GEOPHYTA

Home Septic System Site Evaluation And Replacement System Design

For:

Cheryl McDaniel (WPCLF)

11133 W. T.R. 112
Fostoria, OH 44830

Property Location:

11133 W. T.R. 112
Fostoria, OH 44830

Loudon Township, Seneca County

SYSTEM TYPE:

Engineered Sand Mound W/ 2-Foot-Wide Diffusers & Perimeter Drain

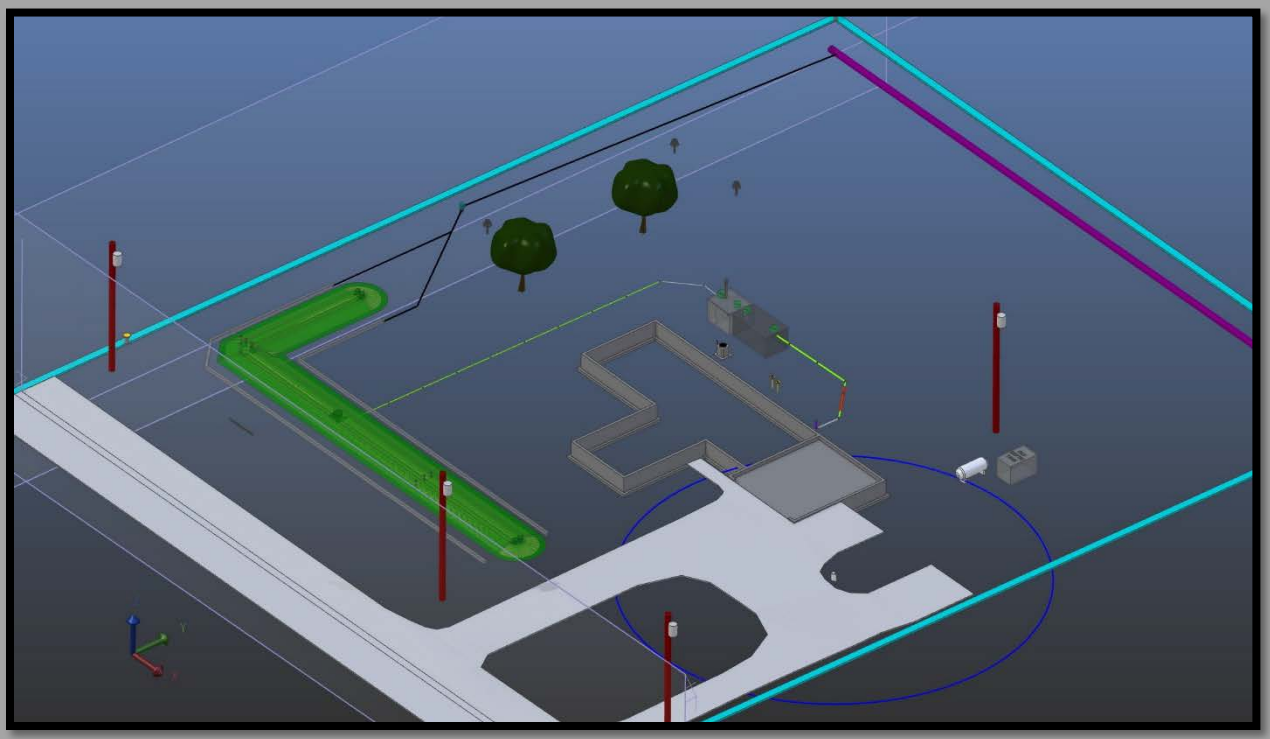
Nathan Wright (Soil Scientist)
Seth V. Layne (Designer)

Geophyta, Inc.
2685 C.R. 254
Vickery, OH 43464

419-547-8538

March 10th, 2023

◊ The McDaniel Residence ◊



1. Disclaimer
2. Layout Map
3. Soil Report (2X Total)
4. Calculation Sheets (3X Total)
5. 3D CAD Layout
6. Top CAD Layout
7. Mound Detail Prints (3X Total)
8. Elevation CAD Layout
9. Component Detail Prints (17X Total)
10. Bill of Materials (2X Total)
11. Operation & Maintenance (5X Total)

To The Homeowner:

A septic system is designed based on all the information you provide and Geophyta Inc collects at the site. It must be accurate. This information includes local soil limits and topography, plus existing and future locations of your home, number of bedrooms, out buildings, driveways, drinking water wells, ponds, septic systems, and property lines. Geophyta Inc. relies on this information to construct detailed design drawings that must meet local health department regulations before installation.

Any design changes required by the local health department to meet existing regulations are the responsibility of Geophyta Inc.

Any information changes made by you after the initial site inspection are your responsibility and will result in additional charges to you above the original quote for services. These charges may include additional site inspection work, system redesign, and resubmitted drawings.

To The Installer:

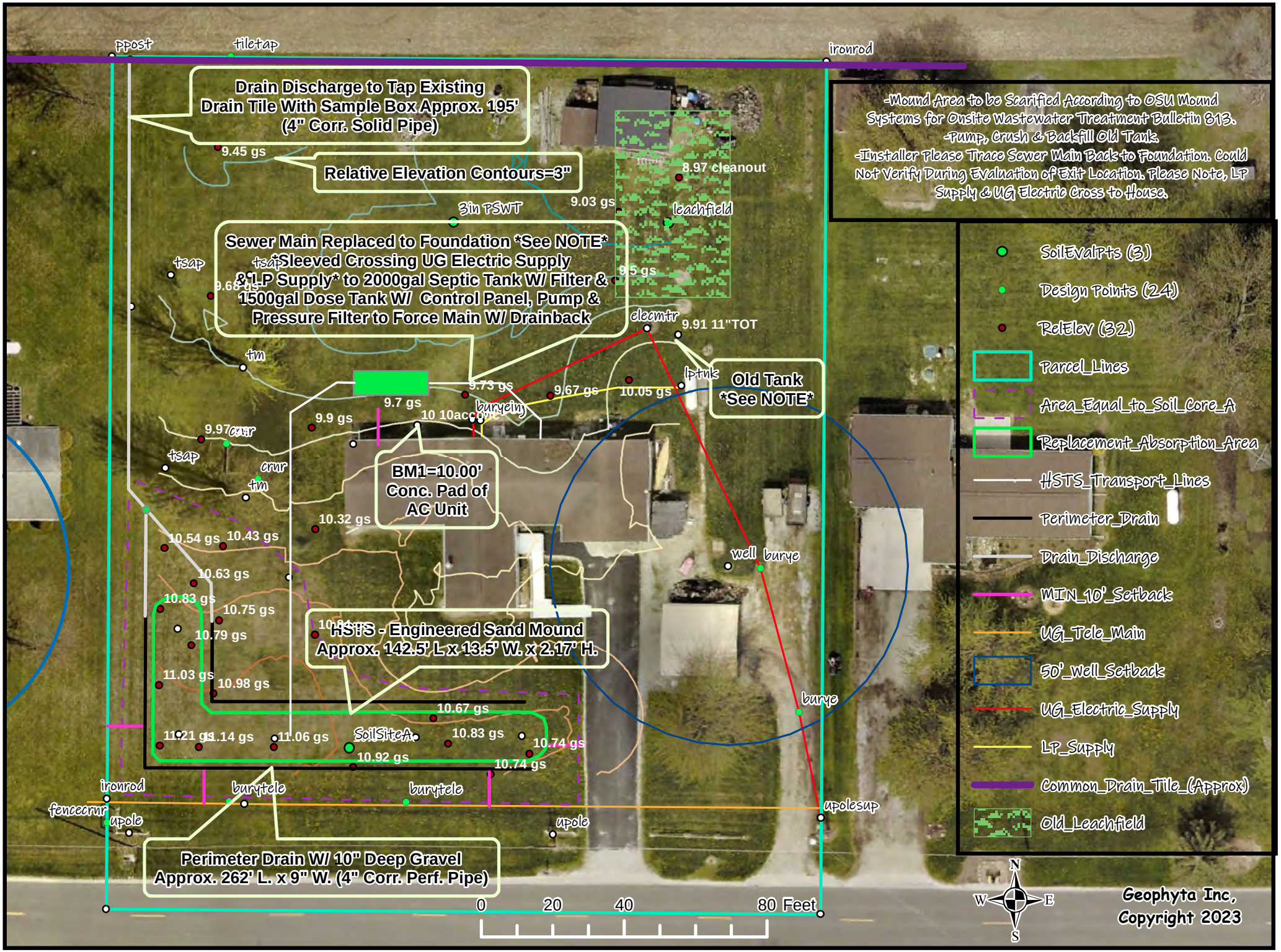
The registered installer of this septic system design is responsible for preparing an "as-built" record, as stated in the Ohio Administrative Code Chapter 3701-29-09, Par. F (p.32) of the "Sewage Treatment System Rules," Ohio Department of Health, January 1, 2015. Additionally, the installer is responsible for measuring and recording distal pressure head and float switch settings as baseline measures for future operation and maintenance of any pressure distribution system (3701-29-15, Appendix B, Par. VI(p.93) of above referenced rules.

If the installer requests "as-built" record creation from Geophyta Inc., additional charges will be billed to the installer by Geophyta Inc. and must be arranged prior to installation.

Geophyta Inc. must assume that any registered installer has the knowledge, equipment, ability, and experience to properly layout, install, and create as-built drawings for any septic system design approved by a local board of health. This includes the ability to read detailed design prints with an associated bill of materials. For this reason, any Geophyta Inc project supervision prior to or during installation will be billed to the installer.

Any product substitution made by the installer that is not specifically permitted in the design prints may result in Health Dept. disapproval and will result in additional re-design costs billed to the installer.

HSTS Replacement Layout - 11133 W. T.R. 112



Site and Soil Evaluation for Sewage Treatment and Dispersal

County: **Seneca**
Township / Sec.: **Loudon**
Property Address: **11133 W TR 112**
OR Location: **Fostoria, OH 44830**
Applicant Name: **Cheryl McDaniel**
Address: **11133 W TR 112**
Fostoria, OH 44830
Phone #: **567-230-3943**
Lot #:
Test Hole #: **A**
Latitude/Longitude: **83°23'6.49"W 41°7'23.919"N**
Method: ____ Pit ___ Auger **X** Probe; 1 1/4" dia.

Land Use / Vegetation: **Residential Turf**
Landform: **Glacial Till Plain**
Position on Landform: **Hillslope**
Percent Slope: **1-2**
Shape of Slope: **Linear-Linear**
Approximate Soil Type: **Blount SiL**

Date: **10-Feb-23**
Evaluator: **Nathan Wright**
Geophyta, Inc.
2685 C.R. 254
Vickery, OH 43464
Phone#: **419-547-8538**

Control #: **23 - SEN - 7A - 40**

CPSS Certified Professional Soil Scientist

Certification #: **19395**

Signature: Nathan Wright

Soil Profile		Estimating Soil Saturation			Estimating Soil Permeability							
		Munsell Color (hue, value, chroma)										
			Redoximorphic Features		Texture			Structure				
Horizon	Depth (inches)	Matrix Color	Concentrations	Depletions	Class	Approx. % Clay	Approx. % Fragments	Grade	Size	Type (shape)	Consistence	Other Soil Features
A1	**0.0 - 7.0**	**10YR 4/3**	**none**	**none**	**SiL**	**25**	**0**	**2-mod**	**medium**	**gr**	**friable**	
A2	**7.0 - 10.0**	**10YR 4/3**	**10% 10YR 4/6**	**5% 10YR 4/2**	**SiL**	**25**	**0**	**2-mod**	**medium**	**gr**	**friable**	
Bt	**10.0 - 25.0**	**10YR 4/6**	**none**	**30% 10YR 5/2**	**SiCL**	**35**	**5**	**1-weak**	**coarse**	**sbk**	**firm**	
C	**25.0 - 48.0**	**10YR 4/3**	**none**	**20% 10YR 5/1**	**C**	**45**	**10**	**1-weak**	**coarse**	**sbk**	**firm**	

Limiting Conditions	Depth to (in.)	Descriptive Notes	Remarks / Risk Factors: Values For Sand Mound W/Perimeter Drain
Perched Seasonal Water Table	**7.0**	Restricted in: Bt & C	Tyler Table: A1 horizon (0.0 - 7.0) ILR: SiL, HLLR: SiL
Apparent Water Table	**>48**		ILR(>30mg/L) = 0.6 gal/day/ft^2, ILR(<30mg/L) = 0.8 gal/day/ft^2
Highly Permeable Material	**>48**		HLLR = 2.7 gal/day/ft
Bedrock	**>60**	By Tile Probe	4 bedroom min. required absorption area = 800 sq.ft.
Other Restrictive Layer	**25.0**	C and weak structure	5xW Soil Absorption Box: 23' W x 178' L

Note : The evaluation shall include a complete site plan or site drawing including all requirements in paragraphs (B)(1) through (B)(4) of OAC 3701-29-08.

Landforms
Upland*
Terrace
Flood Plain
Lake Pain
Beach Ridge
*Includes glacial till plain and end moraine

Position on Landform
Depression
Flat
Knoll
Crest
Hillslope
Footslope

Shape of Slope
Convex
Concave
Linear
Complex

Horizon Nomenclature

Master Horizons

O	Predominantly organic matter (litter & humus)
A	Mineral, organic matter (humus) accumulation, loss of Fe, Al, clay
E	Mineral, loss of Si, Fe, Al, clay, organic matter
B	Subsurface accumulation of clay, Fe, Al, Si, humus; sesquioxides; loss of $CaCo_3$; subsurface soil structure
C	Little or no pedogenic alteration, unconsoilidated earthy material, soft bedrock
R	Hard bedrock

Horizon Suffixes

a	Highly decomposed organic matter
b	Buried genetic horizon
d	Densic layer (physically root restrictive)
e	Moderately decomposed organic matter
g	Strong gley
i	Slightly decomposed organic matter
p	Plow layer or artificial disturbance
r	Weathered or soft bedrock
t	Illuvial accumulation of silicate clay
w	Weak color or structure within B
x	Fragipan characteristics

Horizon Modifiers

Numerical Prefixes: Used to denote lithologic discontinuities.

Numerical Suffixes: Used to denote subdivisions within a master horizon.

Soil Texture

Texture Class Abbreviations		Textural Class Modifiers	
Course Sand	cos	Gravelly	GR
Sand	s	Fine Gravelly	FGR
Fine Sand	fs	Medium Gravelly	MGR
Very Fine Sand	vfs	Coarse Gravelly	CGR
Loamy Coarse Sand	lcos	Very Gravelly	VGR
Loamy Sand	ls	Extremely Gravelly	XGR
Loamy Fine Sand	lfs	Cobbly	CB
Loamy Very Fine Sand	lvfs	Very Cobbly	VCB
Coarse Sandy Loam	cosl	Extremely Cobbly	XCB
Sandy Loam	sl	Stony	ST
Fine Sandy Loam	fsl	Very Stony	VST
Very Fine Sandy Loam	vfsl	Extremely Stony	XST
Loam	l	Bouldery	BY
Silt Loam	sil	Very Bouldery	VBY
Silt	si	Extremely Bouldery	XBY
Sandy Clay Loam	scl	Channery	CN
Clay Loam	cl	Very Channery	VCN
Silty Clay Loam	sicl	Extremely Channery	XCN
Sandy Clay	sc	Flaggy	FL
Silty Clay	sic	Very Flaggy	VFL
Clay	c	Extremely Flaggy	XFL

*Estimate approximate clay percentage within 5 percent

Soil Structure

Grade		Size		Type (Shape)	
Structureless	0	Very Fine	vf	Granular	gr
Weak	1	Fine	f	Angular Blocky	abk
Moderate	2	Medium	m	Subangular Blocky	sbk
Strong	3	Coarse	co	Platy	pl
		Very Coarse	vc	Prismatic	pr
		Extr. Coarse	ec	Columnar	cpr
		Very Thin*	vn	Single Grain	sg
		Thin*	tn	Massive	m
		Thick*	tk	Cloddy	CDY
		Very Thick*	vk		

* The sizes Very Thin, Thin, Thick, and Very Thick, are used when describing platy structure only. Substitute thin for fine, and thick for coarse when describing platy structure.

Moist Consistence	
Loose	l
Very Friable	vfr
Friable	fr
Firm	fi
Very Firm	vfi
Extremely Firm	efi

For a more detailed explanation on describing and sampling soils, please refer to the "Field Book for Describing and Sampling Soils"

Schoeneberger, P.J., Wysocki, D.A., Benham, E.C., and Broderson, W.D. (editors) 2002. Field book for describing and sampling soils, version 2.0. Natural Resources Conservation Service, USDA, National Soil Survey Center, Lincoln, NE.

