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Pipeline

Small Community Wastewater Issues Explained to the Public

Maintaining Your Septic System—A Guide For Homeowners

Buried beneath your back yard, it is out there—constantly working. When you're at work, it is working. When you're eating dinner, it continues working. And when you're sleeping, it's still out there in the dark—working. What is it? Your septic system. It may be the most overlooked and undervalued utility in your home; but with proper care and maintenance, your septic system can continue to work for you for at least 25 to 30 years.

If you are like most homeowners, you probably never give much thought to what happens when waste goes down your drain. But if you rely on a septic system to treat and dispose of your household wastewater, what you don't know *can* hurt you.

Proper operation and maintenance of your septic system can have a significant impact on how well it works and how long it lasts, and in most communities, septic system maintenance is the responsibility of the homeowner.

Preventing groundwater pollution from failing septic systems should be a priority for every community and every homeowner. Contamination of the groundwater source can lead to the pollution of local wells, streams, lakes, and ponds—exposing family, friends, and neighbors to waterborne diseases and other serious health risks.

When a septic system fails, inadequately treated domestic waste can reach the groundwater. Bacteria and viruses from human waste can cause dysentery, hepatitis, and typhoid fever. Many serious outbreaks of these diseases have been caused by contaminated drinking water.

Nitrates and phosphates, also found in domestic wastewater, can cause excessive algae growth in lakes and streams called algal blooms. These blooms cause aesthetic problems and impair other aquatic life. Nitrate is also the cause of methemoglobinemia, or blue baby syndrome, a condition that prevents the normal uptake of oxygen in the blood of young babies.

In addition, a failing septic system can lead to unpleasant symptoms, such as pungent odors and soggy lawns.

This issue of Pipeline is an update to the Fall, 1995 issue, Vol. 6, No. 4.

Why Maintain Your System

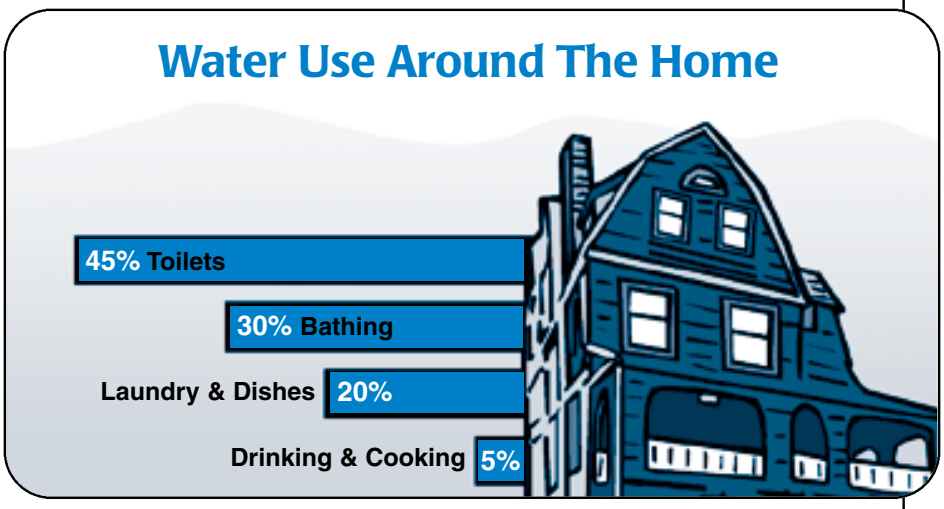
There are three main reasons why septic system maintenance is so important. The first reason is money. Failing septic systems are expensive to repair or replace, and improper maintenance by homeowners is a common cause of early system failure. The minimal amount of preventative maintenance that septic systems require costs very little in comparison to the cost of a new system. For example, it typically costs from $3,000 to $10,000 to replace a failing septic system, compared to $100 to $300 average per year costs to have a septic system routinely pumped and inspected.

The second and most important reason to properly maintain your system is the health of your family, your community, and the environment. When septic systems fail, inadequately treated household wastewater is released into the environment. Any contact with untreated human waste can pose a significant risk to public health. Untreated wastewater from failing septic systems can contaminate nearby wells, groundwater, and drinking water sources.

