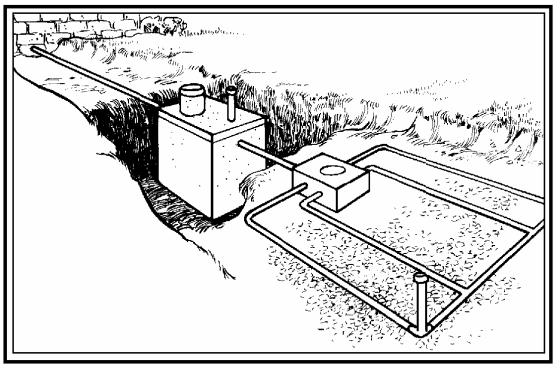
This OLDS HOUSE

Managing Your Malfunctioning On-lot Disposal System (OLDS)



Prepared by

York County Conservation District

In Partnership with

Penn State Cooperative Extension

York County Sewage Enforcement Officers

Conservation ♦ Stewardship ♦ Education

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PREFACE

With country living, comes responsibility...

Chances are that you have chosen to live in the country because you cherish the peace and quiet, the wide open spaces, and the beauty of nature. However, with this enjoyment and independence often comes responsibility. Most drinking water supply and sewage disposal in rural areas of York County is done on-lot. As a property owner, you are responsible for maintaining your drinking water well and septic systems. Understanding how they are built, work and how to keep them operating effectively and efficiently is good for your family's health, your household budget, and the environment. Replacing these systems can be expensive.

What you can do for failing septic systems...

If you own one of the thousands of septic systems in this county, someday you may have problems with it. Effluent (wastewater from the septic tank) may back up into your plumbing or pond on your lawn. Besides being unsightly, a nuisance, and the cause of health problems, failing systems are often difficult and costly to fix. This booklet describes two proven methods that may be effective in restoring failing septic systems: 1) water conservation and 2) absorption-area resting. While the initial cost of either method may be slightly greater than the cost of reconstructing a system, both methods have benefits that will, in the long run, save money.

A note about terminology

This publication is a collection of information from various sources. As a result, a variety of terms may be used to mean the same thing. For example, all the drains in your house are connected to a tank. Traditionally called a septic tank, it is also called a treatment tank. A septic system and an on-lot disposal system (OLDS) both refer to the collection of parts that is used to treat and release wastewater within your property. A glossary of terms used is provided at the end of this publication.

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1. We All Live Downstream

The Chesapeake Bay -- the largest estuary in the U.S. -- is an incredibly complex ecosystem that includes important habitats and food webs. The Bay itself, its rivers, wetlands, trees and land all provide homes, protection or food for complex groups of species. Fish of all types and sizes either live in the Bay and its tributaries or they use the waters as they migrate along the East Coast. Young crabs hide from predators in underwater grasses, while oysters filter water as they feed on plankton. The intertwined combinations of relationships are countless.

Water Quality

All living things need water. In the Chesapeake Bay region, waterways support more than 3,000 species of plants and animals. Healthy water contains a balanced amount of nutrients and normal fluctuations in salinity and temperature. It also has plenty of oxygen and little sediment so that underwater living resources can breathe or receive enough sunlight to grow. Monitoring the changes to the Bay's waterways is important, and the data that is collected can help scientists make determinations about water quality.

Water quality factors:

- *Nutrients* are essential for plants and animals, but too much can cause harmful effects.
- *Sediments* can cloud the water which can hamper the growth of aquatic plants.
- *Water temperature* affects when animals and plants feed, reproduce, and migrate.
- *Salinity* greatly determines where plants and animals live within the Bay.
- *Dissolved oxygen* is essential for animals living within the Bay.
- *Chemical contaminants* can affect the growth, survival and reproducibility of benthic organisms.

Land and People

More than 64,000 square-miles of land drains into creeks, streams, rivers and, eventually, the Chesapeake Bay. The Bay watershed includes all types of land uses, from intensely urban areas, spread out suburban development and diverse agricultural practices. Human activities on the land within the Bay watershed affect the quality of the Chesapeake's water.

There are countless opportunities to improve local waterways and the Chesapeake Bay by improving the way we use the land.

Watersheds

A watershed is the total land area that drains water into a given river, lake, estuary or other body of water. A watershed can be quite large (figure 1. the Chesapeake Bay watershed) or small (e.g., the watershed of a local stream).

The Chesapeake Bay watershed, stretches across six states - New York, Pennsylvania, Maryland, Delaware, Virginia and West Virginia - and the District of Columbia. Threading through the Bay watershed are several "subwatersheds," smaller systems that drain into the streams and rivers that flow into the Chesapeake.

Figure 1. Chesapeake Bay Watershed

What's the Problem?

To survive, the Chesapeake Bay and its rivers must endure an array of assaults from air, water and land. The watershed's worst problem is nutrient pollution, which is caused by the overabundance of the nutrients, nitrogen and phosphorus. Other problems are related to toxic chemicals, air

pollution and landscape changes, along with sedimentation and the over-harvesting of living resources.

What Are Nutrients?

Nutrients, like nitrogen and phosphorus, occur naturally in water, soil and air. Just as the nitrogen and phosphorus in fertilizer aids the growth of agricultural crops, both nutrients are vital to the growth of plants within the Bay and rivers.

How are nitrogen and phosphorous used in the ecosystem?

Nitrogen is essential to the production of plant and animal tissue. It is used primarily by plants and animals to synthesize protein. Nitrogen enters the ecosystem in several chemical forms and also occurs in other dissolved or particulate forms, such as tissues of living and dead organisms.

Some bacteria and blue-green algae can extract nitrogen gas from the atmosphere and transform it into organic nitrogen compounds. This process, called nitrogen fixation, cycles nitrogen between organic and inorganic components. Other bacteria release nitrogen gas back into the atmosphere as part of their normal metabolism in a process called de-nitrification.

Phosphorus is another key nutrient in the Bay's ecosystem. Phosphorus occurs in dissolved organic and inorganic forms, often attached to particles of sediment. This nutrient is a vital component in the process of converting sunlight into usable energy forms for the production of food and fiber. It is also essential to cellular growth and reproduction for organisms such as phytoplankton and bacteria. Phosphates, the inorganic form are preferred, but organisms will use other forms of phosphorus when phosphates are unavailable.

In the presence of oxygen, high concentrations of phosphates in the water will combine with suspended particles. These particles eventually settle to the Bay bottom and are temporarily removed from the cycling process. Phosphates often become long-term constituents of the bottom sediments. Phosphorus compounds in the Bay generally occur in greater concentrations in less saline areas, such as the upper part of the Bay and tributaries. Overall, phosphorus concentrations vary more in the summer than winter

How can nutrients become pollutants to the Bay and its rivers?

Although nutrients are essential to all plant life within the Bay, an excess of these same nutrients can be harmful. This is called "nutrient pollution".

Nutrients have always existed in the Bay, but not at the present excessive concentrations. When the Bay was surrounded primarily by forest and wetlands, very little nitrogen and phosphorus ran off the land into the water. Most of it was absorbed or held in place by the natural vegetation. Today, much of the forests and wetlands have been replaced by farms, cities, and suburbs. As the use of the land has changed and the watershed's population has grown, the amount of nutrients entering the Bay's water has increased tremendously.

Excess amounts of phosphorus and nitrogen cause rapid growth of phytoplankton, creating dense populations, or blooms. These blooms become so dense that they reduce the amount of sunlight available to submerged aquatic vegetation (SAV). Without suffice light, plants cannot photosynthesize and produce the food they need to survive. The loss of sunlight can kill the grasses. Algae may also grow directly on the surface of SAV. Unconsumed algae will ultimately sink and be decomposed by bacteria in a process that depletes bottom waters of oxygen. Like humans, most aquatic species require oxygen. When oxygen in deep water is depleted, fish and other species will die unless they move to other areas of suitable habitat.

What are the Sources of Nutrients?

The main causes of the Bay's poor water quality and aquatic habitat loss are elevated levels of two nutrients, nitrogen and phosphorous. These nutrients occur naturally in soil, animal waste, plant material, and even the atmosphere. In addition to these natural sources, sewage treatment plants, industries, vehicle exhaust, acid rain, and runoff from agricultural, residential and urban areas contribute nutrients to the Chesapeake Bay and its rivers.

Virtually all individuals and industries in the watershed, and some even beyond the watershed, contribute the nutrients that ultimately reach the Bay. In the Bay region, excess nutrients are supplied to the system through two sources: point and nonpoint sources (Figure 2).

Farmland

Urban Landscape

Wastewater Treatment Plant

Figure 2. Common Sources of Pollution

- *Point Source* - A source of pollution that can be attributed to a specific physical location; an identifiable, end of pipe "point". The vast majority of point source discharges for nutrients are from wastewater treatment plants, although some come from industries.
- *Nonpoint Source* - A diffuse source of pollution that cannot be attributed to a clearly identifiable, specific physical location or a defined discharge channel. This includes the nutrients that runoff the ground from any land use - croplands, feedlots, lawns, parking lots, streets, forests, etc. - and enter waterways. It also includes nutrients that enter through air pollution, through the groundwater, or from septic systems.

