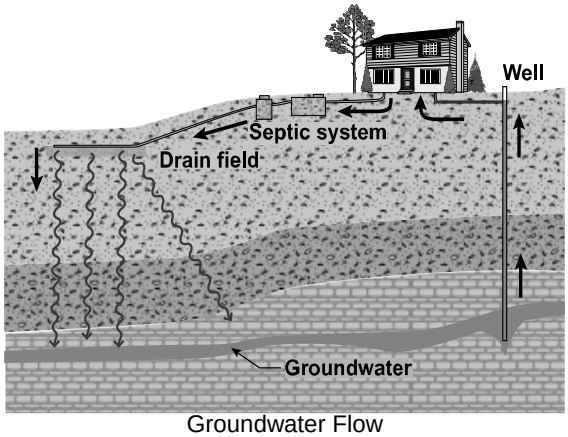
pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Act 537: Understanding the Importance of Soils in Siting an Onlot System

Why is having a properly functioning onlot system important?

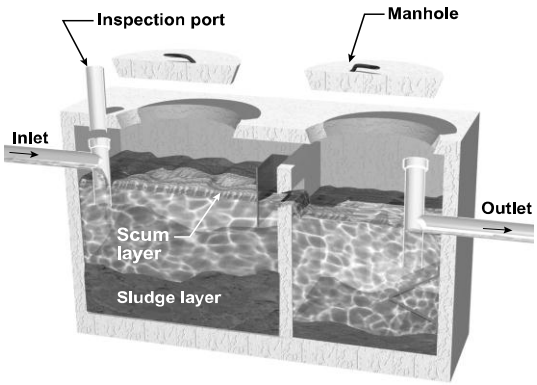
Because groundwater is the primary source of drinking water in areas served by individual and community wells, keeping the groundwater free of contamination is very important. Water that carries sewage from a household or business to an onlot sewage disposal system (sometimes called a septic system) will eventually re-enter this same groundwater. Onlot systems, when properly designed, operated and maintained, will treat this wastewater so that it may safely be used again. Onlot 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 or to groundwater. Improperly treated sewage carries bacteria and viruses known to cause many human diseases, such as gastroenteritis, diarrhea and dysentery.



Groundwater Flow
Onlot Sewage Disposal System

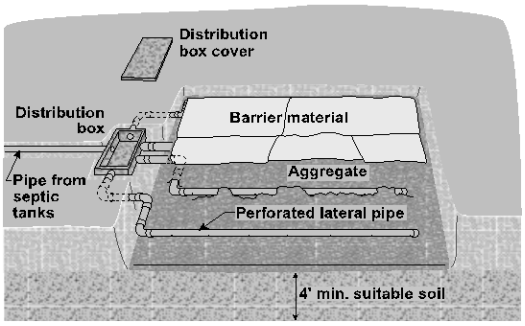
How does an onlot system treat sewage?

The sewage from household plumbing first enters a treatment tank, 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.



Treatment tank

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



Soil Absorption Area

What soil conditions are needed to treat sewage?

About four feet of suitable soil is needed under the gravel layer to treat sewage. 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 may 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. Saturated soils do not provide the aerobic (oxygen rich) environment needed by microorganisms to treat sewage. Fractures in rock allow sewage to move quickly into groundwater without proper treatment.

Partially treated sewage reaching either rock or saturated soils may enter a water supply. Any contaminants or disease-producing organisms present in the sewage may pollute your drinking water. Viruses can survive in groundwater for more than a year.

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 soil's 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 or media filter, 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.

For more information about soils and siting onlot systems, see the Department of Environmental Protection (DEP) fact sheet "Act 537: Soil Mottling and Siting an Onlot Sewage System" at www.dep.state.pa.us, keyword: Sewage.

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230 Chestnut St.
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