

# Simply Septics

A Guide for Delaware Homeowners about On-Site Wastewater Treatment and Disposal Systems



# ON-SITE WASTEWATER TREATMENT AND DISPOSAL SYSTEMS

## How to Obtain a Site Evaluation, Septic Permit and a Licensed System Contractor A Quick Guide Through the Three-Step Process

Obtaining an on-site wastewater treatment and disposal system (OWTDS) in Delaware is a three-step process. Chapter 60, Title 7 of the Delaware Code ensures that a site evaluation must be performed on unimproved lots prior to sale.

**Step 1** Have a site evaluation performed by a licensed Class "D" soil scientist to determine what type of disposal system, under current regulations, can be sited on the parcel.

- ◆ Soil scientist performs field work, prepares site evaluation report and submits it to the Department of Natural Resources and Environmental Control (DNREC), with appropriate fee, for approval.
- ◆ DNREC reviews work and approves/denies the site evaluation within 10 working days of receipt.
- ◆ Site evaluation is mailed to owner or authorized agent (can be picked up on request).

**Step 2** Hire a licensed system designer to design the OWTDS and obtain a permit.

- ◆ Select a Class "B" designer for gravity systems.
- ◆ Select a Class "C" designer for engineered and pressure-dosed systems.
- ◆ All designs are submitted to DNREC with appropriate fee, once approved they become permits.
- ◆ Gravity permits - approximately 10 working days from time of receipt to final approval.
- ◆ Engineered permits - approximately 20 working days from time of receipt to final approval.

**Step 3** Choose a licensed Class "E" system contractor to install your OWTDS.

**Note:** Listings of all licensees and copies of the Regulations Governing the Design, Installation and Operation of On-Site Wastewater Treatment and Disposal Systems can be obtained from DNREC offices located in Dover and Georgetown and also available on-line. Contact the Ground Water Discharges Section (GWDS) at (302) 739-9947 (Dover) or (302) 856-4561 (Georgetown) if you have questions or need directions.

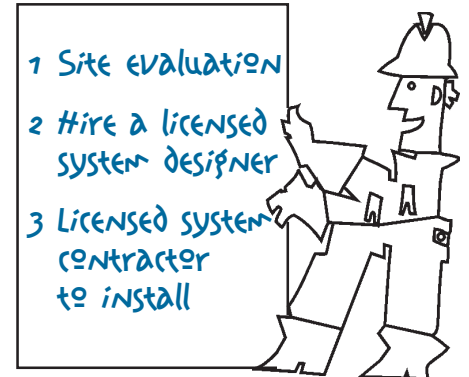
## Do's & Don't's For The Lifespan of Your On-Site Wastewater Treatment and Disposal System

### Do

- ◆ Reduce the amount of water used by taking shorter showers, installing a water-saver shower head or both. Low-flow shower heads can reduce water consumption from five or six gallons per minute to as little as two gallons per minute.
- ◆ Use faucet aerators in the kitchen and bathroom sinks. They will reduce water usage by about 50 percent.
- ◆ Use your dishwasher and washing machine sparingly. Do full loads and average one load per day to let your drainfield accept the amount of wastewater you are generating.
- ◆ Install low-flush toilets in your bathrooms or, if you have an older toilet, use a device which will displace some of the water needed to fill the tank. A plastic jug filled with water works well or, if your finances allow, replace the older fixture with one that has a smaller tank. The low-flush tanks use only a few quarts of water per flush. Reduced number of flushes can also be a water-saving technique.
- ◆ Use biodegradable toilet paper. Many products are labeled "approved for septic tank use".
- ◆ Have your septic tank pumped by a Class "F" liquid waste hauler every 3 years. Depending upon your family size, amount of wastewater generated, the age of the system or if you have a garbage disposal you may need to pump more frequently. The effluent filter requires periodic cleaning to prevent clogging.

Ensure the wastehauler pumps both compartments of your tank through the manhole covers, not the inspection port, and that all the sludge is removed. The manholes are required to have risers now which come above grade.

- ◆ Contact a licensed Class "E" system contractor whenever you have a problem with your disposal system or suspect it may be failing. Contact DNREC to determine the proper action to resolve the problem.



## Don't

- ◆ Construct buildings or allow vehicular traffic over your drainfield and replacement area. Either may result in costly damage.
- ◆ Plant any deep-rooted trees or shrubs within 10 feet of your disposal system. The roots can grow into the drainfield and reduce its capacity to handle wastewater.
- ◆ Pour grease, paints, caustic or oily liquids, fuels, cooking fats or motor oils into sinks or toilets. These can kill the bacteria and/or plug your disposal system.
- ◆ Repair your disposal system without obtaining the proper permit from the GWDS of DNREC. Only use Class "E" licensed system contractors when doing repair work.
- ◆ Climb into a septic tank. Methane and hydrogen sulfide gases, which are present from the decomposition processes, may cause illness or death.
- ◆ Dispose of coffee grounds, sanitary napkins, tampons, condoms, cigarette butts, or disposable diapers in the toilet or sink.



## How Your On-Site Wastewater Treatment and Disposal System Functions

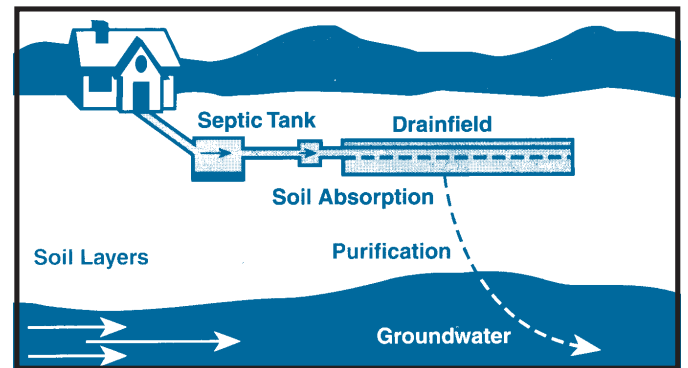
OWTDS are water treatment facilities located within your property boundaries that collect, treat and dispose of wastewater. They differ from municipal wastewater treatment facilities which receive wastewaters from other locations for treatment. The OWTDS can consist of several components: septic tank, distribution box, dosing chamber and drainfield. If properly maintained, a disposal system can last 15 to 20 years.

The purpose of the septic tank is to collect and partially treat household wastewater. In the tank, solids separate from the liquids and bacteria begins to breakdown the wastes. Approximately 60 percent of the solids are broken down by the bacteria into liquid and gas. During the two-to-three day treatment period the lighter-than-water solids such as greases, oils and toilet paper float to the top and form a scum layer. The solids, which are heavier than water, sink to the bottom forming sludge. The cloudy water in between is known as effluent.

The processes in a septic tank take place anaerobically, which means without the presence of oxygen. The gas produced is discharged through the plumbing vent system on the roof of the house. Methane and hydrogen sulfide are gases produced through these natural processes. They are extremely dangerous. You should exercise extreme care when inspecting or looking into your tank.

The final treatment step for the effluent, as it returns to the groundwater, involves the drainfield. The drainfield may be referred to as a soil absorption system, leach field or a disposal field. It is a series of perforated pipes placed in either an aggregate-filled trench or bed or placed in aggregate-free chambers to evenly distribute the effluent. The wastewater slowly trickles through these materials and into the soil beneath. Soil bacteria break down the effluent aerobically, which means with the presence of oxygen.

As the effluent seeps into the soil and approaches the natural groundwater it is purified by other soil components in conjunction with the bacteria. Toxins, viruses and other pollutants are removed from the wastewater. Clay particles located in the soil chemically attract and hold sewage nutrients (phosphates and nitrates), heavy metals and disease-carrying organisms. However, chemical additives, paint, grease, fats or thinners will kill the bacteria and clog the drainfield, contaminating the groundwater. Over time, these products can render your drainfield ineffective.