Recent observations indicate that:

- Nutrients from septic systems are increasing throughout the watershed as development spreads farther into the countryside, beyond the reach of sewer systems.
- Stormwater runoff from urban and suburban areas is increasing as more land is developed.
- Nitrogen from wastewater treatment plants is declining in rivers where biological nutrient removal (BNR) technology is being used. It is increasing in other rivers.
- Phosphorus from sewage treatment plants has declined sharply, in large part because of the phosphate detergent ban.
- Among the major land use categories, urban and suburban lands contribute, per acre, the largest amount of nutrients to the Bay when septic and wastewater treatment plant discharges are factored in.

- Runoff from farms is generally declining as farmers adopt nutrient management and runoff control techniques, and because the overall amount of farmland is declining.

Chesapeake Bay Restoration

In the mid-1970's, U.S. Senator Charles Mathias (R-MD) saw the Bay of his youth in distress and began a fact-finding tour of marine science institutions around the Bay to try to understand the Chesapeake's decline. His efforts eventually resulted in formation of the Chesapeake Bay Program - a multi-jurisdictional partnership that's working successfully to restore and protect the Bay and its resources. Since the Bay Program's inception, the federal and state partners have met many goals and worked toward others in the effort to restore the Bay.

Get Involved

Besides plants, fish, animals and other living resources, humans also are part of the Chesapeake Bay's ecosystem. Although a single individual may think he or she has very little effect on the Bay with more than 15.1 million people living in the Chesapeake Bay watershed, people have a very significant impact on the Chesapeake Bay ecosystem.

So whether you are an on-lot disposal system homeowner, local government official, or realtor, YOU can make a difference.

2. What Homeowners Should Know

How do I obtain a septic system permit?

Anyone who intends to install a septic system with a flow of less than 10,000 gallons per day must obtain a permit using the following generalized process:

1. The lot owner or an agent for the owner applies for a permit through the local agency* Sewage Enforcement Officer (SEO);
2. The SEO for the local agency conducts soil profile examination and percolation tests to determine site suitability;
3. The lot owner or agent completes the permit application by including a septic system design based upon the results of the site suitability testing;
4. The SEO approves or denies the permit within seven days of receipt of a completed application; and
5. If approved, the SEO issues a permit. Installation of a system may begin. If denied, the SEO notifies the applicant and provides opportunity for an appeal hearing.
6. The SEO may oversee any step of installation and must inspect the completed system before coverage.

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

Certified Sewage Enforcement Officers (SEOs) working for local governing bodies handle the septic system permitting process. This includes the review of soil profiles (deep probes) and percolation tests and the issuance of permits.

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 septic system. The following process is 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 soaked before the actual test to reproduce wet season operation;
3. The day of the test, a final soaking is completed for one hour; and

The actual test then begins with a series of measurements of water level drop done at 10 or 30 minute intervals. This test may take as long as four hours or as little as 40 minutes, depending upon the type of soil. (Very sandy soils usually take less time to test than soils with a lot of clay.)

It is very important to realize that although the effluent from a septic or aerobic tank is partially treated, it still contains substances that can affect the groundwater, such as viruses, pathogens and

nitrates. The soil is a critical component of an efficiently running system. Regular maintenance of the system also is necessary to ensure long-term operation.

What is DEP's role in the permitting process?

The Department of Environmental Protection (DEP) can review, monitor and assist a local agency's administration of the permitting process.

For more information on these variations, please contact your local SEO (Appendix A).

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

If your particular lot conditions do not allow the installation of a standard septic system, some alternates may be available. Your local SEO can help find the best system for you depending on your specific site, soil and operational conditions.

Where can I obtain more information on septic related questions?

For more information on on-lot sewage disposal systems, contact your local SEO or the DEP regional office serving your county.

3. Where and how should septic system malfunctions be reported?

Complaints about malfunctioning septic systems should be reported directly to the local agency, SEO or the local government officials (township, borough or city officials) with jurisdiction in the municipality where the malfunction exists. Depending on each municipality's rules and procedures, complaints may have to be made in writing. Complaints received by DEP's service representatives will be directed to the appropriate local agency and/or SEO.

What should happen once a complaint is received?

When a certified SEO or local official receives a complaint, the local government should take certain steps, including:

- Local official may issue a letter notifying the property owner of the alleged malfunction and allowing for voluntary compliance if a malfunction exists. Some local agencies bypass this step and first require the certified SEO to conduct an initial site investigation to document the conditions. If there is a malfunction, the SEO will try to determine the causes of the malfunction and to decide the extent of the repair needed to correct the problem. Corrective action may be as simple as requiring a septic tank to be cleaned or as complex as installing a new system at a new location.
- Local agency issues a Notice of Violation to the responsible property owner requiring the submission of a sewage permit application for the proper system repair. The local agency can often persuade the responsible property owner to take appropriate corrective action. If the responsible property owner fails to voluntarily take proper corrective action, the local agency and SEO should take appropriate legal actions, generally with the assistance of the municipal solicitor.
- SEO issues the responsible property owner a permit to repair or replace the malfunctioning system after any necessary site testing has been done and an acceptable system design has been submitted.
- Responsible property owner begins the repair/replacement activities as approved by the permit. Heavy rains or frozen soils could delay the repair/replacement activities until conditions improve.

What should the person making a complaint expect from the local agency and SEO?

The local agency or SEO should acknowledge a complaint and investigate serious complaints in a timely fashion. Normally, the SEO should contact the owner of the alleged malfunction within one week of receiving the complaint. An actual site visit, if necessary, should be scheduled promptly.

The person making the complaint should not expect a final resolution of a serious malfunction to occur "overnight." The various steps to resolving a serious malfunction take time; investigating the

site, testing soils, processing the sewage permit application, designing the repair system and conducting the repair. Also, the timing of the field activities is dependent on the weather.

If legal action is required by the local agency to get the responsible property owner to resolve the serious malfunction, additional delays can be expected. Complainants need to give their local officials time to do the job.

What happens if the malfunction problem is not resolved?

If the responsible property owner fails to repair the malfunction, the person making the complaint should go back to the local agency and renew the complaint. That person also may wish to seek private legal assistance to help resolve the matter.

Controlling the Impact of Nitrogen on Drinking Water

DEP does not approve or disapprove permits for on-lot or small community on-lot subsurface disposal systems (treating less than 10,000 gal/day). This approval or disapproval power is given to the individual municipalities administering the provisions of Section 7 of the Pennsylvania Sewage Facilities Act. Any requirements for such safeguards as hydrogeologic studies must, therefore, be required as part of the Act 537 planning process over which DEP has approval power.

Pennsylvania does have principles to guide groundwater protection and remediation. DEP currently does not require any discharge limitations where subsurface sewage disposal systems are discharging to groundwater and groundwater nitrate concentrations are less than 5 ppm. Existing DEP regulations on subsurface disposal systems do not establish effluent limitations for specific types of sewage disposal systems. Effluent limitations for surface waters do not apply to subsurface discharges to groundwater.

The Environmental Protection Agency's drinking water regulations define the concentrations and chemical characteristic parameters that are harmful to public health. These regulations state that water containing nitrate nitrogen levels in excess of 10 ppm should not be used for drinking water. Further, nitrite nitrogen may not exceed 1 ppm. This regulation, when linked with the language of the Clean Streams Law which defines pollution in part as contamination that renders waters harmful to public health, thereby provides the basis for requiring hydro geologic studies.

The Act 537 planning process can be used to require site specific testing and hydrogeologic studies to determine the extent of groundwater contamination expected from subsurface systems. Such studies can also identify existing and potential water supplies that will be affected by nitrate nitrogen levels in excess of 10 ppm. The Act 537 Plan can require that the methods of preventing use of this water for drinking water purposes be evaluated. A method can be chosen and implemented, as part of the plan, to prevent creation of a public health hazard.

Evaluations of possible methods of prohibiting the present and potential use of contaminated groundwater within the mixing and buffer zones for drinking water purposes include:

1. Sewage Facilities Planning that limits the installation of treatment facilities in high nitrate nitrogen zones.
2. Land use zoning established by local government agencies which prohibits development using on-site wells in high nitrate nitrogen zones (this would eliminate drinking water use).
3. Use of alternative water supplies.

4. Deed restrictions, easements, or other legal mechanism limiting use of affected groundwater areas.
5. Ownership of all property impacted.

Act 537 Planning can also be used to require evaluation and implementation of groundwater monitoring activities which will detect nitrate nitrogen levels and movement outside the mixing zone defined by the hydrogeologic study. Such monitoring can be used to initiate action to stop nitrate nitrogen from reaching 10 ppm in drinking water supplies. The planning can require an evaluation of contingencies to stop such unpredicted contamination including:

- Abandonment of the on-lot system (replacement with another type of system, connection to public sewers).
- Adding Nitrate Nitrogen treatment components to the on-lot system.
- Groundwater diversion.
- Temporary water supply treatment in conjunction with 1, 2, or 3 above.

