

Enviro-Septic[®] & Simple-Septic[®] Leaching Systems Design and Installation Manual



Sloping, Level, and Multi-Level[™] Leaching Systems for Residential and Commercial Applications



PRESBY ENVIRONMENTAL, INC. *INNOVATIVE SEPTIC TECHNOLOGIES*

Route 117 • PO Box 617 • Sugar Hill, NH 03585
Tel: 1-800-473-5298 • Fax: (603) 823-8114
www.PresbyEnvironmental.com

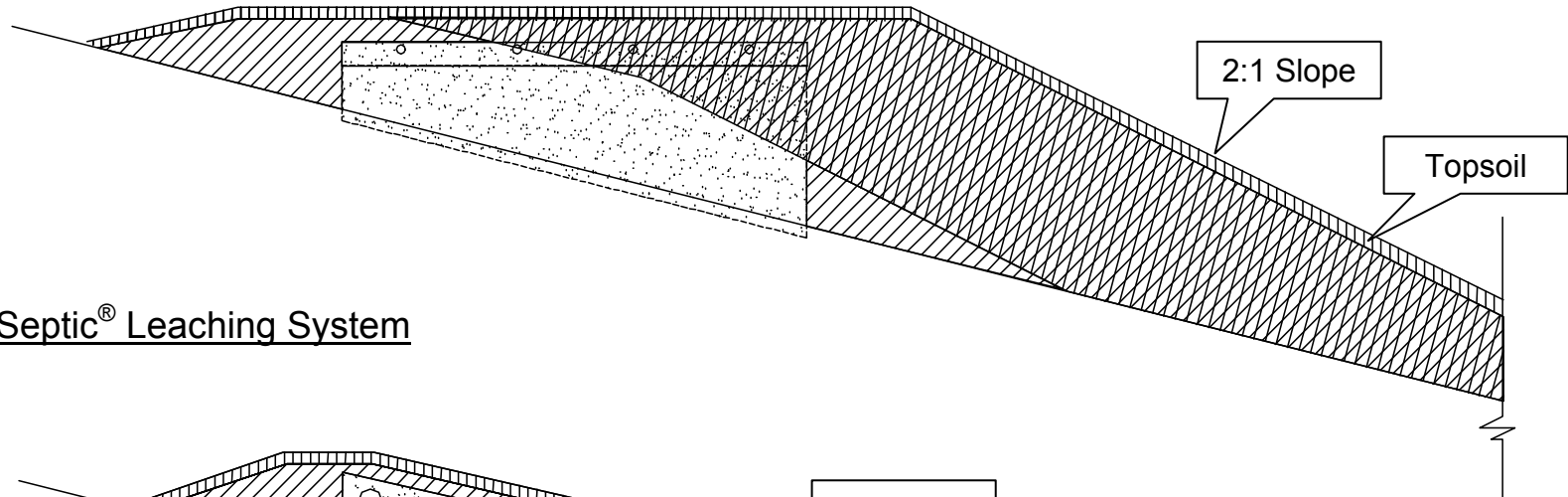
2003 Edition

Enviro-Septic[®] Fill Extension Comparison

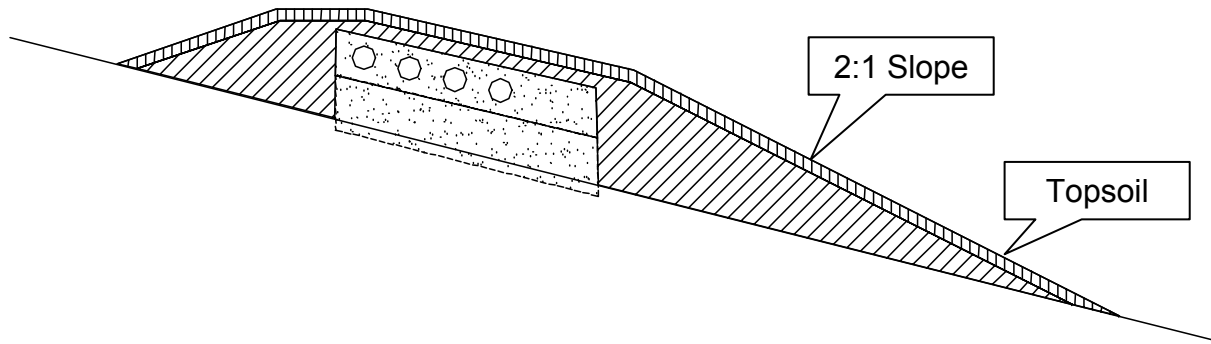
Cross Section – Not to scale

Typical Stone Leaching System

Fill and materials not necessary when using an Enviro-Septic[®] System



Enviro-Septic[®] Leaching System



Enviro-Septic® & Simple-Septic® Leaching Systems Design and Installation Manual

Preview

Purpose The purpose of this manual is to provide guidance in the design and installation of septic leaching systems using the Presby Environmental, Inc., group of products.

Presby Environmental, Inc., standards All systems using Presby Environmental, Inc., products must be designed and installed in compliance with the procedures and specifications described in this manual.

State and Provincial standards Enviro-Septic® when used as directed meets all the standards for public use in the subsurface disposal of wastewater in many States and some Canadian Provinces. Attachments to this manual include information specific to different States and Provinces and should be used in conjunction with the information in this manual.

In this manual This manual contains the following subjects.

Section	Page
A – Introduction	2
B – Definitions of Terms	4
C – Design Criteria	7
D – Installation, Handling, and Storage Guidelines	8
E – Sand and Fill Requirements	11
F – Single Level System Configurations	12
G – Multi-Level™ System Configurations	25
H – Non-Conventional System Configurations	30
I – Pump System Requirements	32
J – Venting Requirements	33
K – Bottom Drain Requirements	35
L – Simple-Septic® Leaching Systems	36
M – System Rejuvenation and Expansion	37

Use of attachment required This manual requires the use of an attachment specific to your State or Province in order to properly design and install Enviro-Septic® systems. Should conflicts occur, the information in State and Provincial attachments takes precedence over that found in this manual.

Technical support Presby Environmental, Inc., provides technical support to all individuals using our products. For questions about our products or the information contained in this manual, please contact us at 1-800-473-5298.

Section A Introduction

Background Liquid that exits from a septic tank (effluent) contains suspended solids that can cause other types of leaching systems to fail prematurely. Solids can overload bacteria, cut off aeration required for bacterial activity, and/or seal the underlying soil.

Our unique system components The Enviro-Septic[®] Leaching System is a product consisting of three components.

1. A corrugated, perforated, high-density plastic pipe with a unique series of ridges on the peak of each corrugation and plastic “skimmers” extending into the pipe’s interior.
2. A thick mat of randomly oriented plastic fibers surrounding the pipe.
3. A special non-woven geo-textile plastic fabric around the mat of fibers.

What our system does By utilizing simple, yet effective, natural processes the Enviro-Septic[®] Leaching System treats septic tank effluent in a manner that prevents solids from entering surrounding soils, increases system aeration, and provides a greater bacterial area (mat) than traditional systems.

Why our system excels The Enviro-Septic[®] Leaching System retains solids in its pipe and provides multiple bacterial surfaces to treat effluent prior to its contact with the soil. The continual cycling of effluent (the rising and falling of liquid inside the pipe) enhances bacterial growth. No other leaching system design offers this functionality. Our systems excel because they are more efficient, last longer, and have a minimal environmental impact.

System advantages Here’s a brief list of the advantages of The Enviro-Septic[®] Leaching System.

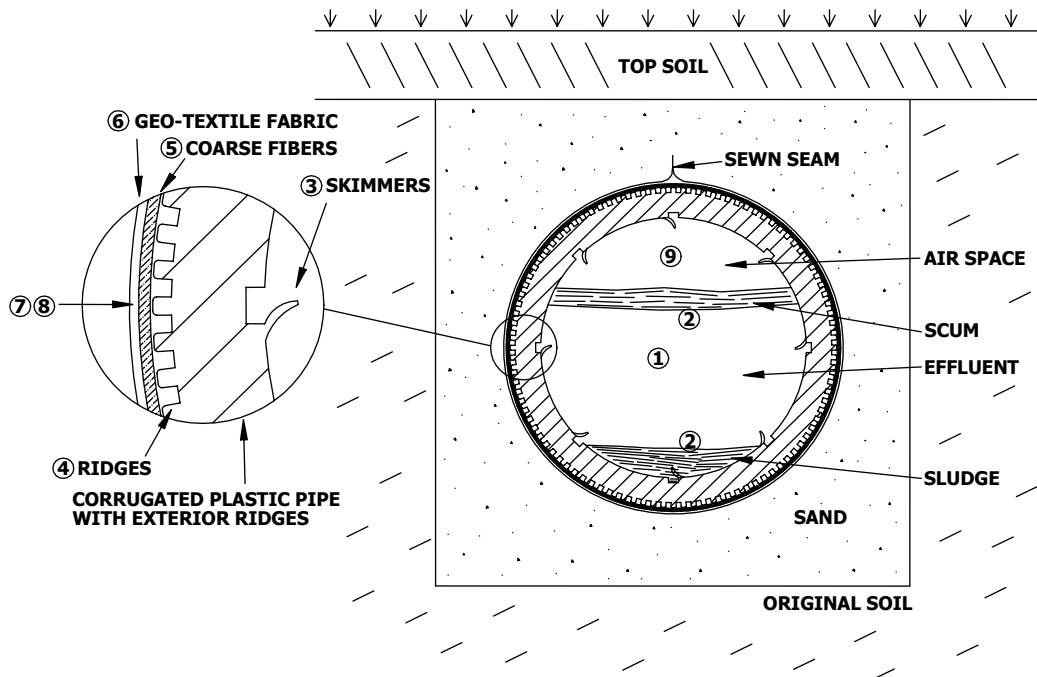
- Costs less than traditional installation products and materials
- Requires a smaller area
- Eliminates “septic mounds” through sloping system installations
- Adapts to difficult sites
- Requires less fill
- Installs more easily and quickly than traditional systems
- Eliminates the need for expensive washed stone
- Adapts easily to both commercial and residential sites
- Uses a protected receiving surface
- Increases system performance and longevity
- Tests environmentally safer than conventional systems
- Recharges groundwater more safely than conventional systems

Continued

Introduction, Continued

What it looks like

Here's a cross sectional diagram of Enviro-Septic[®] pipe.



How it works

These are the basic stages that take effect in the Enviro-Septic[®] Leaching System.

Stage	What Happens
1	Warm effluent enters the pipe and is cooled to ground temperature.
2	Suspended solids separate from the cooled liquid effluent.
3	Skimmers further capture grease and suspended solids from the effluent as it exits through perforations in the pipe.
4	Pipe ridges allow the effluent to flow uninterrupted around the circumference of the pipe and aid in cooling.
5	A mat of random, coarse fibers separates more suspended solids from the effluent.
6	Effluent passes into the geo-textile fabric and grows a protected bacterial surface.
7	Sand wicks the liquid from the geo-textile fabric and enables air to transfer to the bacterial surface.
8	Fabric and fibers provide a large bacterial surface to break down solids.
9	An ample air supply and fluctuating liquid levels increase bacterial efficiency.

Section B Definitions of Terms

Introduction As you read through the information in this manual, you will encounter common terms, terms that are common to our industry, and terms that are unique to Enviro-Septic® systems. While alternative definitions may exist, this section defines these terms as they are used in this manual.

List of terms Here's a list of the terms defined in this section.

- Basic system
- Bottom drain
- Center-to-center spacing
- Combination system
- Coupling
- Design flow
- D-box
- Differential venting
- Distribution box
- Distribution box manifold
- Double offset adapter
- Drain sump
- Drop connection
- End cap
- Enviro-Septic® pipe
- Equalizer™
- GPD
- High and low vents
- High flow
- Level system
- Line
- Low flow
- Multi-Level™ system
- Offset adapter
- Presby Maze®
- Raised connection
- Section
- Serial distribution
- Simple-Septic® pipe
- Sloping system

Basic system A basic system is a system consisting of one section of Enviro-Septic® pipe.

Bottom drain A bottom drain is a pipe connecting the end of a line to a drain sump.

