The Presby Wastewater Treatment System

Florida

Advanced Enviro-Septic®
Design and Installation Manual

✔ Minimizes the Expense ✔ Protects the Environment ✔ Preserves the Site

Presby Environmental, Inc.

The Next Generation of Wastewater Treatment Technology

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The information in this manual is subject to change without notice. We recommend that you check your state's page on our website on a regular basis for updated information. Your suggestions and comments are welcome. Please contact us at: 800-473-5298

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Presby Environmental, Inc. United States and Canadian Patents:
Coupling system: US Patent No 6,899,359; Canada 2,359,255
End Cap: US Patent No 6,792,977; Canada 2,365,453
Enviro-Septic US Patent No 6,461,078; Canada 2,300,535
Fluid Conduit (AES): US Patent No 8,342,212; Canada 2,609,409
Multi-Layer Fabric (AES): US Patent No 5,954,451; Canada 2,185,087
Multi-Level Leaching System: US Patent No 6,290,429; Canada 2,286,995
Pipe Making Method: US Patent No 5,606,786; Canada 2,817,126
Skimmer Tab Former: US Patent No 7,270,532; Canada 2,415,194
US Patent Nos. 7,713,414, 6,461,078; Canada 2,300,535
With other patents pending in the United States, Canada and other jurisdictions.

IMPORTANT NOTICE: This Manual is intended ONLY for use in designing and installing Presby Environmental's Advanced Enviro-Septic®, Enviro-Septic® and Simple-Septic® Wastewater Treatment Systems. The use of this Manual with any other product is prohibited. The processes and design criteria contained herein are based solely on our experience with and testing of Advanced Enviro-Septic®, Enviro-Septic® and Simple-Septic®. Substitution of any other large diameter gravelless pipe will result in compromised treatment of wastewater and other adverse effects.

Modified in accordance with Florida Department of Health approval letter dated April 1, 2014.

Table of Contents

1.0 Additional Design and Installation Requirements

This manual to be used in conjunction with the Presby Supplemental Design and Installation Manual for Florida, which outlines the additional conditions detailed in the Presby Environmental Innovative System Permit Approval dated April 1, 2014 by the Florida Department of Health.

2.0 Background

Liquid that exits from a septic tank ("effluent") contains suspended solids that can cause traditional systems to fail prematurely. Solids can overload bacteria, cut off air required for aerobic bacterial activity, and/or seal the underlying soil, interfering with its ability to absorb liquid.

2.1 What Our System Does

By utilizing simple yet effective natural processes, the Advanced Enviro-Septic® (AES) Treatment System treats septic tank effluent in a manner that prevents suspended solids from sealing the underlying soil, increases system aeration, and provides a greater bacterial treatment area ("biomat") than traditional systems.

2.2 Why Our System Excels

The Presby Treatment 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. This all combines to create a unique eco-system that no other passive wastewater treatment system is designed to offer. The result is a system that excels by being more efficient, lasting longer, and having a minimal environmental impact.

2.3 System Advantages

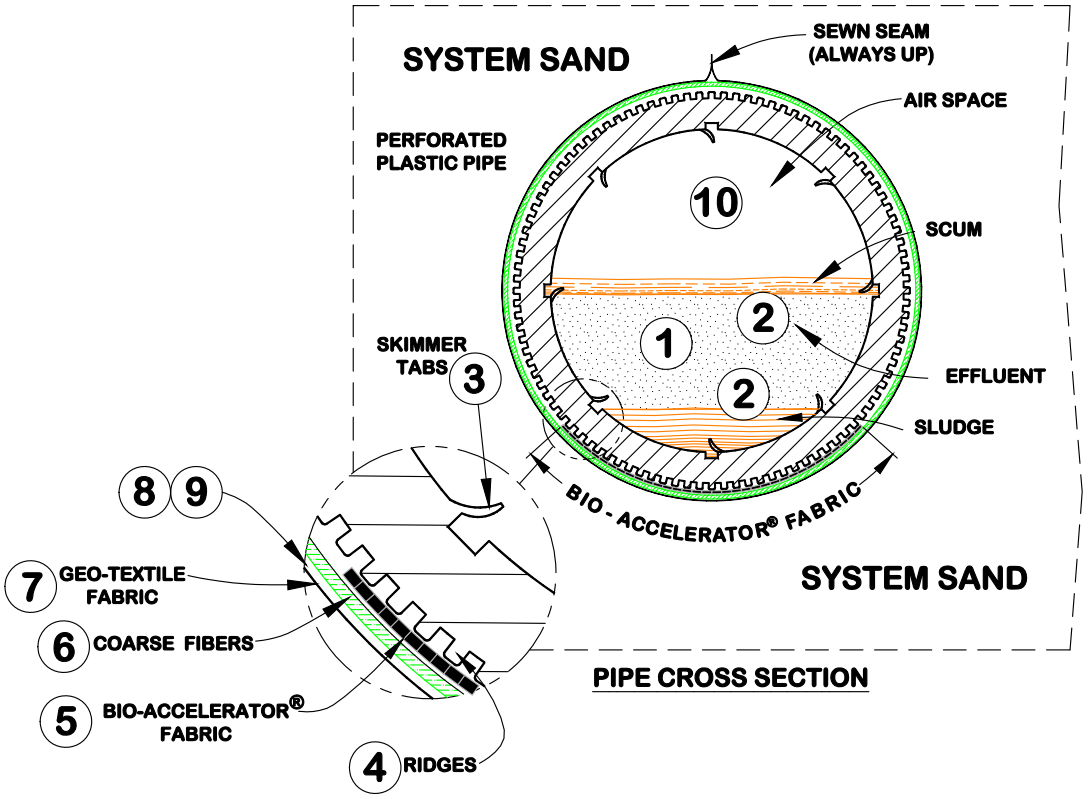
a) costs less than traditional systems
b) eliminates the need for washed stone
c) often requires a smaller area
d) installs more easily and quickly than traditional systems
e) adapts easily to residential and commercial sites of virtually any size
f) adapts well to difficult sites
g) develops a protected receiving surface preventing sealing of the underlying soil
h) blends "septic mounds" into sloping terrain
i) increases system performance and longevity
j) tests environmentally safer than traditional systems
k) recharges groundwater more safely than traditional systems
l) made from recycled plastic

2.4 Patented Advanced Enviro-Septic® Technology

The Advanced Enviro-Septic® (AES) is an onsite wastewater treatment system consisting of a patented configuration of ridged, corrugated, perforated plastic pipe with interior skimmer tabs, surrounded by a mat of random plastic fibers and geo-textile fabrics. The Advanced Enviro-Septic® pipe is assembled into an onsite wastewater treatment system that has been successfully tested and certified to NSF 40, Class I (a certification typically given to mechanical aeration devices), BNQ of Quebec, Class I, II, III and Cebedeau, Belgium standards. The system is designed to simultaneously purify and disperse effluent after primary treatment by a septic tank. The system is completely passive, requiring no electricity, motors, alarms, computers, etc. Advanced Enviro-Septic® is the "next generation" of our Enviro-Septic® technology. The AES product incorporates Bio-Accelerator®, a proprietary enhancement that screens additional solids from effluent, accelerates treatment processes, assures even distribution and provides additional surface area. Each foot of Advanced Enviro-Septic® provides over 40 sq ft of total surface area for bacterial activity.

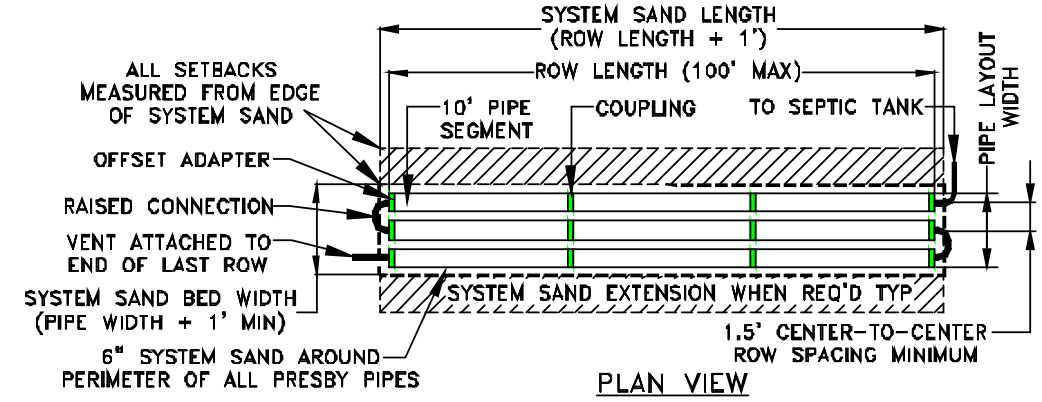
ADVANCED ENVIRO-SEPTIC®
WASTEWATER TREATMENT SYSTEM
WITH BIO-ACCELERATOR®

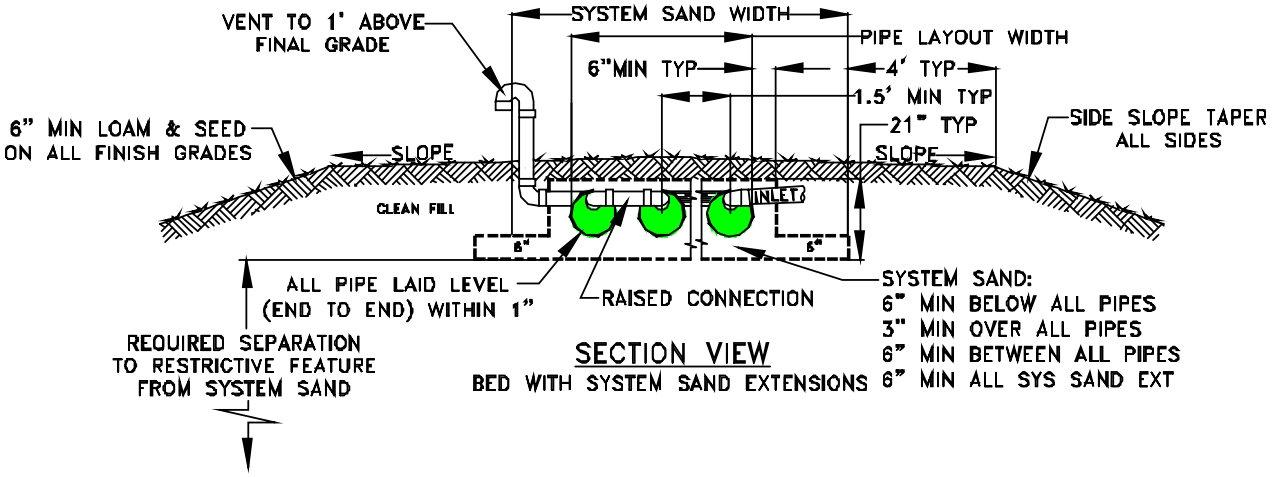
TEN STEPS OF WASTEWATER TREATMENT: ADVANCED ENVIRO-SEPTIC® TREATS EFFLUENT MORE EFFICIENTLY TO PROVIDE LONGER SYSTEM LIFE AND TO PROTECT THE ENVIRONMENT.

