GeoMat SPLIT BED MOUND AND PRESSURE DISTRIBUTION COMPONENT DESIGN

March 2017

INSTRUCTIONS

This GeoMat Design Application (GMDA) was designed to meet most standard system designs for residential and small commercial systems up to seven bedrooms or a 1,500 gpd design flow rate. Higher flows could be used but the file has limitations that may be exceeded.

Persons familiar with mound and pressure distribution system design will find this file very helpful. Even though all calculations should be correct and a code compliant mound system would be designed it is still possible to complete a poor design for a particular site. Long and narrow designs are just about always best if the site will accommodate it and high orifice density (< 6.0 ft^2 per orifice) is highly recommended for optimal treatment performance.

This file is protected and therefore the designer may not change formulas and may not enter or change data in most cells of the worksheet. Protected cells simply will not allow you to enter data. The best way to navigate about on a sheet is to use the tab key to jump to the next unprotected cell where data can be entered. Unprotected cells are either underlined with red or are a red box. You can use the mouse to click on red boxes to enter data too but don't forget to change old data when doing a new design. Tabbing to each cell ensures that you have considered each input.

Instructions are generally in blue font and warnings are in red. Most cells where data is entered have a red triangle in the corner of a cell. These are design comments that pop up when you put the mouse cursor on it. There are also a few drop down menus for certain inputs that have limits.

Printing should always be done using the print buttons on each page or the print entire project on the index page. Using your computer's print button will likely print many pages you don't need or want. You need to accept "macros" when the file first opens in order for the print buttons to work.

A second common warning is that the dose volume is large and there is < 5 doses per day. This is fixed by reducing lateral size by choosing a central manifold, smaller orifices, or fewer orifices (i.e. greater spacing). Keep in mind that a high orifice density is good so don't spread the holes out too much.

Due to uniform surface that distribution pipe will lay on, and the desire to have more doses at a smaller volume, try to choose smaller distribution lateral diameters. This will increase wet/dry cycles, which in turn will increase oxygen transfer.

Every effort has been made to provide a file without any errors in calculations and design concepts. The user of the file assumes all responsibility for the design produced by this GMDA file.

GeoMat SPLIT BED MOUND AND PRESSURE DISTRIBUTION COMPONENT DESIGN

Residential Application

INDEX AND TITLE PAGE

All water treatment systems shall be kept out of septic system

Owner Info

Project Name:

Owner's Name:

Owner's Address:

Property Info

Property Address:

Legal Description: ____ ____ S ____ T ____ N , ____ E ____

Township ____ County:

Subdivision Name:

Lot Number: Block Number: CSM#:

Parcel I.D. Number:

Plan Transaction No.:

Index Pages

Robert Berceau License Number: D-1773

Date: 12/23/25 Phone Number: 920-819-4100

Signature:

Designer Stamp: State of Wisconsin Approval Stamp:

Designed Pursuant to the

GeoMat Mound Component Manual 5/18/22

SSWMP Publication 9.6 Design of Pressure Distribution Networks for ST-SAS (01/81) and

Pressure Distribution Component Manual Ver. 2.1

Mound and Pressure Distribution Component Design

Design Worksheet

All water treatment systems shall be kept out of septic system

Site Information

R	Residential or Commercial Design	N	ISD Required?
300.00	Estimated Wastewater Flow (gpd)		
1.50	Peaking Factor (e.g. 1.5 = 150%)		
450.00	Design Flow (gpd)		
4.00	Site Slope (%)		
100.00	Installation Contour Line Elevation (ft)		
20.00	Depth to Limiting Factor (in)		
0.60	In-situ Soil Application Rate (gpd/ft^2)		
120.00	Contour Length Available (ft)		

Designer Input Cell Length must be greater than Dispersal Cell Length

Distribution Cell Information

3.25	Cell Width (ft) 3.25 or 6.5 Only	22.50	Designer Input Cell Length (ft)
2.00	Dispersal Cell Design Loading Rate (gpd/ft^2)	34.62	Dispersal Cell Length Required (ft)
2	Influent Wastewater Quality (1 or 2)	2	Number of Cells

