The Book On Septics & Mounds

A guide to understanding private on-site wastewater treatment systems for homeowners and homebuilders

HERR Environmental, Inc.
Implementing solutions for on-site wastewater treatment

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A guide to understanding private on-site wastewater treatment systems for home owners and home builders

by

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of

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INTRODUCTION

This book is a general overview - meant to give home owners and builders a better understanding of how and why their wastewater is treated on-site, and how the systems work that treat the wastewater.

This book is not meant to make someone an expert in the design and installation of systems, as this is a very highly regulated field. Licensed professionals are required to perform the soil test, design the system, and install the system. Inspectors review and frequently observe and verify the soil tests, review and approve the system plans based on the soil tests, and inspect during the installation of the system. Licensed installers (plumbers) are required to attend continuing education.

This book is meant as a general overview, intended to answer many of the questions people have regarding their systems (or potential systems). This is not meant to be a technical publication.

Where code restrictions and limitations are discussed, this information is based on the Wisconsin Administrative Code (ILHR 83) current as of December, 1996, and of course is subject to change. Code requirements may vary outside of Wisconsin.

The recommendations made in this book are for methods of maintaining your system to extend its useful life span. They are based on experience gained from the four generations of Herr family members who have been in the plumbing business, designing systems, installing systems and managing systems.

ABOUT THE AUTHORS

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Chapter One
Basics of Systems

What are these systems and what do they do?

All houses (and other buildings) that are built in areas not served by a public sewer system must have its wastewater treated on-site (or off-site in the case of a holding tank). If your water is treated on-site it must be done in such a way to prevent possible contamination of groundwater, and in a way that would prevent any other type of potential health hazards due to improperly treated wastewater coming in contact with humans or other possible disease carriers such as insects or rodents.

On-site systems are referred to as "Privately Owned Wastewater Treatment Systems" (POWTS for short). Mound systems, conventional septic systems, trench systems, in-ground pressure systems, aerobic (or aeration) systems, sand filters, etc. are all names for different methods of treating your wastewater, or different types of POWTS.

What "wastewater" is treated and why?

As of the writing of this book, all water you use in your house (except water softener regeneration discharge and drain tile "sump crocks") such as water from your toilets, sinks, bathtubs, showers,

dishwasher, clothes washer, floor drains, laundry tubs, etc. must be properly treated.

This wastewater may contain potentially harmful substances such as pathogenic bacteria, excess nutrients, decomposing organic matter, toxic chemicals, infectious viruses, and other substances.

On sites that are not served by public sewer but are treating their wastewater with a POWTS (such as a mound, conventional, or any other type of on-site system) eventually recycle the wastewater back to the groundwater. Read the last half of the previous sentence again. Remember, if you are using a POWTS, chances are you are also using a private water well to obtain all of your clean water (for drinking, washing, bathing, etc.). You are the first person who should want to make sure that your wastewater is properly treated prior to returning back to the groundwater. It is important to treat this wastewater properly to protect both the public health and the environment.

Chapter Two
Mound vs. Conventional

What is the difference?

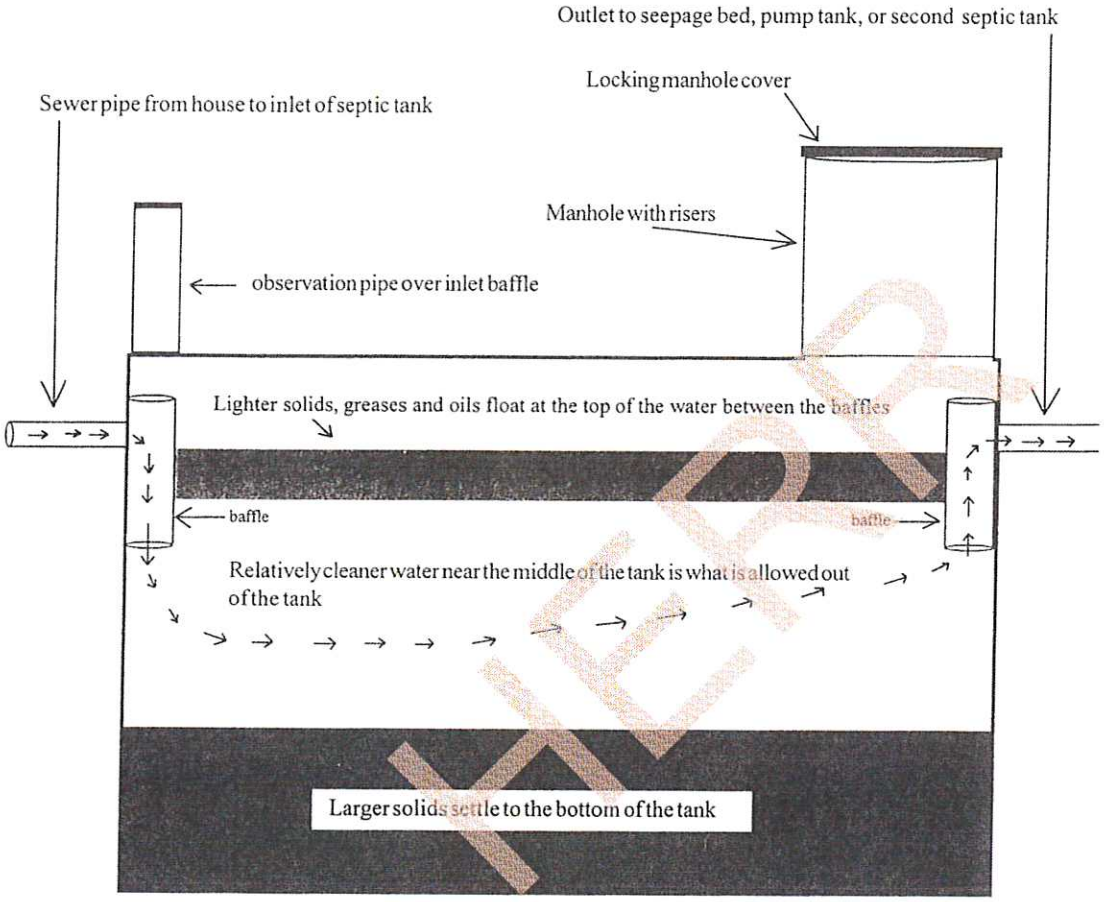
Mound systems, conventional systems, in-ground pressure systems, at-grade systems, trench systems, etc. are all types of systems used to treat wastewater from structures not served by public sewer. They all do basically the same thing. They are just designed differently to compensate for differing lot constraints and soil conditions.

A "mound system" refers to a system in which the "soil absorption" part of the system must be designed and installed literally on top of the existing grade to assure the wastewater is properly treated on sites that have high groundwater or bedrock.

"Conventional septic systems" refer to systems in which the soil absorption part of the system may be designed and installed below grade as there is no indication of high groundwater or bedrock.

In all Privately Owned Wastewater Treatment Systems (POWTS) including both mound and conventional systems in Wisconsin, the wastewater exits the house and enters a septic tank where the water is partially treated (see figure 1). Remember--both conventional septic systems and mound systems begin by having the wastewater partially treated in a septic tank and must be periodically pumped for proper maintenance.

After the partially treated water exits the septic tank(s), the water may flow "gravity" into a "conventional" (below grade) soil absorption bed or flow into a pump tank to eventually be dosed into



Septic tank cross section

(not to scale)

Figure 1

a mound system under pressure.

A mound system in Wisconsin is a pressurized equal distribution system. This means that when water is "dosed" to the mound (four times maximum in a 24 hour period) the water is equally distributed under pressure so you are using the entire square footage of the mound's "soil absorption area" to treat the water. The pressurized equal distribution is due to the "distribution" pipes in the mound being only 1" to 1-1/2" in diameter with small, specifically sized holes drilled at specific spacings to assure equal distribution.

"Conventional" systems have 4" diameter pipes with much larger holes, and the water is not as evenly distributed as a pressurized system.

The septic tank

In all Privately Owned Wastewater Treatment Systems (POWTS), including both mound and conventional systems in Wisconsin, the wastewater exits the house and enters a septic tank where the water is partially treated. In a septic tank the inlet and outlet of the tank are both near the top of the tank, allowing the larger solids to settle to the bottom of the tank (see figure 1). A portion of the solids accumulating on the bottom of the tank are eventually "broken down" by anaerobic bacteria. The balance are pumped out when you periodically have your system pumped. Greases, oils, and lighter solids which float at the top of the water in the tank are prevented from exiting the tank (and clogging the soil absorption bed) by "baffles" which cover both the inlet and outlet of the tank, allowing only the relatively cleaner water at the middle of the tank to exit out to the next part of the system. Remember--both conventional septic systems and

mound systems begin by having the wastewater partially treated in a septic tank and must be periodically pumped for proper maintenance.

After the partially treated water exits the septic tank the water may flow "gravity" into a "conventional" (below grade) soil absorption bed or flow into a pump tank to eventually be dosed into a mound system under pressure.

Maintaining the septic tank

It is up to you whether your manhole cover remains exposed or is buried below grade. There are pros and cons to each. Do not confuse your manhole cover (minimum 24 inches diameter, usually concrete) with your inlet inspection pipe (four inches in diameter). Many people do confuse these two. The manhole cover is what is opened to pump out the tank. The four inch inspection pipe is not used to pump out the tank. At Herr Environmental, Inc. we recommend that a septic tank be pumped once per year. The four inch pipe is not used other than to determine if a "plug" could be occurring at the inlet baffle. If you bury the manhole cover you will have to dig it up each time you have it pumped. If you leave the manhole cover exposed, it will be easier and more accessible when you want it pumped out. If the manhole cover is to remain exposed, it must be equipped with a locking device (typically a chain and lock) and an approved warning label.

Chapter Three
Location, Location, Location

Locating your septic tank on your lot

When your sewer exits your house, the first thing it does is enter the septic tank to separate the majority of the solids out of the water. Before the sewer enters the septic tank, all of the solids are still in the water so a good rule to follow is to get your wastewater into the septic tank as quickly and as straight as possible. The less lineal footage and the less turns in the pipe (before getting to the septic tank), the better.

The minimum setback for a septic tank from the house is five feet. This allows you to have your septic tank installed five feet or more from your house. The closer to your house and the less turns the pipe takes before the septic tank, the better. A straight sewer pipe to the septic tank is preferable.

When determining where to locate your septic tank(s), there are issues to consider both inside and outside of the house.

Inside: If you have an exposed basement wall and will have "underfloor plumbing," the tank location does not really affect the inside of the house to any great degree. If you have "hung" plumbing in your basement, the spot at which the sewer exits through the basement wall will have a four inch diameter pipe going through it at approximately "chest" level. If you are going to have a finished room in your basement, this is definitely something to plan ahead for.

