



# Avoiding an expensive

## Understanding and maintaining your septic system

Selecting or maintaining a septic system is a consideration most people do not have to worry about when they live in town. But if you're one of the many rural homeowners who have a septic system, then understanding how they work and what you need to do to maintain them may prevent the occasional – but very exasperating – problem.

### How it works

Everything that goes down any of the drains in your house (sinks, toilets, baths, showers, washing machines, etc.) travels first to the septic tank. The septic tank is a large-volume, watertight tank that provides initial treatment of household wastewater by intercepting solids and “sinkable” organic matter before disposal of the wastewater (effluent) to the drain field.

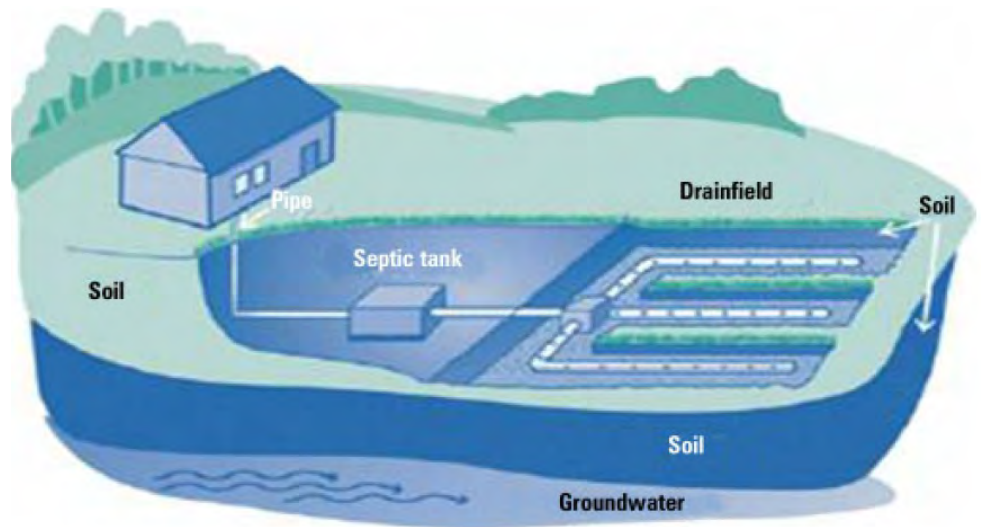
The construction and operation of a septic tank is fairly simple but provides numerous important functions through a complex interaction of physical and biological processes. The essential functions of the septic tank are to receive all wastewater from the house, separate solids from the wastewater flow, cause reduction and decomposition

of accumulated solids, provide storage for the separated solids (sludge and scum), and pass the clarified wastewater (effluent) out to the drain field for final treatment and disposal.

As stated, the main function of the septic tank is to remove solids from the wastewater and provide an effluent relatively free of sludge for disposal to the drain/leach field. The septic tank provides a relatively inactive body of water where the wastewater is retained long enough to let the solids separate by both settling and flotation. This process is often called primary treatment and results in three products: scum, sludge, and effluent. Scum is an extraneous matter or impurities risen to or formed on the surface of a liquid often as a foul filmy covering. Sludge is a slushy mass, deposit, or sediment as precipitated solid matter produced by water and sewage treatment processes that usually lies at the bottom of the septic tank. Effluent is the wastewater that is discharged or flows out of a septic system.

A septic system is normally powered by nothing but gravity. Water flows down from the house to the

# STINK



tank and down from the tank to the drain field.

As new water enters the tank, it displaces the water that's already there. This water flows out of the septic tank and into a drain field. A traditional drain field is made of perforated pipes buried in trenches filled with gravel. A typical drain field pipe is 4 inches in diameter and is buried in a trench that is 4 to 6 feet deep

and 2 feet wide. Gravel fills the bottom 2 to 3 feet of the trench and dirt covers the gravel. The water is slowly absorbed and filtered by the ground in the drain field. The size of the drain field is determined by how well the ground absorbs water and the number of bedrooms in your home.

This is a traditional septic system. There are several other designs that can be utilized for areas with specific

challenges such as high ground water levels, heavy clay soils, steep slopes, etc.

## New properties

Before you purchase a piece of property, make sure that the soil characteristics are suitable for the installation of a septic system. Nothing is worse than being stuck with a piece of heaven not suitable for a septic system. To find out about your soil, you can hire a professional to take soil samples or you can contact your local UW Extension office to find out how to collect a proper sample yourself. Samples are then submitted to a lab for analysis (see the "Soils" section). Ask the local planning and zoning department about wastewater disposal issues. Most county and state health departments or environmental quality agencies require that homeowners apply for a septic permit prior to construction.

