EnviroFin™
Passive Treatment and Dispersal System

Presby Environmental, Inc.
2016

Welcome to Today's Training

***Introduction**
***Review of Presby AES/ES technology**
***Industry need for new product EnviroFin™**
***Designing an EnviroFin™ system**
***Drawing an EnviroFin™ system**
***System Installation**
***Technical Support**
***Wrap-Up session**

Simple ✓
Affordable ✓
Small Footprint ✓
Protects the Environment ✓
Flexible Design and Easy Installation ✓

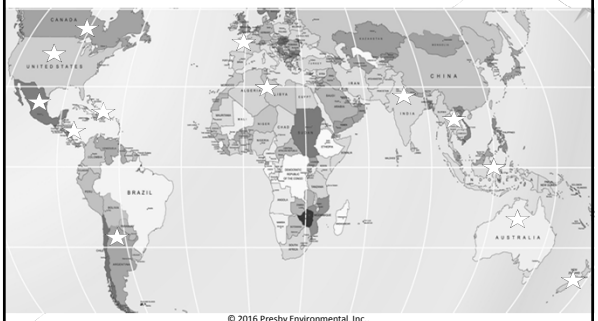
Presby Technology – The Basics

Advanced Enviro-Septic® Summary

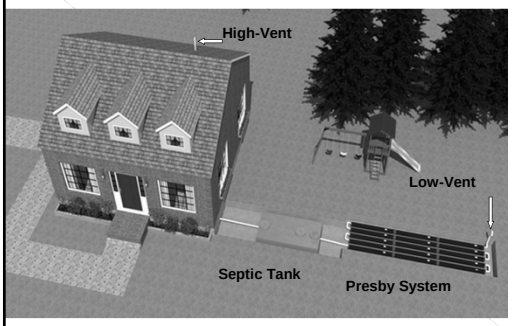
- Introduced in 1995 (Enviro-Septic®)
- Third-Party Tested and Certified
- Passive treatment processes
- Reliable, maintenance-free operation
- Over 250,000 systems in use today
- Scalable technology
- Components are non-biodegradable
- H10/H20 load-bearing capacity

Over 100,000,000 gallons of wastewater are treated by AES everyday, using no energy and no special maintenance or replacement parts

Growing Worldwide



Passive Treatment and Dispersal



~250,000 Systems Worldwide

Advanced Enviro-Septic®

Engineered to strip out and digest wastewater contaminants

Skimmer Tabs

Skimmer Tabs trap the FOGs which are then broken down inside the pipe

Accumulation After EU Testing

"…we didn't observe any accumulation of sludge inside the pipes as you can see in the photograph shown"

– **EU Test Center**

CEBEDEAU

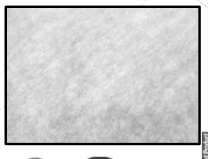
CE European Conformity

AFTER 1.4 MILLION GALLONS

Patented ridges cool the effluent and ensure minimal masking of surface area

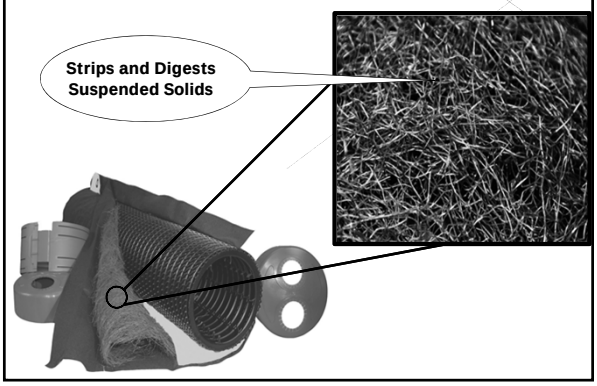
Bio-Accelerator®

Bio-Accelerator® Fabric



- ~ Enhances and accelerates treatment
- ~ Facilitates quick start-up after periods of non-use
- ~ Promotes even distribution without using pressure distribution
- ~ Additional protection of primary receiving surface

Green Fibers



Primary Bacterial Treatment Areas

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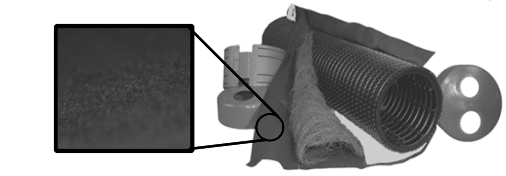
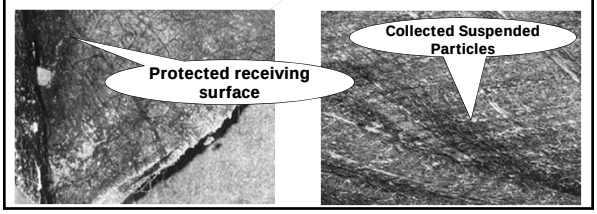
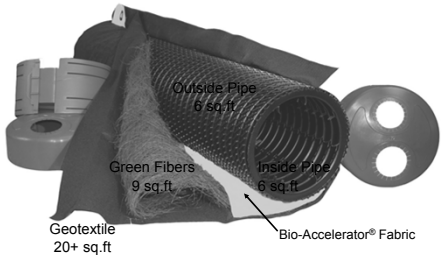




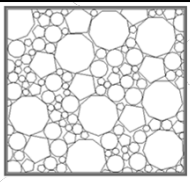
AES Provides More Than 40ft² of Surface Area per Linear Foot

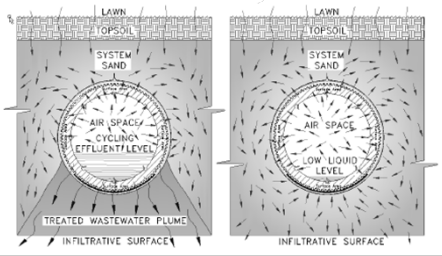
14



~2000 sq. ft. of bacterial treatment area per household bedroom

System Sand has significant void space which provides oxygen to the outside of the Geo-textile while wicking water away from the system





Highly Treated Effluent Protects System Sand

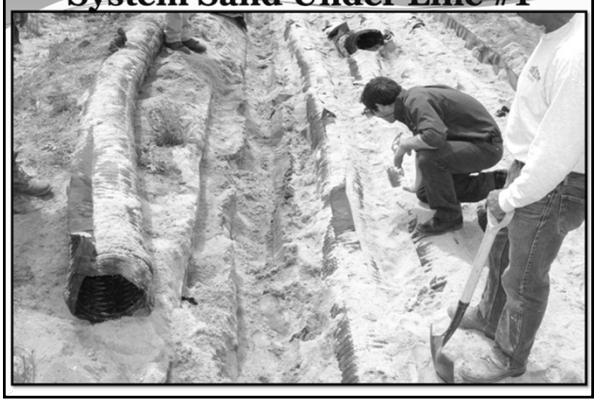
Clean System Sand surrounding Advanced Enviro-Septic® after 5 years in use