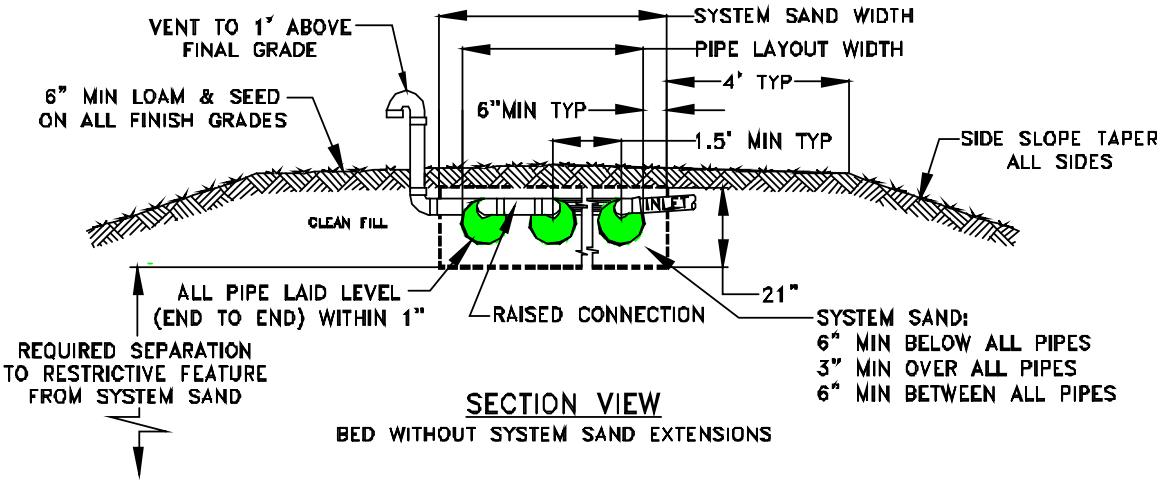


Stage 1 Warm effluent enters the pipe and is cooled to ground temperature.
Stage 2 Suspended solids separate from the cooled liquid effluent.
Stage 3 Skimmers further capture grease and suspended solids from the existing effluent.
Stage 4 Pipe ridges allow the effluent to flow uninterrupted around the circumference of the pipe and aid in cooling.
Stage 5 Bio-Accelerator® geo-textile fabric filters additional solids from the effluent, enhances and accelerates treatment, facilitates quick start-up after periods of non-use, provides additional surface area for bacterial growth, promotes even distribution, and further protects outer layers and the receiving surfaces so they remain permeable.
Stage 6 A mat of coarse random fibers separates additional suspended solids from the effluent.
Stage 7 Effluent passes into the geo-textile fabric and grows a protective bacterial surface.
Stage 8 Sand wicks liquid from the geo-textile fabric and enables air to transfer to transfer to the bacterial surface.
Stage 9 The fabric and fibers provide extensive surface area for bacterial attachment.
Stage 10 An ample air supply and fluctuating liquid levels increase bacterial efficiency.

3.0 System Diagrams







Notes:
- All rows spaced 1.5 ft minimum center-to-center.
- Rows centered in System Sand bed within six inches
- Venting required for all bed configurations
- see paragraph 8.25 on page 10 for Side Slope Taper requirements
- No deep rooted vegetation on final grades

4.0 Presby System Components

4.1 Advanced Enviro-Septic® Pipe

a) Plastic pipe made with a significant percentage of recycled material
b) 10 ft sections (can be cut to any length)
c) Ridged and perforated, with skimmer tabs on interior
d) Bio-Accelerator® along bottom of pipe (sewn seam is always placed up).
e) Surrounded by a mat of randomly-oriented plastic fibers
f) Wrapped in a non-woven geo-textile fabric stitched in place
g) Exterior diameter of 12 in.
h) Each 10 ft section has a liquid holding capacity of approx. 58 gallons
i) A 10 ft length of AES pipe is flexible enough to bend up to 90°

4.2 Offset Adapter

An offset adapter is a plastic fitting 12 in. in diameter with an inlet hole designed to accept a 4 inch sewer line, raised connection or vent pipe. The hole is to be installed in the 12 o'clock position. The distance from the bottom of the Offset Adapter to the bottom of its inlet hole is 7 in. When assembling pipes into rows, note that the geo-textile fabrics are placed over the edges of the Offset Adapter and Couplings.

4.3 Double Offset Adapter

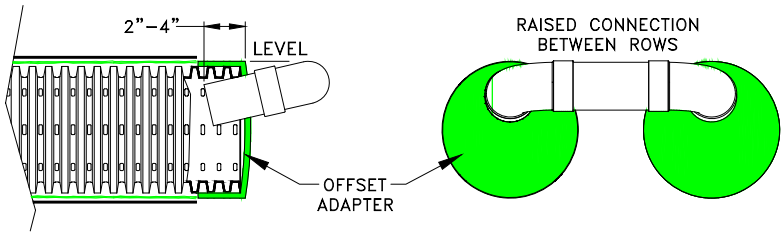
A double offset adapter is a plastic fitting 12 in. in diameter with two 4 in. holes designed to accept a 4 in. inlet pipe, raised connection, vent or vent manifold, depending upon the particular requirements of the design configuration. The 4 in. holes are to be aligned in the 12 o'clock and 6 o'clock positions. The holes are positioned 1 in. from the outside edge of the double offset adaptor and 2 in. from each other.

4.4 Coupling

A coupling is a plastic fitting used to create a connection between two pieces of Presby Pipe. Note that the couplings are wide enough to cover 1 or 2 pipe corrugations on each of the two pipe ends being joined. The couplings feature a snap-lock feature that requires no tools. When assembling pipes into rows, note that the geo-textile fabric does not go under couplings. Pull fabric back, install coupling, and then pull fabric over coupling. Also note, during installation in cold weather, couplings are easier to work with if stored in a heated location (such as a truck cab) before use.

4.5 Raised Connection

A raised connection is a PVC Sewer & Drain pipe configuration which is used to connect Presby Rows. Raised connections extend 2 in. to 4 in. into pipe and are installed on an angle (as shown below). All PVC joints should be glued.



RAISED CONNECTION

5.0 Table A: Soil Loading Rate

Texture	Texture Rating	*Loading Rate (GPD/sq ft)	Comparability Rating (ft² required mineral aggregate / ft² System Sand)	
			Subsurface/Fill	Mound
Coarse Sand, Sand, Loamy Coarse Sand	Slightly Limited	1.25	2.08	2.08
Fine Sand	Slightly Limited	1.25	2.08	2.08
Loamy Sand	Slightly Limited	1.25	2.08	3.13
Coarse Sandy Loam, Sandy Loam	Slightly Limited	1.25	2.08	3.13
Very Fine Sand, Loamy Very Fine Sand	Moderately Limited	0.60	1.71	2.40
Fine Sandy Loam	Moderately Limited	0.60	1.71	2.40
Very Fine Sandy Loam	Moderately Limited	0.60	1.71	n/a
Loam	Moderately Limited	0.50	1.43	n/a
Silt Loam	Moderately Limited	0.43	1.23	n/a
Sandy Clay Loam	Moderately Limited	0.43	1.23	n/a
Clay Loam, Silty Clay Loam	Moderately Limited	0.27	1.35	n/a
Sandy Clay, Silty Clay	Moderately Limited	0.27	1.35	n/a
Clay	Severely Limited	n/a	n/a	n/a

* Loading rates reflect state approved reduction in bed size (increased loading rates)

6.0 Table B: Row Length and Pipe Layout Width

		Total Linear Feet of Presby Pipe													
Row Length (ft)	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300
	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375
	30	60	90	120	150	180	210	240	270	300	330	360	390	420	450
	35	70	105	140	175	210	245	280	315	350	385	420	455	490	525
	40	80	120	160	200	240	280	320	360	400	440	480	520	560	600
	45	90	135	180	225	270	315	360	405	450	495	540	585	630	675
	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750
	55	110	165	220	275	330	385	440	495	550	605	660	715	770	825
	60	120	180	240	300	360	420	480	540	600	660	720	780	840	900
	65	130	190	260	325	390	455	520	585	650	715	780	845	910	975
	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050
	75	150	225	300	375	450	525	600	675	750	825	900	975	1050	1125
	80	160	240	320	400	480	560	640	720	800	880	960	1040	1120	1200
	85	170	255	340	425	510	595	680	765	850	935	1020	1105	1190	1275
	90	180	270	360	450	540	630	720	810	900	990	1080	1170	1260	1350
	95	190	285	380	475	570	665	760	855	950	1045	1140	1235	1330	1425
	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
# of Rows		**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
	1.50	2.50	4.00	5.50	7.00	8.50	10.00	11.50	13.00	14.50	16.00	17.50	19.00	20.50	22.00
	Pipe Layout Width ft at 1.50 ft Row Spacing														

To use Table B: select a row length and move right until the minimum amount of pipe is found (more is allowed). Then move down to find the number of rows required. Continue downward in the same column until adjacent to the row spacing and find the pipe layout width. Example: 200 ft of pipe required, using row length of 40 and 1.50 ft spacing will require (5) rows resulting in a pipe layout width of 7.00 ft. Note: Pipe layout width is always (1) ft less than the System Sand Bed width.

7.0 Design Procedure and Examples

Task 1: Using the daily design flow and loading rate from Table A. Calculate the minimum sand bed area and total Presby Pipe required (more pipe is always allowed).

Task 2: Selected a row length suitable for the site (longer beds are preferred). Calculate the number of rows to meet the minimum pipe requirement and find the pipe layout width from Table B. Add six inches of System Sand around the perimeter of the Presby Pipes when calculating the sand bed area.

Task 3: Verify the sand bed area meets or exceeds the sand bed area required by Task 1. Adjust sand bed area if needed. This may require increasing the sand bed width or by making the rows longer.

Design Example #1: single family residence, four bedrooms (400 GPD), Fine Sand, Slightly Limited.

Task 1: Maximum Loading Rate from Table A = 1.25 GPD/sq ft and 50 feet of Presby Pipe minimum per bedroom

a) Four bedrooms (400 GPD daily flow) ÷ 1.25 GPD/sq ft = 320 sq ft
b) Four bedrooms x 50 ft of Presby Pipe per bedroom = 200 ft total

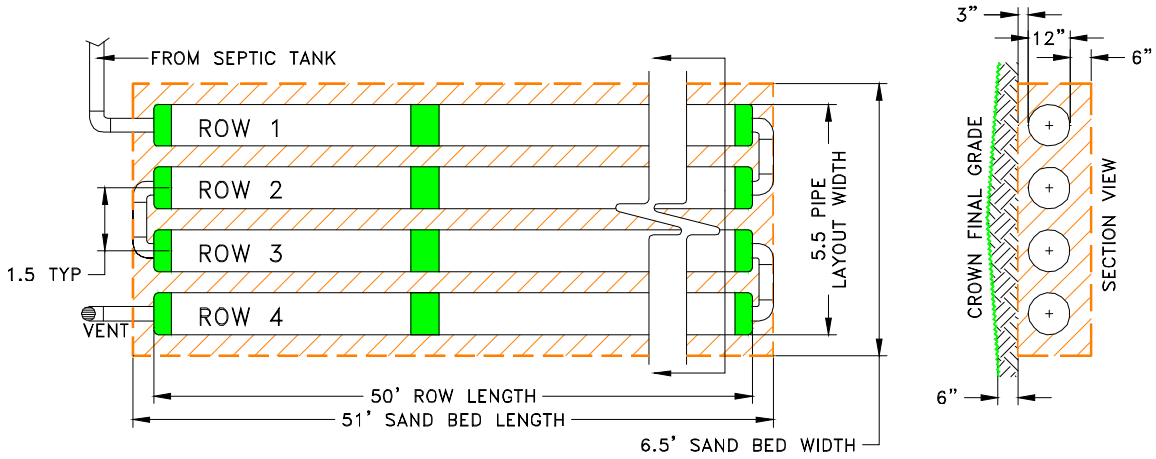
Task 2: The site will allow a row maximum length of 50 ft which will require four rows (200 ft ÷ 50 ft).