Outside: Make sure planning is done to assume that the septic

tank location will not conflict with decks, patios, etc. It is imperative that the manhole remain accessible for periodic pumping and maintenance.

Locating your mound system on your lot

There are several factors to be aware of when locating your mound system and your house on a lot. Slope, contour lines, setbacks, and the area downslope of the mound are all very important variables to be aware of when trying to fit the house and the mound on the lot in a way that will be both acceptable to you as the owner as well as the inspector and regulatory people responsible for making sure the installation is code compliant.

A very important factor to know when deciding how and where your mound will be located on your lot is that the "orientation" of how the mound will sit on the lot is completely out of your control. A mound must be designed and installed so that the longest dimension of the mound is perpendicular to the slope. The mound must be installed along a **contour line** (a line at which every point is the same elevation- see figure 4). This is an extremely critical variable which is checked in fine detail by both the state plan reviewer and the local inspector.

Once you have determined the exact location and orientation of the mound, please note that the mound and an area for a distance of 25 feet downslope from the mound must remain undisturbed. This means that where the mound is to go (and the area 25 feet downslope of the mound area) cannot be driven on, stockpiled on, or stripped of vegetation or topsoil. This is extremely important as the top 12 inches of natural soil is one of the treatment layers "within" the mound and

these steps are to prevent compaction of the pores within the soil which would cause the system to prematurely fail. Note that if your mound area should become disturbed or damaged in any way, the completion of your project may literally be put on hold until a different undisturbed mound area can be located and designated on your lot by a certified soil tester to the satisfaction of the regulatory agencies.

If your home is to be built downslope of the mound, your setback should be well in excess of the common 25 foot setback so you can allow for your excavator and other subcontractors' access around the outside of your house.

A soil test must be completed to determine the type and location of an on-site wastewater treatment system. The location of the system is limited to within the soil tester's tested area and where it delineates on the soil test. It is absolutely imperative that you work closely with the soil tester when determining where the system will be installed.

Setbacks to consider when locating your system

When planning the location of your house, driveway, or any other items that you may intend to install in the future (i.e. swimming pools, outbuildings, large decks, etc.) it is important to consider required set backs from your septic system.

Other variables which affect system placement:

- The side of the house from which you prefer the sewer pipe to exit the house is one of the more important variables.

The sewer pipe will exit through the basement wall approximately 18 to 24 inches below finish grade. If you have a specific area in the basement which will be a "finished" room you may not want the septic on that side of the house to avoid the pipe in the "middle" of the wall. If you do not intend to "finish" any rooms in your basement then your options are not as limited.

- Setbacks to consider (from seepage bed):
  - 25 feet from house
  - 5 feet from lot line
  - 50 feet from well
  - 15 feet from slab building (i.e. garage, etc.)
  - 15 feet from a swimming pool
  - 20 feet from a 20% or greater slope (conventional)

A driveway can be right up to but not over a conventional septic system. A driveway must be at least 25 feet away from the downslope edge of a mound system.

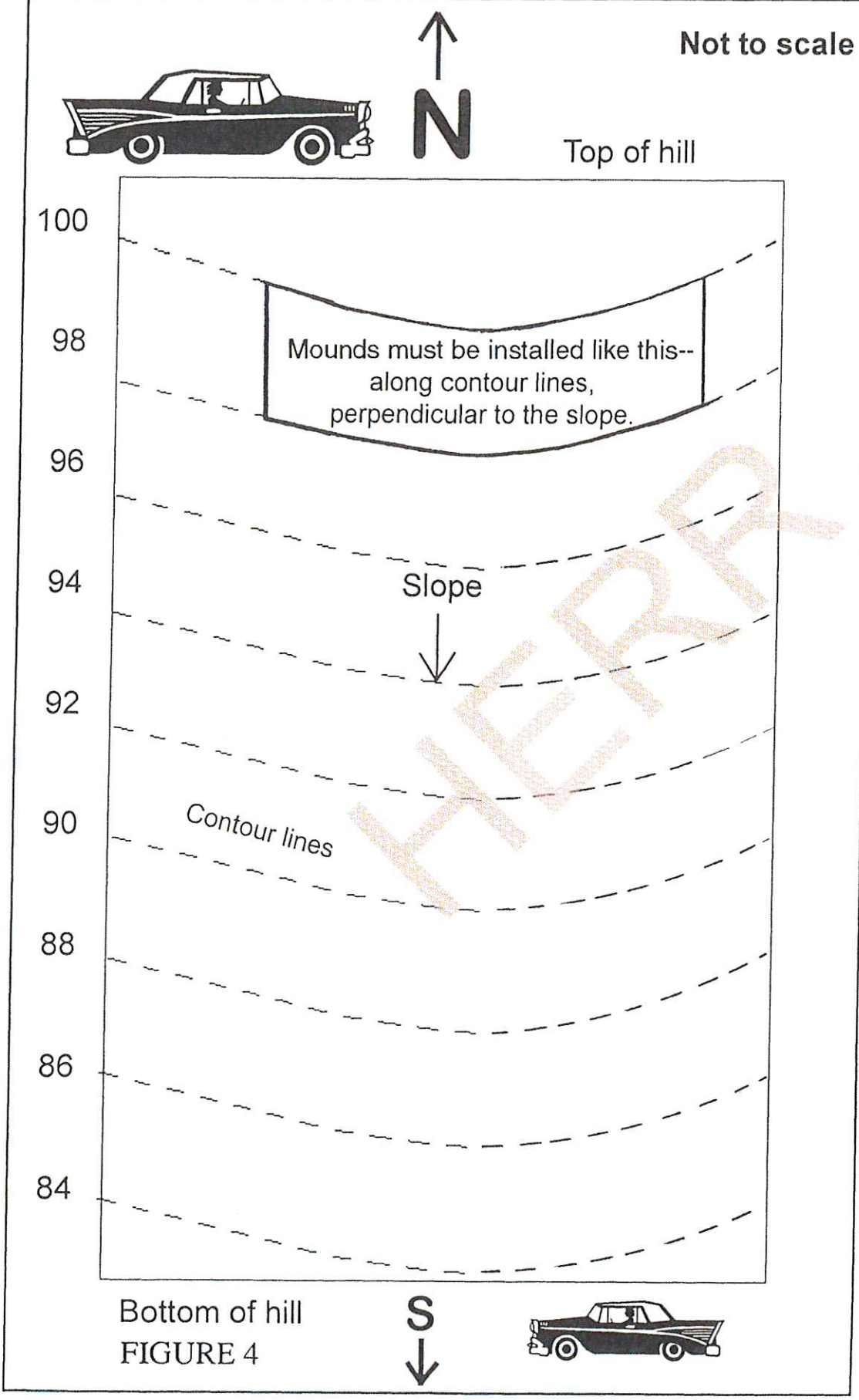

Not to scale
N
Top of hill
100
98
96
94
92
90
88
86
84
Mounds must be installed like this--
along contour lines,
perpendicular to the slope.
Slope
Contour lines
Bottom of hill
S

FIGURE 4

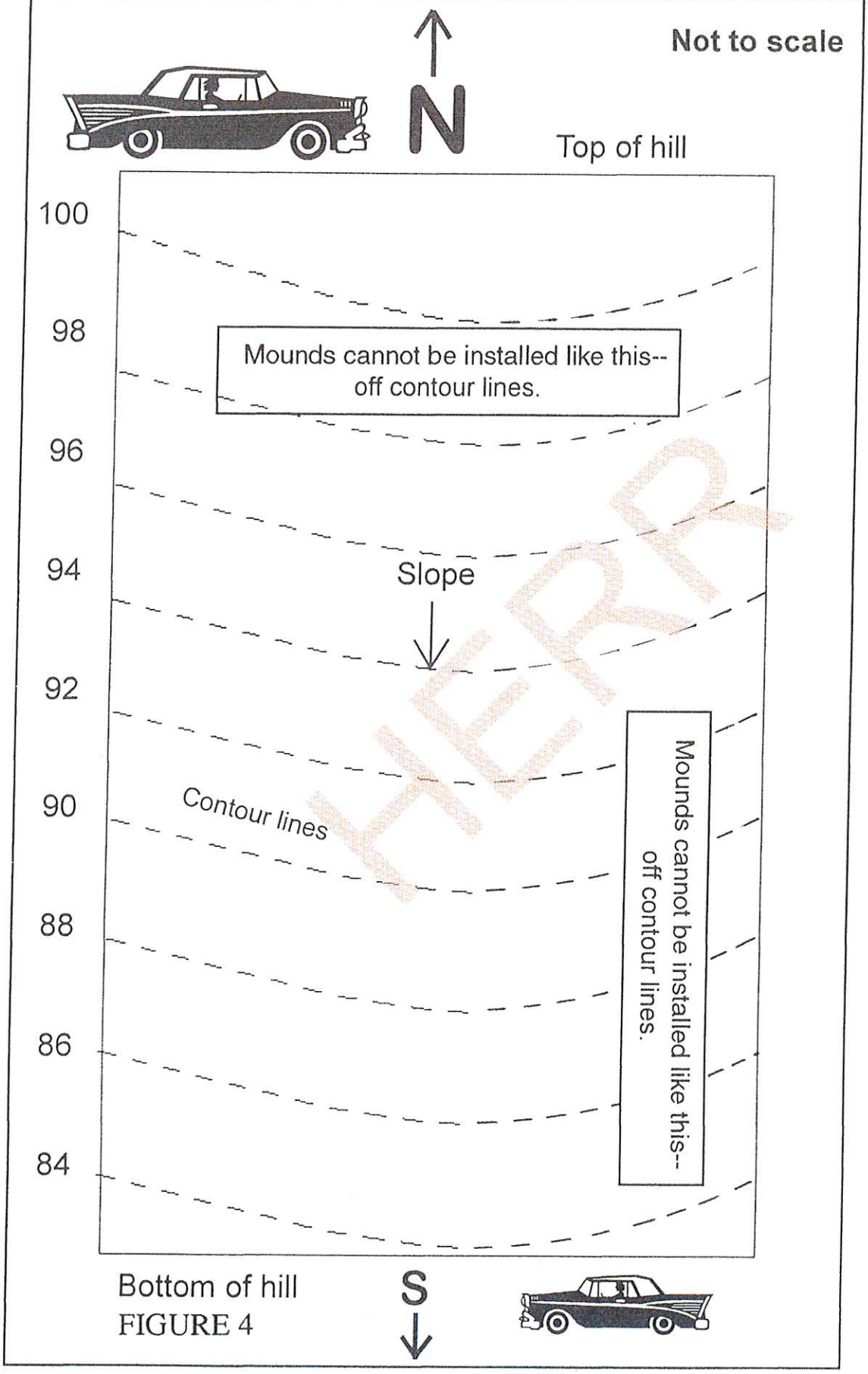

Not to scale
N
Top of hill
100
98
96
94
92
90
88
86
84
Mounds cannot be installed like this-- off contour lines.
Slope
Contour lines
Mounds cannot be installed like this-- off contour lines.
Bottom of hill
S

FIGURE 4

The Soil Test

For some reason there is a common misconception that all replacements of failing systems must be mound systems or that from a certain time forward, all new systems have to be mound systems. This is absolutely not the case.

