several tank designs are available. Some have two adjacent tanks or one large tank with two compartments. All tanks should have inlet and outlet baffles as well as inspection and cleaning access openings.

**Inlet baffle.** The inlet baffle slows the incoming wastes, limiting disturbance of the

**Figure 2. Inside the Septic Tank**









settled sludge. The inlet baffle extends into the liquid contents of the septic tank, forcing the wastewater below the surface scum layer. It also prevents the scum layer from floating back and clogging the inlet pipe.

**Outlet baffle.** The outlet baffle keeps scum inside the tank, preventing the outlet pipe from plugging. The outlet baffle also prevents scum from making its way to the absorption field. Scum can clog soil pores in the absorption field, preventing the field from properly treating the wastewater. Effluent filters can be installed on the outlet to capture small particles and prevent them from clogging the drainfield.



Filters are not a substitute for operating and maintaining a septic system properly.

**Inspection and cleaning access.** Inspection and cleaning accesses are 12- to 24-inch openings in the cover of the tank, through which the septic tank is cleaned. They are usually located above the inlet and outlet baffles. If an inlet or outlet pipe becomes clogged, this can be remedied through an access opening. The amount of sludge at the bottom of the tank can be determined through the access above the outlet.



Use the largest access opening to clean the tank.

Inspection and cleaning access openings are often buried below ground level. They can be opened by lifting up on their concrete or plastic rings.

The cleaning access is sometimes located in the center of the tank, with two smaller inspection access openings near the ends. The manufacturer or installer should be able to tell you where the accesses are located.



Be careful when removing an access cover. It is heavy and creates a large, dangerous opening!

### Wastewater Treatment in the Absorption Field

The absorption field consists of 4-inch-diameter perforated pipe surrounded by gravel. It can be constructed with either a trench or a bed design:

**Bed design.** In this system, the perforated pipe sits in an excavated bed, surrounded by gravel, as shown in Figure 3a.

Advantage: It takes up less space than a field with a trench design.

**Trench design.** The perforated pipe is laid into narrow trenches, surrounded by gravel, rather than a wide bed (see Figure 3b). Each trench cannot be more than 3 feet wide, and the trenches must be at least 6 feet apart.

Advantage: The trench system has more *sidewall space* than the bed design. Sidewall space refers to the amount of soil on either side of the pipe through which effluent can seep. Because the pipes in a trench have soil on *both* sides, the greater sidewall space makes the system less subject to premature failure.

Sidewall space is critical because effluent moves through the sides of an absorption area more effectively than through the bottom. Slime, produced by organisms in the



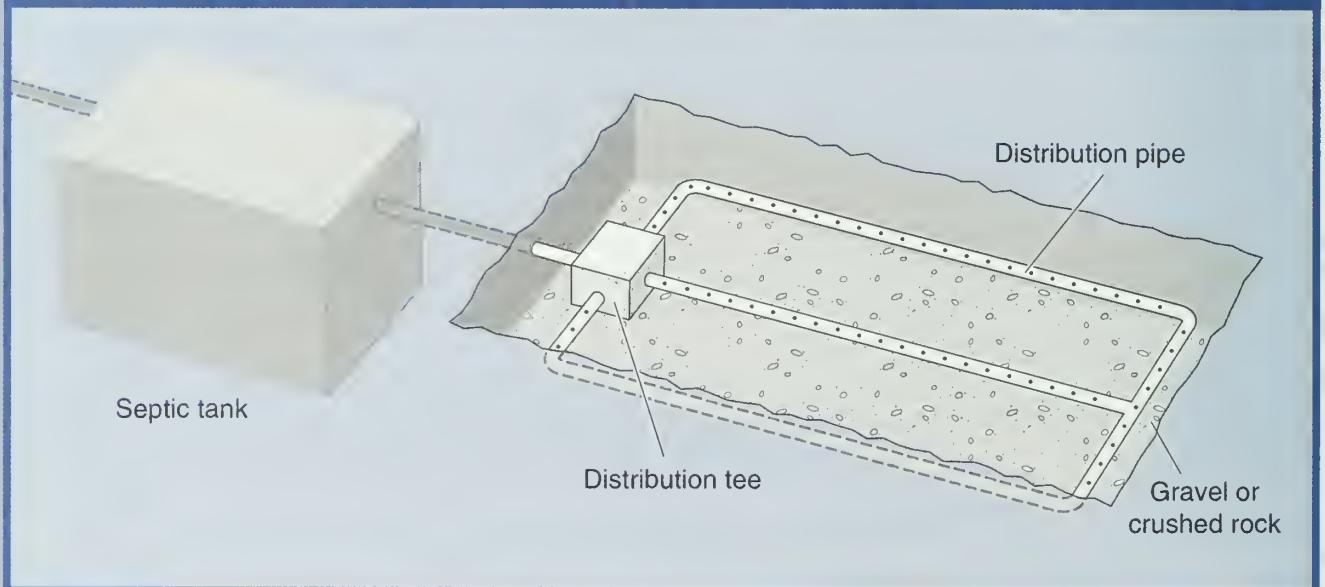
soil, collects on the bottom of an absorption area, creating a barrier and slowing the movement of effluent into the surrounding soil (see Figure 4).

Although the trench system takes up more land than the bed design, the trenches do not have to be parallel—they can be sent in any direction. This flexibility in design makes it easier to construct the trenches in an odd-shaped lot or when obstacles limit the area.