Financial Assistance

Low-cost financing for wastewater systems is available across the Commonwealth. In some parts of the Commonwealth, particularly rural areas, it may be more cost-effective for individual home owners to use their own on-lot sewage disposal systems rather than incur the high costs of constructing long collection lines to service widely scattered properties. As with larger systems, however, these individual on-lot sewage disposal systems may require improvement, repair or replacement to meet public health and environment standards.

Eligibility:

- All citizens of the Commonwealth, with limited exceptions. Detailed information eligibility requirements can be obtained from any of the agencies involved in the program by either sending in an information request form, or by calling the numbers listed at the end of this section. Alternatively, eligibility information can be obtained from a participating local lending institution or your local Sewage Enforcement Officer.
- Family Income must not exceed 150 percent of the statewide median household income, adjusted annually for inflation. The applicable maximum through December 31, 2005 is $66,776.
- All areas are eligible for project location unless a community wastewater collection and treatment system is either in place or will be constructed in the next five years.

Eligible Uses:

- Rehabilitation, improvement, repairs or replacement of an existing system located on a single family, owner occupied property which is the primary resident of the owner.
- Project costs may include construction fees and costs, permit fees, loan origination fees and legal fees.

Ineligible Uses:

- Construction may NOT begin on repair or replacement project before receiving approval of the loan. Projects will be ineligible for funding from this program if construction starts prior to approval.

Amounts:

- Loans up to a maximum of $25,000 at an interest rate of 1% annum.
- Loans must be secured through financial ability to repay loan must be demonstrated through credit worthiness.

Terms and Conditions:

- Loans must be secured by a mortgage on the borrower's home.
- The maximum term of a loan is twenty years and loaned repayment commences within sixty days after the date of loan closing.
- Loan must be immediately repaid in full if the property on which the project is located is either sold or transferred.
- Loan origination and servicing fees will be also charged in connection with a loan.
- A basic requirement of the program is that you keep your upgraded or new on-lot system in good repair, have it pumped out regularly and ensure that it does not malfunction and fail to adequately treat wastewater or cause a public health hazard. A pumping frequency schedule and reporting requirements will be included in your loan agreement.

For more information, contact PennVEST at 717-787-8138.

4. Understanding Holding Tanks

Over the years, the Department of Environmental Protection's (DEP) Sewage Facilities Planning staff has fielded many questions from concerned citizens, landowners, prospective homebuyers and developers about the use of holding tanks for sewage disposal. This fact sheet discusses many of the recurring concerns and questions about holding tanks.

What is a holding tank?

As defined in DEP regulations (Title 25, Pennsylvania Code, Section 73.1 available on-line at www.pacode.com), a holding tank is a tank, whether permanent or temporary, to which sewage is conveyed by a water carrying system. Further, it is a watertight receptacle that receives and retains sewage and is designed and constructed to facilitate ultimate disposal of sewage at another site.

Is that the same as a septic tank?

No, they are not the same. Figure 3 shows that holding tanks and septic tanks are very different structures. Again referring to Title 25, Pennsylvania Code, Section 73.1, a septic tank is a treatment tank that provides for anaerobic (oxygen poor conditions) decomposition of sewage prior to its discharge to an absorption area. This treatment function is the first of two major differences between a septic tank and a holding tank. Holding tanks do not treat sewage, they merely store sewage that will be treated at another location. The second difference is that septic tanks discharge partially treated sewage (called effluent) into the soil for final treatment through an outlet. Holding tanks have no such outlet.

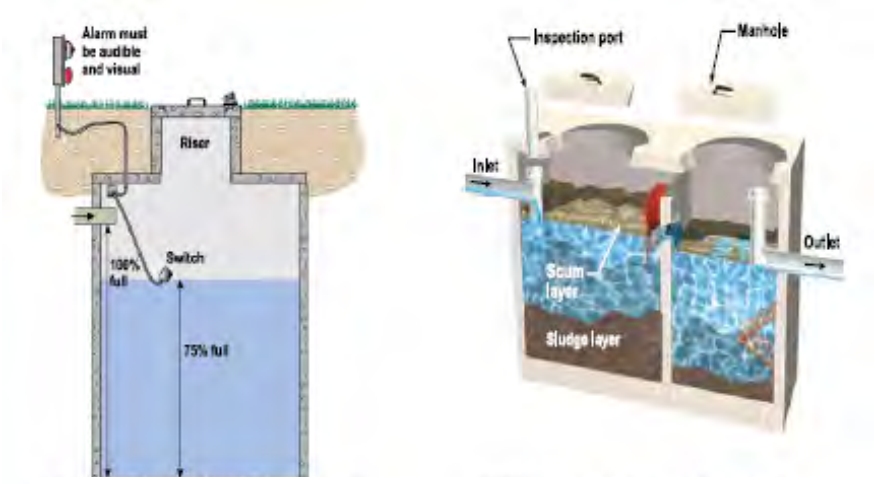

Figure 3. Comparison of Holding vs. Septic Tank

Are cesspools similar to either holding tanks or septic tanks?

Cesspools are not similar to either septic tanks or holding tanks. A cesspool is an outdated method of sewage disposal that is not permitted in modern regulations.

A cesspool may be described as an open, well-like structure, built of loose (without mortar) rock or building blocks, which are buried underground. Cesspools are not watertight and allow the sewage entering them to drain into the surrounding area. Constructed from the late 19th to the mid 20th centuries, these aging facilities can become unstable and dangerous. Figure 4 depicts a collapsed cesspool that previously served a single-family residence. Unlike septic tanks, cesspools provide very little treatment to sewage before releasing it to the environment and unlike holding tanks; cesspools do not retain sewage for treatment elsewhere.

Figure 4. Collapsed Cesspool

How is a holding tank cleaned?

The sewage in a holding tank must be periodically removed by a pump truck and taken to another permitted location for treatment. In Pennsylvania, the cost for this service varies with the volume of the tank, the difficulty in reaching the tank and the geographic location within the Commonwealth. An informal survey, conducted in 2001, revealed the cost of pumping an average sized tank ranged from $120 to $225 per service.

How quickly does a holding tank fill up?

How quickly a holding tank fills up depends on the size of the tank and the volume of sewage generated. The minimum capacity of a holding tank is established by DEP regulations (Title 25, Pennsylvania Code, Section 73.62), as 1,000 gallons or the volume equal to the quantity of waste generated in three days, whichever is greater. If a household generates 250 gallons per day (gpd) of sewage, a 1,000-gallon holding tank will overflow in four days.

How will I know when the holding tank is full?

Holding tanks are required to have a warning device, with an audio and visual signal, that will indicate when the tank is filled to 75 percent of its capacity. This warning should provide sufficient time for the owner to have the holding tank pumped out prior to it overflowing or backing up into the structure.

Wouldn't it be expensive to pump out a holding tank every three days to prevent it from overflowing?

Yes, it would become very expensive over time. On a 3-day pump schedule, over the course of just 1 year, the tank would be pumped 122 times. At even the lowest figure of $120 per pumping, it would cost $14,640 to dispose of this sewage for only 1 year. When compared to public sewer rates of $400 to $600 per year, clearly a holding tank represents the most expensive method of sewage disposal. It is for this reason that DEP discourages their use.

If they are expensive to service, why would anyone use a holding tank?

Holding tanks are most frequently installed to replace failed on-lot sewage disposal systems that cannot be repaired in any other fashion. As such, holding tanks represent a repair of last resort. Under certain circumstances, holding tanks may also be used in new construction. Holding tanks may be used with minor restrictions, to serve new institutional or commercial facilities generating sewage flows of less than 800 gpd and with greater restrictions, as temporary service for new residential facilities pending extension of public sewer service. Restrictions for the use of holding tanks are found in Title 25, Pennsylvania code, Section 71.63 (available on-line at www.pacode.com).

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5. Bonded Disposal Systems and Soil Mottling

This section addresses some commonly asked questions regarding the bonded sewage disposal system process described in Act 537, and in Title 25, Pennsylvania Code, Chapter 73 §73.77. This regulation, as well as others, may be found at www.pacode.com. If you choose the bonded disposal system process, the Bonded Disposal System Confirmation form (3800-FM-WSWM0148), while not required to be used, may be helpful. This form is available electronically on DEP's website at www.dep.state.pa.us, (Keyword: .DEP Wastewater). For more information on soils, soil mottling and on-lot sewage disposal, please see the section Understanding the Importance of Soils in Siting an On-lot System.

What is soil mottling and why is it important?