## How to Repair or Replace a Malfunctioning On-site Wastewater Treatment and Disposal System

A malfunctioning or failed OWTDS is not only a nuisance but a public health hazard. Repairing or replacing a problem system will protect your family, friends and drinking water. But, how do you know your OWTDS is malfunctioning? Here are some warning signs to look for in your house and yard:

## House

- ◆ Slowly draining sinks and toilets
- ◆ Plumbing backups
- ◆ Gurgling in the plumbing

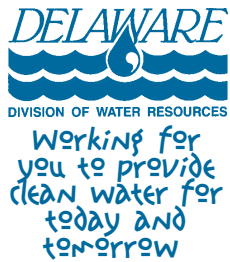
## Yard

- ◆ Damp soil or ponding over system
- ◆ Grass grows faster and greener
- ◆ Sewage odor near the system

If you discover one or more of these warning signs contact a licensed Class "E" system contractor or Class "H" system inspector to have your system inspected. You may want to contact DNREC to inform them of your troubles. Together, DNREC and the Class "E" system contractor will advise you about what they find and what course of action to take. A Class "H" system inspector is a newly created on-site professional who verifies the system components and determines the working condition of the system. The system inspector must report his/her findings to the GWDS within 72 hours of the inspection.

Sometimes, depending on the type of system, minor adjustments can be made to correct your problem, such as cleaning the effluent filter. Systems permitted after March 2002 are required to have risers extending above grade and an effluent filter. It is the property owners responsibility to provide the necessary maintenance for the proper operation of the filter. Repairs can be made to help cure some problems, such as excessive water usage, improper sizing of the drainfield or replacing older septic tanks. Or, a component replacement permit may be used to replace a metal or older concrete tank.

If the disposal system has failed, you must replace it. The replacement system must conform to the current criteria cited in the Regulations.



## State Funds Available to Repair/Replace Failed Wastewater Treatment and Disposal Systems

DNREC has dedicated a portion of the State Revolving Fund (SRF) to help Delawareans pay for the cost of repairing or replacing OWTDS that are malfunctioning. Low interest loans are available to low-to-moderate income homeowners. As these loans are repaid, the money is returned to the revolving fund to make more low interest loans to other Delawareans.

- ◆ The interest rate is 3 or 6 percent, dependent upon income.
- ◆ The loan terms, up to 20 years, with a minimum of \$1,000 & maximum of \$25,000 vary in accordance with the amount borrowed and the rate of the repayment.
- ◆ The rehabilitated property will be used as security for the loan, therefore a lien will be placed on the property for the amount of the loan.
- ◆ The loan can be used to cover the costs of the site evaluation, system design, permit(s), installation of the system and any related loan closing fees.

Please contact the Financial Assistance Branch of DNREC for information about the SRF loan program. Their phone number is (302) 739-9941. There is a non-refundable application fee. All information you supply with your application will be used solely for the purpose of evaluating your application.

## Record-Keeping Tips for Repairs and Maintenance Purposes

Knowing the location of your OWTDS is very important for repairs, pumping and traffic avoidance. All information pertaining to the disposal system should be filed together for safe keeping. Record-keeping will help answer questions and serve as a reference when determining maintenance intervals. This brochure could be used to hold this important information. The following list is a good guide for important record-keeping items.

- ◆ File detailed records of all maintenance performed, inspections and any problems.
- ◆ Obtain a copy of the permit from the contractor or DNREC and keep in the file.
- ◆ Make a map or drawing of the location of your OWTDS if unable to get a copy of the permit.
- ◆ Keep receipts and a record of pumping dates; a septic tank pumping log is included with this guide.

Visit us on the web at [www.dnrec.delaware.gov](http://www.dnrec.delaware.gov)

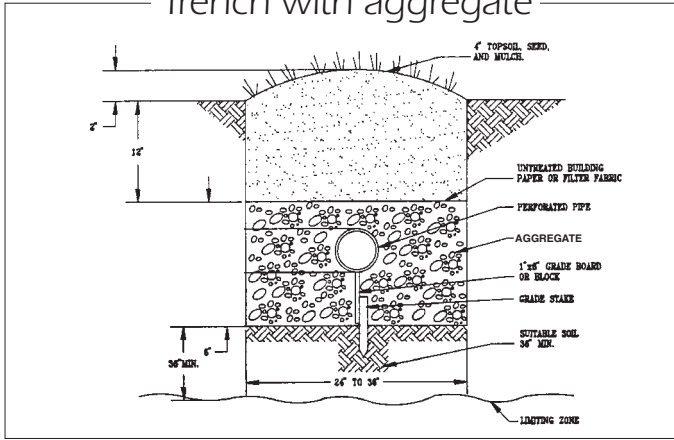
This brochure was designed and compiled by Jack Hayes, Environmental Scientist, DNREC, with assistance from Burns & Ellis Realtors, Clean Delaware, Inc., Eastern Shore Soil Services, Hollis Warren Waste Water Mgmt., Inc., Ken Darling & Sons, Inc., WWES, Inc. and numerous DNREC employees. Funding was provided by a NonPoint Source 319 Grant.

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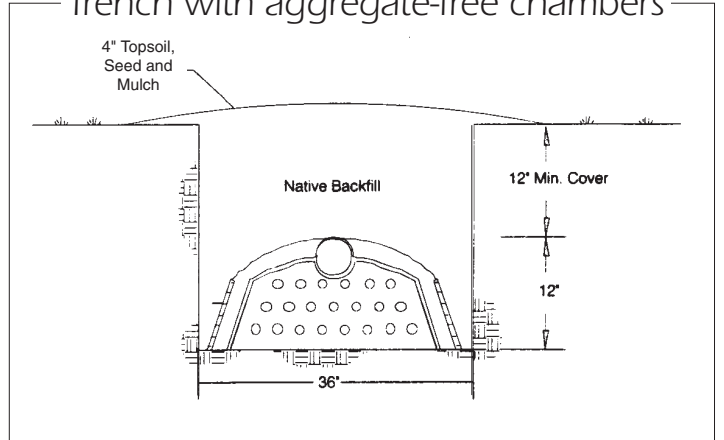
©1999 Department of Natural Resources and Environmental Control (DNREC)