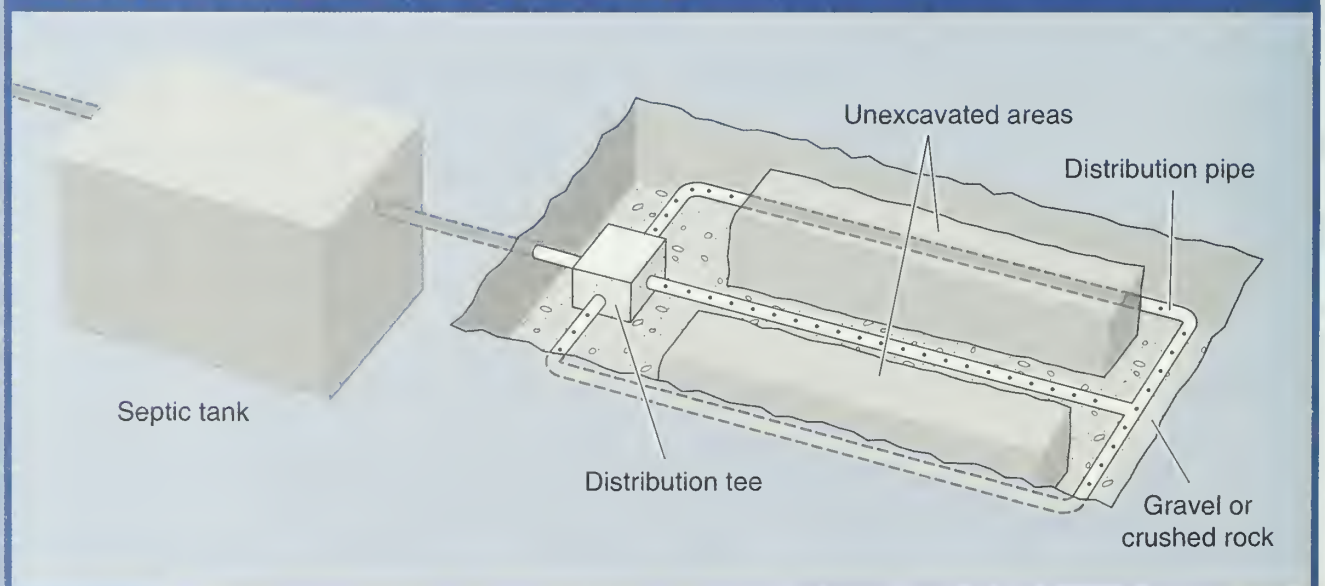
**Gravel-less trenches.** An alternative trench system does not use gravel. Instead, the perforated pipes are larger (8 to 10 inches in diameter), and the trenches are filled in with native soil, rather than gravel.

Advantage: If there is no inexpensive source of gravel in the area, a gravel-less system can dramatically reduce costs.