The Pennsylvania Sewage Facilities Act (Act 537) defines soil mottling (figure 5) as a soil color pattern consisting of patches of different color or shades of color interspersed with the dominant soil color which results from prolonged saturation of the soil. The presence of soil mottling is a strong indicator of a seasonal high or 'perched' water table (the water table's highest level reached during wet periods of the year). If the water table rises to within 24 inches of the soil's surface inside the absorption area of a septic system, then the soil depth necessary for proper sewage treatment will not be available because the soil will become saturated. In saturated soils, the oxygen needed for sewage treatment has been replaced by water. The bacteria necessary to treat the sewage need oxygen to survive. This condition can result in untreated or insufficiently treated sewage polluting the groundwater (often the only source of potable water), pooling on the surface of the ground and/or backing up into the house. Such conditions can pose a serious health hazard.

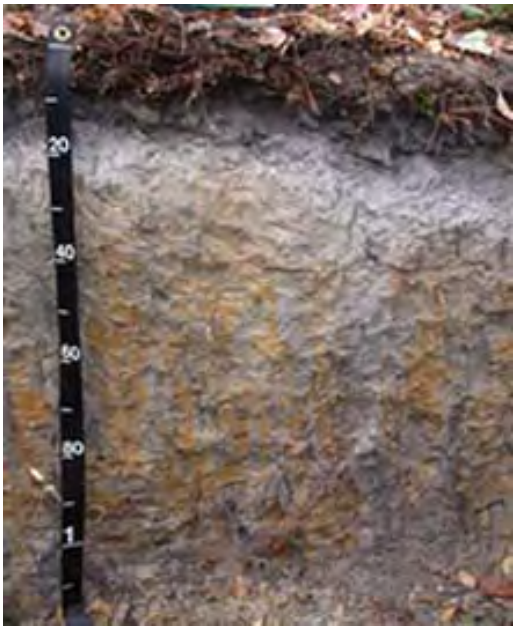

Figure 5. Hydric Soil with Mottling

If I have soil mottling on my lot, is there anything I can do?

There are rare instances when soil mottling is **NOT** the result of a seasonal or perched high water table. To determine if this is the case on an individual lot, Act 537 provides a procedure by which a property owner can have his lot tested when they detect soil mottling. If the testing procedure is used and demonstrates that the soil mottling is not the result of a seasonal or perched high water table, the property owner may be able to obtain a permit from the municipality or local agency to install a type of on-lot system called a **bonded disposal system**. The remainder of this section discusses the bonded disposal system application process.

Under what conditions the bonded disposal system process may be used?

The bonded disposal system process can be used if the **ONLY** reason a lot does not meet the requirements for the installation of an individual on-lot system are evidence of soil mottling that is **NOT** the result of a seasonal or perched high water table.

What is a bonded disposal system?

A bonded disposal system is an individual sewage disposal system serving a single family residence located on an individual lot where soil mottling exists within 20 inches of the mineral soil surface. The installation, operation and replacement of this type of system are guaranteed by the property owner through the posting of a bond. Please note that the individual residential spray irrigation system (IRSIS), a different type of system that can also be installed on soils having soil mottling within 20 inches of the mineral soil surface, is **NOT** included in this definition. A property owner whose lot has soil mottling within 20 inches of the surface may want to investigate the possibility of installing an IRSIS before proceeding with the bonded disposal system process.

How can I find out if the only reason my lot failed was the presence of soil mottling?

While the Sewage Enforcement Officer (SEO) must make several determinations on a given lot to evaluate its suitability for on-lot sewage disposal, most of these measurements should have been completed and found acceptable before conducting the soil profile evaluation that revealed the soil mottling.

The remaining test is called a **percolation**, or 'perc test'. This test is completed last because the depth of the holes used in the percolation test will depend upon the results of the soil profile evaluation.

The SEO uses the soil profile evaluation to determine the soil's depth to **limiting zone**. DEP regulations define a limiting zone as a soil horizon or condition in the soil profile or underlying strata which includes one of the following:

1. A seasonal high water table, whether perched or regional, determined by direct observation of the water table or indicated by soil mottling;
2. A rock with open joints, fracture or solution channels, or masses of loose rock fragments, including gravel, with insufficient fine soil to fill the voids between the fragments; and

3. A rock formation, other stratum or soil condition that is so slowly permeable that it effectively limits downward passage of effluent.

If the SEO examines the soil profile and finds any of the above three conditions within 20 inches of the mineral soil surface, the lot is deemed unsuitable for installation of an on-lot sewage disposal system. Normally, the percolation test is not scheduled and a permit for an on-lot sewage disposal system is denied. However, under the bonded disposal system process, if the lot failed due to the presence of soil mottling (case #1), the permit applicant can request that the percolation test be completed despite the results of the soil profile examination. The percolation test is required before a permit can be issued because the results of the test help determine the proper size and design of the on-lot system.

How do I go about requesting a percolation test?

A written request must be submitted to the local agency. If this procedure is followed, the local agency is required by law to conduct the percolation test, at the expense of the applicant.

A note of caution: Although the law says that the applicant's first step is to request a percolation test, it is advisable for the applicant to hire a soil consultant to re-evaluate the soil profile first for several reasons. First, it is almost impossible to know the depth at which to run the percolation test without knowing the correct depth to limiting zone. If the percolation test is completed at the wrong depth, it cannot be used in sizing the on-lot system and must be reconducted at the correct depth. Since the percolation test is generally the more expensive of the two tests, it is best to run it only once. Second, if the soils expert you hire agrees with the SEO's determination that the mottling is due to a perched or seasonal high water table, the on-lot disposal system will not work properly and there is no reason to run the percolation test. For these reasons, DEP suggests that the applicant have his/her soils expert examine the soil profile first. You must notify the local agency in writing at least seven days before any testing is conducted at your site, so that the local agency representative may observe the evaluations and/or review the results.

Who would be considered a qualified soils expert?

You can hire any qualified soil scientist, qualified registered professional geologist, certified sewage enforcement officer or qualified registered professional engineer to evaluate your soils, provided the person is not employed by the local agency with control over your property.

What do I do after my site has been evaluated by the soils expert?

If your expert determines that the original soil profile evaluation was accurate and that the soil mottling on your site displays evidence of a perched or seasonal high water table, you have the option of appealing the original permit denial to the local agency. You must file for this appeal within 30 days of the date of the permit denial. For more information, the Appealing a Local Agency Decision Under Act 537) section describes the appeal process in detail.

While it is unlikely in this case that the local agency's decision will be overturned, you can also work with your local agency SEO to investigate other possible sewage disposal options.

If, however, your expert finds that the mottling on your site is not an indication of a seasonal or perched high water table, and the expert is willing to put his or her findings in writing, you have two options:

1. You may choose to appeal the original permit denial, as described above. You may use your expert's soil profile appraisal, as well as any other available evidence, to argue for a reversal of the local agency's decision; or
2. You may request a permit to be issued by the local agency under the bonded disposal system procedure. In this option, you would pose a written request for the local agency to perform a percolation test based on the written findings of your soils expert. Your expert may actually conduct the percolation test as long as the local agency's SEO is present to observe the test. If the results of the test are unsuitable per DEP regulations, this demonstrates that the soil mottling present on the lot is not the only reason for the lot's unsuitability for on-lot sewage disposal.

The process stops at this point if the local agency cannot issue a permit for an individual residential on-lot disposal system that meets DEP regulatory standards (as required by law). If, however, the percolation test results fall within acceptable standards as defined in DEP regulations, Act 537 requires the local agency to issue a permit if all of the following requirements are met:

- The individual residential on-lot sewage system must be designed in accordance with DEP regulations. The property owner is required to obtain the design, which the local agency SEO will review to determine if it is in compliance with the Act and regulations.
- The property owner must provide, and the local agency must accept, evidence of financial assurance (bond) in an amount sufficient to cover the reasonably anticipated cost to repair or replace the on-lot system, clean up contaminated groundwater and replace any contaminated water supplies in the event of a system malfunction. The minimum amount the local agency may accept under the law is $20,000 or 15 percent of the appraised value of the lot and proposed house, annually, up to three years. At its discretion, the local agency may require an additional two years of financial assurance. The local agency must also establish the procedures to be followed if the financial assurances must be forfeited due to a system malfunction and/or the type of additional financial assurance required if the original system is replaced. By law, the local agency may offer, for a fee, financial assurance for bonded disposal systems. This is a choice of the individual agency; you should check with your local agency to see if they offer this option; and
- The property owner must document that the property deed contains a clause clearly stating the presence of soil mottling on the property and that an individual on-lot sewage system meeting the requirements of Section 7.2 of Act 537 was installed on the property.

Who is responsible for the local agency's costs incurred in review of my application?

The permit applicant must pay for any costs incurred by the local agency for review of the application. These costs can include those incurred for technical and legal review of the application, as well as consultant or legal fees for establishing the term or amount of the financial assurances and forfeiture procedures.

How long must I maintain the financial assurances?

The law requires the local agency to waive the financial assurance requirements five years after the date they were established.

Who is liable for the bonded disposal system in the event of a malfunction?