Cell Length Fixed by Formula

Pressure Distribution Information

E	Center or End Manifold	Are the laterals the highest point	
2	Number of Laterals	in the distribution network?	Y
16.67	Lateral Spacing (S) (ft)		
16.67	Lateral Spacing Between Cells (V)		
2.29	Forcemain Drainback (gal)	If N above, enter the elevation (ft)	
1.90	Forcemain Filter Loss (ft)	of the highest point.	
1.50	Forcemain Diameter (in)		
25.00	Forcemain Length (ft)	Does the forcemain drain back?	Y
94.00	Inside Pump Tank Elevation (ft)		
0.250	Orifice Diameter (in) (e.g. 0.25)		
3.00	Estimated Orifice Spacing (ft) =	9.14 ft^2/orifice	
3.25	System Head (ft) x 1.3		
6.75	Vertical Lift (ft)		
0.81	Friction Loss (ft)		
12.71	Total Dynamic Head (ft)		
19.27	5x Void Volume (gal)		
21.56	Minimum Dose Volume (gal)		
18.64	System Demand (gpm)		

Diameter Selection

Lateral Diameter Selection

in. dia.	options	choice
0.75		
1.00	x	
1.25	x	
1.50	x	x
2.00	x	
3.00	x	

Manifold Diameter Selection

in. dia.	options	choice
1.25		
1.50		x
2.00		
3.00		

Not an Option

Change Orifice Diameter to change Manifold Diameter Selections.

Manufacturer Information

Treatment Tank Information

1000.00	Septic Tank Capacity (gal)
ABC	Manufacturer

Effluent Filter Information

Polylok Inc./Zabel	Filter Manufacturer
3014-525-1/16-10,000 GPD	Filter Model Number

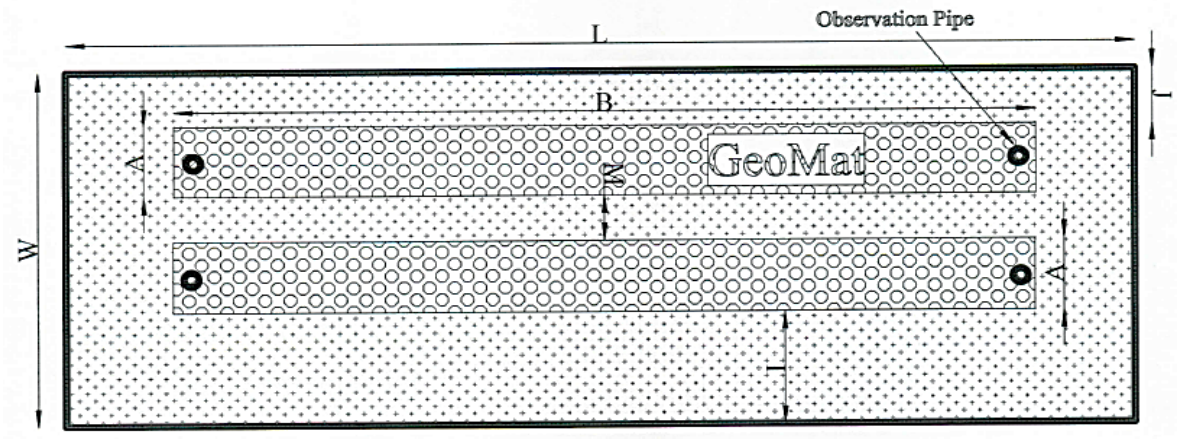
Dose Tank Information

600.00	Dose Tank Capacity (gal)
12.50	Dose Tank Volume (gal/in)
ABC	Manufacturer

Gallons/Inch Calculator (optional)

