

Franklin Township On-Lot Sewage Management Program

Public Education

List of articles and suggested order of presentation:

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- Alternate On-lot Sewage System Technologies

Franklin Township On-Lot Sewage Management Program
Public Education Series #1:
What is an On-Lot Sewage System?

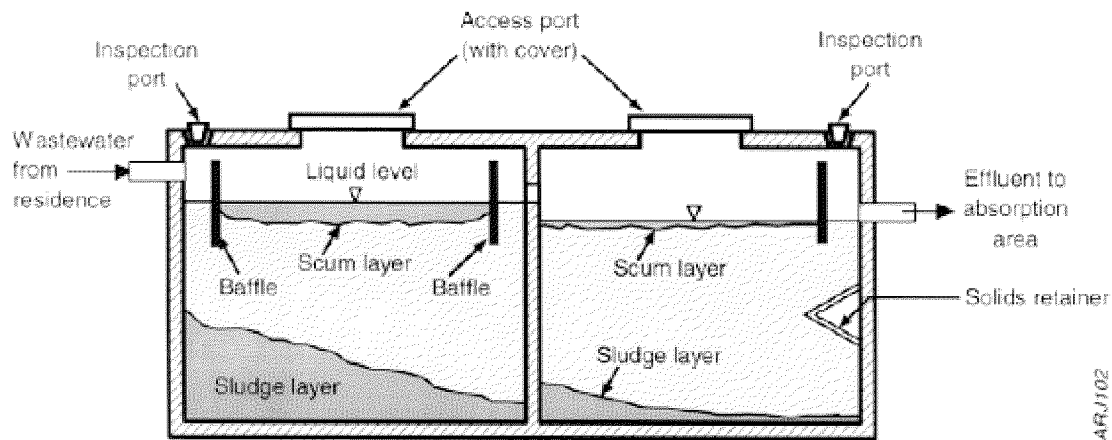
Any infrastructure (pipes, tanks, pumps, drainfields, etc.) located outside of a building and intended to convey, treat and dispose of wastewater on a single lot, or in some cases more than one lot, is collectively considered an on-lot sewage system. The specific nature of these components can range widely depending upon the age of the system, soil conditions, and size of the home or building in question.

Most of the on-lot sewage systems in use in Franklin Township can generally be described as septic systems, with some number of cesspools still in use for older homes. Cesspools, and a variation of this technology known as a seepage pit, are discussed more fully in another article in this series. The following discussion about septic systems will be applicable to most residents.

Septic systems are sewage systems designed to treat and dispose of domestic household sewage through natural processes. In its most basic form, a septic system consists of a treatment tank (i.e., septic tank) and a disposal area (i.e. drainfield). Both of these components play important roles in cleaning up the wastewater and disposing it into the soil in an environmentally friendly manner.

The treatment tank is a large watertight “box”, usually made of concrete, with an inlet and outlet pipe. Wastewater flows from the home to the treatment tank through the sewer pipe. The treatment tank treats the wastewater naturally by holding it in the tank long enough for solids and liquids to separate. The wastewater forms three layers inside the tank. Solids lighter than water (such as fats, oils, and greases) float to the top forming a layer of scum. Solids heavier than water settle at the bottom of the tank, forming a layer of sludge. This leaves a middle layer of partially clarified wastewater. The layers of sludge and scum remain in the septic tank where bacteria found naturally in the wastewater continue to break the solids down. The sludge and scum that cannot be broken down are retained in the tank and build up until it is pumped.

Baffles in the tank serve a very important role in preventing accumulated solids from traveling out of the tank. Any solids which escape the tank can clog up the drainfield and cause premature (and expensive) failure. The illustration below shows how sludge and scum layers separate and how baffles serve to keep these layers from leaving the tank. This illustration shows a tank constructed with 2 compartments in series, which has been required in Pennsylvania for homes built since 1997 so that an additional level of protection is in place to prevent solids or scum from flowing out of the tank.



Cross Section of a typical Two Compartment Septic Tank

The layer of clarified liquid, also known as effluent, flows from the septic tank to the disposal area. A drainfield (also known as a leachfield, disposal field, or a soil absorption area) represents the most common disposal component of a septic system. This is the place where the effluent from the septic tank trickles through the soil for final treatment and disposal. There are many different kinds of drainfields, but most involve an excavation in the ground with perforated pipe set in crushed stone. The diagram below shows one of the more common layouts in Franklin Township, with several long and narrow excavations, or trenches.