**Figure 3a. Absorption Field: Bed Design**

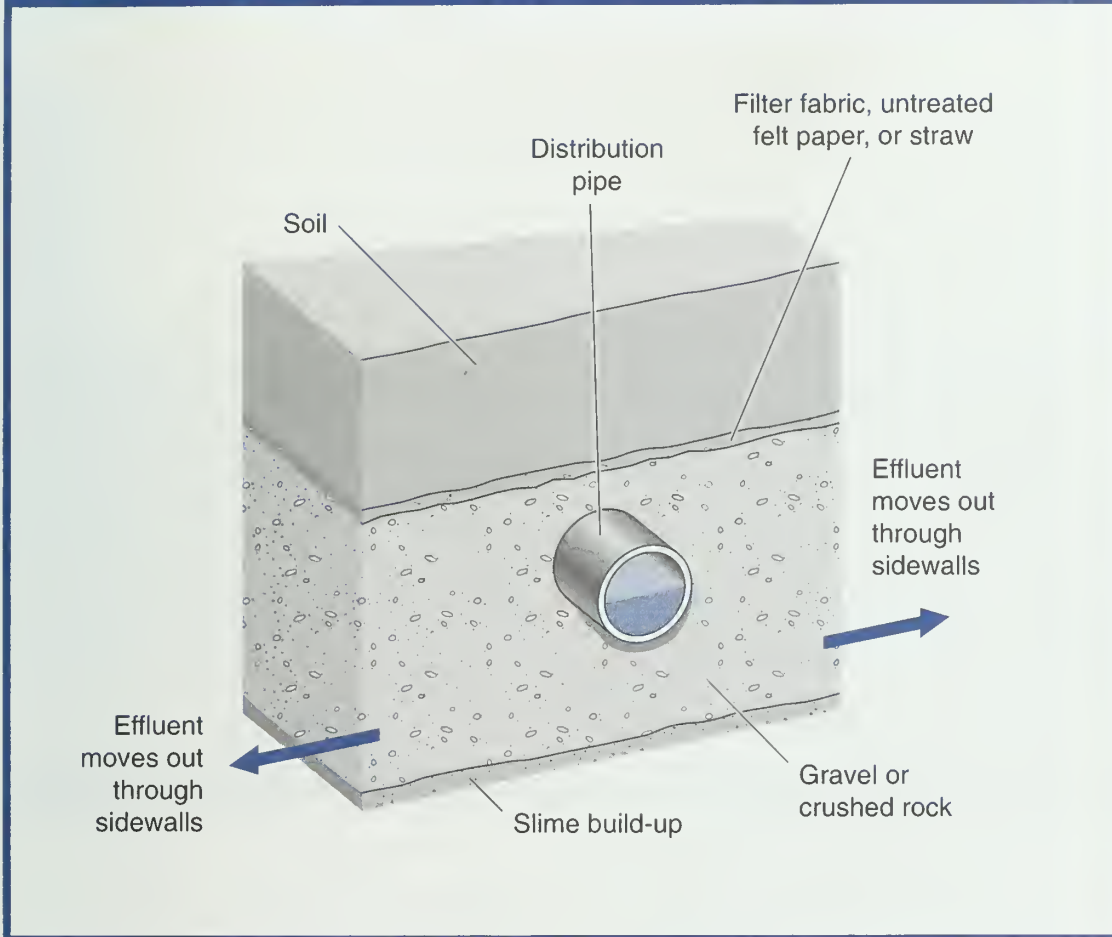


**Figure 3b. Absorption Field: Trench Design**





**Figure 4. Sidewalls**



## Alternative Systems

If you are in an area where a conventional septic tank/soil absorption system is unsuitable (such as a locale with a high water table or slowly permeable soil), you may be able to modify site conditions or use an alternative system. Here are a couple of alternatives:

**The aerobic system.** The aerobic system consists of a chamber that mechanically aerates (mixes air with) the effluent and decomposes the solids. Effluent is discharged to an absorption field or, after chlorination, to surface water or a drainageway.

**Advantage:** The aerobic system is effective in areas with high water tables or slowly permeable soils. An aerobic system also treats effluent more rapidly than other sys-

tems, allowing for a smaller tank. However, it requires continuous power and greater maintenance. Aerobic tanks should be inspected and serviced every 6 months—much more often than a septic tank—and may require a specialized contractor to do the job.

**The mound system.** With the mound system, the absorption field is built above the natural ground level (see Figure 5). In other words, the drainfield is built within a mound.

This system includes a pressurized distribution network of 1- or 2-inch perforated pipe in a layer of small rocks. The distribution network supplies effluent to the mound, and the effluent is treated as it passes through the fill sand and natural soil.





**Advantage:** This is an effective system in areas with high water tables or slowly permeable soils.

**Additional systems.** Other alternatives include sand filters and lagoons. In general, alternative systems are more costly to install and operate than conventional septic tank/soil absorption systems, and they may require additional maintenance.



For more information on alternative systems, contact your county's public health department or your local University of Illinois Extension office.

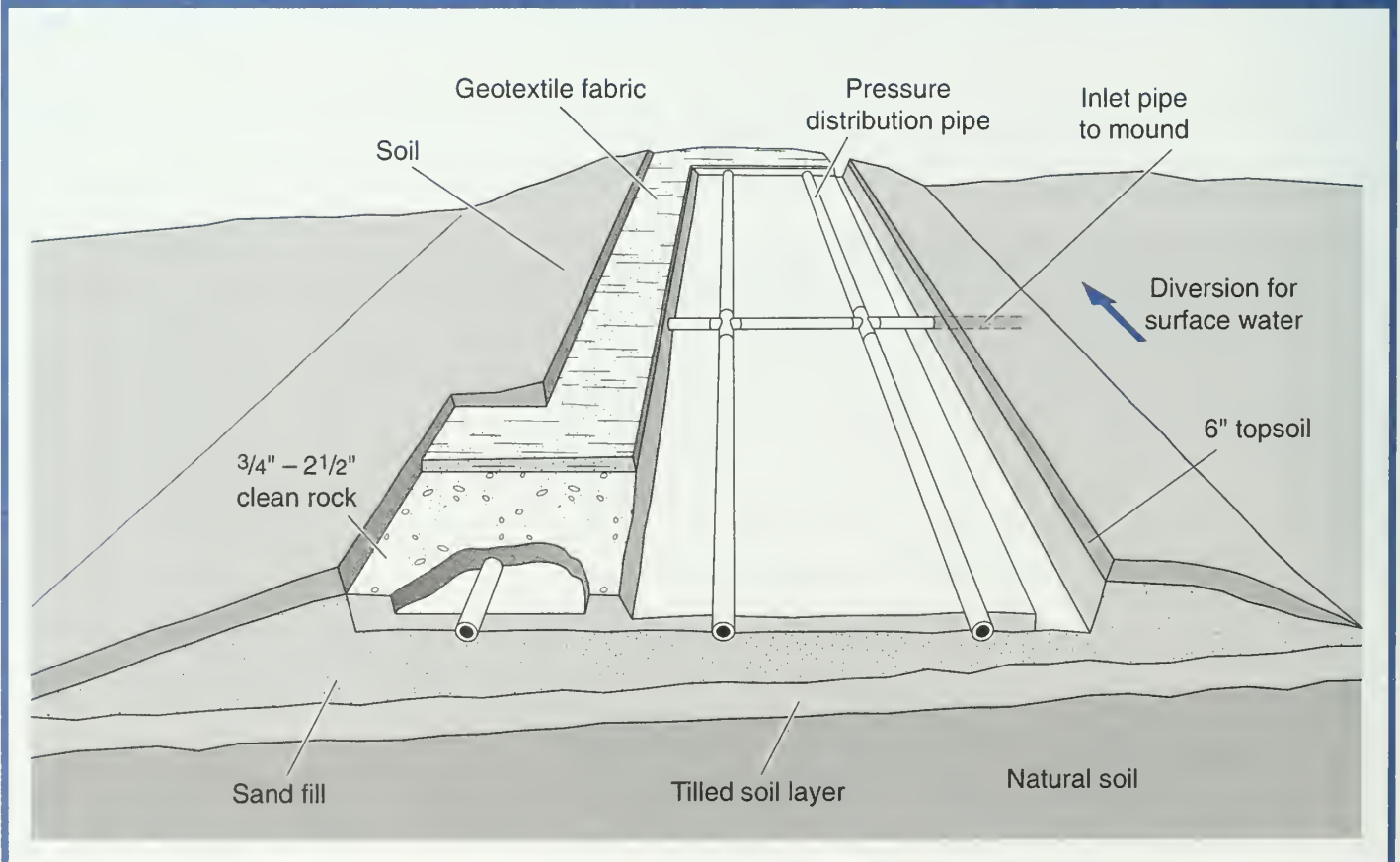
## Sizing the Absorption Field

The size of an absorption field is based on the volume of wastewater your home generates and the permeability of the soil. Permeability—the ability of water to flow through soil—is determined through percolation tests or is estimated by a soil investigation conducted by a certified soil classifier.

