



Obtaining Onlot Sewage Permits for Recreational Camps & Cabins



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Persons desiring an On Lot Sewage Permit for hunting, fishing, or summer camps and cottages have several options available to them.

It is a well observed fact that, over time and changing ownership, many seasonal facilities such as hunting and fishing camps evolve into year round residences. With this evolution in mind, state regulations require that even seasonal sites demonstrate the capability to support a sewage disposal system able to serve a full-time residence.

Therefore, sufficient site and soils testing must be conducted to identify and protect a location suitable for the installation of an onlot sewage disposal system to service a structure with indoor plumbing. In this way, seasonal and recreational cabins & cottages are prepared for long term use.

VAULT PRIVY (Outhouse)

The most requested type of Permit is for the construction of a privy or outhouse.

In cases where there is no indoor pressurized water system, there is also no piped wastewater, so there is no need for a septic system.



Structures served by a privy **MUST NOT BE SERVED BY WATER UNDER PRESSURE AND CAN NOT HAVE INDOOR PLUMBING FACILITIES. WATER MUST BE HAND CARRIED INTO AND OUT OF THE BUILDING.**

To obtain a Privy Permit for a vacant lot, the property must have areas that have been tested for suitable soils and have been approved for a conventional in-ground, sandmound, or an alternate type of sewage disposal system. There is an exception, and that is a lot which is larger than one acre and subdivided prior to 1972, (or if a privy previously existed on the lot)soils & perc. testing may not necessarily be required.

Complete soils' testing is required in almost all cases to obtain a Privy Permit. Although there is no minimum lot size, the proposed location of the privy must be located at least fifty feet (50') from the dwelling and fifty feet (50') from any springs, wells, or other surface water features and 10' from proper-

ty lines and other right-of-ways. Since the lot is required to have an approved location to site a conventional septic system (gravity bed or trench or sandmound) in the event that indoor water is someday proposed, most lots must be at least one (1) acre in size.

The privy structure is typically built on top of a 1000-gallon concrete septic tank and is pumped empty when the tank is 75% full. The cabin may not be served by indoor plumbing and water & wastewater pipes may not enter or exit the building.

Privy standards have changed over the years and an examination of the privies construction can reveal much information.

Modern privies are built above a watertight concrete vault. (A septic tank is often used as the vault) Many older substandard privies were simply constructed above a small hand dug pit into the ground.

The combination of a privy and an indoor water supply is not typically permitted under state law. Such a situation should cause a prospective buyer to ask questions about waste disposal.

Do not make the mistake of assuming that upgrading a pit privy to a holding tank is an available option - it is not. Most lots that utilize pit privies are too small to construct an septic system. Pit privies are routinely upgraded to vault privies, not holding tanks.

HOLDING TANKS

HOLDING TANKS ARE NOT PERMITTED FOR ANY RESIDENTIAL DWELLINGS, INCLUDING SEASONAL CAMPS & COTTAGES. (The only instance where a holding tank is used would be when a Privy is constructed on top of a septic tank as described above. Although this is not really a holding tank, the term "holding tank" is often used to describe a privy vault.)