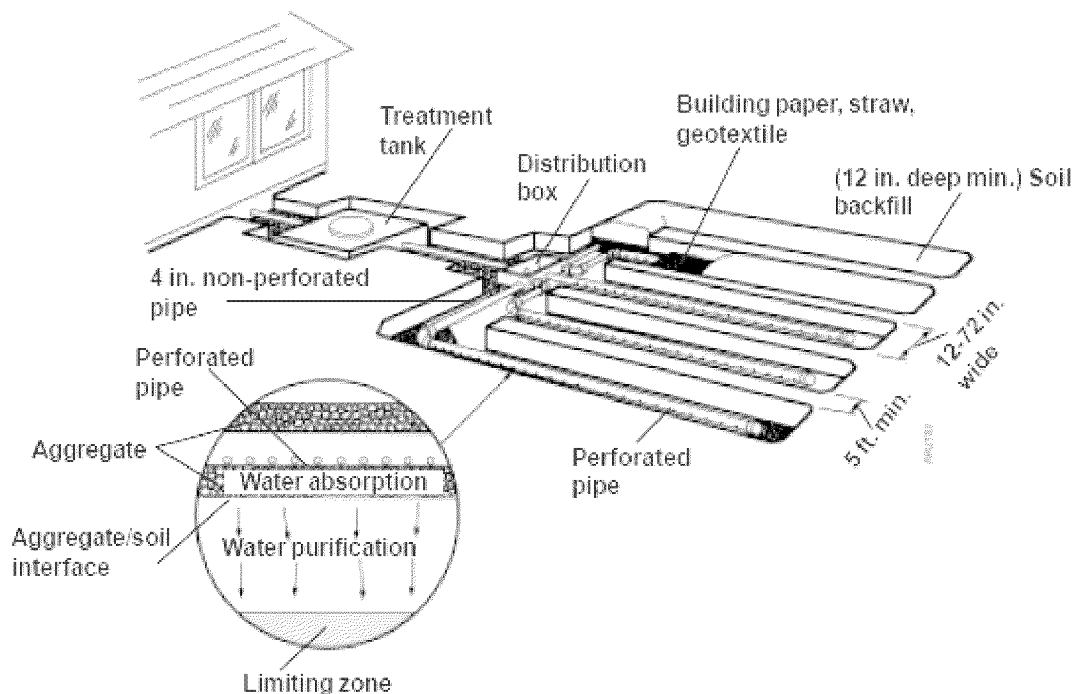


Diagram of Typical Drainfield Showing Underground Trenches

The more common types of drainfields in Franklin Township are:

1. Standard trench – two or more long narrow trenches with stone and perforated pipe to distribute the wastewater (as illustrated above). These designs may also include a pump and associated pump tank to convey wastewater from the septic tank to the trenches in cases where gravity flow is not possible, or where a poor percolation rate requires the piping in the trenches to be pressurized for more even distribution.
2. Seepage bed – a single rectangular excavation filled with stone and perforated pipe to distribute the wastewater. These designs may also include a pump and associated pump tank to convey wastewater from the septic tank to the seepage bed in cases where gravity flow is not possible, or where a poor percolation rate requires the piping in the bed to be pressurized for more even distribution.
3. Elevated sand mound – typically used when rock or a water table is too close to the ground surface to allow for an in-ground system. Sand is placed on top of the ground to make up for the lack of soil depth, and the stone and pipe are placed on top of the sand. All of this is covered and surrounded by a soil berm. An additional tank with a pump is required for all elevated sand mounds, so that the perforated pipe can be pressurized with the wastewater and thereby spread it out more evenly throughout the whole drainfield area.

More complex septic systems may be needed to accommodate sites which have more challenging soil and site conditions. Residents using these advanced technologies are advised to consult with the Chester County Health Department for more information.

Franklin Township On-Lot Sewage Management Program
Public Education Series #2:
Cesspools and Seepage Pits

A typical cesspool is a cylindrical excavation with an open bottom and walls lined with unmortared stone or concrete block. Raw sewage is discharged into the cesspool from a sewer pipe connected the building drain. Most solids accumulate in the cesspool, and the remaining liquid sewage waste is absorbed into the soil through the open bottom and porous sides of the cesspool. The diagram below shows the cross section of a typical cesspool installation.

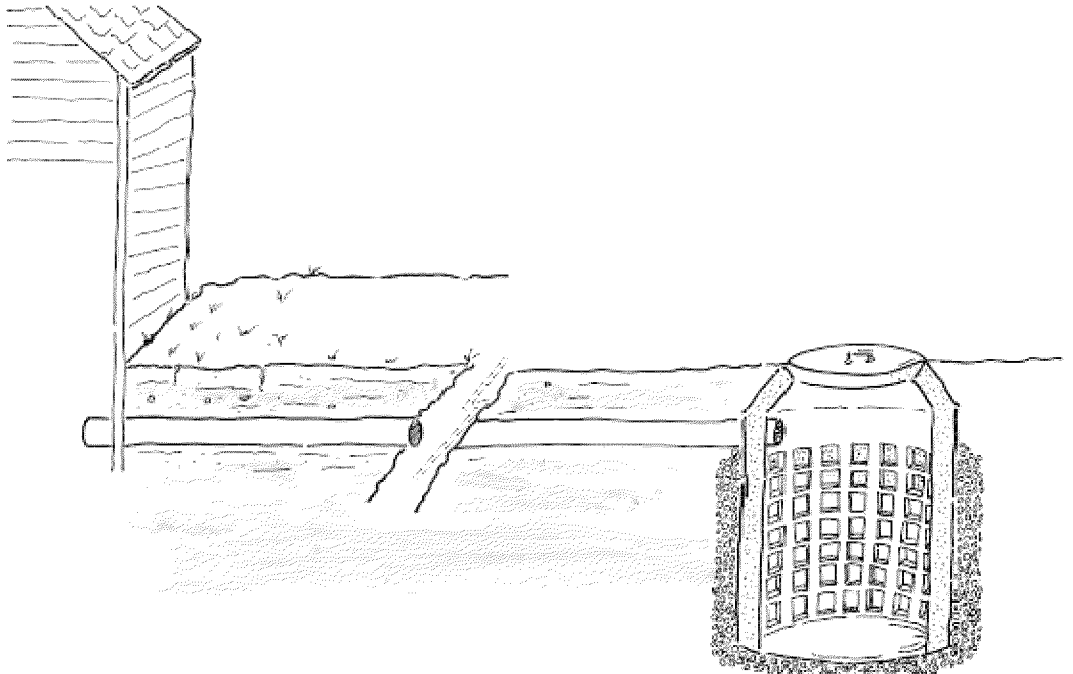


Diagram of Typical Cesspool

Cesspools were used frequently in the past, but have been prohibited for new homes in Pennsylvania for over 40 years due to a high risk for groundwater contamination. Many of the natural processes that “clean up” wastewater in a modern septic system do not occur with a cesspool.