	Total Tank Capacity (gal)
	Total Working Liquid Depth (in)
	gal/in (enter result in cell DoseTankVolume)

Mound Plan View



Mound Component Dimensions

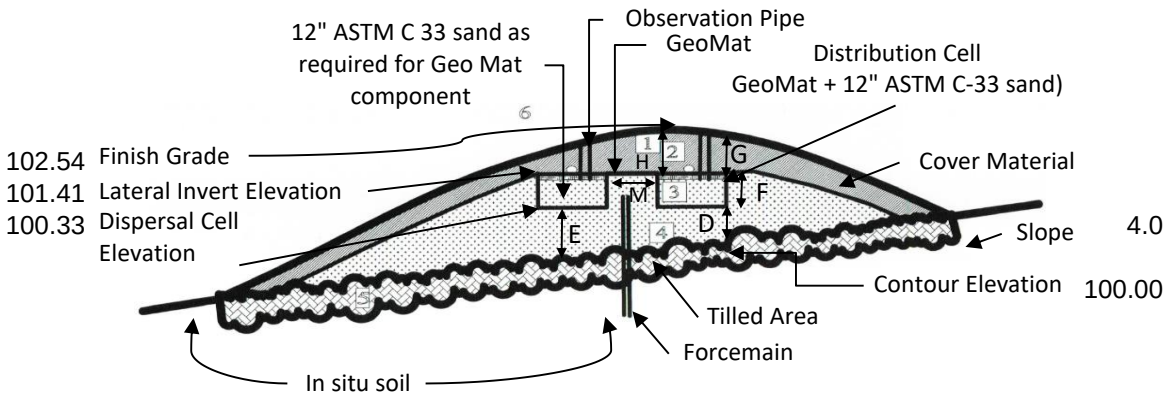
Down slope toe extension made.

A	3.25	ft	E	13.56	in	H	1.00	ft	K	8.82	ft
B	22.50	ft	F	14.50	in	I	15.04	ft	L	40.14	ft
D	4.00	in	G	0.50	ft	J	5.47	ft	W	40.43	ft
									M	13.42	ft

750.00	Basal Area Required	786.56	(ft^2) Basal Area Available
0.00	End B Obs. Pipe Placement	375.00	Basal Area Available Upslope
73.13	(ft^2) Dispersal Cell Area Per Cell	411.56	Basal Area Available Downslope
10.00	(gpd/ft) Linear Loading Rate		