What's Inside...

Chemicals improperly disposed of through a septic system also can pollute local water sources and can contribute to early system failures. For this reason it is important for homeowners to educate themselves about what can and what cannot be disposed of through a septic system.

A third reason to maintain your septic system is to maintain the economic health of your community. Failing septic systems can cause property values to decline. Sometimes building permits cannot be issued for these properties. Also, failing septic systems may contribute to the pollution of local rivers, lakes, and shoreline that your community uses for commercial or recreational activities.



How to Maintain Your System

Septic system maintenance is often compared to automobile maintenance because only a little effort on a regular basis can save a lot of money and significantly prolong the life of the system.

Annual inspections of your septic system are recommended to ensure that it is working properly and to determine when the septic tank should be pumped. Systems that have moving parts may require more frequent inspections. By having your system inspected and pumped regularly, you can prevent the high cost of septic system failure.

A professional contractor can do a thorough inspection of the entire system and check for cracked pipes and the condition of the tees or baffles and other parts of the system.

A thorough septic system inspection will include the following steps:

1. Locating the system.
Even a professional may have trouble locating the system if the access to your tank is buried. One way to start looking is to go in the basement and determine the direction the sewer pipe goes out through the wall. Back outside, the inspector will use an insulated probe inserted into the soil to locate the buried piping. Once the system components are found, be sure to sketch a map and keep it on hand to save time on future service visits.

2. Uncovering the manhole and inspection ports.
This may require some digging in the yard. If they are buried, it will help future inspections if elevated access covers or risers are installed to make it easier to access the ports and manhole.

3. Checking connections.
Flushing the toilets, running water in the sinks, running the washing machine through a cycle will help to determine if the household plumbing is all going to the system and working correctly.

4. Measuring the scum and sludge layers.
The inspector will measure the scum and sludge layers with special tools inserted through the inspection port. A proper inspection will also include a visual observation of the scum and sludge layers. (The sludge layer is the heavier solids that have settled down to the bottom of the tank. The scum layer is made up of grease and light solids that float near the top of the tank.)

If the sludge depth is equal to one third or more of the liquid depth, the tank should be pumped. Also, the tank needs to

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be pumped when it is 1/3 full. See the table below for estimated pumping frequencies. But be aware it is most prudent to conduct regular inspections and pump when the inspection says the tank needs to be pumped.

Remember that toxic gases are produced by the natural treatment processes in septic tanks and can kill in minutes. Even looking into the tank can be dangerous. Leave inspections to the trained professionals.

5. Checking the tank and the drainfield.
The inspector will check the condition of the baffles or tees, the walls of the tank for cracks, and the drainfield for any signs of failure. If the system includes a distribution box, drop box, or pump, these need to be checked too.

How often the tank needs to be pumped depends on the tank size, the number of people living in your home, and the habits of your particular household. Garbage disposals and high-water-use appliances, such as a hot tub or whirlpool, also affect the pumping frequency.

When it's time to pump, be sure to hire a licensed contractor. He or she will have the appropriate equipment and will dispose of the sludge at an approved treatment site. You can find listings for licensed pumpers and haulers in the yellow pages, or contact your local health department or permitting agency for assistance.

It's a good idea to be present when your tank is being pumped. Make sure that the contractor uses the manhole, not the inspection ports, to pump the tank to avoid damaging the baffles or tees. Also make sure all of the material in the tank is removed. It is not necessary to leave anything in the tank to "restart" the biological processes, but it is also not necessary to scrub or disinfect the tank.

Pumping your septic tank is probably the single most important thing that you can do to protect your system. If the buildup of solids in the tank becomes too high and solids move to the drainfield, this could clog and strain the system to the point where a new drainfield will be needed.

Figure 1.
Estimated septic tank pumping frequencies in years. These figures assume there is no garbage disposal unit in use. If one is in use, pumping frequency may need to be increased.
(Source: Pennsylvania State University Cooperative Extension Service.)