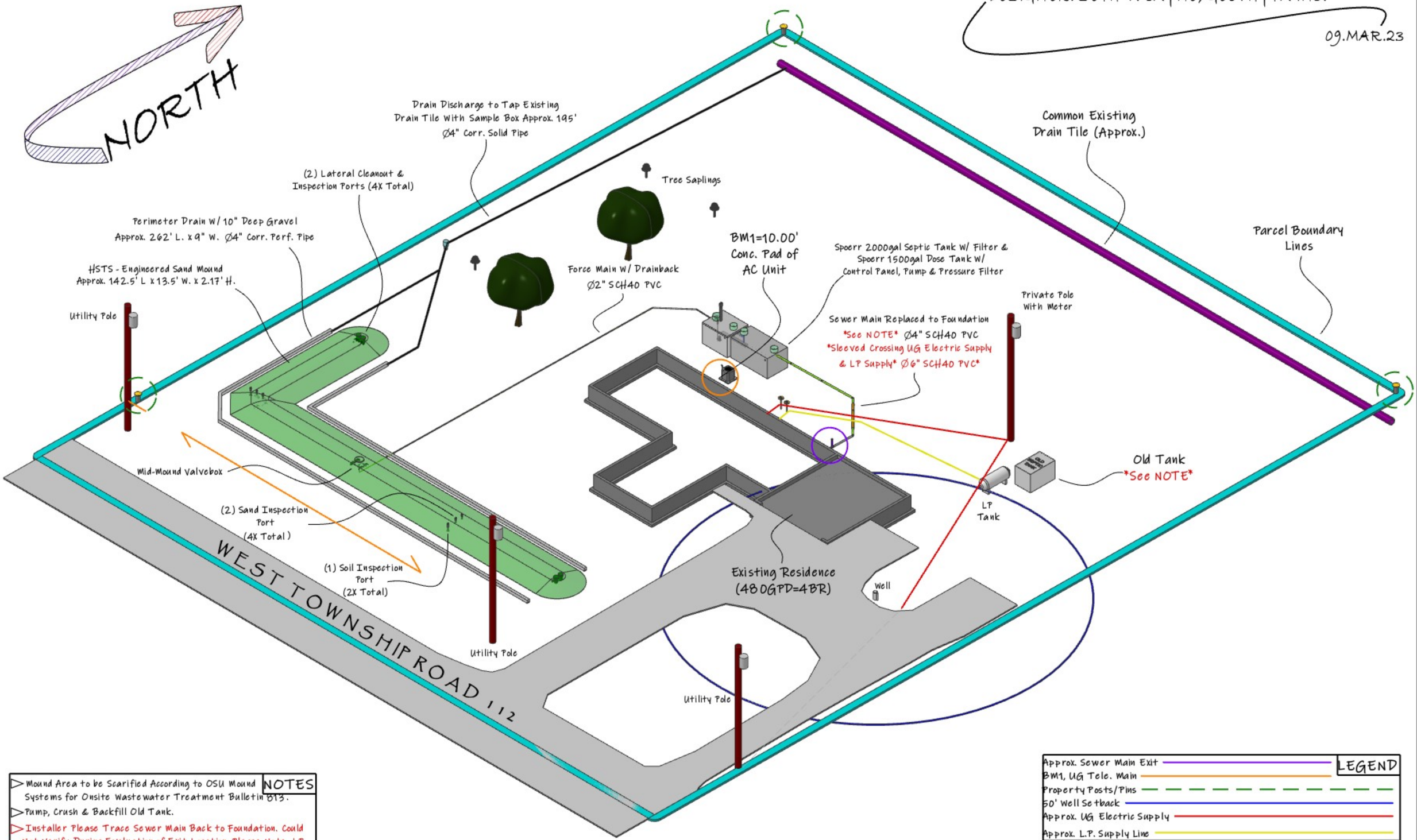
Mound Calculations: Gravelless Chambers			
Owner: McDaniel: Site A	Design		
Residence w/ 4 BEDROOMS	Min. Design	Actual Design	Comment
Water Use (gal/day)(DFR)	480		
Limiting Condition	PSWT		
Depth To Limiting Condition (inches)	7.0		
Total Infiltration Depth (Soil+Sand) (in.)	13.0		MIN 12"
Sand Depth To Add (in.)	6.0		MIN Sand Spec.
Most Limiting Soil Texture	SiL		
Site Slope % (Perpendicular To Contour)	0.0		
Tyler Table Values			
Soil Infiltration Loading Rate (gal/day/sq. ft)(BLR)	0.6	0.6	SiL > 30 mg/L
Soil Hydraulic Linear Loading Rate (gal/day/ft)(HLLR)	2.7	2.7	SiL @ (8"-12") Infiltration
Sand Loading Rate (gal/day/sq. ft)(SLLR)	1.0		
Required Soil Absorption Area (sq. ft.) DFR/BLR	800.0		
Mound Design Requirements			
Sand Absorption Area Width (ft)(A)	2.7	3.8	Using (2) 22" Wide Chambers
Sand Absorption Area Length (ft)(B)	177.8	128.0	Using 28% Length Reduction *See Below*
Sand Distribution Area for Laterals(sq. ft.)	480.0	480.0	
Min. Mound Basal Soil Width (ft)(I+A+J)(HLLR/BLR)	4.5	10.67	Needed For 3:1 Sand Edge Slope
Upslope Sand Depth (in)(D)	6.0		
Downslope Sand Depth (in)(E)	6.0		
Aggregate Depth (in)(F)	8.0		LP Chamber Dome Height
Edge Topsoil Cover (in)(G)	6.0		
Peak Topsoil Cover (in)(H)	12.0		
Mound Downslope Width at 3:1 (in)(I)	78.0		
Mound Upslope Width at 3:1 (in)(J)	78.0		
Mound Endslope Width at 3:1 (in)(K)	78.0		
Mound Overall Length (ft)(L)	190.8	142.5	Using 28% Length Reduction to Fit Mound Within Property & Elevation Contours
Mound Overall Width (ft)(W)	13.0	13.5	
Mound Overall Height (ft)	2.2	2.2	

	A	B	C	D
1	**Mound Dosing Calculations: Gravelless Chambers**			
2				
3	**Owner: McDaniel: Site A**	**Design**		
4		**Target**	**Formula**	**Actual**
5	Sand Absorption Area Width (ft)(A)	3.8		
6	Sand Absorption Area Length (ft)(B)	128.0		
7	Sand Distribution Area for Laterals(sq. ft.)	480.0	B5*B6	
8				
9	Area Per Orifice (sq. ft.)	6.00		
10	Orifice Quantity (Dist. Area/Std)	80.0	B7/B9, Rnd to Even; Divide by 4	80.0
11	Total Laterals Length (ft)	256.0		
12	Number of Laterals C	4		
13	Each Lateral Length (ft.)(B/C)	64.0	B11/B12	
14	Orifice Separation (length/# orifices)(ft.)	3.2	B11/B10	3' 3" Spacing
15	Orifice Separation Less Than Or Equal To 4 ft.?	yes		
16	Orifice Size (in)(Otis, 1982)	0.125	1/8"	
17	Lateral Diameter (in) (Otis, 1982)	1.00	SCH40 PVC	
18	Target Head at Lateral End (ft)	5.0		
19	Flow Rate per Orifice (gpm)(Otis et al, 1978)	0.41		
20				
21	**Lateral Design:**			
22	Diameter (in)	1.00	SCH40 PVC	
23	Flow Rate per Lateral (gpm)	8.2	B10/B12*B19	
24	Flow Rate Total (gpm)	*32.8*	D10*B19	
25	Gal. per Foot of Pipe (Clemons, 1991)	0.045	SCH40 PVC	
26	Total Lateral Volume (gal)	11.52	B11*B25	
27				
28	**Manifold Design:**	None - Main Direct To Laterals By Tee		
29	Diameter (in)	0.0		
30	Length (ft)	0.0		
31	Gal. per Foot of Pipe (Clemons, 1991)	0.0		
32	Total Manifold Volume (gal)	0.0	B30*B31	
33	# Std 90deg Elbows			
34	Std 90deg Elbow Pipe Length Equivalent (ft)			
35	# Std 45deg Elbows			
36	Std 45deg Elbow Pipe Length Equivalent (ft)			
37	# Std Tees			
38	Std Tee Pipe Length Equivalent (ft)			
39	# Quick Disconnects			
40	Quick Disconnect Pipe Length Equivalent (ft)			
41	# Check Valves			
42	Check Valves Pipe Length Equivalent (ft)			
43				
44	Total Length Equivalent (pipe&fittings) (ft)	0.0		
45	Head Loss per 100 ft.(ft.)(Otis et al, 1978)	0.0		
46	Total Manifold Head Loss (ft)	0.00		
47				
48	**Main Design:**			
49	Diameter (in)	2.00	SCH40 PVC	
50	Length (ft)	110	Includes All Drainback Piping	
51	Gal. per Foot of Pipe (Clemons, 1991)	0.174		
52	Total Main Volume (gal)	19.14	B50*B51	
53	# Std 90deg Elbows	3		
54	Std 90deg Elbow Pipe Length Equivalent (ft)	9.0		
55	# Std 45deg Elbows	2		

	A	B	C	D
1	**Mound Dosing Calculations: Gravelless Chambers**			
2				
3	**Owner: McDaniel: Site A**	**Design**		
4		**Target**	**Formula**	**Actual**
56	Std 45deg Elbow Pipe Length Equivalent (ft)	4.0		
57	# Std Tees	3		
58	Std Tee Pipe Length Equivalent (ft)	11.0		
59	# Quick Disconnects	1		
60	Quick Disconnect Pipe Length Equivalent (ft)	2.0		
61	# Full Flow Ball Valves	4	1.00" Dia.Valves	
62	Ball Valves Pipe Length Equivalent (ft)	0.9		
63				
64	Total Length Equivalent (pipe&fittings) (ft)	183.6	B50+(B53-62)	
65	Head Loss per 100 ft.(ft.)(Otis et al, 1978)(Zoeller)	*2.06*		
66	Total Main Head Loss (ft)	3.78	(B64/100)*B65	
67				
68	**Dose Volume:**			
69	Total Lateral Volume (gal)	11.52	B26	
70	Total Manifold Volume (gal)	0.00	B32	
71	Total Main Volume (gal)	19.14	B52	
72				
73	Drainback Volume: Main+Manifold+Lateral (gal)	30.7	B69+B70+B71	
74	Lateral Vol x 5.208333 (gal)	60.0	B69*5 (Minimum 5X VOID VOLUME)	
75	TOTAL dose (gal)	90.7		
76				
77	Daily Design Flow (DFR)(120gal/day/bedroom)	480.0		
78	Is Lateral Dose <=1/4 of Daily Design Flow?	yes	REQUIRED	
79	Is Lateral Dose <1/8 of Daily Design Flow?	yes		
80				
81	**Total Dynamic Head:**			
82	Static Lift - Lateral Ht. Above Surface (ft)	0.50	6.0 inch Sand	
83	Static Lift - Depth to Pump Off Below Surface (ft)	5.92	6.75 - .83	
84	Static Lift - Topo Difference (ft.)	1.5	-	
85	Total Pipe & Fittings Headloss (ft)	3.8	B46+B66	
86	Network Loss (5ft head x 1.3) (ft)(includes laterals)	6.5	-	
87	Total Head Loss (ft)	*18.2*	sum(B81:B85)	
88				
89	Dose Tank Parameters			
90	Volume (gal)	1500	55.0	inches effluent
91	Gallons Per Inch in Tank	27.30		
92				
93	**Timed Dose Settings:**			
94	Total Gallons Per Pump Cycle W/drainback	90.7	3.32	inches drawdown
95	Total Pump Cycles Per 24 Hrs.	8.0		
96	Total Pump On Time - seconds	166		
97	Total Pump Off Time - hours	3.0		
98	Redundant Off Effluent Ht. from bottom (in)	10.0	(to prevent tank flotation)	
99	Timer Enable (low level cutout) Ht. From tank bottom (in)	13.3		
100	High Level Alarm Ht. from bottom (in.)	28.6	(provides 1 & 1/2 day reserve after alarm)	

DESIGNER: SETH V. LAYNE, GEOPHYTA INC.

09.MAR.23



NOTES

- Mound Area to be Scarified According to OSU Mound Systems for Onsite Wastewater Treatment Bulletin 813.
- Pump, Crush & Backfill Old Tank.
- Installer Please Trace Sewer Main Back to Foundation. Could Not Verify During Evaluation of Exit Location. Please Note, LP Supply & UG Electric Cross to House.

LEGEND

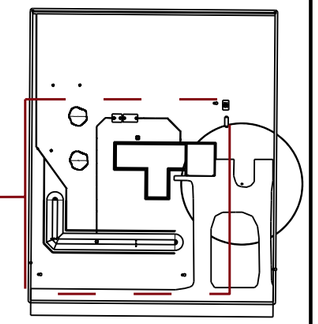
- Approx. Sewer Main Exit
- BM1, UG Tele. Main
- Property Posts/Pins
- 50' Well Setback
- Approx. UG Electric Supply
- Approx. L.P. Supply Line

SCALE 1:240

MCDANIEL - HSTS_3D_LAYOUT

DESIGNER: SETH V. LAYNE, GEOPHYTA INC.

10.MAR.23

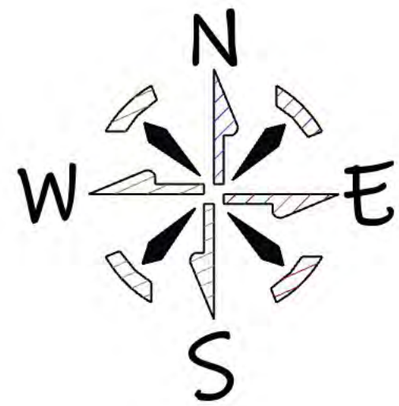


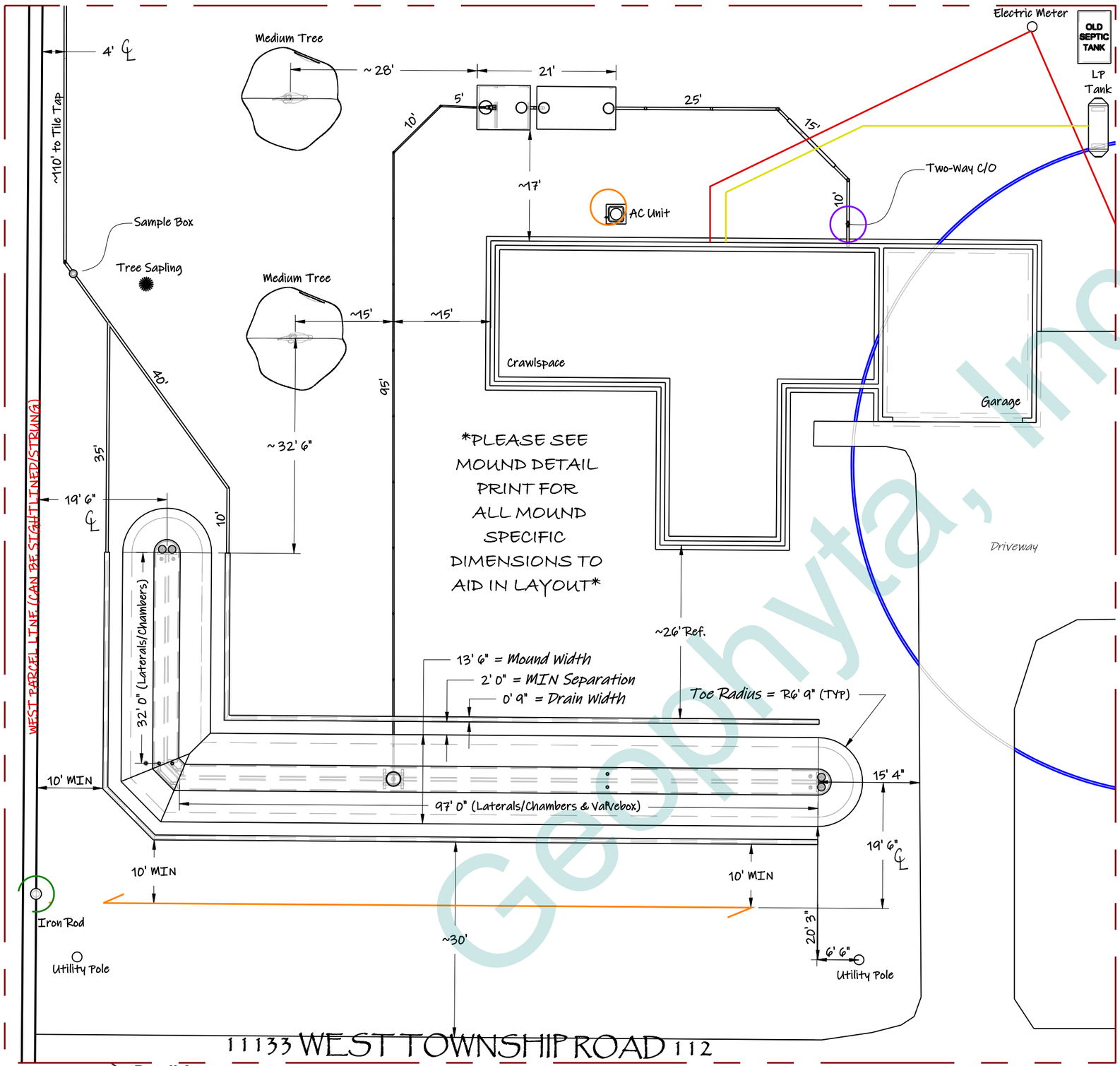
Mound Layout by: Sightlining/Stringing West Parcel Line Along With site Measurements to Locate Mound Centerline.

NOTES

Approx. Sewer Main Exit
BM1, UG Tele. Main
50' Well Setback
Approx. UG Electric Supply
Approx. LP Supply Line
Property Rod

LEGEND





11133 WEST TOWNSHIP ROAD 112

Detail A SCALE 1:195

MCDANIEL - HSTS_TOP

DESIGNER: SETH V. LAYNE, GEOPHYTA INC.