Continued

Definitions of Terms, Continued

Center-to-center spacing	<u>Center-to-center spacing</u> is the horizontal distance from the center of one line to the center of the adjacent line.
Combination system	A <u>combination system</u> is a system incorporating two or more sections of Enviro-Septic [®] pipe, each section receiving effluent from a distribution box.
Coupling	A <u>coupling</u> is a fitting that joins two pieces of Enviro-Septic [®] pipe.
D-Box	<u>D-Box</u> is an abbreviation for distribution box.
Design flow	Design flow is the determined GPD flow as dictated by State and/or local code or rule.
Differential venting	<u>Differential venting</u> is a method of venting an Enviro-Septic [®] system utilizing high and low vents.
Distribution box	A <u>distribution box</u> is a device used to divide and/or control effluent flow.
Distribution box manifold	A <u>distribution box manifold</u> is a method of joining any number of distribution box outlets to a single pipe.
Double offset adapter	A <u>double offset adapter</u> is an end cap with two offset holes.
Drain sump	A <u>drain sump</u> is a watertight chamber connected to the end of a bottom drain line.
Drop connection	A <u>drop connection</u> is a PVC pipe arrangement used to connect different levels of Enviro-Septic [®] pipe used in Multi-Level [™] systems.
End cap	An <u>end cap</u> is a solid cap used to seal the end of an Enviro-Septic [®] pipe.
Enviro-Septic[®] pipe	An <u>Enviro-Septic[®] pipe</u> is a single unit of pipe, 10' in length with an outside diameter of 12" and a storage capacity of approximately 58 gallons.
Equalizer[™]	An <u>Equalizer[™]</u> is a plastic insert installed in the outlet lines of a distribution box to provide more equal effluent distribution to each outlet.
GPD	<u>GPD</u> is an abbreviation for gallons per day.

Continued

Definitions of Terms, Continued

High and low vents	<u>High and low vents</u> are pipes used in differential venting.
High flow	<u>High flow</u> is the minimum “design flow” requiring combination or distribution box system designs.
Level system	A <u>level system</u> is a system in which lines of Enviro-Septic® are installed at the same elevation.
Line	A <u>line</u> is a number of Enviro-Septic® pipes connected by couplings with an offset adapter on the inlet end and an offset adapter or end cap on the opposite end.
Low flow	<u>Low flow</u> is any “design flow” lower than “high flow.”
Multi-Level™ system	A <u>Multi-Level™ system</u> is a patented system consisting of at least two levels of Enviro-Septic® pipe separated by sand.
Offset adapter	An <u>offset adapter</u> is an end cap fitted with a 4” offset hole at the 12 o’clock position.
Presby Maze®	A <u>Presby Maze®</u> is a plastic unit that traps suspended solids and pre-treats septic tank effluent inside a septic tank.
Raised connection	A <u>raised connection</u> is a PVC pipe arrangement used to connect lines of Enviro-Septic® pipe to maintain the correct liquid level inside each line.
Section	A <u>section</u> is a group of Enviro-Septic® lines in serial distribution receiving effluent from a distribution box in a combination system.
Serial distribution	A <u>serial distribution</u> is a group of Enviro-Septic® lines* connected with a raised and/or drop connection. *See “line” in this section.
Simple-Septic® pipe	A <u>Simple-Septic® pipe</u> is a product identical to Enviro-Septic® with the exception of the thick mat of randomly orientated plastic fibers between the corrugated plastic pipe and the geo-textile fabric.
Sloping system	A <u>sloping system</u> is a system in which lines of Enviro-Septic® are installed at different elevations.

Section C Design Criteria

Introduction	This page discusses general design criteria.
Line orientation	Enviro-Septic [®] lines must be laid level and should run parallel to contours (perpendicular to sloping terrain) if possible.
Longer lines preferable	In general, fewer long lines are preferable to a greater number of short lines. Longer lines provide more efficient settling of solids. In addition, longer more narrow systems reduce the potential for ground water mounding.
Minimum/maximum line lengths	To maintain efficient effluent cycling, the minimum length of an Enviro-Septic [®] line should be 30' and the maximum length 100'. In some instances site conditions may require shorter or longer lengths. <u>Reference:</u> See Section H, "Non-Conventional System Configurations."
Ten foot increments work best	It is easier for the installer if systems are designed in 10' increments since Enviro-Septic [®] pipe is 10' in length. However, the pipe is easily cut to any length necessary with a sharp knife.
Line elevations	For sloping systems it is helpful to provide elevations on the design for each line of the system.
Septic tank and D-Box elevations	The outlet of a septic tank or D-Box must be set at least 2" above the highest inlet of the Enviro-Septic [®] line.
Depth and types of cover	While most installations should avoid a cover depth of more than 18", some conditions will require exceeding this limit. In particular, Enviro-Septic [®] systems with paved cover and/or vehicular traffic require a <u>minimum</u> of 18" of cover along with appropriate venting. <u>Reference:</u> See Section J, "Venting Requirements."
Provide notes for homeowners	Designers should add homeowner notes to their designs regarding system use and maintenance. Notes should include topics such as abusive substances, additives, constant discharge, etc. Suggested tank pumping and inspection schedules would also be beneficial.
See State requirements	Local and State jurisdictions may require additional design specifications. <u>Reference:</u> See the Quick Reference Guides in your State attachment.

Section D

Installation, Handling, and Storage Guidelines

Introduction This page contains guidelines that must be observed while installing, handling, and storing Enviro-Septic[®] products.

Site preparation Here are some site preparation guidelines.

- Remove topsoil, roots, and organic matter under the required sand area of a proposed system, including the slope extensions of raised systems.
- Maintain the existing characteristics of the underlying soil as much as possible.
- Add the sand fill on the same day that the leach area is excavated.
- Do not allow water to run into or over the system during construction.
- Do not work wet or frozen soils.
- Do not smear or compact soils while preparing site.

Note: It is not necessary for the leach area to be smooth when the site is prepared.

System components

Here's a picture of the Enviro-Septic[®] components.



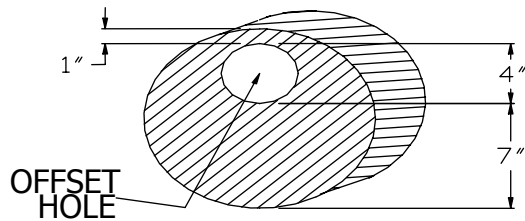
Contamination Note: Keep mud, grease, oil, etc., from all system components. Avoid dragging pipe through wet or muddy areas.

Continued

Installation, Handling, and Storage Guidelines, Continued

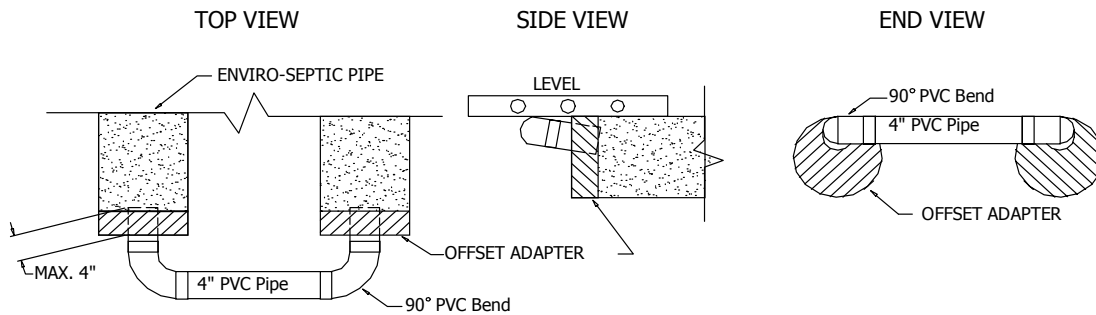
Use raised connections

Raised connections consist of offset adapters, 4" PVC pipe and pipe elbows. They enable greater liquid storage capacity and increase the bacterial surfaces being developed. Use raised connections to connect lines of Enviro-Septic® pipe. Here is a diagram along with some installation notes.



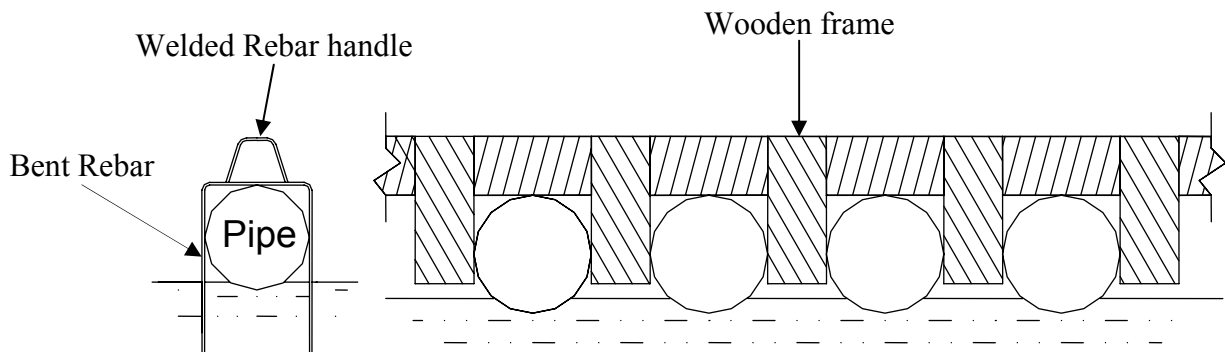
Installation Notes:

1. Insert PVC pipe no more than 4" into the offset adapter to prevent air locking.
2. Install the raised connection so that the top of the 90° bend is level with the top of the offset adapter.
3. Pack sand under and around the raised connection to prevent movement.



Line spacers

While sand may be used to keep pipe in place while covering, simple tools may also be constructed for this purpose. Here are two examples. One is made from rebar, the other from wood.



Caution: Remove all tools used as line spacers before final covering.

Continued

Installation, Handling, and Storage Guidelines, Continued

Soil compaction Minimize machine movement to avoid soil compaction and destruction of the soil structure under and around the system. Be especially careful not to compact soil on the down slope side of the system.

Backfilling and final grading Spread a minimum of 6” of system sand over the pipe. Spread the remaining fill. Final grading should shed water away from the system.

Note: A tracked vehicle may be used to spread the system sand and topsoil as long as it maintains at least 12” of cover over the pipe.

Erosion control Protect the site from erosion by proper grading, mulching, seeding, and control of runoff.

Storage The outer fabric of the Enviro-Septic[®] pipe is ultra-violet stabilized. However, the protection breaks down after a period of time in direct sunlight. To prevent damage to the fabric, cover the pipe with an opaque tarp.

Store pipe on high and dry areas to prevent surface water and soil from entering the pipes or contaminating the fabric prior to installation.

Section E

Sand and Fill Requirements

Introduction	This page describes the sand and fill requirements for the Enviro-Septic [®] Leaching System.
System sand	<p><u>All configurations</u> of Enviro-Septic[®] require a minimum of 6” of system sand surrounding the circumference of the pipe. This sand, typically gravelly coarse sand, must adhere to the following percentage and quality restrictions.</p> <p><u>Percentage Restrictions</u> 35% or less of the total sand may be gravel. 40%-90% of the total sand is to be coarse and very coarse sand.</p> <p><u>Gravel Quality Restrictions</u> No gravel is to exceed ¾” in diameter. No gravel is smaller than 2mm/.0787” in diameter. (It must not pass through a #10 sieve.)</p> <p><u>Coarse Sand Quality Restrictions</u> No coarse sand is smaller than 0.5mm/.0196” in diameter. (It must not pass through a #35 sieve.)</p> <p><u>Fines Quality Restrictions</u> No more than 2% of the total sand may pass through a #200 sieve.</p> <p><u>ASTM Standard:</u> C-33 (concrete sand) meets the above requirements.</p>
Sand fill and clean fill	<p>Sand fill is the material used to surround the system sand.</p> <p><u>Note:</u> System sand may also be used as sand fill.</p> <p>Clean fill is the material used to complete the system.</p> <p><u>Reference:</u> See “Sand Fill and Clean Fill Requirements” in your State attachment.</p>
Raised system fill extensions	<p>Raised systems require fill extensions.</p> <p><u>Reference:</u> See “Raised systems fill extensions” in your State attachment.</p>
Perimeter sand requirements	<p>Systems sloping 10% or less require the system sand and sand fill area to extend a minimum of 1.0’ around the perimeter of the Enviro-Septic[®] pipe.</p> <p>Systems sloping greater than 10% require the system sand and sand fill area to extend a minimum of 1.0’ on three sides and 4.0’ beyond the Enviro-Septic[®] pipe on the down-slope side.</p>

Section F

Single Level System Configurations

Preview

Introduction Enviro-Septic[®] systems may be designed in a variety of unusual shapes such as curved, trapezoidal, or L-shaped to provide optimum design flexibility to address the challenges of each site.

Reference: See Section H, “Non-Conventional System Configurations.”

Low flow systems Low flow systems may use any of the configurations described in this section.

Reference: See “Low Flow” In your State attachment.

High flow systems High flow systems must be designed as combination systems or distribution box systems.

Reference: See “High Flow” In your State attachment.

Sloping systems The percentage of slope refers to the slope of the Enviro-Septic[®] system, not the existing terrain. The slope of the system and the existing terrain are not required to be equal. A sloping system can be designed with more than one distinct slope and/or center-to-center pipe spacing in the same system. Maximum slope percentages are governed by jurisdiction specifications.

Reference: See the “Single Level Quick Reference Guide” in your State attachment.

Line orientation Enviro-Septic[®] lines must be laid level and should run parallel to contours (perpendicular to sloping terrain) if possible.