Side view of the first row on a serial system in Indiana

Treated Effluent Leaving an AES Test Site in New Zealand

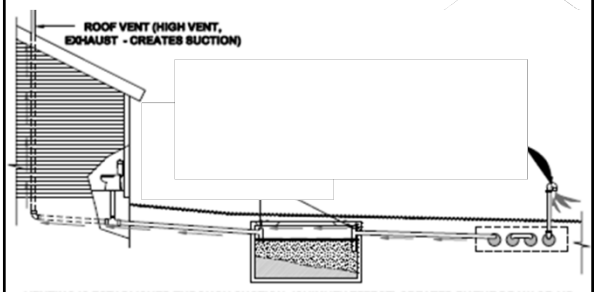
System Sand Under the Line #1

System Sand Under Line #1



Passive Oxygen Supply

19



Engineered to Ensure Airflow

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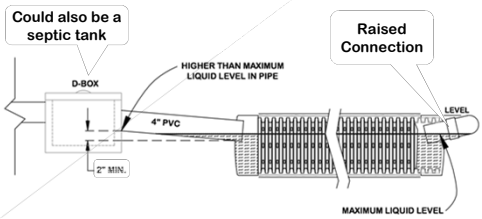
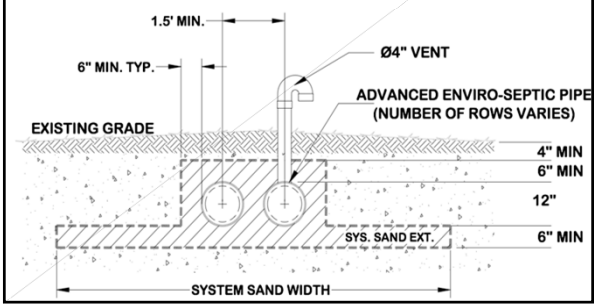
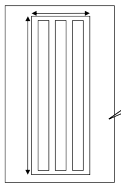


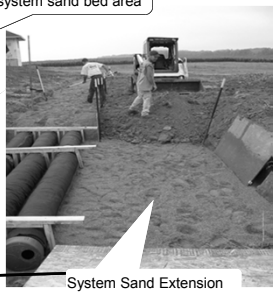
Fixed Pipe Amounts & Sand Mantels

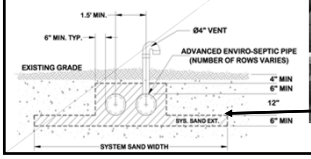


Indiana Farmland Soils



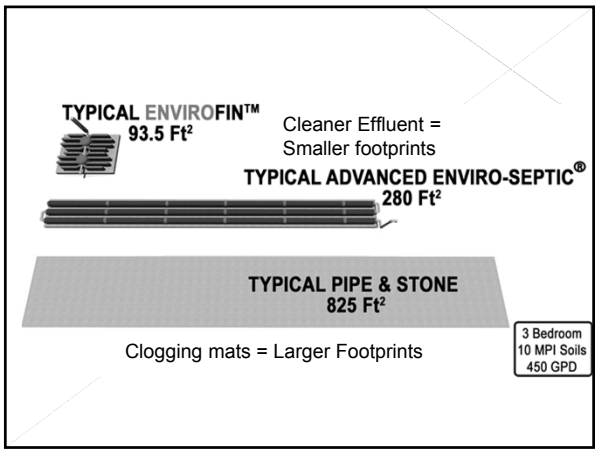
Length & Width =
overall system sand bed area





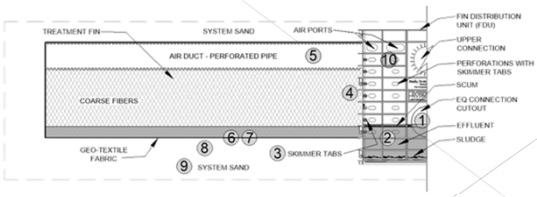
System Sand Extension

INDUSTRIES NEED the EVOLUTION OF A NEW SOLUTION



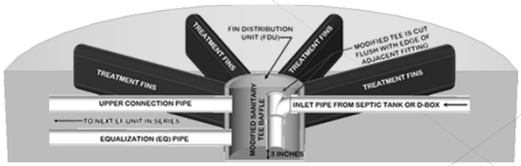
New Method of Treatment

- **Fin distribution unit (FDU)**
- **Wastewater delivered to Treatment Fins**
- **Familiar 10 stages of treatment**



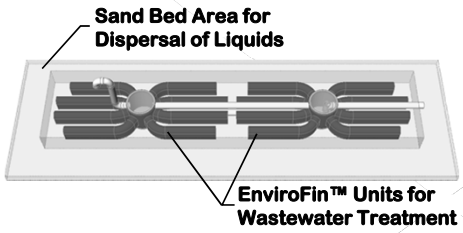
New Method of Distribution

- **Wastewater levels passively equalized between units using Equalization (EQ) Pipe**
- **Controlled release through Treatment Fins**

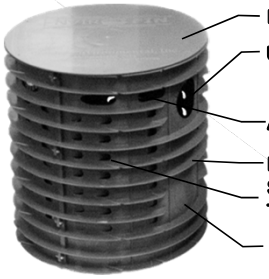


Tall (Treatment) Area vs Shorter (Dispersal) Area

- EnviroFin™ units needed for treatment
- Sand bed area needed for dispersal

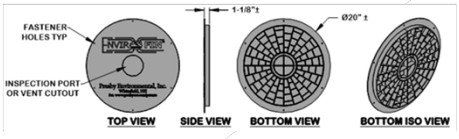


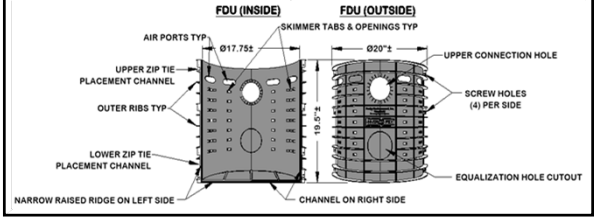
Fin Distribution Unit



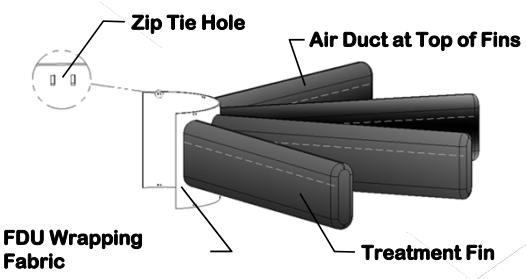
Fin Distribution Unit - (FDU)

