SEPTIC CHECK

EXPERT SERVICE. LASTING VALUE. CLEAN WATER

INDIVIDUAL SEWAGE SYSTEM DESIGN SUMMARY

Property Owner: Joel Schilling
Phone: 651-270-8460
Address: 38039 State Hwy 18
Township: 36-0-033302
City: Aitkin
Zip: 56431
County: Aitkin

DESIGN USAGE

Single Family Home X
Other
Number of Potential Bedrooms 3
Garbage Disposal No
Sewage Lift Pump No

SITE CHARACTERISTICS

Soil type Fine Sand
Hydraulic Loading 0.60 gpd/ft2
Depth to restrictive layer 12”

PUMP INFORMATION

Pump GPM & TDH 29.0’ GPM & 17.6’ TDH
Cycles per day 5 cycles
Gallons per cycle 80 gallons
Perforation size & spacing 1/4” Perfs, every 36”
Number, spacing, & diameter of laterals 3 - 1 ½” laterals every 36”
Forcemain Size 2”

CAPACITIES

Daily Water Use Est Calc 450 gpd
Septic Tank Capacity 1000 Gallons (Combo Tank)
Pump Tank Capacity 500 Gallons

MOUND SYSTEM

Dimension of Rock Base 10’ x 38’
Depth of Rock Below Pipe 9”
Dimensions of Mound 40’ x 68’
% Slope of Soil Under Mound 0%
Upslope Dike Width 15’
Downslope Dike Width 15’
Sideslope Dike Width 15’

TRENCH SYSTEM

Type of trench
Maximum Depth of trench
Square Feet of bed Required
Square Feet of bed Proposed
Lineal Feet of bed Proposed

APPROVAL

By Melissa Besser License #2624
Date 10/21/2019
See additional information sheet if checked ☒

Property Owner: Joel Schilling 38039 State Hwy 18 - Aitkin, MN 56431

Description of Wastewater Treatment and Dispersal System

This design is for a Type I, 3-bedroom, Class I home that does not have a garbage disposal or sewage pump in the basement. The property currently consists of two septic systems that did not pass a compliance inspection on 10/4/19 for soil separation.

The system for the 3-bedroom home is located on the north side between the home and garage. The existing tank will not be reused in this design due to age; it will need to be pumped and properly abandoned. There are two 4" lines exiting the home, but homeowner is not sure where they connect outside. Installer must locate each line and ensure they both get connected to the new septic tank. Sewage will flow by gravity through 4" SCH 40 pipe 123' from the home to the septic tank. A cleanout will be installed at 88' just before the driveway that leads into the garage. From there 35' of 4" SCH 40 ***insulated*** pipe is to be installed under the driveway to the new 1,500-gallon, two compartment septic/pump tank. The 1,000-gallon compartment is to be used for the septic and the 500-gallon compartment as the pump tank. All manholes will need to be installed to grade for ease of servicing, and the pump installed must deliver at least 29.0 GPM and 17.6 TDH. Effluent will then be dosed to a 10' by 38' rockbed mound built with a 2.0' clean sand lift which will have lateral cleanouts and inspection pipes to grade. The homeowner will need to remove the raised garden and fencing around the staked rockbed area prior to installing the new drainfield.

The second system is located south of the home near the lake that has a seasonal RV connected to it. This system will not be rebuilt to meet compliance criteria so the installer will pump and properly abandon the septic tank and cap off the drainfield.

It is the installer's responsibility to make sure the septic system is seeded and mulched prior to final completion.

Keep all vehicles and construction equipment off septic area. Rutting and/or compacting the soil will change the percolation rates and may lead to system failure.

Homeowner to verify all property lines.

Elevations are referenced to Bench Mark on the concrete in the NW corner of garage marked with pink spray paint.

Installer to verify all elevations, dimensions, and ensure proper fall to pipes. Pitch pump chamber outlet to ensure complete drainback to pump chamber.

Establish turf to prevent erosion and freezing.