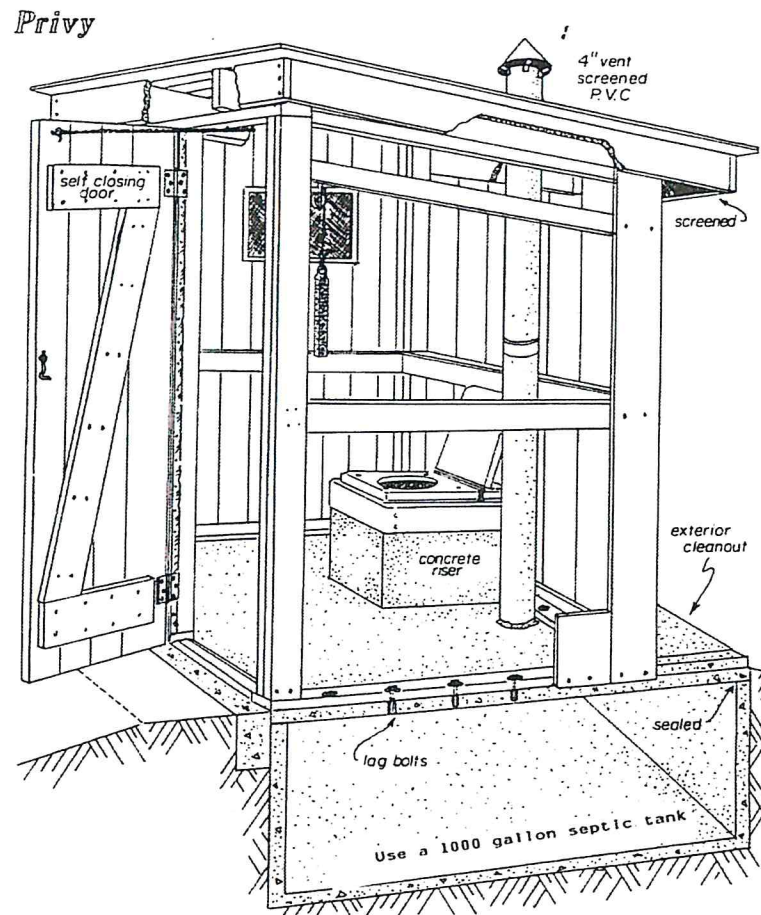
Modern regulations do not allow for long-term holding tank usage to residential type structures, including recreational hunting and fishing cabins & camps.

Generally speaking, cabins without indoor plumbing rely on privies for sanitary facilities while cabins with indoor plumbing facilities utilize onlot septic systems, not holding tanks.

INCINERATING & COMPOSTING TOILETS

Permits for incinerating and composting toilets have the same water and use restrictions as a Vault Privy. However, these devices are installed inside the dwelling and have the advantage of providing for an indoor facility.

Privy Construction Requirements*



Location:

- The Privy must be located so as to minimize any danger of contamination of ground or surface water. The Privy must be located downgrade and at least 50 feet from any source of water supply, streams, or other surface water, including wetland areas.
- The structure must not be located within 50-foot perimeter of any occupied building or structure.(maybe reduced to 10-feet in some instances)
- Consideration should be given to the direction of prevailing winds to reduce odor nuisances.

Construction:

- The superstructure must be constructed of durable and sustainable materials.
- A concrete holding tank, a septic tank, or other type of concrete constructed vault must be used to provide a vault large enough to accommodate several years' use. A 1000-gallon septic tank is recommended.
PLASTIC TANKS ARE PROHIBITED.
- The vault must be made water tight to prevent seepage to ground water.
- The vault must be equipped with a roof-venting stack that is screened to prevent entrance of insects.
- An exterior access cleanout must be provided to allow for pumping of the vault.
- The privy superstructure shall be insect proof, well ventilated, and fastened securely and solidly to the vault.
- The door should be self-closing and provided with weather stripping to make it insect proof.
- The seat and seat cover shall be constructed of smooth and easily cleanable materials.
- An earth mound must be constructed around the privy, or a surface water diversion ditch shall be constructed to prevent surface water from flooding end entering the vault.

* Referenced from 25 PA Code Chapter 73.63(a) (b)

Toilet Options: Composting

Composting toilets

A number of designs for composting toilets exist, but the process for waste treatment is basically the same in each of them. (See figure 2 for an example of a composting toilet system.) Human waste is biologically decomposed in a relatively moist environment by naturally occurring microorganisms. A typical system consists of a composting reactor tank or bin (sized according to frequency of use and number of users) connected to one or more waterless toilets in the house or other structure.

The reactor bin contains and controls the decomposition of excrement, toilet paper, and any organic (carbon-based) bulking agents. Bulking agents may include wood chips (other than cedar or redwood), straw, hay, or grain hulls. No liquid is added to the collected material inside the bin except for urine. This condition promotes the growth of aerobic (air-requiring) organisms that decompose the waste.