Illustration



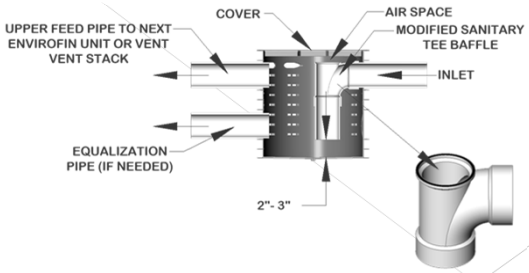


Treatment Fins



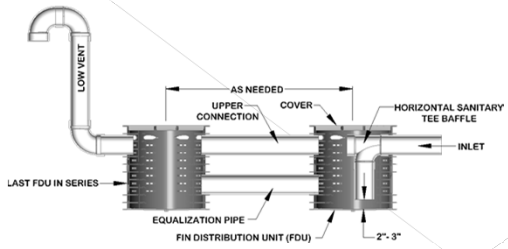
(8) Treatment Fins required per EF Unit

Modified Sanitary Tee



Modified Sanitary Tee (not supplied)

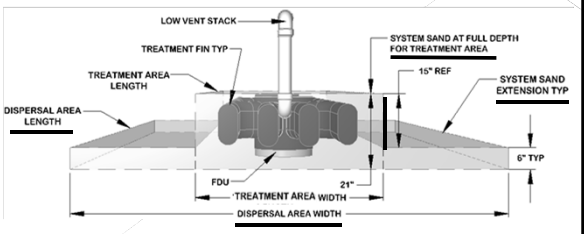
Alternate Sanitary Tee Baffle



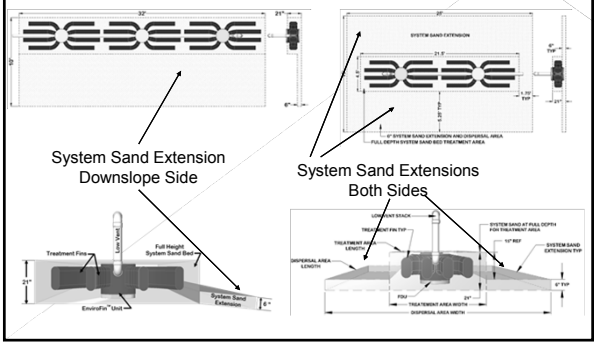
Horizontal Tee needs no modification

Design Concepts

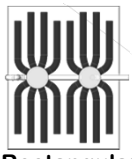
Treatment vs Dispersal



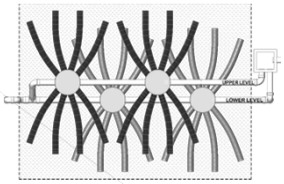
Dispersal Options



EF Bed Configurations



Rectangular



Multi-Level™

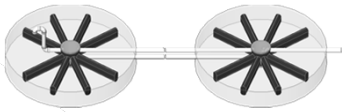
Circular

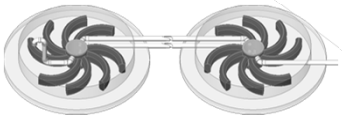
Part #2 Configurations

37

Circular Configurations

Straight Fins





Spiral Fins

System Sand Extensions as needed

Part #2 Configurations

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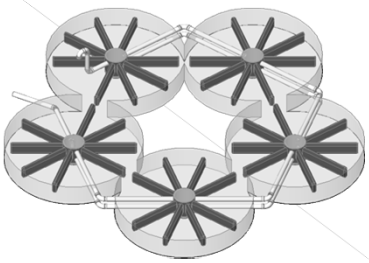
Circular Layout



System Sand Extensions as needed

Part #2 Configurations

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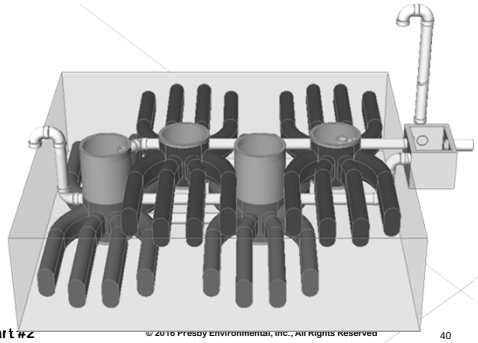
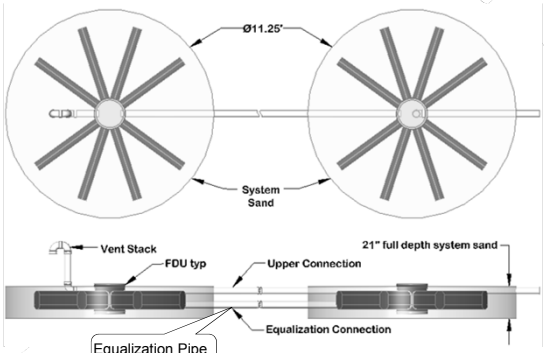
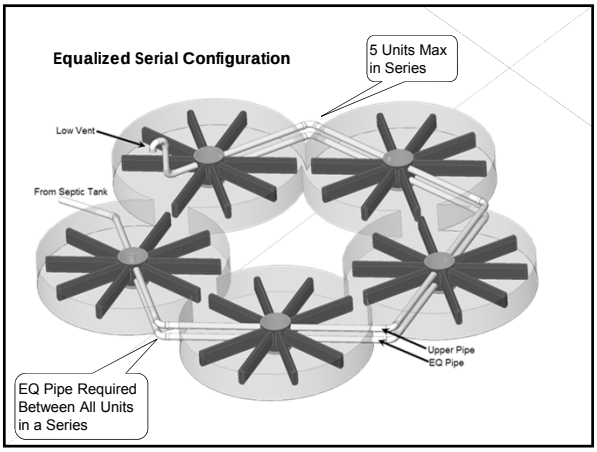
Multi-Level™ EnviroFin



