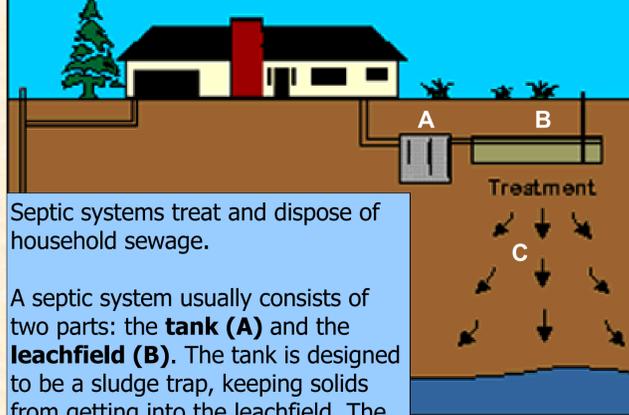


Sensitivity of Fractured Bedrock Aquifers to Septic System Effluent

In 2006 Ohio EPA conducted an investigation into the source of nitrate and bacterial contamination of private water supply wells. The study indicated that the most probable source of contamination is effluent from local septic systems with leachfields located too close to bedrock.

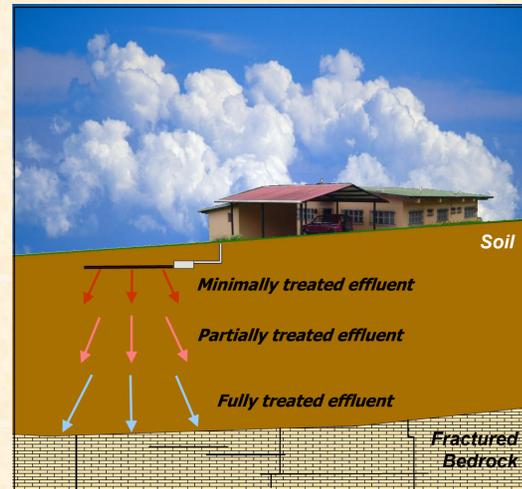
What is a septic system?



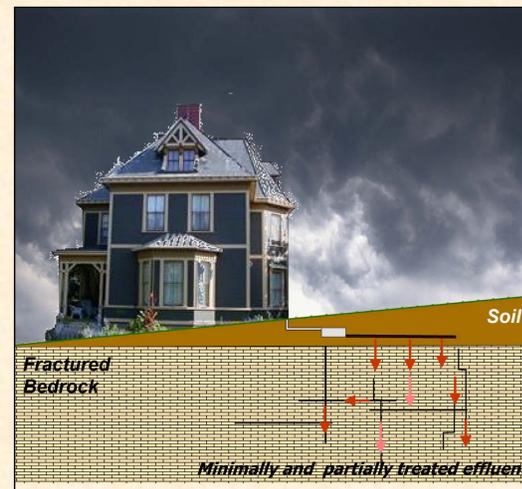
Septic systems treat and dispose of household sewage.

A septic system usually consists of two parts: the **tank (A)** and the **leachfield (B)**. The tank is designed to be a sludge trap, keeping solids from getting into the leachfield. The leachfield is built into the soil and uses the soil to treat and disperse wastewater.

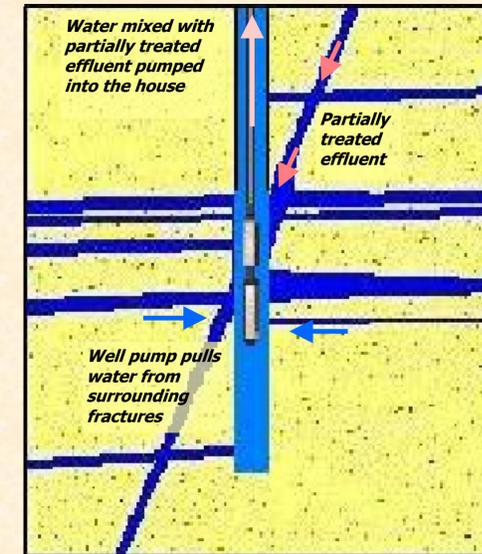
Effluent (C) is the liquid that drains from the leachfield into the soil. Effluent often contains nitrates, bacteria and viruses.