Temperature within the reactor also plays a role in composting. The process itself creates heat in the material being composted. High temperatures may inhibit growth of beneficial organisms, thereby slowing decomposition. Low temperatures (less than 41° F) may stop the composting process until temperatures increase enough for biological decomposition to resume. Composting activity is best between 78° F and 113° F.

An exhaust system (which is usually driven by a fan) vents odors, carbon dioxide, and moisture from the reactor bin to the outdoors. Air must also be drawn into the system so oxygen is available for growth of the aerobic organisms. Screening should tightly cover the exterior vent pipe opening to prevent flies and/or other insects from entering the composting system.

During the composting process, naturally occurring aerobic bacteria and fungi break down organic materials. Bulking agents need to consist of materials that break down quickly to avoid filling the bin with these substances.

Urine usually keeps the composting waste material moist enough—50 to 70 percent moisture is fine for thorough decomposition. But, decomposition nearly stops if the moisture level drops below 40 percent. To remedy an over-dry condition, some designs have a sprayer built in that draws liquid collected in the bottom of the reactor to rewet the pile.

As in any composting action, the decomposing material needs to be turned periodically to break up the mass. This action helps the pile to remain porous and aerated so that the aerobic organisms can accomplish their work.

A correctly sized and maintained composting toilet system produces a final material that is 10 to 30 percent of its original volume. The product that remains,

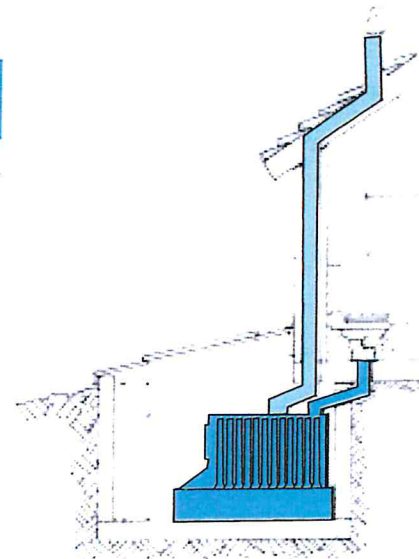


Figure 3. Residences without basements can have a composting reactor bin built in a water tight structure adjacent to the house beneath the ground's surface. *Clivus Multrum* illustration.

called “humus,” resembles soil, but legally must be either buried or removed by a licensed septage hauler, depending on state and local regulations.

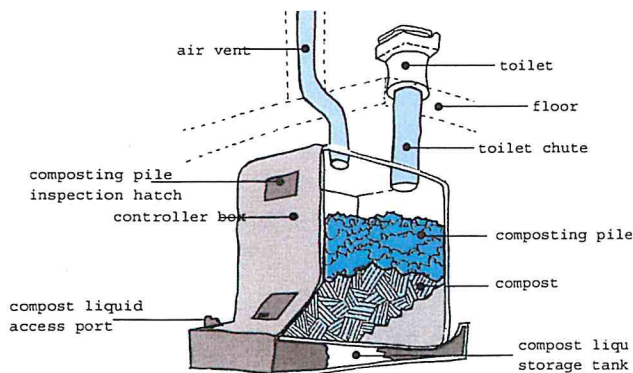
The composting bin and the toilet stool or seat can be constructed as a self-contained unit. (See figure 4.) Self-contained systems, because of their small size, are most suitable for vacation cottages or very small families. Daily residential use may overload these smaller toilet systems, so the consumer should consider purchasing a system with extra capacity.

Alternatively, composting toilets can be connected to a centralized tank reactor located in a basement of a home or built beneath the toilets, as in a public restroom. (See figure 3 for an example.) These larger composting reactors can be built with rotating drums, as mentioned earlier, to encourage waste decomposition. Or, they may be built with a sloped bottom where fresh wastes remain at the top of the slope as the bottom of the pile ages. Heat and a fan-powered exhaust system help remove excess moisture and speed the composting process in some models.