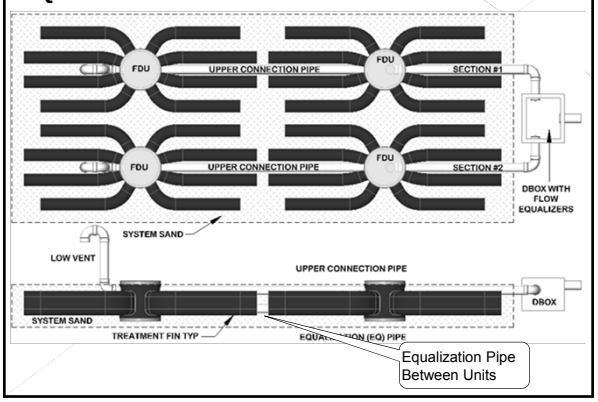
EQ Connection / Units in Series



Equalized Serial Configuration

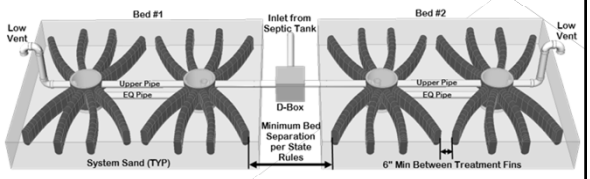


EQ Combination Distribution

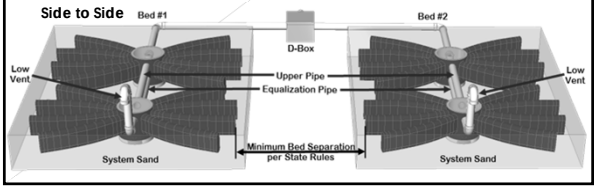


Multiple Beds

End to End

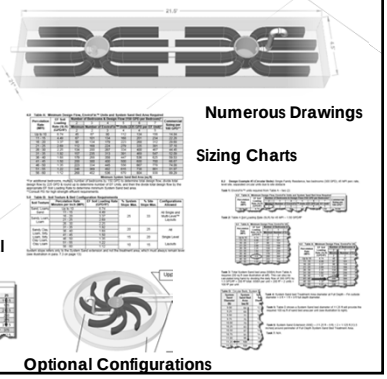


Side to Side



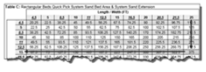
Design & Installation Manual

37 Page Comprehensive Manual



Numerous Drawings

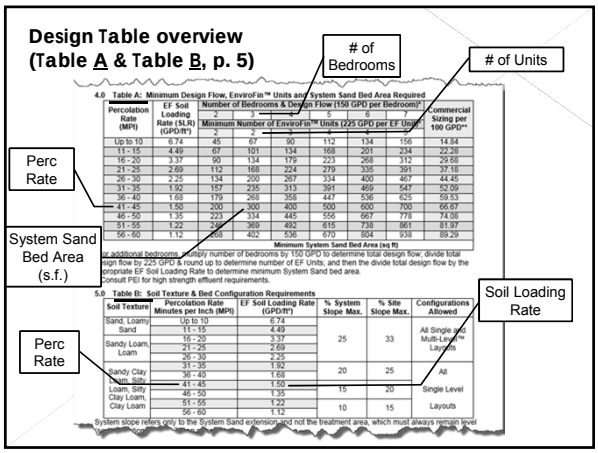
Sizing Charts



Design Examples

Optional Configurations

Design Table overview (Table A & Table B, p. 5)



4.0 Table A: Minimum Design Flow, EnviroFin™ Units and System Sand Bed Area Required

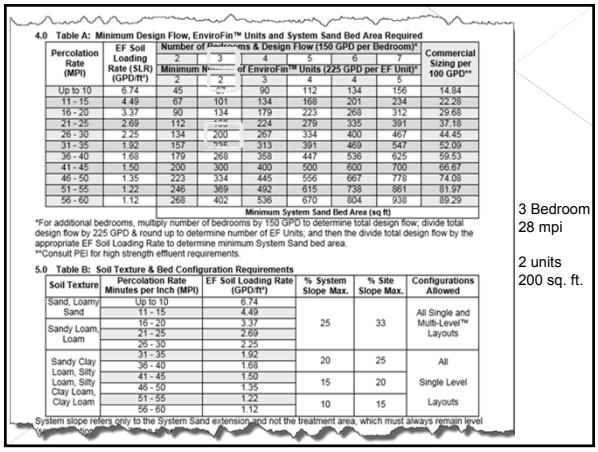
Percolation Rate (MPI)	EF Soil Loading Rate (SLR) (GPD/ft²)	Number of Bedrooms & Design Flow (150 GPD per Bedroom)*						Commercial Sizing per 100 GPD**
		2	3	4	5	6	7	
		Minimum Number of EnviroFin™ Units (225 GPD per EF Unit)*						
		2	2	3	4	5	6	
Up to 10	6.74	45	67	90	112	134	156	14.84
11 - 15	4.49	67	101	134	168	201	234	22.28
16 - 20	3.37	90	134	179	223	268	312	29.68
21 - 25	2.69	112	168	224	279	335	391	37.18
26 - 30	2.25	134	200	267	334	400	467	44.45
31 - 35	1.92	157	235	313	391	469	547	52.09
36 - 40	1.68	179	268	358	447	536	625	59.53
41 - 45	1.50	200	300	400	500	600	700	66.67
46 - 50	1.35	223	334	445	556	667	778	74.08
51 - 55	1.22	246	369	492	615	738	861	81.97
56 - 60	1.12	268	402	536	670	804	938	89.29
		Minimum System Sand Bed Area (sq ft)						

*For additional bedrooms, multiply number of bedrooms by 150 GPD to determine total design flow; divide total design flow by 225 GPD & round up to determine number of EF Units; and then the divide total design flow by the appropriate EF Soil Loading Rate to determine minimum System Sand bed area.
**Consult PEI for high strength effluent requirements.

5.0 Table B: Soil Texture & Bed Configuration Requirements

Soil Texture	Percolation Rate Minutes per Inch (MPI)	EF Soil Loading Rate (GPD/ft²)	% System Slope Max.	% Site Slope Max.	Configurations Allowed
Sand, Loamy Sand	Up to 10	6.74	25	33	All Single and Multi-Level™ Layouts
	11 - 15	4.49			
Sandy Loam, Loam	16 - 20	3.37			
	21 - 25	2.69			
	26 - 30	2.25			
Sandy Clay Loam, Silty Loam, Silty Clay Loam, Clay Loam	31 - 35	1.92	20	25	All
	36 - 40	1.68			
	41 - 45	1.50	15	20	Single Level
	46 - 50	1.35			
	51 - 55	1.22	10	15	Layouts
	56 - 60	1.12			

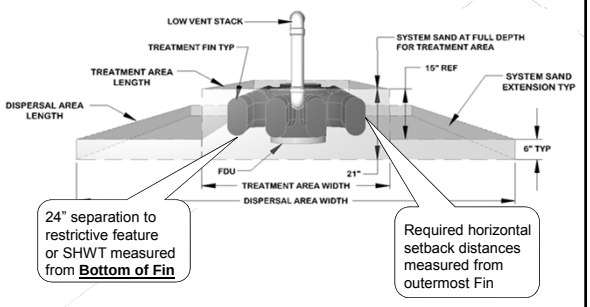
System slope refers only to the System Sand extension and not the treatment area, which must always remain level