Task 3: The sand bed area for the system @ 1.5 ft row spacing = 51 ft (50 ft row length + 1 ft for sand) x 6.5 ft (5.5 ft layout width @ 1.5 ft spacing + 1 ft) = 331.5 sq ft, which exceeds the minimum 320 sq ft calculated in Task 1. No adjustment to the system is required.

Table B: Row Length and Pipe Layout Width

	Total Linear Feet of Presby Pipe									
20	40	60	80	100	120	140	160	180	200	22
25	50	75	100	125	150	175	200	225	250	275
30	60	90	120	150	180	210	240	270	300	330
35	70	105	140	175	210	245	280	315	350	38
40	80	120	160	200	240	280	320	360	400	44
45	90	135	180	225	270	315	360	405	450	49
50	100	150	200	250	300	350	400	450	500	55
55	110	165	220	275	330	385	440	495	550	60
90	1	21	360	4	5	63	720	810	00	9
95	190	285	380	475	570	665	760	855	950	104
100	200	300	400	500	600	700	800	900	1000	110
# of Rows	2	3	**4**	5	6	7	8	9	10	11
1.5' Spacing	2.5	4.0	5.5	7.0	8.5	10.0	11.5	13.0	14.50	16.0
	Pipe Layout Width ft.									

Illustration of Example #1:



Alternate bed configurations for Example #1: (2 rows of pipe 100 ft long) or (5 rows of pipe 40 ft long).
Note: for complete description of Basic Serial Distribution (see sect. 9.0, p 10).

Design Example #2: single family residence, six bedrooms (600 GPD), Very Fine Sandy Loam

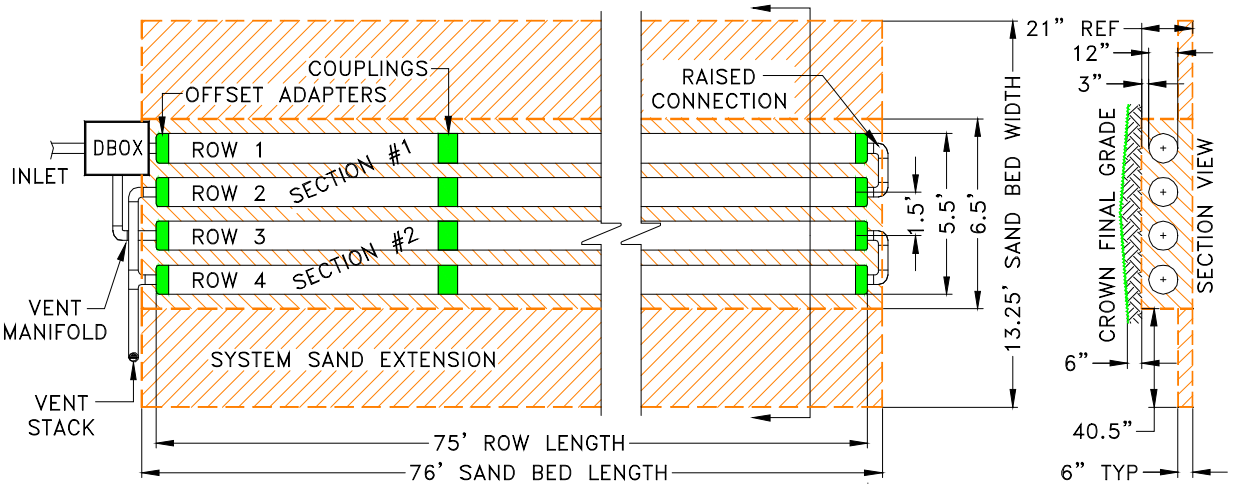
Task 1: Loading rate required from Table A = 0.6 GPD/sq ft and 50 feet of Presby Pipe minimum per bedroom

a) Six bedrooms (600 GPD daily flow) ÷ 0.6 GPD/sq ft = 1,000 sq ft
b) Serial Section required = 600 GPD ÷ 500 gallons/section = 1.2 (round up to 2 minimum)
c) Six bedrooms x 50 ft of Presby Pipe per bedroom = 300 ft total

Task 2: The site will allow a row length of 75 ft which will require four rows (Combination system with 2 rows per **serial section)**

Task 3: The sand bed area for the system as designed = (75 ft row length + 1 ft for sand) x (5.5 ft layout width + 1 ft) = 494 sq ft which is less than the minimum of 1,000 sq ft calculated in Task 1. To find the minimum sand bed width: 1,000 sq ft ÷ 76 ft = 13.2 ft (round up to 13.25 ft). The additional sand will be placed symmetrically in System Sand extensions on both sides of the Presby pipes. See illustration of system on next page.

Illustration of Example #2 using Combination Distribution:



Note: for complete description of Combination Distribution (see para.11.0, p 11).

8.0 General Design Requirements
The following requirements apply to all bed configurations unless otherwise noted.

8.1 Advanced Enviro-Septic® Requirements

a) Sewn seam must be oriented in the 12 o'clock position. This correctly orients the Bio-Accelerator® fabric in the 6 o'clock position.
b) Venting is always required regardless of vertical separation to restrictive features.
c) Vertical separation distances are measured to the bottom of the System Sand.

8.2 Barrier Materials over System Sand
No barrier materials (hay, straw, tarps, etc.) are to be placed between the System Sand and cover material; such materials may cut off necessary oxygen supply to the system.

8.3 Beds Constructed Level
System Sand bed bottom and Presby pipe rows will be constructed level end to end within ±1/2 in. (1 in. total) of the specified elevation.

8.4 Beds Long and Narrow
Long and narrow beds are preferred in soils with loading rates under 0.6 GPD/sq ft.

8.5 Certification Requirements
Any designers and installers who have not previously attended a Presby Environmental, Inc. Certification Course are required to obtain Presby Certification. Certification is obtained by attending a Certification Course presented by Presby Environmental, Inc. or its sanctioned representative and successfully passing a short online assessment test. Certification can also be obtained by viewing tutorial videos on our website (high speed connection required) and then successfully passing the assessment test. All professionals involved in the inspection, review or certification of Presby Systems should also become Presby Certified.

8.6 Converging Flows Restriction
Presby Systems must not be located where surface or ground waters will converge, causing surface water flow to become concentrated or restricted within the soil absorption field.

8.7 Daily Design Flow
Each bedroom is calculated at a minimum of 100 GPD. No system shall be constructed for less than two bedrooms. The minimum daily design flow for sizing Presby systems for any single-family residential system is two bedrooms (200 GPD per bedroom) and 300 GPD for any commercial system.

a) PEI recommends that certain fixtures, such as jetted tubs, may require an increase in the size of the septic tank.

b) PEI recommends that the daily design flow for a single bedroom apartment with a kitchen connected to a residence (also sometimes referred to as a "studio" or "in-law apartment") shall be calculated by adding two additional bedrooms (200 GPD).
c) When using metered flow for non-residential or food operations PEI recommends taking the average daily use from a peak month and multiply it by a minimum peaking factor of 2 times.
d) Note that estimated wastewater flows are calculated to assume occasional "peak" usage and a factor of safety; Systems are not expected to receive continuous dosing at full daily design load.

8.8 Distribution Box

A distribution box, also called a D-Box, is a device used to evenly distribute effluent coming from a septic tank to more than one Presby row, serial section (combination system) or more than one bed. D-Boxes with baffles or tees are also sometimes used for velocity reduction. Concrete boxes are preferred and must be placed on firmly compacted soil. Flow equalizers are placed in all used D-Box outlets (where the D-Box is used to divide flow), except outlets feeding vent stacks, and help ensure equal distribution in the event the D-Box settles or otherwise becomes out of level. Unused openings in the D-Box are to be capped or mortared.

8.9 Elevated Bed Systems (Mounds)

Elevated Presby Beds are designed for sites with soil, depth to groundwater or restrictive feature constraints that do not allow for In-Ground Bed Systems. An elevated bed system is a soil absorption field with any part of the Presby System above original grade.

8.10 End-to-End Preferred Over Side-to-Side

If site conditions permit, End-to-End multiple bed configurations are preferable to Side-to-Side configurations (see sect. 12.0, page 12).

8.11 Fill Extensions for Elevated (Mound) Systems

If any portion of the bed extends above the original grade the fill covering the field cannot begin the side slope taper for a distance of 4 ft minimum from the outmost edge of the System Sand bed (see illustration in sect. 3.0, page 3).

8.12 Filters, Alarms & Baffles

a) Effluent Filters are not recommended for use with Presby Systems.
b) Effluent filters **must** be maintained on at least an annual basis if used. Follow manufacturer's instructions regarding required inspections, cleaning and maintenance of the effluent filter.
c) Effluent Filters must allow the free passage of air to ensure the proper functioning of the system. A blocked filter in any on-site septic system could interfere with venting, causing the system to convert to an anaerobic state and result in a shortened life.
d) All pump chambers are to have a high water alarm float or sensor installed.
e) All septic tanks must be equipped with baffles to prevent excess solids from entering the Presby System.
f) Charcoal filters in vent stacks (for odor control) are not recommended by PEI. They can block air flow and potentially shorten system life. Contact PEI for recommendations to correct odor problems.

8.13 Flow Equalizers Required

All distribution boxes used to divide effluent flow require flow equalizers in their outlets. Flow equalizers are limited to a maximum of 20 GPM per equalizer.

8.14 Garbage Disposals (a.k.a. Garbage Grinders)

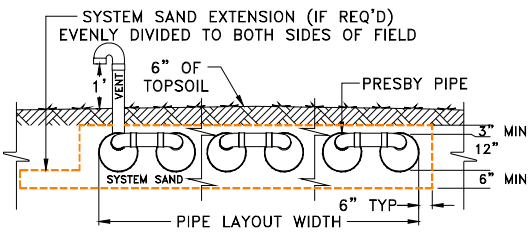
No additional Presby Pipe is required when using a garbage disposal (grinder). If a garbage disposal is utilized, follow the State's requirements regarding septic tank sizing. Multiple compartment septic tanks or multiple tanks are preferred and should be pumped as needed.

8.15 Graywater Systems

Advanced Enviro-Septic® pipe may be used to treat and disperse graywater.

8.16 In-Ground Bed Systems

Presby Systems are installed below existing grade for sites with no soil restrictive features to limit placement. System Sand extensions (when required) evenly divide to both sides of field. In-ground illustration:



8.17 Interceptor Drains
Interceptor Drains, if used, must be upslope of the Presby System and a minimum of 15 ft away from all parts of the system. Presby Pipe is excellent for use in constructing interceptor drains.

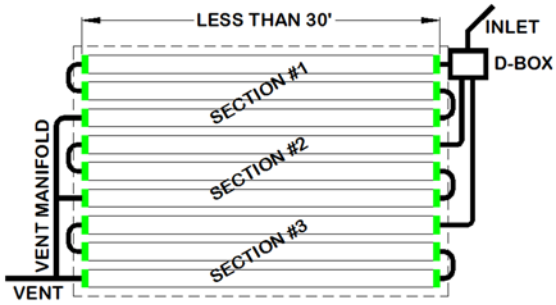
8.18 Presby Environmental Standards and Technical Support
All Presby Systems must be designed and installed in compliance with the procedures and specifications described in this Manual and in the product's Florida approval. This Manual is to be used in conjunction with the State of Florida's rules and/or local ordinances. In the event of contradictions or conflicts Presby Environmental, Inc. should be contacted for technical assistance at (800) 473-5298. Exceptions to any Florida rules other than those specifically discussed in this Manual may require state and/or local approval.

