FORD COUNTY PUBLIC HEALTH DEPARTMENT
SEWAGE SYSTEM GUIDE

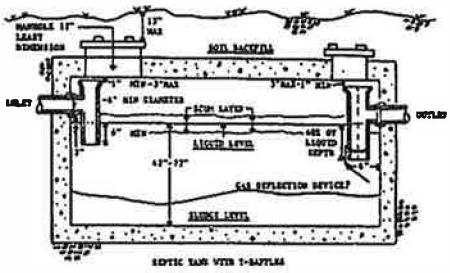
Purpose: The purpose of this guide is to help the homeowner explore the common sewage system options available and to provide guidance in the construction of suggested systems.

When evaluating what sewage system to use, the soil and surrounding areas must be evaluated. The suitability of the soil is determined by performing a soil evaluation. This test will determine whether a seepage system may be used or if another option will be necessary.

In most cases the soil will give an adequate loading rate to allow for a seepage system. The most common of these is a gravel seepage trench method, which is very reliable and by far the most common of all the seepage systems. This guide will go into more detail as to the construction of these systems. Other systems are available, including graveless systems, seepage beds, and the infiltrator seepage system. If you are interested in any of these systems, contact the health department to discuss construction.

In the cases where the soil does not have a loading rate adequate for a seepage system, a buried sand filter is suggested. These filters are very reliable, easily maintained, and comparably priced to other options. This guide will go into more detail about buried sand filters. Other options are available, such as aerobic units. Contact the health department about alternate systems if a buried sand filter is not practical.

Figure 1- A Typical Septic Tank



Septic Tanks

Septic tanks are required for almost every type of sewage system used. A septic tank is designed to retain sewage for 24-48 hours, during which time the heavy solids (sludge) drops to the bottom and the grease and foam (scum) rise to the top. It is important to note that the tank is designed to keep sludge within the tank. This allows time for the natural bacterial processes to decompose the stored sludge and scum. The liquid between the sludge and scum layers (effluent) flows out of the tank. The effluent should only contain small suspended particles. Baffles around the tank outlet keep the scum from leaving the septic tank. If the tank is not pumped every three to five years, this scum could get so thick as to pass the baffle and go out into the field and clog it.

Determining the size of septic tank needed is an easy process. Simply determine the number of bedrooms in the house and whether a garbage grinder will be used and follow this chart:

NO. OF BEDROOMS	2 OR LESS	3	4	5	6	7
NO GARBAGE GRINDER	750 gal	1000 gal	1250 gal	1500 gal	1750 gal	2000 gal
WITH GARBAGE GRINDER	1250 gal	1500 gal	2000 gal	2200 gal	2600 gal	3000 gal

The Preferred Option – The Subsurface Seepage Systems

What is a Subsurface Seepage System:

Subsurface seepage systems are simple systems which let the soil act as a filter for the sewage. All subsurface seepage systems share some common characteristics. All of them have a septic tank and a seepage field. Subsurface seepage systems do have their advantages and disadvantages.

Advantages	Disadvantages
Least expensive option to install	Some soils not suitable (high water table)
No electrical or mechanical	Extremely wet conditions can cause temporary failure
No operational costs for electricity	Lifetime is limited, but can be extended with proper care
Water is returned to the soil	Must be enough ground area to install the system

Some keys to extending the life of your subsurface seepage system should be kept in mind when planning, constructing, and maintaining your system.

-Install curtain drain around the seepage field to lower seasonally high water tables, reduce wetness and possibly speed up the loading rate.
-Install a field 25% larger than required.
-Landscape so runoff water from surrounding land does not run onto field and roots do not grow into distribution lines.
-install a larger size tank than needed, a multiple compartment tank, or more than one tank in series.
-Install water saving shower heads, toilets, faucets, and clothes washers.
-Install a "riser" over the septic tank inspection ports to make pumping easy, check tank yearly, and pump it every three years.