Soil conditions can differ and vary dramatically from lot to lot. Some require mounds, some conventional (subsurface) systems, as well as several other types of systems that fall somewhere between these two.

What determines the type of system required on each lot or parcel of land are the results of a "Soil and Site Evaluation" by a Certified Soil Tester/Morphological Evaluator. This evaluation is commonly referred to as just a "soil test," and just as commonly (although mistakenly) called a "perc test."

Actual "perc tests," which used to be the common method for determining the design of POWTS, was the method in which water was literally poured into holes in the ground for the purpose of measuring just how far into the ground a certain amount of water would go in a certain amount of time, thus determining the soil's "percolation rate." The "perc" method is no longer the accepted method of "soil testing," as the information gathered was far too limited for making accurate determinations of important soil characteristics. Sure, you knew how fast the water went into the ground, but the perc method did not indicate just how far this water would travel before it would encounter a "limiting factor."

A "limiting factor" would be high bedrock, or high groundwater.[1] The "perc rate" may indicate how fast the water is moving, but

[1] "High groundwater" could be zones of seasonally saturated soil , shallow regional groundwater tables or aquifers, or perched water tables, etc. ILHR 83.02 (24).

if the water immediately (within inches or just a few feet) encounters high bedrock or high groundwater, the wastewater would not be treated properly, and very likely contaminate the groundwater, move much more quickly to the groundwater (untreated) through cracks and crevices in the bedrock, and cause a system to fail prematurely due to less than adequate depths to a limiting factor.

Wisconsin Administrative codes mandate that any type of system must be designed so that the "bottom" of a soil absorption system be a minimum of three feet above high groundwater or bedrock. Groundwater in this instance does not necessarily refer to the actual water table your well is drilled to, but by code definition could mean any "zones of soil saturation which include: perched water tables, shallow regional groundwater tables or aquifers, or zones that are seasonally, periodically, or permanently saturated."[1] This is the answer to many peoples' dilemma of "Why do I need a mound if my soil is all sand? It should be a conventional!" Well, even if someone's soil *is* all sand, but the soil test shows indications of high groundwater at only two feet below the ground, there is only one way to design a system which will be three feet above the groundwater. The solution is to artificially create a soil absorption system one foot above the ground, which is what a mound system is--a system designed with the bottom of its soil absorption area a minimum of one foot above the existing grade. This allows for the three foot vertical separation to the limiting factor on sites that have a limiting factor two feet below grade.

Wisconsin Administrative codes allow for a minimum of two feet to a limiting factor below existing grade for approval of a mound system for construction purposes. If the limiting factor is observed less than 24 inches below existing grade, the site would "not pass" for a mound for "new construction." In some instances the limiting factor

[1] Wisconsin Administrative Code ILHR 83.02 (24).

could be less than 24 inches for mound approval for replacement of a failed system for an existing building only, and the mound design is changed accordingly.

Most soil tests are performed using a backhoe to dig "pits" large enough for the soil tester, (and in most cases an inspector), to closely observe (and hand texture) each "horizon" (or layer) within the soil profile. This is done to both observe for the limiting factors discussed above, and to determine several other characteristics of the soil which will determine the type, depth, and square footage of the system required on a particular lot.

Mottling

When a soil tester is observing the soil profile trying to determine if the "limiting factor" of groundwater is present, the soil tester does not have to see actual water. If the soil tester observes "mottling" in the soil, it is at the depth the mottling is observed that is considered the limiting factor of high groundwater (with a few exceptions). Mottling is a discoloration, or "staining" of a color which is not part of the dominant soil color. Mottling is an indicator that groundwater, at some point in time, fluctuated up to that elevation and remained there long enough to cause the chemical reaction--or oxidation to create the mottling. The soil tester must assume that because water had fluctuated that high at some point in the past, that the potential exists that groundwater may fluctuate up to that elevation again at some point in the future. The groundwater elevation is now assumed to be the elevation at which mottling was observed, whether water is present there at the time of the soil test or not.

This information on "mottling" should answer the continuing question asked, "Why do I need a mound? I didn't see any groundwa-

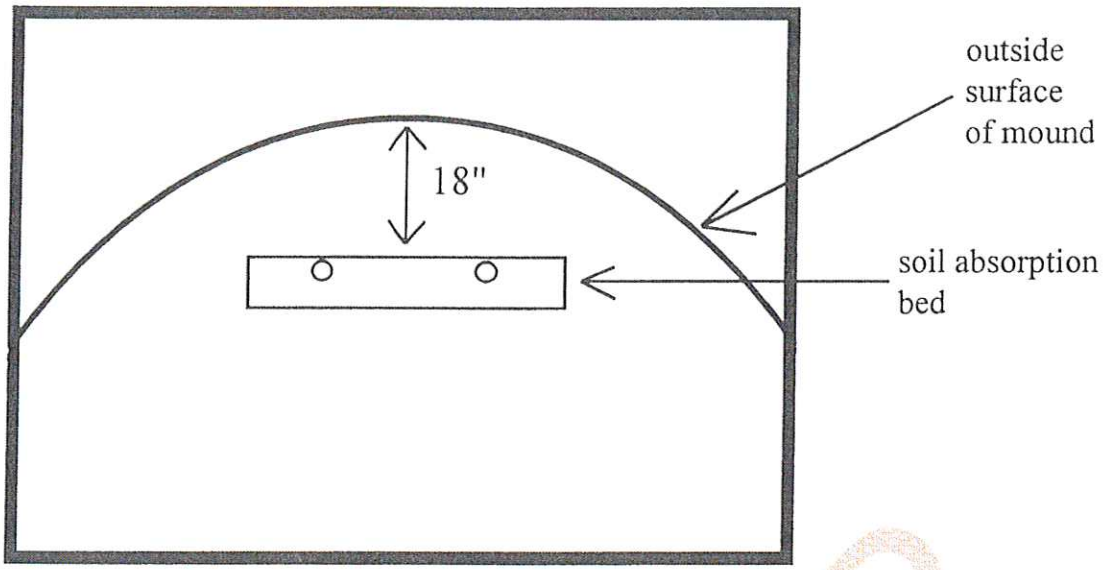
ter." Actual water does not have to be observed, the mottling is the indication that groundwater has "fluctuated" that high and that there is a potential for the groundwater to rise that high again, and the system must be designed based according to the soil tester's observations.

Mound landscaping info

The rules for landscaping on or near a mound are actually quite simple. On the upslope side of the mound (on a sloping lot) you can fill right up to the top of the mound to blend the mound into the slope. Some certain percentages of slope are better than others, but on some hills you can blend in a mound (only from the upslope side) until it virtually disappears by blending right into the natural hill! You can plant trees virtually to the very upslope edge of the mound, just not on the mound itself. It is **NOT** advised that you plant silver maples or willow trees near any system.

The downslope side is completely different. The intent is not to disturb the downslope side of the mound in any way for within 25 feet of the downslope side of the mound. The biggest concern is compaction. The compaction of the downslope side of the mound could adversely affect the mound and its normal functions.

As for actually planting <u>on</u> the mound itself, it is recommended not to plant anything that would have a large root system (i.e. trees on a mound would destroy the mound). The reason for this is that the actual soil absorption (or seepage bed) portion of the mound is typically only <u>18 inches</u> below the very top of the mound! (See mound cross section). Plants with very small root structure such as wildflowers offer a good option of something to plant on the mound. First and foremost, a good thick layer of grass should initially take hold on the mound to prevent erosion.



Mound cross section
(not to scale)

How much will a system cost?

There are many variables which affect the price of an on-site wastewater treatment system. A review of a completed soil test will allow an installer to determine the answers to such pricing variables. The installer will review the type, depth, square footage, distance of system from the house, etc. All of these are important in pricing a system. Asking how much a system costs without a completed soil test is like asking how much a car costs without knowing what kind of car it is, or what options are to be included.

The type of system is important because if it is a pressurized system instead of conventional (i.e. gravity), the price is initially affected due to the addition of a pump and pump tank which may not have been required if the system was a conventional.

Some people call us and say, "I'm thinking about a lot, and the seller says it passes for a conventional system. How much will the system cost?" Please realize one thing. When someone says that a lot

"passes for a conventional system" without reviewing a completed soil test, that statement does not mean very much. Of course, when people hear the word "conventional," they automatically assume "inexpensive." Conventional systems typically are less expensive than other types of systems, but there are several variables which add costs up fast on some conventional systems. One example is a person who was told the lot he was buying "passes for a conventional system." Assuming conventional meant inexpensive, this person bought the lot. In reality it only barely passed for conventional. The soil conditions required 2000 square feet of seepage bed, where in optimum soil conditions a four bedroom house would only require 858 square feet of seepage bed. Every square foot of a system affects the price, as each square foot requires machine time to excavate, washed stone for the treatment medium, pipe, synthetic fabric, labor, and backfilling. What this customer was also not told was that the area that did "pass" for a conventional system was located at an area on the lot which was 30 feet above the area where the house was to be located, so a pump and pump tank were also needed for the system. The price of this "conventional" system wasn't too much less than a mound.

The other pricing variable besides all of the design criteria on the soil test is site access for trucks, equipment, and stockpiling. A system being installed on a flat, non-wooded lot which has room for all of the spoil (excavated dirt) to be stockpiled along the edge of the excavation will cost significantly less that a system on a wooded lot which all spoil has to be loaded on trucks, hauled away, and hauled back in when it is time to backfill. Most systems are quite trucking intensive and require good open access for large dump trucks and other big equipment. If site restrictions do not allow good, easy access for large equipment, the use of smaller equipment will increase the time spent on the project and the price will increase accordingly.

Chapter Four
Evaluating Existing Systems

What to look for

What if you are buying an existing home and want to get a good representation of the status of the existing septic system?

It must be stated up front that it is impossible to tell "how long a system will continue to work properly" from the time an evaluation is done, but there are some easy ways to determine if the system is working properly or if you should be concerned. And, of course, if you are the buyer, make sure you have the seller's written permission to perform a thorough evaluation of the system before doing any of the following. The following system evaluation method is only accurate if the house is currently being lived in. The evaluation will not be accurate if the house has not been lived in for a while, or if the septic tank had already been pumped within the last three to five months. Also, remember that the current usage versus your proposed usage of the system could dramatically affect the system. If one person is living in the house now, the system could appear to be functioning properly based on the low water usage of only one person. If you now plan to move into the house with a family of three or four, the system may fail immediately as it was only "getting by" on the extreme low water usage of one person. This is definitely something which must be considered when evaluating an existing system.