8.19 Presby Pipe per Bedroom
Each bedroom for single or multi-family residences requires a minimum of 50 ft of Presby pipe (more is always allowed). Presby Pipe requirements were developed assuming normal, domestic strength effluent which has received primary treatment in a septic tank (see para. 8.7, p. 7 for minimum daily design flow). When designing a system that will treat unusual or high strength wastewater consult our Technical Staff at (800) 473-5298 for guidance.

8.20 Presby Pipe Required Commercial Systems
A minimum of 50 ft of Presby Pipe per 100 GPD of flow are required for non-residential systems treating normal strength effluent. Contact Presby environmental for recommendations when designing for high strength effluent.

8.21 Pressure Dosing
The use of pressure dosing lines in Presby Systems is prohibited. Pumps may be utilized when necessary only to gain elevation (lift dosing) and to feed a distribution box which then distributes effluent by gravity to the Presby Field.

8.22 Row Requirements
a) All beds must have at least 2 rows.
b) Maximum row length for any system is 100 ft.
c) Recommended minimum row length is 30 ft.
d) A combination (or D-Box) distribution system must be used if any row length is less than 30 ft. The D-Box must feed at least 30 ft of Presby Pipe (calculated by adding the length of each serial sections first rows), a minimum of two D-Box outlets must be used and the field must be vented. Ex: row length 10 ft requires (3) serial sections (3 rows x 10 ft = 30 ft of pipe directly connected to the D-Box). Illustration of row lengths less than 30 ft:



e) Row lengths less than 30 ft may be used in all soil types allowed by Table A.
f) Row Center-to-Center Spacing is 1.5 ft min. for all systems.
g) Rows shall be grouped in the middle of the sand bed area when System Sand Extensions are required (see illustration in sect. 3.0, page 3).
h) All rows must be laid level to within +/- ½ in. (total of 1 in.) of the specified elevation and preferably parallel to the contour of the site, although alternate orientations are allowed with proper construction. Contact Technical Support for recommendations.
i) It is easier if row lengths are designed in exact 10 ft increments since Presby Pipe comes in 10 ft sections. However, if necessary, the pipe is easily cut to any length to meet site constraints.

8.23 Separation Distances (Horizontal and Vertical)
a) Separation distances to the seasonal high water table (SHWT) or other restrictive features are measured from the outermost edge or bottom of the System Sand.
b) For a site to be acceptable for a Presby System, there must be at least 9 in. of in situ unsaturated soil.
c) The separation distance between the bottom of the System Sand and the Seasonal High Water Table (SHWT) is 24 in. min. for new construction.
d) The separation distance between the System Sand and ledge, bedrock or impermeable soils is 42 in. min. for new construction.
e) System repair requirements shall be in accordance with 64E-6.015 FAC.

8.24 Septic Tank
The Advanced Enviro-Septic® System is designed to treat effluent that has received primary treatment in a standard, single or multi-compartment, septic tank. Septic tanks must also:

a) Meet the minimum size requirements of Table II of 64E-6.008, FAC.
b) Have both Inlet and outlet baffles to prevent solids from entering the Presby System in accordance with 64E-6.013(2) (d) and (e).
c) Effluent filters are not to be used in the septic tank due to their tendency to clog when not properly maintained, which restricts the oxygen supply that is essential to the proper functioning of the system.
d) If a garbage disposal is in use, consider a 50% increase in septic tank capacity.
e) If a basement ejector pump (pumping solids) is used, the pump line must connect to the sewer pipe delivering wastewater to the septic tank and not pump directly into the septic tank. The use of ejector pumps will often require the septic tank be serviced more often.
f) Septic tank sizing for graywater systems shall be sized in accordance with Florida rules.

8.25 Side Slope Tapers

Side slope tapering (as shown in paragraph 3.0 illustration on page 3) begins 4 ft from the edge of the edge of the System Sand and is to be no steeper than 2:1 for systems that do not extend more than 36 inches above the original grade or 3:1 for systems extending over 36 inches above the original grade.

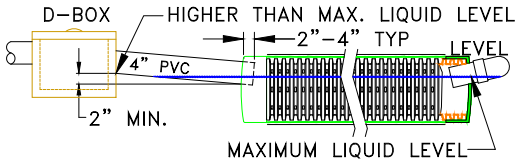
8.26 System Sand Bed Height Dimension

The height of a Presby Sand Bed measures 21 in. minimum (not including 6 in. of cover material):
a) 6 in. minimum of System Sand below the Presby Pipe; and
b) 12 in. diameter of the pipe; and
c) 3 in. minimum of System Sand above the Presby Pipe.
d) The System Sand Extension area is required to be a minimum of 6 in. deep (see illustration on page 3).

8.27 Two Inch Rule

The outlet of a septic tank or distribution box must be set at least 2 in. above the highest inlet of the Presby Row, with the connecting pipe slope not less than 1% (approximately 1/8 in. per foot.)

Illustration of 2 in. rule:



8.28 Topographic Position Requirement

The system location must be located in an area that does not concentrate water, both surface and subsurface. If allowed by state and local authorities, altering the terrain upslope of a system may alleviate this requirement if the waters are sufficiently altered to redirect flows away from the field.

8.29 Wastewater Strength

Please contact Presby Environmental for design recommendations when dealing with high strength effluent.
High strength wastewater is septic tank effluent quality with a combined 30-day average carbonaceous biochemical oxygen demand (CBOD) in excess of three-hundred (300) mg/L. and total suspended solids (TSS) in excess of two-hundred (200) mg/L in accordance with Florida 64E-6.002(15).

8.30 Water Purification Systems

a) Water purification systems and water softeners should **not** discharge into any Presby System. This "backwash" does not require treatment and the additional flow may overload the system.
b) If there is no alternative means of disposing of this backwash other than in the Presby System, then the system will need to be "oversized." Calculate the total amount of backwash in GPD, multiply by 3, and add this amount to the daily design flow when determining the field and septic tank sizing.
c) Water purification systems and water softeners require regular routine maintenance; consult and follow the manufacturer's maintenance recommendations.

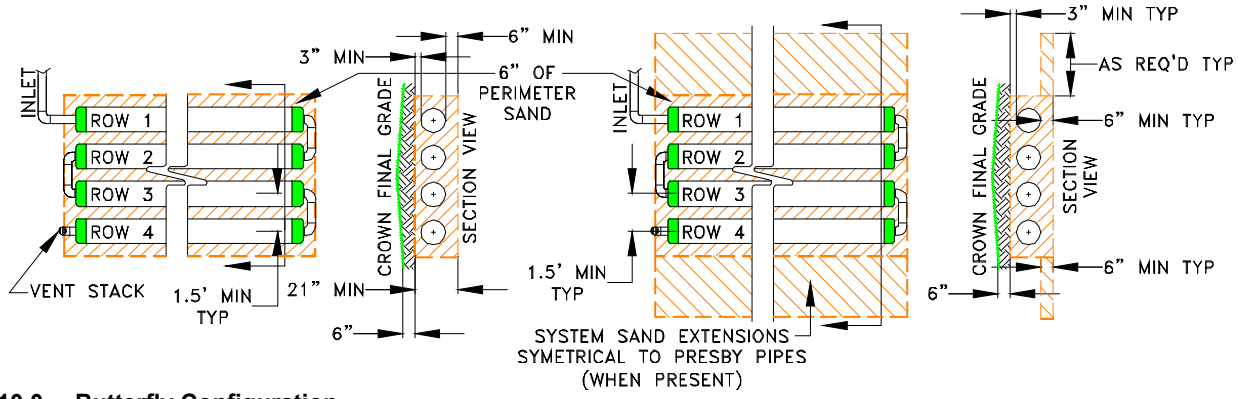
9.0 Basic Serial Distribution

Advanced Enviro-Septic® pipes are connected in series at the ends with raised connections, using offset adapters. Basic Serial distribution systems are quick to develop a strong biomat in the first row, provide a longer flow route, improved effluent treatment, ensures air will pass through all the Presby Rows and does not require the use of a D-Box. Other criteria:
a) May be used for single beds of 500 GPD or less.
b) Basic Serial distribution incorporates rows in serial distribution in a single bed
c) Maximum length of any row is 100 ft

d) Flow Equalizers are not required for Basic Serial systems. In pump systems, the d-box is only used for velocity reduction and the system is only feeding one row (flow is not being divided).

e) Illustrations of Basic Serial Systems:

Without System Sand Extensions - With System Sand Extensions –



10.0 Butterfly Configuration

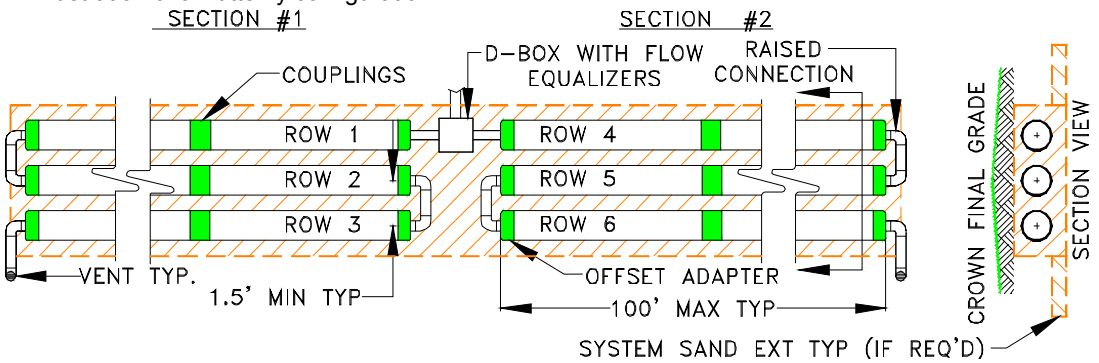
a) A "butterfly configuration," is considered to be a single bed system with two or more sections (can also be Combination configurations).

b) Maximum length of any row is 100 ft.

c) Serial Section loading limit is 500 GPD.

d) Beds can contain any number of serial sections.

Illustration of a Butterfly configuration:



11.0 Combination Serial Distribution

Combination Serial distribution within one bed, or multiple beds, is required for systems with daily design flows greater than 500 GPD. Combination Serial distribution is quick to develop a strong biomat in the first row of each section, providing improved effluent treatment. Combination Serial distribution consists of two or more serial sections installed in a single bed.

a) Each section in a Combination Serial system consists of a series of Presby Rows connected at the ends with raised connections, using offset adapters and PVC or polyethylene sewer and drain pipe.

b) Maximum length of any row is 100 ft.

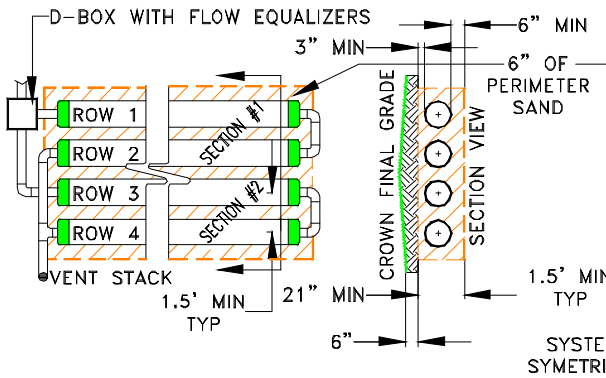
c) Serial Section loading limit is 500 GPD.

d) There is no limit on the number of Combination Serial Sections within a bed.