Table 1 shows that the size of the absorption field is determined by the number of bedrooms in a home and the percolation test results. For instance, if your percolation test determines that it takes 90 minutes for 6 inches of water to infiltrate your soil, your absorption field should be 210 square feet per bedroom. If your house has three bedrooms, the absorption field should be 630 square feet.

Consult the county public health department to determine what sizing method is used.

**Figure 5. The Mound System**





**Table 1. Required Absorption Area**

| Percolation test results<br>(minutes for 6 inches of<br>water to infiltrate soil) | Absorption area required<br>per bedroom (square feet) |
|---|---|
| 18–60   | 200   |
| 90  | 210   |
| 120   | 235   |
| 150   | 265   |
| 180   | 290   |
| 240   | 320   |
| 300   | 350   |
| 360   | 385   |
| Above 360   | Unsuited*   |

*\*A soil with a percolation rate exceeding 360 minutes (6 hours) is unsuitable for a conventional subsurface soil absorption system. Consult with your county public health department to find out what alternative or innovative system to use.*

## Installing a System

The design and installation of a septic system are controlled by local and state regulations through the permit process. The permit takes into consideration specific site characteristics, including soil type, house size, and the fixtures and appliances that are part of the wastewater system.

To ensure that a septic system is properly installed, the work must be done by a licensed contractor and inspected by qualified officials. Contact the responsible agency in your locale (county public health department, planning and zoning, environmental services, etc.) to learn about local requirements. Your local University of Illinois Extension office can direct you to the proper agency in your area.



The contents of the septic tank separate into three layers:

- **Floating scum**—soaps, greases, toilet paper, and the like. Scum floats on top of the liquid layer.
- **Liquid**—water, liquid, and suspended solids.
- **Sludge**—heavy organic and inorganic materials at the bottom of the tank.



## Chapter 3

# Septic System Sense: Best Management Practices

**H**ow effectively your septic system treats sewage depends primarily on how much water you use. After all, one of the most common problems with a septic system is overloading it with water. Every time you



use water, wastewater enters the septic tank, and an equal amount of water leaves the tank for the drainfield. Ideally, wastewater would enter the system at an even rate throughout the day and across the week, but in reality usage is more cyclical.

The septic system needs time for complete and uniform treatment of wastes. If you overload the system with more water than it can handle, it may agitate and re-suspend sludge and scum in the liquid contents. If this hap-

pens, suspended solids are carried into the absorption field, clogging soil pores and preventing adequate treatment.

Your family's water-use habits and your home's fixtures and appliances play a role in how much water enters the septic system. Wasteful water habits, such as allowing faucets to drip and fixtures to leak, contribute to excessive water flowing into the septic system. Table 2 lists how many gallons of water you can expect to be used by various household activities.

**Table 2. Quantities of Water Used in Typical Household Activities**

| Activity                           | Typical use (gallons)     | Conservative use (gallons)    |
|------------------------------------|---------------------------|-------------------------------|
| Toilet flush                       | 6 (old standard)          | 1.5–3 (low-flow)              |
| Tub bath                           | 30 (½ filled)             | 15 (¼ filled)                 |
| Shower                             |                           |                               |
| 10 minutes                         | 50 (5 gal/min)            | 25 (2.5 gal/min)              |
| 3 minutes                          | 15 (5 gal/min)            | 7.5 (2.5 gal/min)             |
| Laundry, full load                 |                           |                               |
| Top-loading machine                | 50–60 (older models)      | 40 (newer models)             |
| Front-loading machine <sup>1</sup> | 33 (older models)         | 17–28 (newer models)          |
| Dishwashing                        |                           |                               |
| By machine <sup>2</sup>            | 12–15 (old—regular cycle) | 6–9 (new—regular cycle)       |
| By hand                            | 16 (faucet rinse)         | 6 (basin rinse)               |
| Teeth-brushing                     | 2 (faucet running)        | ⅛ (wet brush, brief rinse)    |
| Hand-washing                       | 2 (faucet running)        | 1 (filled basin, brief rinse) |
| Shaving                            | 3–5 (faucet running)      | 1 (filled basin, brief rinse) |

<sup>1</sup>"Suds-saver" reuses most of the "wash fill" for the second load.

<sup>2</sup>Rinsing before loading adds 3–5 gallons.





How much water you use makes a huge difference in how your septic system works (or doesn't work).

## Cutting Water Use, Room by Room

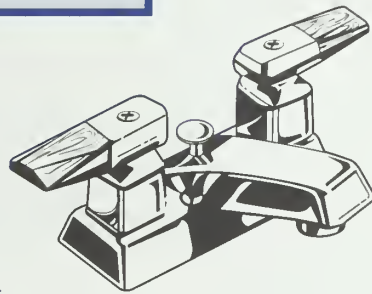
One of the best ways to reduce the amount of water treated by the septic system is to replace older water-hungry appliances. If you are planning major remodeling, regulations may require you to upgrade to low-water-use appliances. But whether you're remodeling or not, you may want to install low-flow showerheads and hand-held shower hoses with pause control to reduce water use, save energy, and save money.