Of particular concern is the depth where wastewater seeps into the soil. Most cesspools were constructed without regard for soil limitations which may affect groundwater quality. These limitations commonly include a high groundwater table or fractured

bedrock which may cause wastewater to flow through open channels directly to groundwater. Sewage which is discharged close to groundwater or fractured bedrock greatly increases the chance that groundwater may become contaminated. Sewage that seeps into the soil at the depths that are usually found in cesspools also does not get renovated by aerobic bacteria as much as would be the case with modern, shallower drain fields. Aerobic bacteria are naturally occurring microorganisms that live in an oxygen rich environment, and there's much more oxygen in shallow soil than there is in deeper soil.

A seepage pit is very similar to a cesspool in design, but wastewater flows first into a septic tank, and then into the seepage pit, which is a porous block or stone lined pit like a cesspool. The addition of a septic tank improves the quality of the wastewater that seeps into the ground, since septic tanks are designed to filter out solids and scum, as well as provide some microbial decomposition of sewage wastes. From an environmental standpoint, this type of sewage system is an improvement over a cesspool but still deficient with regard to current criteria. A seepage pit still has much greater potential for groundwater contamination than a modern drain field, since the wastewater seeps into the soil at depths that don't support the beneficial aerobic bacteria and which may be too close to groundwater and/or rock.

As with any existing septic system, cesspools and seepage pits are generally "grandfathered" from a regulatory standpoint. As long as sewage does not appear on the ground surface or back up into a dwelling, their use may generally continue. However, should a property served by these technologies exhibit any of these problems, repair will usually entail replacing the cesspool or seepage pit with a new sewage system that meets all current standards.

Although these designs work a little differently than more modern sewage systems, a similar level of maintenance is still required to help them last longer and minimize the threat of groundwater pollution.

Maintenance

Cesspools should be pumped out regularly to prevent excessive solids build-up and minimize clogging the soil pores in the area surrounding the cesspool. A pump-out every three years is required, consistent with general Pennsylvania standards and Franklin Township requirements for all types of on-lot sewage systems.

The septic tank for a seepage pit system should be regularly pumped out for the same reasons as any more modern septic system – the tank functions the same way.

All other maintenance recommendations for more modern sewage systems are also applicable to both cesspools and seepage pit systems, such as careful water usage, protecting the area of the sewage system from vehicular traffic, and not putting garbage or toxic chemicals down the drain. Please see other articles in this series for more detailed information about system pumping and maintenance activities.

Franklin Township On-Lot Sewage Management Program

Public Education Series #3:

How to Maintain Your On-Lot Sewage System

On-lot sewage systems can be an effective way to treat household wastewater, but also require some maintenance and oversight to avoid costly problems and help avoid polluting our environment. A summary of how typical on-lot sewage systems work and important system maintenance tips are presented below.

Basic On-lot Sewage System Function

As noted in another article in this series, entitled “What is an On-Lot Sewage System”, wastewater first flows into a treatment tank. In the tank, heavier 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 continue to break them down. The bacteria cannot completely digest all of the sludge and scum, 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 settle and separate. This can happen when water use is unusually high (laundry activities, for example), or if the septic tank is too small for the needs of the household. 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 wastewater. Solids damage the drainfield by clogging the small holes in the drainfield pipes, the surrounding gravel, and soil matrix. These are the primary reasons that water conservation awareness is important for any on-lot system owner.

How to Care for Your On-lot System

On-lot sewage system maintenance is often compared to automobile maintenance, as a little effort on a regular basis can save a lot of money and significantly prolong the life of the system.

Sound on-lot system operation and maintenance practices include conserving water, having an awareness of what is put down the drain, and scheduling regular pump-outs, as described more fully below.

1. Pump Your Tank Regularly

Pumping your treatment tank or septic tank is probably the single most important thing you can do to protect your on-lot system. If not pumped regularly, the buildup of solids in the tank

becomes excessive and they overflow to the drainfield. This will compromise the ability of the drainfield to function properly, and possibly lead to premature (and very expensive) failure. Consistent with guidelines in place throughout Pennsylvania, Franklin requires a standard three year pumping interval.

2. Use Water Wisely

Water conservation is very important for septic systems because continual saturation of the soil in the drainfield can affect its quality and ability to naturally remove toxins, bacteria, viruses, and other pollutants from the wastewater. The most effective way to conserve water around the house is to first repair any leaking faucets or running toilets, and use washing machines and dishwashers only when full.

In a typical household, most of the water used indoors is used in the bathroom, and there are a lot of 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 (aerators) on faucets and shower heads. These devices can reduce water use by up to 50 percent. Modern low-flush toilets use one to two gallons per flush compared to the three to five gallons used by older 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 (like laundry) over several days.

3. Know What Not To Flush

What you put into your septic system greatly affects its ability to do its job. As a general rule of thumb, do not dispose of anything in your sewage system that can just as easily be put in the trash. Remember that your system is not designed to be a garbage disposal, and that solids build up in the septic tank and eventually need to be pumped out.

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. Garbage disposals generally increase the amount of solids in the tank, and as a result can require more frequent pump-outs.