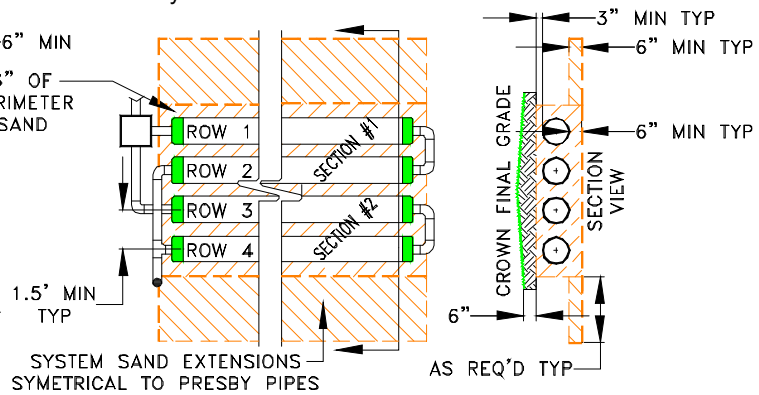
e) System Sand Extensions (if required) divided symmetrically on both sides of the Presby pipes.

f) Illustrations of Combination Serial Systems on next page

Without System Sand Extensions -



With System Sand Extensions -



g) When the vent manifold is on the same side as the serial section inlets, the manifold runs over the top of these inlets.

11.1 Section Loading

Each section in a Combination Serial system has a maximum daily design flow of 500 GPD. More than the minimum number of sections may be used. Ex: Daily design flow = 1,000 GPD requires (1,000 ÷ 500) = 2 sections minimum.

11.2 Section Length Requirement

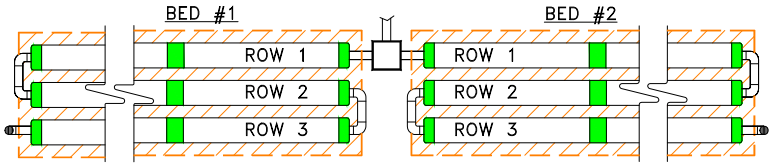
a) Each section must have the same minimum linear feet of pipe.
b) The minimum linear feet of pipe per section is determined by dividing the total linear feet required in the Presby System by the number of sections required.
c) A section may exceed the minimum linear feet required.
d) Rows within a section may vary in length to accommodate site constraints.

12.0 Multiple Bed Distribution

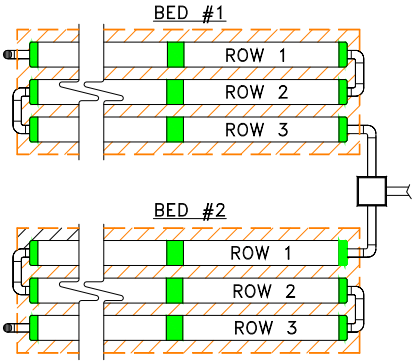
Multiple Bed distribution incorporates two or more beds, each bed with Basic Serial or Combination Serial distribution, and each receiving an equal amount of effluent from a D-Box. Multiple beds may be oriented along the contour of the site or along the slope of the site.

a) Each bed must have the same minimum linear feet of pipe. The minimum linear feet of pipe per bed is determined by dividing the total linear feet required in the Presby System by the number of beds.
b) Rows within a bed may vary in length to accommodate site constraints.
c) End-to-End configurations are preferred to Side-to-Side configurations.
d) In Side-to-Side configuration, one bed is placed beside another or one bed is place down slope of another. Bed separation distance is measure from edges of System Sand.
e) Minimum bed separation (measured from the edges of the System Sand) is 10 ft per Florida rules.

End-to-End Multiple Beds:



Side-to-Side Multiple Beds:

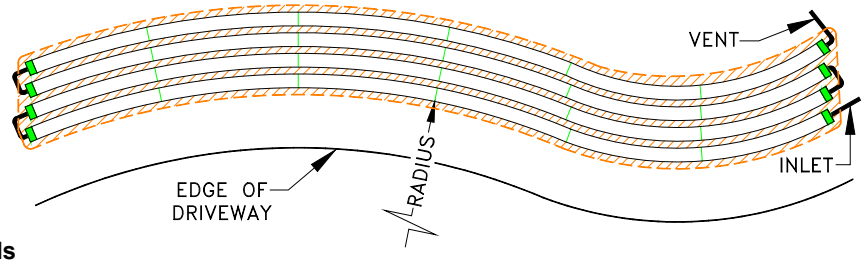


12.1 Total Linear Feet Requirement

a) Maximum row length is 100 ft.
b) Each section or bed must have at least the minimum linear feet of pipe (total feet of pipe required divided by number of sections equals the minimum number of feet required for each section or bed).
c) A section or bed may exceed the minimum linear length.
d) Rows within a section or bed shall be the same in length, near as practical, to accommodate site constraints.

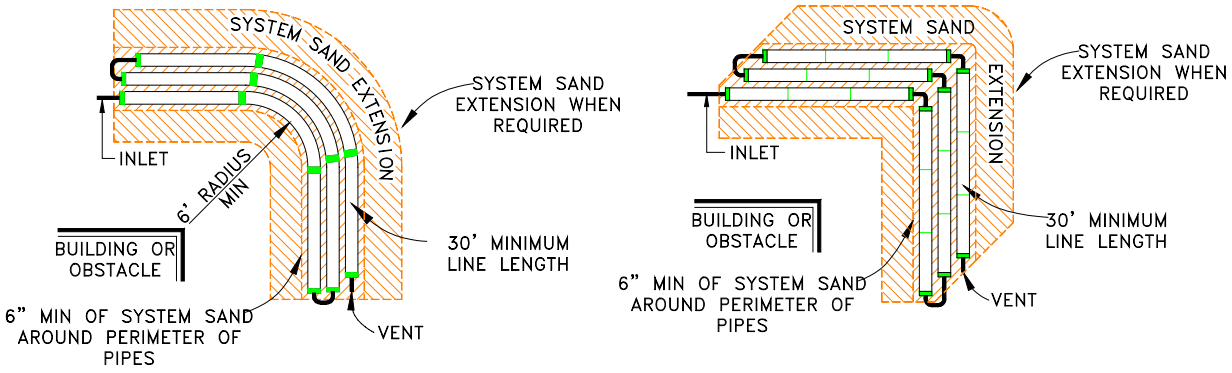
13.0 Curved Beds

Curved configurations work well around structures, setbacks, and slopes. Multiple curves can be used within a system to accommodate various contours of the site.



14.0 Angled Beds

Angled configurations generally have one or more specific bends, but the rows should follow the contour of the site as much as possible. Rows are angled by bending pipes or through the use of offset adapters. A 10 ft length of Presby Pipe may be bent up to 90°. The angled system shown to the right requires 30 ft minimum row lengths.
Illustrations of Angled Beds:



15.0 Pumped System Requirements

Lift-Pumped systems supply effluent to the Presby System using a pump and distribution box when site conditions do not allow for a gravity system. Dosing siphons are also an acceptable means of delivering effluent to the system.

15.1 Alarm

Florida requires all pump chambers to have a high water alarm float or sensor installed.

15.2 Differential Venting

All lift dosing systems must use differential venting (see illustration, sect. 17.4c, page 16).

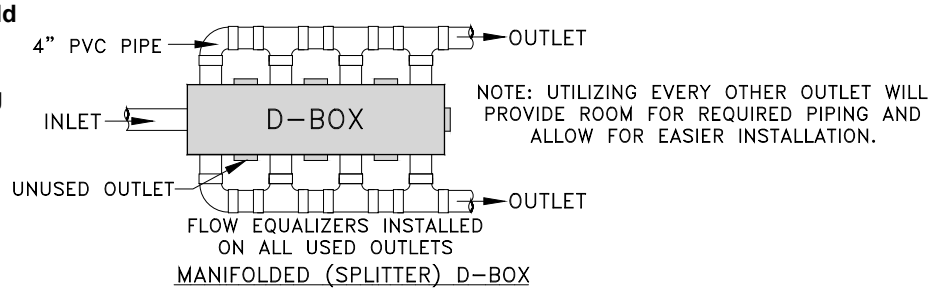
15.3 Distribution Box

A device used to divide effluent flow to the Presby Field must be placed on firmly compacted fill, native soil, or a concrete pad. When dividing flow, Flow Equalizers are required on all D-Box outlets. When using lift dosing provide some means of velocity reduction for the effluent entering the D-Box.

15.4 Distribution Box Manifold

If a distribution box manifold is utilized to divide large flows, velocity reduction of the incoming effluent is necessary.

Manifolded D-Box:

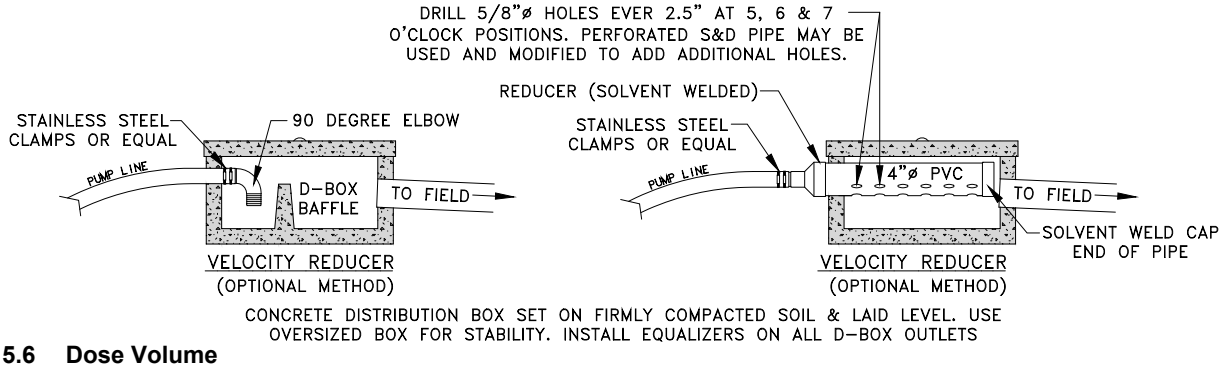


15.5 Velocity Reduction

The rate at which effluent enters the Presby Pipe must be controlled. Excessive effluent velocity can disrupt solids that settle in the pipes.

a) Effluent must never be pumped directly into Presby Pipe.

b) A distribution box or tank must be installed between the pumping chamber and the Presby Pipe to reduce effluent velocity.
c) Force mains must discharge into a distribution box (or equivalent) with velocity reducer and a baffle, 90° bend, tee or equivalent (see illustrations below).



15.6 Dose Volume

a) Pump volume per dose must be no greater than 1 gallon times the total linear feet of Presby Pipe.
b) Lift dosing should be designed for a minimum of 6 cycles per day.

15.7 Basic Serial Distribution Limit

Lift dosing to a Basic Serial distribution system is limited to a maximum dose rate of 40 gallons per minute and does not require the use of a flow equalizer on the D-Box outlet. Never pump directly into Presby Pipe.