About 60 percent of the water used each day is used in the bathroom, so that may be a good place to start conserving water. But don't stop there. Reducing water use can be a priority in the kitchen, laundry room, basement, and utility room.

In addition to conserving water, you can improve your septic system's performance by selecting appropriate products and making careful disposal decisions. The following sections provide a variety of tips.

### In the Bathroom

✘ Install a new low-flow toilet. New units are intended to give a complete flush with 1½ gallons per flush, rather than the 6 gallons used by an old-style toilet. Displacing water from the tank of an old toilet with a brick or plastic bottle may result in incomplete flushes.



- ✘ Do not use "every flush" toilet bowl disinfectants that are placed in the tank or bowl because they can damage bacteria levels in the septic tank.
- ✘ Flush toilets less often. Consider using a toilet several times for liquid waste before flushing.

✘ Do not put non-biodegradable items, including sanitary napkins, tampons, disposable diapers, paper towels, and plastic, in the toilet. These items do not break down, and they may block the septic tank's inlet or outlet.

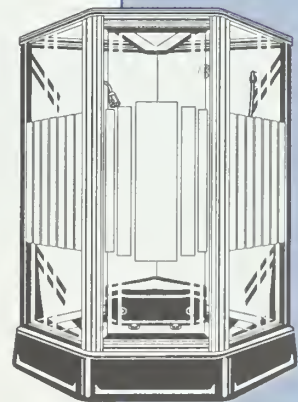
Also, non-biodegradable items may fill the septic tank and require more frequent pumping of the tank.

- ✘ Repair leaky faucets and toilets immediately.
- ✘ Shut off water while shaving and brushing teeth. This saves up to 5 gallons per minute.
- ✘ Fill the basin to wash hands instead of washing them under running water.
- ✘ Take showers instead of baths, because showers use less water. Every inch of water in a typical tub is about 5 gallons.
- ✘ Take shorter showers.
- ✘ Do not run hot water in the shower to warm the bathroom.

✘ Install low-flow shower heads and hand-held shower hoses with pause control.

✘ Shut off water in the shower while lathering and shampooing.

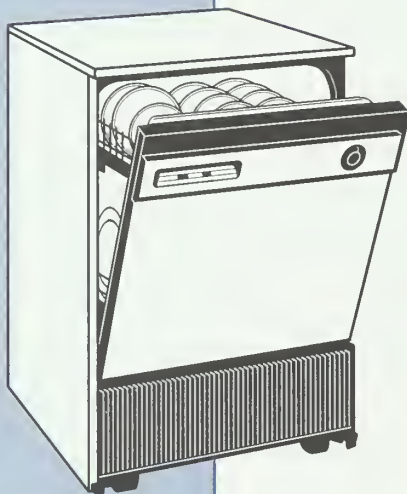
✘ Reduce the use of cleaners, which can disturb septic bacteria, by doing more scrubbing with less cleanser.





### In the Kitchen

- ✘ Install low-flow faucets.
- ✘ Repair leaky faucets.
- ✘ Hand-wash dishes in a filled basin instead of under running water.
- ✘ Wash only full loads in the dishwasher.



- ✘ Install a low-water-use dishwasher.
- ✘ Use liquid detergent in the dishwasher. Powdered detergents add fine particles to the accumulated sludge.
- ✘ To maintain healthy bacteria levels in your septic system, use the minimum amount of soap necessary to do the job. This is often less than suggested by manufacturers.

✘ Use dishwasher soaps low in phosphates (0 to 5 percent).

- ✘ Do not install a garbage disposal. It markedly increases the load of suspended solids in wastewater, causing more rapid buildup of sludge in the septic tank and resulting in a premature failure of the system.

✘ If you must install a garbage disposal, the size of the septic tank must be increased 1½ to 2 times the normal tank volume to better handle the increased level of solids.

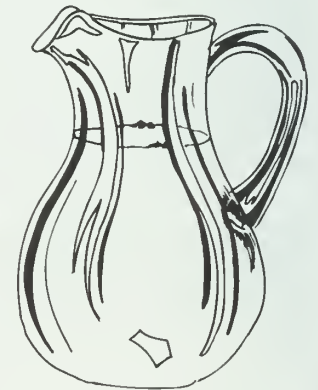


- ✘ If you have a garbage disposal, use it minimally to dispose of vegetables, meat fat, oil, coffee grounds, and other undigested food products in the septic system. (Use composting for appropriate materials and garbage service for other items.)

✘ Discard grease in a garbage can. Grease is very resistant to decomposition. If it is allowed

to enter the plumbing system, it can clog the septic tank, carry over to the absorption field, and reduce soil permeability. By minimizing the amount of grease and food particles that go down the drain, you can also reduce the use of drain cleaners.

- ✘ Use minimal amounts of mild cleaners, only as needed.



- ✘ Keep a pitcher of drinking water in the refrigerator instead of running the tap every time you want cool water.
- ✘ If you use a drinking-water treatment device, be sure there is a shutoff valve so the system doesn't run continuously when the reservoir is full. Some units may reject up to 8 gallons for every 1 gallon retained.