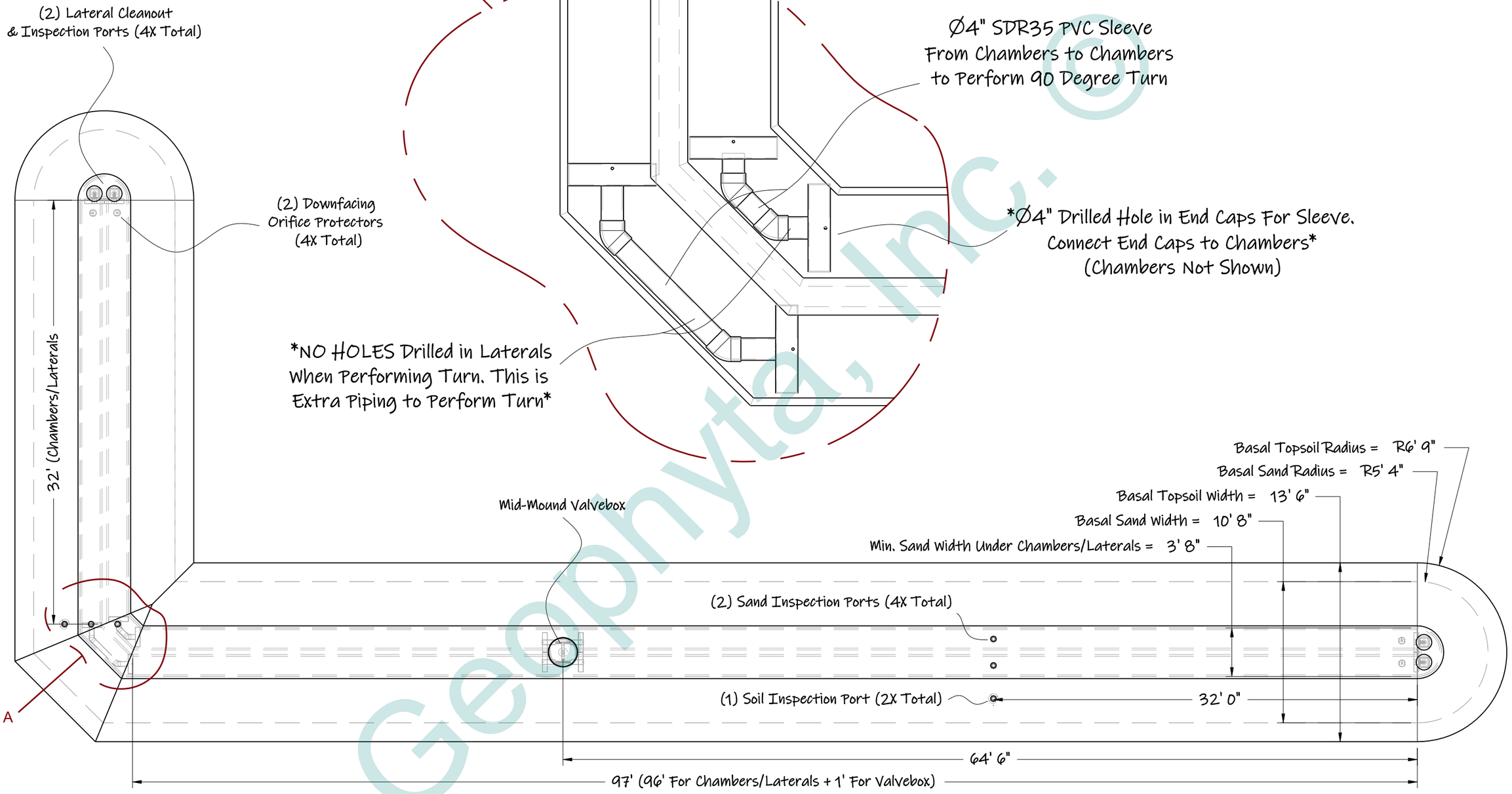
10.MAR.23

Detail A SCALE 1:20

Ø4" SDR35 PVC Sleeve
From Chambers to Chambers
to Perform 90 Degree Turn

*Ø4" Drilled Hole in End Caps For Sleeve.
Connect End Caps to Chambers*
(Chambers Not Shown)

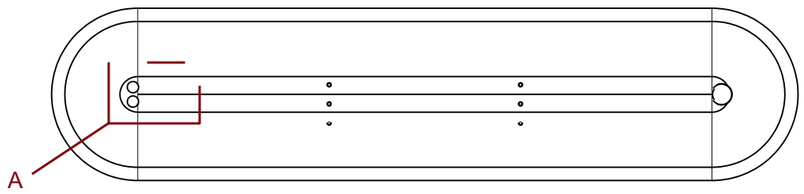
*NO HOLES Drilled in Laterals
When Performing Turn. This is
Extra Piping to Perform Turn*



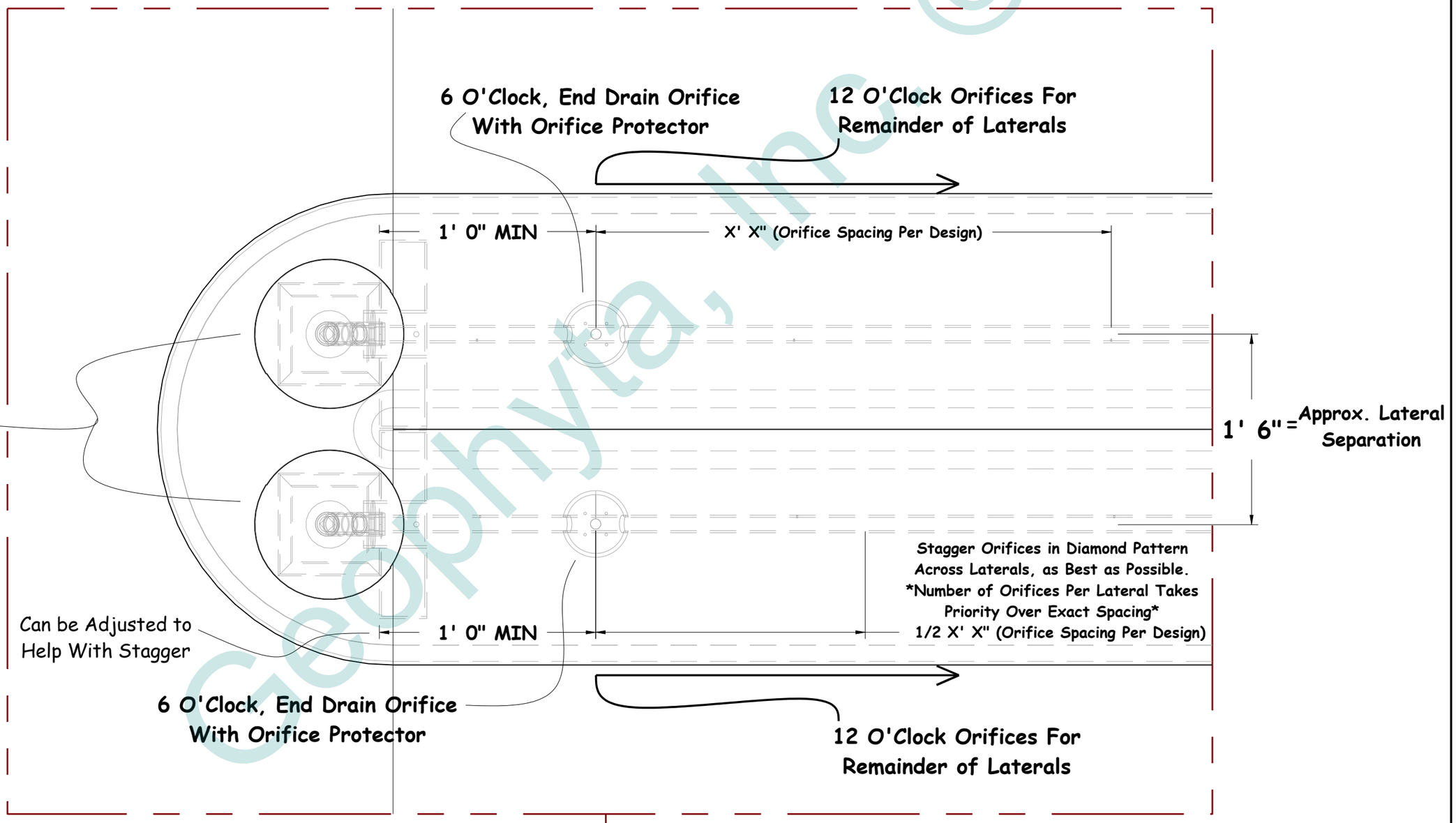
SCALE 1:90

HSTS_MOUND_DETAIL

DESIGNER: SETH V. LAYNE, GEOPHYTA INC. 22.DEC.21



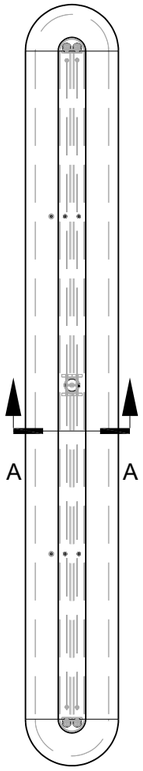
Lateral Diameters Are Determined From Each Individual Design And Can Be Found In The Calculations Pages As Well As Bill Of Materials.



Detail A SCALE 1:10

HSTS-Mound_Laterals_Detail

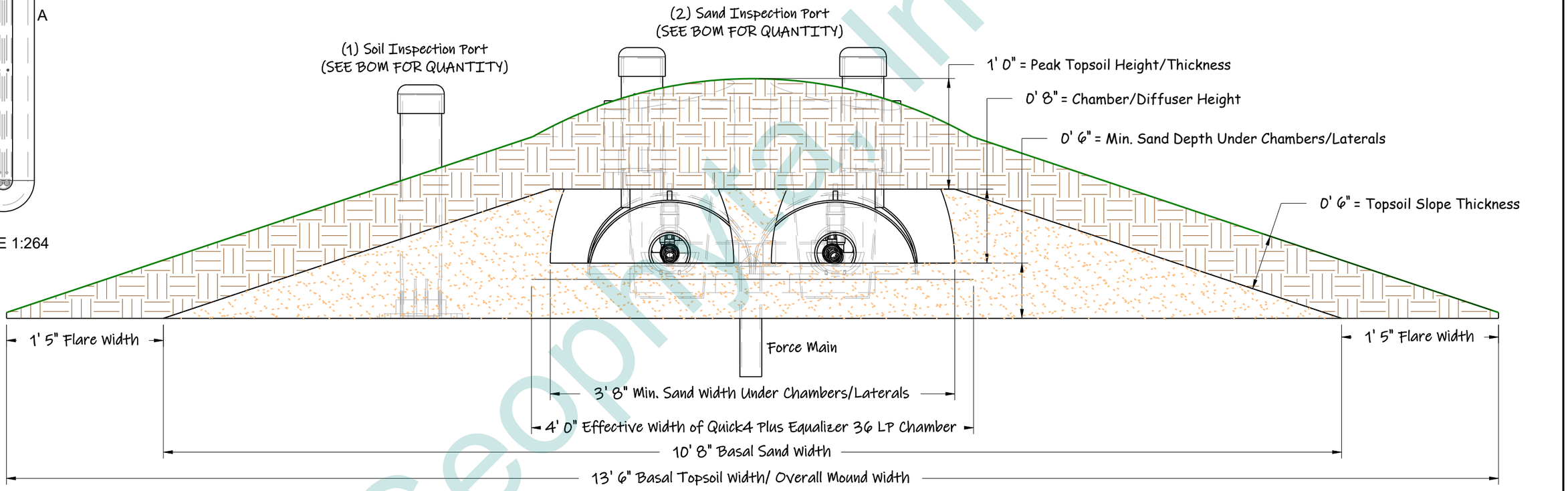
DESIGNER: SETH V. LAYNE, GEOPHYTA INC. 19.SEP.22



SCALE 1:264

C-33 Natural Sand

Silt Loam or Better



Section A-A

SCALE 1:11

HSTS_Mound_Cross-Section

NOTES

- Sand Depths Under Chambers Due To Soil Unevenness: Avg. = 8.9" Range = 6.0" - 11.1"
- Sewer Main to Have Min. Fall .125"/1'
- Force Main Must Have Drainback With Suggested Fall or 1"/100'.
- Installer Please Verify Sewer Main Bottom of Pipe is 15" Below BM1 @ Tap-in or Shallower Before Setting Tanks. Adjust Depth of Tanks Accordingly Based on Actual Depth of Flowline.

LEGEND

Native Soil Surface

Zero Elevation Reference

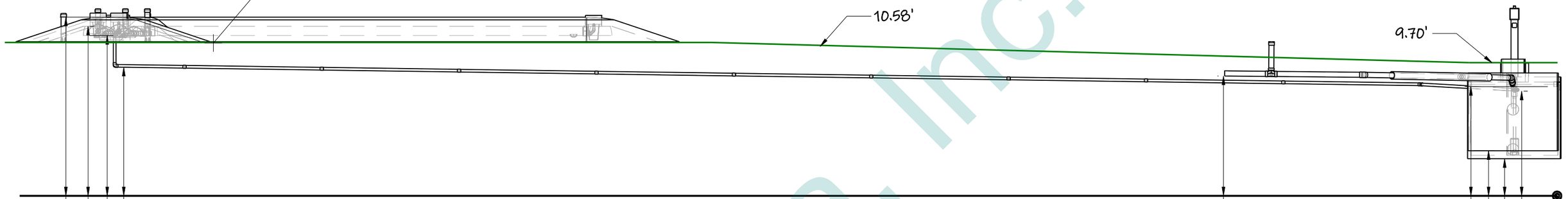
ELEVATION VIEW - EAST TO WEST

N

DESIGNER: SETH V. LAYNE, GEOPHYTA INC.

10.MAR.23

****All Elevation Values Pointing to Surface Are of Native Grade****



Approx. BOP Tap-in to Sewer Main (Flowline Approx. 15" Below BM1) *See NOTE* = 8.75'

9.33' = BOP Force Main 90 Degree Elbow Into Mid-Mound Valvebox Pipe (20" Drainback Fall)

11.67' = Top of Sand Under Chambers/Laterals (20" Above BM1)

12.33' = Top of Chambers/Sand Edge (28" Above BM1)

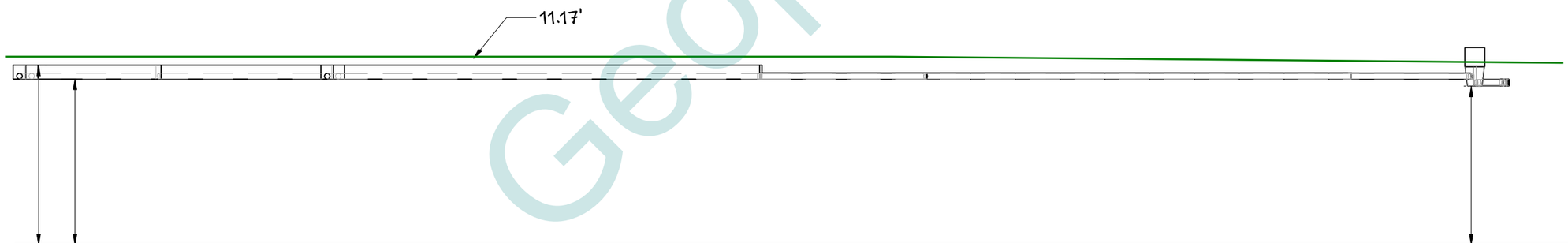
13.33' = Peak Topsoil Height (40" Above BM1)

BOP Sewer Main Into Septic Tank (9" Fall) = 7.95'

Bottom of Spoerr 2000gal Septic Tank = 3.28'

Bottom of Spoerr 1500gal Dose Tank = 2.70'

BOP Dose Into Force Main = 7.67'



9.83' = Bottom of Pipe Start of Perimeter Drain *East End* (2" Below BM1)

10.67' = Starting Elevation of Gravel *East End* (8" Above BM1)

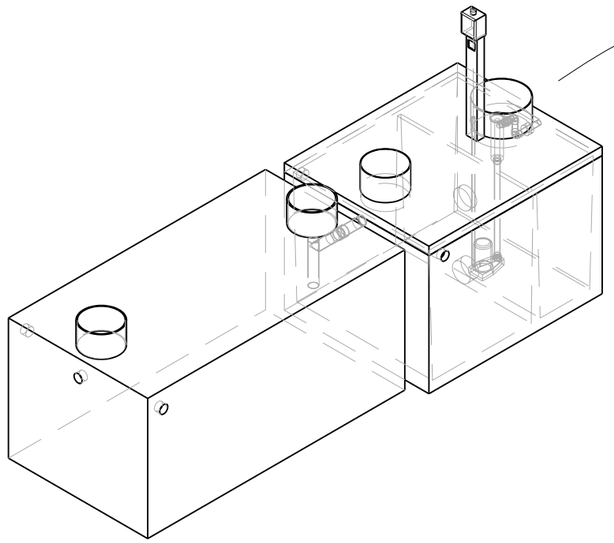
Bottom of Sample Box *Includes 4" Drain Fall + 4" Sample Drop* (10" Below BM1) = 9.17'

ZERO ELEVATION REFERENCE BM1 = 10.00' Conc. Pad of AC Unit (SEE LAYOUT MAP)

SCALE 1:85

MCDANIEL - HSTS_ELEVATION

DESIGNER: SETH V. LAYNE, GEOPHYTA INC. 19.MAY.22



SCALE 1:60

Total Extent of Width = 6' 9"

All Risers as Grade
Requires: 12", 18", 24" or 36"