15.8 Combination and Multiple-Bed Distribution Limit

All Presby Systems with Combination Serial distribution or Multiple Bed distribution must use Flow Equalizers in each distribution box outlet. Each Bed or section of Combination Serial distribution is limited to a maximum of 20 gallons per minute, due to the flow constraints of the equalizers. Example: pumping to a combination system with 3 sections (using 3 D-Box outlets). The maximum delivery rate is (3 x 20) = 60 GPM. Always provide a means of velocity reduction.

16.0 System Sand and Sand Fill Requirements for All Beds

It is critical to the proper functioning of Presby System's that the proper amount and type of System Sand be installed.

16.1 Presby System Sand

System Sand must be clean, granular sand free of organic matter and must adhere to the following percentage and quality restrictions:

Presby System Sand Specification

Sieve Size	Percent Retained on Sieve (by weight)
3/4 in. (19 mm)	0
#10 (2 mm)	0 - 35
#35 (0.50 mm)	40 - 90
Note: not more than 3% allowed to pass the #200 sieve (verified by washing sample per requirements of ASTM C-117)	

The Presby Spec-Check® is a device created to help determine the suitability of material for use as System Sand without the need for an expensive lab test. Go to www.PresbyEnvironmental.com for more details.

16.2 System Sand Acceptable Alternative

ASTM C-33 (concrete sand), natural or manufactured sand, with not more than 3% passing the #200 sieve (verified by washing the sample per the requirements of ASTM C-117 as noted in the ASTM C-33 specification) may be used as an acceptable alternate material for use as System Sand. The Presby Spec-Check® is a quick and easy inspection tool

16.3 Quantity of System Sand

System Sand is placed a minimum of 6 in. below, around the perimeter of and between the Presby Rows. A minimum of 3 in. of System Sand is placed over all the Presby Rows.

16.4 Sand Fill

Sand fill is used to raise the elevation of the system in order to meet the required separation distance from the SHWT or other restrictive feature. No organic material or stone over 6 inches in diameter are allowed. System Sand may be used in place of sand fill; however, this may increase material costs.

17.0 Venting Requirements

An adequate air supply is essential to the proper functioning of Presby Systems. Venting is required for all systems.

17.1 General Rules

a) Vent openings must be located to ensure the unobstructed flow of air through the entire Presby System.
b) The low vent inlet must be a minimum of 1 ft above final grade.
c) One 4 in. vent is required for every 1,000 ft of Presby Pipe.
d) A single 6 in. vent may be installed in place of up to three 4 in. vents.
e) If a vent manifold is used, it must be at least the same diameter as the vent(s).
f) When venting multiple beds, it is preferred that each bed be vented separately rather than manifolding bed vents together.
g) Remote Venting may be utilized to minimize the visibility of vent stacks.

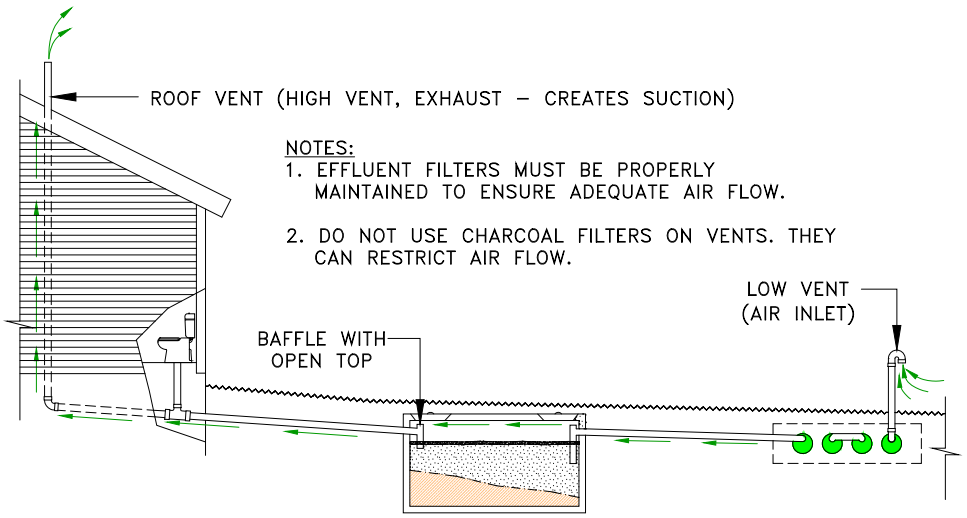
17.2 Differential Venting

a) Differential venting is the use of high and low vents in a system.
b) In a gravity system, the roof stack acts as the high vent.
c) High and low vent openings must be separated by a minimum of 10 vertical feet.
d) If possible, the high and low vents should be of the same capacity.
e) Sch. 40 PVC or equivalent should be used for all vent stacks.

17.3 Vent Locations for Gravity Systems

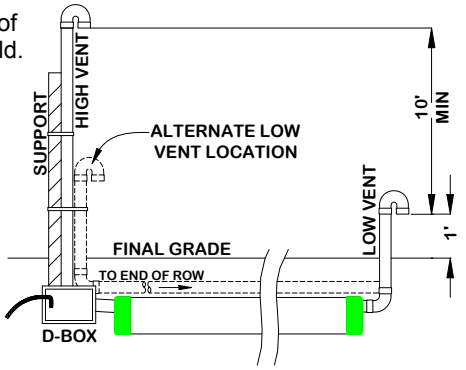
a) A low vent through an offset adapter is installed at the end of the last row of each section or the end of the last row in a Basic Serial bed, or at the end of each row in a D-Box Distribution Configuration system. A vent manifold may be used to connect the ends of multiple sections or rows.
b) The house (roof) vent functions as the high vent as long as there are no restrictions or other vents between the low vent and the house (roof) vent.
c) When the house (roof) vent functions as the high vent, there must be a minimum of a 10 ft vertical differential between the low and high (roof) vent openings.

Illustration of Gravity System Venting:



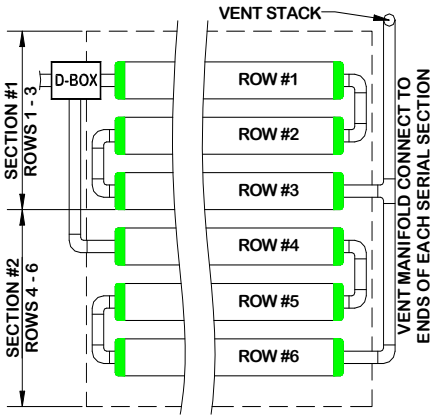
17.4 Pump System Vent Locations

a) A low vent is installed through an offset adapter at the end of each section, Basic Serial bed or attached to a vent manifold.
b) A high vent is installed through an unused distribution box outlet.
c) A 10 ft minimum vertical differential is required between high and low vent openings.
d) When venting multiple beds, it is preferred that each bed be vented separately (have their own high and low vents) rather than manifolding bed vents together.
e) The low vent may be attached to the D-box and the high vent attached to the end of the last row (or manifold).



17.5 Vent Manifolds

A vent manifold may be incorporated to connect the ends of a number of sections or rows of Presby Pipe to a single vent opening. See diagram to right.



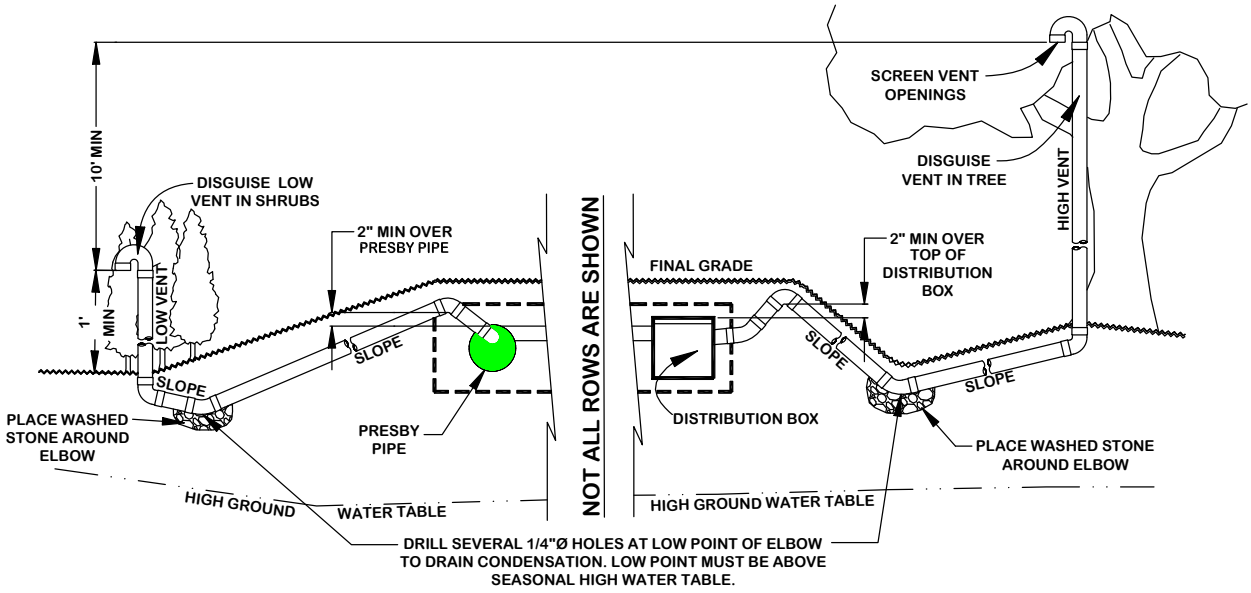
17.6 Vent Piping Slope

For standard venting, piping should slope downward toward the system to prevent moisture from collecting in the pipe and blocking the passage of air (see para. 17.7 below for Remote Venting information).

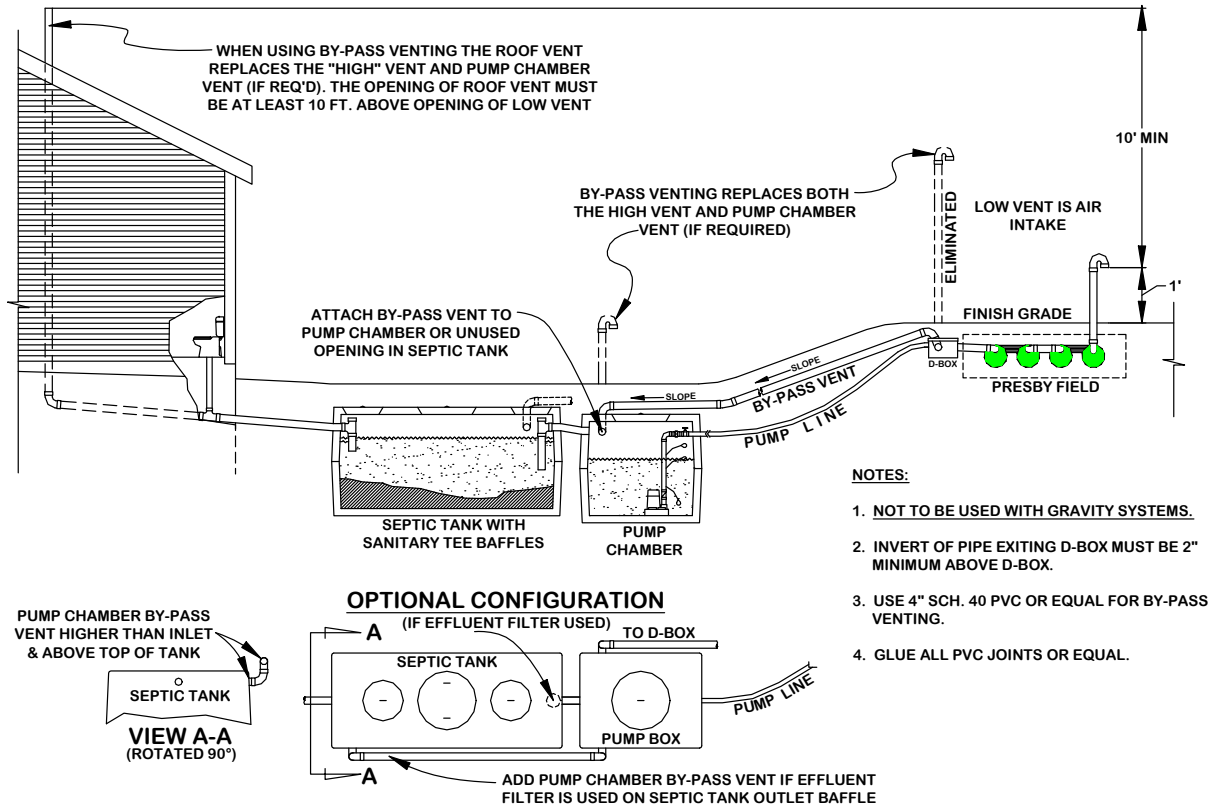
17.7 Remote Venting

If site conditions do not allow the vent pipe to slope toward the system, or the owner chooses to utilize remote venting for aesthetic reasons (causing the vent pipe not to slope toward the system), the low point of the vent line must be drilled creating several ¼ in. holes to allow drainage of condensation. This procedure may only be used if the vent pipe connecting to the system has:

a) A **high point** that is above the highest point of all Presby Pipes or the Distribution Box; and,
b) A **low point** opened for drainage which is above the SHWT. (See diagram below.)