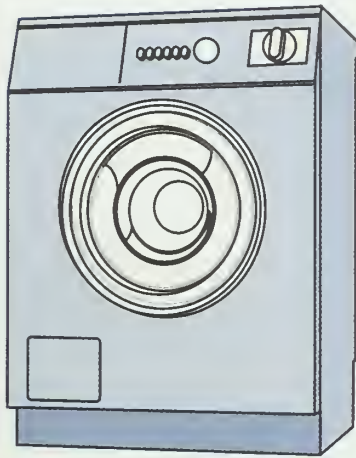
Try to get by without a garbage disposal.





**Doing the Laundry**

✘ Select a front-loading washing machine, which uses 40 percent less water than top-loading models.



✘ If you prefer a top-loading machine, a suds-saving model will reduce water and detergent use.

✘ Wash only full loads, or adjust the load-level settings for smaller loads.

✘ Distribute wash loads evenly throughout the week to avoid overloading the system with large volumes of water.

✘ Install a lint trap on the washing machine. Lint can clog the septic system.

✘ Use no-phosphate laundry detergents.

✘ Use the minimum amount of detergent or bleach necessary to do the job. This is often less than suggested by manufacturers.

✘ Use liquid detergents. Powdered detergents add fine particles to the accumulated sludge.

✘ If liquid detergents are undesirable, use powdered detergents labeled highly biodegradable.

✘ Route roof drains and basement drainage tile water (from a sump pump) away from the septic system's drainfield.

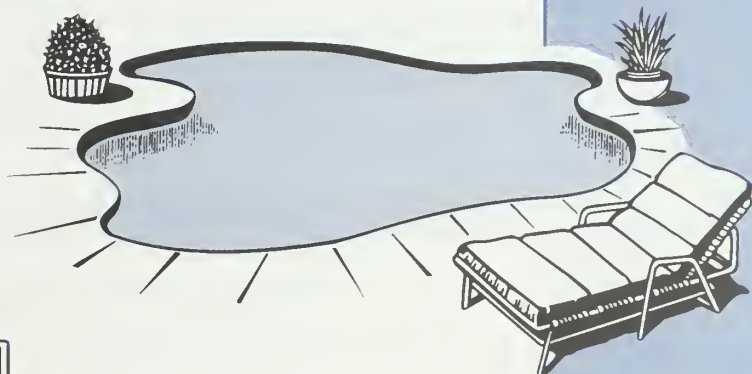
✘ Dispose of all toxic substances, including paints, solvents, oils, degreasers, acids, and pesticides, through local recycling and hazardous waste channels. Because the soil cannot remove many of these compounds from wastewater, toxic substances may move out of the absorption field and into groundwater supplies.

Consult local solid-waste officials for proper disposal methods.



✘ Never let paint washwater from brushes or rollers go down the drain and into the septic system.

✘ Route chlorine-treated water from swimming pools and hot tubs away from the septic system to a ditch or a separate dry well.



**Other Places Inside and Out**

✘ Recharge the water softener as infrequently as possible, or use a softener that automatically recharges when it's necessary.







## What About Additives?

Starters, feeders, cleaners, and other additives cannot replace the smart operation and regular maintenance of your septic system. In fact, you don't need septic system additives at all.



**There is no such thing as a safe AND effective septic system additive!**

**Starters.** You do not need a starter to begin bacterial action in the septic tank. Additives that contain microorganisms may have no benefit for a septic system because the effluent already contains millions of microorganisms.

**Feeders.** Likewise, since millions of bacteria enter the system in normal sewage, you do not need to feed it additional bacteria, yeast preparations, or other home remedies. If you have low levels of bacteria, something must be killing them off, and the culprit may be household cleaners. Bacterial activity will

increase if you find out what is causing the problem and correct it.

**Cleaners.** You will probably damage your soil absorption system if you use cleaners that effectively remove solids from the septic tank. By suspending solids that would normally float to the top or settle to the bottom of the tank, these additives allow them to be flushed into the absorption field. There, the suspended solids can clog pipes and soil pores, leading to partial or complete failure of the system.

Other additives, particularly degreasers, may contain cancer-causing agents. These agents flow directly into the groundwater along with the treated sewage. Some counties prohibit the use of additives that contain solvents.



**Additives and cleaners are heavily promoted to homeowners through direct mail and telephone. Don't be duped!**



## Chapter 4 Septic System Maintenance

Letting a septic tank overload with sludge is a problem. An overload of sludge reduces the time that wastewater remains in the tank. As a result, fewer solids settle in the tank, fewer solids decompose, and more solids reach the absorption field. Clogging the field with solids can lead to premature failure of the absorption field and may require costly repairs or replacement.

**Check sludge levels annually.** Determine the condition of your septic tank and its level of sludge annually, and have sludge pumped out every two to three years—sooner if needed. Table 3 shows the estimated pumping frequency according to the size of your tank and the size of your household.

A licensed septic-tank pumper can perform this simple task of pumping. The pumper also can demonstrate how to determine the level of sludge in the tank. So make sure there is accessibility for a pumper truck or backhoe to service your system.

**New installations.** Following installation, the septic tank should be cleaned after 6 to 12 months of use to ensure good bacterial activity and proper functioning. Wastewater from painting, varnishing, staining, and other construction jobs can reduce the initial levels of bacterial activity, damaging the soil absorption system. If finishing work is still being completed, the tank should be cleaned before it is used for sewage.

### Tips on Pumping the Tank

Proper cleaning will remove all scum, sludge, and liquid from the septic tank. This requires pumping, flushing, and backflushing liquid contents back and forth through the access opening several times between the truck's tank and the septic tank.