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, disposable diapers, kitty litter, or any inorganic materials. The only things that should be flushed down the toilet are wastewater and toilet paper.

4. Avoid Hazardous Chemicals

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, thinners, waste oil, photographic solutions, pesticides, and other organic chemicals can destroy helpful bacteria and the biological digestion taking place within your system. These chemicals also pollute the

groundwater. Some septic system additives that claim to help or clean your system also contain hazardous chemicals and should be avoided.

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 when possible.

To help prevent groundwater pollution, be sure to dispose of leftover hazardous chemicals by taking them to an approved hazardous waste collection center.

5. Have Your System Inspected

Regular sewage system inspections by a qualified contractor can help catch many small problems before they become big (and expensive) problems. Although such inspections are not mandatory in Franklin, hiring a qualified firm or individual to periodically inspect all your sewage system components can alert you to simple repairs or maintenance recommendations specific to your property which could prevent serious failures in the future. Many firms that are licensed to pump your treatment tank can also provide inspection services, and scheduling these things at the same time could save both time and money. As always, it's a wise idea to verify any contractor's qualifications through references and applicable licensing or certification. There is no required certification in Pennsylvania for private sewage system inspectors, but a voluntary certification program is in place through an organization called the Pennsylvania Septage Management Association. Information for this organization can be found on their web site at www.pasma.net.

6. Protect Your System

Finally, it is important to protect your septic system from potential damage. Don't plant anything but grass on or near your septic system. Roots from large shrubs and trees can cause damage. Grass is the most appropriate groundcover for the drainfield.

Don't allow anyone to drive or operate heavy machinery over any part of the system, and do not build or construct anything over the drainfield – these activities can crush piping, crack tanks, and compact the soil so it won't absorb wastewater as effectively.

One of the most important ways to protect your sewage system is to divert roof drains, surface water, and sump pumps away from the drainfield or treatment tank lid. Your drainfield area is already being asked to absorb more water than the rest of the yard – adding an extra load on top of this will cause it to function poorly, or fail altogether. If water is directed over the tank area, it can sometimes seep into small gaps around the lid opening or inspection port, and will then get into the tank and flow to the drainfield, again promoting system malfunction or failure.

Franklin Township On-lot Sewage Management Program
Public Education Series #4:
The Importance of Regular Pumping

All on-lot sewage systems require routine maintenance to keep working properly, protect the environment, and protect your bank account from preventable and expensive repairs.

The single most effective maintenance activity that can and should be performed on all on-lot sewage systems is the regular pumping of the treatment tank. This simple activity will remove the accumulated solids in the treatment tank, prevent solids from traveling out of the tank and damaging the drainfield, and allow the natural treatment processes in the tank to work as intended. Additional information regarding treatment tank pumping follows, to better explain why pumping your sewage system is usually a “win/win” situation for both the environment and your bank account.

How does regular tank pumping help?

The treatment tank treats the wastewater naturally by holding it in the tank long enough for solids and liquids to separate. The wastewater forms three layers inside the tank. Solids lighter than water (such as fats, oils, and greases) float to the top forming a layer of scum. Solids heavier than water settle at the bottom of the tank, forming a layer of sludge. This leaves a middle layer of partially clarified wastewater. The layers of sludge and scum remain in the septic tank where bacteria found naturally in the wastewater continue to break the solids down. The sludge and scum that cannot be broken down are retained in the tank and build up until it is pumped.

It is very important to remove these solids as they will eventually build up to the point that the tank no longer has enough liquid area to allow for adequate microbial activity or the settling out of solids and scum. Once this point is reached, suspended solids will pass through the tank to the drainfield, and the wastewater will not stay in the tank long enough for bacterial activity which helps break down some solids. Both of these consequences result in greater risk for groundwater contamination and premature failure of the drainfield. Since repairing or replacing a failing drainfield will cost significantly more money than regular treatment tank pumping, having your tank pumped regularly will save you money in the long run, and at the same time help protect the environment.

How often should I have my tank pumped?

The rate at which solids accumulate varies significantly based upon such things as how many people live in the house, whether or not a garbage disposal is used, and the size of the tank. The general guideline for determining when a pump-out should be conducted is whenever the solids and scum layers accumulate to 1/3 of the liquid depth of the tank. In lieu of constant monitoring of the depth of the solids, a maximum three year pumping interval has become the accepted standard in Pennsylvania, and is also the basis for Franklin Township’s program. If you have a very large family, an undersized tank, or

use a garbage disposal, the 3 year interval may need to be decreased to a more frequent schedule to avoid excessive solids build-up.

What else should I consider when having my system pumped?

All sewage pumpers/haulers in Chester County are required to be licensed by the Chester County Health Department. As a condition of maintaining this license, they are also required to enter a record for each sewage system they pump into an electronic database maintained by the County. Franklin Township may use this database to help track system pumping, generally eliminating the need for you to send receipts to the Township to provide proof of pump-out. Keep receipts for all pumping though – if your pumper does not enter this information in the County database, or if Franklin chooses to not use the County database, you are ultimately responsible and will need a receipt as documentation. Always make sure the pumper you hire is licensed by the County and records your system's pumping in the County database.

A list of licensed pumpers can be found on the County's web site at https://apps.chesco.org/reports/rwservlet?cchd&REPORT=WL_LWPS.rdf, or you may call the Health Department at (610) 344-6526 to obtain a copy.