Tank Size (gals.)	Household Size (number of people)					
	1	2	3	4	5	6
500	5.8	2.6	1.5	1.0	0.7	0.4
750	9.1	4.2	2.6	1.8	1.3	1.0
900	11.0	5.2	3.3	2.3	1.7	1.3
1000	12.4	5.9	3.7	2.6	2.0	1.5
1250	15.6	7.5	4.8	3.4	2.6	2.0
1500	18.9	9.1	5.9	4.2	3.3	2.6
1750	22.1	10.7	6.9	5.0	3.9	3.1
2000	25.4	12.4	8.0	5.9	4.5	3.7
2250	28.6	14.0	9.1	6.7	5.2	4.2
2500	31.9	15.6	10.2	7.5	5.9	4.8

Recordkeeping

It is very important to keep a detailed record of all inspections, pumpings, permits, repairs, and any other maintenance to your system along with a sketch of where your septic system is located. Having this information on hand for service visits can save you both time and money.

Learn the location of your septic system, and keep a diagram or sketch of it with your maintenance records.

Inspecting your septic system annually is a good way to monitor your system's health. Inspections can reveal problems before they become serious, and by checking the levels of sludge and scum in your tank, you can get a more accurate idea of how often it should be pumped.

Protect the tank and drainfield

Protect your septic system from potential damage. Don't plant anything but grass near your septic system—roots from shrubs and trees can cause damage—and don't allow anyone to drive or operate heavy machinery over any part of the system. Also, don't build anything over the drainfield. Grass is the most appropriate cover for the drainfield.

Sound septic system operation and maintenance practices include conserving water, being careful that nothing harmful is disposed of through the system, and having the system inspected annually and pumped regularly.

By educating everyone in your household about what is and what isn't good for septic systems, they can begin to develop good maintenance habits.

What Not To Flush

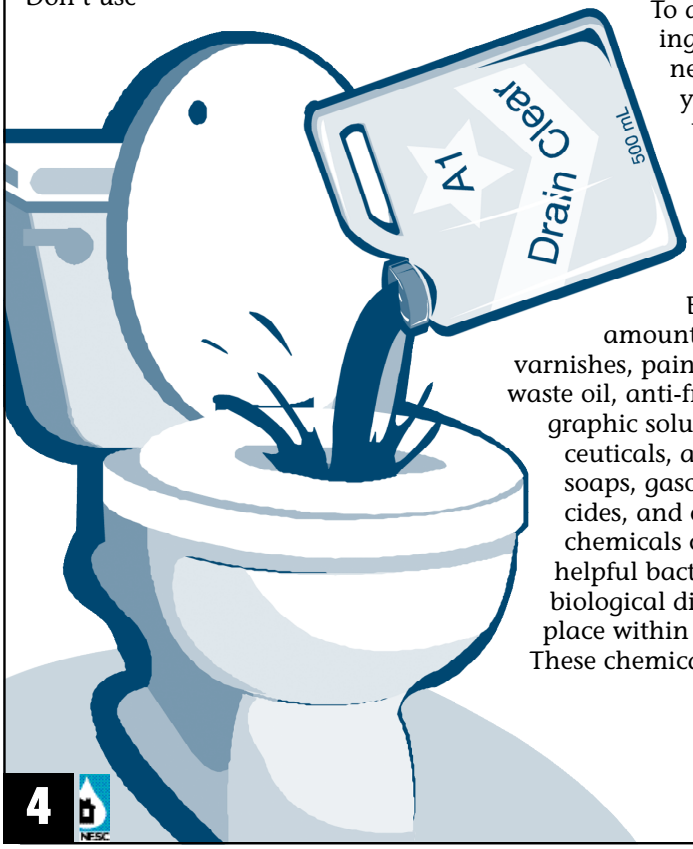
What you put into your septic system greatly affects its ability to do its job. Remember, your septic system contains living organisms that digest and treat waste. As a general rule of thumb, do not dispose of anything in your septic system that can just as easily be put in the trash. Your system is not designed to be a garbage can and solids build up in the septic tank that will eventually need to be pumped. The more solids that go into the tank, the more frequently the tank will need to be pumped, and the higher the risk for problems to arise.

In the kitchen, avoid washing food scraps, coffee grinds, and other food items down the drain. Grease and cooking oils contribute to the layer of scum in the tank and also should not be put down the drain.