If the existing system is a conventional (subsurface) system first look for obvious signs of effluent (wastewater) surfacing to the

ground level in the area of the septic tank or "seepage bed." Surface discharge is one of the main definitions of a failed system.

The next step in evaluating a conventional system (and probably the most important) is to have the septic tank professionally pumped out. There are several things you want to observe before, during, and after the septic tank is (being) pumped out.

Immediately upon removing the septic tank manhole and prior to pumping the tank, observe the water elevation in the tank. The elevation should be at the bottom of the outlet pipe.

▶ If the level of the wastewater in the septic tank is below the outlet pipe, the tank may not be structurally sound. The tank may have cracks allowing the wastewater to leak out into the ground without being properly treated.

▶ If the level of the wastewater in the septic tank is above the outlet pipe, there is an adverse reason the water is not exiting the tank at its normal rate. It could be a blockage in the pipe or a broken pipe. Even worse yet, the high level in the tank could indicate that the "seepage bed" portion of the system is in a "saturated" state, and is becoming impervious even to water, causing the water level to rise in the "seepage bed," pipe, and septic tank.

▶ If the level of the wastewater in the septic tank is not only above the outlet pipe, but also above the outlet baffle, the high level could be caused by any of the above, but water level above the baffle should cause great concern. Water level above the outlet baffle means the septic tank has ceased functioning in one of its most primary purposes. The baffle is used solely to prevent greases, fats, and light solids which all float at the top of the water from exiting the tank. This layer is then removed during the tank's periodic pumping. If the water level is above the outlet baffle these fats, greases, and solids are being allowed to flow out of the septic tank and into the soil

absorption ("seepage bed") portion of the system, causing the system to eventually fail much faster.

Another item to check is the observation pipe/fresh air inlet (commonly referred to as a vent). This should be located at the end of the soil absorption portion of the system or "seepage bed." By removing the vent cap and checking the amount of water (if any) in the bottom of the pipe, some people claim to determine how the system is functioning. This is typically not a very accurate way to evaluate a system, but for some systems you may gain a little additional information. No water in the bottom of the vent doesn't mean much. A very small amount of water in the bottom of the vent (i.e. one inch, plus or minus) also doesn't lead to much conclusion. However, if there is a substantial amount of water in a vent (i.e. three to four inches or more) or the water level is actually up inside of the vent pipe, then this could be a sign that the system has reached some stage of "saturation" and is working its way toward an eventual failure.

Again, there is no way to tell how long a system is going to last from a certain time forward. The variables of how long a system will last are many; volume of water usage, how the system is maintained, soil conditions, etc. All the previous evaluation techniques provide is a determination of how the system appears to be working at the time it is evaluated.

It is rumored that some people evaluate systems by pulling a tanker truck up to the septic tank and flushing hundreds of gallons of water into a system all at once with the premise that they will somehow be able to determine the status of the system by observing how the system reacts to this large volume of water. Not only is this method not recommended but may actually harm the system by flushing solids in the tank out into the bed and "flooding out" the system. Systems are not designed for large "doses" of water. Not only

will this potentially cause harm to the system, there is absolutely nothing that can be gained from this method.

System Evaluation Recap:

1 Look for obvious signs of discharge of wastewater to the ground surface.

2 Check level of water in septic tank. Water should be at elevation of bottom of outlet pipe.

▶ If water is above bottom of outlet pipe, there is an adverse reason the water is not exiting the tank fast enough to be at the normal level. It could be a blocked pipe or in more severe situations, a "saturated" seepage bed which no longer accepts water as fast as it should.

▶ If the water level in the septic tank is below the outlet pipe, the tank may not be structurally sound and may be leaking into the ground without the wastewater being properly treated.

3 Have the septic tank pumped and watch for "drainback."

▶ A small amount of water trickling back into the tank from the outlet pipe may not be cause for alarm. However, a substantial amount of water pouring back into the tank from the outlet pipe during pumping may indicate the seepage bed portion of the system is no longer taking water at an adequate rate, it could potentially be working its way to failure. A system working properly will have little to no water "drainback" into the tank from the outlet pipe during pumping.

Chapter Five
Basement Plumbing

"Underfloor" or "Hung" Plumbing?

Definitely one of the most frequently asked questions, and with very good reason. This question specifically pertains to newly constructed buildings which have basements. These two types of plumbing in the basement are quite different from each other, and each has drastically different pro's and con's.

First let's review the definitions:

Underfloor plumbing: This refers to a house in which all of the plumbing/wastewater exits the house through a sanitary sewer beneath the basement floor level. All basement plumbing fixtures drain beneath the basement floor to the main sewer pipe. All of the plumbing from the upper floors also flows straight down through a few pipes to the sewer pipe beneath the basement floor. This is typical of homes on municipal sewer where sewer mains run deep enough. Because of how deep some municipal sewer mains run, gravity flow can normally be achieved from the sewer lateral beneath the basement floor to the sewer main. In instances where the sewer main is not deep enough, hung plumbing would be required even for the municipal sewer. A basement in a house with "underfloor" plumbing can have finished rooms quite easily as the few plumbing pipes coming from the upstairs floor(s) can be built into walls.

Hung plumbing: This refers to a house with a basement in which all of the plumbing/wastewater must exit the house through a

sanitary sewer at a higher elevation than beneath the basement floor. An example of this is that the optimum depth at which a sanitary sewer (which is discharging into a septic tank) must exit the house is 18 inches (minimum) to 24 inches below finish grade. This typically means that a house on a flat lot with a basement fully in the ground on all four walls has "hung" plumbing in the basement. The plumbing from the upper floors is piped down to just beneath the first floor level (virtually the basement ceiling). This piping then flows by "gravity" (basically has a pitch to it) to the point where it all ties together, and one sewer pipe runs through the basement wall. Again, for a septic or mound system this sewer exits the house between 18 and 24 inches below finish grade.

If the basement has any plumbing in it (including a floor drain), the basement plumbing drains "gravity" beneath the floor to a sealed "sanitary sump crock." This crock (see figure 2) has a pump which pumps the basement level wastewater up to the level of the "hung" plumbing, where it also ties into the sewer exiting the house through the basement wall. The sanitary crock should be sealed airtight, and be vented into the regular plumbing venting.

"Hung" plumbing makes it harder to "finish" basement rooms, as the plumbing pipes are hanging below the ceiling level. The plumbing pipes can be hid by "boxing" them in or by also having a "drop" ceiling. The success you will have hiding "hung" plumbing in finished ceilings depends on careful planning between you, your inside plumber, and your builder.

Some general guidelines to follow to help determine whether you will have *underfloor* plumbing or *hung* plumbing (of course all of these are assuming your lot is not served by a municipal sewer system deep enough to achieve gravity flow):

1 If you are building on a flat lot and all four walls of your basement are "below grade," you more than likely will have to have "hung" plumbing. If you have any plumbing in the basement (including a floor drain--even if your plumbing in the basement is only a floor drain!), you will also need a sanitary crock with a pump to pump the basement wastewater up to the level of the "hung" plumbing.

2 In a situation where the home has an exposed (walkout) basement wall, you could have "underfloor" plumbing as the sanitary sewer could still exit the house 18 to 24 inches below finish grade out the exposed side. If your conventional system is yet downslope from the exposed basement wall, you may still be able to achieve gravity flow to the system. In an instance where you exit the exposed side to eliminate the need for "hung" plumbing, but your suitable system area is upslope of the basement floor, you would need to add an external pump tank and pump after the septic tank to pump the effluent up to a higher elevation. In the instance of a mound or other pressurized system, you would need the external pump tank and pump regardless of elevations or slopes.

Chapter Six
Maintaining a System

"How long will my system last before it fails?"

How a system is used (or abused) is directly proportional to how long it will last. Systems that are extremely abused can fail in one year. Systems which are heavily abused (i.e. daily use of a garbage disposal, grease and/or oils poured down the drain, etc.) can fail in as little as four years or less . Other **mounds and conventional septic systems can last for many years if used and maintained properly.** Proper maintenance and use of a system can add many years to a system and is basically common sense once you understand what causes a system to fail.

How to optimize your system

On-site wastewater treatment systems are progressively failing systems. You definitely want your system to be designed, installed, and maintained so that you are not digging up your yard and replacing your system in just a few years. There are several steps that can be taken to truly extend the longevity of your system. Please read the following carefully, and also refer to page 43 for a list of "do's and don'ts."

If your lot allows enough room, a **second septic tank** is one of the most important things you can do to try to maximize the life of your system. A second septic tank has been shown to reduce the amount of solids getting from the first septic tank to the "seepage bed" (or soil absorption portion of the system) by up to 50%! Although a two-compartment septic tank is better than a standard one septic tank system, a second septic tank is much better than the tiny second compartment of a two-chamber tank. Some of the major variables in what make a second tank important to reducing solids is the area, volume, and retention time of the second tank. A small chamber in a two-compartment tank does not compare to a second tank in these variables.

One of the main causes of solids getting out of the septic tank and into the seepage bed portion of the system (or into the second tank) is water being introduced into the septic tank with such a great force that a portion of the solids which are settling on the bottom of the tank are riled off the bottom, incorporated into the water, and washed out of the tank. Primary causes of this powerful surge of water are the force at which water enters the tank from second story plumbing, use of a sewage ejector pump in the basement, or septic tanks being set substantially downgrade of the house. If a second septic tank is incorporated into the system, the surge of water entering the first tank is slowed to the point of not affecting the solids in the bottom of the second tank nearly as much as in the first. This allows most of the solids which escape the first tank to settle in the bottom of the second tank. This prevents a large portion of the solids, which would eventually clog the "seepage bed" portion of the system, from even getting that far.

A mound or other pressurized system has a septic tank and a pump tank. Many people assume (because the pump tank looks

virtually identical to the septic tank) that the pump tank counts as a second septic tank. Absolutely not! The pump tank has a pump just inches from the bottom of the tank. Whatever gets from the septic tank and into the pump tank will be pumped out into the system. In this type of system, a second septic tank would be between the first septic tank and the pump tank, for a total of three actual "tanks."

In all cases some solids will leave a septic tank, but in instances where a sewage ejector is used (where basements have a toilet), where there is plumbing on a second (or higher) story, or the septic tank is set well downgrade of the house, the amount of solids that will get out of the tank will be substantially more.

An **effluent filter** is also highly recommended for any on-site wastewater treatment system. An effluent filter takes the place of the septic tank's outlet baffle and filters out solids (down to 1/16 of an inch) from getting out of the septic tank. This filter must be periodically cleaned to prevent clogging. Some people use an effluent filter instead of a second septic tank, while some people use effluent filters in combination with a second septic tank. (The effluent filter takes the place of the outlet baffle in the second septic tank.) Maintenance and cleaning of this type of filter is quite easy and takes only minutes.

Things to remember

Have your septic tank(s) pumped on an annual basis. Having your septic tank(s) pumped once per year is an excellent way of maintaining your system for maximum longevity. When your septic tank is pumped, the pumper is pumping the solids accumulating in the bottom and at the top of the tank. These solids that are being removed by the pumper are what will eventually cause your system

to fail. Reducing the amount of solids before they create a problem is one of the best things you can do for the system.

Many people say "well my grandfather had a septic and he never pumped it for fifty years." There are many things to remember about the times our grandparents didn't pump their septic tanks. As recently as twenty to thirty years ago clothes washing was not done in a manner in which extremely hot water was ejected in large doses into their septic system . Clothes washing was done in a manner which the wash water was then literally just poured outside, "out the backdoor." Only recently have garbage disposals been prevalent, as well as dishwashers, the use of cleaners, anti-bacterial soaps, and other chemicals which just were not used on a daily basis in our grandparent's day. The use of all of these things (EXCEPT THE GARBAGE DISPOSAL!!!) is fine with your septic system, but realize these are just some of the many things which have changed in the recent past and are all causes for you to be much more aware of the need to maintain and regularly pump your septic tank to prolong the longevity of your system.

Do not use a garbage disposal. Using a garbage disposal is one of the worst things you can do to an on-site wastewater treatment system. Using a garbage disposal adds up to 36% more solids to the system! By using a garbage disposal you are asking for a problem. Not only do garbage disposals create fine "solid" particles, it also extracts greases and oils from the food while it is grinding it up, which adversely affects the system.

Do not pour cooking oils and greases down the drain or into the toilet. Of course any other oils or greases should be avoided as well, but in a residential setting, cooking oils will be the most prevalent.

Do not use additives in the system. Additives will not benefit the system and may actually harm it. Additives are covered at greater

length elsewhere in this book.

Do not have your water softener "regeneration" discharge to your septic system. Even if your water softener discharges to a floor drain or a sink, it is going to your system. Wisconsin Administrative Code ILHR 83.04(5) allows for a water softener to be discharged to the "ground surface if a nuisance is not created." Very few people are aware of this code, so it is important to mention it here.

Use common sense. Imagine your system as a type of "filter" built in your yard, because in essence that's really what it is. "Filters" don't last forever and can only take so much of what they are supposed to filter out. These systems are not giant municipal sewer plants to which people have become accustomed to the habit of "if it fits down the pipe, I can flush it." This is far from the truth here. It is a system that if maintained properly can last for many years, but if not maintained will cause the system to fail.

Additives

Do not use any types of additives in your septic system. They do nothing beneficial and some may actually harm the system and/or the environment. Adding yeast to the system is one of the biggest septic myths of all time. Adding yeast to your septic system will do nothing at all.

Many additives claim to get rid of grease in the system. What they mean is the grease will liquefy, or become suspended in the water and float out of the tank--into the seepage bed!!! The reason you have a septic tank is to prevent the greases and solids from getting out to the seepage bed portion of your system. This type of additive will only cause your system to fail faster!

Some other additives will cause some of the solids on the bottom to also become waterborne and get out of the tank, on it's way to clogging the seepage bed. Remember--once a seepage bed is failed there is no cure other than replacing the system! Additives may (and some will) cause your system to fail faster!

Some do nothing at all as they are "yeast based" because so many people (including makers of the additives) believe in the fallacy of yeast helping systems.

Some additives are actually caustic and not only will not help your system, but may be dangerous to the environment and groundwater by not being biodegradable in an anaerobic environment. These caustic chemicals may pass untreated through the system, through the ground, and eventually into the groundwater.

Do not use any additives in your system!

Do

Do have your installer install two septic tanks.

This has been shown to reduce the amount of solids getting into the bed by up to 50% !

Do have a filter installed in your septic tank.

This will also reduce solids which cause clogging!

Do have your tank(s) pumped once per year.

This is done to remove the accumulation of solids in the tank(s).

Do read, understand, and follow the Don't list!

This is the most important page in this book.

If you don't read or remember anything else from this book, this page is a must.

If you follow the steps on this page, you could substantially extend the longevity of your system.

Don't

Don't install a garbage disposal.

This not only creates the fine particles you are trying to prevent accumulating in your system, but it also creates oils and greases which cause these fine particles to accumulate faster!

Don't pour or flush oils or greases into your system.

Causes the solids to accumulate much faster and subsequently faster system failure.

Don't use "additives" in the system.

-Some do nothing at all
-Some actually harm the system
-Some actually harm the environment

Don't have your water softener discharge into your system.

-Water volume from softeners is detrimental to your system.
-It is code complying to have your softener discharge outside untreated.

Don't flush <u>anything</u> down the toilet that could potentially clog your system.

Do not think of your toilet as a method of disposing of objects that wouldn't normally go in your toilet. Items as small as cigarette butts are detrimental to the system due to the particles which could accumulate in the system. Just because an item "fits down the toilet" does not mean it won't clog your system!

<u>Remember</u>: Septic systems and mound systems are not permanent! Nor are they giant municipal sewer systems that can handle anything you pour or flush into them! They are merely filters built in your yard that will fail (due to accumulation of solids) at some point in time. The above information, if followed properly will help you maintain your system for as long a time as possible.

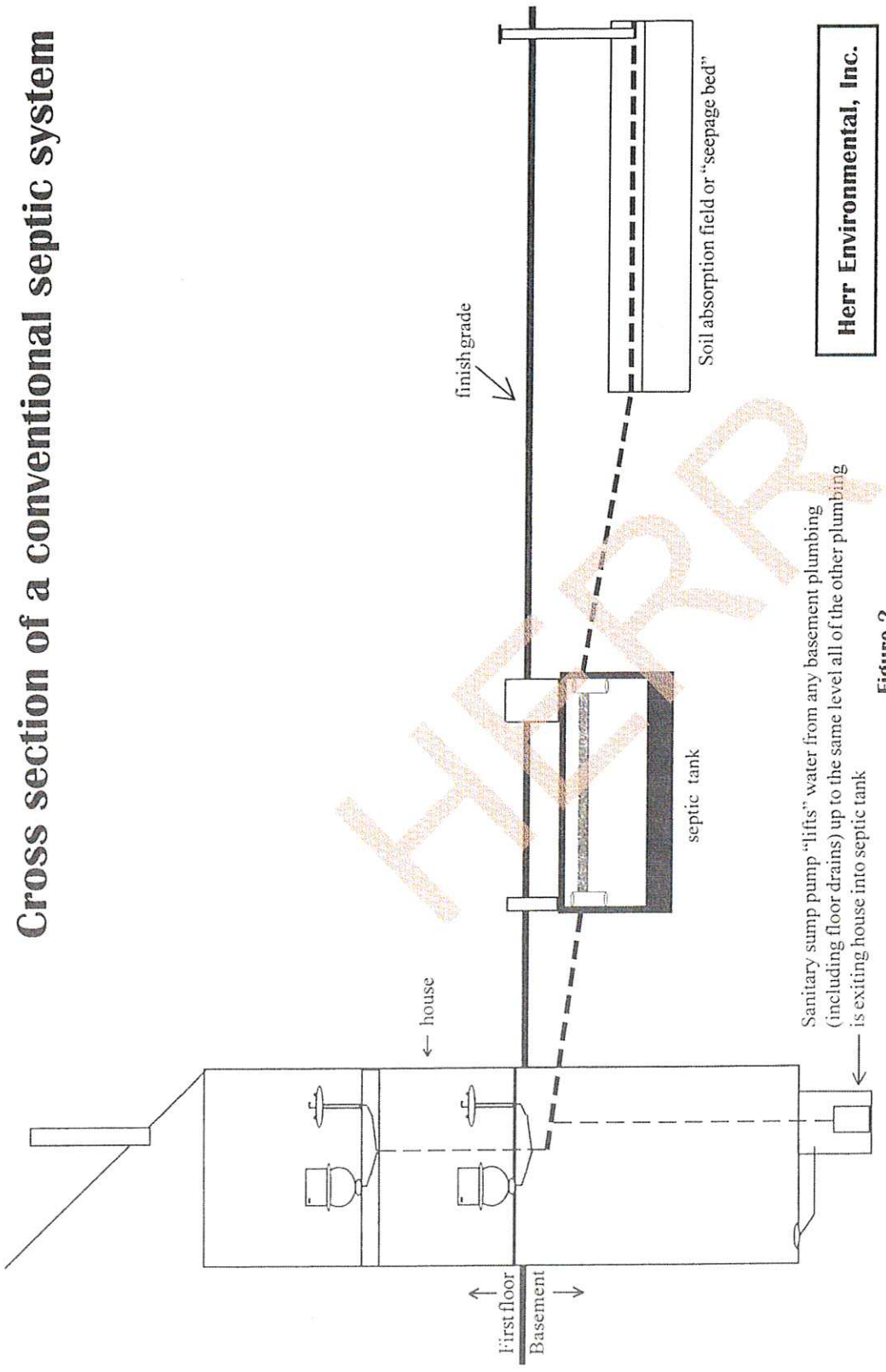

Cross section of a conventional septic system
finish grade
Soil absorption field or "seepage bed"
Herr Environmental, Inc.
septic tank
← house
Sanitary sump pump "lifts" water from any basement plumbing
(including floor drains) up to the same level all of the other plumbing
is exiting house into septic tank
First floor
Basement

Figure 2

Cross section of a mound system

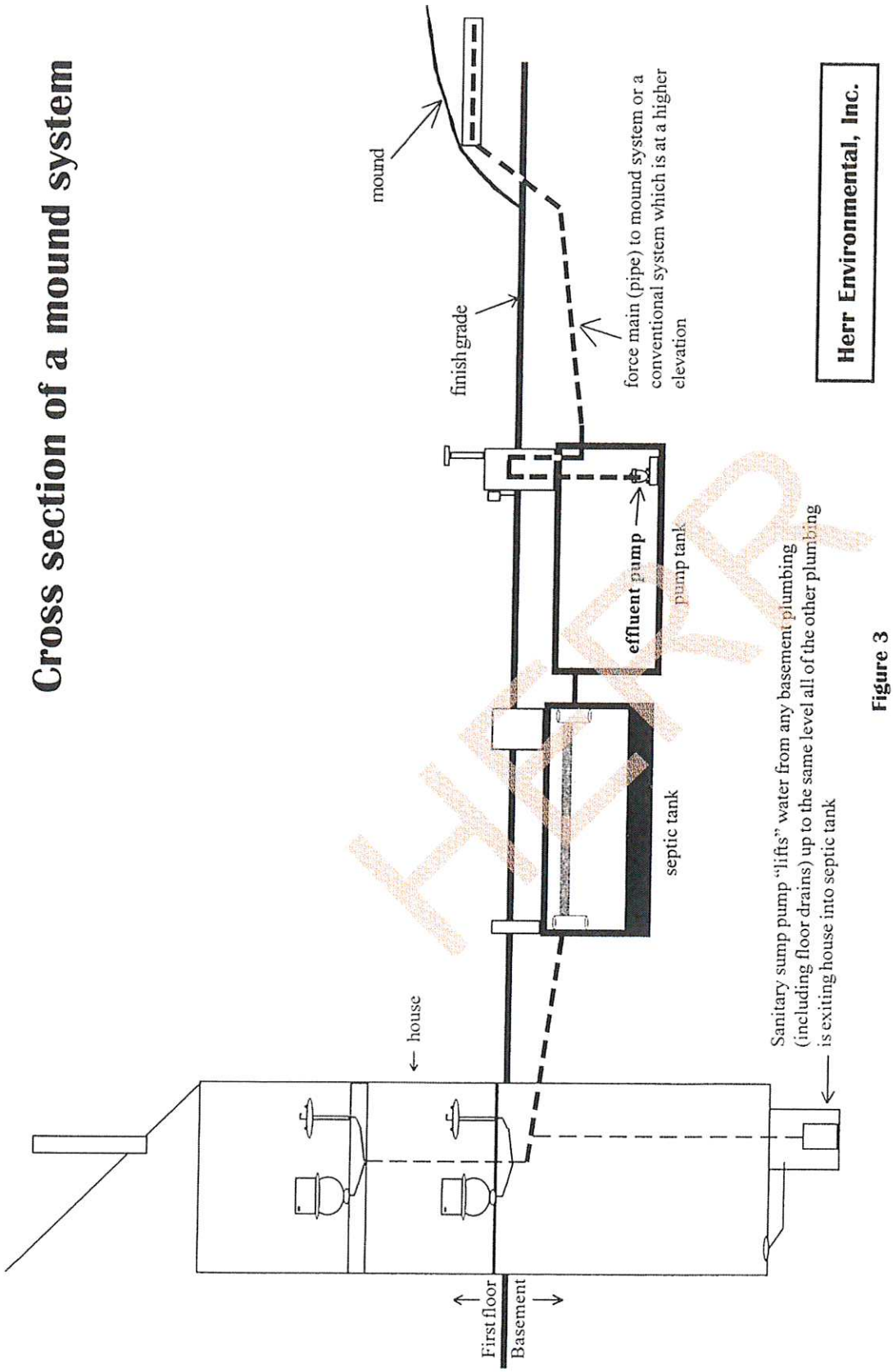
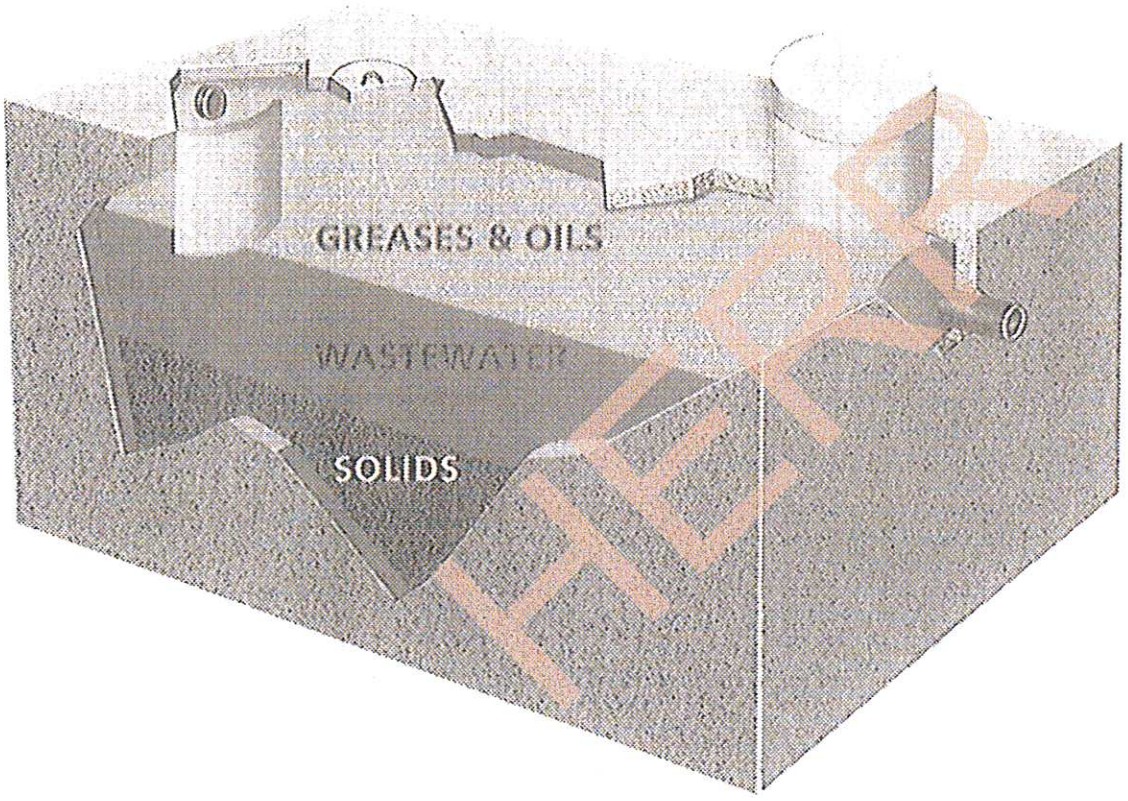
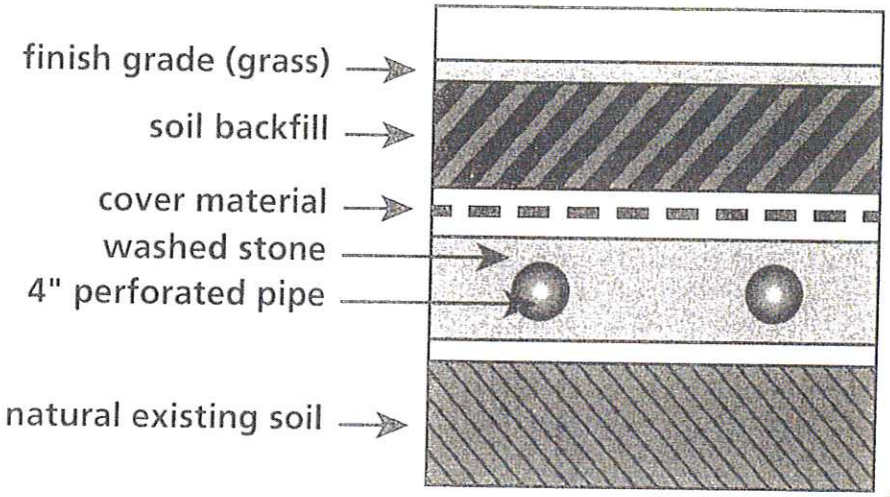


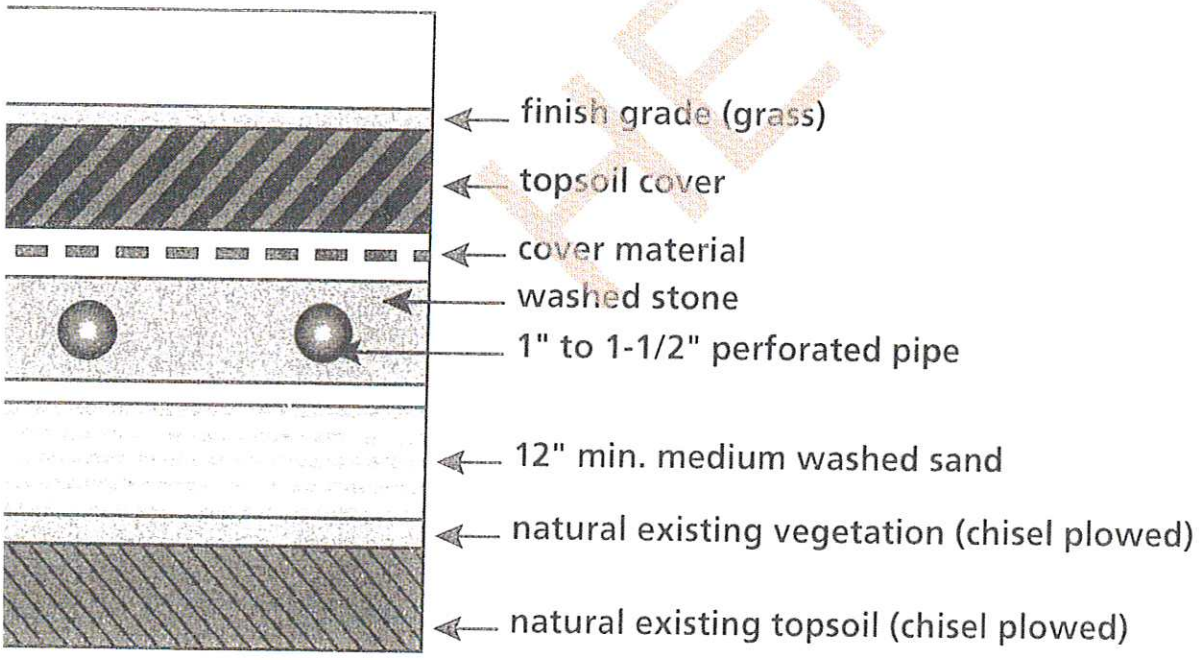
Figure 3



Cross-section
Septic tank



CONVENTIONAL
CROSS-SECTION



MOUND
CROSS-SECTION

GLOSSARY

Aerobic system - A system which incorporates oxygen into the treatment process of the wastewater. Treatment of the wastewater aerobically has been shown to dramatically reduce the amount of suspended solids and other contaminants in the wastewater in a much more thorough manner than typical anaerobic (septic tank) type systems. Aerobic pretreatment is typically achieved in a special aerobic tank which infuses much oxygen into the treatment process, or by pretreating the wastewater through a sand filter or other type of aerobic process. In Wisconsin, the aerobically pretreated wastewater is then still filtered through some type of final soil absorption method, whether a mound system or a conventional "seepage bed" system. By aerobically pretreating the wastewater, these systems are receiving water which is virtually free of any solids, thus substantially extending their longevity.

Anaerobic system - A standard septic tank treats wastewater anaerobically (without oxygen). This method does not quite treat the wastewater as efficiently as an aerobic system.

At-grade system - A system built above the ground due to a limiting factor such as high groundwater. Similar to a mound system but does not have the layer of washed sand between the existing topsoil and the "system elevation" or bottom of the soil absorption system. The "seepage bed" portion in an at-grade system is installed directly on the ground surface which has been chisel-plowed, then covered over with

topsoil. Typically the length is much longer than a regular mound system.

Baffle - A baffle in a septic tank is a device which protects the outlet pipe and inlet pipe from the layer of greases, fats, and light solids which float at the top of the water ("scum layer") in the septic tank (see figure 1). In a normally operating septic tank the baffles do not allow this "scum" layer to float out of the tank. If this "scum" layer was allowed to get out of the septic tank, the eventual failure of the system would happen much faster.

Conventional system - A system in which the soil absorption portion ("seepage bed") is below the ground surface and the flow of the effluent (wastewater) can be achieved from the septic tank by gravity.

Effluent - The wastewater which exits a septic tank, pump tank, or other type of treatment tank.

Effluent filter - Effluent filters are used instead of an outlet baffle in some septic tanks, causing larger solid particles to actually be filtered out of the wastewater on it's way out of the septic tank. This will help reduce the amount of solids getting out to the soil absorption ("seepage bed") portion of the system and could slow the clogging which will eventually cause the system to fail.

Holding tank - On sites that are not served by a municipal sewer and do not have suitable soil or suitable area for an on-site wastewater treatment system, not even a mound, a holding tank is the last resort. A holding tank is exactly what it sounds like. A house served by a holding tank has all of its wastewater go out into a tank which, when

full, must be pumped out or no water can be used. This is not the most desirable of systems due to the frequency of pumping. Frequency of pumping will vary depending on water usage and tank capacity. Single family homes on holding tanks can average pumping frequencies of between every three to six weeks.

In-ground pressure system - An in-ground pressure system is a system in which the effluent is pumped under pressure out to (typically a shallow) subsurface soil absorption system. The distribution pipes in the soil absorption "bed" are typically small in diameter (1 inch to 1-1/2 inches) and have small, specifically sized holes (or "orifices") which are located on the pipe at specific intervals to achieve equal distribution of effluent throughout the system.

Mottles - Soil mottling is a discoloration or almost a staining in the soil of spots and streaks of colors that contrast with the dominant soil color. Certified soil testers/morphological evaluators and other soils experts use mottling as one way of determining the site's limiting factor, or how high in the ground the potential is for saturation or other seasonal groundwater fluctuations. The presence of mottles is deemed an indication that the soil has been subject to saturation and may be subject to the same types of saturation again at some point in the future.

Mound system - A soil absorption system that is built above the ground surface (or shallow in the ground) due to a high limiting factor such as high groundwater or bedrock. To artificially create an optimum, known soil condition above the ground to treat effluent. Once this is built above the ground and covered over with topsoil and grass, the shape is a mound shape. A mound system is a pressurized/equal

distribution system.

Perc test - A short way of saying "percolation test." Formerly the method of determining sizing and design criteria for on-site wastewater treatment systems. Percolation tests were merely holes dug with water poured in them to determine how fast water moved through the ground in minutes per inch. This method is no longer an accepted method of designing systems as it did not indicate enough other important information. Yes, you knew how fast the water was moving, but had no idea whether the water would immediately be subject to a limiting factor such as high groundwater or bedrock. A much more thorough method of analyzing the soil (a morphological evaluation) is now used to determine design characteristics for systems. Of course, many people still (mistakenly) refer to them as "perc tests."

Sand filter - A method of pretreating effluent aerobically. After leaving the septic tank, the effluent is pumped to the top of a large "bed" of specifically sized sand (the sand filter). This effluent is being aerobically treated, which is considered a very good way of treating effluent. In Wisconsin, the effluent then goes from the sand filter to a final method of soil absorption (a mound, seepage bed, or seepage trenches).

Seepage bed - The term often used for the final (soil absorption) portion of an on-site wastewater treatment system. Typically it is a large (often rectangular shaped) "bed" of washed stone with perforated pipe running throughout lengthwise. The pipe is covered with more stone. The stone and pipe is covered with a synthetic fabric (or in some cases a layer of hay) to prevent blocking up the pores in the

stone with dirt while backfilling.

Septic tank - A septic tank is the first partial treatment process for all of the wastewater exiting a building which is not served by municipal sewer. The wastewater exits the house through a sewer pipe which enters the inlet side of the septic tank. The inlet and outlet of the septic tank are on opposite ends of the tank, both near the top of the tank (see figure 1). The inlet and outlet are near the top of the tank so that the largest, heaviest solids can settle out of the wastewater to the bottom of the tank. Some of the solids settling to the bottom are broken down by some anaerobic bacteria, but the majority of the solids just begin to accumulate and begin to form a large layer on the bottom of the tank. Greases, oils, and lighter solids which tend to float toward the top of the wastewater. This top "scum" layer is kept from exiting the tank by "baffles" which cover the inlet and outlet of the tank (from the inside). The bottom and top layers of greases, oils, and solids are what are important to have pumped from your tank on a periodic basis. The baffles only allow the relatively cleaner water out of the middle of the tank (see figure 1).

Soil test - A detailed analysis of a site's soil (morphological evaluation) and site (slopes, setbacks, etc.) characteristics as they relate to the design of an on-site wastewater treatment system. This test determines the type, size, and location of an on-site wastewater treatment system. Typically performed with an excavator/backhoe, a minimum of three to five (or more) large backhoe pits are dug to analyze and determine the soil characteristics.

Update

Aerobic pretreatment

and the New Code

The new septic system code

The septic code (in Wisconsin) has finally changed! In July of 2000, (after more than 10 years of effort) Wisconsin approved a new revision to the plumbing code, COMM 83, which regulates on-site wastewater treatment systems .

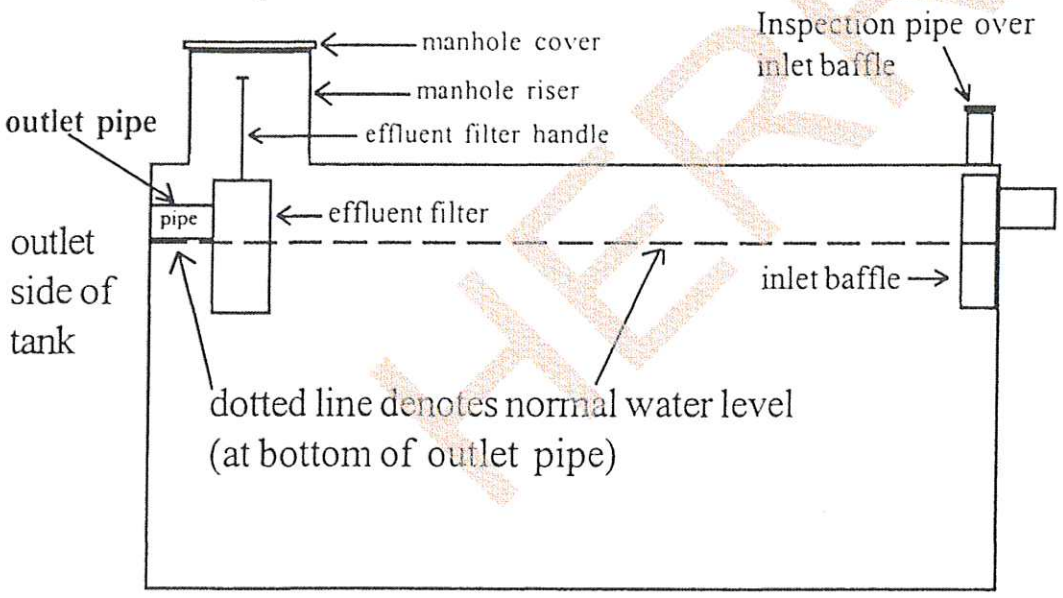
Some of the changes of the new code:

1. **Effluent filters** are no longer optional, filters are a mandatory part of all systems.
2. The distribution cell (i.e. soil absorption 'bed') inside of a mound has been increased in size by 20 %.
3. **Aerobic pretreatment** is now allowed as a code compliant option for most systems. In some instances, aerobic pretreatment allows you to reduce the size of the system you are having installed.
4. Setback from the distribution cell (i.e. seepage bed) portion of a system to a building is now only 10 feet. Previous had been 25 feet !
5. **"A + 4" mounds**, which were once only allowed for replacement systems are now allowed for new construction in most municipalities. "A+4" mounds will be allowed for new construction in all Wisconsin municipalities (that are not served by municipal sewer) in January of 2003 (where suitable soil is shown to exist by a certified soil tester).

Effluent filters replace the outlet baffle on the septic tank. The water must travel up through the filter on its' way out of the tank, reducing the amount of waterborne solids that will eventually clog the distribution cell (i.e. 'seepage bed').

Effluent filters are easily cleaned on a periodic basis by pulling the filter out of its' housing (by using a handle- DO NOT EVER ENTER THE TANK UNDER ANY CIRCUMSTANCES!) and hosing it off back into the tank. The filter is then slid back into the housing.

Filter cleaning frequency will vary with every system. Filters in a system that only has ONE (single chamber) septic tank should be at least looked at every 30 to 90 days to determine if the filter needs cleaning. You can tell if the filter needs cleaning by sliding the manhole cover over and looking at the water level in the septic tank. A water level that is higher than normal would indicate that the filter should be cleaned. **Normal water level is at the bottom of the 4 inch pipe that exits the septic tank.**



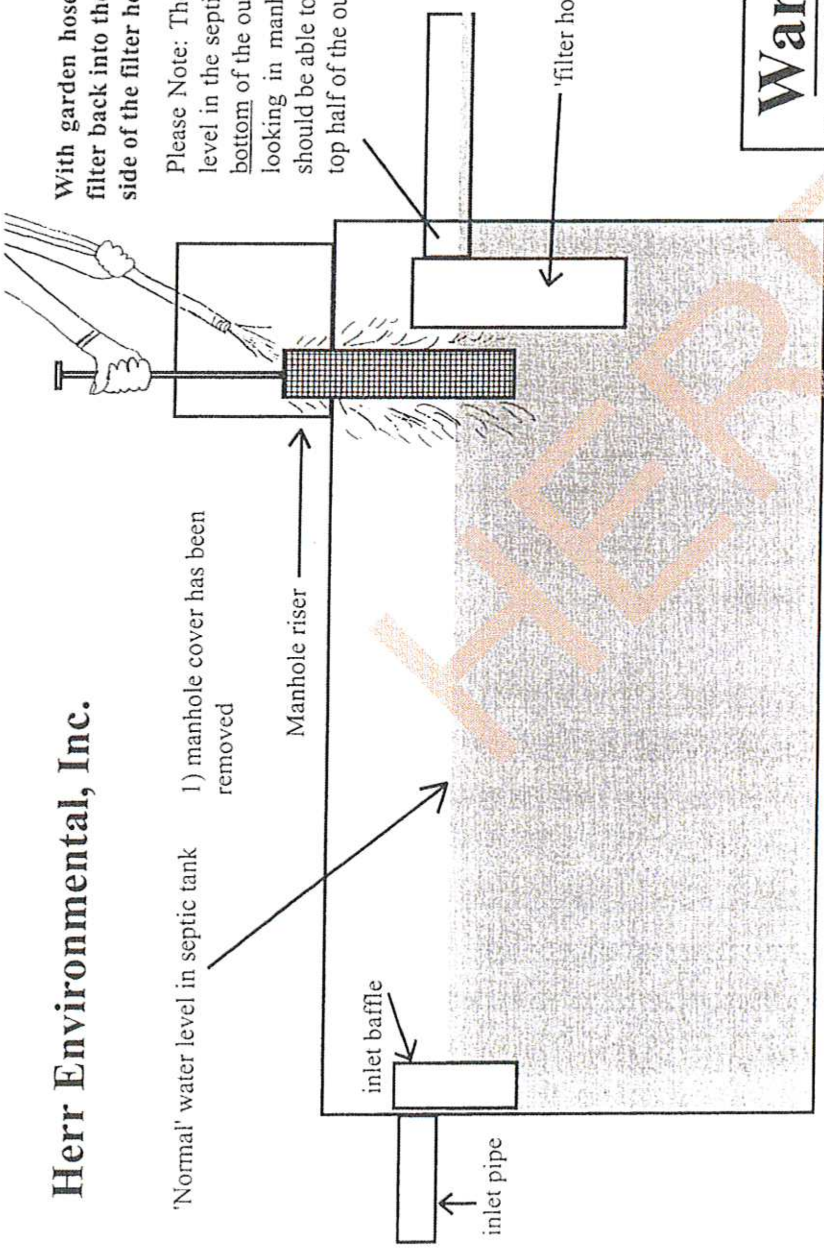
septic tank cross section
not to scale

Many people think the 'normal' water level in a tank looks 'too full'. The inlet and outlet of the tank *are* toward the top of the tank which makes the tank look 'full' when it is actually at the normal level. If the water level rises close to the top of (or over) the outlet pipe, the filter definitely needs cleaning. The water level in a system with a two chamber tank, or a two-septic tank system should be checked every 8 to 12 months, or per the manufacturers recommendation, whichever is more often.

Herr Environmental, Inc.

With garden hose, spray off filter back into the tank (outside of the filter housing).

Please Note: The normal water level in the septic tank is at the bottom of the outlet pipe. When looking in manhole cover you should be able to see at least the top half of the outlet pipe.



Warning

DO NOT ENTER the septic tank for any reason! It is extremely dangerous and could result in death ! Cleaning the filter can easily be accomplished from outside of the tank. If unsure call Herr or your pumper to clean your filter or to show you how.

Cleaning the Effluent Filter

Aerobic systems incorporate the use of oxygen into the treatment process of the wastewater . Pretreatment of the wastewater aerobically has been shown to dramatically reduce the amount of suspended solids and other contaminants in a much more thorough manner than typical anaerobic (septic tank) type systems. Aerobic pretreatment is typically achieved in a special aerobic tank which infuses much oxygen into the treatment process, or by pretreating the wastewater through a sand filter or other type of aerobic process. In Wisconsin, the aerobically pretreated wastewater is then still filtered through some type of soil 'distribution cell' method, whether a mound system or a conventional (subsurface) system (depending on soil test results). By aerobically pretreating the wastewater, these systems are receiving highly pretreated water, which has a significant reduction in solids, extending the longevity of the system.

Another benefit of an aerobic system is a reduction in size of the distribution cell ('seepage bed') area. Because water that has been aerobically pretreated is unlikely to form a clogging mat, Wisconsin allows significant size reduction of the distribution cell (seepage bed) portion of most systems .

'A + 4' mounds typically were for replacement systems only, but now are allowed for new construction. Prior to the new code, when a soil tester performed a soil test, new construction sites required 24 inches of suitable soil above the limiting factor to pass for a mound system. A limiting factor is high groundwater, bedrock, or a restrictive soil layer such as clay. For replacement systems the soil tester was only required to find topsoil ('A'), plus 4 inches of suitable soil beneath the topsoil above the limiting factor. If topsoil plus the next 4 inches was less than 24 inches, the difference is made up in the design and construction of the mound by adding additional sand to compensate for the amount less than 24 inches.

Troubleshooting Systems

In case of emergency! When a problem occurs within any type of septic or mound system, the possiblity exists of untreated wastewater surfacing on the ground and / or backing into the house. If this begins to occur, or any indication happens that would lead you to think this might occur, immediately contact a certified septic tank pumper to pump the tank(s) out. By having your tank(s) pumped out, typically the tank capacity can be used safely until necessary repairs can be made. Certified pumpers are found in the yellow pages under the heading of "**Septic Tank Cleaners**", or sometimes "Septic Tank Pumpers". Again! Your first response to any septic system problem is to have a pumper pump your system, to alleviate the potential for immediate backup into your house.

Important !

Please note that the following troubleshooting tips should actually be performed by licensed plumbers and / or certified septic tank pumpers, but in some instances some of the following might allow some people to alleviate an urgent situation.

NEVER ENTER A SEPTIC TANK FOR ANY REASON!
NEVER GO INTO A SEPTIC TANK !

Gases in a septic tank deplete oxygen, there is no oxygen in a septic tank. It would only take one or two breaths in a septic tank to asphyxiate a person . Entering a septic tank (not that most people would ever want to) can easily cause death.

Recap:

If having problems with a system:

1. **Call a septic tank pumper-have tank(s) pumped!**
2. **Do NOT enter the septic tank- death could occur!**
3. **Know the 'normal water level' info on page 55**

Troubleshooting Systems

If having problems with a system:

1. **Call a septic tank pumper-have tank(s) pumped !**
2. **Do NOT enter the septic tank- death could occur !**
3. **Know the 'normal water level' info on page 55**

Water back-up into the house

If you are having wastewater backing into the house, check the level of water in the septic tank. If the water is at the 'normal' level (bottom of outlet pipe- see page 55), then the blockage is before the septic tank. A normal level in the septic tank would indicate that the blockage could be anywhere in your sewer pipe, under the basement floor, in the house, or outside between the house and the septic tank. The pipe could be plugged or broken.

If you are experiencing problems with the system (i.e. back-up into the house) and the water level in the septic tank is high, the effluent filter would need to be cleaned. If the system does not have an effluent filter (it just has an outlet baffle) have the septic tank pumped. During the pumping have the pumper (and you can also) watch for drainback from the outlet pipe back into the tank. If there is little to no drainback, this would be an indication that the outlet pipe is plugged or broken. Steady, substantial drainback would be an indication that the system is at an advanced stage of a 'saturated' condition, and needs to be replaced.

If this system has a pump tank after the septic tank to pump the water to a higher elevation (or to pressurize the system), check the breaker panel (in the house) to make sure the breaker for the pump has not 'tripped'.

Water back-up out of manhole cover of tank

If water backs up out of the manhole cover, it is obvious the level is above normal. Immediately get the tank pumped by a certified septic tank pumper. During the pumping have the pumper (and you can also) watch for drainback from the outlet pipe back into the tank. If there is little to no drainback, this would be an indication that the outlet pipe is plugged or broken. Steady, substantial drainback would be an indication that the system is at an advanced stage of a 'saturated' condition, and needs to be replaced.

Water back-up out of ground

If water backs up out of the ground at the seepage bed location or out of the side of a mound, this is a failed system. Surface discharge of wastewater is one of the definitions of a failed system. This is an indication that a clogging mat has formed over time that has now become impermeable to water, and the system needs to be replaced. This paragraph does not include water backing out of a manhole cover (see above).

Alarm is activated

Systems that have pumps (i.e. mounds, etc.) should also have a high water alarm. The high water alarm alerts you if the level in the pump tank is at a level that is above normal, indicating that the pump is not functioning properly . The pump and alarm are typically on separate breakers. If the alarm is activated (the buzzer sounds) check the circuit breaker panel to see if the breaker for the pump was tripped. If the breaker was tripped, turn it back on and wait about 15 to 20 minutes and see if the alarm goes off. If 30 minutes after the breaker was turned back on the alarm is still activated (or if the breaker was never tripped), call a pumper to pump the tanks. Most likely the pump or the pump float switch needs replacement.

Odors

Believe it or not, odors associated with a septic system are relatively rare. The following information pertains to some odor issues, and how they can be resolved.

'Sewer gas' smell indoors

'Sewer gas' smells indoors are typically NOT directly related to your septic or mound system. Under most circumstances, indoor 'sewer gas' odors are directly related to one of the following causes:

1. Basement sanitary sump crock: If you have 'hung plumbing' (sewer pipe exits *through* the basement wall as opposed to under the floor), you probably have a crock that pumps basement level plumbing up to the sewer pipe that exits through the wall. This sanitary crock MUST be a sealed crock that allows NO air through the top. The sanitary crock is directly tied into the plumbing vent system, and any air that can escape the sanitary crock will contain the sewer gases. All pipes and wires coming through the top of the the crock have rubber grommets around them and are sometimes caulked to further prevent 'sewer gas' odors from escaping the crock. The top (cover) is bolted down with many bolts and has a rubber gasket around the entire perimeter of the top, and is also caulked sometimes for additional protection against sewer gas emission. If you check your sanitary crock and there is ANY way for air to escape, you will be getting sewer gas odors.

2. Floor drains or 'future plumbing: If a floordrain (typically in the basement), or a sink , or a shower is never used, the drain 'trap' eventually evaporates and causes 'sewer gas' odors to easily get through. The purpose of the drain 'trap' is to be full of water to prevent sewer gases from escaping. If a drain of any type is not used for a length of time, pour a pitcher of water into the drain to fill the trap and stop the odors. Pipes sticking out of the floor for 'future

plumbing' must be capped off air tight or sewer gas odors will come from them also.

Another way sewer gases can get inside of a house is if one of the pipes associated with the vent system in the house is compromised. One example is during the construction of the home a drywall screw going through a vent pipe. Nobody would ever know the screw went through the vent pipe until odors begin being noticed after a family lives in the house.

'Sewer gas' smell outdoors

'Sewer gas' odors outside are also rare but can be caused by the following.

1. Roof vents: Wisconsin building code laws do not require that roof vents be above the roof peak nor very high out of the roof. Plumbing roof vents generally only stick up through the roof a few inches, and well below the peak of the roof. 'Sewer gases' are heavier than air and will tend to remain relatively low, generally 'falling' down over the edge of the roof and gutter. Winds coming from the opposite side of the roof peak will also 'push' the gases down over the edge of the roof. Many newer houses have quite a few gables and other walls on the roof that 'box' the vent into a corner, also forcing the gases to go in one direction (typically down). The two ways to reduce or eliminate these odors :

    1. Raise the vent (extend it) substantially.
    2. There are 'carbon' filters available that fit over the vent pipe to eliminate odors.

Other causes of outdoor odors:

1. Defective-fitting septic tank manhole cover. Replacement of cover could eliminate the odor.
2. Vent on manhole cover of pump tank , at the bottom of a hill or some other area preventing good air flow. The 'carbon' filters work well here also.