There are several easy things a pumper can check while he's pumping your system which will help avoid problems in the future. Tank baffles should be inspected and, if necessary, repaired or replaced whenever a pump-out is conducted. The tank and tank lid should be checked for visible cracks or other structural defects, and repaired if needed. You should also ask your pumper to note the depth of your tank lid. Current regulations require that it be no more than 12 inches deep so that it's easy to get to for regular pumping. If yours is deeper than this, you may want to consider adding a "riser", or manhole extension, to save extra digging every three years. All these items require very little time or effort while the tank lid is opened and the tank is emptied out, and are required to be checked every time a tank is pumped out in Franklin Township.

Franklin Township On-lot Sewage Management Program
Public Education Series #5:
Septic System Additives

There are approximately 1,200 additive products on the market today, most of which claim to accelerate the natural processes in a treatment tank or even rejuvenate a clogged soil absorption system.

There are two distinct categories of additives used in a septic system: 1) chemical, which includes inorganic and organic compounds and 2) biological, which includes yeast, bacteria, and enzymes.

Over the past 40 years, there have been several studies conducted on septic tank additives; however, there is still some debate on their effectiveness. Part of the problem stems from the number of additives that are marketed and the lack of an established standard testing method for all additives.

It is important to understand that a homeowner does not need to add anything to an on-lot sewage system that is designed, operated, and properly maintained because naturally occurring bacteria are already present within typical household sewage. Contrary to popular belief and urban legend, items such as road kill or yeast do not need to be added to a septic tank.

Chemical additives, such as caustic hydroxides and sulfuric acid, should never be added to a septic system. Adding these products will destroy the bacterial population in the septic tank, possibly affect the permeability of the drainfield, and may cause groundwater contamination. Often, manufacturers of biological additives market their use to restore the bacterial balance in a septic tank on a monthly basis as part of a routine maintenance program.

Claims made on the effectiveness of additives to either eliminate pumping of a septic tank or restore permeability of the soil absorption system are unsubstantiated. ***No product will allow a homeowner to replace a regular septic tank pumping and maintenance schedule.***

Franklin Township On-lot Sewage Management Program
Public Education Series #6:
Guidance on Addressing System Malfunctions

Contrary to popular belief, many on-lot sewage system malfunctions can be prevented. There are a number of maintenance activities which will assist in providing the longest service life and proper function of any on-lot sewage system (previous articles in this series have been devoted to this subject, and should be referred to for more detailed information). Two of the most basic and effective preventative maintenance activities are regular treatment tank pumping and water conservation. Tank pumping removes accumulated solids and allows the natural treatment processes to work more effectively, which also helps prevent problems with other parts of the sewage system, most notably the drainfield. Water conservation is also important as it limits unnecessary loading on a system - even the best soils have a finite ability to absorb wastewater.

However, and despite a homeowner's best efforts, there may still arise various situations where an onlot system is not functioning satisfactorily. There can be a myriad of reasons for a sewage system problem, and consultation with a qualified contractor and/or the Chester County Health Department (CCHD) will be needed in most cases.

Two general principles are important to keep in mind when addressing any malfunction:

1. A problem involving sewage ponding on the surface of the ground is a serious environmental health hazard, as well as an illegal condition. Anytime a malfunction like this occurs the sewage system should be pumped out by a CCHD license sewage hauler and evaluated by a qualified contractor as soon as possible to protect the health of your family and your neighbors.
2. Problems associated with the soil absorption area (aka drainfield) are typically the most difficult and expensive to correct, so try to be sure that simpler and less expensive things like a clogged or broken pipe, plumbing problem, tank problem, or unequal distribution from a "d-box" are not causing the malfunction.

Steps to help guide a homeowner through the process of resolving a malfunction in more detail are presented below. Please note that these steps are just suggestions, and the method of addressing any particular problem will likely vary based upon the nature of the problem, homeowner knowledge of the sewage system, and timely consultation with a qualified contractor.

Step 1 – Identify the Problem

Most sewage system malfunctions can be described by one or more of several general symptoms. These symptoms, and some possible causes for each, are as follows:

Slow Drains or Wastewater Back-Up

- Plumbing problem inside house
- Clogged or crushed pipe in sewage system
- Clogged inlet baffle in treatment tank
- Treatment tank clogged with solids/scum build-up
- System hydraulically saturated

Odors

- Problem with house plumbing vent
- Tank or tank lid not structurally sound
- Broken piping
- System hydraulically saturated

Lush Green Grass Over Part of System

- Broken piping
- Tank leak or overflow
- Drainfield saturated

Wastewater Surfacing and/or Wet Spongy Area

- Broken piping
- Tank leak or overflow
- Drainfield saturated

Step 2 – Check Your Maintenance Records and Pump if Needed

If your sewage system has not been pumped regularly and recently, a simple call to a CCHD licensed sewage pumper to have your tank pumped out could help define the problem. When pumping a tank, most qualified contractors can easily check for poor flow into the tank (as may be caused by a clogged or damaged pipe or inlet baffle), excessive solids buildup which could be an indicator of possible drainfield problems, or even backflow into the tank in some extreme cases of drainfield saturation. Even if tank pumping and associated system checks fail to indicate the cause of a problem, in many cases pumping abates the immediate emergency by providing an empty tank as a storage reservoir for a few days until more investigation can be completed.

In the absence of needed tank pumping and associated system checks, a homeowner can proceed to step 3 for more troubleshooting.