Mound Cross Section View

GeoMat Dispersal Area

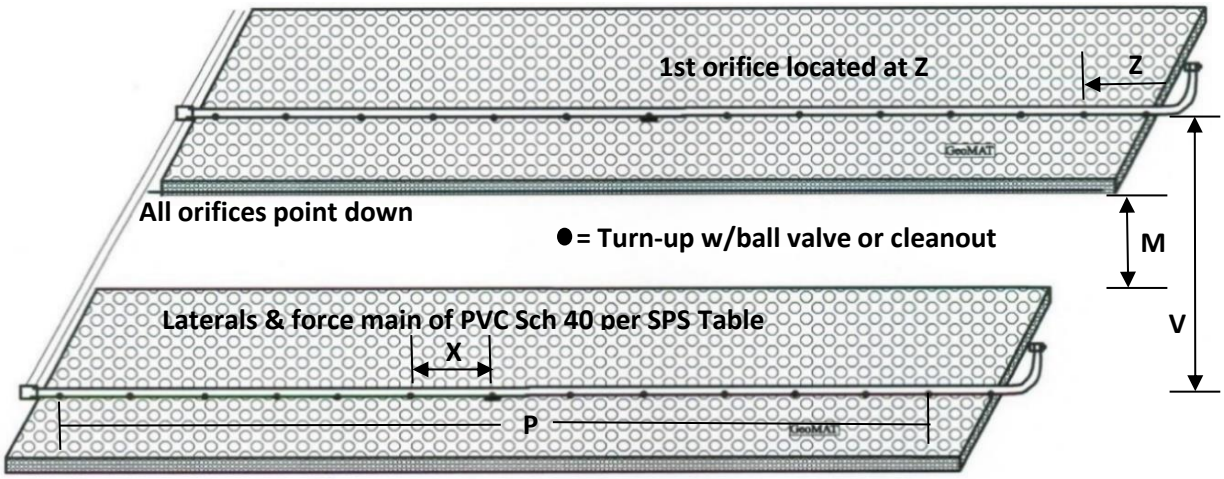


Shading Key

1 Topsoil Cap
2 Subsoil Cap
3 ASTM C 33 sand (F)
4 ASTM C 33 sand (D)
5 Tilled Layer
6 Geo Mat

See details on page 4 for number, size, and spacing of laterals.

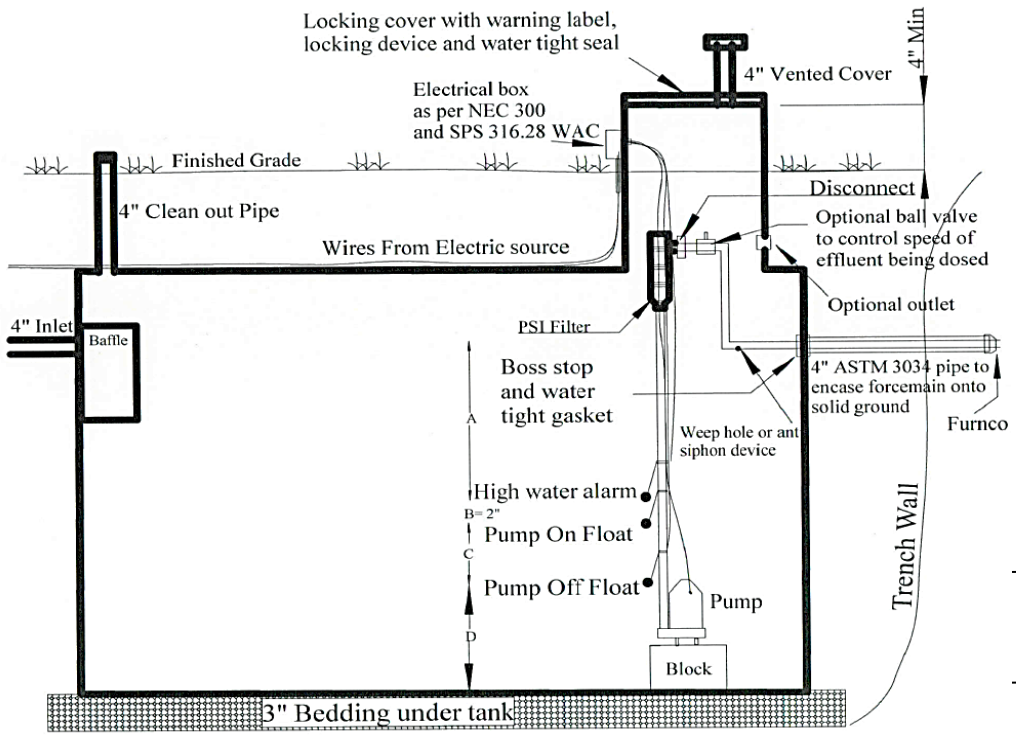
End Connection Lateral Layout Diagram



Number of Laterals	2		Orifice Diameter	0.25	in
Lateral Diameter	1.50	in	Orifice Spacing (X)	3.00	ft
Lateral Length (P)	21.75	ft	Orifices per Lateral	8	
Lateral End (Z)	0.75	ft	Orifice Density	9.14	ft^2/orifice
Lateral Spacing (S)	16.67	ft	Manifold Length	16.67	ft
Lateral Spacing Between Cells (V)	16.67	ft	Manifold Diameter	1.50	in
Lateral Flow Rate	9.32	gpm	Forcemain Velocity	3.38	ft/sec
System Flow Rate	18.64	gpm			
Total Dynamic Head	12.71				

Project:

Dose Tank Information



Forcemain diameter
1.5 in.

