Septic Systems Maintenance:

A typical septic system consists of two basic components: a septic tank and an underground disposal field. Wastewater flows from the house to the septic tank. Effluent, after the solids have settled out of the wastewater, flows from the tank to the drainage field.

Most septic systems operate by gravity. Thus, it is a passive system, perhaps one of the best passive systems we have to serve our homes.

For various reasons some septic systems will require a pump (an effluent pump) to pump effluent from the septic tank to the drainage field. Others may require a pump (sewage ejection or grinder pump) to pump the wastewater from the house to the septic tank. The simpler system is the one using an effluent pump. A sewage ejection or grinder pump is a more complex piece of equipment that requires more maintenance. Dual ejection pumps are sometimes installed so one can serve as a backup in the event of a problem. Both types of pump should be equipped with a high-water alarm to alert you if there is any problem with the system. All septic system pumps should be maintained on regular basis.

Fundamentally, the septic tank has several functions:

1. To receive all wastewater from the house.
2. To allow solids to settle from the wastewater.
3. To facilitate decomposition of the accumulated solids.
4. To provide storage for accumulated solids.
5. To allow the wastewater without the solids (the effluent) to flow to the drainage field.
6. The disposal field is sometimes called a drainage field, leach field, or absorption field. It is intended to purify and disperse the effluent flowing from the septic tank. Disposal fields typically consist of either perforated distribution pipe or chambers. Chambers are typically concrete or plastic. The type of soil in which the drainage field is located and how well it will absorb the effluent will dictate the size and configuration of the disposal field. Also, in most states, the number of bedrooms dictates the minimum system size of the septic tank and disposal field. There are many regional variations of the disposal field.

For most single-family homes, the septic tank will range from 1,000 to 1,500 gallons in capacity. Most modern septic tanks are concrete. The majority of tanks are prefabricated units. Many older tanks were constructed of stone, block or steel.

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Ultimately, the water and nutrients from the effluent will recycle back into the environment to nurture plant growth and/or evaporate into the atmosphere.

The most serious problem for a septic system occurs when solids flow into the disposal field. This can cause a backup of the system because the drainage field becomes blocked. To minimize the risk of damaging the drainage field, it’s important to pump out the septic tank on a regular basis. In most areas it is recommended that a septic tank be pumped out every 1 to 3 years. A qualified technician should do the inspection. Those qualifications vary regionally.
Here is a summary of key points regarding your septic system:

1. Have your septic system inspected annually.
2. Expect to replace a steel septic tank and stone or cinder block cesspools and drywells soon.
3. Pump the septic tank every 1-3 years, depending on inspection findings.
4. Most disposal fields will last 20–30 years or more, depending on soil type and use and proper use.
5. Effluent pumps will typically last 20–30 years, assuming normal use and regular maintenance.
6. Sewage ejection (grinder) pumps will last 10–20 years, assuming normal use and regular maintenance.
7. If you want to add a bedroom, you may have to enlarge your septic system, check with your local municipality.

Septic systems are natural, effective, reliable, and passive systems for disposing of wastewater. With proper maintenance, most will serve for many, many years. For more information, we recommend The Septic Systems Owner’s Manual noted above.

### CAUSES OF SEPTIC SYSTEM FAILURE

<table>
<thead>
<tr>
<th>Causes</th>
<th>Solutions</th>
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<td>Septic tanks seldom fail, the soil, or drain field fails when it becomes plugged and the effluent can no longer migrate through the soil. The drain field essentially becomes a dead pool of water. In most cases these failures occur when it becomes plugged with solids that were supposed to remain in the tank. These failures are usually a combination of factors and can be avoided and in some cases, damages can even be reversed.</td>
<td>Failures can be avoided by learning how a septic system functions, how to properly use it, and what steps you can take to protect it. The basics of protecting a system are really quite simple, once you realize that they work on a bacterial process (good bacteria eating bad bacteria) and bacteria don't eat plastic like polyester and nylon...too much harsh cleaning solution will kill off the good bacteria. Also a septic system can only handle a certain amount of water per day...if you put more water down the drain than it can handle you will overload the system. Install water-saving appliances, devices and practice water saving techniques. Repair plumbing leaks. Leaking toilet valves are a major culprit of hydraulic overload putting hundreds of gallons of water through the system every day.</td>
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<td>The homeowner puts more water down the drain than the system can handle hydraulically overloading the system. See &quot;How Water is Wasted&quot; on page 4 to see how easily a septic system can be overloaded.</td>
<td>Install filter for the washing machine to remove the fine solids from the discharge and do not use or minimize the use of garbage disposals.</td>
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<td>Fine solids from washing machines (lint) and garbage disposals do not have the mass to settle in the tank, instead they remain in suspension until reaching the drain field where they plug the pores of the soil bed.</td>
<td>Chemicals are over-used killing the bacteria in the system stopping the treatment (and breakdown of solids) process. Conserve chemical usage. Automatic toilet bowl cleaners can be very hard on a system because they kill the bad bacteria in the toilet but the killing process continues throughout the system.</td>
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<td>Periods of heavy water use do not allow solids to settle in the tank and are flushed out to the drain field.</td>
<td>Water use should be spread out. Do 1 or 2 loads of laundry per day rather than 10-15 loads on Saturday morning.</td>
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<td>Baffles in the tank are not of the proper size or fall off allowing solids to float out to the drain field.</td>
<td>Exit baffle should be replaced with effluent filters. These cleanable filters prevent the larger solids from reaching the drain field.</td>
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<td>Solids are allowed to build-up in the tank leaving little settling room for newly introduced solids.</td>
<td>Have the tank pumped and inspected every 1-3 years. Tanks should be pumped and inspected through the manhole cover, not the inspection pipe.</td>
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<td>Vehicles are allowed to drive over the drain field compacting the soil and destroying the natural (drainage) structure of the soil.</td>
<td>Keep vehicular and heavy foot traffic off the drain field. Plugged/compacted drain fields can be rejuvenated by having the soil fractured. This fracturing creates thousands of tiny fissures that allow the soil to drain and the aerobic bacterial colonies to repopulate.</td>
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<td>Sodium (salt) in wastewater can bind with certain types of clay soils causing the soil to seal.</td>
<td>A soil de-flocculent can be used to correct sodium damaged soil. A mini-septic system can be installed to receive the discharge from the water softener to prevent this damage.</td>
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Sodium (salt) in wastewater can bind with certain types of clay soils causing the soil to seal. A soil de-flocculent can be used to correct sodium damaged soil. A mini-septic system can be installed to receive the discharge from the water softener to prevent this damage.