# Typical Full Depth Gravity System

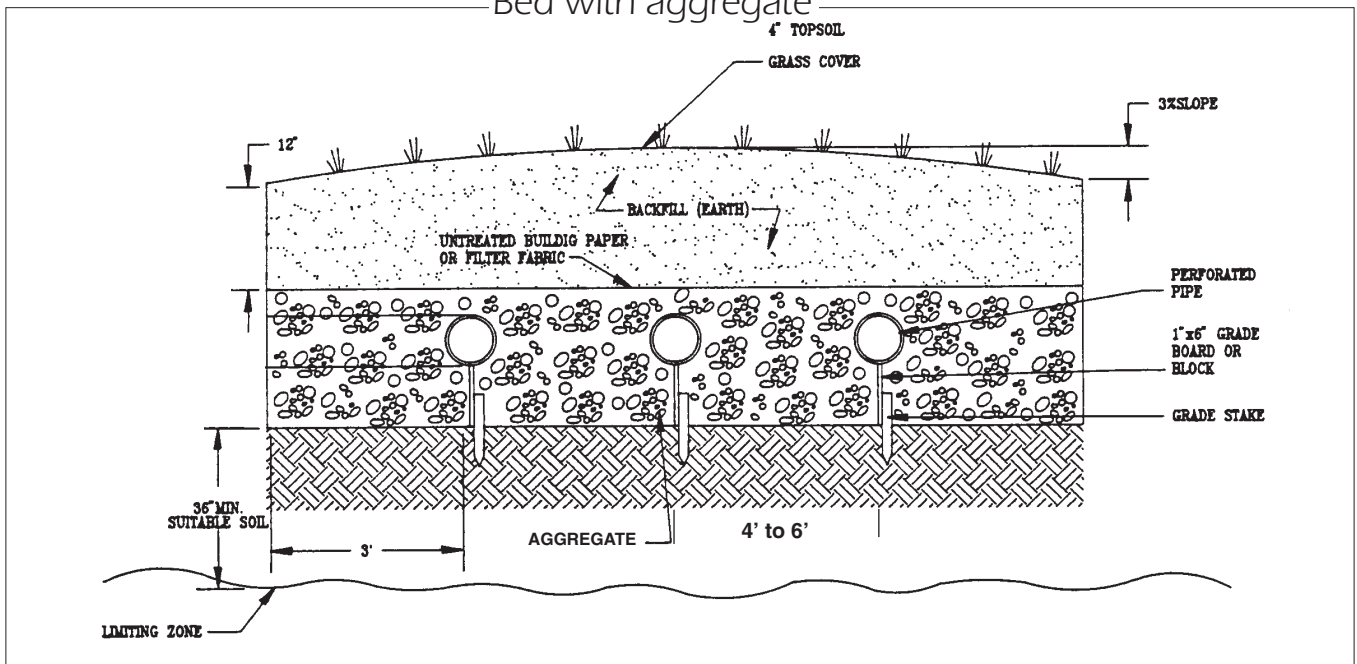
Trench with aggregate



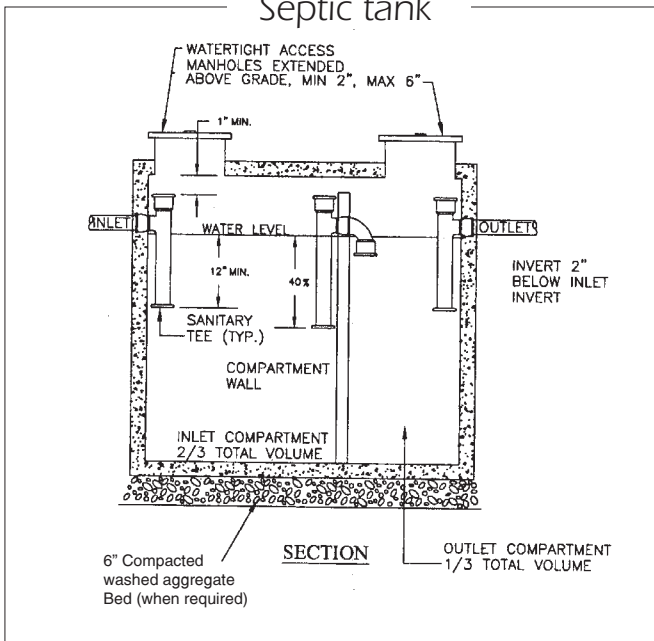
Trench with aggregate-free chambers



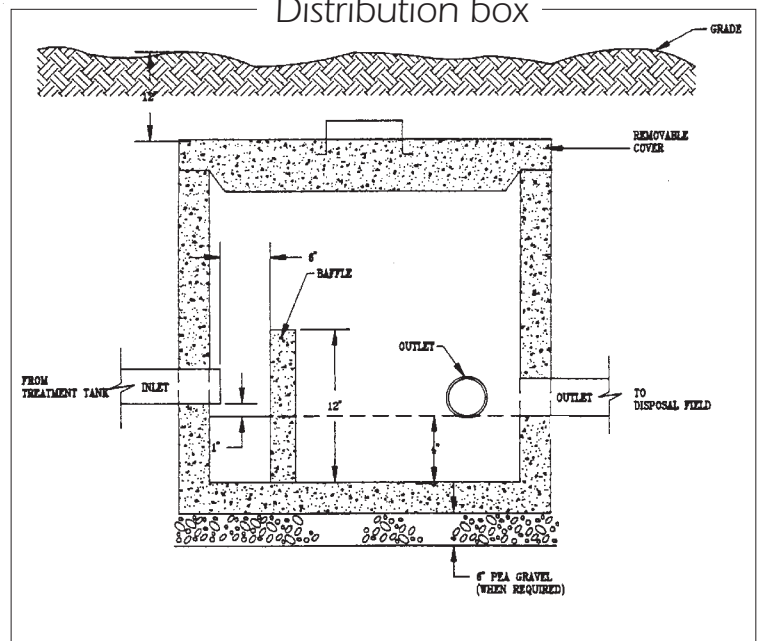
Bed with aggregate



Septic tank



Distribution box



# Fact Sheet

## Full Depth Gravity - Trenches

### Characteristics

- ◆ > 59 inches to the limiting zone
- ◆ 6 - 120 mpi percolation rate                      mpi = minutes per inch
- ◆ 0 - 15% slopes
- ◆ Usually installed 24 inches deep

### System Components

- ◆ Septic tank
- ◆ Effluent filter
- ◆ Distribution box
- ◆ Drainfield

### Care and Maintenance

- ◆ This system is gravity fed. There is no maintenance required other than routine as described in this brochure. Septic tank pumping and effluent filter cleaning.

## Full Depth Gravity - Bed

### Characteristics

- ◆ > 59 inches to the limiting zone
- ◆ 6 - 120 mpi percolation rate                      mpi = minute per inch
- ◆ 0 - 2% slopes
- ◆ Usually installed 24 inches deep