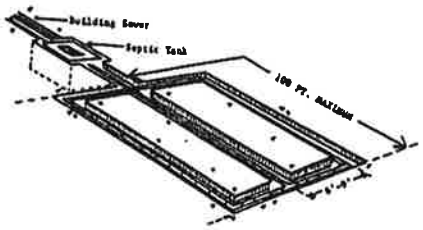
Designing a Layout

Layouts for seepage trenches may vary, but there are a few generalizations that may be made when laying out the design.
Use three foot wide trenches, so every one foot of trench would equal 3 square feet of seepage trench. If using a three foot wide trench, simply divide the amount of square footage of seepage area needed by 3. This gives you your total running fee. When configuring you trenches, do not count corner areas twice (one corner can only count for 3 running feet of one of the distribution lines).

Seepage System Construction Suggestions

1. Use a 36 inch wide trench (unless impossible).
2. Loop all distribution lines.
3. Trenches shall be no closer together than 9 feet center to center.
4. Allow at least 5 feet from house to septic tank and 5 feet from tank to distribution system.
5. Follow strictly the subsurface seepage system distance standards sheet.
6. All tile should be 4 inch.

A Basic Layout



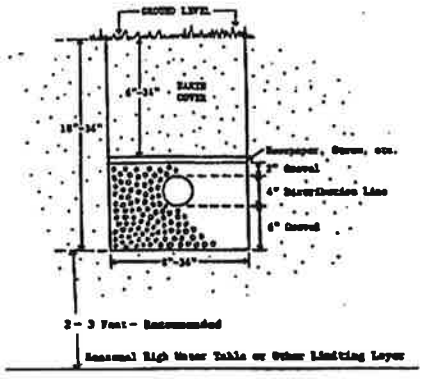
***After designing is complete, it will be necessary to complete the APPLICATION FOR PERMIT TO CONSTRUCT OR REPAIR A PRIVATE SEWAGE DISPOSAL SYSTEM. This form may be obtained from the health department via the mail or by stopping by the office. This form must be returned and approved by the health department before construction may begin.**

Construction of a Gravel Trench Seepage System

Septic Tank Installation

The tank shall be set level (level meaning plus or minus ½ inch in any one direction). The lines coming in and out of the tank shall be watertight using tar, silicone caulk, or mastic. There should be a minimum drop from the house to the septic tank of at least 12 inches per 100 feet. From the tank to the distribution line there shall be a minimum of one inch drop from the invert of the outlet of the septic tank to the top of the gravel of the trench. There shall be no joints, splices, or fittings within the area of overdig around the tank. It is also suggested that once the tank is in place that the tank is filled with water to hold it in place.

Figure 2- Trench Construction



Field Construction

The basic construction of the trench is relatively simple. The trench is dug to the desired depth (a minimum of 18 inches and a maximum of 36 inches to the bottom of the trench), uniformly level throughout the entire field, 36 inches wide. It is important to note that the earth between and immediately around the trenches should remain undisturbed, as they are the essential part of the system and may contribute to the failure of the system. The actual trench space is only 12 inches deep and consists of 6 inches of gravel, the 4 inch perforated distribution pipe (level) surrounded by gravel and another 2 inch layer of gravel on top of the line. This is then covered by a layer of straw and rosenpaper to prevent soil infiltration and the rest of the trench is then filled with soil no less than six inches and no greater than 24 inches deep. This can be seen on the diagram. All connections must be water tight.

Material Used

The pipe from the house to the septic tank should be Schedule 40 PVC or greater and it suggested that the pipe from the septic tank to the leach field be of equal strength. There are many types and brands to choose from, but the most commonly used and available can be seen in Table 4. Table 4 also lists the common types of distribution pipe most often used and preferred.