**Tip:** Do you have a water softener? These devices can put several hundred gallons of water down the drain every week that is not contaminated and does not need to go through the treatment process. Up-grade your softener with a newer efficient model that uses less water and regenerates on demand (when you use $x$ number of gallons of water) instead of a timer system that regenerates whether you use water or not. You can also install a mini-septic system for your softener. Check with your local municipality for any permits needed.

**MINI ABSORPTION FIELD FOR WATER SOFTENERS, AIR CONDITIONERS AND SELLDOM USE SUMP PUMPS.**

![Diagram of mini absorption field]

1. Dig hole at least 2 feet below frost line. Watch for cave-ins!!!
2. Place 100 foot coil of drain tile w/fabric wrap in pit
3. Run 1 inch PVC pipe from house to pit
4. Insert PVC into coil and seal fabric around PVC
5. Backfill with top soil.

**Tip:** Fix all leaking appliances. The number one issue for a malfunction in a septic system is too much water. The drainage field can only handle so much and if you overload it it will back up. So fix any leaking faucets or running toilets. The illustration below gives you an idea of how much water can come from a small leak.
Tip: If you are building a house make sure the contractor that designs and installs your system is a certified professional. Don’t make the mistake of hiring someone because they are the cheapest. Go with the contractor with the best track record. Many people have saved a few bucks on the first installation only to have the system fail 1, 2, 3 years later and by that time the original contractor is out of business or refuses to correct the problem. Now the second system can be even more expensive because the yard is landscaped and the choices for a replacement are narrowed down.

Tip: If you are buying a home with a septic system, hire an independent contractor to perform a full inspection, many county inspectors will only flush the toilet 3 times and look in the yard for surface discharge. In many cases once you buy the house the problem is yours and there have been cases where the people have been kicked out of their home weeks after moving in because the failed system is an immanent health risk to the public.

A full inspection should include:

- Tank pumped and inspected for cracks, missing/inadequate baffles, excessive, drainback from the drain field.
- Size of tank.
- Size and location of drain field.
- Any non-complying parts of the system should be noted.

This inspection will cost $150-$250 (not including pumping of tanks) but it is worth every penny if you find any problems. Any up-grades can/should be negotiated into the selling price of the home or corrected prior to closing. If no problems are found then you know you are starting with a good system and it is up to you to take care of the system from the beginning of ownership.

If the seller refuses an inspection you should take this as a sign of potential problems and walk away or plan for possible extensive and expensive corrections if the system and property is capable of repairs or replacements. Some properties due to location, size or terrain may not be able to be corrected. Some properties have been condemned shortly after settlement due to a failed system that can not be corrected.

Waste water leaves the house and enters the septic tank. The septic tank performs two functions. First, it acts as a holding tank and allows the solids to settle-out. The heavier solids sink to the bottom forming the sludge layer, the lighter solids, fats, oils, grease, etc...rise to the surface and form the scum layer. The relatively clear layer in
the middle is called effluent. **Second,** naturally occurring anaerobic bacteria begin breaking down the solids in size and destroying the pathogens.

This is a standard septic system. The treatment process starts in the septic tank and is completed in and around the drain field. This simple type of system is best suited for those ideal building lots: well draining soils, no high water tables or nearby bodies of water.

After the treatment process is started in the septic tank the effluent enters the soil treatment phase of the process (baffles prevent the larger floating solids from entering the drain field). The soil treatment system, more commonly called the drain field, is comprised of distribution pipe laid in a trench partially filled with gravel and covered with topsoil.

As the effluent enters the drain field it percolates through the gravel bed where a large portion of the pathogens are destroyed. Pockets of oxygen created by the uneven shape of the gravel allow the more efficient aerobic bacteria to exist. As the effluent exits the drain field the natural soil completes the treatment process. By the time the effluent has traveled 2-3 feet through the soil all the remaining pathogens have been destroyed and the water is drinking quality. The cleaning process continues as the water migrates through the soil

Phosphorus and nitrogen are utilized by the vegetative life covering the drain field and chemically changed in the soil. A large portion of the moisture is returned to the atmosphere though evaporation (evapotranspiration).

Obviously not all sites are going to be perfect. When dealing with high water tables, nearby bodies of water,
Contrary to what most people and community leaders believe, septic systems are one of the best choices for treating household wastewater, in most cases they are a better option financially and environmentally than a sewage treatment facility. But as with anything they must be used correctly and properly maintained.

**CESSPOOLS and DRYWELLS**

A cesspool is basically a hole in the ground that has been lined with stone, brick or some other material. It is constructed to allow the liquid contents to leach into the soil through the walls of the containment unit. The older homes that have cesspools are not required to upgrade them. Cesspools are antiquated systems and chances are the ones in existence today are nearing the end of their usefulness. However, the owner of the property is obligated to replace the system, when problems arrive, with an approved system. We strongly suggest that cesspool systems are pumped and inspected every year.