Pump off elevation (ft)
94.67

Dose tank elevation (ft)
94.00

Dimension	Inches	Gallons
A	36.28	453.44
B	2.00	25.00
C	1.72	21.56
D	8.00	100.00
Total	48.00	600.00

ABC	
Capacity	600.00
Volume	12.50

gal/inch

Filter Manufacturer: Clearflow
Filter Model Number: NSSCFF324

Alarm Manufacturer: SJE Rhombus
Alarm Model Number: AB

Pump Manufacturer: Little Giant
Pump Model Number: 6EC

Pump Must Deliver: 18.64 gpm at 12.71 ft TDH

Note: Switches containing mercury may not be used in this system.

GeoMat Distribution Cell Media Layout

3.25	Cell Width (ft)	1.63	Sidewall to Lateral (ft)

Distribution Cell Cross-section Arrangements

Component Legend

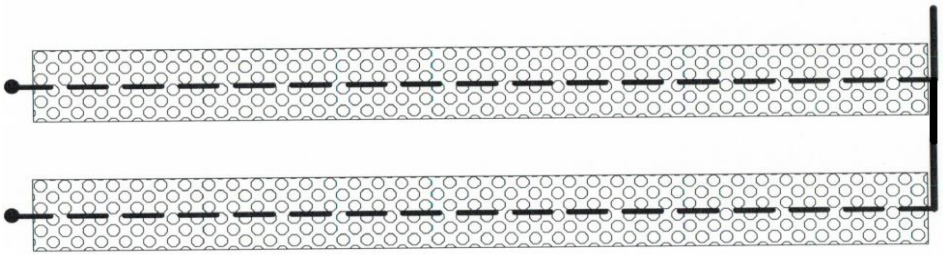
- Distribution Pipe With Pressure Lateral
- Turnup Enclosure
- Orifice Shield
- Pressure Lateral

GeoMat is covered with approved geotextile fabric as per the their product approval.

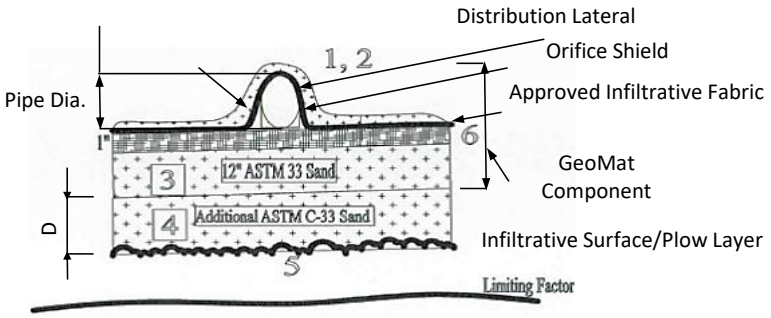
Distribution Cell Plan View Layout - Typical

3.25	Cell Width - A (ft)	22.50	Cell Length - B (ft)

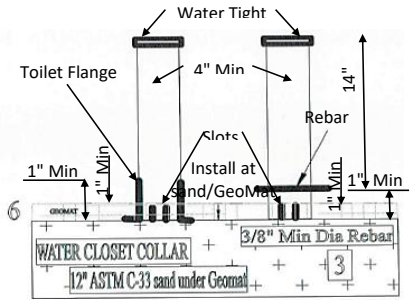
End Connection Lateral Layout Diagram



Typical Dispersal Cell



Observation Pipes



Shading Key

1. Topsoil Cap
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4. ASTM C 33 sand (D)
5. Tilled Layer
6. Geo Mat

Mound System Maintenance and Operation Specifications

Service Provider's Name	Robert Berceau	Phone	920-819-4100
POWTS Regulator's Name	Sawyer County SPIA - Zoning Administration	Phone	(715) 634-8288