17.8 By-Pass Venting



18.0 Site Selection

18.1 Determining Site Suitability
Refer to Florida Rules regarding site suitability requirements.

18.2 Topography
Locate systems on convex, hill, slope or level locations that do not concentrate surface flows. Avoid swales, low areas, or toe-of-slope areas that may not provide sufficient drainage away from the system.

18.3 Surface Water Diversions
Surface water runoff must be diverted away from the system. Diversions must be provided up-slope of the system and designed to avoid ponding. Systems must not be located in areas where surface or groundwater flows are concentrated.

18.4 Containment
Systems should not be located where structures such as curbs, walls or foundations might adversely restrict the soil's ability to transport water away from the system.

18.5 Hydraulic loading
Systems should not be located where lawn irrigation, roof drains, or natural flows increase water loading to the soils around the system.

18.6 Access
Systems should be located to allow access for septic tank maintenance and to at least one end of all Presby Rows. Planning for future access will facilitate Rejuvenation in the unlikely event the system malfunctions.

18.7 Rocky or Wooded Areas
Avoid locating systems in rocky or wooded areas that require additional site work, since this may alter the soil's ability to accept water. No trees or shrubs should be located within 10 ft of the system to prevent root infiltration.

18.8 Replacement System

In the event of system malfunction, contact PEI for technical assistance prior to attempting Rejuvenation procedures. Florida requires a suitable replacement (reserve area) be available in the unlikely event a Presby System must be replaced.

19.0 Installation Requirements, Component Handling and Site Preparation

19.1 Component Handling

a) Keep mud, grease, oil, etc. away from all components.
b) Avoid dragging pipe through wet or muddy areas.
c) Store pipe on high and dry areas to prevent surface water and soil from entering the pipes or contaminating the fabric prior to installation.
d) The outer fabric of the Presby Pipe is ultra-violet stabilized; however, this protection breaks down after a period of time in direct sunlight. To prevent damage to the fabric, cover the pipe with an opaque tarp if stored outdoors.

19.2 Critical Reminder Prevent Soil Compaction

It is critical to keep excavators, backhoes, and other equipment off the excavated or tilled surface of a bed. Before installing the System Sand, excavation equipment should be operated around the bed perimeter; not on the bed itself.

19.3 Site Preparation Prior to Excavation

a) Locate and stake out the System Sand bed, extension areas and soil material cover extensions on the site according to the approved plan.
b) Install sediment/erosion control barriers prior to beginning excavation to protect the system from surface water flows during construction.
c) Do not travel across or locate excavation equipment within the portion of the site receiving System Sand.
d) Do not stockpile materials or equipment within the portion of the site receiving System Sand.
e) It is especially important to avoid using construction equipment down slope of the system to prevent soil compaction.

19.4 When to Excavate

a) Do not work wet soils. If a fragment of soil from about 9 in. below the surface can easily be rolled into a wire, the soil moisture content is too high for construction.
b) Do not excavate the system area immediately after, during or before precipitation.

19.5 Tree Stumps

Remove all tree stumps and the central root system below grade by using a backhoe or excavator with a mechanical "thumb" or similar extrication equipment, lifting or leveraging stump in a manner that minimizes soil disturbance.

a) Do not locate equipment within the limits of the System Sand bed.
b) Avoid soil disturbance, relocation, or compaction.
c) Avoid mechanical leveling or tamping of dislodged soil.
d) Fill all voids created by stump or root removal with System Sand.

19.6 Organic Material Removal

Before tilling, remove all grass, leaves, sticks, brush, topsoil and other organic matter or debris from the excavated system site. It is not necessary for the soil of the system site to be smooth when the site is prepared.

19.7 Raking and Tilling Procedures

All areas receiving System Sand, sand fill and fill extensions **must** be raked or tilled. If a backhoe/excavator is used to till the site, fit it with chisel teeth and till the site. The backhoe/excavator must remain outside of the proposed System Sand area and extensions.

a) For in-ground bed systems, excavate the system bed as necessary below original grade. Using an excavator or backhoe, tilt the bucket teeth perpendicular to the bed and use the teeth to rake furrows 2 in.- 6 in. deep into the bottom of the entire area receiving System Sand or sand fill ("receiving area").
b) For elevated bed systems remove the "A" horizon, then use an excavator or backhoe to rake furrows 2 in. – 6 in. deep into the receiving area.

19.8 Install System Sand and/or Sand Fill Immediately After Excavation

a) To protect the tilled area (System Sand bed area and System Sand extension area) from damage by precipitation, System Sand should be installed immediately after tilling.
b) Work off either end or the uphill side of the system to avoid compacting soil.
c) Keep at least 6 in. of sand between the vehicle tracks and the tilled soil of the site if equipment must work on receiving soil.

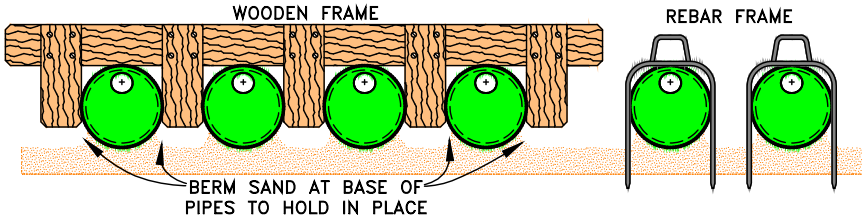
d) Track construction equipment should not travel over the installed system area until at least 12 in. of cover material is placed over the Presby Pipes.
e) Heavy equipment with tires must never enter the receiving area due to likely wheel compaction of underlying soil structures.

19.9 Distribution Box Installation
To prevent movement, be sure D-boxes are placed level on compacted soil, sand, pea gravel base, or concrete pad.

19.10 Level Row Tolerances
Use a laser level or transit to install rows level. Variations beyond 1 in. (±1/2") may affect system performance and are not acceptable.

19.11 Correct Alignment of Advanced Enviro-Septic® Bio-Accelerator® Fabric
The Bio-Accelerator® (white geo-textile fabric) is to be positioned centered along the bottom of the pipe rows (sewn seam up).

19.12 Row Spacers
System Sand may be used to keep pipe in place while covering, but simple tools may also be constructed for this purpose. Two examples are shown. One is made from rebar, the other from wood. Center-to-center row spacing may be larger than specified by this manual. Caution: Remove all tools used as row spacers before final covering. The pipe layout width (outermost edges of rows) must be centered on the System Sand bed with a tolerance of six inches.



19.13 Connect Rows Using Raised Connections
Raised connections consist of offset adapters, 4 in. PVC or equal sewer and drain pipe, and 90° elbows. They enable greater liquid storage capacity and increase the bacterial surfaces being developed. Use raised connections to connect the rows of the Presby System (see sect. 4.5, page 4). Glue or mechanically fasten all pipe connections.

19.14 Backfilling Rows
a) Spread System Sand between the rows.
b) Confirm pipe rows are positioned with Bio-Accelerator® along the bottom (sewn seam up).
c) Straddle each row of pipe and walk heel-to-toe its entire length, ensuring that System Sand fills all void spaces beneath the Presby Pipe.
d) Finish spreading System Sand to the top of the rows and leave them exposed for inspection purposes.

19.15 Backfilling and Final Grading
Spread System Sand is required a minimum of 3 in. over, 6 in. between, 6 in. below and a minimum of 6 in. beyond all the Presby Pipes. Spread soil material free of organics, stones over 4 in. and building debris, having a texture similar to the soil at the site, without causing compaction. Tracked construction equipment should not travel over the installed system area until at least 12 in. of cover material is placed over the Presby Pipes (H-10 Loading).

19.16 Fill Extensions Requirements
All Presby Systems with any portion of the System Sand bed above original grade require fill extensions on each side beyond the outside edge of the System Sand bed. Side slope tapering begins 4 ft from the edge of the System Sand and is to be no steeper than 2:1 for systems that do not extend more than 36 inches above the original grade or 3:1 for systems extending over 36 inches above the original grade (see illustration on page 3).

19.17 System Soil Cover Material
A minimum of 6 in. of suitable earth cover (for subsurface systems), with a texture similar to the soil at the site and capable of sustaining plant growth, must be placed above the installed system.

19.18 Erosion Control
To prevent erosion, soil cover above the system shall be planted with native, shallow-rooted vegetation such as grass, wildflowers and certain perennials or ground covers (see 64E-6009(3)(f) for stabilization requirements for mound and fill systems).

19.19 Trees and Shrubs
No trees or shrubs should be located within 10 ft of the system perimeter to prevent roots from growing into and damaging the system.

20.0 System Bacteria Rejuvenation and Expansion
This section covers procedures for bacteria rejuvenation and explains how to expand existing systems.
Note: Presby Environmental, Inc. must be contacted for technical assistance prior to attempting rejuvenation procedures.

20.1 System Bacteria Rejuvenation
Bacteria rejuvenation is the return of bacteria to an aerobic state. Flooding, improper venting, alteration or improper depth of soil material cover, use of incorrect sand, sudden use changes, introduction of chemicals or medicines, and a variety of other conditions can contribute to converting bacteria in any system from an aerobic to an anaerobic state. This conversion severely limits the bacteria's ability to effectively treat effluent, as well as limiting liquids from passing through.

20.2 How to Rejuvenate the Bacteria in a Presby System
System bacteria are "rejuvenated" when they return to an aerobic state. By using the following procedure, this can be accomplished in systems without costly removal and replacement.

1. Contact Presby Environmental before attempting Rejuvenation for technical assistance.
2. Determine the problem causing the bacteria conversion.
3. Drain the system by excavating one end of all the rows and removing the offset adapters.
4. If foreign matter has entered the system, contact Presby Environmental for recommendations.
5. Safeguard the open excavation.
6. Guarantee a passage of air through the system.
7. Allow all rows to dry for 72 hours minimum. The System Sand should return to its natural color.
8. Re-assemble the system to its original design configuration. As long as there is no physical damage to the Presby components, the original components may be reused.