The law excuses the municipality, local agency SEO and DEP from liability for the performance of bonded disposal systems. The local agency that issued the permit for the system could be liable if it chose to offer the financial assurance itself. In this case, the local agency would only be liable for the amount established in the financial assurance agreement.

If the bonded disposal system malfunctions to the ground surface or pollutes the groundwater while the financial assurances are in effect, the financial assurances must be forfeited to the local agency. The funds must be used to correct the malfunction, clean up any contaminated groundwater and replace any contaminated water supplies. If the amount of the financial assurance is insufficient to cover these costs, the property owner is liable for any additional costs. If the system malfunctions after the financial assurances are waived by the local agency (three to five years following permitting of the system), the property owner is liable for the costs.

If I need additional information on this process, whom can I contact?

The local agency is solely responsible for administering the Act 537 permitting program. DEP recommends that you direct any specific questions to your local agency and/or SEO.

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6. Malfunctioning On-lot Sewage Disposal Systems

Under the Pennsylvania Sewage Facilities Act (Act 537 of 1966, as amended), local governments have substantial powers and primary responsibilities for administering and enforcing major portions of the Act 537 sewage facilities program. Among the many responsibilities:

- A municipal government (such as a township board of supervisors, borough council or city council) must develop and implement an approved official sewage facilities plan that addresses existing sewage disposal needs or problems, accounts for future land development and provides for future sewage disposal needs of the entire municipality. The official plan must be revised when new subdivisions are proposed or when the plan becomes outdated for various reasons.
- A local agency must handle the permitting program for the installation or repair of individual and community on-lot sewage disposal systems with a flow of 10,000 gallons or less each day. *The local agency, through its Sewage Enforcement Officer (SEO), must investigate complaints about malfunctioning on-lot systems and, if necessary, take enforcement actions to ensure proper repairs.*

This section provides information on the roles and responsibilities of local agencies and their SEOs in handling and resolving complaints about malfunctioning on-lot sewage disposal systems. (On-lot systems are more commonly referred to as septic systems.)

What is a Local Agency?

A local government that is able to administer its on-lot sewage disposal permit program is called a local agency. To qualify as a local agency, the local government must employ a certified Sewage Enforcement Officer (SEO) to perform activities including: 1) issue, deny or revoke septic system permits in accordance with state regulations and standards; 2) inspect newly installed systems to ensure proper installation; and 3) investigate and resolve septic system malfunction problems. The certified SEO is employed by and works for the local agency, not the PA Department of Environmental Protection (DEP).

Qualifying local agencies can be one of the following:

- A single municipality;
- A combination of municipalities acting jointly; or
- A county or joint-county Department of Health.

Local agencies, usually through their SEOs, are by law responsible for investigating complaints of malfunctioning septic systems and ensuring that the malfunctions are properly repaired. Where system repairs are not made voluntarily; local agencies must take enforcement actions against responsible property owners. (The local agency also is responsible for taking action against property owners with illegal septic systems that were installed without prior permit approval.)

What are DEP's roles and responsibilities for resolving malfunction problems?

DEP's role in the on-lot sewage disposal program is one of oversight. Under Act 537 and its regulations, the responsibility for investigating and resolving malfunction problems was explicitly given to local agencies, not to DEP. For that reason, DEP does not ordinarily get directly involved in matters that are strictly the responsibility of local agencies. DEP's responsibilities under the on-lot sewage program include:

- Training and providing technical assistance to SEOs and local agencies to ensure that they can effectively perform their activities;
- Routinely evaluating the performance of each certified SEO and each local agency. Appropriate action is taken where an evaluation reveals inadequate or inappropriate municipal or SEO response to complaints about system malfunctions or other violations of Act 537 or the rules and regulations; and
- Providing grants and reimbursements to local agencies and SEOs for permitting and enforcement activities which are consistent with Act 537 and DEP's rules and regulations.

While DEP will not ordinarily intervene in individual complaints, it is DEP's responsibility to take action where a pattern of unresponsiveness on the part of an SEO or municipality is observed. DEP action could include:

- The suspension or revocation of an SEO's certification;
- The withholding or reduction of a local agency's reimbursement for the administration of the program; and/or
- The issuance of a formal order to compel a local agency to adequately administer the program.

In addition to providing training and technical guidance to handle individual septic system problems, DEP works cooperatively with municipal governments to correct areas with multiple malfunctions. During the process of updating an official municipal plan, a schedule is developed either to provide comprehensive municipal repair and management of area-wide problems, or to construct community sewage collection and treatment systems to replace the failed septic systems.

7. Understanding the Importance of Soils in Siting an On-lot System

Why is having a properly functioning on lot system important?

Groundwater is the primary source of drinking water in areas served by individual and community wells; therefore, keeping the groundwater free of contamination is very important. Water that carries sewage from a household or business to an on-lot sewage disposal system (sometimes called a septic system) will eventually re-enter this same groundwater (figure 6). On-lot systems, when properly designed, operated and maintained, will treat this wastewater so that it may safely be used again. On-lot systems that are not functioning properly do not treat sewage to a level that is safe and can discharge improperly treated sewage to the surface of the ground and/or to groundwater. Improperly treated sewage carries bacteria and viruses known to cause many human diseases, such as gastroenteritis, diarrhea and dysentery.

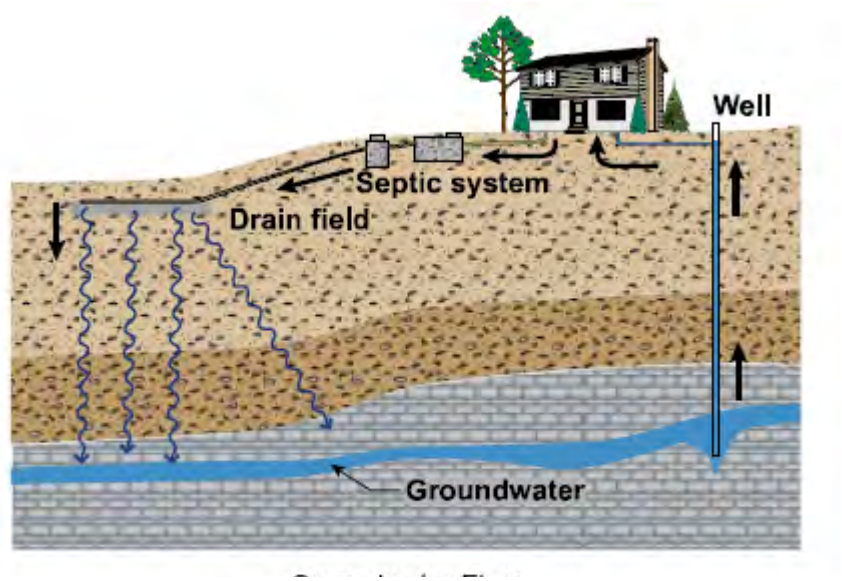

Figure 6. On-Lot Disposal System and Groundwater Flow

How does an on-lot system treat sewage?

The sewage from household plumbing first enters a treatment tank (figure 7), where primary treatment occurs. The heavier solid matter settles to the bottom of the tank, where microorganisms feed on and break down the waste. Lighter fats, oils and greases float to the top of the tank, forming a scum layer. Wastewater leaving the treatment tank is cleaner, but still contains disease causing bacteria and viruses, as well as other contaminants, which must be further treated before reaching groundwater or other water supplies.

From the treatment tank, the partially-treated sewage passes through a distribution system of piping and into a bed of gravel (aggregate). The sewage flows over the gravel and then into the underlying

soil. In a properly sited on-lot system, further treatment is provided by this soil. The soils are the most important part of your on-lot system because they provide a treatment barrier between untreated sewage and water supplies.

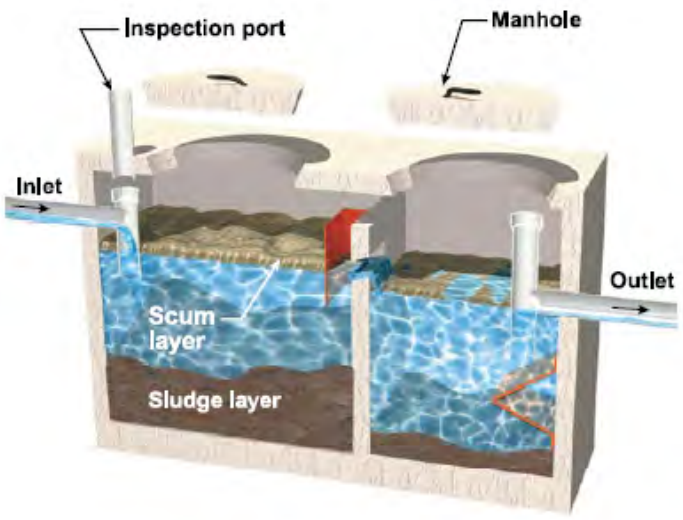

Figure 7. Typical Treatment Tank

What soil conditions are needed to treat sewage?