### System Components

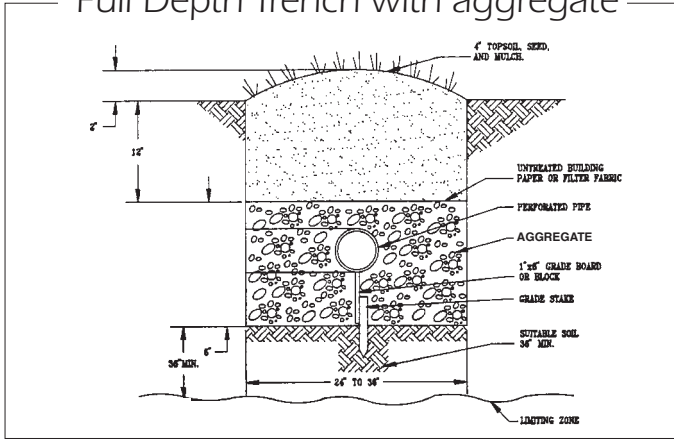
- ◆ same as above

### Care and Maintenance

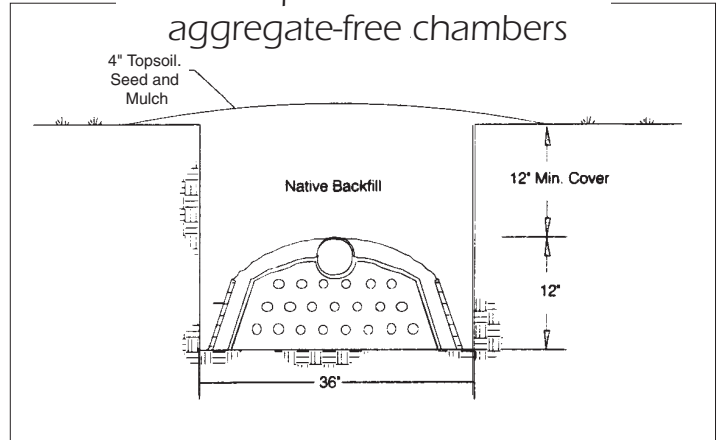
- ◆ same as above

# Typical Pressure-Dosed System

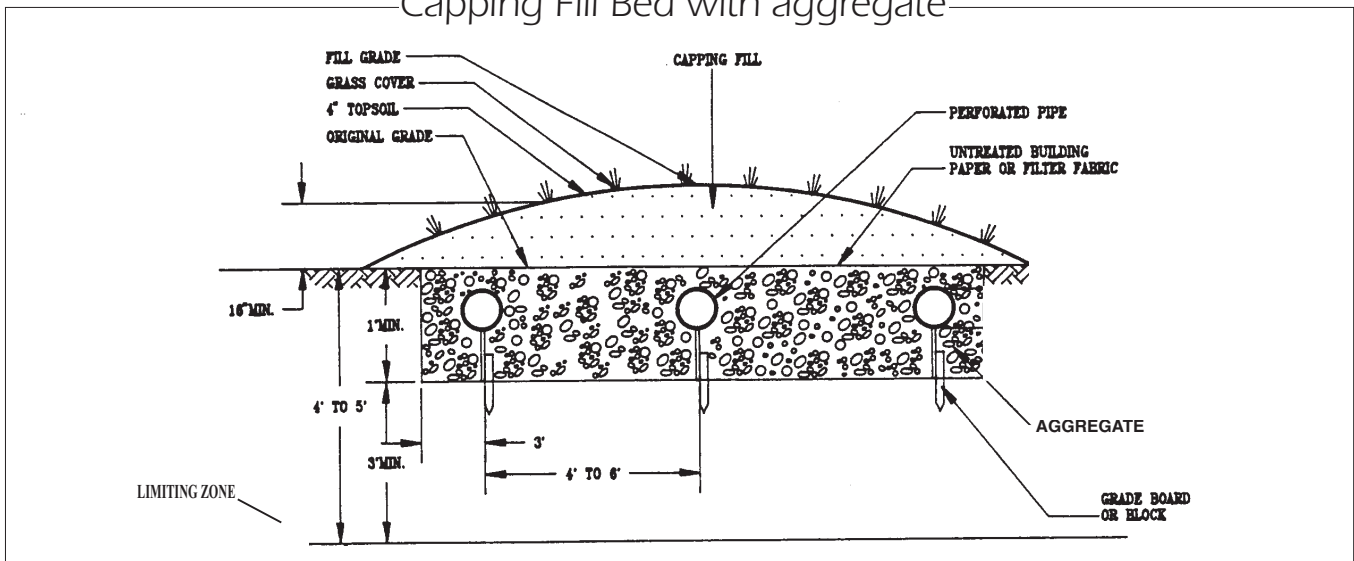
Full Depth Trench with aggregate



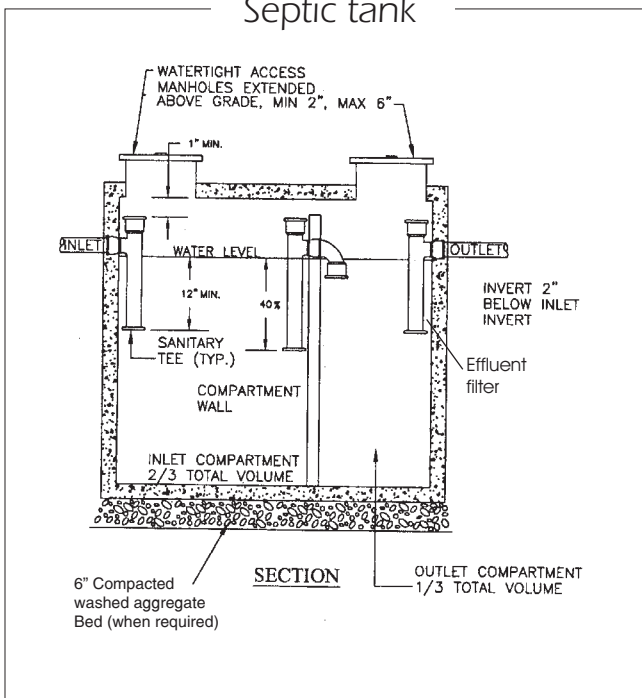
Full Depth Trench with aggregate-free chambers



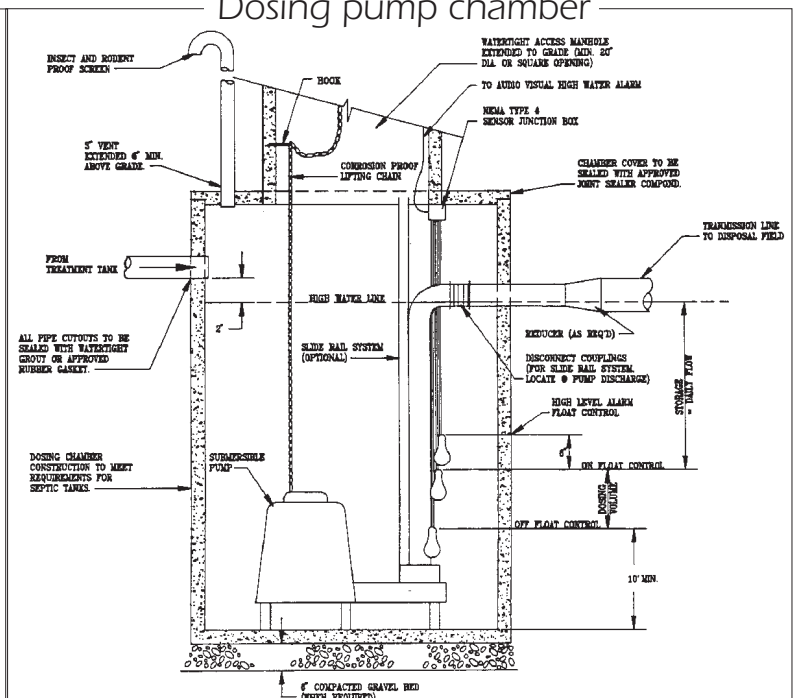
Capping Fill Bed with aggregate



Septic tank



Dosing pump chamber



# Fact Sheet

## Full Depth and Capping Fill Pressure Dosed System

### Characteristics

- ◆ > 48 inches to the limiting zone
- ◆ < 0 - 120 mpi percolation rate                      mpi = minutes per inch
- ◆ 0 - 15% slopes (for trenches)                      0 - 2% slopes (for beds)
- ◆ Usually installed 12- 24 inches deep and may be capped with up to 16 inches of fill.
- ◆ Designed by a licensed Class "C" designer

### System Components

- ◆ Septic tank
- ◆ Effluent filter
- ◆ Dosing chamber
- ◆ Effluent pump and float system
- ◆ Drainfield
- ◆ Alarm system
- ◆ Timer

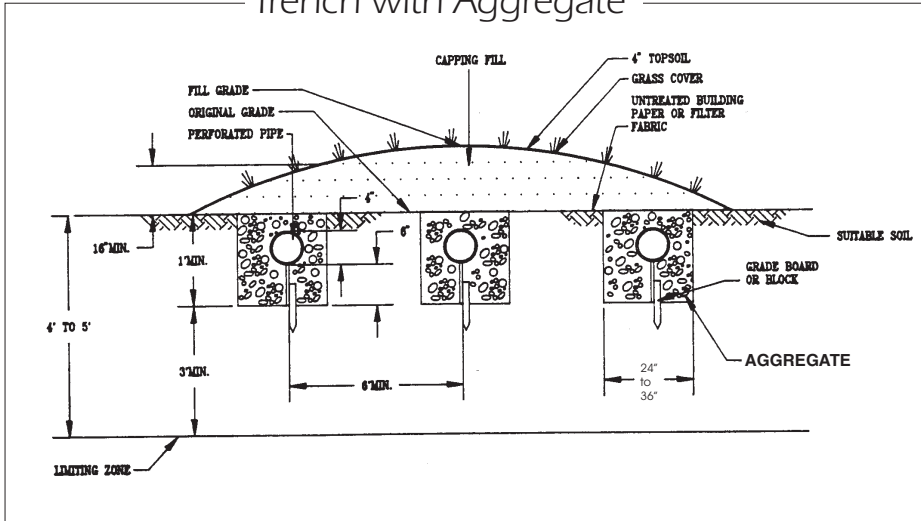
### Care and Maintenance

- ◆ This system is pressurized by an effluent pump. The pump sends effluent to the drainfield a minimum of 3 times a day with resting periods in between to allow aerobic treatment of the effluent. If the pump or float system should fail, the alarm will turn on signaling the failure. Contact a licensed Class "F" liquid waste hauler to pump the septic tank and the dosing chamber. Then contact your licensed Class "C" system contractor to inspect and correct the problem.
- ◆ The alarm panel and timer should be checked and tested regularly.
- ◆ Pump maintenance should follow the manufacturer's recommendations.
- ◆ A properly designed and constructed system should operate satisfactorily with care and routine maintenance as described in this brochure.
- ◆ Septic tank pumping and effluent filter cleaning.