In most Wyoming counties, residents should check with their county government about obtaining permits before constructing a septic system. Residents in a few Wyoming counties must



*Gravity fed system in a trench configuration. A plastic (poly) tank and distribution box are used with this system.*

obtain small wastewater permits from the Wyoming Department of Environmental Quality.

At a minimum, the permitting agency should perform a site evaluation, which includes a trench inspection and soil test, and determine if there is high ground water or impermeable layers. A percolation test determines the soil's water absorption capability, a vital characteristic for properly functioning septic systems. A geologist, professional engineer, sanitarian, or the property owner most often performs this. Improper percolation tests could result in an inadequately sized drain field or a costly oversized field. Owners must also make sure the property is large enough to have a replacement area if the first system fails. The property owner is responsible for providing the necessary equipment, such as a backhoe, for these tests. The overseeing agency will not provide the equipment.

Sites with impermeable soils, high clay content, or shallow bedrock will not absorb and treat septic effluent readily. Sites with steep slope (greater than 15 percent) may also pose challenges. These limiting site conditions may require special septic design and construction practices to avoid failure. County and state personnel can discuss options with you and your contractor. Poor septic system siting or design can lead to premature failure of the system.

Septic/small wastewater system permits contain valuable information such as the age of the system, size of the tank and drain field, and location. They can also be a part of the lending process at the bank.

## Maintenance

Septic systems do not last forever – many are designed to last around 20 years with proper maintenance. Having your septic system



*Conventional gravity fed septic system with concrete tank and distribution box. Drainfield is a bed configuration with graveless chambers.*



*Commonly when a drainfield fails, effluent can be seen surfacing in the area.*

pumped out at regular intervals (information about this is contained Table 1) is an important part of that maintenance. Neglecting to have your system pumped on the recommended schedule, excessive household chemical use, or sending excessive wastewater to a septic tank at one time can shorten the life of your leach field, resulting in system failure. Septic systems are designed to break down and discharge

household wastewater at a rate that allows it to be adequately treated by microbes in the soil. If your septic system fails, along with creating a stinky, expensive mess, it can also be a source of contamination for surface and ground water (aka your drinking water source).

Maintenance of septic systems comes in two parts. First, the sludge layer that accumulates on the

bottom of the tank must be pumped out and hauled away regularly (Table 1). The frequency depends on the household occupancy and tank size. The second part involves the bacteria that are necessary for digesting organic solids in the floating (scum) layer. Moderation should be the rule when soaps, detergents, bleaches, or other household cleaners are disposed in septic systems. Certain household products and wastes should never be dumped down drains because they can directly contaminate ground water: excessive amounts of grease, paints or solvents, petroleum products, flammable liquids, paint strippers, and other volatile cleaners. Commercially available septic system cleaners containing organic cleaners or active agents, such as sodium hydroxide (lye) or potassium hydroxide, can disrupt the operation of the system and cause ground water pollution.

An inspection by a licensed contractor can tell you when to pump. A contractor will measure scum, liquid effluent, and sludge layers in the septic tank. The sludge depth will determine pumping frequency, generally every three to five years; however, if you have a large household, increase your pumping frequency (see Table 1). The U.S. Environmental Protection Agency has an excellent maintenance schedule ([www.epa.gov/owm/septic/pubs/septic\\_sticker.pdf](http://www.epa.gov/owm/septic/pubs/septic_sticker.pdf)) you can use to record septic maintenance activities.

**Other keys to getting the most out of your septic system**

Knowing where the tank and leach field are located is a critical step in the maintenance process. Look for line cleanouts or tank risers that provide access to the septic system without digging. If unable to locate

**Table 1**  
**How often to pump (numbers in table are in years):**

Suggested Pumping Interval (years)						
	Number of Persons Living in Home					
Tank Size in Gallons	1	2	3	4	5	6
1,000	12	6	4	3	2	2
1,250	16	8	5	3	3	2
1,500	19	9	6	4	3	3



*Risers on a concrete tank.*



*Gravity fed system in a trench configuration. A plastic (poly) tank and distribution box are used with this system.*



*An effluent filter reduces the possibility of solids moving out of a tank and clogging a leach field.*

these components, consider having a licensed contractor inspect the system with a sewer camera.

**Driving and Parking Over a Septic System** Plan parking areas and driving routes so they will not interfere with a septic system. The weight from vehicles can collapse pipes, septic tanks, and leaching chambers requiring costly excavation and repair. Driving and parking on a leach field also compacts soil, reducing its ability to effectively treat effluent. During winter, be mindful that driving over sewer pipes can increase frost penetration, resulting in the inconvenience and expense of repairing frozen plumbing.