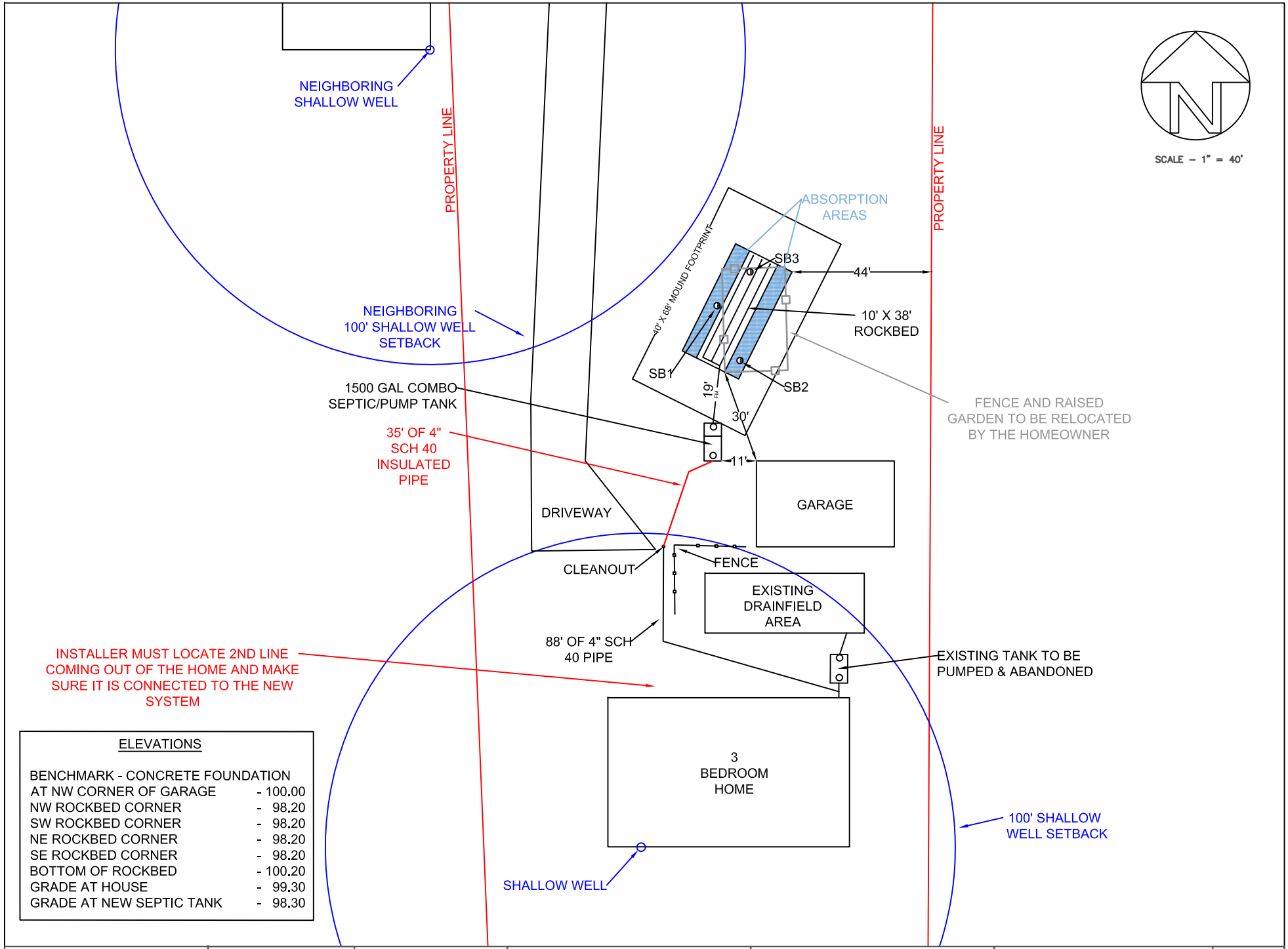
Each tank is to be pumped through the maintenance cover when serviced. Do not pump through inspection pipes.

Homeowner is responsible for all costs involved in servicing, monitoring, and mitigating the system.