The cleaning process breaks up scum and sludge in the tank, allowing all solids to be removed by the truck's suction line. Floating scum left in the tank after cleaning may plug baffles or allow solids to enter the absorption field when the tank refills.

Cleaning will leave a black film on the tank walls and a small amount of liquid on the tank floor. This liquid contains millions of bacteria to help get the tank working after the cleaning. It is not necessary to add a starter.

When the tank is cleaned, ask the septic-tank pumper to make sure the baffles are in place and functioning properly. If they are missing or have deteriorated, replace them.

**Table 3. Estimated Pumping Frequencies in Years**

| Tank size (gallons) | Number of people in household |      |      |     |     |     |     |     |     |     |
|---------------------|-------------------------------|------|------|-----|-----|-----|-----|-----|-----|-----|
|                     | 1                             | 2    | 3    | 4   | 5   | 6   | 7   | 8   | 9   | 10  |
| 1,000               | 12.4                          | 5.9  | 3.7  | 2.6 | 2.0 | 1.5 | 1.2 | 1.0 | 0.8 | 0.7 |
| 1,500               | 18.9                          | 9.1  | 5.9  | 4.2 | 3.3 | 2.6 | 2.1 | 1.8 | 1.5 | 1.3 |
| 2,000               | 25.4                          | 12.4 | 8.0  | 5.9 | 4.5 | 3.7 | 3.1 | 2.6 | 2.2 | 2.0 |
| 2,500               | 31.9                          | 15.6 | 10.2 | 7.5 | 5.9 | 4.8 | 4.0 | 4.0 | 3.0 | 2.6 |

*Note: More frequent pumping is needed if you use a garbage disposal.*  
*Source: Ohio State University Extension*



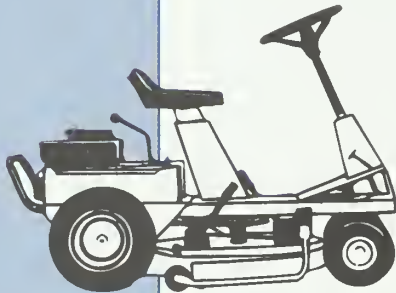
## Maintaining the Absorption Field

**Divert water.** If possible, divert water from the roof, footer drains, and sump pumps away from the absorption field. Saturated soil is less effective at treating wastewater.

**Don't compact the soil.** Soil treatment depends on undisturbed, uncompacted, unsaturated soil to treat wastes. A heavy vehicle on an absorption field can compact soil. So keep vehicles off of the drainfield, especially in winter, when a vehicle's weight can drive frost deep into the soil and prevent effective treatment of wastes. Don't drive anything heavier than a riding lawnmower over any part of the septic system.

**Do not build over the septic system.** Driveways, patios, aboveground swimming pools, and other structures built over the absorption field can hurt a system's performance. Absorption fields remove a large amount of effluent by evaporation from the soil surface and by transpiration from plants.

If you seal over the surface of the absorption area with construction, you restrict the removal of effluent.



**Plant good cover.** Plant good vegetative cover, usually grass, over a soil treatment system. Vegetation helps the system remove nutrients by using them for plant growth. Regular mowing is necessary to encourage growth without using fertilizer.



Money spent every one to three years on cleaning is better than an unexpected big-time repair bill.

Do not plant new trees or leave existing trees close to the absorption field. Tree roots can cause the distribution system to fail by growing into the perforated pipe and clogging the system.

## Record Keeping

It is a good idea to keep records of installation information as well as the regular maintenance that is performed on your septic system. (See pages 20–21 for record sheets.) Information about your system may be available from your county or regional public health department. The Department of Public Health or your local Extension office can provide further information or answer any questions about on-site sewage disposal systems. To obtain the state sewage code, write to this address:

Private Sewage Disposal  
Licensing Act and Code  
Illinois Department of Public Health  
525 W. Jefferson St.  
Springfield, IL 62761

Information is also available through links on the Illinois Department of Public Health web page at [www.idph.state.il.us](http://www.idph.state.il.us).





## Chapter 5

# Troubleshooting

To take good care of a septic system, you must know where it is. But since wastewater treatment systems are usually out of sight, they can be hard to find.

If you have inherited a septic system and the location is not noted in your home records, perhaps a previous homeowner, the county public health department, or a local pumper holds the answer. If not, there are other steps to take.

### *Locating the tank.*

Begin the search in the basement. Find the sewer pipe, which is the largest diameter pipe made of plastic or cast iron. Note the

direction the pipe heads as it goes out through the wall.

Next, go outside and probe the ground 10 to 15 feet from the foundation of the house in the same direction the sewer pipe is headed. Listen for a hollow sound. A 3- to 4-foot metal rod with a “T” handle makes a good probe. Do this until you have hit the top of the tank several times.

You might also try using a metal detector, because most concrete tanks contain metal reinforcing rods. A metal detector can help you pinpoint the access cover.

*Locating the absorption field.* To locate the

drainfield, look for clues in your yard that may help in the search. Try looking in the general direction where the sewer pipe left the house. Look for:

- an area where the grass isn’t growing well or where the grass is greener or grows faster;
- an area where there is a slight depression or mound;
- an area where the soil is soggy when the rest of the yard is dry.

Many licensed contractors and inspectors have the tools necessary to locate the tank. Once you’ve found it, be sure to map its location.

## Common Problems

Most septic systems will fail at some point. They are designed to have a life of 20 to 30 years, under the best conditions. If a system fails before its time, the most common reason is improper use or maintenance.