Control Panel

SEE BILL OF MATERIALS FOR COMPONENT DETAILS

End Riser

End Riser

End Riser

End Riser

Pressure Filter

Union Quick Disconnect

Force Main

1/4" Dia. Weep Hole For Drainback in 6 O'Clock Position

Float Tree

Effluent Pump

Effluent Filter

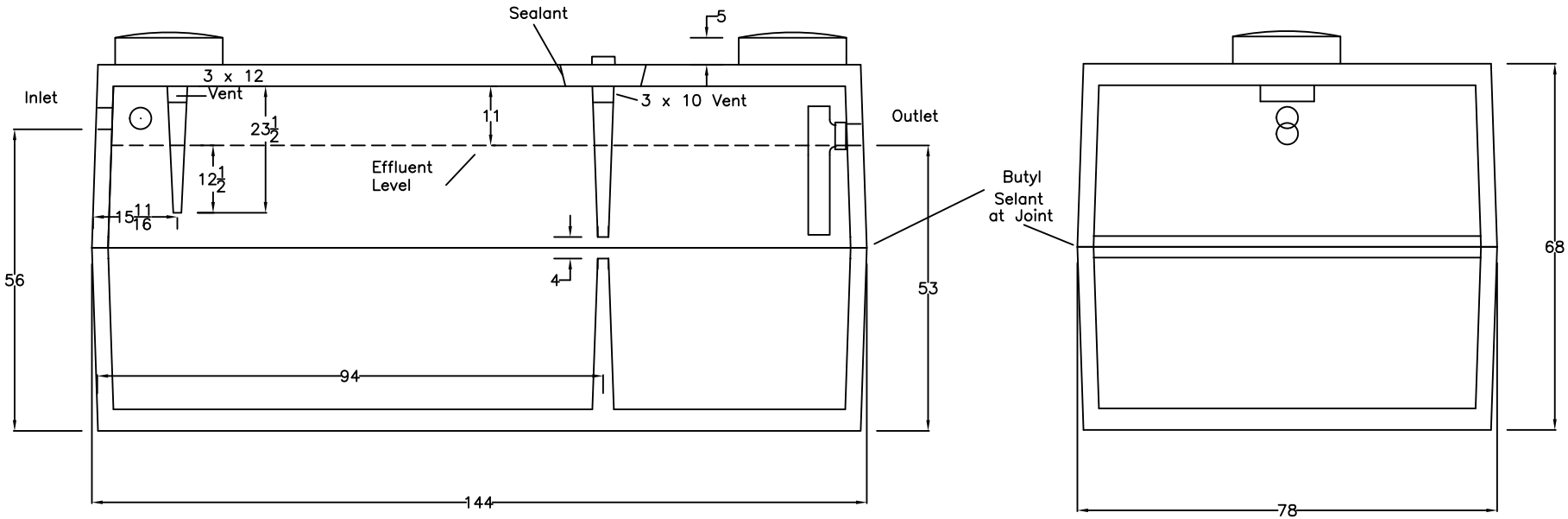
Spoerr 2000gal Septic Tank

Spoerr 1500gal Dose Tank

~21 FEET

SCALE 1:20

Spoerr 2000gal Septic Tank & Spoerr 1500gal Dose Tank With Control Panel, Pump & Filters



Side View

End View

Spoerr Precast
Concrete Inc.
2020 Caldwell St
Sandusky, OH 44870
800-252-5205

Concrete 5000 PSI @ 28 Days
All Dimensions in Inches
Max cover on top of tank 48"
Minimum cover 6"
Inlet/Outlet boots for 4" pipe
Boots: Meet ASTM C923
Sealant: Meets ASTM C990
Outlet Filter: Meets
ANSI/NSF 46

2000 Gallon Septic

Excavation 7'6" x 13'

11/26/15

PL-122 Filter

The PL-122 was the original Polylok filter. It was the first filter on the market with an automatic shut-off ball installed with every filter. When the filter is removed for regular servicing, the ball will float up and prevent any solids from leaving the tank. Our patented design cannot be duplicated.

Features:

- Offers 122 linear feet of 1/16" filter slots, which significantly extends time between cleaning.
- Has a flow control ball that shuts off the flow of effluent when the filter is removed for cleaning.
- Has its own gas deflector ball which deflects solids away.
- Installs easily in new tanks, or retrofits in existing systems.
- Comes complete with its own housing. No gluing of tees or pipe, no extra parts to buy.
- Has a modular design, allowing for increased filtration.

PL-122 Installation:

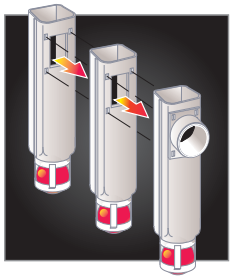
Ideal for residential waste flows up to 1,500 gallons per day (GPD). Easily installs in any new or existing 4" outlet tee.

1. Locate the outlet of the septic tank.
2. Remove the tank cover and pump tank if necessary.
3. Glue the filter housing to the outlet pipe, or use a Polylok Extend & Lok if not enough pipe exists.
4. Insert the PL-122 filter into tee.
5. Replace and secure the septic tank cover.

PL-122 Maintenance:

The PL-122 Effluent Filter will operate efficiently for several years under normal conditions before requiring cleaning. It is recommended that the filter be cleaned every time the tank is pumped, or at least every three years.

1. Do not use plumbing when filter is removed.
2. Pull PL-122 cartridge out of the tee.
3. Hose off filter over the septic tank. Make sure all solids fall back into septic tank.
4. Insert filter back into tee/housing.



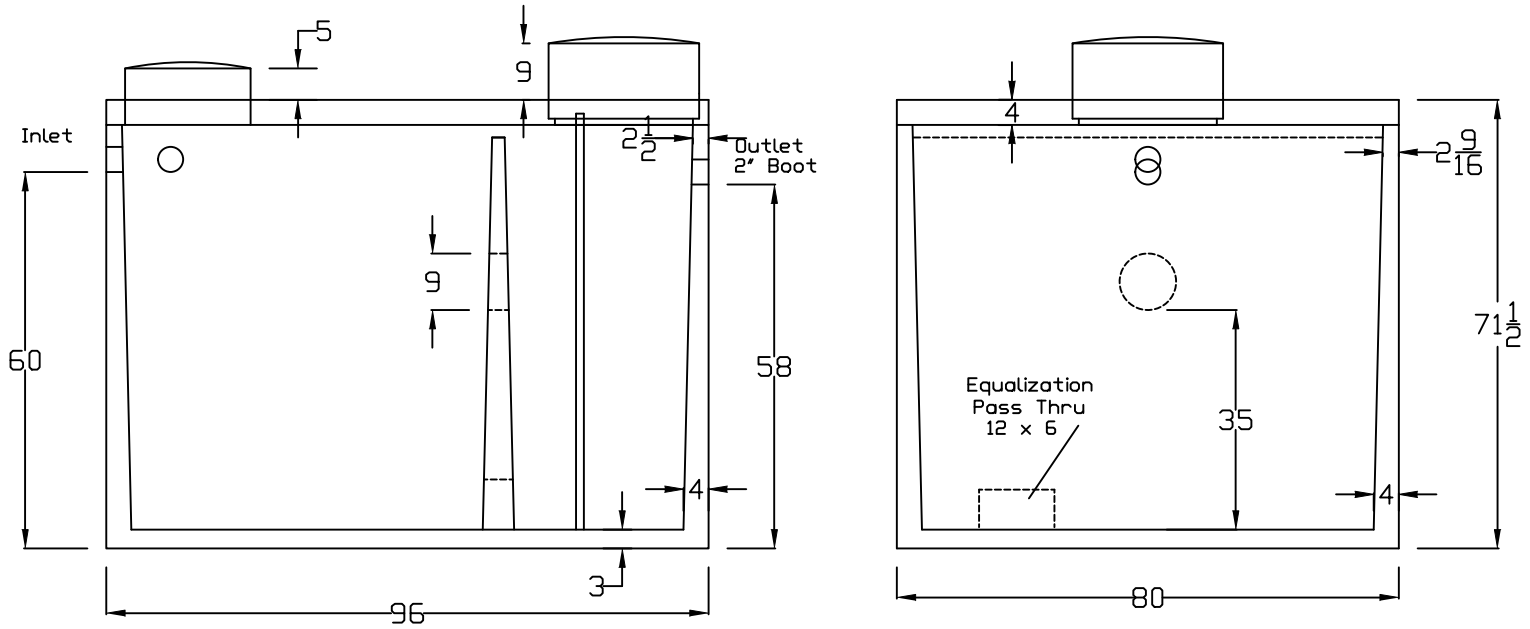
Polylok offers the only filter on the market where you can get more GPD by simply snapping our filters together!

1 Filter = 1500 GPD
2 Filters = 3000 GPD
3 Filters = 4500 GPD

Patent Numbers
6,015,488 & 5,871,640

Filter Ready Adapter
Connects to Septic Tank Wall

Outdoor SmartFilter® Alarm
Polylok, Zabel & Best filters accept the SmartFilter® switch and alarm.



Spoerr Precast
Concrete Inc.
2020 Caldwell St
Sandusky, OH 44870
800-252-5205

Concrete 5000 PSI @ 28 Days
All Dimensions in Inches
Max cover on top of tank 48"
Minimum Cover 6"
Inlet boots for 4" pipe
Outlet Boot for 2" Pipe
Boots meet ASTM C923
Sealant: Meets ASTM C990
27.3 Gallons /Inch

1500 Gallon Pump Tank
Excavation: 7'9" x 9'

11/26/15

OHIO ELECTRIC CONTROL, INC.

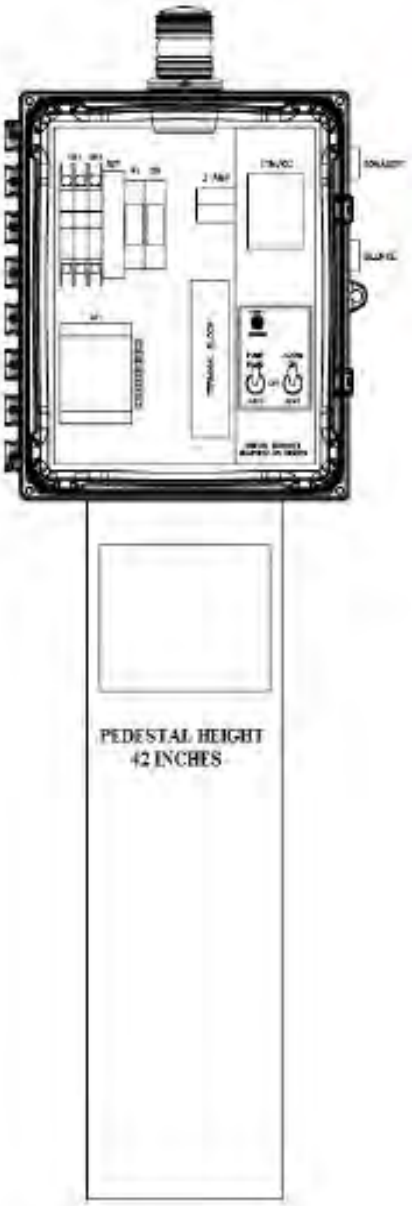
ECONOMY SERIES CONTROL PANELS

Time Dose Control Panel

For single phase residential and commercial lift stations and holding tanks
Float activated pump controllers for time dose applications

Features

- Circuit breaker for each pump
- Audible alarm with silence
- 360 degree visual alarm
- 3 float operation: Off, Enable, High level
- Externally mounted silence switch
- UL Type 4X enclosure padlockable
- Separate power feed for Pump and Control
- Clearly labeled terminal blocks
- Easy to use timer
- Individually adjustable On and Off Times
- DP Rated contactor
- ETM and Cycle Conter
- All components UL Listed



Specifications

Voltage Input: 115VAC/230VAC 60Hz, single phase
Pump ratings: 115VAC/230V – 2HP at 20FLA, single phase
Enclosure: UL Type 4X rated, polycarbonate
1 year limited warranty

ECP-TD-11

Phone: (419) 289-1553 Fax (419) 289-5555 E-mail: oecinc@oecinc.net
www.oecinc.net

Champion Pump

CPE

4/10 - 1/2HP
EFFLUENT

Every pump tested in water to ensure pump meets peformance curve.

SSPMA CERTIFIED

FEATURES/BENEFITS

PERFORMANCE
Heads up to 65' TDH
Flows up to 86 GPM

MOTOR
High efficient, 115v or 230v, oil filled, permanent split capacitor motor with upper and lower ball bearings and thermal overload protection
- Constant bearing lubrication
- Maximum motor cooling
- Runs cooler and lasts longer
- Internal overload protection
- Quiet operation
- Fasteners and shaft made from rugged, corrosion resistant stainless steel

SEAL DESIGN
Type 21 inboard seal design with secondary exclusion seal
- Rotating components of seal are in the motor housing, being lubricated by the motor oil preventing foreign matter from wrapping around the seal components
- Seal will last longer if the pump runs dry
- Secondary exclusion seal keeps debris from entering the seal cavity

IMPELLER DESIGN
Non-clog style, cast-iron vortex impeller (CPEH Thermoplastic Vortex)
- Designed to help reduce clogging by foreign material

POWER CORD
Sealed entry quick disconnect power cords
- Prevents water from entering the motor housing through a cut cord
- Easy to replace in the field
- Available in lengths up to 100'

SWITCH
Piggy-back switch design
- Defective switches can be diagnosed over the phone
- Pump can be operated manually or supplied with other piggy-back switches
- Switch can be replaced without having to replace the pump

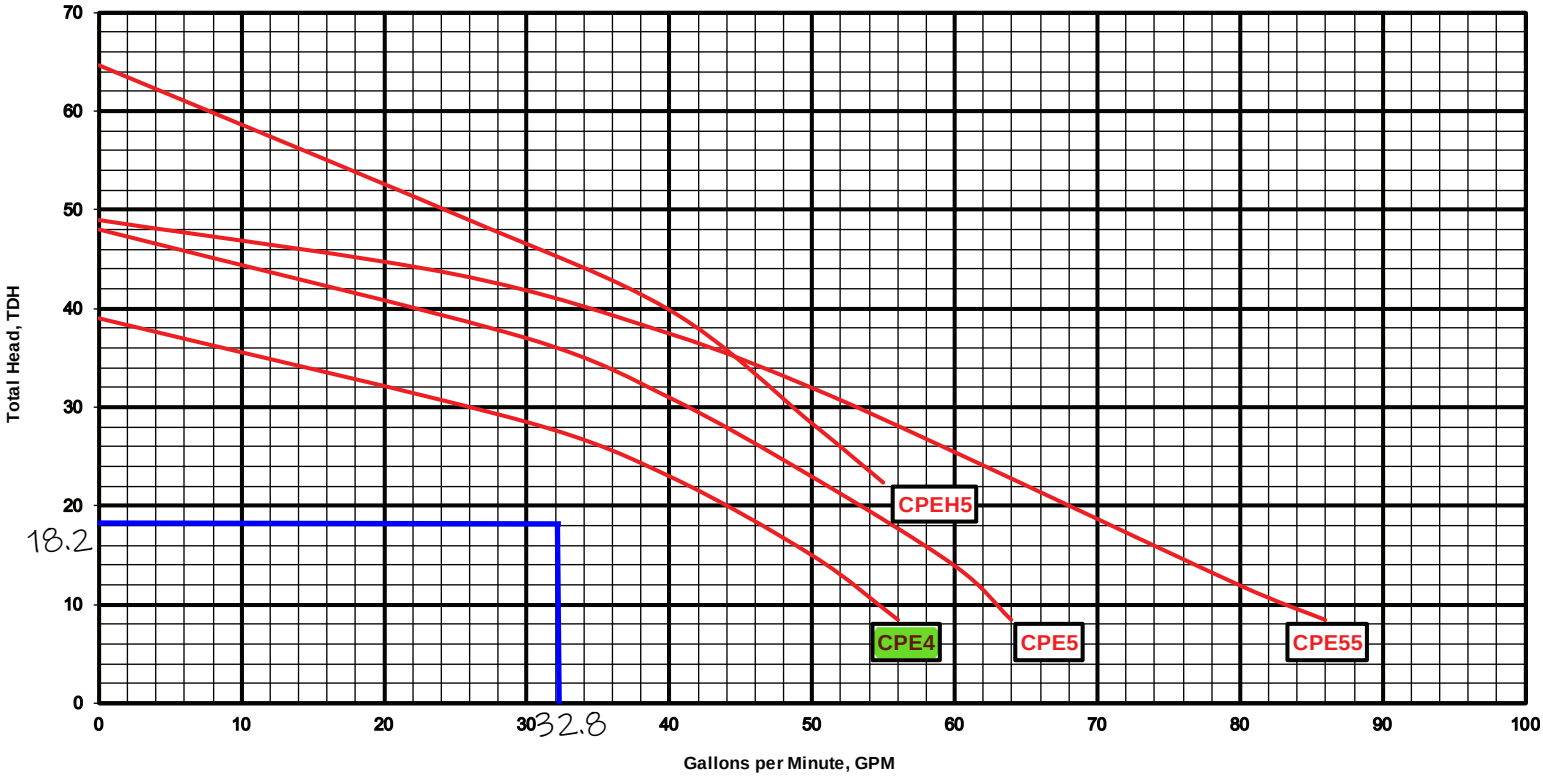
APPLICATIONS
Dewatering, septic systems, residential and commercial developments, elevator pits and STEP systems