About four feet of suitable soil is needed under the gravel layer to treat sewage (figure 8). Good soil for sewage treatment is relatively free of rock and not saturated with water. The soil structure must allow the liquid waste to pass through at a suitable rate. The waste must pass slowly enough to allow the microorganisms time to feed on the harmful material, yet fast enough to dispose of the amount of liquid waste entering the absorption area. While soils rich in clay treat sewage most effectively, the fine pores of many of these soils slow the downward movement or percolation of sewage, which may cause backups to the surface of the ground. Soils rich in sand allow rapid percolation to dispose of sewage but do not hold the sewage long enough to treat it adequately before it reaches groundwater. Treatment continues in the soil until rock or soil saturated with liquid is encountered. Rock allows sewage to move quickly into groundwater without proper treatment. Saturated soils do not provide the aerobic (oxygen rich) conditions needed by microorganisms to treat sewage.

Partially treated sewage reaching either rock or saturated soils will enter the water supply. Any contaminants or disease-producing organisms present in the sewage will be in the glass of water you drink from your polluted well. Viruses can survive in groundwater in excess of one year.

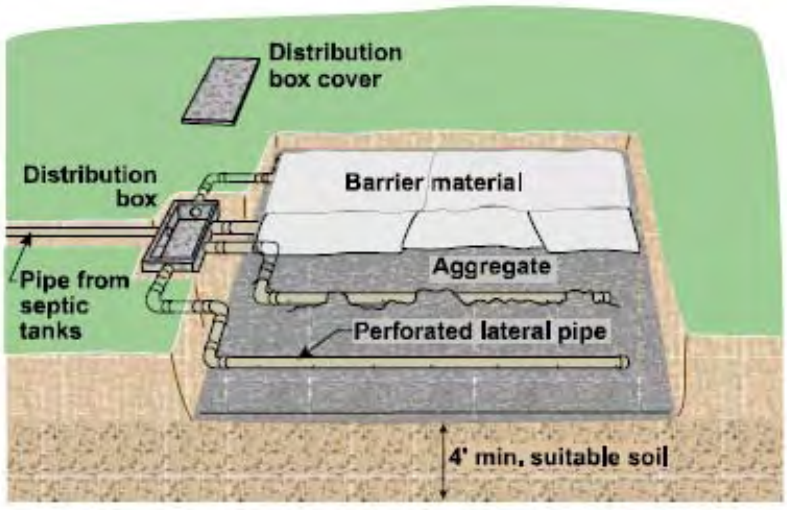

Figure 8. Soil Absorption Area

How do I know if my soils will properly treat sewage?

As part of the evaluation of a building lot to be served by a septic system, the sewage enforcement officer (SEO) employed by your local or county government evaluates soils by examining a soil profile. This is an excavation (commonly called a soil profile or deep probe) of the soil near the proposed location of the absorption area. The SEO enters the excavation to evaluate the soils texture, structure and color. The SEO also looks for signs of rock and saturated soils. A percolation test is performed to determine soil permeability (the rate of water movement through the soil). If the results of these soil tests show that the soils can properly treat sewage, a system may be installed. If there are problems with the soils, systems designed to overcome these soils limitations, such as an elevated sand mound, may have to be used. If the soils are unsuitable, no septic system may be installed. This is why it is important to have soils testing done before committing to the purchase of a building lot.

How does water move through the soil?

Rain and other sources of water move through the soil until the water reaches a barrier (called a limiting zone). In some cases, rock or tight layers of clay will slow down water movement and cause saturation of the soil above the barrier. During wet periods in the fall or spring, these water levels rise close to the surface of the soil. The closest the water table comes to the surface of the ground is called the seasonal high water table. In drier periods of the year, the water level drops. If the water table rises close to the surface within a septic system's absorption area, the soils will become saturated and cannot treat sewage. If the depth of this seasonal high water table is too close to the surface, the site may be unsuitable for any soil-dependent on-lot system.

If an SEO evaluates a soil profile during the wettest part of the year, water will usually fill the hole to the level of the seasonal high water table. At other times of the year, this water table may be below its highest level, and the SEO must look for other evidence of the highest level the water will

reach. The SEO looks for soil structure, signs of restrictive layers of soil, depth of root penetration and soil mottling.

What is soil mottling and why is it important?

Soil mottling is a contrasting or blotchy color pattern within the dominant soil color. It is formed when the seasonal high water table rises into aerobic soils changing the conditions in the soils from aerobic (oxygen rich) to anoxic (without oxygen). The types of bacteria that can live under these two conditions are different. Bacteria living under aerobic conditions die when the water table rises because the oxygen in the soil is replaced by water. Anoxic bacteria begin to thrive because they can use certain oxides (oxygen bonded to iron and manganese) in the soil to survive. When the bacteria use the oxygen bonded to the iron and manganese, these minerals change color and dissolve into the water around them. When the water level begins to drop, these dissolved minerals stick to the surface of soil particles as yellow, red, orange, brown, blue or black coatings or a combination of these colors. Areas from which all of these minerals were removed because of long saturation periods become gray in color (called soil gleying).

The SEO can use soil mottling and soil gleying as indicators of a seasonal high water table regardless of what time of year the soils are evaluated. Any sewage reaching this water table, without first passing through a minimum of four feet of suitable soil, will enter the water table improperly treated. In saturated soils caused by seasonal high water table, sewage often backs up onto the surface of the ground because the soil already contains all of the liquid it can absorb. Soil clogging also occurs in the absorption area as slime produced by anoxic bacteria accumulating in the soil, gravel and piping.

Is mottling the reason a site is not suitable for use of a septic system?

No. The reason a site would be found to be unsuitable for an on-lot system is that the mottling found at a specific depth documents that the seasonal high water table reaches that level. The seasonal high water table is the reason the site is unsuitable.

Are the colors of mottled soils and the amount of color the same in all soils?

No. Factors such as the length of time the soil is saturated each year, the original soil color, the amount of iron and manganese oxides in the soil, the amount of oxygen trapped in the soil during saturation periods, the soil temperature, and the types of bacterial populations in the soil all can influence the color and intensity of mottling in the soil.

Does the amount of mottling or the intensity of the color influence the SEO's decision regarding suitability of the lot for septic system use?

No. The tests for other factors that influence mottling are unreliable and complex. The SEO must make a decision regarding seasonal high water table based primarily on the presence or absence of a uniform depth of soil mottling or direct observation of water in the soil profile. This determination may be supported in some cases by additional information, such as the presence of

deeper restrictive layers of soil or rock which would cause the seasonal water table to rise in the soil.

Doesn't mottling only occur in clay soils in lowland areas or flat areas near streams where drainage is poor?

All soils containing manganese or iron oxides, even sandy soil or well drained soils, will produce mottling when saturated because of a seasonal high water table. While lowlands, flat areas and areas near streams commonly have mottled soils, many other areas, including uplands, hillsides, farmland and wooded land, may also have mottled soils. This is because the presence of restrictive layers in the soil is very common in this state. These restrictive layers, as discussed before, often cause seasonal high water tables and the accompanying mottled soils.

My property has a seasonal high water table, so I conducted a percolation test during dry weather. The percolation test passed. Does that mean that the system will work even though there is a seasonal high water table at a depth which makes the lot unsuitable for an on-lot system?

No. A percolation test conducted during dry weather may result in an average rate that falls within the acceptable range. This may occur when the water table has dropped below the depth of the percolation test holes. However, when the water table is high, saturated soils will be found closer to the surface. Saturated soils cannot treat sewage effluent.

What if I disagree with the SEO's evaluation of my soils?

A process has been established for the appeal of decisions made by an SEO and is discussed under the section Additional Information, "Appealing a Local Agency Decision under Act 537". An additional process specifically for disagreements regarding mottling is discussed under the Bonded Disposal Systems and Soil Mottling section.

8. Appealing a Local Agency Decision under Act 537

The **local agency** may be a municipality, a combination of municipalities acting cooperatively or jointly, a county, a county department of health or a joint county department of health that administers the provisions of the Pennsylvania Sewage Facilities Act (Act 537) on the local level. One of the administrative functions of the local agency is to review applications and issue permits for the installation of on-lot sewage disposal systems. The local agency official who reviews applications for on-lot sewage disposal system permits and issues the permits on behalf of the local agency is known as the **Sewage Enforcement Officer**, or SEO.

What permitting actions of the local agency are appealable?

If the local agency either issues or denies a permit for an on-lot sewage disposal system after review of a permit application, either of these actions would be appealable. The revocation of a previously issued permit also is an appealable action. However, a local agency finding that the application for an on-lot sewage disposal system permit is incomplete is not an appealable action.

Who may appeal a local agency permitting decision?

Anyone who disagrees with a local agency permitting decision may appeal that action. For example, neighboring property owners may appeal the issuance of a permit on an adjoining lot. If an application for a permit has been denied, the affected property owner may appeal the denial. If the local agency revokes a permit that it has previously issued, the affected property owner may appeal the revocation action.