Velocity reduction/Equalizer[™] If piping from the septic tank to Enviro-Septic[®] is excessively steep, a velocity reducer at the system inlet is necessary. A distribution box with a baffle or an inlet tee may be an adequate velocity reducer.

Note: An Equalizer[™] is limited to a maximum of 10 gallons/minute in gravity systems and 20 gallons/minute in pumped systems.

In this section This section contains the following subjects.

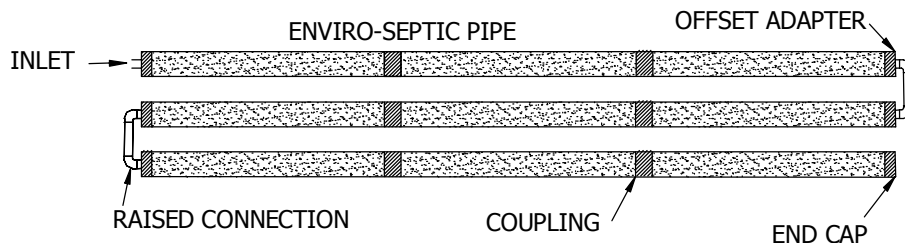
Subject	Page
Basic Serial Systems – Level In-Ground, Level Raised, In-Ground Sloping, and Raised Sloping	13
Distribution Box Systems – Level In-Ground, Level Raised, In-Ground Sloping, and Raised Sloping	16
Combination Systems – Level In-Ground, Level Raised, In-Ground Sloping, and Raised Sloping	20
Trench Systems – Basic Serial and Distribution Box	24

Basic Serial Systems – Level In-Ground, Level Raised, In-Ground Sloping, and Raised Sloping

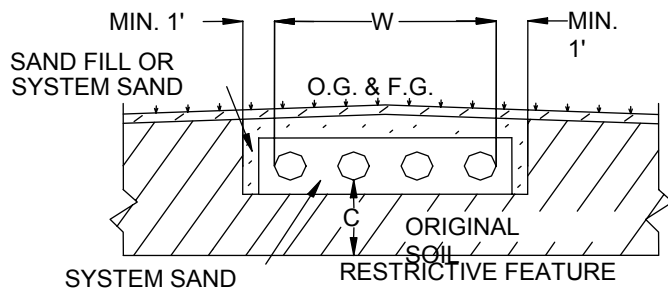
Introduction This page shows basic serial distribution systems in level in-ground, level raised, in-ground sloping, and raised sloping configurations.

Definition A basic serial system is a series of lines of Enviro-Septic[®] connected by raised connections.

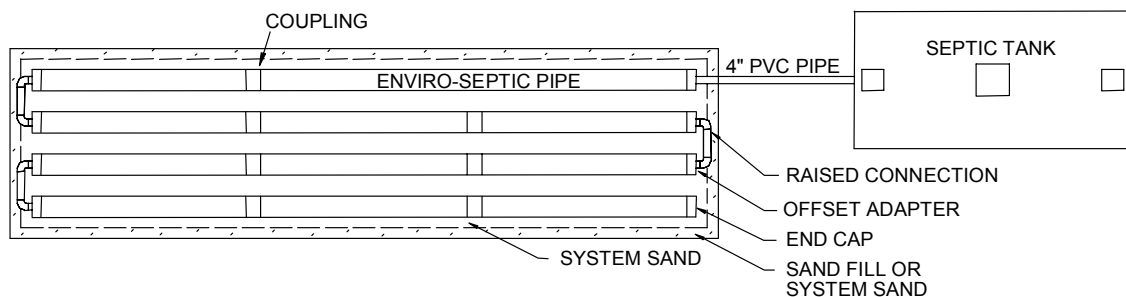
Serial diagram Here's a top view of lines of pipe in a serial configuration.



Level in-ground Here are end and top views of a level in-ground system.



C-Minimum separation distance
F.G.-Final grade
O.G.-Original grade
W-Width of Enviro-Septic[®] pipe

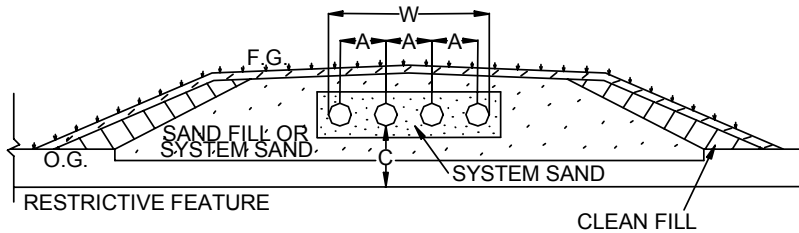


Note: Tank location may vary.

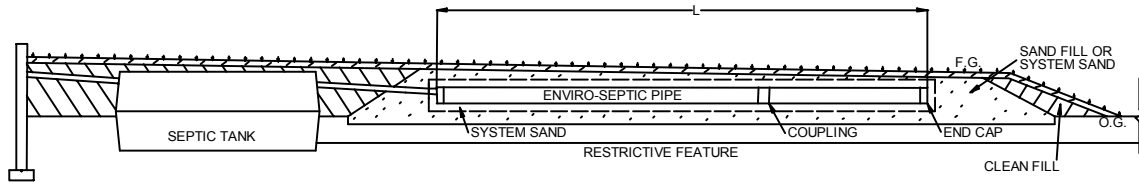
Continued

Basic Serial Systems – Level In-Ground, Level Raised, In-Ground Sloping, and Raised Sloping, Continued

Level Raised Here are end and side views of a level raised system.

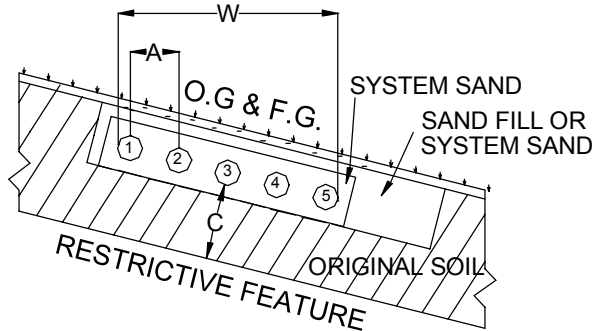


A-Center-to-center pipe spacing
 C-Minimum separation distance
 F.G.-Final grade
 L-Length of Enviro-Septic[®] pipe
 O.G.-Original grade
 W-Width of Enviro-Septic[®] pipe

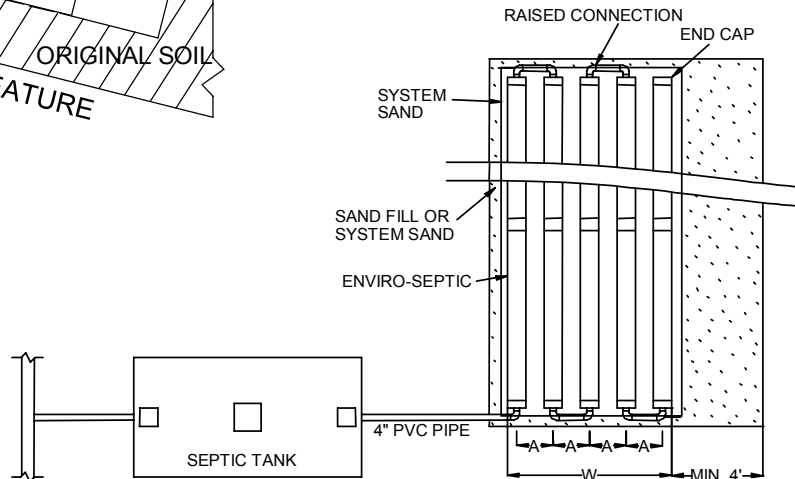


Note: Tank location may vary.

In-ground sloping Here are end and top views of an in-ground sloping system. This system has a slope greater than 10%.



A-Center-to-center pipe spacing
 C-Minimum separation distance
 F.G.-Final grade
 O.G.-Original grade
 W-Width of Enviro-Septic[®] pipe

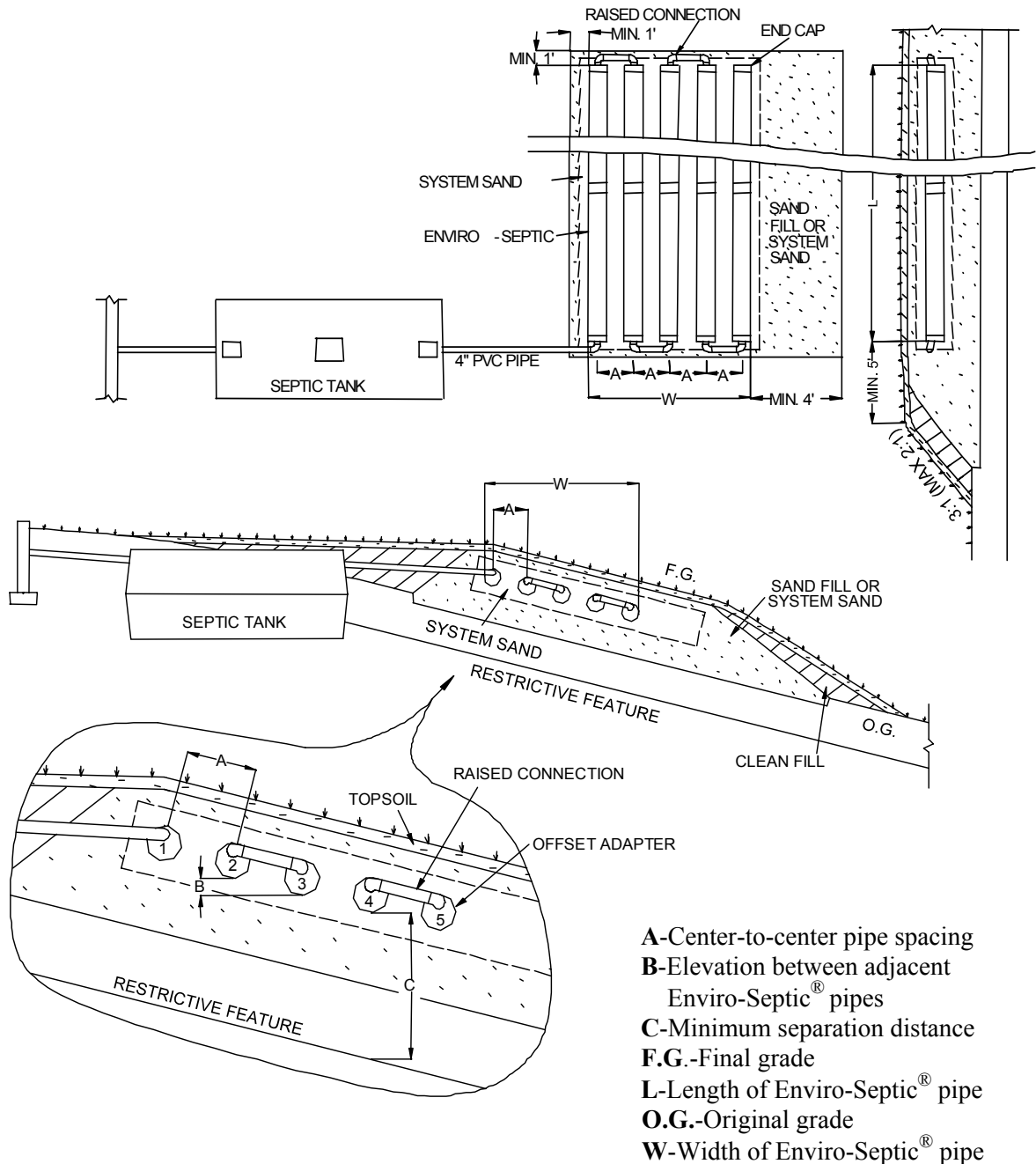


Note: Tank location may vary.

Continued

Basic Serial Systems – Level In-Ground, Level Raised, In-Ground Sloping, and Raised Sloping, Continued

Raised sloping Here are top/side and end views of a raised sloping system. This system has a slope greater than 10%.



Note: Tank location may vary.

Distribution Box Systems – Level In-Ground, Level Raised, In-Ground Sloping, and Raised Sloping

Introduction This page shows distribution box systems in level in-ground, level raised, in-ground sloping, and raised sloping configurations.

Definition A distribution box system is a number of system lines of equal length, each supplied evenly with effluent through a distribution box.

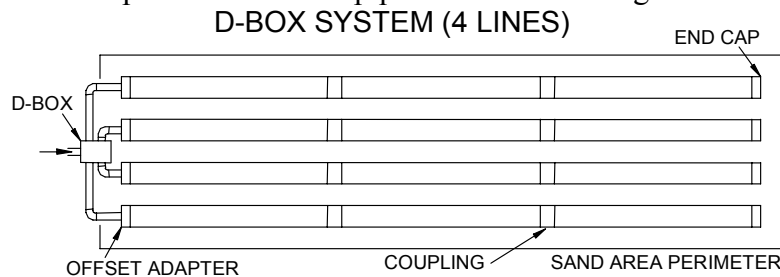
Equalizer™ required All distribution boxes that divide effluent flow in pump or gravity systems require an Equalizer™ or its equivalent in their outlets.