Step 3 – Locate the Problem

To determine what part of your sewage system may be causing the problem, it's often helpful to first confirm where the tank and drainfield are located on your property. In

many cases, the permit that was issued by the CCHD for your sewage system can tell you where all the components are on your property, as well as the size and construction of each component. If you do not have this information in your records, permit copies for most newer systems (built in the last 20-30 years) can often be obtained directly from the CCHD for a fee. If no permit data is available for your property, you may need to contact a qualified sewage system contractor to help locate your sewage system components.

Once the location of your system components is known, you may be able to narrow down the possible causes of the problem. For example, if you have sewage ponding or surfacing, or an area of lush green grass, over the drainfield or tank you will know that one of these components could be the problem. If sewage is surfacing between the tank and house, or between the tank and drainfield, you could have a broken pipe or damaged distribution box.

Step 4 – Evaluate Recent Changes or Events

Have you recently added a sump pump, diverted a roof drain, or changed the surface water run-off on your yard in any way? These things could lead to a saturated drainfield if surface water has been allowed to get into the treatment tank or flow over the drainfield area. Any changes like this that could add to the hydraulic load on your sewage system should be corrected.

Have you recently moved into a house that previously had a smaller family, or added to the number of people living in your home? If so, the additional water usage could lead to failure of an older or poorly maintained sewage system. Your sewage system may also have not been designed to handle a particularly large family – a check of CCHD permit data can tell you the number of bedrooms (roughly equal to number of people) that your system was designed to accommodate. If your sewage system is undersized, you may want to discuss procedures for permitting a larger sewage system with the CCHD. Water conservation, fixing leaky fixtures, and installing low flow fixtures (always wise on-lot sewage system practices) may be crucial in dealing with an undersized system.

Have you had any work done recently that involved heavy equipment on your yard, or allowed anyone to drive a vehicle across your yard? Vehicles and heavy construction equipment can crack tanks, crush pipes, and damage a drainfield in some cases. Addressing these problems will almost always require the input of a qualified contractor and the CCHD.

Step 5 – Solve the Problem

Based upon the investigations conducted in the steps above, you should be able to identify or at least narrow down the cause of the malfunction. In many cases the experience of a qualified contractor may be needed to determine the precise cause, but in these cases the information a homeowner has gathered by considering the steps above could be vital to securing a timely diagnosis.

If you haven't already done so, always consult with the CCHD prior to repairing or replacing any part of your sewage system. If your tank or drainfield is the cause of the malfunction and needs to be replaced, a permit from CCHD is always required. Simpler repairs may or may not require a permit – always verify permit requirements directly with the CCHD, or make sure that your contractor has done this, before beginning any type of repair work.

In the case of a drainfield replacement, a permit will usually involve CCHD personnel evaluating soils on your property to see if they are suitable for a new drainfield. This evaluation typically consists of back-hoe excavations and detailed percolation testing requirements, usually requiring the skills and equipment of a qualified contractor.

As previously noted, a drainfield replacement can be very costly, and there may also be cases where a property doesn't have enough suitable area to install a new drainfield. Depending upon the severity of the problem, increased pumping in conjunction with water conservation may be a feasible solution in these cases.

For homeowners who find themselves with no feasible repair to a failing on-lot sewage system, frequent pumping and extreme water conservation may be the only solution. Homeowners in this condition may have to consider the installation of sewage holding tanks, which do not drain to a drainfield or absorption area but are instead designed to retain all sewage until it is pumped out. Holding tanks could provide longer intervals between pumping by providing larger storage capacity, mitigating costs and inconvenience in the long run, but this is generally the option of last resort in solving a sewage system malfunction.

Step 6 – Maintain Your Sewage System

After resolving a malfunction, and possibly incurring significant costs to do so, keep your sewage system properly maintained so that the next malfunction can be avoided!

For more information, please contact the following:

Chester County Health Department
Government Services Center
601 Westtown Road, Suite 288
West Chester, PA 19380-0990
610-344-6526
<http://dsf.chesco.org/health>

Pa. Dept. of Environmental Protection
Southeast Regional Office
2 East Main Street
Norristown, PA 19401
484-250-5970
<http://www.depweb.state.pa.us/watersupply>

Franklin Township On-lot Management Program
Public Education Series #7:
Permitting On-Lot Sewage Systems

Anyone who intends to modify, repair, or install an on-lot sewage system must follow these general guidelines:

1. The lot owner or consultant for the owner applies for a permit through the Chester County Health Department (CCHD) Sewage Enforcement Officer (SEO). Each municipality in Chester County has an assigned SEO; you may contact the CCHD at:

Chester County Health Department

Government Services Center

601 Westtown Road, Suite 288

West Chester, PA 19380-0990

Phone: 610-344-6526

<http://dsf.chesco.org/health> (click on “sewage and water”)

2. If the work involves installation of an absorption area, the CCHD SEO or a consultant working with the CCHD SEO, in coordination with the property owner or consultant for the property owner, evaluates soil profile examinations (deep probe test) and percolation tests to determine site suitability;
3. The lot owner and/or consultant then completes the permit application by including an onlot system design based upon the results of the site suitability testing;
4. The CCHD SEO approves or denies the permit within seven days of receipt of a completed application, or identifies the application to be incomplete and requests the missing information; and
5. If approved, the CCHD SEO issues a permit for the installation of the system. If denied, the SEO notifies the applicant and provides opportunity for an appeal hearing. Please note that denials are unusual – the CCHD will usually work with a homeowner to resolve any concerns before denying a permit application.
6. The CCHD SEO typically oversees the system installation and conducts a final inspection prior to the system repair or installation being backfilled with soil (covered).

What is an SEO and what are his/her duties?