The composted end-product can be produced in either a single-chambered, continuous process or in multi-chamber batch units. A continuous composting system has a single chamber for con-

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Figure 2. A typical single-chambered composting toilet system. *Illustration based on the Clivus Multrum system.*



Alternative Toilets



Figure 4. A self-contained composting toilet unit. The composting bin is located under and behind the toilet seat. Photo courtesy of BioLet U.S.A.

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taining the waste material, which is added to the top of the unit, and the finished compost is removed from the bottom.

A batch composter has at least two chambers. When one chamber is filled, the waste stored inside is left to break down, and the system is switched to use the other chamber. These systems segregate the older waste material from fresh material, thus reducing the risk of finding living disease organisms (pathogens) in the finished compost.

Composting systems may also have active or passive reactor bins. Passive systems use a simple, moldering or crumbling process, whereby the waste material accumulates and decomposes without added heat, electric fans, or mechanical mixing. Active systems may have any or all of the following features: automatic mixers, pile-leveling devices, tumbling drums, thermostatically controlled heaters, and fans.

Advantages:

- Composting toilets do not require water

- for flushing, thereby reducing household water consumption.
- They reduce the amount and strength of wastewater to be disposed of onsite.
- They are well suited for remote sites where conventional onsite systems are not feasible.
- They have low power consumption.
- Composting toilets productively recycle human waste back into the environment.
- They can compost selected kitchen waste, reducing household garbage.
- They may allow a property owner to install a reduced-size soil absorption system

for graywater disposal, minimizing costs and disruption to the landscape. (*Check local and state regulations.*)

Disadvantages:

- Maintenance of composting toilets requires a high level of responsibility and commitment by owners.
- Removing the end-product is an unpleasant job if the system is not properly installed or maintained.
- Composting toilet systems must be used in conjunction with a graywater system where other plumbing fixtures are in place.
- Smaller units may have limited capacity for accepting peak loads.
- Improper maintenance makes cleaning difficult and may lead to health hazards and odor problems.
- Using an inadequately treated end-product as a soil amendment may have possible health and environmental consequences.
- Composting excrement may be visible in some systems.

- Too much liquid in the composter can disrupt the process if it is not drained and properly managed.
- Most composting toilet systems require a power source. ♀

Composting Toilet Do's and Don'ts

Do:

- * Keep the toilet seat cover down and the waste valve closed when not in use to prevent odors from escaping.
- * Put toilet paper into the toilet.
- * Add organic bulking material to the toilet occasionally.
- * Clean the seat area with mild soap.
- * Determine the proper disposal means according to state and local regulations.

Don't:

- * Throw any trash (sanitary products, diapers, paper-towels, etc.), cigarettes, matches, or burning material into the toilet.
- * Use harsh chemicals, chlorine bleach or toxic chemicals on or in the toilet.
- * Pour quantities of water into the toilet.
- * Empty compost from bin until it is decomposed.
- * Remove compost from a filled external composter unless it has been composting for six to 12 months or longer.

From *The Composting Toilet Book*.



Toilet Options: Incinerating

Incinerating toilets

Incinerating toilets are self-contained, waterless systems that don't discharge any effluent. They rely on electric power, oil, natural gas, or propane to burn human waste to a sterile ash. When properly installed, an incinerating toilet is safe and relatively easy to maintain.

An electric-powered incinerating toilet (see figure 5) is designed with a paper-lined upper bowl to hold newly deposited waste. This paper liner is replaced after each use. "Flushing" is

The fan continues to run after the heating cycle finishes to cool the incinerating unit. The entire cycle of burning waste to a small amount of ash takes from 1.5 to 1.75 hours.

Maintenance of the electric incinerating toilet includes:

- regular emptying of the ash collection pan,
- cleaning the outer surfaces including the upper bowl halves,
- periodic (every 90 days) cleaning of the blower motor and occasional replacement of the blower wheel,
- cleaning and lubricating the foot pedal mechanism, and
- annual inspection of the odor-removing catalyst.

likelihood of liquid wastes boiling over during incineration. The toilet seat is lifted and a cover plug is inserted over the chamber opening to act as a fire wall.