Note: To prevent movement, be sure distribution boxes are placed on a stable soil base or concrete pad.

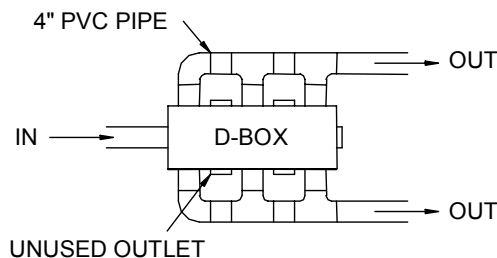
Loading Each line of a distribution box system has a maximum GPD limit.

Reference: See “Loading Limits” in your State attachment.

D-Box diagram Here’s a top view of lines of pipe in a D-Box configuration.

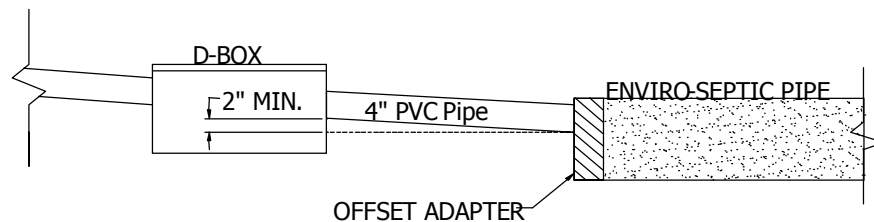


D-Box manifold This D-Box top view shows a pipe manifold design.



Note: Utilizing every other outlet will provide room for required piping and allow for easier installation

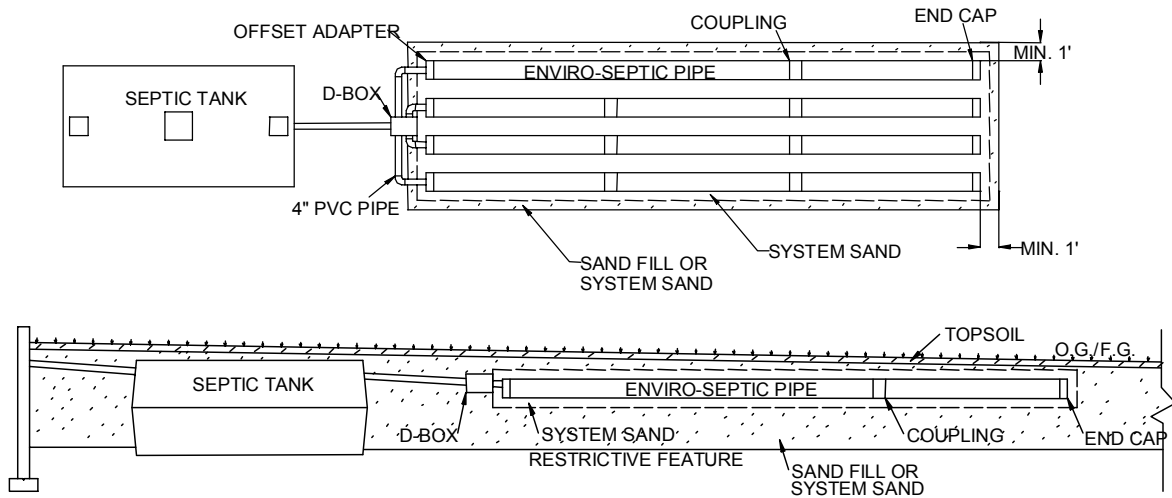
D-Box pipe drop This side view shows the minimum drop from a D-Box to a line of pipe.



Continued

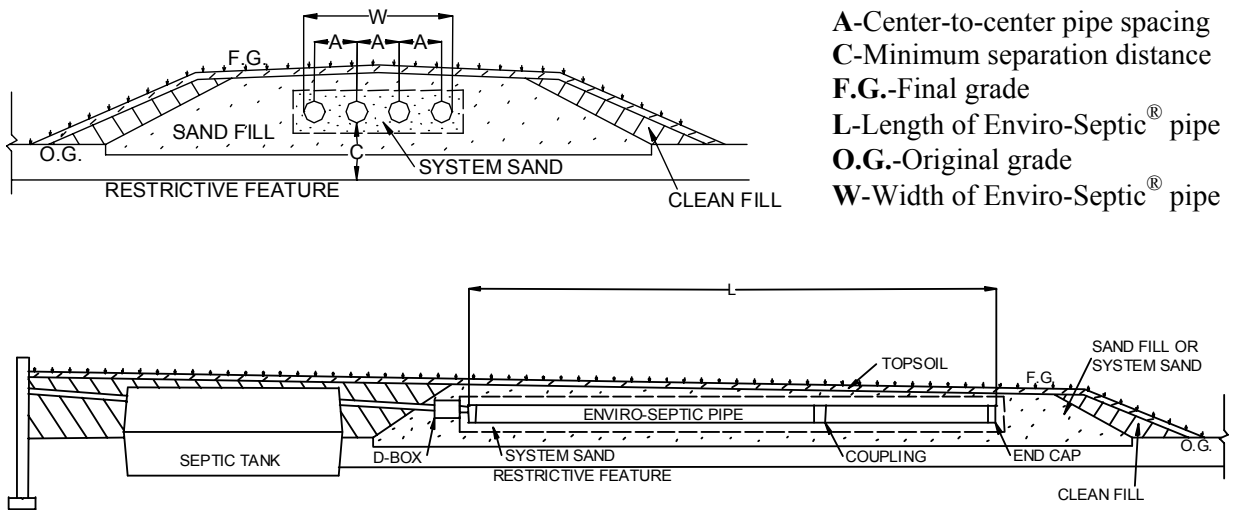
Distribution Box Systems – Level In-Ground, Level Raised, In-Ground Sloping, and Raised Sloping, Continued

Level in-ground Here are top and side views of a level in-ground D-Box system.



Note: Tank location may vary.

Level raised Here are end and side views of a level raised D-Box system.



- A-Center-to-center pipe spacing
- C-Minimum separation distance
- F.G.-Final grade
- L-Length of Enviro-Septic[®] pipe
- O.G.-Original grade
- W-Width of Enviro-Septic[®] pipe

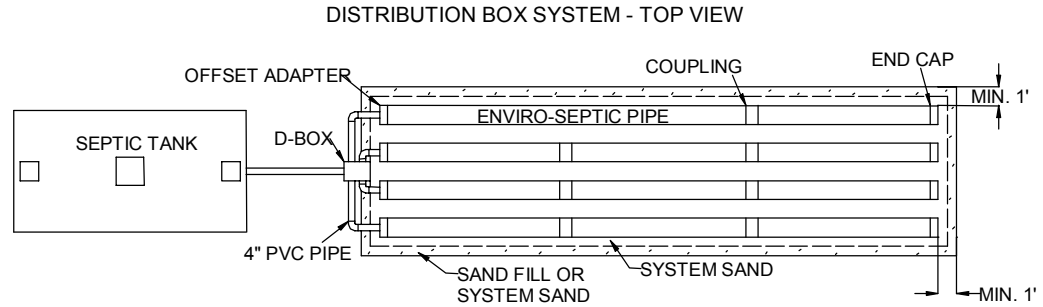
Note: Tank location may vary.

Continued

Distribution Box Systems – Level In-Ground, Level Raised, In-Ground Sloping, and Raised Sloping, Continued

Level raised
(continued)

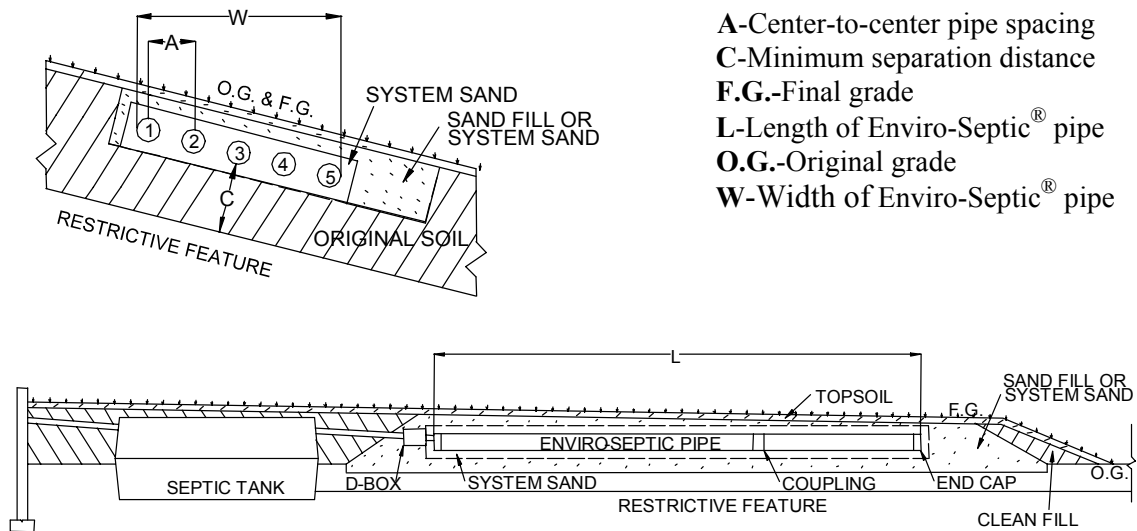
Here is a top view of a level raised D-Box system.



Note: Tank location may vary.

In-ground sloping

Here are end and side views of an in-ground sloping D-Box system.

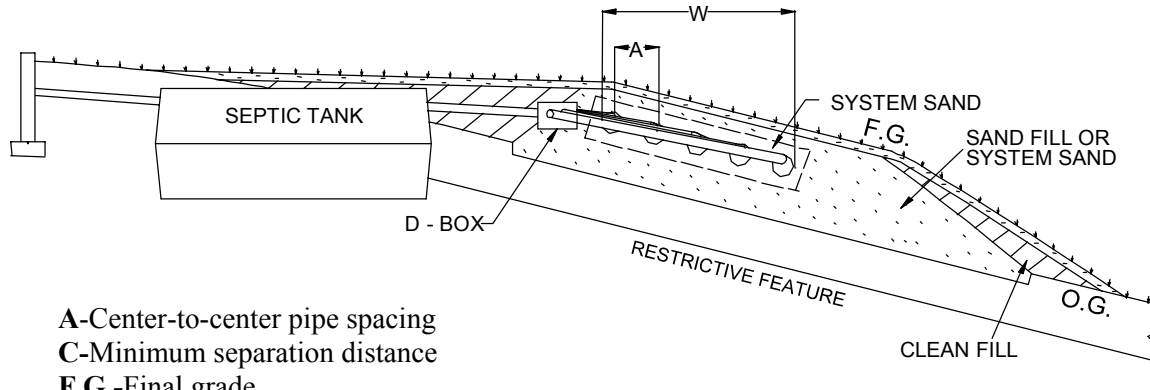


Note: Tank location may vary.

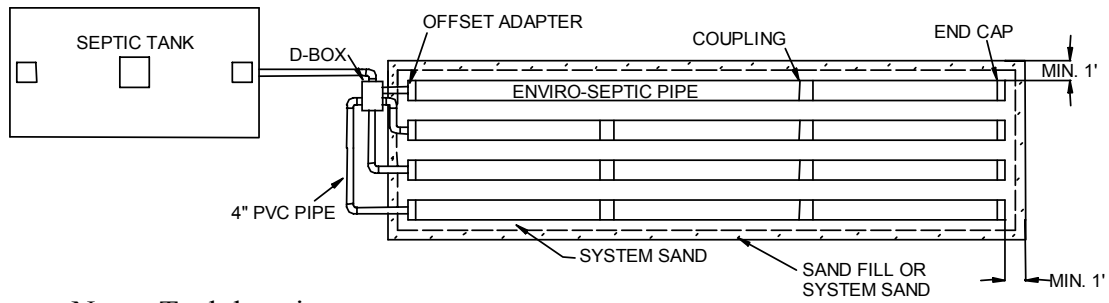
Continued

Distribution Box Systems – Level In-Ground, Level Raised, In-Ground Sloping, and Raised Sloping, Continued

Raised sloping Here are end and top views of a raised sloping D-Box system.



- A-Center-to-center pipe spacing
- C-Minimum separation distance
- F.G.-Final grade
- O.G.-Original grade
- W-Width of Enviro-Septic[®] pipe



Note: Tank location may vary.