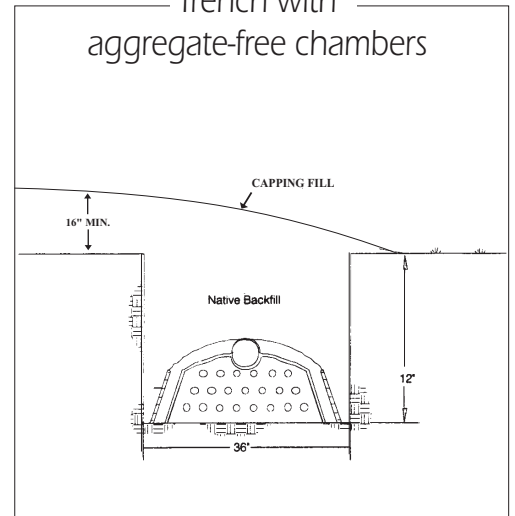


# Typical Gravity Capping Fill System

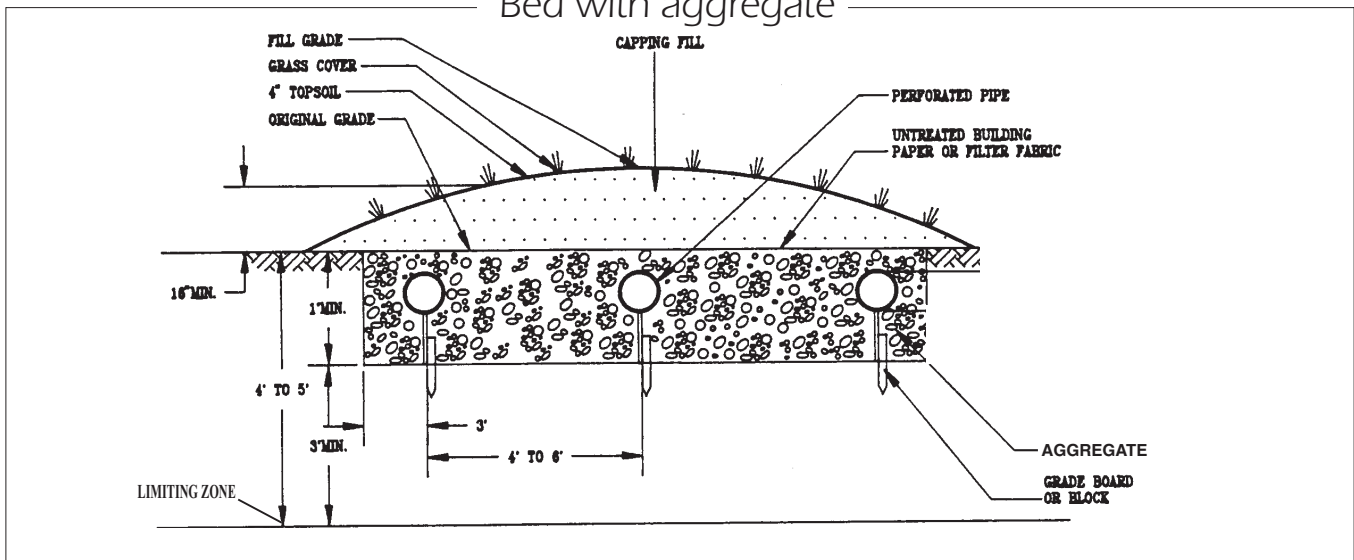
Trench with Aggregate



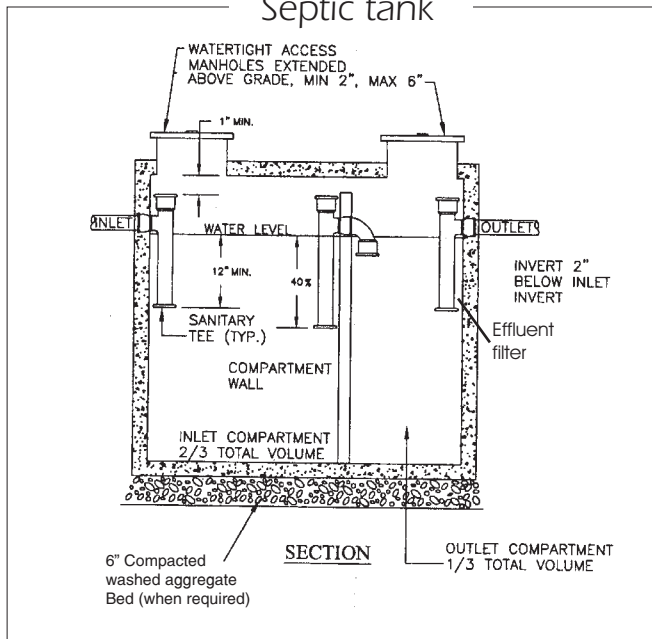
Trench with aggregate-free chambers



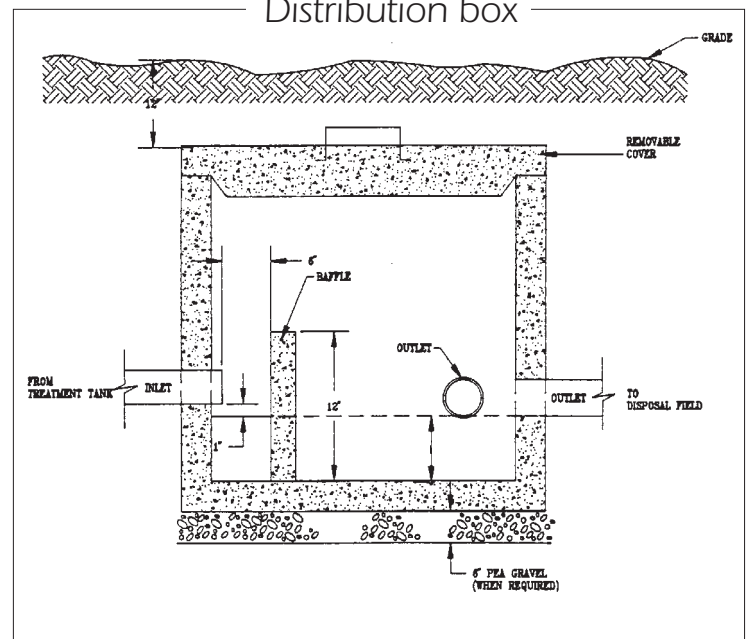
Bed with aggregate



Septic tank



Distribution box



# Fact Sheet

## Gravity Capping Fill - Trenches

### Characteristics

- ◆ 48 - 59 inches to the limiting zone
- ◆ 6 - 120 mpi percolation rate                      mpi = minutes per inch
- ◆ 0 - 15% slopes
- ◆ Installed 12 - 23 inches deep and capped with 16 inches of fill

### System Components

- ◆ Septic tank
- ◆ Effluent filter
- ◆ Distribution box
- ◆ Drainfield

### Care and Maintenance

- ◆ This system is gravity fed. There is no maintenance required other than routine as described in this brochure. Septic tank pumping and effluent filter cleaning.

## Gravity Capping Fill - Bed

### Characteristics

- ◆ 48 - 59 inches to the limiting zone
- ◆ 6 - 120 mpi percolation rate                      mpi = minute per inch
- ◆ 0 - 2% slopes
- ◆ Installed 12 - 23 inches deep and capped with 16 inches of fill