How much time do I have to appeal a local agency permitting action?

The filing deadlines vary depending upon the action being appealed. A written appeal of the issuance or denial of a permit must be filed within 30 days of the action (issuance of the permit or receipt of the written notice of permit denial) or the right to a local agency hearing expires. In the case of a permit revocation, the appeal must be filed within 10 days of receipt of the written notice of revocation or the revocation action becomes final.

Where do I file an appeal of local agency permitting action?

The appeal must be filed with the local agency serving the area in which the permit was issued.

If I am opposed to the issuance of a permit, how will I know when the permit has been issued?

In order to know when a permit has been issued, you may request to be notified by the local agency. Alternatively, you may check for the posting of the permit on the lot. This is required prior to the start of construction of the on-lot sewage disposal system.

If I file an appeal of a permit issuance, must construction on the lot stop?

Appeal of an issued permit does not stop construction on the lot; therefore, the appeal should be filed as soon as possible following permit issuance.

If my permit is revoked and I file an appeal of the revocation, may I continue to construct my home or sewage system?

Appeal of a revocation does NOT allow construction on the lot to continue. No further construction or use of the sewage system or the structure it is to serve may occur until a new permit is issued.

How soon can I expect a hearing of my appeal to be held?

The local agency must hold a hearing within 30 days of receipt of an appeal. The local agency must inform both the appellant and DEP of the date, time and location of the hearing, and must be prepared to defend its actions during the course of this and any subsequent appeal.

How should I prepare for the hearing?

You should gather any evidence that is available to support your contention that the local agency action was unjustified. You should also make arrangements with any experts or witnesses that you may want to have testify at the hearing in support of your position.

What will happen at the hearing?

At the hearing, you will be given the opportunity to formally present the reasons that you think the local agency decision was unjustified. You may have experts or witnesses testify in support of your position, and submit evidence gathered by you or your expert(s). You also may question the SEO or any experts providing testimony or evidence for the local agency. The local agency, its SEO and experts, if any, also will be given the opportunity to present evidence and testimony in support of the local agency's position. After all evidence and testimony has been presented; the local agency will render its decision on the appeal.

How will I know what the local agency has decided?

The local agency will inform you of its decision in writing within a reasonable time, usually two to four weeks.

What are my options if the local agency does not find in my favor?

In the event of an unfavorable decision, you may choose to appeal the local agency's decision to the county Court of Common Pleas.

Whom should I contact if I want additional information regarding filing an appeal of a permitting action?

The local agency is solely responsible for appeals of permitting actions. You or your representative should contact the local agency for more information.

9. Alternative Systems

In some cases, when a lot does not qualify for a conventional on-lot disposal system, the lot owner may wish to consider an alternate system. There are a variety of alternate on-lot system types DEP has approved over the years that may be appropriate. This list is updated periodically and is available online at DEP's website (www.dep.state.pa.us), PA Keyword "Wastewater." Keep in mind; however, some lots just are not suitable for any type of disposal system due to inadequate soils, high water table, steep slopes, or other important factors.

Some alternate systems include:

- elevated sand mound bed on slopes between 12 and 15 percent
- non-infiltration, evapotranspiration bed contained within a greenhouse
- separation of blackwater/greywater sewage flows
- flow equalization (commercial only)
- subsurface sand filter (trenches)
- shallow absorption area with pressure distribution
- peat based filter systems
- leaching chambers
- at-grade bed systems
- the A/B soil system
- various recirculating sand filters

There are specific requirements that must be met when using an alternate system. Contact your SEO or DEP for information about these requirements.

DEP also has guidelines for the development and use of experimental systems. Successful experimental systems eventually may be accepted as alternate systems, making them available for use at other difficult sites.

Alternate systems and technologies have been determined to meet the criteria listed under Chapter 73, Section 73.72.

Policy, allows for the use of these systems when correcting a malfunction or making a repair of an existing system. It should also be noted that site suitability for these systems need not be considered as part of the suitability determinations performed under Chapter 71, Section 71.64(c)(1) (relating to site suitability for small flow treatment facilities). Where ranges are specified in the guidance, such as for slopes or percolation rates, these ranges are inclusive.

Alternate systems may be used to serve residential development or other facilities producing sewage having chemical characteristics typical of untreated domestic wastewater. Typical untreated domestic wastewater is defined as raw sewage effluent with composition within the following ranges: 12 - 50 mg/L ammonia as nitrogen, 8 - 35 mg/L organic nitrogen (20 - 85 mg/L total Kjeldahl nitrogen), 350 - 1200 mg/L total solids, 100 - 350 mg/L suspended solids and 110 - 400 mg/L

BOD5. (Source: Metcalf and Eddy. 1991. Typical Composition of Untreated Domestic Wastewater. Wastewater Engineering - Treatment, Disposal, Reuse, Third Edition, Page 109, Table 3-16.)

Alternate on-lot systems require proper operation and maintenance to assure adequate sewage treatment over the life of the system. Municipalities are required to assure proper operation and maintenance of the systems proposed for use within their borders in accordance with the provisions of Chapter 71, Subchapter E, titled .Sewage Management Programs.. All proposals submitted as alternate under Chapter 73, Section 73.72 of the regulations must document compliance with the appropriate regulatory requirements relating to sewage management. The operation and maintenance requirements for each technology are specified in the individual listings.

Under Chapter 72, Section 72.43(l), DEP may delegate the review of certain alternate sewage systems intended for single family residential use to Sewage Enforcement Officers (SEO) determined to be qualified by DEP to review the systems. Each alternate system listing describes the qualifications that must be met by an SEO to independently review that alternate system and issue a permit. If DEP review is necessary for a given technology, this is indicated in the individual description. DEP may also require review of proposals for systems not intended to serve single-family residential homes. The final determination on the issuance of an individual alternate permit is the sole responsibility of the local agency.

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Understanding the Importance of Soils in Siting an On-Lot System Fact Sheet, PADEP.

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GLOSSARY

You may come across the following words and terms in reference to on-lot disposal systems (septic systems), either in this document or elsewhere.

Absorption area—A component of an individual or community sewage system where liquid from a treatment tank seeps into the soil; it consists of an aggregate-filled area containing piping for the distribution of liquid and the soil or sand/soil combination located beneath the aggregate.

Act—The Pennsylvania Sewage Facilities Act (35 P. S. § § 750.1—750.20).

Aggregate—Coarse material manufactured from stone, gravel or slag, having Type B characteristics as described in Department of Transportation specifications, Form 408, section 703.3, Table B and uniform size and grading equivalent to American Association of State Highway and Transportation Officials No. 57, as described in Form 408, section 703.3, 2 Table C.

Agricultural areas—Areas used primarily for the production of crops and where the soil is without vegetative cover during certain periods of the year.

Alternate sewage system—a method of demonstrated on-lot sewage treatment and disposal not described in this part.

Bonded disposal system—an individual sewage system located on a single lot serving a single family residence, where soil mottling is within 20 inches of the mineral soil surface, the installation, operation and replacement of which is guaranteed by the property owner.

Building sewer—Piping carrying liquid wastes from a building to the treatment tank or holding tank.

Buried sand filter—a system of piping, sand media, aggregate and collection piping in a buried liner used for the intermittent filtration and biochemical treatment of sewage.

Clean Streams Law—the Clean Streams Law (35 P. S. § § 691.1—691.1001).

Conventional sewage system—a system employing the use of demonstrated on-lot sewage treatment and disposal technology in a manner specifically recognized by this chapter. The term does not include alternate or experimental sewage systems.

Dosing pump—the pump housed in a dosing tank which provides a measured volume of sewage effluent to the pressurized distribution system in an absorption area.

Experimental sewage system—a method of on-lot sewage treatment and disposal not described in this title which is proposed for the purpose of testing and observation.

Filter tank—the tank housing the piping and sand of the free access sand filter.

Forested areas—Areas where the predominant vegetative cover is comprised of trees with a closed canopy.

Free access sand filter—an accessible system of tanks, dose piping, sand media, aggregate and collection piping used for the intermittent filtration and biochemical treatment of sewage.

Geotextile—Material consisting of mesh polypropylene, polyester, nylon or similar material, used to prevent migration of fine aggregate into coarser aggregate.

Grassed area—an area where the predominant vegetative cover is comprised of grasses, bushes or trees not forming a closed canopy.

Individual residential spray irrigation system—An individual sewage system which serves a single dwelling and which treats and disposes of sewage using a system of piping, treatment tanks and soil renovation through spray irrigation.

Individual sewage system—A system of piping, tanks or other facilities serving a single lot and

collecting and disposing of sewage in whole or in part into the soil or into waters of this Commonwealth or by means of conveyance to another site for final disposal.

Industrial waste—A liquid, gaseous, radioactive, solid or other substance, which is not sewage, resulting from manufacturing or industry or other plant or works and mine drainage, silt, coal mine solids, rock, debris, dirt and clay from coal mines, coal collieries, breakers or other coal processing operations. The term includes substances whether or not generally characterized as waste.