Design Flow - Peak	450	gpd	Maximum Influent Particle Size	1/8	in
Estimated Flow - Average	300	gpd	Maximum BOD5	30	mg/L
Septic Tank Capacity	1000	gal	Maximum TSS	30	mg/L
Soil Absorption Component Size	73.125	ft^2	Maximum FOG	10	mg/L
Type of Wastewater	Domestic		Maximum Fecal Coliform	10E4	cfu/100 mL

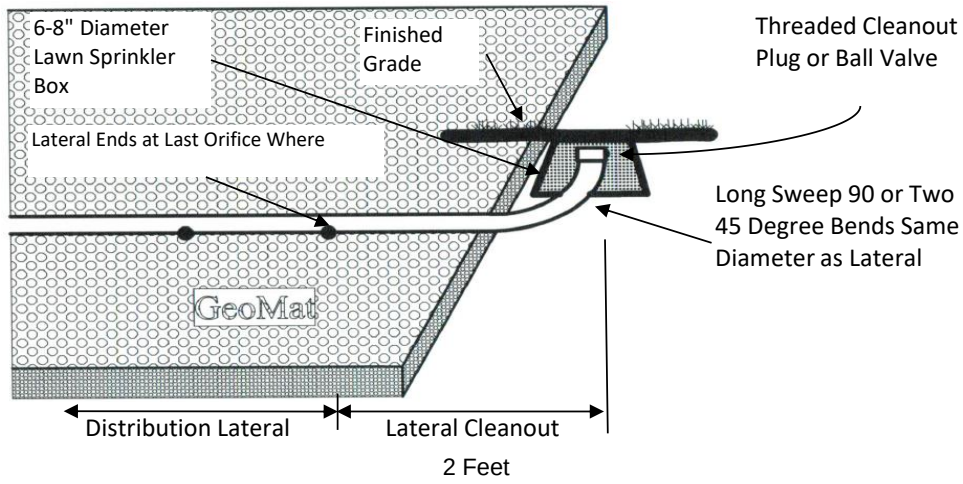
Service Frequency

Septic and Pump Tank	Inspect and/or service once every 3 years
Effluent Filter	Inspect and clean as necessary at least once every 3 years
Pump and Controls	Test once every 3 years
Alarm	Should test periodically
Pressure System	Laterals should be flushed and pressure tested every 3 years
Mound	Inspect for ponding and seepage once every 3 years
Other	

Miscellaneous Construction and Materials Standards

1. Observation pipes are slotted and materials conform to Table SPS 384.30-1, have a watertight cap and are secured in as shown in the Synergy Systems GeoMat Mound Component Manual Version 1, 2017.
2. Dispersal cell media conforms to GeoMat products approved for use with the Synergy Systems GeoMat Mound Component Manual Version 1, 2017. Media is covered with an approved geotextile fabric.
3. All gravity and pressure piping materials conform to the requirements in SPS 384, Wis. Adm. Code.
4. Tillage of the basal area is accomplished with a mold board or chisel plow.
5. The mound structure and other disturbed areas will be seeded and mulched to prevent soil erosion and help reduce frost penetration.

Lateral Turn-up Detail



Mound System Management Plan

Pursuant to SPS 383.54, Wis. Adm. Code

General

This system shall be operated in accordance with SPS 382-84 Wis. Adm. Code, and shall maintained in accordance with its' component manuals [Synergy Systems L.L.C., Geomat Mound Component Manual version 1, 2017, Pressure Distribution Component Manual Ver. 2.0 SBD-10706-P (N. 01/01) and SSWMP Publication 9.6 (01/81)] and local or state rules pertaining to system maintenance and maintenance reporting.

Septic and pump tank abandonment shall be in accordance with SPS 383.33, Wis. Adm. Code when the tanks are no longer used as POWTS components.