Vertical Float

Wide-Angle Float

4/10-1/2 HP submersible pumps that handle up to 3/4" solids with 2" discharge

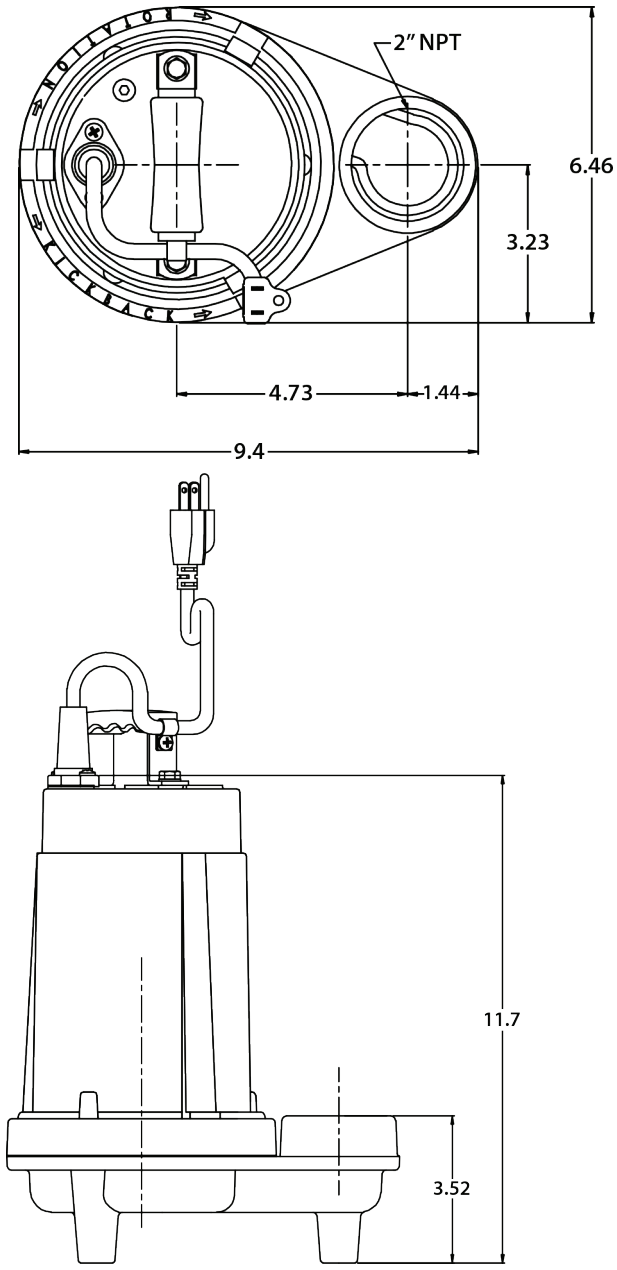
PERFORMANCE CURVE



Champion Pump Company, Inc • P.O. Box 528 • Ashland, OH 44805
Phone 419-281-4500 • Fax 419-616-1100 • www.championpump.com

TECHNICAL DATA

DISCHARGE	2" NPT. vertical standard
LIQUID TEMPERATURE	140 Degrees F. (Intermittent)
MOTOR HOUSING	Cast Iron
VOLUTE	Cast Iron
SEAL PLATE	Cast Iron
IMPELLER	Cast Iron / Vortex (CPEH thermoplastic vortex)
SOLIDS HANDLING	3/4"
SHAFT	Stainless Steel
SHAFT SEAL (SINGLE SEAL)	Inboard mechanical with secondary exclusion V-Seal, carbon rotating face, ceramic stationary face, Buna-N elastomer, 300 series stainless steel hardware
BEARINGS (UPPER & LOWER)	Single row, ball, oil lubricated
HARDWARE	300 Series stainless steel
O-RINGS	Buna-N
CORD	20' Length standard. Up to 100' available. (UL/CUL) Listed 16 AWG, Type SJTW
MOTOR (SINGLE PHASE)	4/10-1/2 HP 3450 RPM, 60 Hz, NEMA L Includes Overload Protection in the motor, oil filled, class B permanent split capacitor
WEIGHT	37 lbs. (Manual)



MODEL(S) INFORMATION

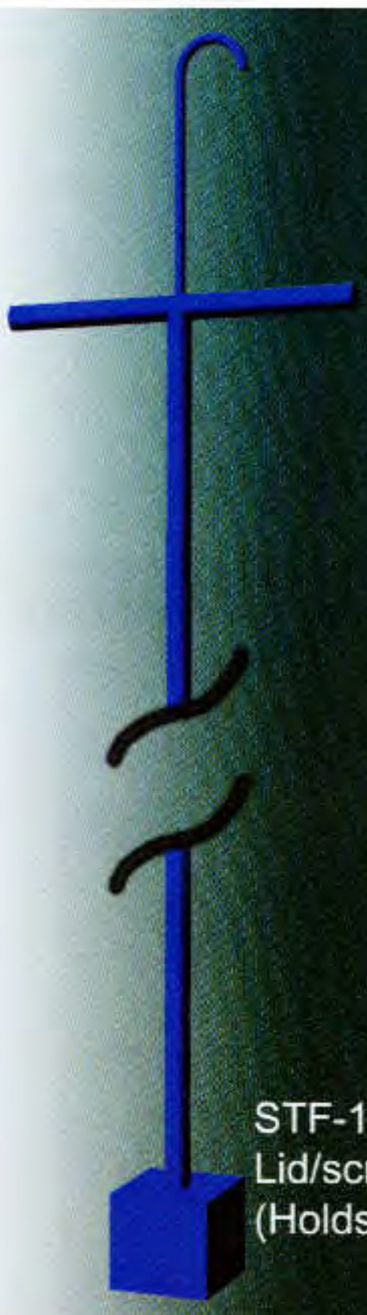
MODEL	HP	VOLTS	PHASE	AMPS	CORD LENGTH	SWITCH
CPE4-12 / CPE5-12 / CPE55-12 /CPEH5-12	4/10 - 1/2	115	1	6.6 / 8.5 / 10.5 / 11.5	20'	Manual
CPE4-13 / CPE5-13 / CPE55-13 / CPEH5-13	4/10 - 1/2	115	1	6.6 / 8.5 / 10.5 / 11.5	30'	Manual
CPE4-15 / CPE5-15 / CPE55-15 / CPEH5-15	4/10 - 1/2	115	1	6.6 / 8.5 / 10.5 / 11.5	50'	Manual
CPE4A-12 / CPE5A-12 / CPE55A-12 / CPEH5A-12	4/10 - 1/2	115	1	6.6 / 8.5 / 10.5 / 11.5	20'	Wide-Angle Float
CPE4A-13 / CPE5A-13 / CPE55A-13 / CPEH5A-13	4/10 - 1/2	115	1	6.6 / 8.5 / 10.5 / 11.5	30'	Wide-Angle Float
CPE4V-12 / CPE5V-12 / CPE55V-12 / CPEH5V-12	4/10 - 1/2	115	1	6.6 / 8.5 / 10.5 / 11.5	20'	Vertical Float
CPE4V-13 / CPE5V-13 / CPE55V-13 / CPEH5V-13	4/10 - 1/2	115	1	6.6 / 8.5 / 10.5 / 11.5	30'	Vertical Float
CPE4-22 / CPE5-22 / CPE55-22 / CPEH5-22	4/10 - 1/2	230	1	3.3 / 4.3 / 5.75 / 5.75	20'	Manual
CPE4A-22 / CPE5A-22 / CPE55A-22 / CPEH5A-22	4/10 - 1/2	230	1	3.3 / 4.3 / 5.75 / 5.75	20'	Wide-Angle Float
CPE4V-22 / CPE5V-22 / CPE55V-22 / CPEH5V-22	4/10 - 1/2	230	1	3.3 / 4.3 / 5.75 / 5.75	20'	Vertical Float

Champion Pump Company, Inc • P.O. Box 528 • Ashland, OH 44805
Phone 419-281-4500 • Fax 419-616-1100 • www.championpump.com

Essential Components for Pressurized Systems

SIM/TECH offers many performance products engineered to protect effluent treatment systems and prevent costly repairs. From our pressurized filter, to the best orifice shield in the industry, we keep your systems performing at 100% efficiency.

Sometimes the simplest ideas are the best, so depend on a time proven leader.... protecting effluent treatment systems is our busines - SIM/TECH Filter.



STF-103
Lid/screen removal wrench.
(Holds lid after removal)

STF-107
Alert w/latching light

STF-101 Pressure switch

STF-100
Pressure filter

pump chamber
(dosing tank)

septic tank

STF-100 Sim/Tech Filter

Pressure system filter - molded in tough PVC plastic, with installed stainless steel screen.

Installs easily onto effluent pump in holding tank. The vortex scrubbing action helps keep the filter clean.

The last line of defense before the laterals.

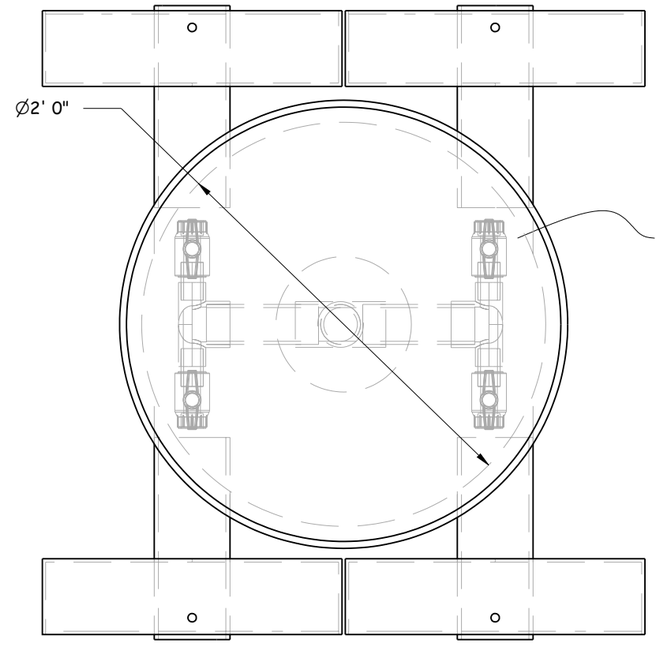
STF-102 Filter Screen
STF-104 Filter Sock

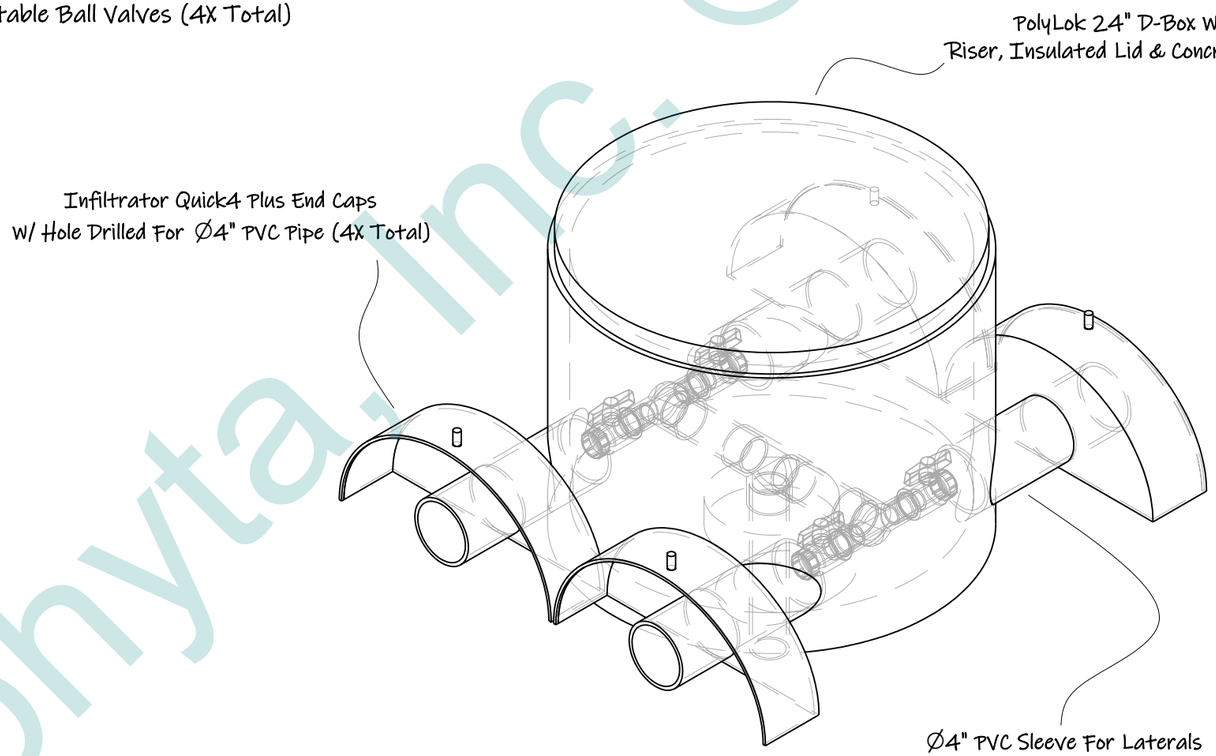
Optional filter socks can lower the acceptable TSS size from .023 inches to .0039 inches, depending on the application.

Our standard stainless steel screen will filter .062" in diameter. (1/16 o an inch)

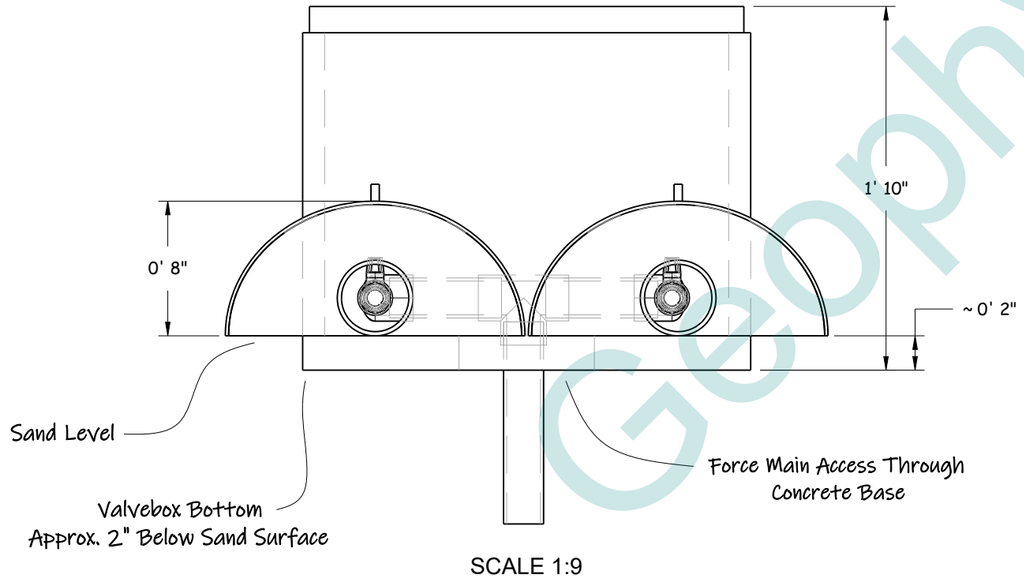
Socks easily install inside stainless steel screen.

DESIGNER: SETH V. LAYNE, GEOPHYTA INC. 19.MAY.22





SCALE 1:9



SCALE 1:9

SEE BILL OF MATERIALS FOR ALL PIPE FITTINGS SIZING

Mid-Mound Dual Lateral Valvebox

INFILTRATOR
water technologies

Quick4 PLUS CHAMBER SYSTEMS

The Quick4® Plus Equalizer 36 Low Profile (LP) Chamber

Quick4 Plus™ Series

The Quick4 Plus Equalizer 36 Low Profile (LP) offers maximum strength through its two center structural columns. This chamber can be installed in a 24-inch-wide trench. It is 4 inches shorter in height than other Equalizer 36 model chambers, allowing for shallower installation. Like the original line of Quick4 chambers, it offers advanced contouring capability with its Contour Swivel Connection™, which permits turns up to 15°, right or left. The Quick4 Plus All-in-One 8 and Quick4 Plus Endcaps provide increased flexibility in system design and configurations.