Combination Systems – Level In-Ground, Level Raised, In-Ground Sloping, and Raised Sloping

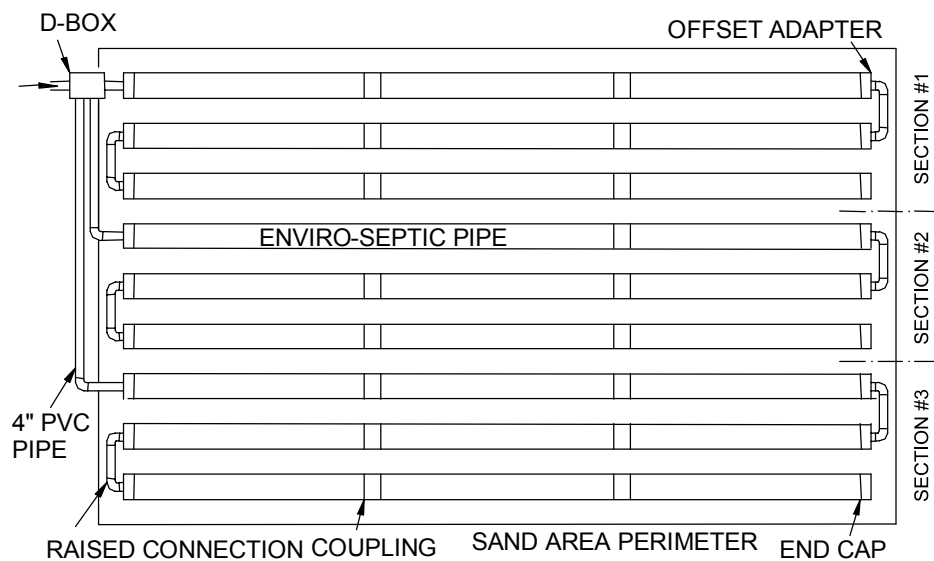
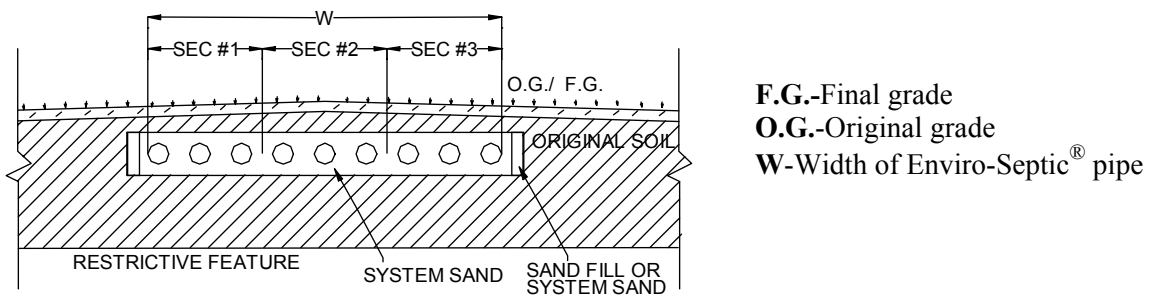
Introduction This page shows combination systems in level in-ground, level raised, in-ground sloping, and raised sloping configurations.

Definition A combination system is a system of two or more sections (lines of pipe connected in serial distribution) of pipe being supplied effluent evenly through a distribution box.

Loading Each section of a distribution box system has a maximum GPD limit.

Reference: See “Loading Limits” in your State attachment.

Level in-ground Here are end and top views of a level in-ground combination system.

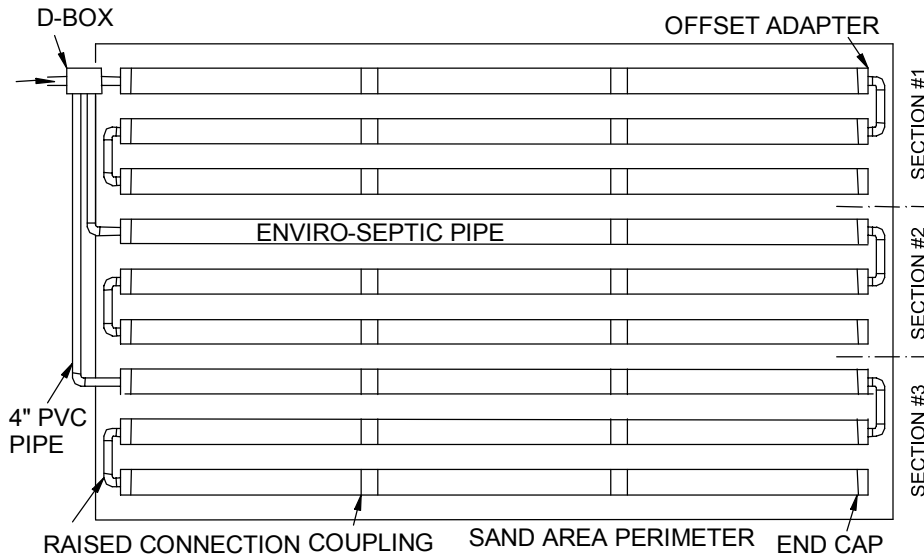
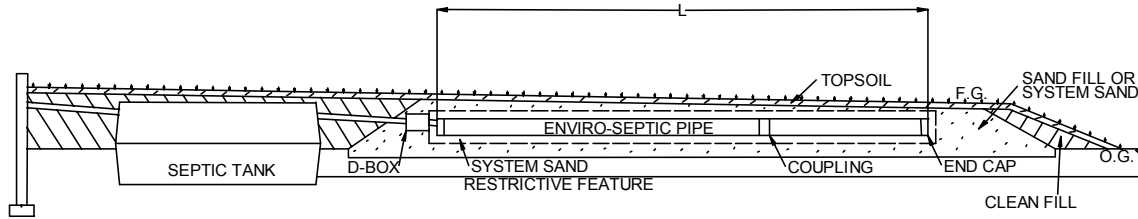
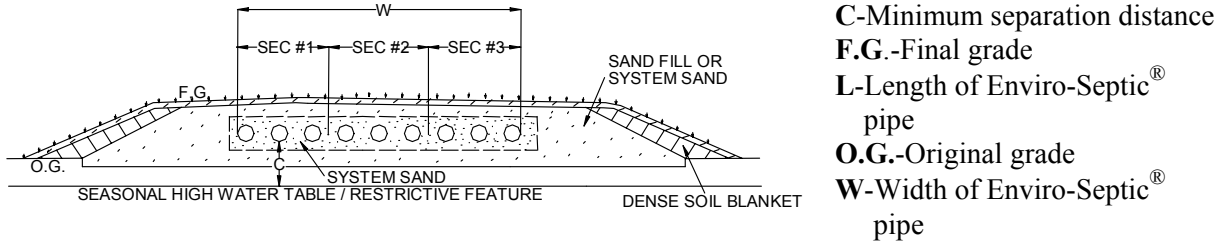


Note: Tank location may vary.

Continued

Combination Systems – Level In-Ground, Level Raised, In-Ground Sloping, and Raised Sloping, Continued

Level raised Here are end, side, and top views of a level raised combination system.



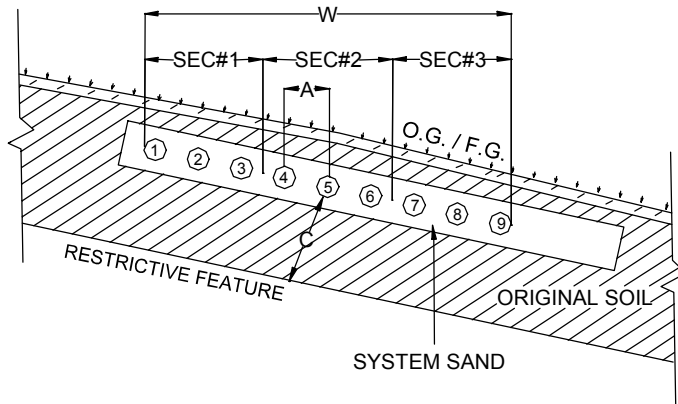
Note: Tank location may vary.

Continued

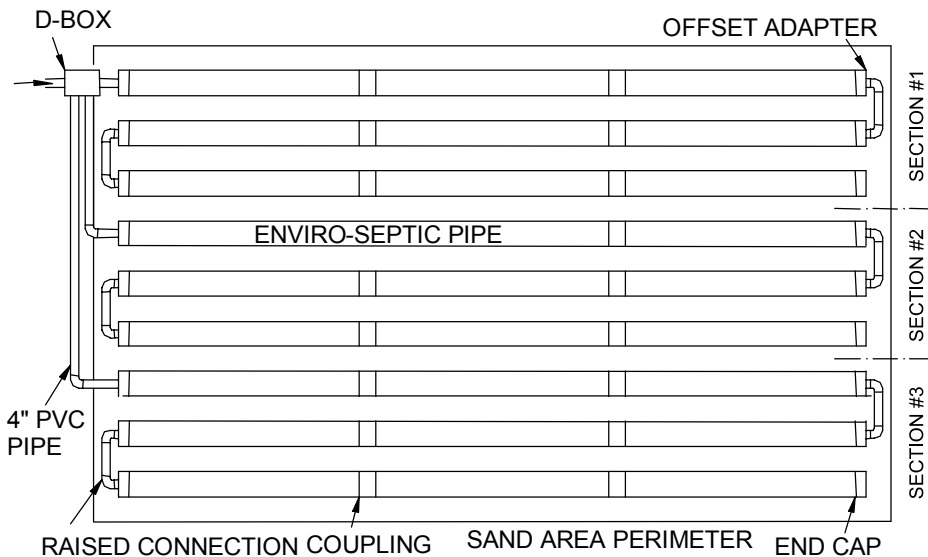
Combination Systems – Level In-Ground, Level Raised, In-Ground Sloping, and Raised Sloping, Continued

In-ground sloping

Here are end and top views of an in-ground sloping combination system.



A-Center-to-center pipe spacing
 C-Minimum separation distance
 F.G.-Final grade
 O.G.-Original grade
 W-Width of Enviro-Septic® pipe

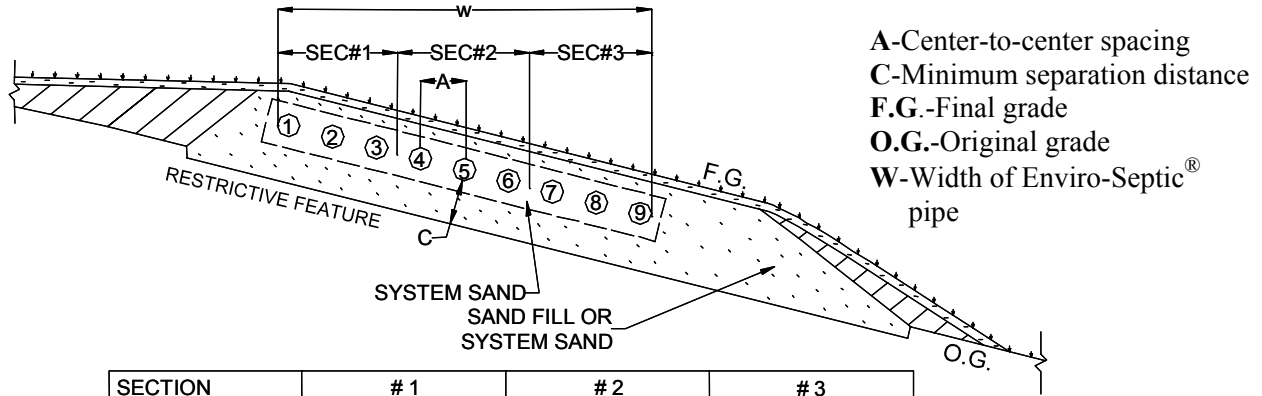


Note: Tank location may vary.

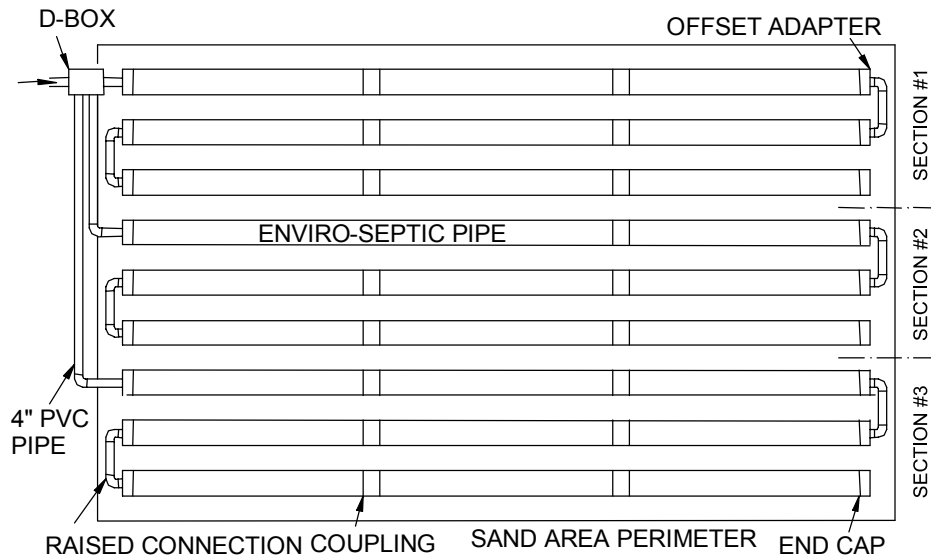
Continued

Combination Systems – Level In-Ground, Level Raised, In-Ground Sloping, and Raised Sloping, Continued

Raised sloping Here are end and top views of a raised sloping combination system.