Certified Sewage Enforcement Officers (SEOs) working for the Chester County Health Department are empowered by the Department of Environmental Protection (DEP) with administering the on-lot sewage system permitting process. In Chester County this includes the evaluation of soil profiles (deep probes), oversight of percolation tests, review of system design, issuance of permits,

inspection of system installations, and malfunction investigations. SEOs are certified by passing a State administered examination and are subject to continuing education requirements as well.

What is DEP's role in the permitting process?

DEP can review, monitor, and assist the Chester County Health Department's administration of the permitting process, although most permitting activity is usually handled entirely by the CCHD.

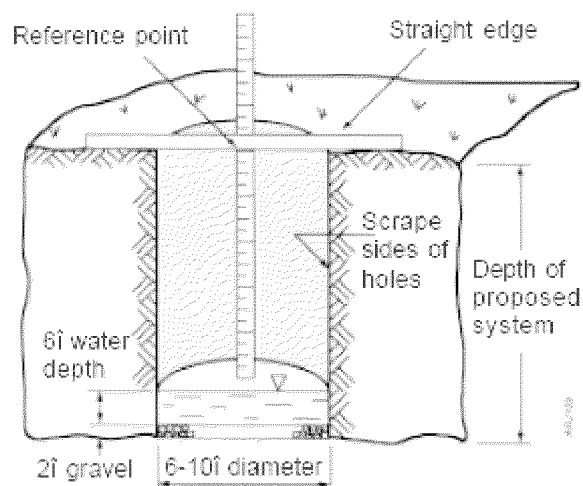
What is a deep probe test?

The first test in replacing an onlot system is typically a deep probe test, often called a "test pit". In this test, a backhoe pit is dug in order to determine the presence or absence of a "limiting zone". Limiting zones include, but are not limited to, a high water table and bedrock. This determination directly affects the location and type of septic system which may be allowed on the site, since Pennsylvania regulations require a certain amount of "good" soil between the bottom of any sewage system absorption area and any incidence of a water table or excessive rock. If sewage comes in contact with a water table, or rock with open fractures which could cause the sewage to move quickly downward to a water table, groundwater pollution can result.

What is a percolation test?

A percolation ("perc") test measures the rate at which water moves through soil. The test is to determine if the soil will allow water to drain quickly enough to support a properly working on-lot sewage system. The following is a summary of the process used to perform a percolation test:

1. A minimum of six holes are dug in the area of the proposed absorption field;
2. The soil is pre-soaked by pouring 12 inches of water in each hole 24 hours before the actual test to simulate saturated conditions;
3. The day of the test, a final pre-soak is conducted by pouring 6 inches of water in each hole for two periods of ½ hour each;
4. The actual test then begins with a series of measurements of water level drop done at 10 or 30 minute intervals, depending upon how quickly the water dropped during the final pre-soak. This test may take as long as four hours or as little as 40 minutes, depending upon the type of soil.



Typical Percolation Test Hole

There are many variations to on-lot sewage system design that may be appropriate for a particular property, depending on soil and site conditions. A few examples are:

1. Standard trench
2. Elevated sand mound
3. Seepage bed system
4. Individual residential spray irrigation system (IRSIS)
5. Subsurface sand filter

For more information on these variations, please contact your local CCHD SEO.

What if my lot conditions do not meet the requirements for a standard septic system?

Lot size, slope, and soil conditions can all affect how a new sewage system may be able to fit on your lot. If your particular lot conditions do not allow the installation of a standard septic system, some alternates may be available. The CCHD SEO or a qualified consultant can help find the best system for you depending on your specific site and soil conditions.

Where can I obtain more information on sewage-related questions?

For more information on onlot sewage disposal systems, contact the Chester County Health Department at the address above.

You may also visit DEP's Web site at <http://www.depweb.state.pa.us>, Keyword: "Wastewater", or contact the DEP office for our region at the address below.

Pennsylvania Department of Environmental Protection
Southeast Regional Office
2 E. Main St.
Norristown, PA 19401
Main Telephone: 484-250-5900
24-Hour Emergency: 484-250-5900
Counties Serviced: Bucks, Chester, Delaware, Montgomery and Philadelphia

Franklin Township On-lot Sewage Management Program

Public Education Series #8:

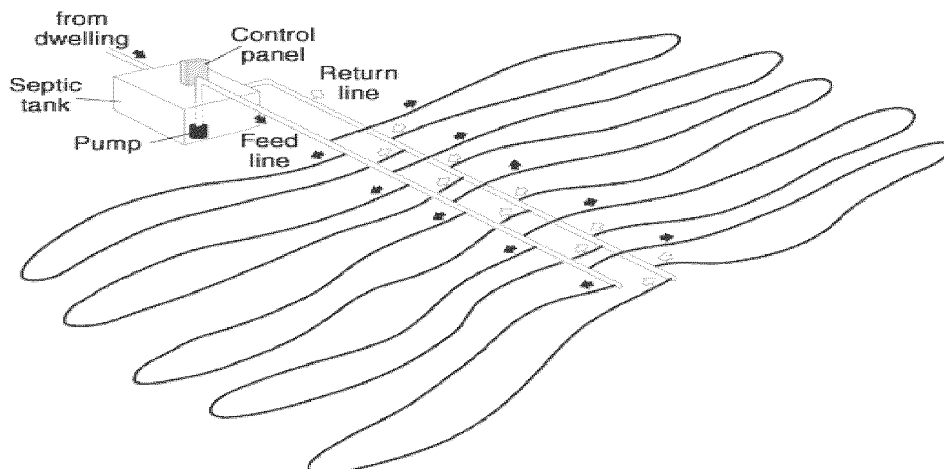
Alternate On-lot Sewage System Technologies