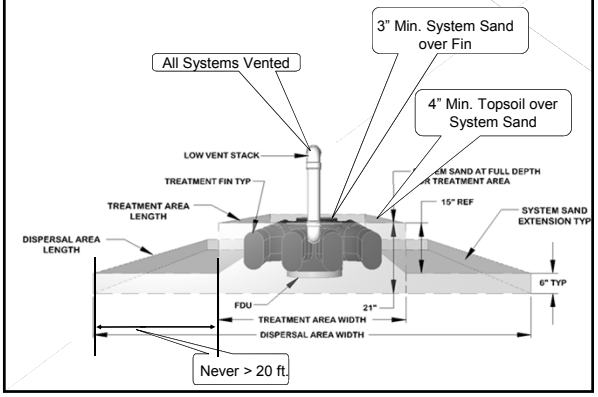
3 Bedroom
28 mpi

2 units
200 sq. ft.

Separation / Setback Measurements



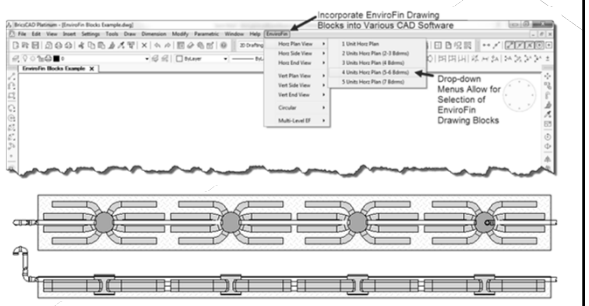
Key Criteria



Drafting an EnviroFin™ System

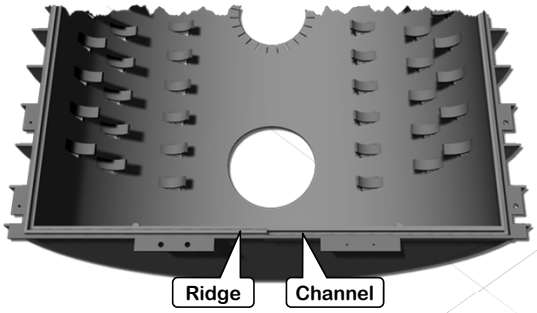
Drafting Suggestions / Recommendations

- Presby ACAD EnviroFin™ Drawing Blocks



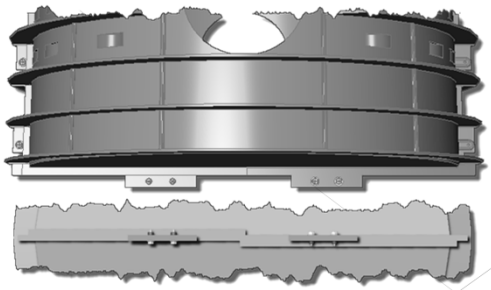
Installing an EnviroFin™ System

Mating Ridge and Channel



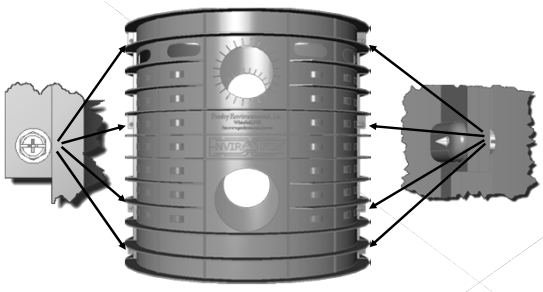
Skimmer tabs will be opposite each other to stabilize the pressure on the perforation machine while puncturing… not worth changing just wanted to let you know

Screw Bottom First



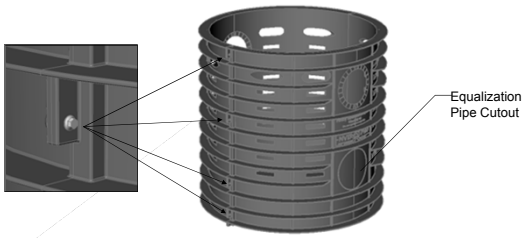
4 screws on bottom

Screw Sides Together

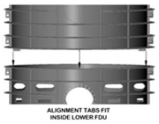


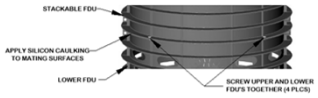
4 screws on each side

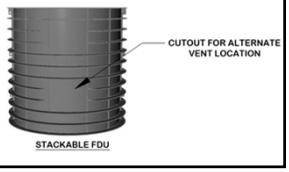
Pre-Assemble FDU



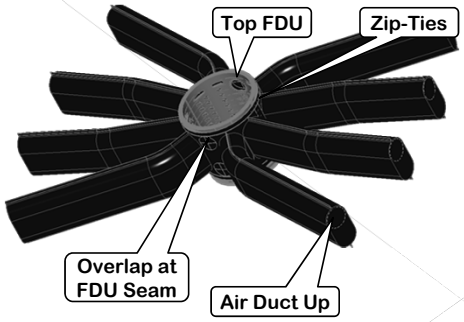
Stackable FDU's (Riser)



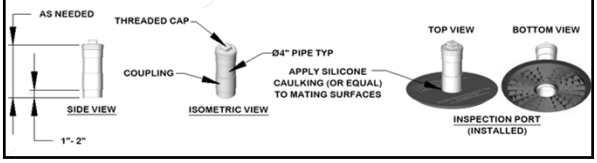




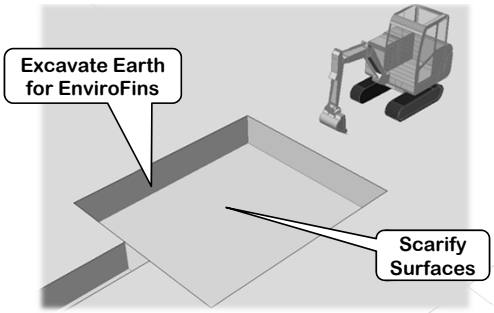
Treatment Fins Attached to FDU



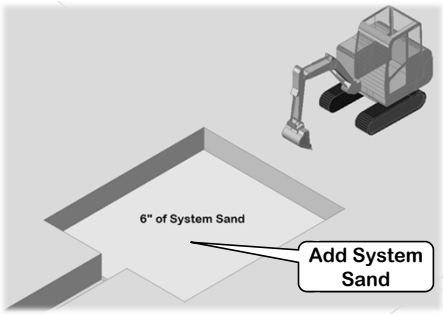
Inspection Port



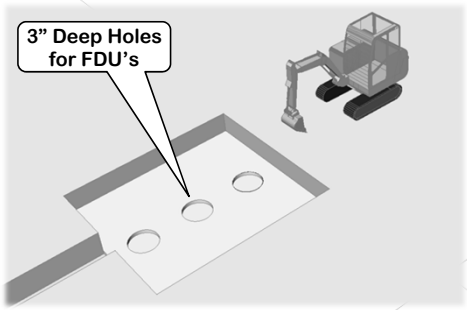
Site Preparation



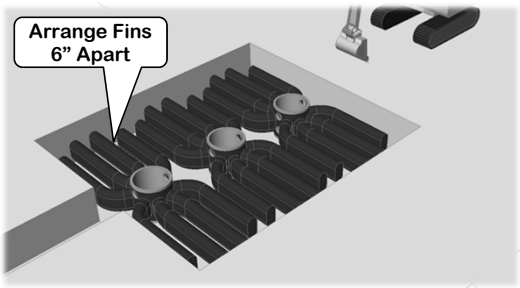
Place System Sand



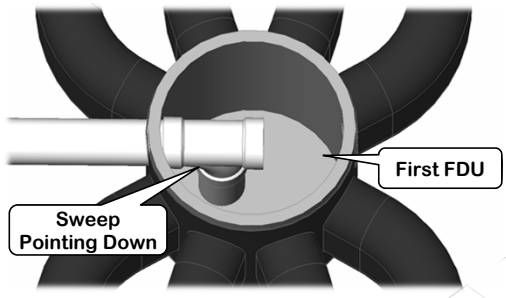
FDU Holes in System Sand



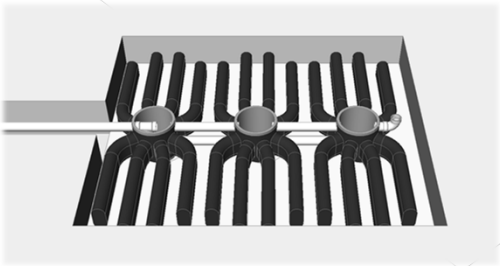
Place Units



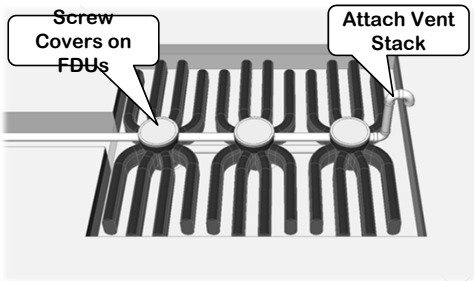
Horizontal Tee Baffle



PVC Between Units



Additional System Sand



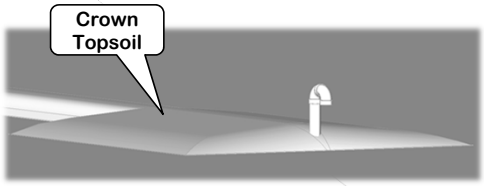
Call for State Inspection

Basal Area Preparation

Indiana Installation

Walk the "Rows"

Backfill and Final Grading



Final grading to shed water off & away from field

Online Classes, Resources, & Support

All Designers and Installers are Required to be "Presby Certified"

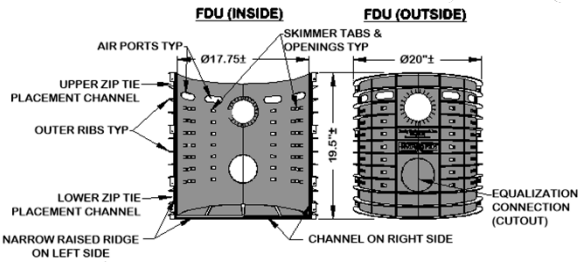
www.PresbyEnvironmental.com

Free Technical Support

- Technical Recommendations and Phone Support
- Site Visits With Training and Education
- CAD Drawings
- Regulatory Support
- Installation and Operation Guidance and Manuals
- Onsite During Construction
- Post-Sale Support for the Life of the System

PEI has a team of dedicated experts to help you with your project!

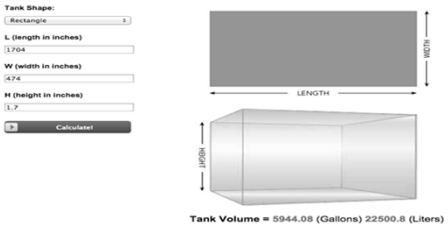
Views of FDU



Components

Component Description	Quantity Needed	PEI Provided (yes/no)
FDU Halves	2	Yes
Stackable FDU Halves	As required	Yes, when requested
Treatment Fin Array Halves	2	Yes
Top Cover	1	Yes
Zip Ties	4 short or 2 long	Yes
Silicon Caulking (or equal)	1 tube	Yes
Stainless Steel Screws	1 bag	Yes
Modified Sanitary Tee	1	No
4-inch plastic pipe	As needed	No
Hand Tools	Utility knife, screw driver, measuring tape, shovel, saw	No
4-inch plastic pipe	As needed	No

Treatment Systems vs Leachfields



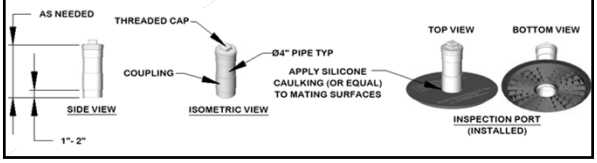
"Soil could accept onsite wastewater at two to three orders of magnitude higher … if a clogging mat … was limited or not present." - ***Dr. Tyler***

Simplified Soil Classifications (Siegrist, 2007)

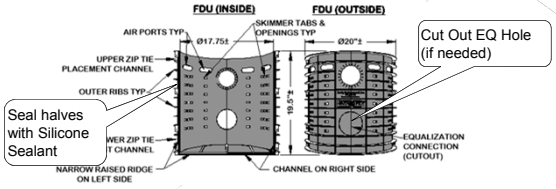
Soil profile class	Representative soil textures	Representative clean water hydraulic conductivity (Ksat)
Class I	Sand, loamy sand	1000 cm/d (250 gpd/ft^2)
Class II	Sandy loam, loam, silt loam	100 cm/d (25 gpd/ft^2)
Class III	Silty clay loam, clay loam	10 cm/d (2.5 gpd/ft^2)

Indiana Installation – Tall Portion

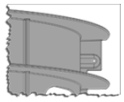
Inspection Port



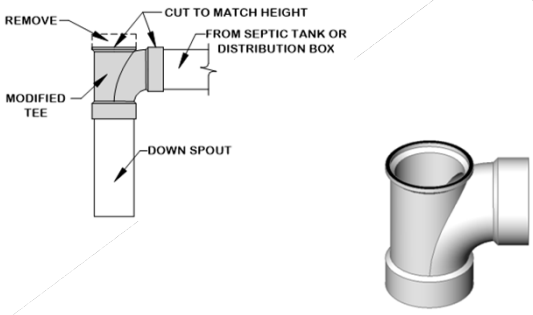
Pre-Assemble FDU



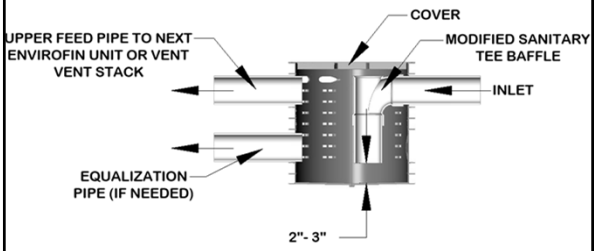
Fastener holes on left side of FDU are clearance holes for starting screws. Fastener holes on right side of the FDU are smaller pilot holes for screw threads.



Modified Sanitary Tee Baffle



Modified Sanitary Tee Baffle



Drafting Suggestions / Recommendations

- Utilize Presby ACAD blocks & details as appropriate
- Clearly depict System Sand Bed Area – Horizontal ties Should be to Corners of System Sand Bed Area in a Rectangular Fin Configuration
- Clearly Depict FDU Separation Distances Between Units
- Clearly Depict Horizontal Regulatory Setbacks to *Outermost Fin*
- Label Key Elevations (*Bed Bottom is Bottom of Fin*)
- Clearly Label EQ pipes When Required by Criteria
- Indicate in Section View Where Tall Portion and System Sand Extension/Extensions exist

Designing an EnviroFin™ System

(design tasks & examples)

Design "Tasks" (page 9)

Finding number of units

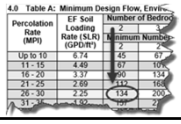
Task 1: Use bedrooms or flow and **Table A** to determine **EF** units

4.0 Table A: Minimum Design Flow, EnviroFin Units and System Sand Bed Area Required

Percolation Rate (MPI)	EF Soil Loading Rate (SLR) (GPD/ft²)	Number of Bedrooms & Design Flow (150 GPD per Bedroom)*						Commercial Sizing per 100 GPD**
		2	3	4	5	6	7	
		Minimum Number of EnviroFin™ Units (225 GPD per EF Unit)*						
		2	2	3	4	4	5	
Up to 10	6.74	45	67	90	112	134	156	14.84
11 - 15	4.49	67	100	134	168	201	234	22.27

Finding the Minimum System Sand Bed Area

Task 2: Use perc rate and bedrooms and **Table A** to determine sand area

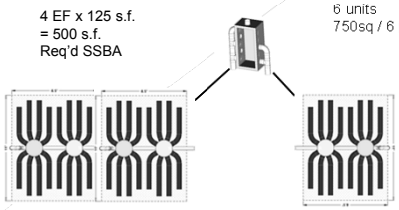


Finding SSBA for each bed in Multiple Bed configurations

Task 3 (p. 9): If using Multiple Bed Configurations, divide the total SSBA by the total number of EF units required for all beds, then multiply the answer by the number of EF units in each individual bed of the multiple bed configuration.

4 EF x 125 s.f.
= 500 s.f.
Req'd SSBA

750 sqft total SSBA Req'd
6 units
750sq / 6 EF = 125sq per EF

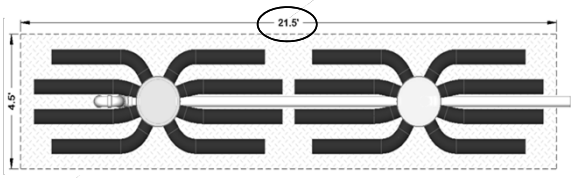


2 EF x 125 s.f.
= 250 s.f.
Req'd SSBA

**If Individual Beds in Different Soils (Perc Rates), Calculate Areas Independently.

Finding the Length of Full Depth System Sand Bed Area
(Long Axis (LA))

Task 4 (p.9) : (Full Depth System Sand Bed Treatment Area along Long Axis of EF = # of EF units along the LA x 10.5 + 0.5)

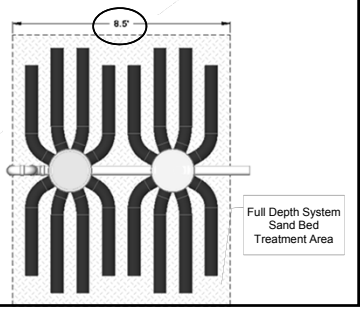


2 EF units x 10.5' + 0.5' = 21.5'

Finding the Length of Full Depth System Sand Bed Area
(Short Axis (SA))

Task 5 (p.10) : (**Full Depth System Sand Bed Treatment Area along Short Axis of EF units = # of EF Units along the SA x 4 + 0.5**)

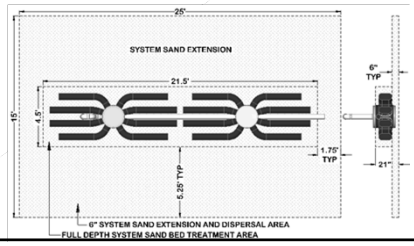
2 EF Units x 4' + 0.5'= 8.5'



Choosing SSBA to Fit Site
(Level Beds)

Task 6 (level beds) (p. 10):

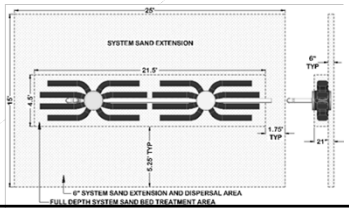
*Sand bed dimensions must be at least those calculated in Tasks 4 & 5
*Sand bed Area Minimum as Required from Task 2
*Use Table C to find SSBA for your Dimensions
*Treatment area must be within 20' of the final sand bed dimensions



Task 6 (p.11): Continued

Example:

- Two EF units placed along long axis parallel to terrain
- Assume System Sand Bed Area required is 369 sq ft
- Assume site will accommodate a 25 ft long system
- Using Table C, find 25 ft along the top of the chart
- Follow that column down until at least 369 sq ft of area is shown (375 sq.ft.).
- Move left to find a bed width of 15 ft
- These dimensions are larger than treatment area dimensions, there will be System Sand extensions



Task 6 (p.11): Continued
Alternate acceptable configuration using Table C: Final sand bed dimensions of 21.5 ft long and 20 ft wide.

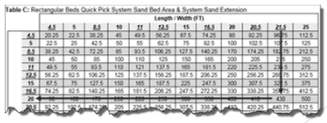
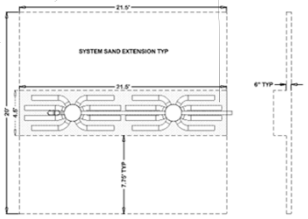


Table C: Rectangular Beds Quick Pick System Sand Bed Area & System Sand Extension

Length - Width (FT)

	4.5	5	8.5	10	11	12.5	15	16.5	20	20.5	21.5	25
4.5	20.25	22.5	38.25	45	49.5	56.25	67.5	74.25	90	92.25	96.75	112.5
5	22.5	25	42.5	50	55	62.5	75	82.5	100	102.5	107.5	125
8.5	38.25	42.5	72.25	85	93.5	106.25	127.5	140.25	170	174.25	182.75	212.5
10	45	50	85	100	110	125	150	165	200	205	215	250
11	49.5	55	93.5	110	121	137.5	165	181.5	220	225.5	236.5	275
12.5	56.25	62.5	106.25	125	137.5	156.25	187.5	206.25	250	256.25	268.75	312.5
15	67.5	75	127.5	150	165	187.5	225	247.5	300	307.5	322.5	375
16.5	74.25	82.5	140.25	165	181.5	206.25	247.5	272.25	330	338.25	354.75	412.5
20	90	100	170	200	220	250	300	330	400	410	430	500
20.5	92.25	102.5	174.25	205	225.5	256.25	307.5	338.25	410	420.25	440.75	512.5

Full Depth System Sand Bed Treatment Area



Any configuration that accommodates the system requirements and site constraints is acceptable

SSBA's on Sloping Terrain

Task 6 (Sloping beds) (p.11):

Site Slopes Less than 5%

If Treatment Area = or > than Minimum SSBA	NO SYSTEM SAND EXT
If Treatment Area < than Minimum SSBA	SYSTEM SAND EXT. Req'd.

Subtract Full Depth Width from Min. SSBA width = Extension width

Site Slopes Equal to or Greater than 5%

If Treatment Area = or > than Minimum SSBA	Use Minimum 2.5 ft. Req'd.
If Treatment Area < than Minimum SSBA	Calculate same as < 5%

Subtract Treatment Area Width from Min. SSBA width = Extension width

Design Examples

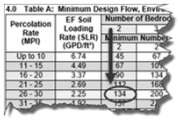
Design Example #1 (p.12): Single Family Residence, two bedrooms (300 GPD), 27 MPI perc rate & single rectangular bed

Task 1: Presby EnviroFin™ units required from Table A = 2 units

4.0 Table A: Minimum Design Flow, EnviroFin Units and System Sand Bed Area Required

Percolation Rate (MPI)	EF Soil Loading Rate (SLR) (GPD/ft²)	Number of Bedrooms & Design Flow (150 GPD per Bedroom)*							Commercial Sizing per 100 GPD**
		2	3	4	5	6	7		
		Minimum Number of EnviroFin™ Units (225 GPD per EF Unit)*							
		2	2	3	4	4	5		
Up to 10	6.74	45	67	90	112	134	156		14.84
11 - 15	4.49	67	100	134					22.3

Task 2: Table A shows a minimum System Sand Bed Area of 134 sq ft required for this daily flow.


4.0 Table A: Minimum Design Flow, Enviro...

Percolation Rate (MPI)	EF Soil Loading Rate (SLR) (GPD/ft²)	Number of Bedroo...
		2
		Minimum Numbe...
		2
Up to 10	6.74	45
11 - 15	4.49	67
16 - 20	3.37	90
21 - 25	2.69	112
26 - 30	2.25	134
31 - ...	...	156

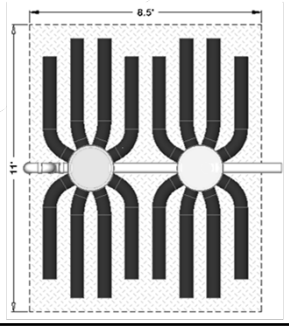
Task 3: N/A using a single bed configuration

Design Example #1 (p. 12, continued)

Task 4: Two EF units arranged in a rectangular bed placed in a single row with the long axis oriented vertically (See illustration below). The Full Depth System Sand bed Treatment Area along the horizontal axis = 2 EF units x 4 ft + 0.5 ft = 8.5 ft

Task 5: The Full Depth System Sand Bed Treatment Area along the vertical axis = 1 EF unit x 10.5 ft + 0.5 ft = 11 ft

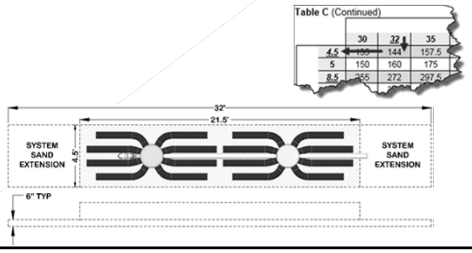
Now multiply the dimensions from Tasks 4 & 5 (93.5 sq. ft.) and compare that area to the min. SSBA required in Table A (134 sq. ft.). In this case System Sand Extensions will be required to meet the Min. SSBA required.



Design Example #1 (Alternative Layout)

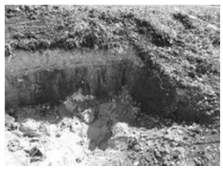
Task 6 (level bed) (pp. 12-13): The site will accommodate a sand bed length of 32 ft. Table C shows that using a length of 32' and a width of 4.5 ft will provide 144 sq ft of sand bed area, which is larger than the 134 sq ft required by Task 2.

Note: System Sand Extensions can be placed on the ends or sides of the Treatment Area depending on site criteria

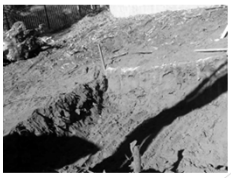


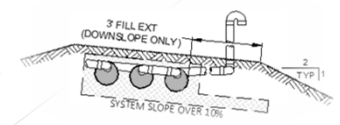
Design Criteria

Puerto Rico - Clay Soils



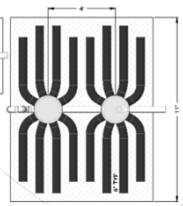
California - Sandy Clay Loam Soils





Rectangular Configurations

Horizontal Orientation



Vertical Orientation

Horizontal Units →10.5' spacing
Vertical Units → 4' spacing
6" between fins

Fin Orientation