Maximum Strength

Quick4 Plus Equalizer 36 LP Chamber Specifications

Size 22”W x 53”L x 8”H (559 mm x 1346 mm x 203 mm)
Effective Length 48” (1219 mm)
Louver Height 6.3” (160 mm)
Storage Capacity 20 gal (76 L)
Invert Height 3.3” (84 mm), 9.6” (244 mm)

Quick4 Plus Equalizer 36 Low Profile (LP) Chamber Benefits:

- Low profile design makes this chamber ideal for shallow applications
- Reduces imported fill needed for cap and fill systems
- Two center structural columns offer superior strength
- Advanced contouring connections
- Latching mechanism allows for quick installation
- Four-foot chamber lengths are easy to handle and install
- Supports wheel loads of 16,000 lbs/axle with 12” of cover

Quick4 Plus All-in-One Periscope Benefits:

- Allows for raised invert installations
- 180° directional inletting
- 12” raised invert is ideal for serial applications

Quick4 Plus All-in-One 8 Endcap Benefits:

- May be used at the end of chamber row for an inlet/outlet or can be installed mid-trench
- Mid-trench connection feature allows center feed inletting of chamber rows
- Center-feed connection allows for easy installation of serial distribution systems
- Variable pipe connection options allow for side, end or top inletting
- Piping drill points are set for gravity or pressure pipe

Quick4 Plus Endcap Benefits:

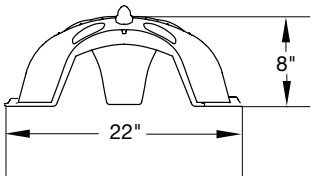
- Simple, flat design
- Allows installation of a pipe from the end only
- Piping drill points are set for gravity or pressure pipe

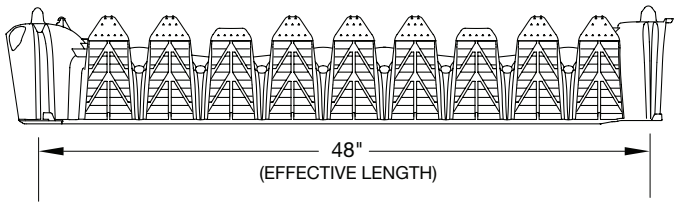
Certified by the International Association of Plumbing and Mechanical Officials (IAPMO)

IAPMO R&T

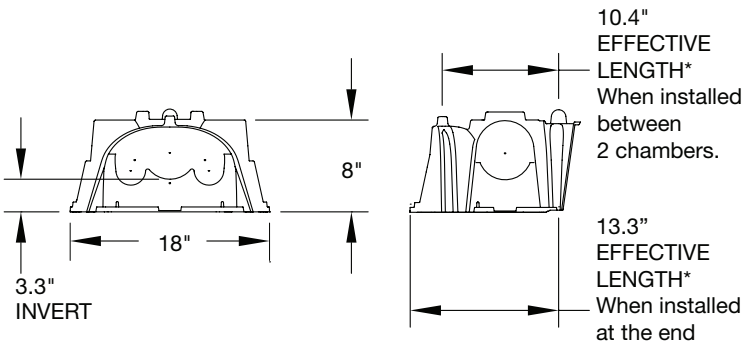
APPROVED in _____

Quick4 Plus Equalizer 36 Low Profile Chamber

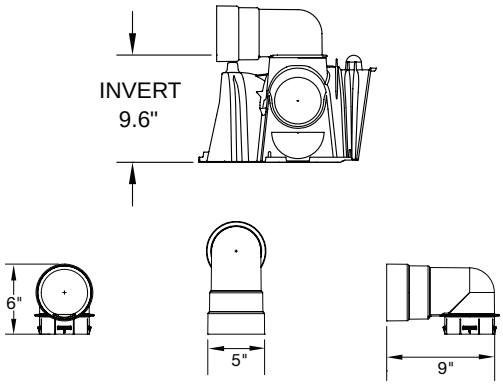




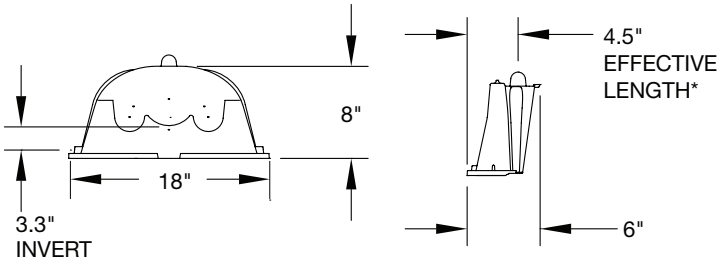
Quick4 Plus All-in-One 8 Endcap



Quick4 Plus All-in-One Periscope



Quick4 Plus Endcap



INFILTRATOR WATER TECHNOLOGIES STANDARD LIMITED WARRANTY

(a) The structural integrity of each chamber, endcap and other accessory manufactured by Infiltrator ("Units"), when installed and operated in a leachfield of an onsite septic system in accordance with Infiltrator's instructions, is warranted to the original purchaser ("Holder") against defective materials and workmanship for one year from the date that the septic permit is issued for the septic system containing the Units; provided, however, that if a septic permit is not required by applicable law, the warranty period will begin upon the date that installation of the septic system commences. To exercise its warranty rights, Holder must notify Infiltrator in writing at its Corporate Headquarters in Old Saybrook, Connecticut within fifteen (15) days of the alleged defect. Infiltrator will supply replacement Units for Units determined by Infiltrator to be covered by this Limited Warranty. Infiltrator's liability specifically excludes the cost of removal and/or installation of the Units.

(b) THE LIMITED WARRANTY AND REMEDIES IN SUBPARAGRAPH (a) ARE EXCLUSIVE. THERE ARE NO OTHER WARRANTIES WITH RESPECT TO THE UNITS, INCLUDING NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE

(c) This Limited Warranty shall be void if any part of the chamber system is manufactured by anyone other than Infiltrator. The Limited Warranty does not extend to incidental, consequential, special or indirect damages. Infiltrator shall not be liable for penalties or liquidated damages, including loss of production and profits, labor and materials, overhead costs, or other losses or expenses incurred by the Holder or any third party. Specifically excluded from Limited Warranty coverage are damage to the Units due to ordinary wear and tear, alteration, accident, misuse, abuse or neglect of the Units; the Units being subjected to vehicle traffic or other conditions which are not permitted by the installation instructions; failure to maintain the minimum ground covers set forth in the installation instructions; the placement of improper materials into the system containing the Units; failure of the Units or the septic system due to improper siting or improper sizing, excessive water usage, improper grease disposal, or improper operation; or any other event not caused by Infiltrator. This Limited Warranty shall be void if the Holder fails to comply with all of the terms set forth in this Limited Warranty. Further, in no event shall Infiltrator be responsible for any loss or damage to the Holder, the Units, or any third party resulting from installation or shipment, or from any product liability claims of Holder or any third party. For this Limited Warranty to apply, the Units must be installed in accordance with all site conditions required by state and local codes; all other applicable laws; and Infiltrator's installation instructions.

(d) No representative of Infiltrator has the authority to change or extend this Limited Warranty. No warranty applies to any party other than the original Holder.

The above represents the Standard Limited Warranty offered by Infiltrator. A limited number of states and counties have different warranty requirements. Any purchaser of Units should contact Infiltrator's Corporate Headquarters in Old Saybrook, Connecticut, prior to such purchase, to obtain a copy of the applicable warranty, and should carefully read that warranty prior to the purchase of Units.

INFILTRATOR
water technologies

4 Business Park Road
P.O. Box 768
Old Saybrook, CT 06475
860-577-7000 • Fax 860-577-7001
1-800-221-4436
www.infiltratorwater.com
info@infiltratorwater.com

Contact Infiltrator Water Technologies' Technical Services Department for assistance at 1-800-221-4436

Sim/Tech Filter
1455 Lexamar Drive
Boyne City, MI 49712
Office: 231-582-1020

Website: www.gag-simtech.com
Email: sales@gag-simtech.com
Fax: 231-582-7324
Toll Free: 888-999-3290

Orifice Shields

Why Use Orifice Shields?

Sim/Tech Filter orifice shields are designed to protect the discharge holes in pressurized systems from the outside. Most of these systems are designed with specific flow-rates, pressure heads, etc. to obtain "even distribution" in the drain field and thus allow for proper treatment. Much like our pressure filter prevents debris from obstructing the discharge holes from the inside, our orifice shields prevent blockage on the outside. As shown in the top picture to the left, drain media can block the small discharge holes, throwing the whole design and operation of a system out of whack. The bottom picture to the left shows our standard orifice shield installed on the lateral piping of a system. The orifice shield creates a protective void between the drain media and the discharge hole. The design allows the discharge hole to spray effluent into the shield where the much larger open area of the shield keeps the hole discharging at its designed flow rate.

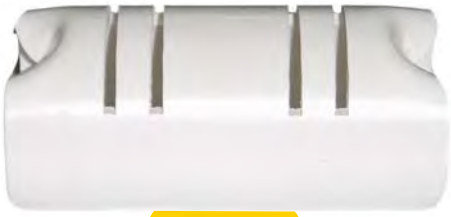
Why Use Sim/Tech Filter Orifice Shields?

They have a large open area, 9 inches of gripping surface and a simple, but very effective design. The large open area of the interior of the shield prevents it from becoming easily blocked if you are not using a Sim/Tech pressure filter on your system. There is also a large open area for allowing effluent to drain from the shield. There are various slots depending upon the configuration you desire and both ends of the shield also have open area for drainage.

Styles and Sizes Available

Sim/Tech Filter currently offers two orifice shield designs. The STF-106D is designed for systems that have discharge holes that point down. The STF-106TDS is designed for systems that have discharge holes that point up. Both versions of the Sim/Tech Filter orifice shield are available in four different sizes to fit the pipe sizes 3/4", 1", 1-1/4" & 1-1/2" and 2". A 3" size is also available as a special custom order.

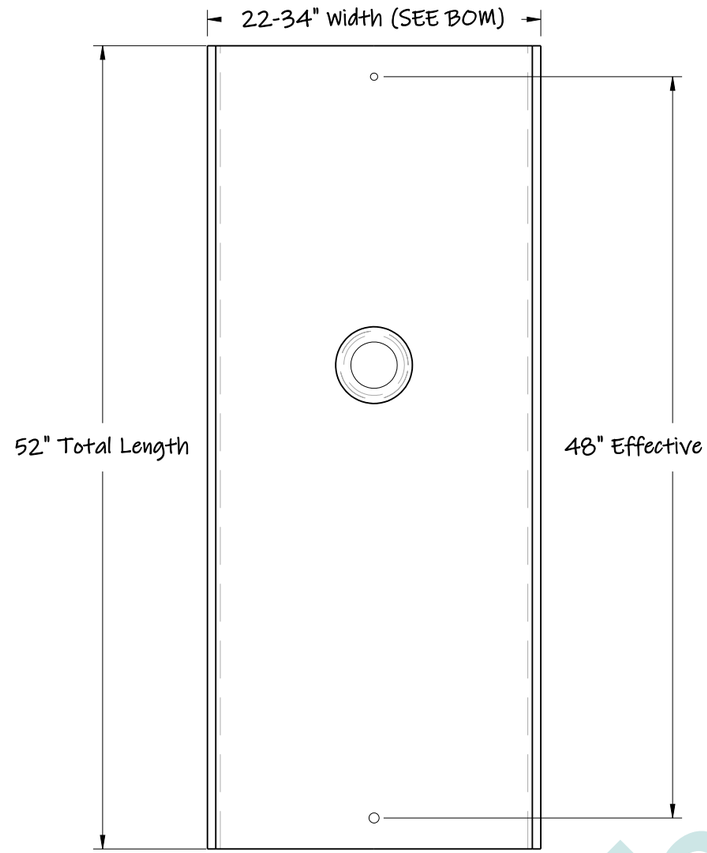
US Patent 6,167,914

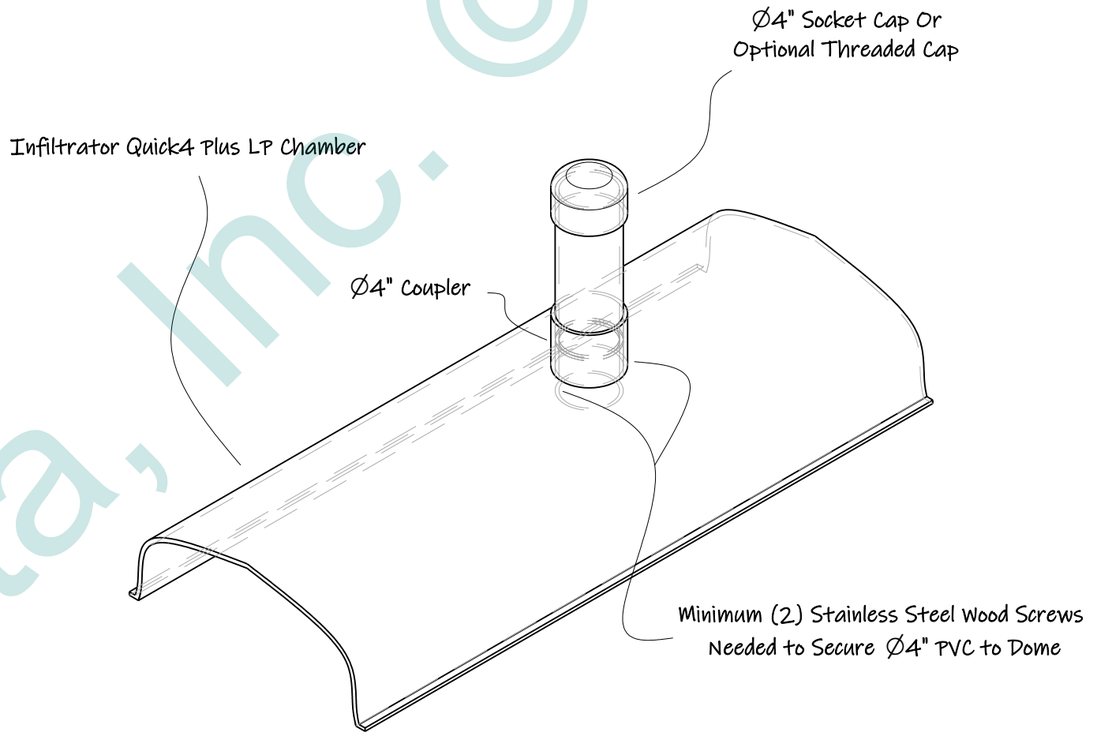


STF-106D

STF-106TDS

DESIGNER: SETH V. LAYNE, GEOPHYTA INC. 17.MAY.22





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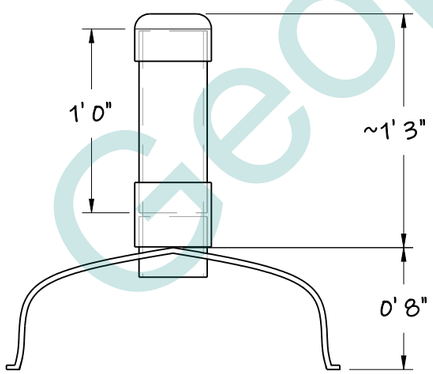
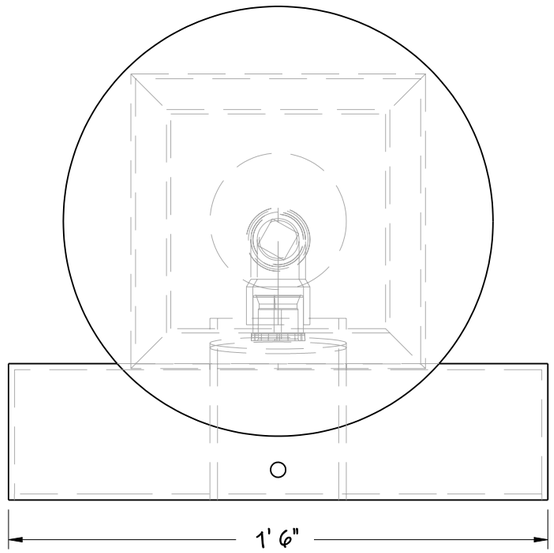


SCALE 1:10

Sand Inspection Port For
Engineered Sand Mounds

DESIGNER: SETH V. LAYNE, GEOPHYTA INC. 17.MAY.22



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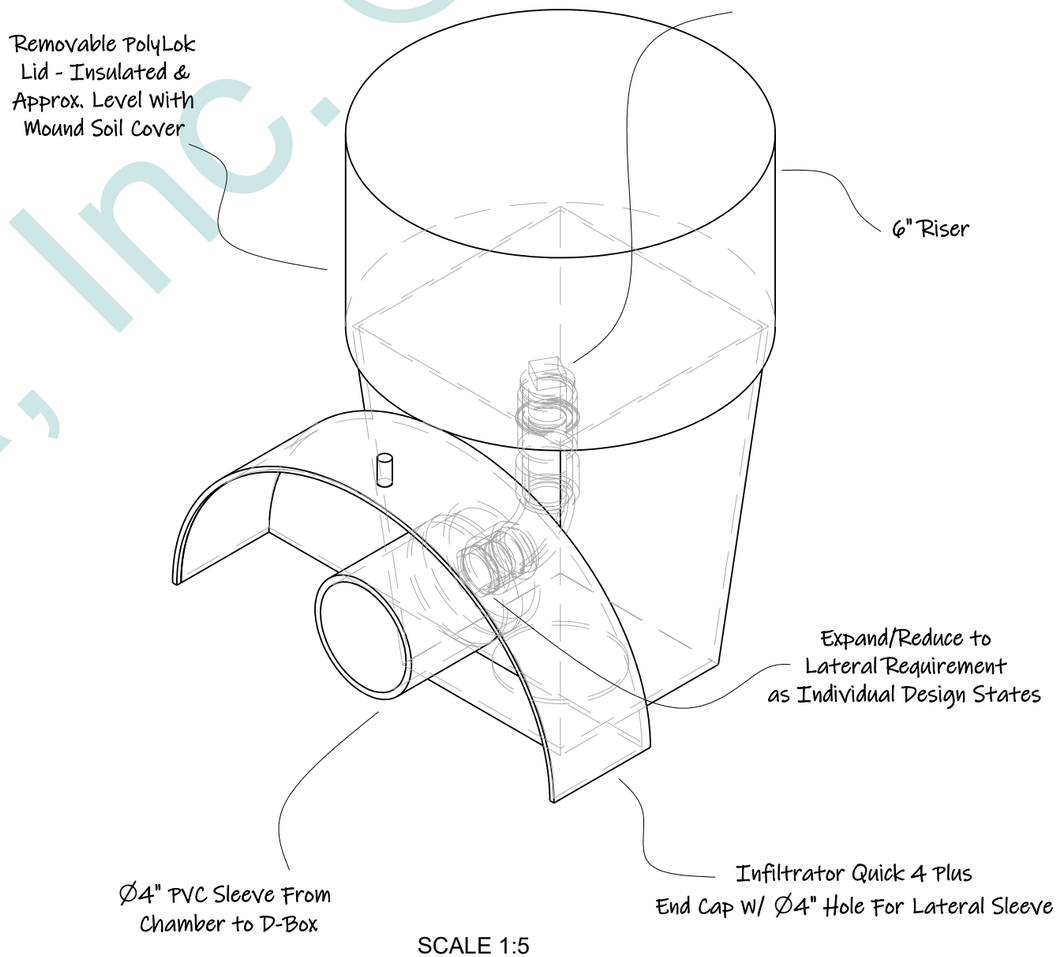