Septic or pump tank manhole risers, access risers and covers should be inspected for water tightness and soundness. Access openings used for service and assessment shall be sealed watertight upon the completion of service. Any opening deemed unsound, defective, or subject to failure must be replaced. Exposed access openings greater than 8-inches in diameter shall be secured by an effective locking device to prevent accidental or unauthorized entry into a tank or component.

Septic Tank

The septic tank shall be maintained by an individual certified to service septic tanks under s. 281.48, Stats. The contents of the septic tank shall be disposed of in accordance with NR 113, Wis. Adm. Code. The operating condition of the septic tank and outlet filter shall be assessed at least once every 3 years by inspection.

The outlet filter shall be cleaned as necessary to ensure proper operation. The filter cartridge should not be removed unless provisions are made to retain solids in the tank that may slough off the filter when removed from its enclosure. If the filter is equipped with an alarm, the filter shall be serviced if the alarm is activated continuously. Intermittent filter alarms may indicate surge flows or an impending continuous alarm.

The septic tank shall have its contents removed when the volume of sludge and scum in the tank exceeds 1/3 the liquid volume of the tank. If the contents of the tank are not removed at the time of a triennial assessment, maintenance personnel shall advise the owner as to when the next service needs to be performed to maintain less than maximum scum and sludge accumulation in the tank.

The addition of biological or chemical additives to enhance septic tank performance is generally not required. However, if such products are used they shall be approved for septic tank use by the Wisconsin Department of Commerce.

Pump Tank

The dosing (pump) tank shall be inspected at least once every 3 years. All switches, alarms, and pumps shall be tested to verify proper operation. If an effluent filter is installed within the tank it shall be inspected and serviced as necessary. If the force main has a weep hole, it should be noted if it is functional during pump operation, and if not, it should be cleaned.

********No one should ever enter a septic or dose tank since dangerous gases may be present that could cause death.*******

Mound and Pressure Distribution System

No trees or shrubs should be planted on the mound. Plantings may be made around the mound's perimeter, and the mound shall be seeded and mulched as necessary to prevent erosion and to provide some protection from frost penetration. Traffic (other than for vegetative maintenance) on the mound is not recommended since soil compaction may hinder aeration of the infiltrative surface within the mound and snow compaction in the winter will promote frost penetration. Cold weather installations (October-February) dictate that the mound be heavily mulched as protection from freezing.

Influent quality into the mound system may not exceed 220 mg/L BOD_5, 150 mg/L TSS, and 30 mg/L FOG for septic tank effluent or 30 mg/L BOD_5, 30 mg/L TSS, 10 mg/L FOG, and 10^4 cfu/100 mL for highly treated effluent. Influent flow may not exceed maximum design flow specified in the permit for this installation.

The pressure distribution system is provided with a flushing point at the end of each lateral, and it is recommended that each lateral be flushed of accumulated solids at least once every 3 years. When a pressure test is performed it should be compared to the initial test when the system was installed to determine if orifice clogging has occurred and if orifice cleaning is required to maintain equal distribution within the dispersal cell.

Observation pipes within the dispersal cell shall be checked for effluent ponding. Ponding levels shall be reported to the owner, and any levels above 4 inches considered as an impending hydraulic failure requiring additional, more frequent monitoring.

Contingency Plan

If the septic tank or any of its components become defective the tank or component shall be repaired or replaced to keep the system in proper operating condition.

If the dosing tank, pump, pump controls, alarm or related wiring becomes defective the defective component(s) shall be immediately repaired or replaced with a component of the same or equal performance.

If the mound component fails to accept wastewater or begins to discharge wastewater to the ground surface, it will be repaired or replaced in its' present location by increasing basal area if toe leakage occurs or by removing biologically clogged absorption and dispersal media, and related piping, and replacing said components as deemed necessary to bring the system into proper operating condition.

See Page 7 of this plan for the name and telephone number of your local POWTS regulator and service provider.