The same common-sense approach used in the kitchen should be used in the bathroom. Don't use the toilet to dispose of plastics, paper towels, facial tissues, tampons, sanitary napkins, cigarette butts, dental floss, disposable diapers, condoms, kitty litter, etc. The only things that should be flushed down the toilet are wastewater and toilet paper.

When used as recommended by the manufacturer, most household cleaning products will not adversely affect the operation of your septic tank. Drain cleaners are an exception, however, and only a small amount of these products can kill the bacteria and temporarily disrupt the operation of the tank.

Household cleaners such as bleach, disinfectants, and drain and toilet bowl cleaners should be used in moderation and only in accordance with product labels. Overuse of these products can harm your system. It makes sense to try to keep all toxic and hazardous chemicals out of your septic tank system.



To avoid disrupting or permanently damaging your septic system, do not use it to dispose of hazardous household chemicals. Even small amounts of paints, varnishes, paint thinners, waste oil, anti-freeze, photographic solutions, pharmaceuticals, antibacterial soaps, gasoline, oil, pesticides, and other organic chemicals can destroy helpful bacteria and the biological digestion taking place within your system. These chemicals also pollute the groundwater.

Even latex paint is unhealthy for your septic system. To reduce the cleanup of these products, squeeze all excess paint and stain from brushes and rollers on several layers of newspaper before rinsing.

To help prevent groundwater pollution, be sure to dispose of leftover hazardous chemicals by taking them to an approved hazardous waste collection center. For more information, contact your local health department.

Additives/System Cleaners

While many products on the market claim to help septic systems work better, the truth is there is no magic potion to cure an ailing system. In fact, most engineers and sanitation professionals believe that commercial septic system additives are, at best, useless, and at worst, harmful to a system.

There are two types of septic system additives: biological (like bacteria, enzymes, and yeast) and chemical. The biological additives are harmless but some chemical additives can potentially harm the soil in the drainfield and contaminate the groundwater.

While there hasn't been extensive study on the effectiveness of these products, the general consensus among septic system experts is that septic system additives are an unnecessary evil.

Be aware that the extended use of strong pharmaceuticals and personal care products may harm the working bacteria population in the tank. The total effects are unknown at this time.

Modern Appliances May Affect Your Septic Tank

Hot Tubs/Whirlpools

Hot tubs and whirlpools have become more common today in the home as a source of relaxation and therapy. While the soothing, swirling waters of a spa may be good for a homeowner, unfortunately, the large amounts of water that drain from the hot tub are not good for your septic system.

Emptying large quantities of water from a hot tub into your septic system can overload a system and stir the solids in the tank, pushing them into the drainfield, eventually causing it to fail.

Hot tub water should instead be cooled and then drained onto turf or landscaped areas of your property well away from the septic tank, drainfield, and house in accordance with local regulations.

Garbage Disposals

Garbage disposals can increase the amount of solids in the tank up to 50 percent and should not be used. Eliminating a garbage disposal can greatly reduce the amount of grease and solids that enter the drainfield.

Because a garbage disposal grinds kitchen scraps into small pieces, once they reach the septic tank, they are suspended in the water. Some of these materials are broken down by bacterial action, but most of the grindings must be pumped out of the tank.

As a result, use of a garbage disposal will significantly increase the amount of sludge and scum in your septic tank. Therefore, many states require a larger minimum size septic tank if there will be a garbage grinder/disposal unit in operation in the house.

Water Softeners

Some freshwater purification systems, including water softeners, needlessly pump hundreds of gallons of water into the septic system all at once. This can agitate the solids and allow excess to flow into the drainfield. Consult a plumbing professional about alternative routing for such freshwater treatment systems.

Water softeners remove hardness by using a salt to initiate an ion exchange. The backwash to regenerate the softener flushes pounds of this used salt into the septic system. There is some concern that these excess salts can affect the digestion in the septic tank or reduce the permeability in the soil dispersal system.

The Winter 2001 issue of *Pipeline* gives additional information about water softener use.

How Your Septic System Works

There are two main parts to the basic septic system: the septic tank and the drainfield.