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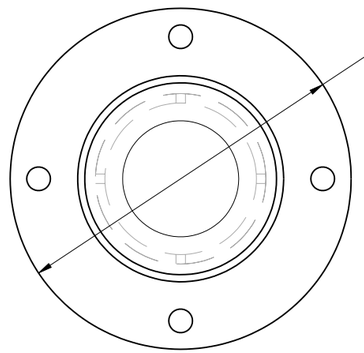
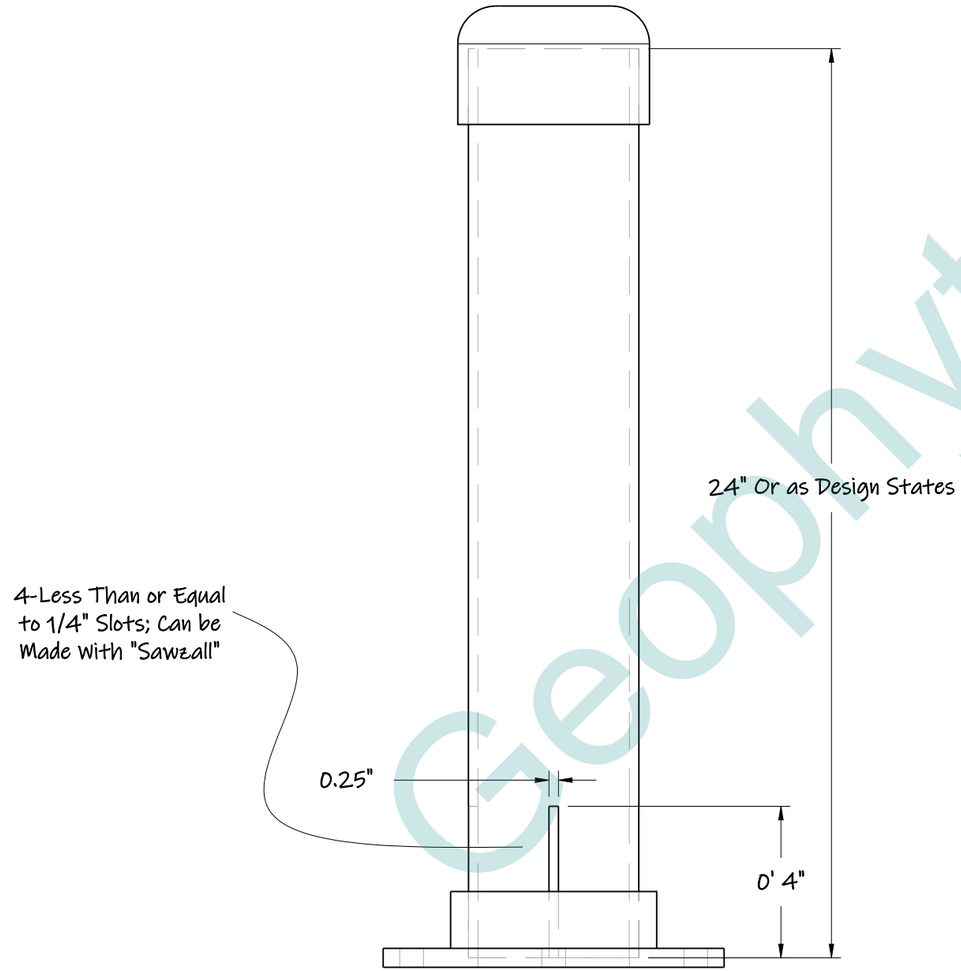
Lateral Cleanout & Inspection Port For Engineered Sand Mounds

DESIGNER: SETH V. LAYNE, GEOPHYTA INC. 17.MAY.22





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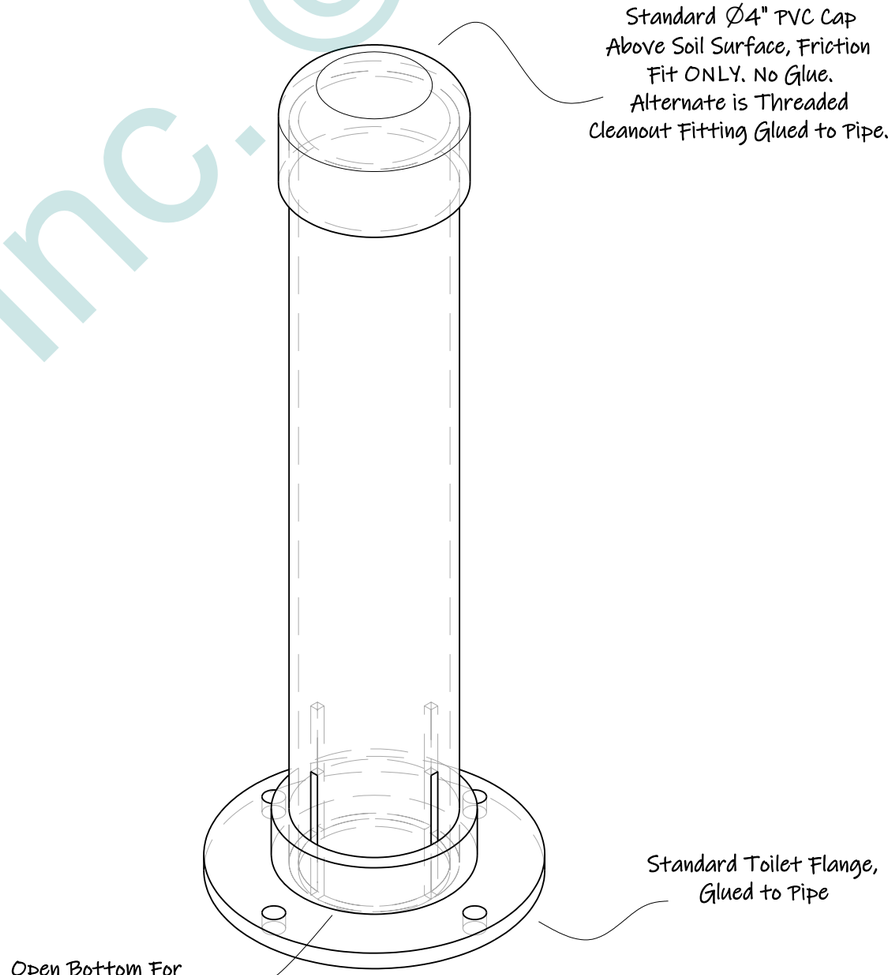

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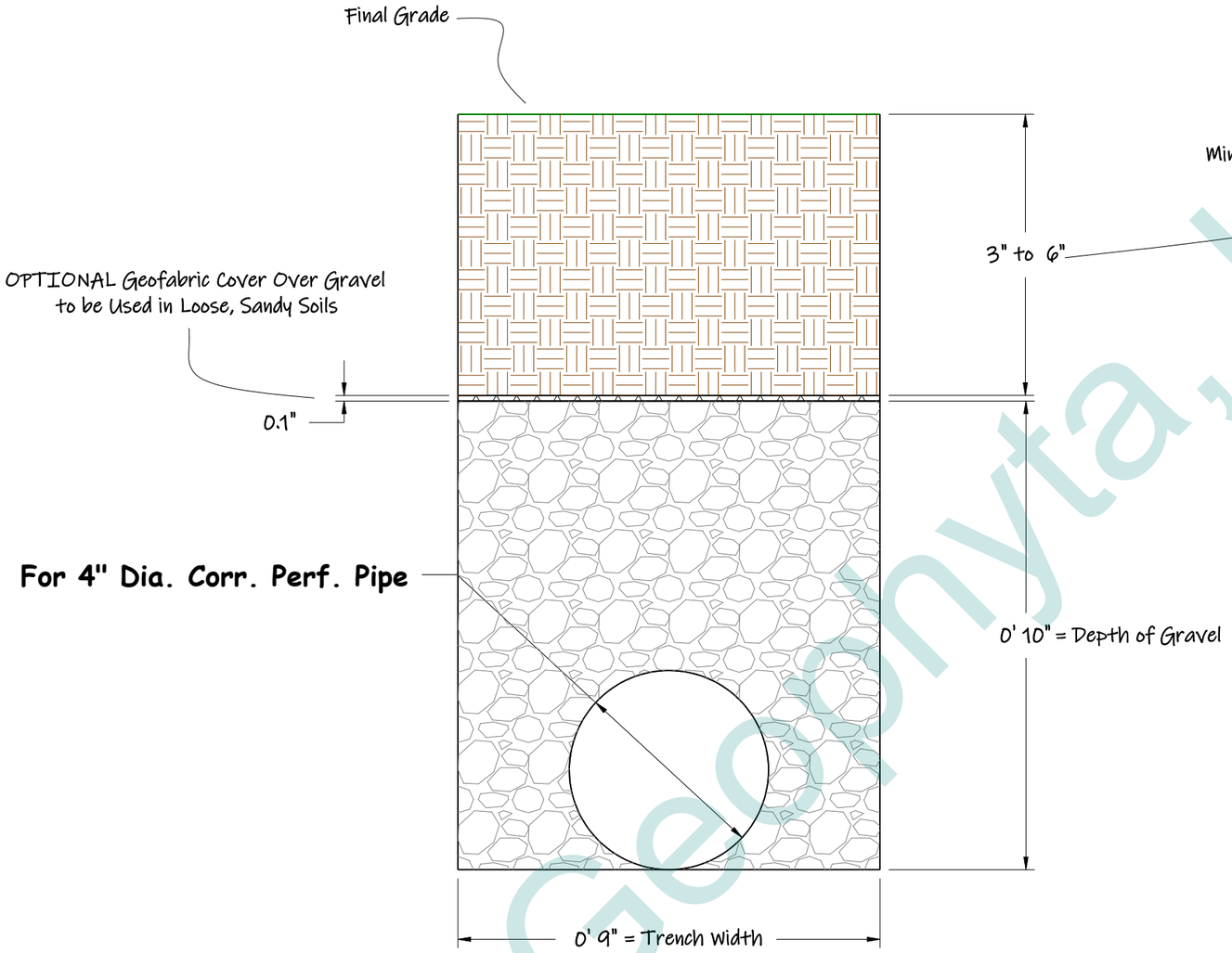
Sand/Soil Inspection Port

DESIGNER: SETH V. LAYNE, GEOPHYTA INC. 23.MAY.22



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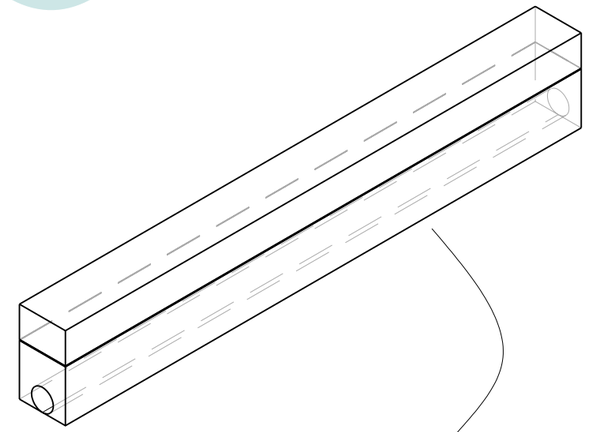
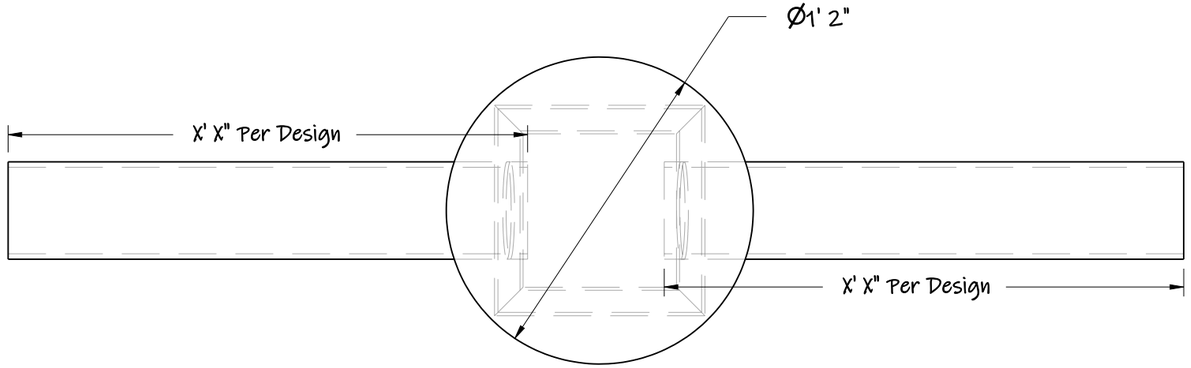


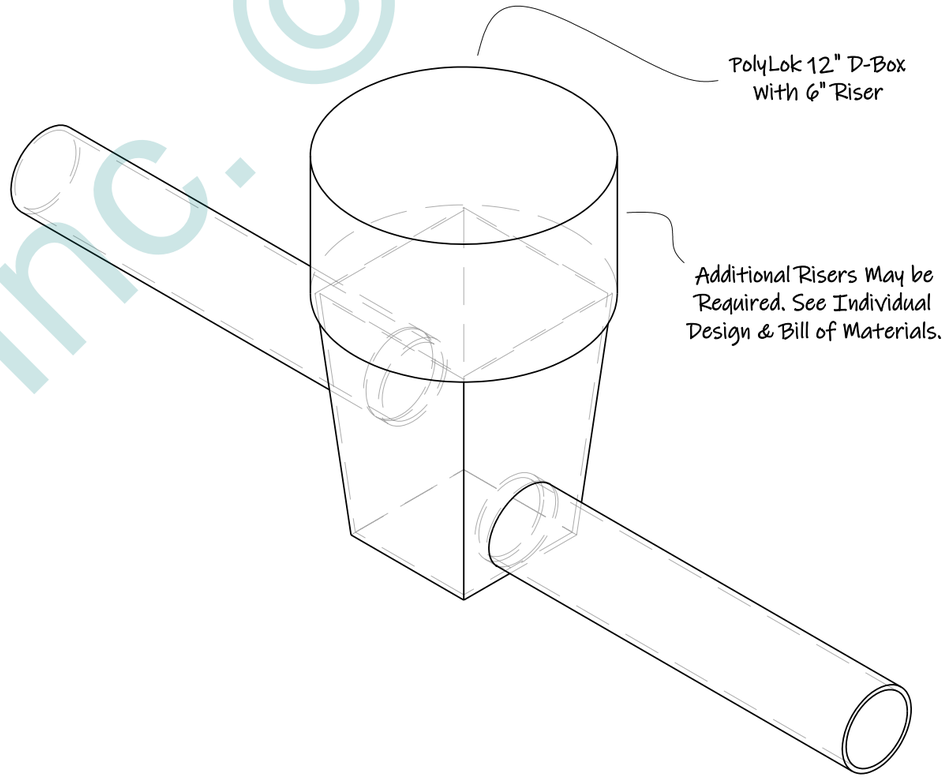
Trench Bottom Minimum Slope =
1.2" Per 100' or 0.1%

INSTALLER MUST RECORD ACTUAL TRENCH DIMENSIONS & COMPONENTS ON AS-BUILT DRAWINGS SUBMITTED TO HEALTH DEPARTMENT

Trencher Dug Interceptor, Perimeter &
Engineered Drain With 10 Inch Deep Gravel

DESIGNER: SETH V. LAYNE, GEOPHYTA INC. 18.MAY.22





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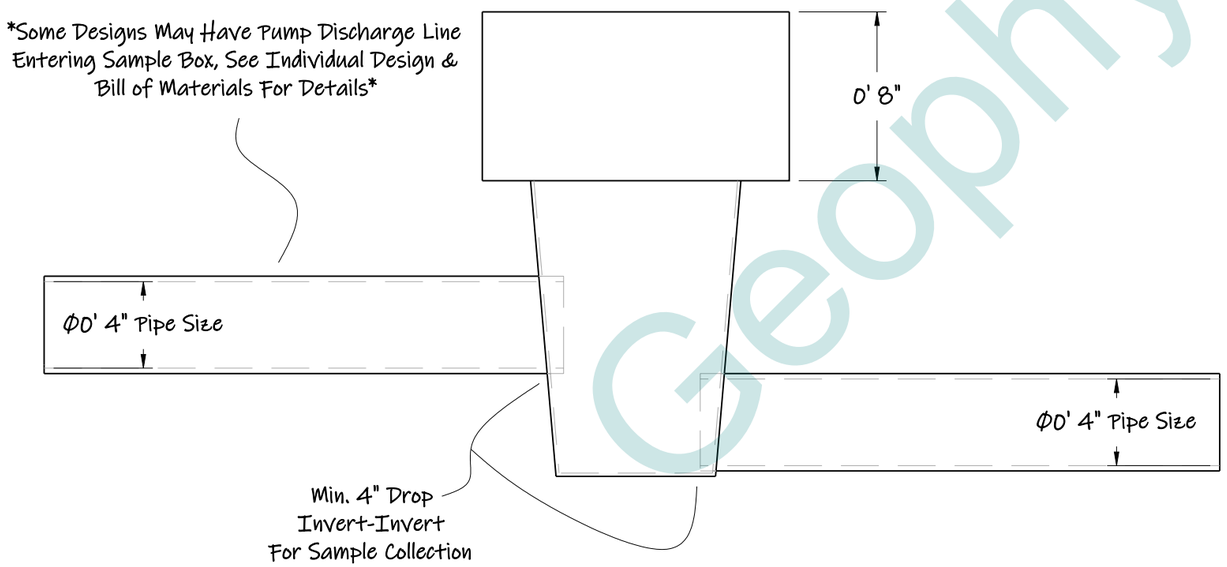