A timer is set according to the recommended duration for the load size. A gas valve is turned to the pilot position and ignited by pressing a button. The pilot light ignites the burner, which automatically locks down the unit (similar to a self-cleaning oven), so the toilet cannot be used during the burning cycle. The complete incinerating cycle takes from 1.5 to 4.5 hours, depending on the waste load.

Several factors must be considered when installing a gas-fired incinerating toilet. The toilet, being a gas fixture, must be routinely inspected for integrity of connections. Gas appliances must also be adequately vented to the outdoors. A gray-water system must be in place to treat and

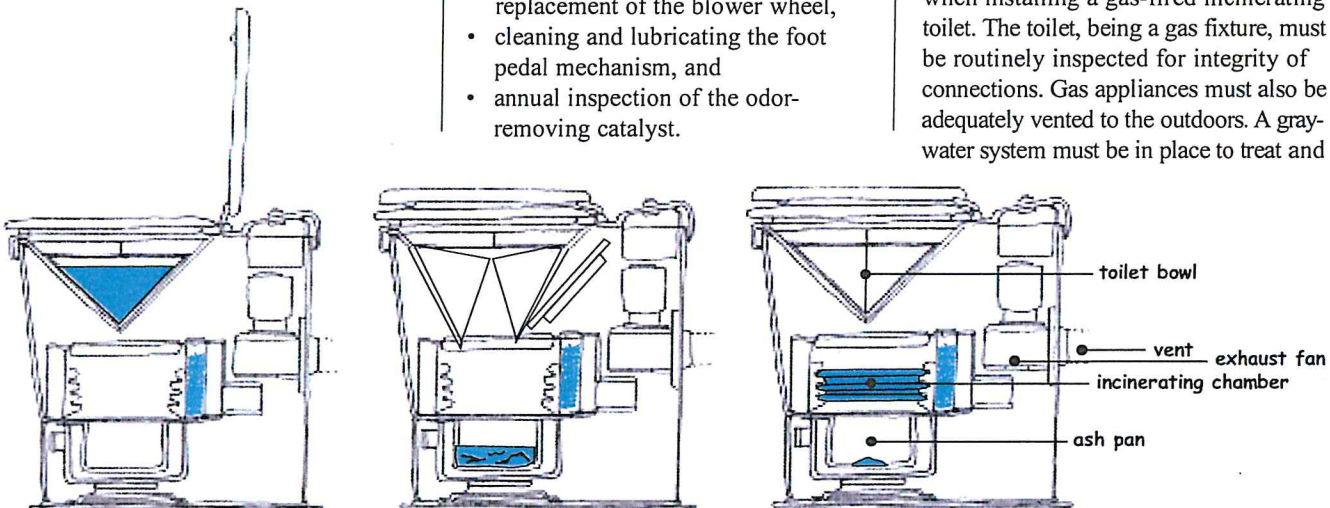


Figure 5. An electric incinerating toilet system. Illustration based on the Incinolet toilet from Research Products, Dallas, Texas.

accomplished by pressing a foot pedal, causing an insulated chamber cover to lift and swing to the side while the bowl halves separate. The paper liner and its contents drop into the incinerating chamber. When the foot pedal is released, the chamber cover reseals, and the bowl halves return to the closed position.

The system is designed to burn individual deposits, while outside surfaces remain cool to the touch. Burning begins with a press of the "start" button located on the frame of the toilet. An electric heating unit cycles on and off for 60 minutes while a blower motor draws air from the incineration chamber over a heat-activated catalyst to remove odors. The air then flows (with help from a fan) to the outdoors through a vent pipe.

A gas-fired incinerating toilet can be installed anywhere that has a propane or natural gas source. The toilet unit has an integral storage tank that can accommodate 40 to 60 uses before beginning the incinerating cycle. According to the only manufacturer of gas-fired incinerating toilets, Storburn International Inc., these systems can accommodate eight to 10 workers in an average work day or six to eight people in a cottage or residence in a normal-use day.

Gas-fired incinerating toilets do not have a toilet bowl. The waste drops into a holding chamber directly beneath the seat of the unit. An aerosol masking foam can be used to reduce odors and cover wastes between incineration cycles.