Lift pump—a submersible pump used to convey effluent to the sand filter and from the sand filter to the chlorine/retention tank.

Municipality—A city, incorporated town, township, borough or home rule municipality other than a county.

NSF—National Sanitation Foundation.

Official plan—A comprehensive plan for the provision of adequate sewage systems adopted by a municipality possessing authority over the provision of the systems and submitted to and approved by the Department as provided by the act and Chapter 71 (relating to administration of sewage facilities program).

Person—The term includes an individual; association; public or private corporation for-profit or not-for-profit; partnership; firm; trust; estate; department; board; bureau or agency of the United States or the Commonwealth; political subdivision; municipality; district; authority; or other legal entity which is recognized by law as the subject of rights and duties. The term includes the members of an association, partnership or firm and the officers of a local agency or municipal, public or private corporation for-profit or not-for-profit.

Qualified registered professional engineer—a person registered to practice engineering in this Commonwealth who has experience in the characterization, classification, mapping and interpretation of soils as they relate to the function of on-lot sewage disposal systems.

Qualified registered professional geologist—a person registered to practice geology in this Commonwealth who has experience in the characterization, classification, mapping and interpretation of soils as they relate to the function of on-lot sewage disposal systems.

Qualified soil scientist—A person certified as a sewage enforcement officer and who has documented 2 years' experience in the characterization, classification, mapping and interpretation of soils as they relate to the function of on-lot sewage disposal systems and either a Bachelor of Science Degree in soils science from an accredited college or university or certification by the American Registry of Certified Professionals in Agronomy, Crops and Soils.

Retaining tank—a watertight receptacle which receives and retains sewage and is designed and constructed to facilitate ultimate disposal of the sewage at another site. The term includes the following:

(i) Chemical toilet. A permanent or portable nonflushing toilet using chemical treatment in the retaining tank for odor control.

(ii) Holding tank. A tank, whether permanent or temporary, to which sewage is conveyed by a water-carrying system.

(iii) Privy. A tank designed to receive sewage where water under pressure is not available.

(iv) Incinerating toilet. A device capable of reducing waste materials to ashes.

(v) Composting toilet. A device for holding and processing human and organic kitchen waste employing the process of biological degradation through the action of microorganisms to produce a stable, humus-like material.

(vi) Recycling toilet. A device in which the flushing medium is restored to a condition suitable for reuse in flushing.

Sewage—A substance that contains the waste products or excrement or other discharge from the bodies of human beings or animals; a substance harmful to the public health, to animal or aquatic life or to the use of water for domestic water supply or for recreation; or a substance which constitutes pollution under The Clean Streams Law.

Sewage enforcement officer (SEO)—An official of the local agency who reviews permit applications and sewage facilities planning modules and issues permits as authorized by the act and conducts the investigations and inspections that are necessary to implement the act and regulations thereunder.

Sewage facilities—A system of sewage collection, conveyance, treatment and disposal which will prevent the discharge of untreated or inadequately treated sewage or other waste into waters of this Commonwealth or otherwise provide for the safe and sanitary treatment and disposal of sewage or other waste. The term includes:

Individual sewage system—A system of piping, tanks or other facilities serving a single lot and collecting and disposing of sewage in whole or in part into the soil or into waters of this Commonwealth or by means of conveyance to another site for final disposal.

(A) Individual on-lot sewage system—An individual sewage system which uses a system of piping, tanks or other facilities for collecting, treating or disposing of sewage into a soil absorption area or spray field or by retention in a retaining tank.

(B) Individual sewerage system—an individual sewage system which uses a method of sewage collection, conveyance, treatment and disposal other than renovation in a soil absorption area, or retention in a retaining tank.

Community sewage system—A sewage facility, whether publicly or privately owned, for the collection of sewage from two or more lots, or two or more equivalent dwelling units and the treatment or disposal, or both, of the sewage on one or more of the lots or at another site.

(A) Community on-lot sewage system—A community sewage system which uses a system of piping, tanks or other facilities for collecting, treating and disposing of sewage into a soil absorption area or retaining tank.

(B) Community sewerage system—a publicly or privately owned community sewage system which uses a method of sewage collection, conveyance, treatment and disposal other than renovation in a soil absorption area, or retention in a retaining tank.

Small flow treatment facility—An individual or community sewerage system designed to adequately treat sewage flows not greater than 2,000 gpd for final disposal using a stream discharge or other methods approved by the Department.

Soil horizon—a layer of soil approximately parallel to the soil surface with characteristics produced by soil-forming processes.

Soil mottling (redoximorphic features)—a soil color pattern consisting of patches of different colors or shades of color interspersed with the dominant soil color which results from prolonged saturation of the soil.

Soil profile—the collection of soil horizons, including the natural organic layers on the surface.

Solids retainer—a deflection device at the outlet tee or baffle of a septic tank designed to deflect buoyed solids from escaping the tank.

Spray field—piping, spray heads and ground surface to the outside edges of the wetted perimeter, used for the application and treatment of the sewage effluent in an individual residential spray irrigation system.

Treatment tank—a water-tight tank designed to retain sewage long enough for satisfactory bacterial decomposition of the solids to take place. The term includes the following:

(i) Septic tank—A treatment tank that provides for anaerobic decomposition of sewage prior to its discharge to an absorption area.

(ii) Aerobic sewage treatment tank—a mechanically aerated treatment tank that provides aerobic biochemical stabilization of sewage prior to its discharge to an absorption area.

Undisturbed soil—Soil or soil profile, unaltered by removal or other man-induced changes, except for agricultural activities, that would adversely affect the siting or operation of on-lot systems.

Water of this Commonwealth—Rivers, streams, creeks, rivulets, impoundments, ditches, water courses, storm sewers, lakes, dammed water, ponds, springs and other bodies or channels of conveyance of surface and underground water, or any of their parts, whether natural or artificial within or on the boundaries of this Commonwealth.

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APPENDICES

A. Sewage Enforcement Officers of York County

B. Offices of Pennsylvania Department of Environmental Protection

C. Other Resource Contacts

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APPENDIX A – Sewage Enforcement Officers of York County

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York PA 17402-
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Clark Craumer - SEO#:01588
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William Deal - SEO#:01327
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WILLIAM FRALIC - SEO#:03603
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Jacobus PA 17407-1010

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Caliber Consulting LLC
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GEORGE MAUTE JR - SEO#:03481
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Susan Miller - SEO#:03252
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Fawn Grove PA 17321-9653
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Etters PA 17319-

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Ethan Poe - SEO#:01953
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(717) 843-2119

John Shambaugh - SEO#:01972
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Dillsburg PA 17019
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JASON SNYDER - SEO#:03427
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New Cumberland PA 17070
(717) 770-0100

Robert Whitmore - SEO#:02897
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York PA 17404
(717) 332-1525

Zane Williams - SEO#:02294
2464 Croll School Rd
York PA 17403-
(717) 741-4621

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APPENDIX B – Offices of Pennsylvania Department of Environmental Protection

Department of Environmental Protection

Bureau of Water Supply and Wastewater Management

Division of Wastewater Management

P.O. Box 8774

Harrisburg, PA 17105-8774

(717) 787-8184

South-central Region

909 Elmerton Ave.

Harrisburg, PA 17110

Main Telephone: 717-705-4700

24-Hour Emergency: 1-877-333-1940

Counties: Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry and York

For more information, visit DEP's website at www.dep.state.pa.us, Keyword: "DEP wastewater."

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APPENDIX C – Other Resource Contacts

Bradley D. Hengst, Sewage Enforcement Officer, Septic System Design & Inspection, 40 Water Street, Jacobus, PA 17407-1010. Phone: (717) 428-1188. Fax: (717) 428-0563

Thomas R. McCarty, Ph.D., Multi-County Agent, Penn State Cooperative Extension, 110 Claremont Road, Carlisle, PA 17013-8802. Phone: (717) 240-6500. Fax: (717) 240-6548. Internet: www.sfr.cas.psu.edu/water

Gary R. Peacock, Watershed Specialist, York County Conservation District, 118 Pleasant Acres Road, York, PA 17402. Phone: (717) 840-7430. Fax: (717) 755-0301. E-mail: yorkccd@yorkccd.org. Internet: www.yorkccd.org.

York County Conservation District

Who are we?

The York County Conservation District is the county government office that handles environmental concerns. The District was founded in 1938 when 554 farmers from 18 townships signed a petition. Since the beginning, the office has been citizen directed. Education has been consistently labeled as a priority area of focus.

The education office officially began in November 1996 although the District has been active in education programs for more than 15 years.

Our Mission

The York County Conservation District commits to being an innovative leader, assisting and educating the public to make the best choices for conserving and preserving our natural resources.

Contact Us

York County Conservation District

118 Pleasant Acres Road

York, PA 17402

Telephone: 717-840-7430

FAX: 717-755-0301

E-mail: yorkccd@yorkccd.org

Web: www.yorkccd.org