In a properly designed and constructed leachfield the soil treats the effluent and disperses the wastewater.



If the local soil is too permeable or the leachfield is too close to bedrock, effluent may flow into fractures before it is adequately cleaned. This partially treated effluent may enter ground water, contaminating the water supply.

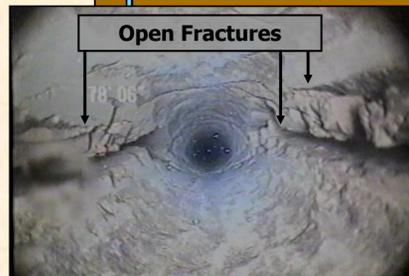
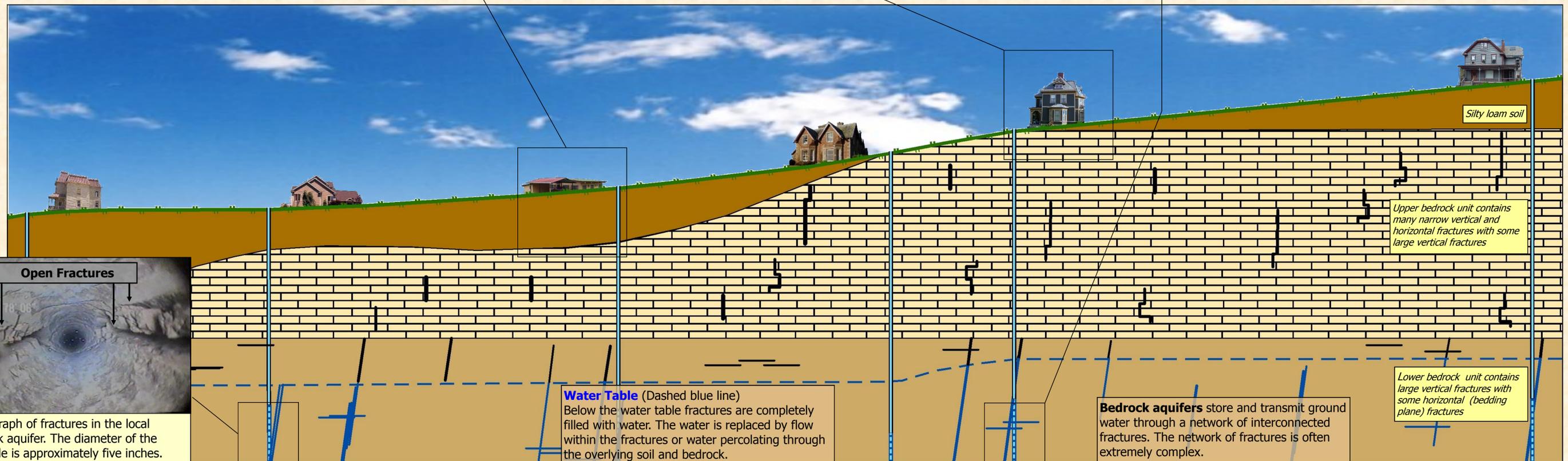


When incompletely treated effluent enters fractures in the bedrock it may be pumped, along with untainted water, into a home's water system.

Potential Health Effects of Drinking Water Contaminated with Septic System Waste

Incompletely treated effluent in the drinking water supply can carry disease-causing bacteria, viruses and parasites. Many of these micro-organisms can cause potentially **severe gastrointestinal illnesses**.

Incompletely treated effluent may contain nitrate. Excessive levels of nitrate in drinking water can produce **"Blue Baby" syndrome** in infants when nitrate-contaminated water was used to prepare formula and other baby foods.



Photograph of fractures in the local bedrock aquifer. The diameter of the borehole is approximately five inches. (Courtesy of the Ohio Department of Health)

Water Table (Dashed blue line)
Below the water table fractures are completely filled with water. The water is replaced by flow within the fractures or water percolating through the overlying soil and bedrock.

Bedrock aquifers store and transmit ground water through a network of interconnected fractures. The network of fractures is often extremely complex.

Lower bedrock unit contains large vertical fractures with some horizontal (bedding plane) fractures

Upper bedrock unit contains many narrow vertical and horizontal fractures with some large vertical fractures