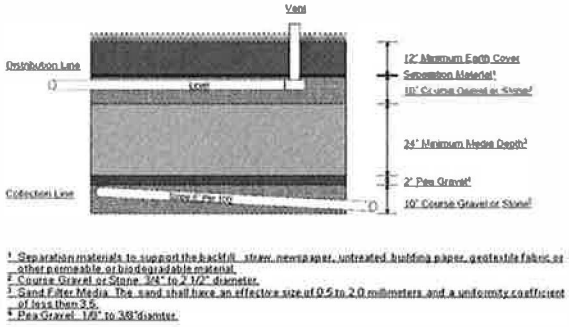
Pipe	ASTM Standard Code (**Bold Indicates Commonly Used Pipe**)
From building to septic tank **and** from septic tank to 5 feet after septic tank	Schedule 40 (F628, D2661, D1527, **D2665,** F891, F949, **D3034***, **D3033***)
From 5 feet past septic tank to distribution line	F628. D2661, D1527, **D2665,** F891, F949, D3034*, D3033*, D2729, F405HD (heavy duty only)
Distribution	F628, D2661, D1527, D2665, F891, F949, **D3034***, **D3033***, **D2729**, F405HD (heavy duty only), F667
	*- pipe shall be SDR35

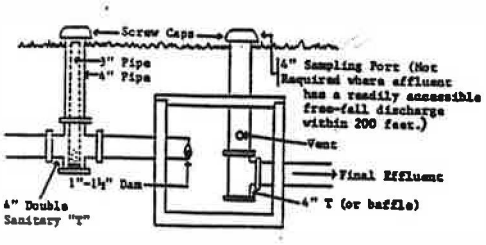
Non-Seepage System Alternative

If the ground is not capable of supporting a seepage system, the suggested choice for an alternative is a **sand filter.**

What is a Sand Filter?

A sand filter is a specialized type of septic system used in areas where a seepage field is impractical due to soils that do not absorb water well. A typical sane filter is an excavation 20 feet wide, 30 feet long, and 5 to 6 feet deep that is layered with specific amounts of gravel and filter sand. Effluent is distributed in the top 10 inches of gravel, filtered through sand and gravel and collected by a tile in the bottom of the pit. The filtered effluent is then directed through the chlorinator and contact tank and finally discharged.





Chlorine Contact Chamber

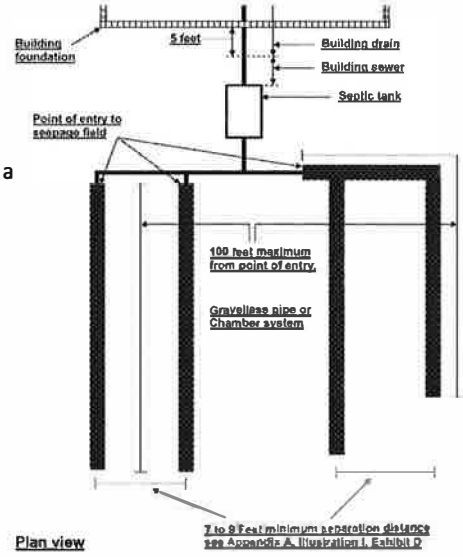
Designing a Buried Sand Filter

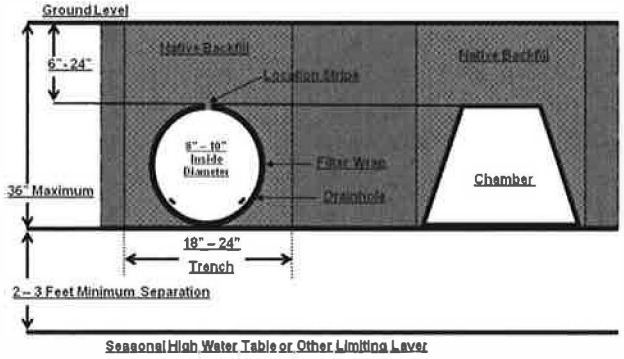
To figure the square footage needed is simple: 200 square foot per bedroom. When planning the system, keep in mind that a larger filter will probably extend the life of the system.

What is a Chamber/Gravelless System?

Gravelless septic systems or "no gravel" septic system trenches use plastic or other prefabricated wastewater distribution systems which are buried in soil without the use of surrounding gravel.

Typical gravelless septic systems use a plastic chamber, a geotextile-wrapped pipe, or a polystyrene-wrapped pipe to distribute effluent into the soil. The necessary soil absorption area is provided by the perforated surface of the gravelless septic system components or by soil at the bottom of a chamber.



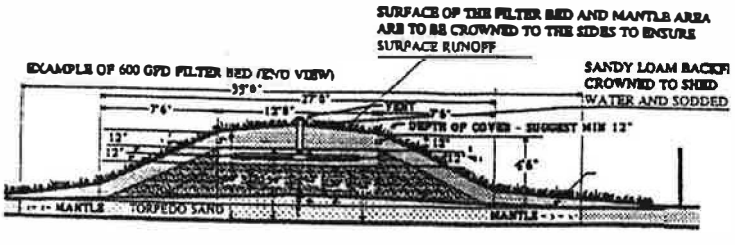


What is an Illinois Raised Filter Bed?

A raised septic system [or raised bed septic system] is an absorption trench system constructed in fill material with acceptable permeability placed above the natural soil on a building lot.

Designing an Illinois Raised Filter Bed

Residential systems should have a loading rate of 4 gallons per square foot per day for homes with a flow up to 1500 gallons per day. The bed shall not exceed 600 square feet. After finding the daily wastewater flow, an aeration tank volume should be double of the flow.



Septic System Failure

A septic system fails over time because suspended solids are carried out of the septic tank with effluent. These small solids plug up spaces between soil particles in seepage field trench walls and between the sand in a sand filter. It is important, therefore, to properly maintain a septic tank in order to ensure the system lasts approximately 20 years.

Avoiding Additive: Some 1,200 products have been placed on the market for use in septic tanks. Extravagant claims have been made for some of these; however, research has shown no benefits resulting from their use and these products may actually cause a marked deterioration in the system.

Water Usage: New septic systems are designed to accommodate 100 gallons of water per person per day. If septic system problems are encountered; however, they may be minimized by practicing water conservation: installing low-flow shower heads, using clothes and dish washing machines only for full loads, reducing the quantity of water used when flushing the toilet, and repairing leaky faucets.

Garbage Disposals: Garbage disposals are not recommends in homes served by septic tanks and subsurface seepage fields or sand filters. If they are used, the accumulation of solids in the tank will be more rapid and the carry out of solids into the field or filter will be increased. This means that the life of the seepage field or sand filter is likely to be shortened.

Heavy Trucks and Equipment: Prevent heavy trucks and equipment from driving over your septic system. This is especially important to consider when a new home is being constructed. Concrete and building material trucks may make deliveries on the property and can easily damage a newly installed septic system.

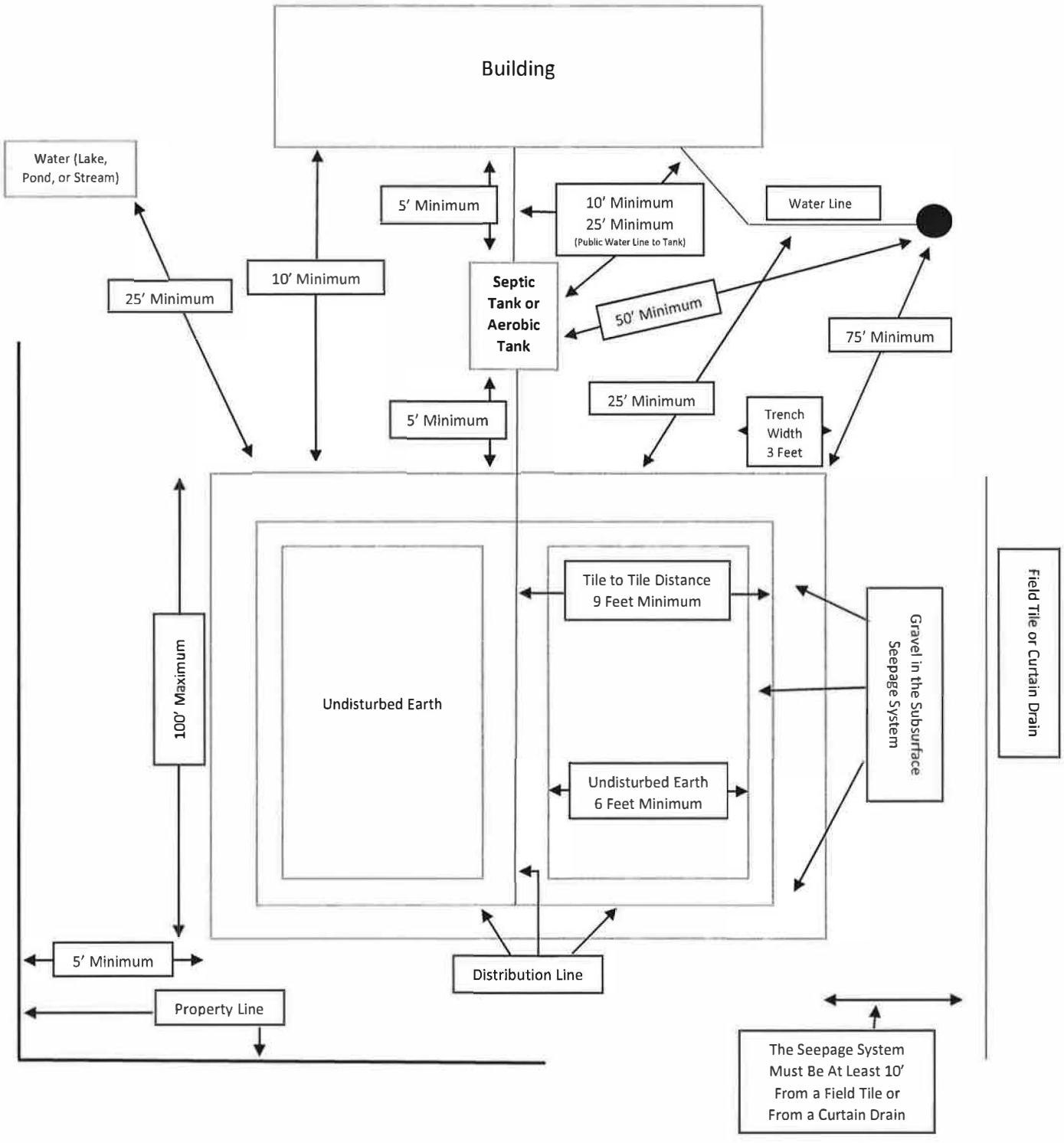
Additional Construction: Do not build any new structures over a septic system. They can keep a system from working to its full capacity and cause failure.

Soaps and Detergents: Usually no appreciable adverse effects will occur to the system when using soaps, detergents, bleaches and drain cleaners; however, large quantities could. The rule should be moderation.

Cigarettes and Other Disposable Items: Cigarettes, paper towels, sanitary napkins, tampons, condoms, and disposable diapers will not readily decompose in the tank and are likely to clog the septic tank.

Water Softener Backwash: State law requires water softener backwash to discharge into the septic system. Backwash water may have adverse effects on the septic tank, bacterial growth, and the soil structure of the system. When it is possible, backwash water may be directed to separate seepage field.

FORD COUNTY PUBLIC HEALTH DEPARTMENT
SUBSURFACE SEEPAGE SYSTEM DISTANCE STANDARDS



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