SECTION	# 1			# 2			# 3		
LINE NO.	1	2	3	4	5	6	7	8	9
TOP OF PIPE	99.00'	98.50'	98.00'	97.50'	97.00'	96.50'	96.00'	95.50'	95.00'
BOTTOM OF PIPE	98.00'	97.50'	97.00'	96.50'	96.00'	95.50'	95.00'	94.50'	94.00'



Note: Tank location may vary.

Trench Systems – Basic Serial and Distribution Box

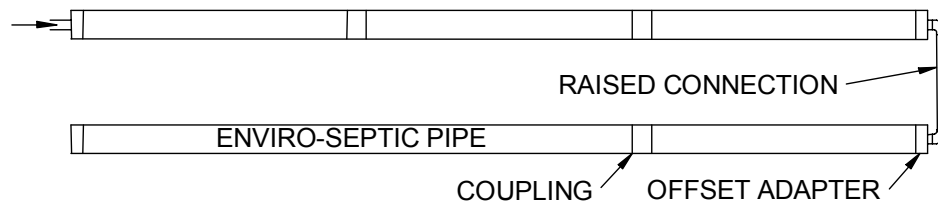
Introduction This page shows trench systems in basic serial and distribution box configurations.

Definition A trench system is a line or lines of Enviro-Septic[®] pipe connected in serial or distribution box systems.

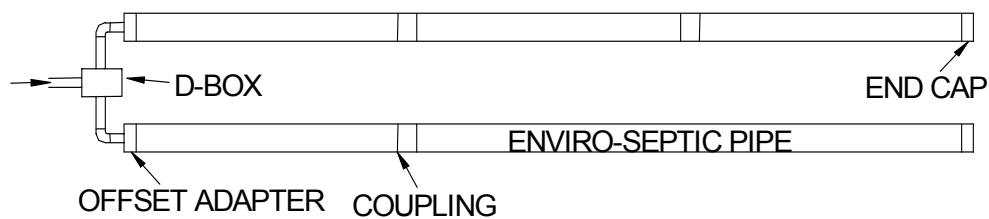
Level or sloping terrain Enviro-Septic[®] pipe may be installed in trench systems on level or sloping terrain. Enviro-Septic[®] pipes in trench configurations must be surrounded by a minimum of 6” of system sand.

Reference: See “Trench system spacing” and “Sand fill and clean fill requirements” in your State attachment.

Basic serial Here’s a top view of two lines of pipe in a basic serial trench configuration.



D-Box Here’s a top view of two lines of pipe in a D-Box trench configuration.



Section G

Multi-Level™ System Configurations

Preview

Introduction

Multi-Level™ systems are well suited to irregular shapes and/or difficult sites. By offering nearly two times the bacterial surface in the same footprint of ground, Multi-Level™ systems provide a cost effective solution for problem sites. Multi-Level™ systems are usually used on small lots or for systems that generate abnormally strong wastewater.

Reference: See Section H, “Non-Conventional System Configurations.”

Limited information

The diagrams provided in this section regarding Multi-Level™ systems are general in nature and not intended to represent all of the information required to design or install a Multi-Level™ system.

Design/install certification required

Designers and installers must be certified by Presby Environmental, Inc., (P.E.I.) or its representative to design or install a Multi-Level™ system.

Once certified, P.E.I. is available to aid throughout the entire design and installation process.

Non-certified exception: Non-certified designs and installations may be acceptable if performed under the direct supervision of P.E.I. or its representatives.

Use limitations

Certain soil types or percolation rates may limit using Multi-Level™ installations.

Reference: See the “Multi-Level™ Quick Reference Guide” in your State attachment.

Linear footage

Different states require specific considerations.

Reference: See the “Multi-Level™ Quick Reference Guide” in your State attachment.

Pipe spacing

Each level of a Multi-Level™ system has the same center-to-center pipe spacing.

The upper level is offset by ½ the center-to-center spacing so the Enviro-Septic® pipe of one level lines up with the center of the sand area between the pipes of the other level.

The bottom of the upper level pipe is separated from the top of the lower level pipe by a minimum of six inches of system sand.

Reference: See the “Multi-Level™ Quick Reference Guide” in your State attachment.

Continued

Multi-Level™ System Configurations, Continued

Line orientation Enviro-Septic® lines must be laid level and should run parallel to contours (perpendicular to sloping terrain) if possible.

Sloping systems The percentage of slope refers to the slope of the Enviro-Septic® system, not the existing terrain. The slope of the Enviro-Septic® system and the existing terrain are not required to be equal. A sloping system can be designed with more than one distinct slope and/or center-to-center pipe spacing in the same system. Maximum slope percentages are governed by jurisdiction specifications.

Reference: See the “Multi-Level™ Quick Reference Guide” in your State attachment.

Velocity reduction/Equalizer™ consideration If piping from the septic tank to Enviro-Septic® is excessively steep, a velocity reducer at the system inlet is necessary. A distribution box with a baffle or an inlet tee may be an adequate velocity reducer.

Note: An Equalizer™ is limited to a maximum of 10 gallons/minute in gravity systems and 20 gallons/minute in pumped systems.

Loading Each line of a distribution box system has a maximum GPD limit.

Reference: See “Loading Limits” in your State attachment.

Venting All Multi-Level™ systems must be vented in a manner that allows air to pass through each line of Enviro-Septic® pipe.

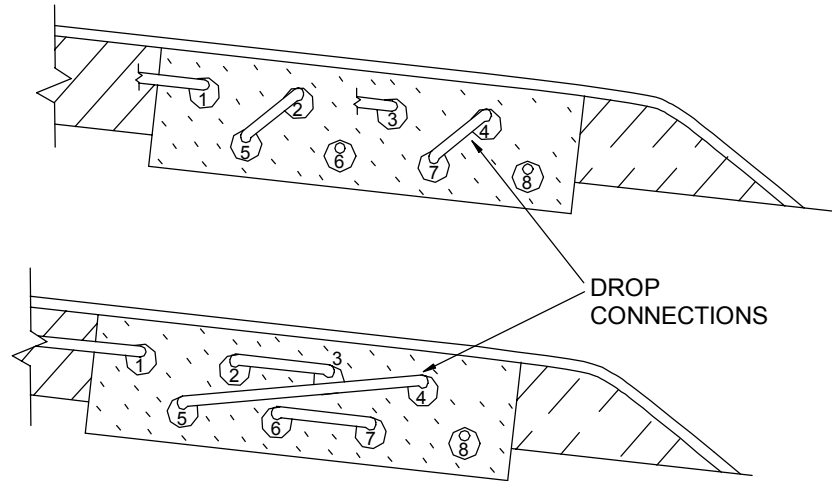
In this section This section contains the following subjects.

Subject	Page
Drop Connections	27
Basic Multi-Level™ Systems	28
Combination Multi-Level™ Systems	29

Drop Connections

Introduction Drop connections are unique to Multi-Level™ installations.

Drop connection A drop connection is a piece of 4" PVC pipe connecting two levels of Enviro-Septic® pipe. The diagrams below show drop connections in two different configurations.

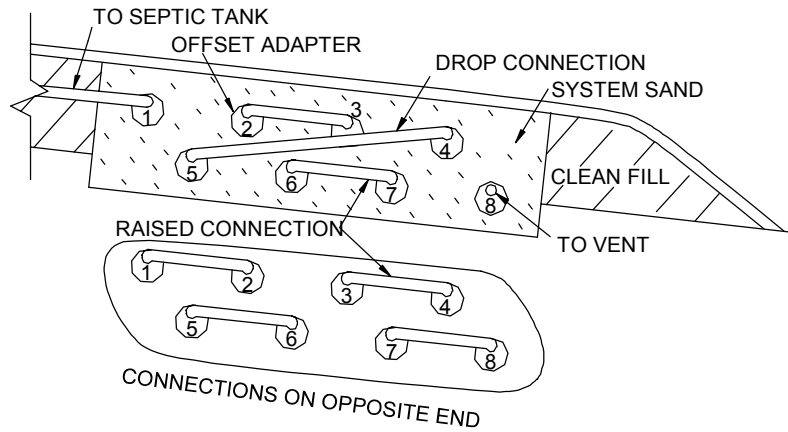


Caution: Ensure that drop connections in sloping systems have a minimum drop of 2" between the upper and lower levels.

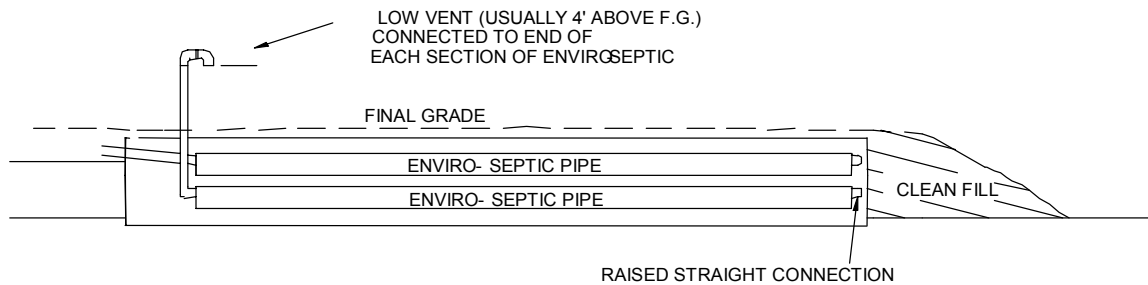
Basic Multi-Level™ Systems

Description Basic Multi-Level™ systems consist of a single section of Enviro-Septic® pipe installed on two levels, one above the other. The two levels are connected using a drop connection.

End view Here's an end view of a basic Multi-Level™ system.



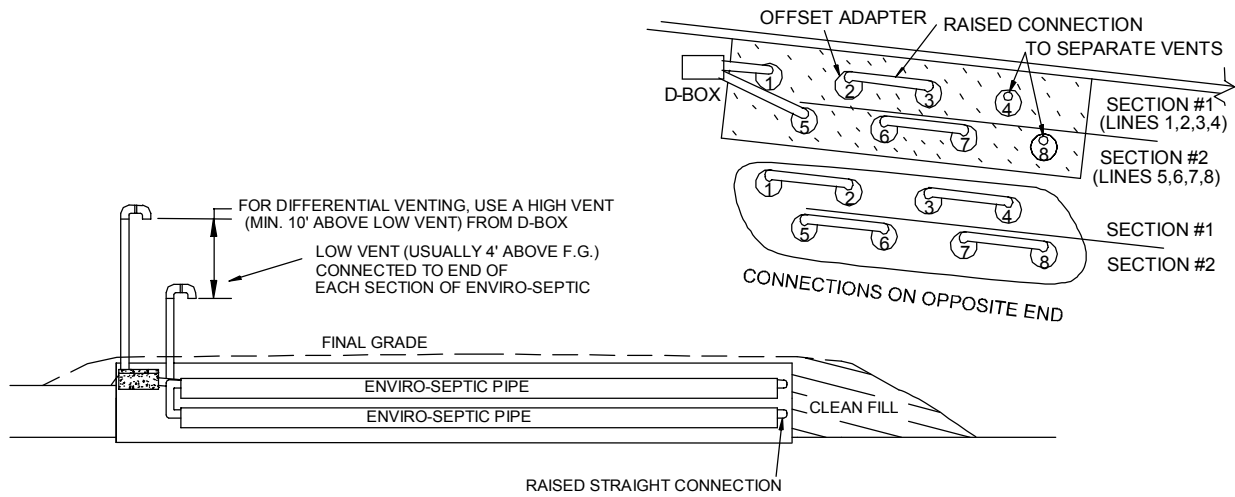
Side view Here's a side view of a basic Multi-Level™ system.