The troubleshooting guide on the following pages is designed to help you recognize a problem, determine what to do if it happens, and, most important, learn how to prevent it.


**Table 4. Septic System Troubleshooting Guide for Homeowners**

| Problem   | Risks   | Potential Causes  | Potential Remedies  |
|---|---|---|---|
| Sewage backing up into house or plumbing fixtures not draining or draining sluggishly | Human contact with sewage is a serious public health risk. Many water-borne diseases exist in household sewage. <i>Avoid contact!</i> | <ul style="list-style-type: none"> <li>• Excess water entering system</li> <li>• Improper plumbing</li> <li>• Blockage in plumbing</li> <li>• Improper operation</li> <li>• Pump failure</li> <li>• Improper system design</li> <li>• Roots clogging pipes</li> <li>• Broken sewage line</li> </ul> | <ul style="list-style-type: none"> <li>• Fix leaks</li> <li>• Install water-saving fixtures</li> <li>• Stop using garbage disposal</li> <li>• Clean septic tank and check pumps</li> <li>• Replace broken or cracked pipes and remove roots</li> <li>• Seal pipe connections</li> <li>• Keep willow trees away from system</li> </ul> |
| Sewage surfacing in yard  | Human contact with sewage is a serious public health risk. Many water-borne diseases exist in household sewage. <i>Avoid contact!</i> | <ul style="list-style-type: none"> <li>• Excess water use</li> <li>• System blockages</li> <li>• Improper system evaluations</li> <li>• Undersized soil treatment system</li> <li>• Pump failure or improper operation</li> </ul>   | <ul style="list-style-type: none"> <li>• Fix leaks</li> <li>• Install water-saving fixtures</li> <li>• Clean septic tank and check pumps</li> <li>• Consult professionals</li> <li>• Fence off area until problem is fixed</li> </ul>   |
| Sewage odors indoors  | Toxic gases can cause discomfort and illness.   | <ul style="list-style-type: none"> <li>• Sewage surfacing in yard</li> <li>• Improper plumbing</li> <li>• Dry drain trap</li> <li>• Sewage backup in house</li> <li>• Unsealed ejector sump pump</li> <li>• Roof vent pipe frozen closed</li> <li>• Broken sewage line</li> </ul>                   | <ul style="list-style-type: none"> <li>• Repair plumbing</li> <li>• Clean septic tank and check pumps</li> <li>• Replace water in drain traps</li> <li>• Repair or replace broken sewage line</li> </ul>  |
| Sewage odors outdoors   | Major nuisance, but no serious health risk  | <ul style="list-style-type: none"> <li>• Sewage surfacing in yard</li> <li>• Source of odor is something other than your system</li> </ul>  | <ul style="list-style-type: none"> <li>• Clean septic tank and check pumps</li> <li>• Repair or replace drainfield</li> </ul>   |



| Problem   | Risks   | Potential Causes   | Potential Remedies   |
|---|---|--|--|
| Contaminated drinking water or surface water              | Public health risks are magnified by possible ingestion of contaminated water. Drinking contaminated water can cause health problems, including dysentery, hepatitis, and, for infants, a reduced ability of the blood to carry oxygen. | <ul style="list-style-type: none"> <li>• System too close to well, water table, or fractured bedrock</li> <li>• Cesspool or dry well in use</li> <li>• Sewage discharges to surface or groundwater</li> <li>• Improper well construction</li> <li>• Broken water supply</li> <li>• Contamination source is not your system</li> <li>• Broken sewage lines</li> </ul> | <ul style="list-style-type: none"> <li>• Replace your well and/or septic system</li> <li>• Contact a local unit of government to investigate other potential sources of the problem</li> </ul>   |
| Distribution pipes or absorption field freezing in winter | System may be inoperable.   | <ul style="list-style-type: none"> <li>• Improper construction</li> <li>• Check valve in lift station not working</li> <li>• Foot or vehicle traffic over piping</li> <li>• Low flow rate</li> <li>• Lack of use</li> <li>• Undersized pump</li> </ul>   | <ul style="list-style-type: none"> <li>• Check construction</li> <li>• Examine the check valve and/or replace it</li> <li>• Keep people and vehicles off area</li> <li>• Increase water use</li> <li>• Have someone use water in house if you are away</li> <li>• Increase frequency of pump cycling</li> <li>• Operate septic tank as a holding tank</li> <li>• Pump system in fall and use carefully over winter months</li> <li>• Don't use antifreeze</li> </ul> |





### Septic System Installation Record

Date Installed: \_\_\_\_\_

Building Permit Number: \_\_\_\_\_

Name and Address of Licensed Installer: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Size and Location of Septic Tank: \_\_\_\_\_

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\_\_\_\_\_  
\_\_\_\_\_

Layout of System: \_\_\_\_\_

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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Location, Length, and Depth of Trenches or Bed: \_\_\_\_\_

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Distance From Tank to Any Well: \_\_\_\_\_

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Distance From Absorption Field to Any Well: \_\_\_\_\_

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Writers

**Irene Miles**

University of Illinois Extension communications specialist

**Doug Peterson**

U of I Extension communications specialist

Technical Reviewers

**John Church**

U of I Extension educator, natural resources management

**Duane Friend**

U of I Extension educator, natural resources management

**Michael C. Hirschi**

U of I Extension specialist, agricultural engineering

**Mark Kuechler**

Regional engineer, Illinois Department of Public Health

Copy Editor

**Molly Bentsen**

Proofreader

**Stacey Krejci**

Designer

**Deb Eisenmann**

Technical Illustrator

**M.R. Greenberg**

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