Before the burning process begins, an anti-foaming agent must be added to the heating chamber to reduce the

dispose of all other wastewater produced in the home or building. An air space must be provided beneath the unit to ensure proper drafting/airflow during the incineration cycle. Rugs and carpets should not be installed under the unit. And, intake air vents may need to be installed if the incinerating toilet is installed in an enclosed, air-tight room.

Advantages:

- Units are self-contained and use no water.
- No effluent is discharged.

Disadvantages:

- A power source must be available.
- Ash must be removed and the incinerating unit must be cleaned.
- Units cannot be used during the incinerating cycle.
- Incinerating toilets are not practical for public use. ♀



Obtaining a Septic System Permit

Anyone who intends to install a septic system must use the following generalized process:

Site Investigation & Deep Soil Probe Test

The first test on the site is a site evaluation and a deep soil probe test. As part of this site and soils investigation, the SEO will also determine if the proposed location of the system will meet certain isolation distance requirements. The sewage system is required to be specific distances (isolated) from natural and man-made features. This is done to assure long term operation of the new system and to prevent ground or surface water pollution. To attain a suitable location, the SEO may need to locate the system on a specific part of the lot. These isolation distances are:

1. Property lines, easements, or right-of-ways: **10 feet**
2. Occupied buildings, swimming pools, and driveways: **10 feet**
3. Water wells or springs: **100 feet**
4. Cisterns used as a water supply: **25 feet**
5. Water lines under pressure: **10 feet**
6. Streams, lakes, ponds, or other surface water: **50 feet**
7. Other septic systems: **5 feet**
8. Surface Drainageways, stormwater basins, and road ditches: **10 feet**
9. Natural or manmade slopes greater than 25%: **10 feet**

When conducting a soils profile test, a backhoe is used to dig a pit as deep as eight (8) feet, however depths of three to four feet are more typical. The SEO enters this pit to examine the make up of the soil (soil profile). From examining the color, texture and other physical properties of the soil the SEO will determine the suitability of the soil to place a septic system. If the soil is determined suitable for the installation of a system then a percolation test will be performed. **If the site or soil conditions are determined to be unsuitable, the Application will be denied and no permit will be issued.**



To prepare a soil profile examination, the permit Applicant is responsible to have a suitable sized backhoe or excavator on site to dig the test pit(s). The size of the pit will be a maximum of 8 feet deep, and wide enough and tapered on one end so the SEO can get in and out. It is best to schedule the backhoe so that all interested parties and the SEO can be at the site at the same time.

This soils test will determine the type of septic system, if any, that can be permitted on the lot. In Pennsylvania, state regulations require a minimum of 20 inches of suitable soils material from the natural soil surface to the "limiting zone" in order to qualify as acceptable for an on-lot septic system. A "limiting zone" is any condition within the soil geology that limits or alters the downward movement of water and wastewater through the soil.

Locally, the most common soil condition that causes the denial of a permit is the formation of clay hardpans close to the surface that limit or restricts the downward movement of water. Soil particles "hold on" to harmful microbes in the sewage allowing beneficial bacteria in well drained soil to breakdown the sewage effluent before its enters this "limiting zone". A saturated or wet soil does not allow these naturally occurring soil bacteria to renovate or clean-up sewage wastewater. When the site investigation and soil evaluations are found to be acceptable, a percolation test may only then be conducted. (Note: In some cases a minimum of 10-inches of suitable soils may be acceptable for some new alternate systems.)

Knowing the Types of On-Lot Systems

Determined by the above soils testing, there are three basic conventional on-lot systems permitted for use on residential lots. They are:

<u>Depth of Suitable Soil</u>	<u>Maximum Slope</u>	<u>Type of System Permitted</u>
Less than 10"	---	Unsuitable
10" to 20"	12%	Alternate Systems
20" to 48"	15%	Elevated Sandmounds
48" to 60"	15%	At-Grade Seepage Beds (pressurized)
60" - Plus	25%	Conventional Gravity Trenches and Beds

The type of system selected and permitted depends on the type and depth of soils identified on the lot.