### System Components

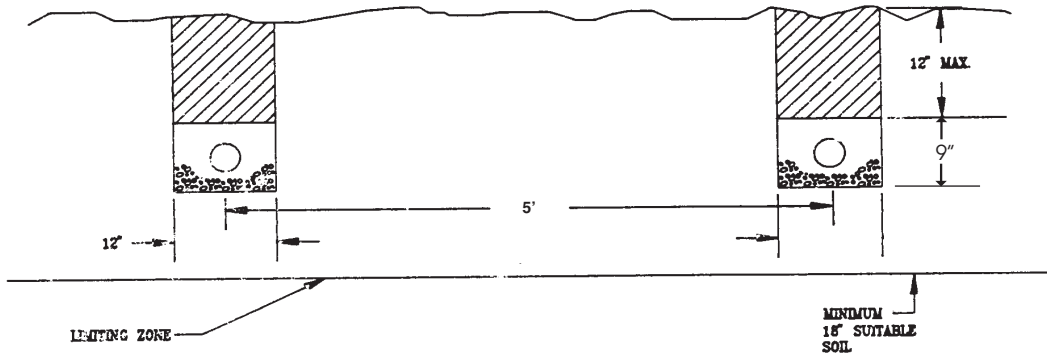
- ◆ same as above

### Care and Maintenance

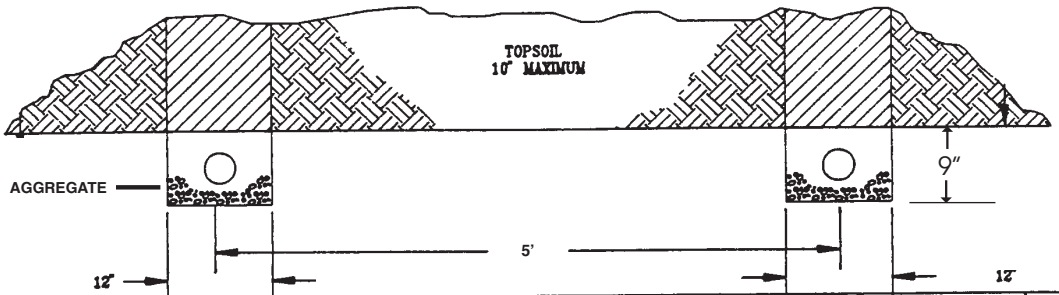
- ◆ same as above

# Typical Low Pressure Pipe System

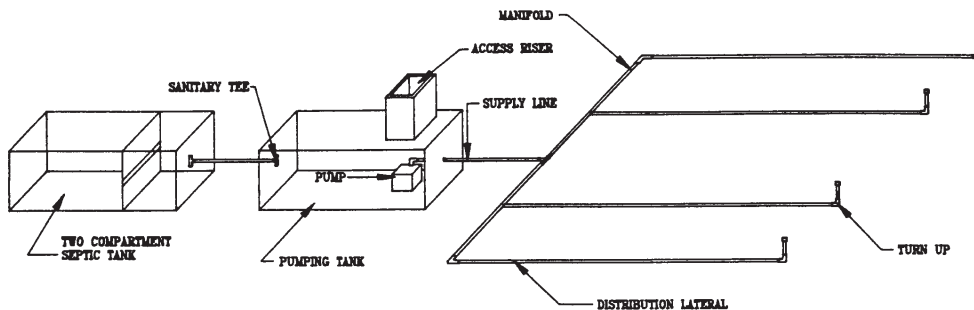
Full depth installation



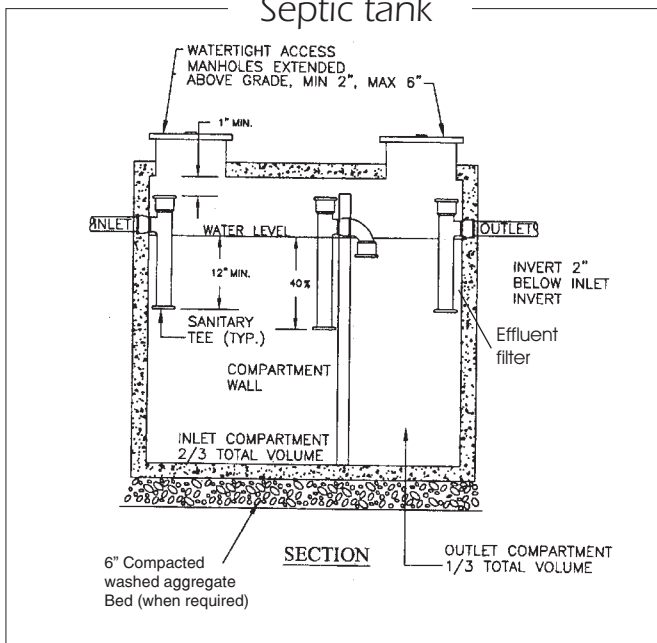
Capping fill installation



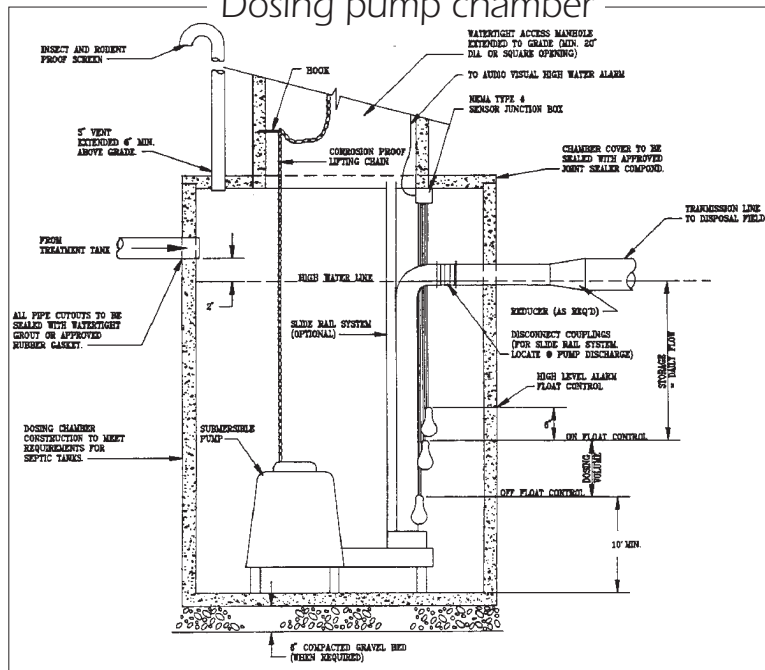
Typical distribution system layout



Septic tank



Dosing pump chamber



# Fact Sheet

## Low Pressure Pipe System

### Characteristics

- ◆ 27 - 47 inches to the limiting zone
- ◆ 0 - 120 mpi percolation rate                      mpi = minutes per inch
- ◆ 0 - 10% slopes permitted with a single manifold
- ◆ > 10% slopes require a split manifold
- ◆ Installed with trenches 9 to 18 inches deep

### System Components

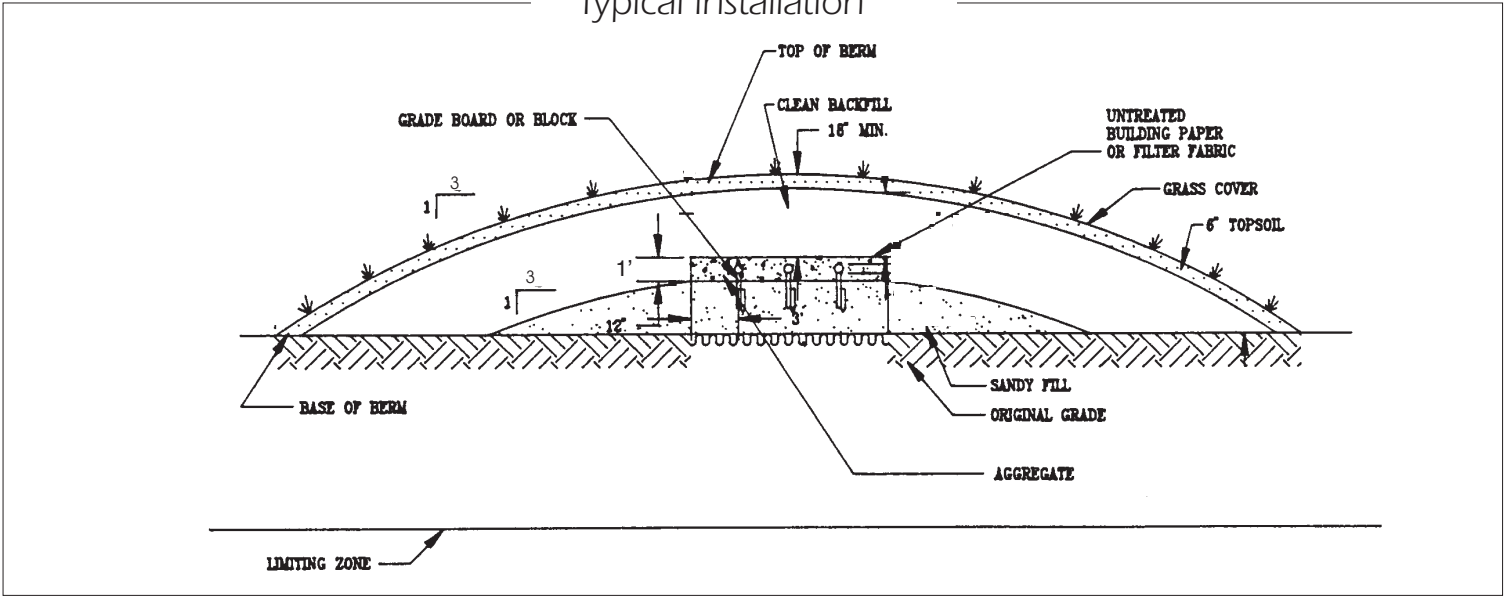
- ◆ Septic tank
- ◆ Effluent filter
- ◆ Dosing chamber
- ◆ Effluent pump and float system
- ◆ Drainfield
- ◆ Alarm system
- ◆ Timer