The type of on-lot sewage system which may be needed on any given lot is dependent upon many factors. Given the option, most homeowners would likely choose the least expensive system, while meeting the minimum regulatory criteria necessary for the site. However, ongoing efforts to overcome a wide variety of site constraints have resulted in new technologies for wastewater treatment. In Pennsylvania, the regulations contain specific criteria which apply to the use of these systems. Mostly, these “alternate” technologies, as they are referred to by Pennsylvania Department of Environmental Protection (DEP) regulations, require more intensive operation and maintenance efforts than a typical septic tank / drainfield system (i.e., “conventional” system). This is due to the fact that alternate systems typically employ more sophisticated treatment components, which are specially designed in order to overcome limitations such as poor soils, shallow bedrock, steep slopes, and limited space, among others.

DEP considers alternate systems as those which generally have a proven track record, but are not currently described in the regulations governing sewage treatment facilities. There is also a category for “experimental” systems, which are considered for the purpose of testing and observation. The use of any “experimental” system is highly regulated, and generally limited to the most severe situations, often in cases where no other feasible repair can be made for an existing house. A few of the more common alternate systems which have been approved for use in Pennsylvania are discussed below.

Drip Irrigation

This technology employs the use of small diameter flexible tubing to distribute effluent into the upper 12 inches of the soil at a controlled rate. Its primary advantage is applicability for sites that may otherwise require an elevated sand mound. In these cases, many homeowners prefer the buried drip tubing for aesthetic reasons. Other advantages include use on steeper slopes with marginal soils, and increased soil oxygen (due to shallow tubing depth) for more efficient renovation.

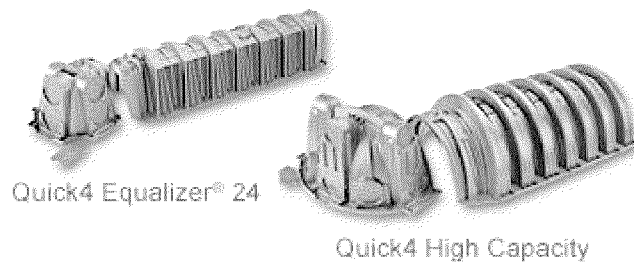


Schematic of Typical Drip Field Installation

Drip irrigation typically requires more advanced treatment technologies than a conventional septic tank. The advanced treatment component(s) and the drip irrigation itself often require regular maintenance oversight by a qualified contractor.

Leaching (“Graveless”) Chambers

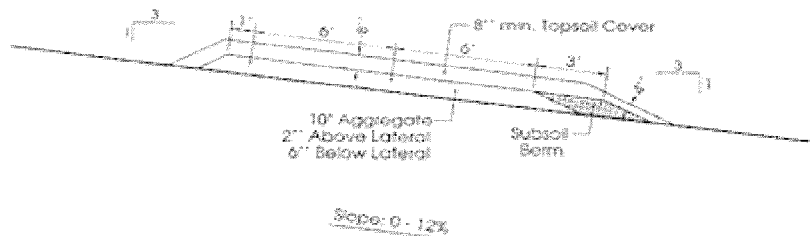
These chambers are sometimes installed in lieu of the traditional stone/gravel around piping in a drainfield. Instead of the wastewater being distributed to the soil by voids in the gravel or stone of a conventional drainfield, the chambers are connected in series and placed with the open face down to provide a large open area for wastewater to spread over the soil at the bottom of a drainfield excavation. Advantages include a possible reduction in the square footage of a drainfield and use for sites where access is difficult – the plastic chambers are much easier to transport than truckloads of stone.



At-Grade Absorption Areas

These are a variation on the conventional elevated sand mound system, whereby the use of a pre-treatment filter (sometimes a peat filter) can allow the elimination of the sand. Lowering the height of a sand mound, by eliminating the sand, can have both cost and aesthetic benefits.

A sloping at-grade, shown below, is a variation where the finished grade of the mound follows the existing grade.



Cross Section of Sloping At-grade

Peat Filters

A peat filter is typically an enclosed unit which contains specially harvested peat. Peat is the byproduct of the partial decomposition of organic matter, in an oxygen-poor environment. It contains an abundance of carbon, and is very effective in wastewater treatment. Peat filters are large tanks typically installed downstream of a treatment tank,

and before the disposal area, to “clean up” the wastewater more than a conventional system. Regular maintenance is crucial, as the peat typically must be replaced after a number of years for the filter to function correctly.

Additional Information

There are additional alternate systems which are approved for use in Pennsylvania, depending on the particular situation. DEP maintains the “Alternate Systems Guidance Document”, which is available on the DEP website (document number 362-0300-007) and describes these technologies and applications in depth.

Homeowners are advised of the necessity to conduct any and all on-lot permitting activities in close association with the Chester County Health Department Sewage Enforcement Officer (SEO) assigned to Franklin Township. The SEO can provide additional guidance on the need for any specific alternate technology.

For further information, you may contact:

Chester County Health Department

Government Services Center

601 Westtown Road, Suite 288

West Chester, PA 19380-0990

Phone: 610-344-6526

<http://dsf.chesco.org/health> (click on “sewage and water”)

Pennsylvania Department of Environmental Protection

Southeast Regional Office

2 East Main Street

Norristown, PA 19401

(484) 250-5900

<http://www.depweb.state.pa.us/watersupply>