21.0 System Expansion
Presby Systems are easily expanded by adding equal lengths of pipe to each row of the original design or by adding additional equal sections. All system expansions must comply with State and local regulations. Permits are required prior to system expansion.

21.1 Reusable Components
Presby Pipe and 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.

22.0 Operation & Maintenance

22.1 Proper Use
Presby Systems require minimal maintenance, provided the system is not subjected to abuse. An awareness of proper use and routine maintenance will guarantee system longevity. We encourage all system owners and service providers to obtain and review a copy of our Owner's Manual, available from our website www.PresbyEnvironmental.com or via mail upon request to (800) 473-5298 or info@presbyeco.com.

22.2 System Abuse Conditions
The following conditions constitute system abuse:

a) Liquid in high volume (excessive number of occupants and use of water in a short period of time, leaking fixtures, whirlpool tubs, hot tubs, water softening equipment or additional water discharging fixtures if not specified in system design).
b) Solids in high volume (excessive number of occupants, paper products, personal hygiene products, garbage disposals or water softening equipment if not specified in system design)
c) Antibiotic medicines in high concentrations
d) Cleaning products in high concentrations
e) Fertilizers or other caustic chemicals in any amount
f) Petroleum products in any amount
g) Latex and oil paints

h) System suffocation (compacted soils, barrier materials, etc.) without proper venting

Note: PEI and most regulatory agencies do not recommend the use of septic system additives.

22.3 System Maintenance/Pumping of the Septic Tank

a) Inspect the septic tank at least once every two years under normal usage.
b) Pump the tank when surface scum and bottom sludge occupy one-fourth or more of the liquid depth of the tank.
c) If a garbage disposal is used, the septic tank will likely require more frequent pumping.
d) After pumping, inspect the septic tank for integrity to ensure that no groundwater is entering it. Also check the integrity of the tank inlet and outlet baffles and repair if needed.
e) Inspect the system to ensure that vents are in place and free of obstructions.
f) Effluent filters require ongoing maintenance due to their tendency to clog and cut off oxygen to the System. Follow filter manufacturer's maintenance instructions and inspect filters frequently.

22.4 Site Maintenance

It is important that the system site remain free of shrubs, trees, and other woody vegetation to within a minimum of 10 ft of the system, including the entire System Sand bed area, and areas impacted by side slope tapering and perimeter drains (if used). Roots can infiltrate and cause damage or clogging of system components. If a perimeter drain is used, it is important to make sure that the outfall pipes are screened to prevent animal activity. Also check outfall pipes regularly to ensure that they are not obstructed in any way.

23.0 Glossary

This Manual contains terminology which is common to the industry and terms that are unique to Presby Systems. While alternative definitions may exist, this section defines how these terms are used in this Manual.

23.1 Advanced Enviro-Septic® (AES) Pipe

A single unit comprised of corrugated plastic pipe, Bio-Accelerator® fabric along its bottom which is surrounded by a layer of randomized plastic fibers and a sewn geo-textile fabric, is 10 ft in length, with an outside diameter of 12 in. and a storage capacity of approximately 58 gallons. Each foot of Advanced Enviro-Septic® provides over 40 sq ft of total surface area for bacterial activity. The sewn seam is always oriented up (12 o'clock position) within the bed. A white tag is sewn into the seam indicating the product is Advanced Enviro-Septic® pipe. Pipes are joined together with couplings to form rows. Advanced Enviro-Septic® is a combined wastewater treatment and dispersal system.

23.2 Bio-Accelerator®

Bio-Accelerator® fabric screens additional solids from the effluent, enhances and accelerates treatment, facilitates quick start-up after periods of non-use, provides additional surface area for bacterial growth, promotes even distribution, and further protects outer layers and the receiving surfaces so they remain permeable. Bio-Accelerator® is only available with Advanced Enviro-Septic®.

23.3 Basic Serial Distribution

Basic Serial distribution incorporates Presby Rows in serial distribution in a single bed. See Basic Serial Distribution in section 9.0, on page 10.

23.4 Butterfly Configuration

A variation of a standard, single bed system with the D-box located in the center, with rows oriented symmetrically on either side, and with each side or section receiving an equal volume of flow from the D-Box. See Butterfly Configuration, sect. 10.0, on page 11.

23.5 Center-to-Center Row Spacing

The distance from the center of one Presby Row to the center of the adjacent row.

23.6 Coarse Randomized Fiber

A mat of coarse, randomly-oriented fibers which separates more suspended solids from the effluent protecting the bacterial surface in the geo-textile fabric (see illustration on page 2).

23.7 Combination Serial Distribution

Incorporates two or more sections of Presby Pipe in a single bed, with each section receiving a maximum of 500 GPD of effluent from a distribution box. Combination Distribution is not required for daily flows of 900 GPD or less. See Combination Serial Distribution, sect. 11.0, on page 11.

23.8 Cooling Ridges
Pipe ridges that allow the effluent to flow uninterrupted around the circumference of the pipe and aid in cooling (see illustration on page 2).

23.9 Coupling
A plastic fitting that joins two Presby Pipe pieces in order to form rows (see sect. 4.4, page 4).

23.10 Daily Design Flow
The peak daily flow of wastewater to a system, expressed in gallons per day (GPD); systems are typically sized based on the daily design flow. Design flow calculations are set forth in the Florida Rules. In general, actual daily use is expected to be one-half to two-thirds less than "daily design flow."

23.11 Differential Venting
A method of venting a Presby System utilizing high and low vents (see sect. 15.2, page 13).

23.12 Distribution Box or "D-Box"
A device designed to divide and distribute effluent from the septic tank equally to each of the outlet pipes that carry effluent into the Presby System. D-Boxes are also used for velocity reduction, see Velocity Reduction, sect. 15.5, page 13.

23.13 Distribution Box Manifold
A PVC or equal pipe configuration which connects several distribution box outlets together in order to equalize effluent flow. Refer to drawing in sect. 15.4, on page 13.

23.14 End-to-End Configuration
Consists of two or more beds constructed in a line (i.e., aligned along the width of the beds). See sect.12.0, page 12.

23.15 Fill Extension
Utilized in constructing Elevated (mound) Systems and blend the raised portion of the system with side slope tapering to meet existing grade (see illustration on page 3).

23.16 Flow Equalizer
An adjustable plastic insert installed in the outlet pipes of a D-Box to equalize effluent distribution to each outlet.

23.17 GPD and GPM
An acronym for Gallons per Day and Gallons per Minute respectively.

23.18 High and Low Vents
Pipes used in differential venting. Detailed information about venting requirements can be found in Venting Requirements, sect. 17.0, page 15.

23.19 High Strength Effluent
High strength wastewater is septic tank effluent quality with combined 30-day average carbonaceous biochemical oxygen demand (CBOD) in excess of three-hundred (300) mg/L and total suspended solids (TSS) in excess of two-hundred (200) mg/L in accordance with Florida 64E-6.002(15).

23.20 MPI
An acronym for Minutes per Inch and is the numerical value by which percolation rates (also called "perc rates") are expressed.

23.21 Multiple Bed Distribution
Incorporates two or more beds, each bed with Basic Serial or Combination Serial distribution and receiving effluent from a distribution box (see section 12.0, page 12).

23.22 Offset Adapter
A plastic fitting with a 4 in. hole installed at the 12 o'clock position which allows for connections from one row to another and for installation of venting (see sect. 4.2, page 4).

23.23 Pressure Distribution
A pressurized, small-diameter pipe system used to deliver effluent to an absorption field. Pressure Distribution is not permitted to be used with the Presby System. Presby Systems are designed to promote even distribution without the need for pressure distribution.

23.24 Pump Systems
Utilizes a pump to gain elevation (lift dosing) in order to deliver effluent to a D-Box (see sect. 15.0, page 13).

23.25 Raised Connection
A U-shaped, 4" diameter, PVC pipe configuration which is used to connect rows oriented in a serial configuration and to maintain the proper liquid level inside each row. See drawing in sect. 4.5, page 4.

23.26 Raking and Tilling
Refers to methods of preparing the native soil that will be covered with System Sand or Sand Fill, creating a transitional layer between the sand and the soil. See Installation Requirements sect. 19.7, page 18.

23.27 Row
Consists of a number of Presby Pipe sections connected by couplings with an Offset Adapter on the inlet end and an Offset Adapter on the opposite end. Rows are typically between 30 ft and 100 ft long.

23.28 Sand Fill
Clean sand, free of organic materials and meeting the specifications set forth in System Sand and Fill Material Specifications, sect. 16.4, page 15. Sand fill is used to raise the elevation of the system to meet required separation distance or in side slope tapers. System Sand may be used in place of Sand Fill.

23.29 Section / Serial Section
A group of interconnected rows receiving effluent from one distribution box outlet. Sections are limited to 500 GPD daily design flow maximum.

23.30 Serial Distribution
Two or more Presby Rows connected by a Raised Connection. Basic Serial distribution is described in detail in sect. 9.0, page 10. Combination Serial distribution is described in detail in sect. 11.0, on page 11.

23.31 SHWT
An acronym for Seasonal High Water Table.

23.32 Skimmer Tabs
Projections into the AES pipe that help to capture grease and suspended solids from the existing effluent (see illustration on page 2).

23.33 Side-to-Side Configuration
Consist of two or more beds arranged so that the rows are parallel to one another (see sect. 12.0, page 12).

23.34 Side Slope Taper
Side slope tapering begins 4 ft from the outermost edge of the System Sand bed (see illustration on page 3).

23.35 Slope as a Ratio
In this Manual's illustrations, slope is expressed as a ratio of run to rise. Example: A slope with a grade of (3:1) is the difference in horizontal distance of three (3) horizontal feet (run) over an elevation difference of one (1) ft (rise).

23.36 Slope as Percent (%)
Expressed as a **percent**, is the difference in elevation divided by the difference in horizontal distance between two points on the surface of a landform. Example: A site slope of one (1) percent is the difference in elevation of one (1) foot (rise) over a horizontal distance of one hundred (100) feet (run).

23.37 Smearing
The mechanical sealing of soil air spaces along an excavated, tilled or compressed surface. This is also referred to as "compacting." In all installations, it is critical to avoid smearing or compacting the soils under and around the field.

23.38 Surface Diversion
A natural or manmade barrier that changes the course of water flow around an onsite system's soil absorption field.

23.39 System Sand Bed
System Sand area required/used in Presby Systems. The System Sand bed extends a minimum of 6 in. below, 3 in. above and 6 in. horizontally from the outside edges of the Presby Pipes.

23.40 System Sand
System Sand must be clean, granular sand free of organic matter and must adhere to the Presby System Specification with no more than 3% passing the #200 sieve (see complete details in sect. 16.0, page 14).

23.41 System Sand Extension Area
The System Sand extension area is a minimum of 6 in. deep (see illustration in sect.3.0, page 3).

23.42 Topsoil (a.k.a. Loam or Soil Cover Material)
Topsoil, also known as Loam, is soil material cover capable of sustaining plant growth which forms the topmost layer of cover material above the system. No topsoil is allowed under the Presby Field.

23.43 Velocity Reducer
Velocity reducer refers to any of the various components whose purpose is to reduce the velocity of effluent flow into the Presby Pipes. A distribution box with a baffle or inlet tee is sufficient for velocity reduction in most systems (see illustration in sect. 15.5, page 13).