### Care and Maintenance

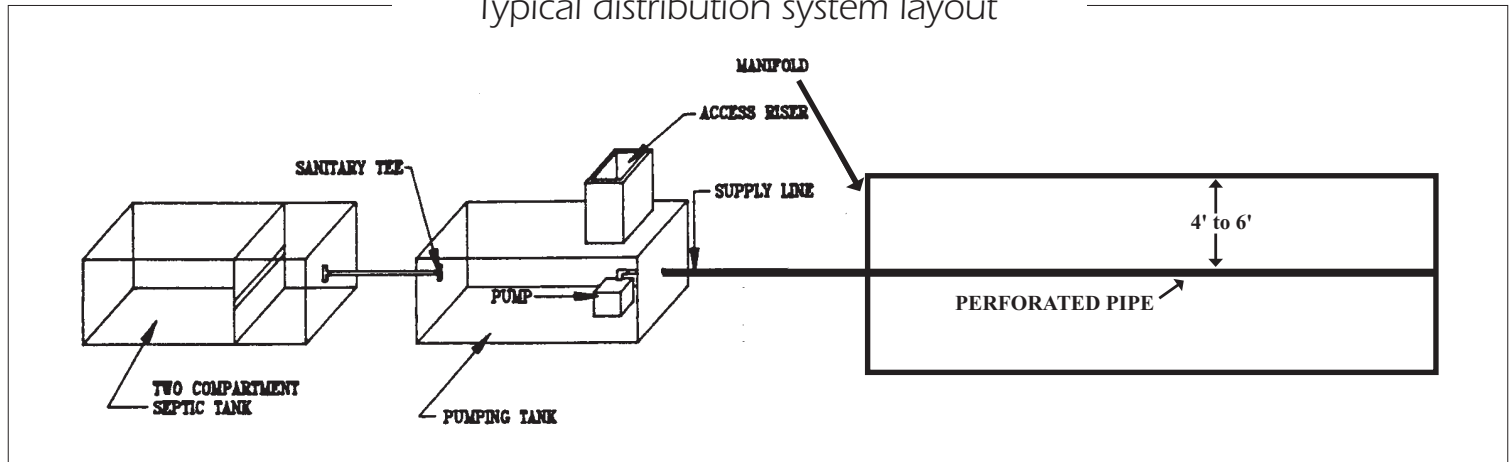
- ◆ This system is pressurized by an effluent pump. The pump sends effluent to the drainfield two to four times a day with resting periods in between to allow aerobic treatment of the effluent. If the pump or float system should fail, the alarm will turn on signaling the failure. Contact a licensed Class "F" liquid waste hauler to pump the septic tank and the dosing chamber. Then contact your license Class "E" system contractor to inspect and correct the problem.
- ◆ Some LPP systems gradually accumulate solids at the ends of the lateral lines. The solids should be removed once a year by unscrewing the caps on each of the turn-ups and back-flushing the laterals with a garden hose.
- ◆ The alarm panel and timer should be checked and tested regularly.
- ◆ Pump maintenance should follow the manufacturer's recommendations.
- ◆ No vehicular traffic should be allowed on the drainfield area because this is a shallow placed system.
- ◆ Septic tank pumping and effluent filter cleaning.

# Typical Elevated Sand Mound System

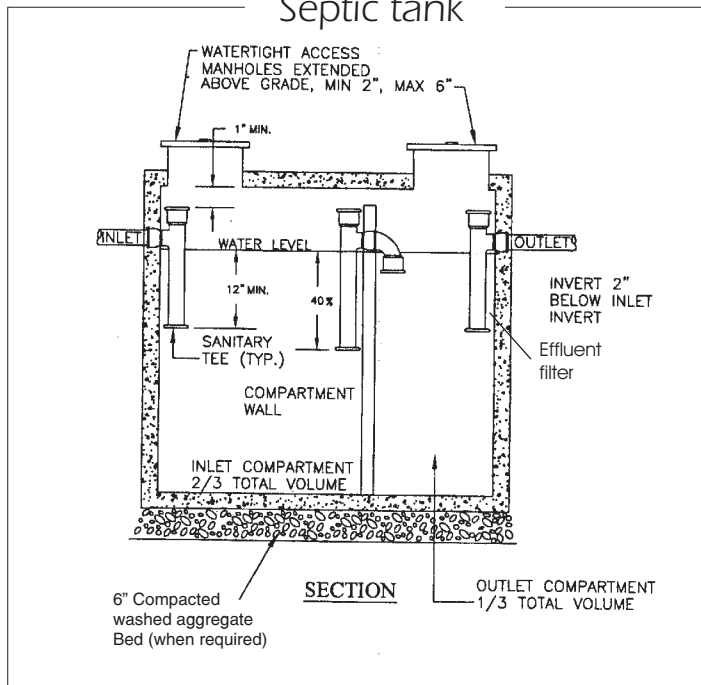
Typical installation



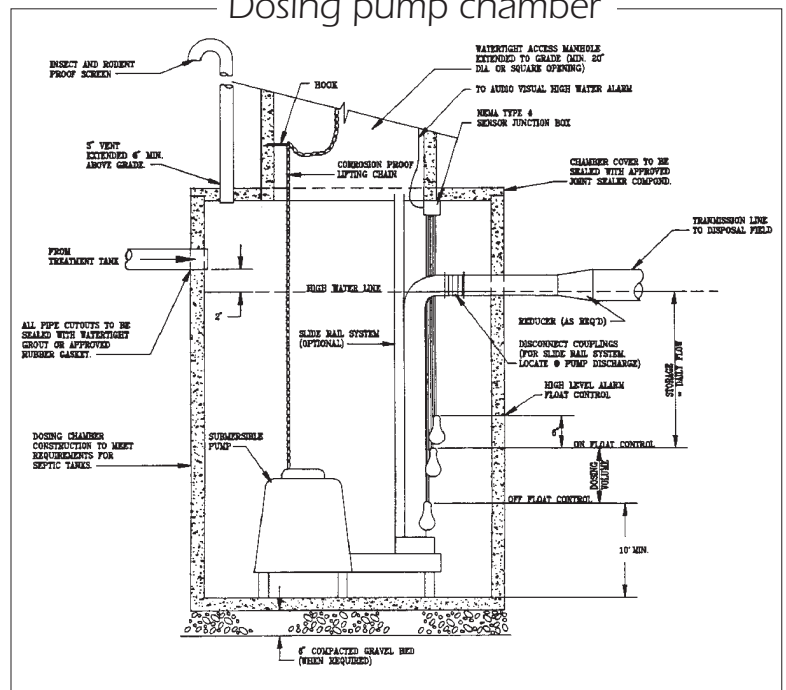
Typical distribution system layout



Septic tank



Dosing pump chamber



# Fact Sheet

## Elevated Sand Mound System

### Characteristics

- ◆ 20 - 47 inches to the limiting zone
- ◆ 0 - 120 mpi percolation rate mpi = minutes per inch
- ◆ Slopes:
  - For rates slower than 60 mpi, 0 - 6%
  - For rates faster than 60 mpi, 0 - 12%
- ◆ Routinely installed 16 inches above grade with a 20 inch limiting zone, 12 inches of aggregate and covered with 18 inches of fill.

### SYSTEM COMPONENTS

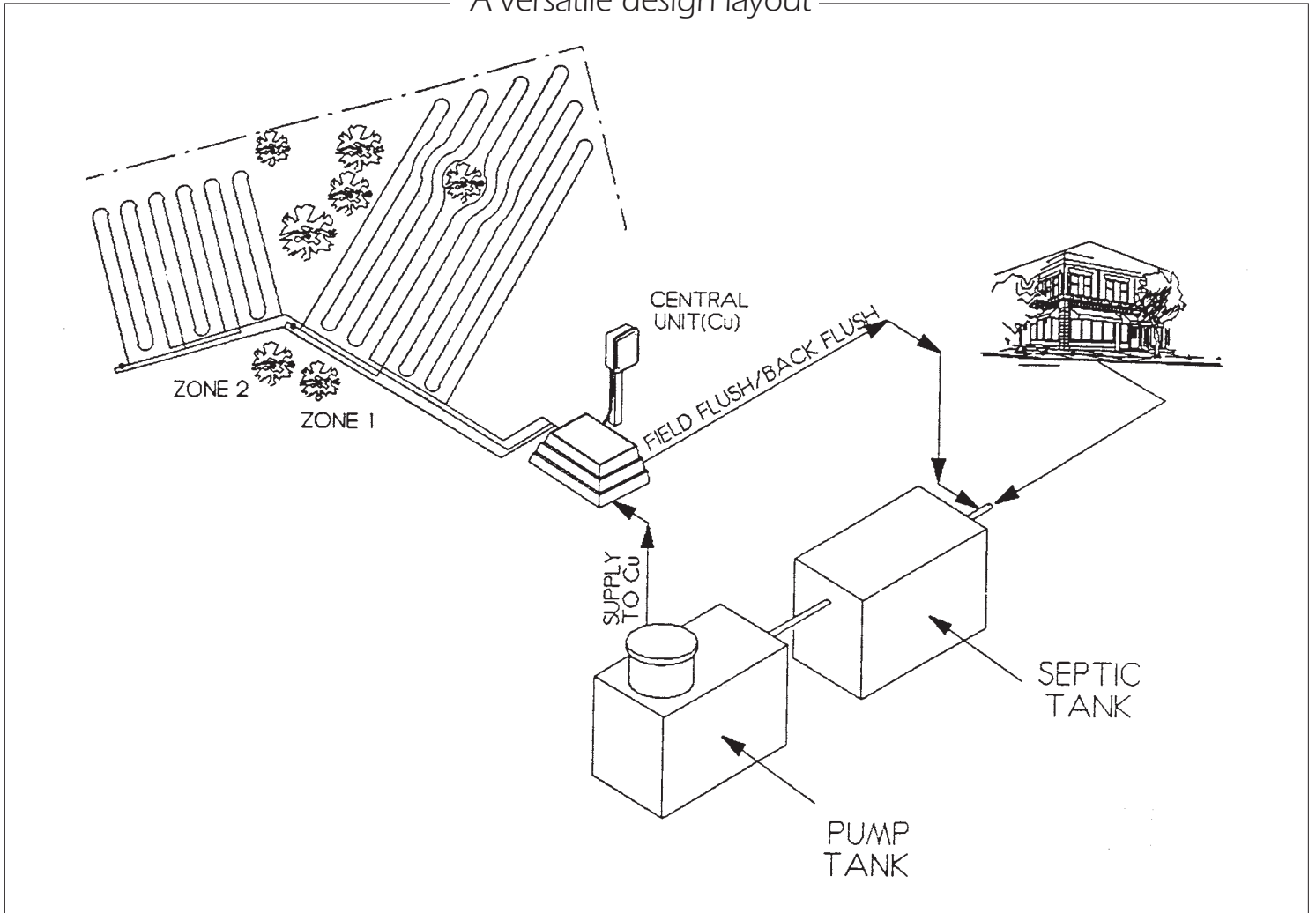
- ◆ Septic tank
- ◆ Effluent filter
- ◆ Dosing chamber
- ◆ Effluent pump and float system
- ◆ Drainfield
- ◆ Alarm system
- ◆ Timer