Free-Falling Sample Port/Box

Bill of Materials - 11133 W. T.R. 112, HSTS Replacement - Engineered Sand Mound W/ 2 Foot Wide Diffusers & Perimeter Drain

Quantity	Part Name	Section	Comment
1	SCH40 PVC Ø4 inch Two-Way Cleanout Tee	Sewer Main Replaced to Foundation Total Length of Pipe = ~50' MUST BE SCH40 PVC	Two-Way Cleanout (Tee)
1	SCH40 PVC Ø4 inch pipe 2 ft. Long		Two-Way Cleanout (Tee to Cap)
1	SCH40 PVC Ø4 inch Cap		Two-Way Cleanout (Cap)
3	SCH40 PVC Ø4 inch Coupler		See Design
2	SCH40 PVC Ø4 inch 45 Degree Ell		
2	SCH40 PVC Ø4 inch pipe 5 ft. Long		
4	SCH40 PVC Ø4 inch pipe 10 ft. Long		
1	SCH40 PVC Ø6 inch pipe 10 ft. Long		Sleeved & Sealed Crossing UG Electric Supply & LP Supply
1	Septic Tank	Septic Tank	Spoerr 2000gal Septic Tank or Equiv. W/ 12" Risers
1	Septic Tank Filter		Polylok PL-122 or Equiv. (See Detail Print)
1	SCH40 PVC Ø4 inch pipe 1 ft. Long	Septic To Dose	Length May Vary
1	SCH40 PVC Ø4 inch Coupler		
1	Dose Tank	Dose Tank	Spoerr 1500gal Dose Tank or Equiv. W/ 12" Riser
1	*Control Panel For Pump Float Control, Timer & Alarms*	Control Panel	Ohio Electric ECP-TD-11 (See Detail Print)
~50 ft.	2 conductor w/ground, 14 gauge UG wire	Dose Pump Assembly	Pump Circuit; Standalone Breaker
~50 ft.	2 conductor w/ground, 14 gauge UG wire		Alarm Circuit, Added To House Lighting Breaker
~50 ft.	Plastic conduit, to contain 6-14ga		Pump & Alarm Circuit
1	Effluent Pump Ø2 inch NPT 0.4HP		Champion CPE4-12 or Equiv.
1	Pressure Filter		Simtech Pressure Filter (See Detail Print)
1	SCH40 PVC Ø2 inch pipe 1ft. Long W/ Ø1/4" Weephole		Ø1/4 inch Drainback Hole Required
2	SCH40 PVC Ø2 inch 90 Degree Elbow		See Tank Assembly Print
1	SCH40 PVC Ø2 inch pipe 47 inch Long		
1	SCH40 PVC Ø1 inch pipe 6 ft. Long as Float Tree		
1	SCH40 PVC Ø2 inch Adapter MNPT to Socket		
1	SCH40 PVC Ø2 inch Union SxS		
2	SCH40 PVC Ø2 inch pipe 3 inch Long		
1	SCH40 PVC Ø2 inch pipe 6.5 inch Long		
10	SCH40 PVC Ø2 inch Coupler	Force Main to Mid-Mound Valvebox Total Length of Pipe = ~110' MUST BE SCH40 PVC	See Design
2	SCH40 PVC Ø2 inch 45 Degree Elbow		
1	SCH40 PVC Ø2 inch 90 Degree Elbow		
2	SCH40 PVC Ø2 inch pipe 5 ft. Long		
10	SCH40 PVC Ø2 inch pipe 10 ft. Long		
1	SCH40 PVC Ø2 inch pipe 2 ft. Long	Force Main to Mid-Mound Valvebox	See Valvebox Print
4	SCH40 PVC Ø1 inch Ball Valve	Mid-Mound Valvebox	
2	SCH40 PVC Ø1 inch x Ø1 inch x Ø2 inch Tee		
4	SCH40 PVC Ø4 inch pipe 1 ft. Long		
4	Infiltrator Quick4 Plus End Cap Modified For Mound Valvebox		
1	PolyLok Ø24" Riser & Pan Plus Concrete Base Valvebox Ø20" With Insulated Lid		
1	SCH40 PVC Ø2 inch Tee		
4	SCH40 PVC Ø1 inch pipe 2.5 inch Long		
2	SCH40 PVC Ø2 inch pipe 6.5 inch Long		

-	Sand Section 3.67 ft. W. x 129 ft. L. x 6.0 inch H. Basal 10.67 ft. W.	Engineered Sand Mound	~44.0 yd.³ @ 77.0 Tons (ASTM C-33 Natural Sand)
-	Topsoil Cap 142.5 ft. L. x 13.5 ft. W. x 2.17 ft. H.		~37.0 yd.³ @ 64.75 Tons (Silt Loam Or Better)
64	Infiltrator 4 ft. L. x 2 ft. W. x 8 inch H. LP Chambers		Infiltrator Quick4 Plus Equalizer 36 Low Profile Chambers
4	Orifice Protectors	Laterals	STF -106D (See Detail Print)
4	SCH40 PVC Ø1inch 64' L. Ø1/8" Orifices 3' 3" Spacing W/ End Weephole		See Mound Laterals Details Print
4	Infiltrator Quick4 Plus End Cap Modified For Mound Lateral	Lateral 90 Degree Turns	Lateral Sleeve *See Mound Detail Print*
4	SCH40 PVC Ø4 inch 45 Degree Elbow		
5	SCH40 PVC Ø4 inch pipe 9 inch Long		
1	SCH40 PVC Ø4 inch pipe 2.5 ft. Long		
4	SCH40 PVC Ø1 inch Coupler		
4	SCH40 PVC Ø1 inch pipe 45 Degree Elbow		No Orifices Drilled in This Section
2	SCH40 PVC Ø1 inch pipe 8 inch Long		
3	SCH40 PVC Ø1 inch pipe 1 ft. Long		
1	SCH40 PVC Ø1 inch pipe 2.5 ft. Long		
4	SCH40 PVC Ø4 inch Cap	Sand Inspection Port	See Sand Inspection Port Print
4	SCH40 PVC Ø4 inch Coupler		
4	SCH40 PVC Ø4 inch pipe 1 ft. Long		
4	SCH40 PVC Ø4 inch pipe 4 inch Long		
2	SCH40 PVC Ø4 inch Cap	Soil Inspection Port	See Soil Inspection Port Print
2	SCH40 PVC Ø4 inch Toilet Flange Socket		
2	SCH40 PVC Ø4 inch Sand Observation Tube 24inch With Slots		
4	SCH40 PVC Ø4 inch pipe 6 inch Long	Lateral Cleanout & Inspection Ports	See Detailed Print
4	SCH40 PVC Ø1.25 inch pipe 3 inch Long		
4	Infiltrator Quick4 Plus End Cap Modified For Mound Cleanout Port		
4	SCH40 PVC Ø1.25 inch x Ø1 inch Bushing Reducer		
4	SCH40 PVC Ø1.25 inch FIPT Coupler		
4	SCH40 PVC Ø1.25 inch 90 Degree Long Sweep		
4	PolyLok Ø12" D-Box With (1) Riser With Insulated Lid Adapted For Mound Cleanout Port		
4	SCH40 PVC Ø1.25 inch MIPT Plug		
-	Corrugated Perforated Ø4". Pipe 262 ft. Long	Perimeter Drain	See Detail Print
-	Trench Drain 262' L. x 9" W. x 10" Deep Gravel		~5.0 yd.^3 @ 6.65 Tons #57 Washed Stone
-	Corrugated Solid Ø4" Pipe 195 ft. Long	Perimeter Drain Discharge	Break Surface Downslope
1	PolyLok Ø12" D-Box With (1) Riser For Sample Box		

Additional Notes

Mound Area to be Scarified According to OSU Mound Systems for Onsite Wastewater Treatment Bulletin 813.

Pump, Crush & Backfill Old Tank.

Installer Please Trace Sewer Main Back to Foundation. Could Not Verify During Evaluation of Exit Location. Please Note, LP Supply & UG Electric Cross to House.

-	Grass Seed	2 lbs./1000 ft.^2 K. Bluegrass	~2000 ft.^2 @ 4.0 lbs.
-	Straw Mulch For Grass Establishment	Homeowner's Choice	~2000 ft.^2
-	Grass Establishment Fertilizer	10 lbs. 20-10-10/1000 ft.^2	~2000 ft.^2 @ 20.0 lbs.

Call OUPS before you dig.

Installer substitution of materials not specified in this Bill Of Materials may void Health Dept. approval of this design and will result in a re-design fee and is the sole responsibility of the installer.

Design Prints Take Precedence Over This Bill of Materials. This is a best estimate of materials required and is provided as a convenience to installers. This BOM is not required for design approval.

Operation and Maintenance Procedures

Home Septic Treatment Systems With Effluent Distribution Through A Sand Mound

Home septic treatment systems are biologically based systems. They rely on both anaerobic and aerobic microorganisms to process human waste. These systems utilize processing, storage, and pumping tanks. A sand/soil absorption component, the mound, also processes, treats, and disperses septic effluent. Any abuse of this biological treatment system will result in less efficient sewage treatment and early failure of your new system.

Improper operation and/or maintenance of your home septic treatment system will result in its failure.

Geophyta, Inc. strongly recommends that a homeowner hire a professional service provider to inspect and maintain your system. Your county health department has a list of registered service providers. Make sure that your service provider has "mound system" experience.

1) **Homeowner Responsibility:**
   a) The system owner is responsible for the continuous operation and maintenance of this home septic treatment system
   b) Your county health department may require third-party inspection and maintenance of your home septic treatment system.
   c) Home Interior Design & Appliance Selection:
      i) Install water conserving fixtures such as low flow shower heads, low flow toilets, and front loading washers.
      ii) Space out water use throughout the day and week. Avoid doing all laundry in one day.
      iii) Repair all water leaking fixtures.
      iv) Eliminate garbage disposals, or limit their use. Collect food scraps with sink strainers for disposal as trash or for composting; this includes coffee grounds.
      v) DO NOT pipe sump pump output into your sewer line.
   d) Home Landscaping Limitations:
      i) Do not pipe roof downspouts or any other rainwater drainage into the septic or dose tanks.
      ii) Divert all downspouts or other rainwater drainage away from your entire septic system.
      iii) Divert all downspouts or other rainwater drainage away from the sand/soil mound area.
      iv) Do not drive or park cars, boats, heavy equipment, or other vehicles on or near septic system tanks and sand/soil mounds.

v) Do not add additional soil fill on or near the sand/soil mound. This will limit air movement into the mound for effluent treatment and may cause system failure.
vi) Limit lawnmower traffic on the mound when soil is excessively wet.
vii) Do not plant any deep rooted plants on top of or near your mound sand/soil absorption area.

e) Home Resident Responsibilities:
i) Only flush or drain bio-degradable human waste, toilet paper, laundry and dish and personal care soaps, and water into your home septic treatment system.
ii) Severely limit disposal of food fats, oils, and greases. These will clog your system.
iii) Do not flush or drain undiluted bleach, cleansers, or drain cleaners.
iv) Do not flush any non-biodegradable items. For example, plastic items.
v) Do not flush or drain motor oils, greases, anti-freezes, cleaners, etc.
vi) Do not flush cat litter.
vii) Do not flush paper towels, facial tissue, cigarette butts, disposable diapers, sanitary napkins, tampons, or condoms.
viii) Do not flush prescription or over-the-counter drugs. Antibiotics and cancer treatment drugs are very harmful to your home septic treatment system.
ix) Do not dump solvents like dry cleaning fluid, pesticides, photographic chemicals, paint thinner down the drain.
x) Don't use septic tank additives.
xi) Don't drain a hot tub or large amounts of water into your septic system.

f) Home Improvement/Expansion:
i) Contact your county sanitarian before adding new driveways, decks, patios, pools, and outbuildings not identified on your original layout plan to make sure all setback distances from your septic system tanks and mound are met.
ii) Contact your county sanitarian before adding bedrooms and/or increasing your home occupancy. This may overload your septic system. Septic system expansion may be required to prevent failure.

g) Homeowner Cautions:
i) **DO NOT ENTER TANKS WITHOUT PROPER SAFETY EQUIPMENT.** Septic and dose tanks contain noxious and deadly gases.
ii) Pump or dose tanks and control boxes contain electrical components. **ELECTRICAL SHOCK HAZARD CAN EXIST WITH IMPROPERLY WIRED OR FAILING COMPONENTS.**
iii) Always keep tank fall guards in place, except for the time needed to replace components when safety equipment is present.
iv) Always replace and secure septic and dose tank lids after completing any inspection.
v) Any disconnection or removal of filters, screens, floats, alarms, and/or control panels will result in system failure.
vi) Contact your county sanitarian for allowed homeowner maintenance and repair of your septic system.

2) Inspection & Maintenance Requirements:

a) Perform inspection & maintenance every six months.

b) Review Baseline Operation and Maintenance Data:
   i) The installer of your system set and recorded all float/liquid level heights, pump down times, cycles per day, and distal head pressures required in the design specifications.
   ii) Review all previous six month inspection data.

c) Identify any house additions, patios, pools, ponds, driveways, outbuildings, etc. added since the last inspection that may impact the home septic treatment system. Draw a sketch of these differences.

d) Inspect bottom of house sewer main two-way cleanout tee
   i) Check for clogging.
   ii) Check for continuous clear water flows from the home.

e) Evaluate Septic Tank & Pump Tank:
   i) Measure sludge and scum depths; pump tank when cumulative thickness is 1/3 of the tank depth.
   ii) Look for signs of clogging and tank damage.
   iii) Look for signs of tank and riser leakage.
   iv) Clean & inspect septic tank outlet filter.
   v) Make sure lids are securely attached to risers.

f) Evaluate Pump/Dose Tank & Pumping Equipment:
   i) Measure sludge and scum depths; pump tank when septic tank is pumped.
   ii) Look for signs of clogging and tank damage.
   iii) Look for signs of tank and riser leakage.
   iv) Inspect and assure proper functioning of floats or other liquid level controls.
   v) Clean and inspect dose pump outlet filter. May not be present in some designs.
   vi) Inspect and assure proper condition and functioning of the effluent pump.
   vii) Make sure lids are securely attached to risers.

g) Evaluate Drain Fields:
   i) Inspect all soil and sand inspection tubes plus maintenance ports for surface condition, surface color, and depth of ponded effluent, if present.
   ii) Look for surfacing effluent.
   iii) Look for excessively moist soil at mound sides and toe slopes.
   iv) Identify appropriate vegetative cover.
   v) Look for surface disturbances, compaction, abnormal settling, and erosion.
   vi) Identify any deep rooted vegetation recently planted near the mound area.

h) Evaluate Laterals:
   i) Flush all distribution laterals, one at a time. Monitor flush output.
   ii) Record new distal head pressures for all laterals.
   iii) Perform additional lateral and orifice cleaning if lateral distal head pressures are not equal.
   iv) Adjust lateral distal head pressures if needed after additional cleaning.

i) Measure Pump Run Time and/or Drawdown:
   i) For demand dosed systems, verify original design effluent drawdown depth.

ii) For time dosed systems, verify original design pump run time.
iii) For systems with a cycle counter or run time meter, record the current values.

j) Test Alarms:
i) Evaluate proper function of low liquid level alarm.
ii) Evaluate proper function of high liquid level alarm and warning light.

3) Findings & Repairs:

a) All findings during inspection and maintenance must be recorded. See attached "Mound System Inspection and Maintenance Record".
b) Any system adjustments must be recorded.
c) Any system deficiencies, worn out components, and/or damage must be repaired to return your septic system to a properly functioning state.
d) All repairs must be recorded.

Mound System Inspection and Maintenance Record

System Owner:_____ **Inspection Date:**_____

System Address:_____ **Inspector Name:**_____

System Address:_____ **Inspector Phone Number:**_____

Septic Tank Condition:	Scum depth: Sludge depth: Filter cleaned?
Dose Tank Condition:	Sludge present?
Dose Pump Condition:	
Controls Condition:	Level controls functional? Alarm functional? Control box functional?

Mound Area Evaluation:

Landscape Changed?		Signs of Surface Ponding?		Mound Damaged?		New Construction Area?	
yes	no	yes	no	yes	no	yes	no

Soil Inspection Tubes:

	Tube 1		Tube 2	
Ponding?	yes	no	yes	no

Sand Inspection Tubes:

	Tube 1		Tube 2	
Ponding?	yes	no	yes	no

Cleanout Ports:

	Port 1		Port 2		Port 3		Port 4	
Ponding?	yes	no	yes	no	yes	no	yes	no
Pressure:		feet		feet		feet		feet

	Port 5		Port 6		Port 7		Port 8	
Ponding?	yes	no	yes	no	yes	no	yes	no
Pressure:		feet		feet		feet		feet

Comments/Sketches: