

OPERATION AND MAINTENANCE OF A SUBSURFACE SEWAGE DISPOSAL SYSTEM

THE PURPOSE OF A SUBSURFACE SEWAGE DISPOSAL SYSTEM

The purpose of a subsurface sewage disposal system is to remove domestic wastes from a building in such a manner as to protect public health, protect the environment, and prevent unnecessary public and private costs. Improperly designed, installed, or maintained on-site sewage disposal systems often cause serious environmental and public health concerns. Poorly treated or untreated effluent can contaminate groundwater and surface water resources. Correction of faulty systems could lead to significant expense to property owners, who must repair such systems, and to tax payers, if municipal sewer lines need to be extended.

There are approximately 300,000 on-site (septic) systems in the State of Connecticut. Estimates suggest that upwards of 15,000 of those systems are in need of repair each year. With the information presented within this inter-net site it is hoped that actions can be taken by you as a homeowner which will reduce the chances of your system being on next year's list.

HOW A SEPTIC SYSTEM WORKS

There are four basic components of a subsurface sewage disposal system:

1. *The house sewer line.*
2. *The septic tank.*
3. *The distribution system.*
4. *The leaching system..*

The House Sewer Line: Sometimes referred to as the *building sewer*, it is the pipe that transmits raw wastewater from the in-house plumbing system to the septic tank. In Connecticut, this pipe is usually made of cast iron or heavy duty (Schedule 40) PVC plastic. The minimum diameter of the pipe is 4". The pipe is laid in a trench leading to the septic tank with a pitch of 1/4" per foot. A larger diameter pipe may be utilized to handle larger flows, or to allow the pipe to be set with less slope (1/8" per foot). The pipe should be laid in a straight line. If the pipe has a significant change(s) (more than 45° or more than one bend) a clean-out access point should be provided which is brought up to the ground surface.

The Septic Tank: The septic tank is a container which delays the sewage waste from proceeding directly to the leaching field. It serves as the primary or physical treatment of the waste. The tank settles out the heavier materials and prevents the floating scum's and greases from escaping. The tank has a 1,000 gallon minimum liquid capacity, normally is made of precast concrete, and has a series of baffles (inlet, compartment and outlet) which slows down wastewater producing a holding period of 3 to 7 days, on average. The efficiency of the septic tank as a settling unit is reduced when the velocity of the liquid moving through the tank increases. This may be caused by a tank which is too small or too shallow due to an excessive depth of sludge in the bottom.

A great deal has been said about "bacterial action" in the septic tank and most of it is myth. Contrary to popular opinion, biological activity has very little influence on the quality of effluent delivered to the leaching system. The prime role that bacterial action plays is in the sludge digestion process. The septic tank produces effluent of rather poor quality, not suitable for direct discharge to the environment via a stream or river. The great virtue of this device is that its treatment process is highly stable, producing effluent quality that is routinely predictable; thus, the leaching system can be designed accordingly.

The Distribution System: There are various methods of distributing effluent to portions of a leaching system, but there are basic concepts which are critical to any evaluation of a distribution system:

1. The primary objective in laying out a distribution system to any leaching system is to assure that all portions of the leaching system are utilized before failure (an overflow condition) can occur.

2. Since sewage normally trickles through the distribution system it is very difficult to set individual distribution pipes at the same elevation so that equal flow to each is achieved. Even if the pipes are set "equal" during initial installation, the box may settle creating an imbalance or, a slime layer may form on the edges of the pipe inverts causing unequal flows.

3. Due to variations in groundwater and soil conditions, two identical leaching structures on the same property can have different rates of sewage acceptance.

4. Whenever possible leaching units should be installed level with interconnected ends. When not possible serial distribution with high level overflow connections from higher leaching units to lower should be utilized. The only exception would be when the sewage flow into the system can be increased by a pump, siphon or, dosing distribution box.

The Leaching System: A properly functioning leaching system should disperse sewage effluent into the surrounding naturally occurring soil without breaking out on the ground surface or backing up during periods of heavy use or under adverse conditions. Such a system should not cause an unacceptable level of groundwater pollution. In order to accomplish these objectives a leaching system must be able to perform the following three functions:

1. *The system must provide sufficient infiltrative surface to prevent excessive clogging by the biological slime which forms on the soil interface.* As stated in the section on septic tanks, if a fairly uniform quality effluent is discharged from a septic tank then predictions can be made as to the thickness of the bio-mat which will form. This in turn will determine the amount of sewage which can pass through it, based in part on the ability of the receiving soils to disperse such sewage. In theory, a leaching system, sized in accordance with present codes, located in suitable soil conditions, maintained properly (septic tank routinely pumped, no toxic chemicals allowed to be discharged to the system, etc.) and utilized within water usage limits, should function properly indefinitely.

2. *The system must be surrounded by an area of soil with sufficient hydraulic capacity to disperse the liquid volume without becoming saturated.* Once sewage passes through the leaching system's bio-mat it must be absorbed and dispersed through the soils which surround the system. It is important that the soil conditions will promote such dispersal. Maximum groundwater (pre-installation of the system) levels shall be a minimum of 18 inches below the bottom of the leaching system, the soils shall be permeable enough to move sewage, there shall be enough slope within the leaching area to force sewage away from the area, and the system shall be spread out enough so the concentration of sewage being discharged doesn't overload the capacity of the soil to dissipate that amount of sewage. Failure to accommodate for the above would lead to flooding of the leaching area and a premature failure.

3. *The system must contain sufficient hollow spaces within the stone or leaching structure to allow sewage to be stored during periods of heavy use, or when rainfall or subsurface flooding reduces the ability of the system to disperse liquid.* Traditional stone leaching trenches do contain extra storage capacity created by the void space within the stone. Stone leaching systems designed in accordance with the Public Health Code requirements contain enough storage to provide for all normally occurring variations in soil dispersal rates or sewage flows. Hollow structured plastic leaching products, leaching galleries and leaching pits provide considerable more storage under the above adverse conditions.

PROPER MAINTENANCE OF A SEPTIC SYSTEM

The owner or user of septic systems should become informed as to the proper operation and maintenance of a subsurface sewage disposal system. Just like other elements of a home, for instance the furnace or the water supply well pump equipment, the on-site sewage disposal system will not function properly without routine maintenance:

Septic Tanks - should be pumped when:

- the scum layer is two (2) inches or more in thickness;
- the top of the sludge layer approaches within twelve (12) inches of the bottom of the outlet baffle;
- a period of 3 to 5 years has elapsed since the last pump-out.

When septic tanks are pumped out they should be visually inspected.

Leaching Area -

-should be kept free of encroachments such as buildings, accessory structures, such as, decks, detached garages, sheds, above and in-ground swimming pools, trees or shrubbery, etc.

-should be graded to divert runoff away from the system to avoid hydraulic overloading. This would also include runoff from roof drains and sump pump discharges.

-should be protected from erosion by providing and maintaining sufficient vegetation.

-should be free of vehicular traffic to prevent damage from crushing or compaction.

Things To Do To Avoid Problems With An On-site Sewage Disposal System:

-Do not allow excess amounts of fat and grease to enter the system, they can congeal and cause obstructions. In conjunction with this, it is not advisable to install a garbage disposal in the kitchen sink since it would tend to promote the disposal of products high in fats and greases. If a disposal unit has already been installed its usage should be limited.

-Do not dispose of household cleaning fluids down the drain and use chlorine bleaches and disinfectants sparingly.

-Do not use chemical additives, enzymes or septic tank "cleaners". They are unnecessary and may actually cause a system to fail prematurely by transporting sewage particles from the septic tank to the leaching system. Once in the leaching system those particles will promote clogging of the infiltrative surface.

- Do not dispose of toxic chemicals down any drain.
- Do not dispose of any non-biodegradable substances or objects, such as cigarette butts, disposable diapers, feminine products (particularly, tampons).
- Do not dispose of the backwash from water softening or other water treatment systems to the septic system. This is a Public Health Code regulated prohibition.
- Do not run multiple "full" loads when using a washing machine or dishwasher. Try to stagger use (i.e., Do not run five or six loads on Saturday and none the other days).
- Do not run water continuously while rinsing dishes, thawing frozen foods or, shaving. Consider limiting toilet flushes or retrofit with low flush units.
- Do not connect any "clear water" sources, such as footing and foundation sump pumps to the sewage system.
- Keep accurate records about the location and cleaning of the system in a permanent house file so this information can be passed on to the next owner.
- Facilitate the pumping process by raising the cleanout manhole of the septic tank to within 6" to 12" of the surface of the ground.
- Set up and adhere to a sound system of inspection and cleaning.
- Check for faucet leaks, etc. ...it is estimated that one leaky faucet can waste as much as 700 gallons of water a year.
- If possible, determine the existing size of leaching system (your local health department may be assistance in this regard). From that information a determination can be made as to the amount of daily flow a well maintained system of that size could handle. Once that limit has been set it is important that it is not exceeded on a consistent basis.
- Educate your family on the proper use of the system