### CARE AND MAINTENANCE

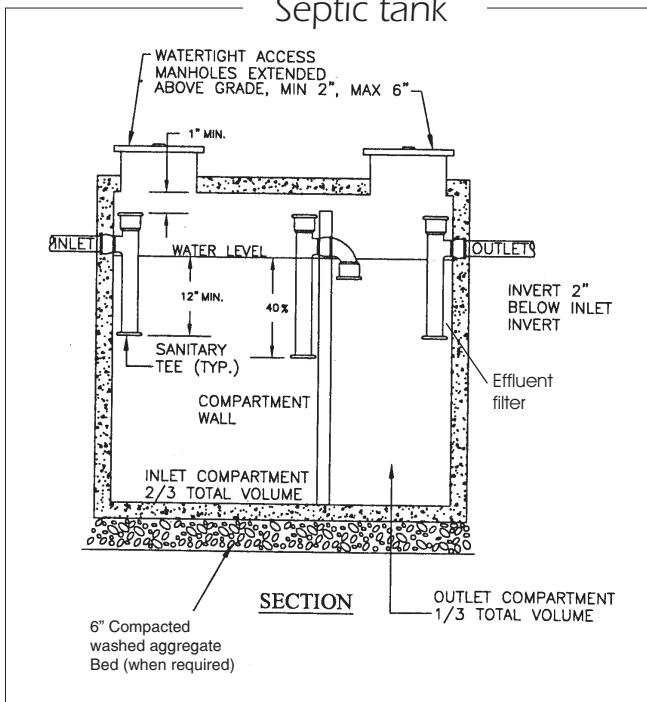
- ◆ This system is pressurized by an effluent pump. The pump sends effluent to the drainfield a minimum of three times a day with resting periods in between to allow aerobic treatment of the effluent. If the pump or float system should fail, the alarm will turn on signaling the failure. Contact a licenced Class "F" liquid waste hauler to pump the septic tank and the dosing chamber. Then contact your licenced Class "E" system contractor to inspect and correct the problem.
- ◆ The alarm panel and timer should be checked and tested regularly.
- ◆ Pump maintenance should follow the manufacturer's recommendations.
- ◆ Plant grass over the entire mound to prevent erosion of the sideslopes. Stabilize the sideslopes with aggregate (straw/mulch) until the grass is established.
- ◆ Deep rooted trees and shrubs should be kept a minimum of ten feet away.
- ◆ A properly designed and constructed elevated sand mound should operate satisfactorily with care and routine maintenance as described in this brochure. Contact your system contractor if you have specific concerns.
- ◆ Septic tank pumping and effluent filter cleaning.

# Typical Micro-Irrigation "Drip" Alternative System

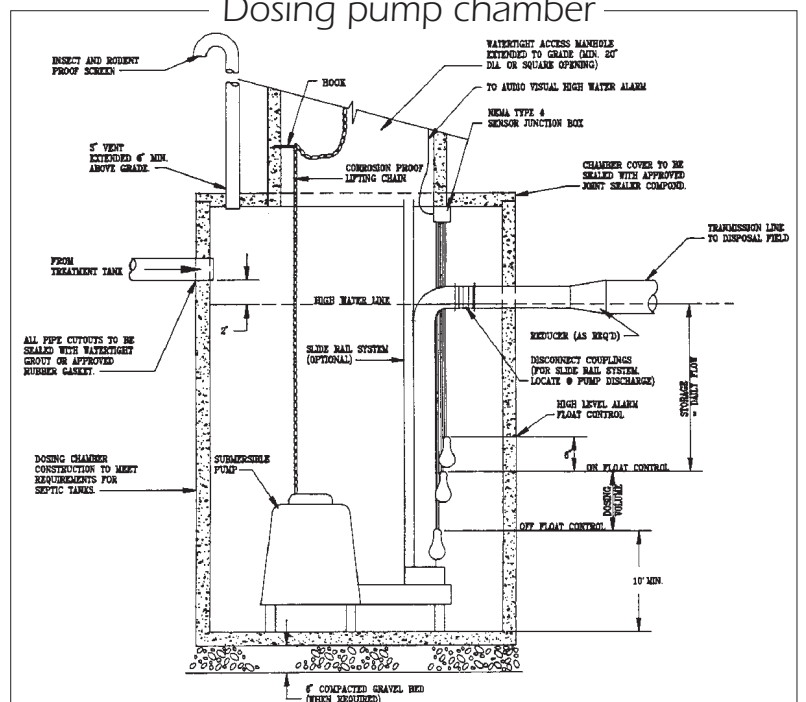
A versatile design layout



Septic tank



Dosing pump chamber



# Fact Sheet

## Micro-Irrigation "Drip" Alternative System

### Characteristics

- ◆ > 18 inches to the limiting zone
- ◆ 0 - 120 mpi percolation rate                                  mpi = minutes per inch
- ◆ 0 - 25% slopes
- ◆ Installed 0 - 6 inches deep by trencher or vibratory plow (Site specific)
- ◆ Flexible designs - can be installed around tree's, buildings, roads and most obstacles

### System Components

- ◆ Septic tank
- ◆ Effluent filter
- ◆ Dosing chamber
- ◆ Effluent pump and float system
- ◆ Computerized control unit and filter system
- ◆ "Drip" line drainfield - 1 or 2 zones
- ◆ Alarm system
- ◆ Timer

### Care and Maintenance

- ◆ This system is pressurized by an effluent pump. The pump sends effluent to the computerized control unit and filter system which then transmits it to the "drip" line drainfield. The effluent is distributed to each zone of the "drip" line drainfield two or more times a day with resting periods in between to allow aerobic treatment of the effluent. If the pump or float should fail, the alarm will turn on signaling the failure. Depending upon the problem contact either a licensed Class "F" liquid waste hauler to pump the septic tank and the dosing chamber or a licensed Class "E" system contractor and/or the manufacturer to inspect and correct the problem.
- ◆ Most disposal systems will gradually accumulate solids in the lateral lines. This disposal system has its own filter and backflushing mechanism which is utilized on a regular basis.
- ◆ The alarm panel should be checked and tested regularly.
- ◆ Pump maintenance should follow the manufacturer's recommendations.
- ◆ No vehicular traffic should be allowed on the "drip" line drainfield area.
- ◆ Alternative systems are required to maintain service contracts with certified service providers for the life of the system.
- ◆ Septic tank pumping and effluent filter cleaning.



# Log of Septic Tank Pumping

Date	Waste hauler	Gallons	Inspected ?