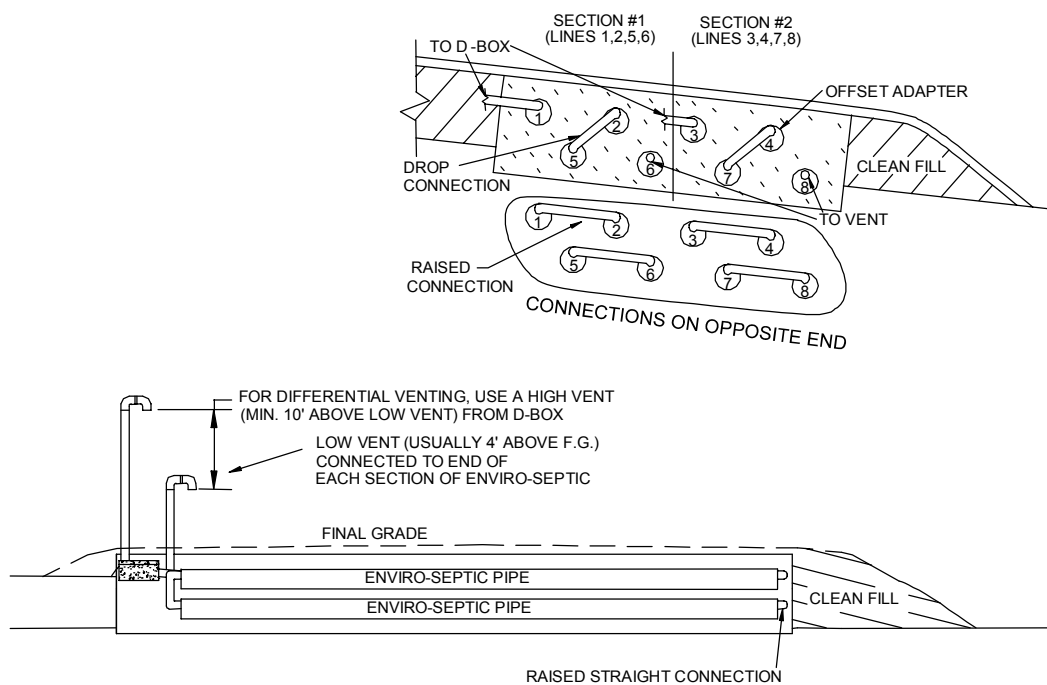
Combination Multi-Level™ Systems

Description Combination Multi-Level™ systems consist of two or more sections of Enviro-Septic® pipe installed on two levels. The sections may be installed one above the other (layered) or on alternating levels. Each section receives effluent through a distribution box and, where installed on alternating levels, are connected using drop connections.

Layered system Here are end and side views of a layered (one section over the other) Multi-Level™ system.



Alternating level system Here are end and side views of a Multi-Level™ system using alternating levels for each section of Enviro-Septic® pipe.



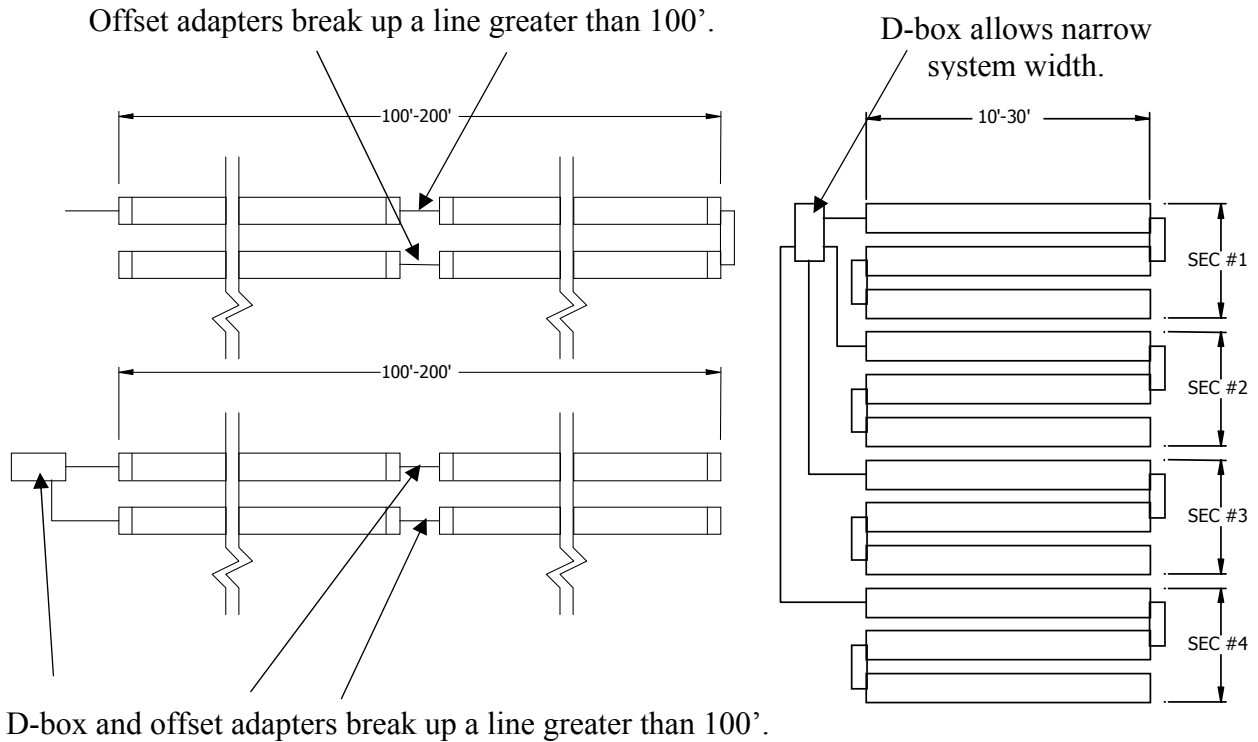
Section H Non-Conventional System Configurations

Introduction Non-conventional system configurations may accommodate greater than 100' system lengths and shorter than 30' line lengths. They may also take irregular shapes to accommodate site constraints.

Total linear feet requirement Each section of a system must have the same minimum linear length. A section may exceed the minimum linear length. Lines within a section may vary in length to accommodate site constraints.

Line length exceptions Proper line loading and cycling requires line lengths to be at least 30' long but no longer than 100'. Non-conventional system configurations allow this rule to be set aside while still guaranteeing proper line loading and cycling.

Here are some examples using offset adapters and distribution boxes.

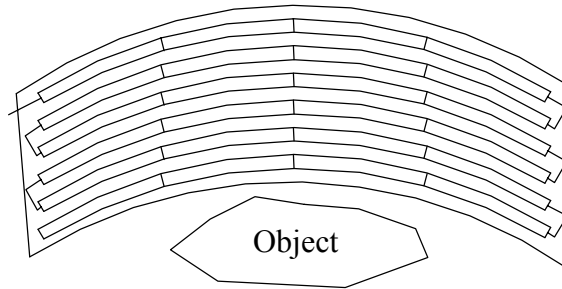


Continued

Non-Conventional Configurations, Continued

Curves

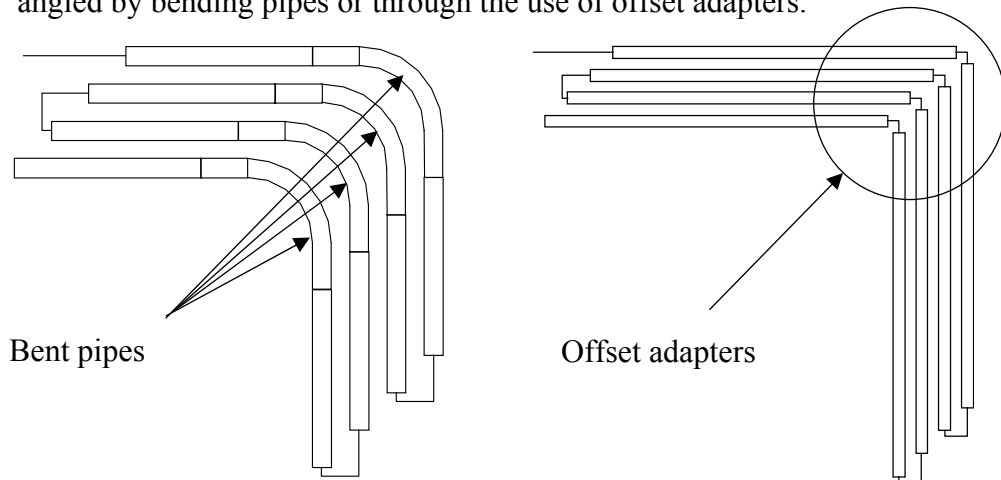
Curved configurations work well around objects, setbacks, and slopes.



Note: Multiple curves can also be used.

Angles

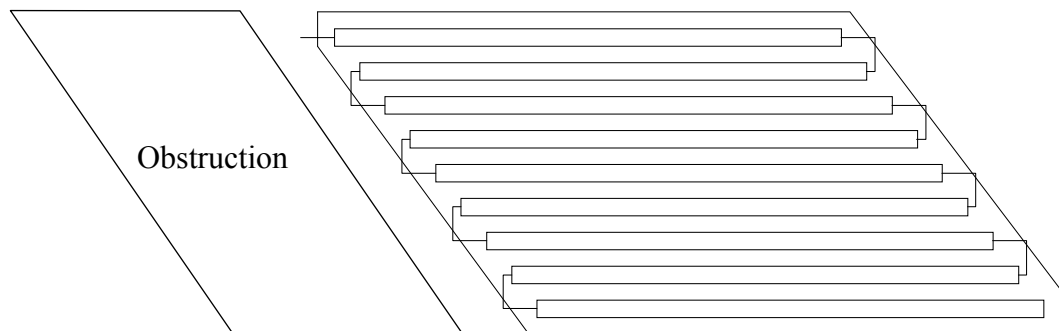
Angled configurations generally have one or more specific bends. Lines are angled by bending pipes or through the use of offset adapters.



Note: A 10' length of pipe may take a 90° bend.

Trapezoids

This system is trapezoidal to fit a particular slope or terrain feature.



Section I

Pump System Requirements

Introduction	Pump systems typically supply effluent to Enviro-Septic [®] pipe using a pressured line and a distribution box as a velocity reducer when site conditions do not permit a gravity system.
Differential venting	All pump systems must use differential venting. <u>Reference:</u> See Section J, “Venting Requirements.”
Velocity control	It is important to control the rate at which effluent enters Enviro-Septic [®] pipe. Excessive effluent velocity can disrupt solids that settle in the Enviro-Septic [®] pipes.
Velocity reduction	Never pump effluent directly into Enviro-Septic [®] pipes. Install a velocity reducer prior to the Enviro-Septic [®] pipe. An appropriately sized distribution box or tank is typically installed as a velocity reducer. If the design already incorporates a distribution box to divide effluent flow, an additional distribution box may not be necessary. Pressurized lines must discharge into a velocity reducer with a baffle, or be fitted with a 90-degree bend or tee fitting.
Pipe length per pumped gallon	Each gallon of effluent pumped per cycle requires a minimum of 1.0’ of Enviro-Septic [®] pipe.
Basic System GPM Limit	A maximum of 40 GPM is permitted for basic systems.
GPM per Equalizer[™] limit	An Equalizer [™] used in a pump system is limited to a maximum of 20 gallons per minute.
Section or line GPM limit	Each line of a distribution box system or section of a combination system is limited to a maximum of 20 GPM.

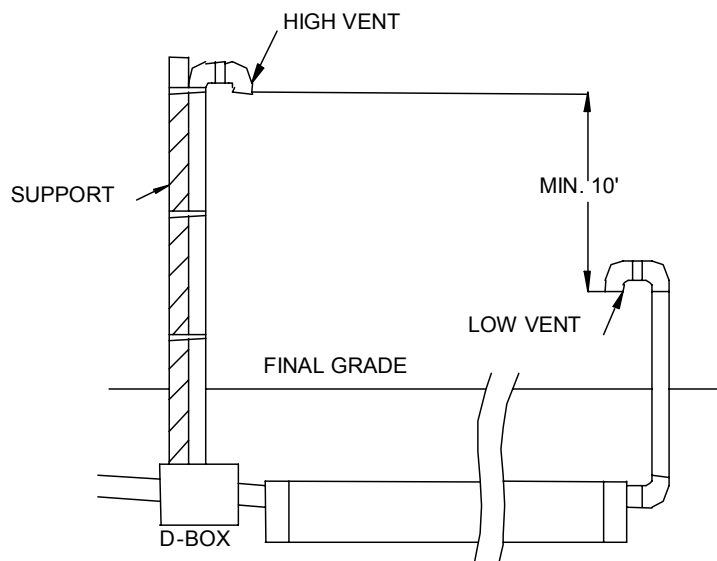
Section J

Venting Requirements

General rule	Locate vent openings to ensure air is drawn completely through each line or section of Enviro-Septic [®] pipe.
When to vent	<p>Venting is required if systems are pumped, under more than 18" of cover, or installed under parking areas, roads, or surface features that restrict air passage through the soil.</p> <p>One 4" vent is required for every 1,000 feet of pipe. If necessary, a single 6" vent opening may be installed in place of a maximum of three 4" vent openings.</p> <p>All Multi-Level[™] systems require venting.</p>
Vent locations	<p>Enviro-Septic[®] systems can be vented in three locations.</p> <ol style="list-style-type: none">1. Through an unused distribution box outlet.2. Through a tee installed in the PVC pipe near the inlet of the Enviro-Septic[®] pipe.3. Through an offset adapter installed at the end of a section or line.
Differential venting	Differential venting is the use of high and low vents in a system. High vents are connected to the distribution box and low vents are connected to the opposite end of the system. This arrangement enhances the circulation of air throughout the entire system.