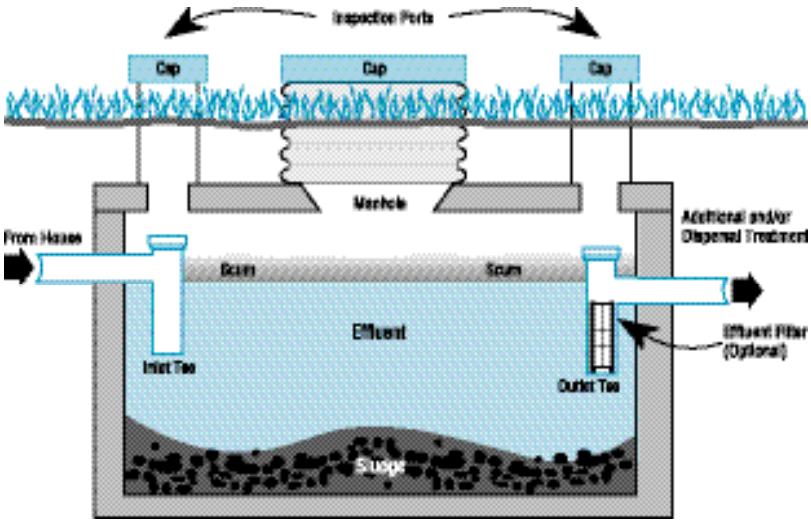
Household wastewater first flows into the septic tank where it should stay for at least a day. In the tank, heavy solids in the wastewater settle to the bottom forming a layer of sludge, and grease and light solids float to the top forming a layer of scum.

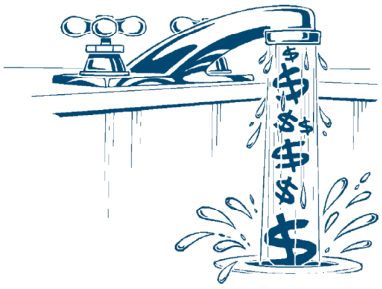
The sludge and scum remain in the tank where naturally occurring bacteria work to break them down. The bacteria cannot completely break down all of the sludge and scum, however, and this is why septic tanks need to be pumped periodically.

The separated wastewater in the middle layer of the tank is pushed out into the drainfield as more wastewater enters the septic tank from the house. If too much water is flushed into the septic tank in a short period of time, the wastewater flows out of the tank before it has had time to separate. This can happen on days when water use is unusually high, or more often if the septic tank is too small for the needs of the household. Homeowners should stagger their laundry throughout the week and try to do no more than two wash loads per day.

When wastewater leaves a septic tank too soon, solids can be carried with it to the drainfield. Drainfields provide additional treatment for the wastewater by allowing it to trickle from a series of perforated pipes, through a layer of gravel, and down through the soil. The soil acts as a natural filter and contains organisms that help treat the waste. Solids damage the drainfield by clogging the small holes in the drainfield pipes, and excess water strains the system unnecessarily.

Conventional septic systems are a very simple way to treat household wastewater. They contain no moving parts and are easy to operate and maintain. Although homeowners must take a more active role in maintaining septic systems, once they learn how their systems work, it is easy for them to appreciate the importance of a few sound operation and maintenance practices.





Use Water Wisely All Around The House

Water conservation is very important for septic systems because continual saturation of the soil in the drainfield can affect the quality of the soil and its ability to naturally remove toxics, bacteria, viruses, and other pollutants from the wastewater.

The most effective way to conserve water around the house is to first take stock of how it is being wasted. Immediately repair any leaking faucets or running toilets, and use dishwashers only when full.

Laundry

You can also cut down on water use by selecting the proper load size for your washing machine. Washing small loads of laundry with large quantities of water is a waste of both water and energy.

Also doing laundry all in one day might seem like a good use of time, but it could be harmful to your septic system. By doing several loads in succession, the septic system does not have time to adequately treat wastes. You might be hydraulically overloading your septic system, causing it to pass solids into the drainfield.

Newer energy-efficient clothes washers use 35 percent less energy and 50 percent less water than a standard model. Look for appliances that display the Energy Star symbol. This indicates they meet strict

energy efficiency guidelines set by the EPA and the U.S. Department of Energy.