**Tree Roots** Many commercial products claim to prevent roots from clogging pipes, but nothing takes the place of careful landscaping practices. To prevent septic system damage, do not place a leach field near trees and shrubs, and plant only grass or shallow-rooted perennials and annuals around a septic system. If you buy a property with an existing septic and leach field and there are trees in the leach field already, it

would be recommended to consider having a licensed contractor inspect the system with a sewer camera or at the least carefully watch your leach field for any signs of failure including surface ponding of water and sewage. If this happens, the leach field will need to be replaced and the new field located away from these plants.

**Flushing Foreign Objects Down the Drain** We have probably all had that sinking feeling when an object accidentally drops into the toilet. Once flushed, removing that toy truck can be costly and time consuming. For households with small children, prevent unwanted objects from going down the drain by installing toilet seat locks. Other notorious septic system cloggers include diapers, baby wipes, paper products other than toilet paper, cat litter, cigarettes, coffee grounds, feminine products, etc. Purchase toilet paper labeled "Septic Safe." Excess kitchen grease will congeal in the sewer line, causing blockages and backups. Kitchen grease does not break down in the tank – it accumulates, filling the tank quicker, and ultimately shortens the time until it will need to be pumped. Dispose of kitchen grease, after it has properly cooled, in the trash rather than down the drain. The goal is to reduce the amount of solids entering the tank. Whatever is put in, will have to be pumped out!

**Failure to Install According to Local Codes** Local codes and regulations help ensure proper installation practices and protect public health. A poorly installed system will not work effectively and will fail early. A properly installed septic system will be designed according to your specific site conditions (soil types, bedrock, ground water, slope). Finally, local regulations protect surface and ground water quality. A septic system that does not conform to regulations can potentially affect the health and

safety of you and your neighbors. Test your household well regularly! For information, contact commercial water testing laboratories, or the Wyoming Department of Agriculture Analytical Services at 307-742-2984.

**Salts/Chemicals: Water Softeners, Washing Machines, Cleaning Products** Excessive use of household chemicals or salts from a malfunctioning water softener disrupts the natural bacterial action necessary for wastewater treatment. **Moderate amounts** of household cleansers and detergents should not pose a problem; however, dispose of solvents, pesticides, herbicides, motor oil, antifreeze, and paint through a household hazardous waste collection facility rather than down the drain.

**Organic Overloading** Garbage disposals contribute excessive amounts of solids, which do not break down in the septic tank, requiring it to be pumped more frequently. Try creating a compost pile for fruit and vegetable scraps, coffee grounds, etc., and properly dispose of kitchen waste that shouldn't go into compost, such as meat scraps and fat. The goal with a septic system is to prevent accelerated leach field failure from solids moving into the field. Consider installing sink strainers, hair traps in drains, lint traps on washing machines, and an effluent filter (see photo) at the outlet of the septic tank. These devices reduce the possibility of solids moving out of the tank and clogging the leach field prematurely.

**Hydraulic Overloading** Hydraulic overloading occurs when too much water enters the septic system at one time, resulting in wastewater backing into drains or effluent surfacing in your yard. Being conservative with water use can prevent hydraulic overloading.

- Ensure all plumbing fixtures are in good working order. No drips or leaks!

- Replace aging fixtures with new water-saving toilets, shower heads, and faucets.
- Adequately space showers, laundry, dishwashing, and other high-volume water uses so they do not coincide with one another, which may flood the septic tank and push solids into the leach field.
- If possible, avoid using a water softener since backwash will enter the septic tank and can cause hydraulic overloading. Oversize your septic tank and leach field if a water softener is in use.

### Conclusions and Contacts

There are many steps to ensure a properly sited, correctly installed, regularly maintained septic system. Done properly, your system should last 20 or more years. There are an abundance of situations or mishaps that can occur with property you may buy or property you already own when it comes to septic systems and leach fields. Please contact your local county planning department for more information on these situations. They will be able to tell you if you need to hire a contractor or if an inspector can conduct a site visit.

**This section was adapted from material in the following articles (all can be found on [barnyardsandbackyards.com](http://barnyardsandbackyards.com)):**

“A Guide to septic systems,” Spring 2005 *Barnyards & Backyards* magazine. Article author Michelle Cook.

“Prevent a stink by checking septic system considerations before buying,” Summer 2006 *Barnyards & Backyards* magazine. Article author April Gindulis.

“Top reasons for septic system failure and how to prevent them,” Summer 2008 *Barnyards & Backyards* magazine. Article author Author Mila Ready.

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