DIFFERENTIAL VENTING

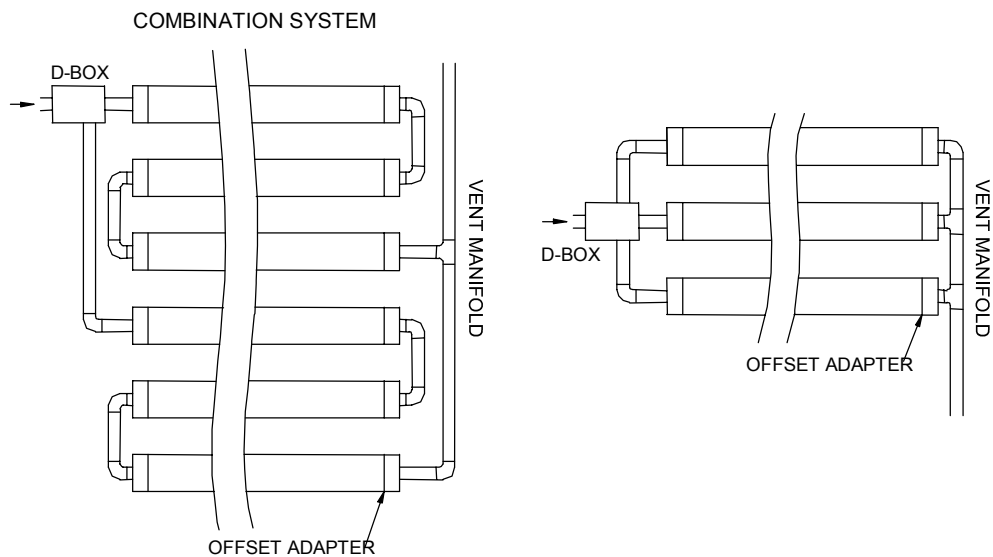
(TYPICAL - NOT TO SCALE)



Continued

Venting Requirements, Continued

Vent manifolds A vent manifold can be incorporated to connect the ends of a number of sections or lines of Enviro-Septic[®] pipe to a single vent opening.



Vent piping slope

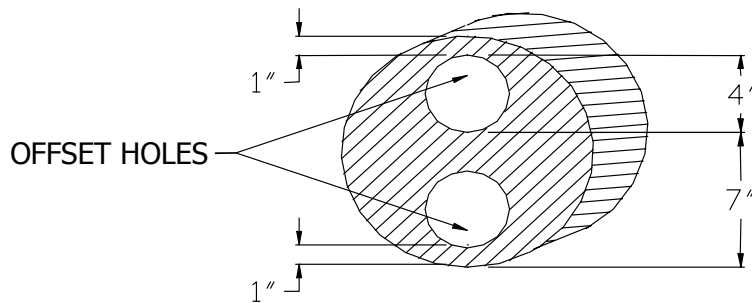
Vent piping should slope downward toward the system to prevent moisture from collecting in the piping and blocking air passage.

Section K Bottom Drain Requirements

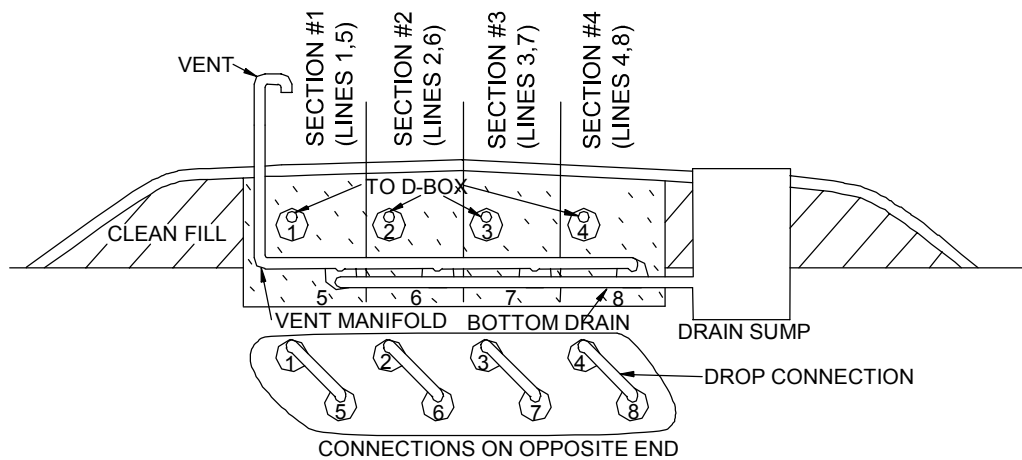
Purpose Bottom drains aid in the rejuvenation of overloaded or abused systems.

- Requirements** Bottom drains lead to drain sumps. Here are some drain requirements.
- The top of the drain sump should be a minimum of 12" above the top of the highest Enviro-Septic® pipe.
 - The bottom drain inlet must be a minimum of 18" above the drain sump floor.
 - Level systems may use single drain sumps.
 - Sloping systems may require multiple drain sumps.
 - All bottom drain connections and drain sumps must be sealed.

Double offset adapter Most bottom drains use double offset adapters.



End view Here's an end view of a combination Multi-Level™ system with a bottom drain and drain sump.



Section L

Simple-Septic[®] Leaching Systems

Introduction Throughout this manual we have presented information as it relates to the Enviro-Septic[®] Leaching Systems. This section presents the differences between the two products.

Simple-Septic[®] vs. Enviro-Septic[®] Simple-Septic[®] is a leaching system identical to Enviro-Septic[®] except that it lacks the thick mat of randomly orientated plastic fibers between the corrugated plastic pipe and the geo-textile fabric.

Simple-Septic[®] cannot be used in Multi-Level[™] systems.

Purpose Simple-Septic[®] was developed to compete with products offering less performance than Enviro-Septic[®]. Simple-Septic[®] is superior and less expensive than products that utilize only a single layer of fabric or promote direct effluent-soil contact.

In general, Simple-Septic[®] is suitable for light residential or light commercial uses that do not have high strength wastewater or high flows.

Simple-Septic[®] is also applicable for drainage systems and/or recharging systems.

Use restrictions Some States restrict the use of this product.

Reference: See your State attachment for any use restrictions.

Design and installation procedures Simple-Septic[®] systems are designed and installed the same way as Enviro-Septic[®] systems in accordance with this manual. The same couplings, offset adapters, and end caps are interchangeable between both products.

Section M

System Rejuvenation and Expansion

Introduction This section covers procedures for rejuvenating failing systems and explains how to expand existing systems.

Definition: failing system System failures, almost without exception, are related to the conversion of bacteria from an aerobic to an anaerobic state. Flooding, improper venting, alteration or improper depth of soil, sudden use changes, introduction of chemicals or medicines, and a variety of other conditions can contribute to this phenomenon.

Rejuvenating failing systems Failing systems need to be returned from an anaerobic to an aerobic state. Most systems can be put back on line and not require costly removal and replacement by using the following procedure.

1. Determine the problem causing system failure and repair.
 2. Drain the system by pumping out the sump of a bottom drain or by excavating one end of all the lines and removing the end cap or offset adapter.
 3. Drain the lines.
 4. If foreign matter has entered the system, flush the pipes.
 5. Safeguard the open excavation.
 6. Guarantee a passage of air through the system.
 7. Allow all lines to dry for a minimum of 72 hours.
 8. Re-assemble the system to its original design configuration.
-

System expansion Enviro-Septic[®] systems are easily expanded by adding equal lengths of pipe to each line of the original design or by adding additional equal sections.

Note: All system expansions need to meet State and/or local regulations.

Re-usable pipe Enviro-Septic[®] components are not biodegradable and may be reused. In cases of improper installation it may be possible to excavate, clean, and reinstall all system components.

System replacement If system components require replacement, simply remove the existing pipe and contaminated sand and replace with new pipe and sand.

Notes

Notes

Note

The information in this manual is subject to change without notice. Your suggestions and comments are welcome. Please contact us at

Presby Environmental, Inc.
Route 117, PO Box 617
Sugar Hill, NH 03585
Phone: 1-800-473-5298 Fax: (603) 823-8114
Website: www.presbyenvironmental.com

Enviro-Septic® U.S. Patent Nos. 6,461,078; 5,954,451; 6,290,429 with other patents pending. Canadian Patent Nos. 2185087; 2187126 with other patents pending. Simple-Septic® U.S. Patent No. 5,606,786. Presby Maze® U.S. Patent No. 5,429,752.

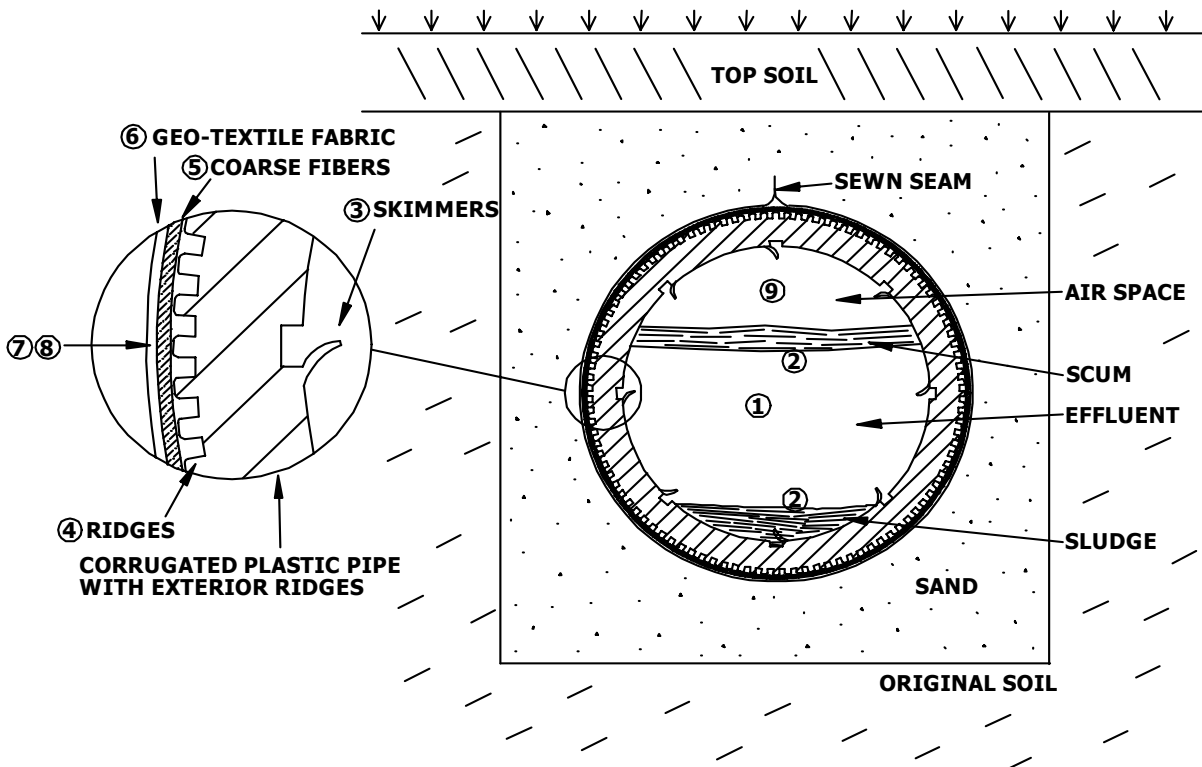
Enviro-Septic®, Simple-Septic®, and Presby Maze® are registered trademarks of Presby Environmental Inc. Multi-Level™, is a trademark of Presby Environmental, Inc.

© 2003 Presby Environmental, Inc. All rights reserved. Publication date: April 2003.

© 2003 Presby Environmental, Inc. All rights reserved. Publication date: April 2003.

ENVIRO--SEPTIC[®] LEACHING SYSTEM

Nine Steps of pretreatment: Enviro-Septic treats effluent more efficiently to provide longer system life and to protect our environment



- Stage 1:** Warm effluent enters the pipe and is cooled to ground temperature.
- Stage 2:** Suspended solids separate from the cooled liquid effluent.
- Stage 3:** Skimmers further capture grease and suspended solids from the exiting effluent.
- Stage 4:** Pipe ridges allow the effluent to flow uninterrupted around the circumference of the pipe and aid in cooling.
- Stage 5:** A Mat of coarse random fibers separates more suspended solids from the effluent.
- Stage 6:** Effluent passes into the geo-textile fabric and grows a protected bacterial surface.
- Stage 7:** Sand wicks liquid from the geo-textile fabric and enables air to transfer to the bacterial surface.
- Stage 8:** The fabric and fibers provide a large bacterial surface to break down solids.
- Stage 9:** An ample air supply and fluctuating liquid levels increase bacterial efficiency.