Use only nonphosphate or low phosphate laundry detergents. Powder detergents with low inert (clay) content are also easier on the septic system.

Bathrooms

In a typical household, most of the water used indoors is used in the bathroom, and there are several little things that can be done to conserve water there.

For example, try to avoid letting water run while washing hands and brushing teeth. Avoid taking long showers and install water-saving features in faucets and shower heads. These devices can reduce water use by up to 50 percent. Low-flush toilets use 1.6 gallons per flush compared to the three to five gallons used by conventional toilets. Even using a toilet dam or putting a container filled with rocks in the toilet tank can reduce water use by 25 percent.

It is also important to avoid overtaxing your system by using a lot of water in a short time period, or by allowing too much outside water to reach the drainfield. Try to space out activities requiring heavy water use over several days. Also, divert roof drains, surface water, and sump pumps away from the drainfield.

Septic System Dos and Don'ts

*__Do__ learn the location of your septic tank and drainfield. Keep a sketch of it handy with your maintenance record for service visits.

*__Do__ have your septic system inspected annually.

*__Do__ have your septic tank pumped out by a licensed contractor, approximately every three to five years, or as often as is appropriate for your system

*__Do__ keep your septic tank cover accessible for inspections and pumping. Install risers if necessary.

*__Do__ call a professional whenever you experience problems with your system, or if there are any signs of system failure.

*__Do__ keep a detailed record of repairs, pumping, inspections, permits issued, and other maintenance activities.

*__Do__ conserve water to avoid overloading the system. Be sure to repair any leaky faucets or toilets.

*__Do__ divert other sources of water, like roof drains, house footing drains, and sump pumps, away from the septic system. Excessive water keeps the soil in the drainfield from naturally cleansing the wastewater.

*__Don't__ go down into a septic tank. Toxic gases are produced by the natural treatment processes in septic tanks and can kill in minutes. Extreme care should be taken when inspecting a septic tank, even when just looking in.

*__Don't__ allow anyone to drive or park over any part of the system.

*__Don't__ plant anything over or near the drainfield except grass. Roots from nearby trees or shrubs may clog and damage the drain lines.

*__Don't__ dig in your drainfield or build anything over it, and don't cover the drainfield with a hard surface such as concrete or asphalt. The area over the drainfield should have only a grass cover. The grass will not only prevent erosion, but will help remove excess water.

*__Don't__ make or allow repairs to your septic system without obtaining the required health department permit. Use professional licensed onsite contractors when needed.

*__Don't__ use septic tank additives. Under normal operating conditions, these products usually do not help and some may even be harmful to your system.

*__Don't__ use your toilet as a trash can or poison your septic system and the groundwater by pouring harmful chemicals and cleansers down the drain. Harsh chemicals can kill the beneficial bacteria that treat your wastewater.

*__Don't__ use a garbage disposal without checking with your local regulatory agency to make sure that your septic system can accommodate this additional waste.

*__Don't__ allow backwash from home water softeners to enter the septic system.

The Summer 2004 issue of *Pipeline* provides more information about septic tanks for homeowners.

NESC Products related to Septic Systems

Conventional Onsite Sewage Disposal System: Your Septic System, What it is and how to take care of it. Video.
WWVTPE61 .....$10.00

Your Septic System: A Guide for Homeowners. Video.
WWVTPE16 .....$10.00

Pumping Your Septic Tank. Brochure.
WWBRPE71 .....$0.40

Septic System Maintenance.
Fact sheet.
WWFSPE73 .....$0.80

Onsite Wastewater Treatment Systems: Operation and Maintenance.
Fact sheet.
WWFSOM45.....$1.00

Homeowner's Manual for the Operation, Monitoring, and Maintenance of a Gravity Onsite Sewage Treatment and Disposal System Manual.
WWBLOM47.....$13.00

Homeowner's Manual for the Operation, Monitoring, and Maintenance of a Proprietary Device Onsite Sewage Treatment and Disposal System Manual.
WWBLOM48 ..... $13.00

Homeowner's Manual for the Operation, Monitoring, and Maintenance of a Pressure Distribution Onsite Sewage Treatment and Disposal System Manual.
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Homeowner's Septic Tank Information Package.
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