WHAT IS A POWTS

The term POWTS did not become popular until about 30 years ago. Prior to that, the all-inclusive term, septic system, was used when discussing a wastewater treatment process in a rural non-centralized environment that generally put the wastewater into the soil. Until recently, POWTS were viewed as a temporary fix until sewers were installed. With the advancement in on-site treatment technology and the ever-increasing cost of large, centralized collection and treatment systems, POWTS are now being installed for long term use.

The term POWTS is now used when referring to rural, decentralized sanitary waste disposal. The acronym POWTS stands for a **P**rivate **O**n-site **W**astewater **T**reatment **S**ystem. Private meaning it is owned by an individual person or organization. On-site means the treatment process is conducted near or at the site of waste generation. Wastewater treatment means that the waste is treated and processed on site. POWTS do not include holding tanks, where the waste is held temporally before it is hauled away rather than treated on site.

First in a POWTS's treatment process is a septic tank. It is often referred as a pre-treatment process that removes solids. The tank is a solid tank with an inlet and outlet pipe. It also has an access hole (manhole), and a vent. The tank serves as a pre-treatment purpose that traps the solids, oils, and scum while allowing the effluent water to move on to the soil absorption treatment process.

Most conventional POWTS use gravity to move the wastewater effluent from the tank to the soil absorption System (SAS). Systems that use sand filters, mounds or activated sludge have a pumping chamber and a pump to move the effluent to these treatment process.

A POWTS's SAS is where the final treatment for removal of the dissolved and biological pollutants happens. It's uses the unique chemical, physical and biological properties of the soil to trap, reduce or convert these pollutants and allows the treated effluent to move into the groundwater. They can include trenches or beds and be at grade, below grade, or a mound. The SAS is the most important component of a POWTS and can be a dominate component to a POWTS's effectiveness.

LINN SANITARY DISTRICT
P.O. Box 454, Lake Geneva WI
262-275-6300 ext. 53

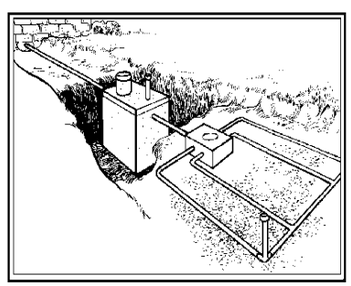
LINN SANITARY DISTRICT

P.O. Box 949
Lake Geneva, WI 53147
262-275-6300 ex.53
https://townoflinn.com/sanitary-district/

NEWSLETTER
Fall 2025

-POWTS components-
-An engineered system-
--Dirt or soil-

-FOR OUR HEALTH-
-AND GENEVA LAKE'S PROTECTION-



-------Some Ways to Protect POWTS---------

- Avoid compacting the soil of the absorption system.
- Avoid growing any deep-rooted plants around or near your soil absorption system.
- Be careful of what you put down your house drains.
- Pump your tank every three years (orange card notice).
- Keep the SAS vent pipe clear and unobstructed.
- Conserve water at all drains.

IS IT DIRT OR SOIL?

The use of the words soil and dirt have long been interchanged. To an ecologist there is a difference. To a soil scientist an even bigger difference. To a POWTS designer and soil tester there is a world of difference.

Dirt is what is found under the bed, on the floor or on used dishes or cloths. Soil is the delicate balance of inorganic and organic material that thinly covers this third rock from the sun making it habitable for life.

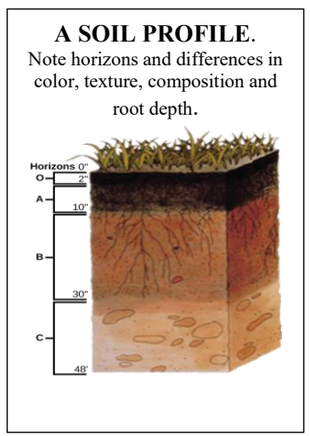
It is this delicate balance of organic material and inorganic material that makes soils a key component in a POWTS's treatment process of sanitary waste effluent. This soil, with its unique structure, texture, color, depth, and moisture makes soil one of nature's most interesting naturally engineered substances.

In designing a soil absorption system (SAS) of a POWTS, extensive assessment of the soil is needed to design the proper loading rate of the wastewater effluent to the soil for treatment and removal. The soil must not only move the effluent water away from the system, but it must be chemically and biologically treated by the soil before the water moves into the ground or surface water. It is important that a SAS breath to allow for evaporation and to supply oxygen to assist in the chemical and biological treatment process.

SOIL EVALUATION, ENGINEERING IN THE GROUND

Before the 1980's soil evaluation for its suitability for an absorption field was based primarily by a peculation test. A "perc" test was simply adding waster to a hole in the soil and recording how fast it moved into the soil. Evaluation of a soil's morphology is now used to calculate a soils suitability for wastewater treatment.

A detailed soil and site evaluation will define the type and size of SAS that can be used to treat and dispose the wastewater. The soil's infiltration, peculation and porosity dictate the wastewater effluent loading rates to the soil. Infiltration is the process of the effluent entering the soil. Peculation is the rate at which the effluent will move through the soil. Porosity is the air space between the soil particles and regulates infiltration and peculation. Sand has some of the highest porosity and clay has some of the lowest porosity. Moisture will move through sand fast and clay slow.



Identifying soil morphology involves recording a soil's horizons (layers)and their depths, sharpness of transitions between layers, a soil's colors (using Munsell color notation that identifies, hue, value and chroma), soil texture (% of sand, clay and silt), size and structure, (blocky, sub-angular, blocky, prismatic, columnar, platy, massive or single grain), particle cohesion, adhesion and structure strength.

The identification of these soil properties will give the soil evaluator a good understanding of the soil's ability to treat wastewater and allow it to move through the soil. This information will also allow for designing a system's loading rate which in turn tells the SAS's size.

Site evaluation identifies the lands, slope, exposure, proximity to surface water, wells, buildings and property lines. There must be separation from any limiting factor in the soil such as impervious clay layers, bedrock and wet subsoil and the bottom of the SAS's dispersal pipes.

A good site for treating wastewater would have a silty, clay, loam soil with firm, sub-angular blocky structure, well defined horizons, good root penetration and no signs of water saturation (mottling). The site would be relatively flat, large enough to meet set back requirement for buildings, slope, surface water, wells and property lines. Too much sand would allow the wastewater to move through the soil too fast and not allow for good wastewater treatment. Too much clay would inhabit wastewater movement through the soil.

When the soils of a site are not sufficient for a typical treatment system, additional processes can be designed into the system. Activated sludge treatment or sand filter can offer some pre-treatment of the wastewater before it is released to the SAS. Mounds and at-grades have been developed to address limiting factors in the soils.

Septic systems are no longer just a hole in the ground that wastewater is dumped into with the hope that it will go away. A POWTS is an engineered, multi-stage treatment process that is a fine balance between the wastewater, its loading and the soil.