All construction to be performed in accordance with MN Rule 7080 and the Aitkin County septic ordinance.

Maintenance Requirements

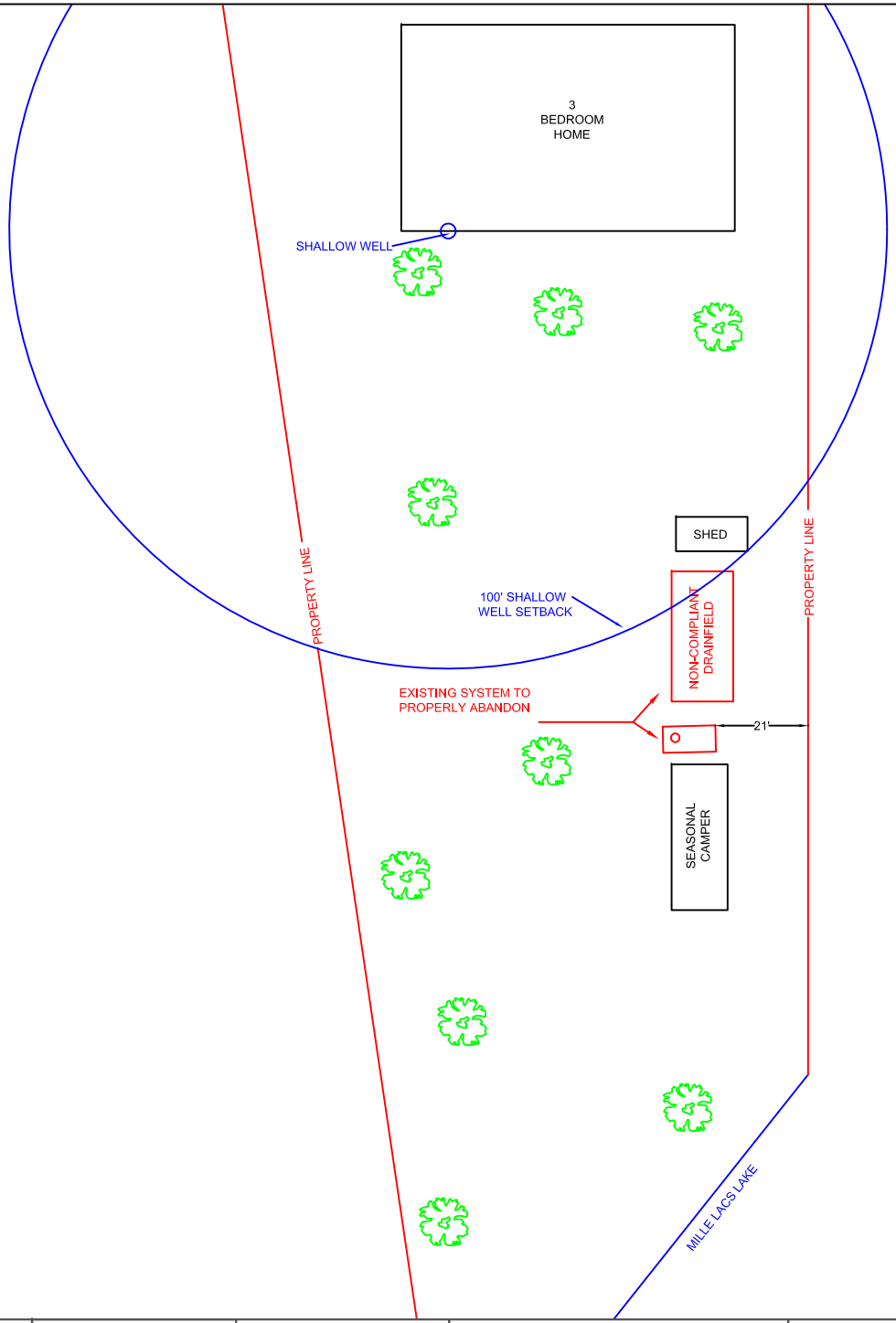
See attached operating permit or management plan for details



ELEVATIONS

BENCHMARK - CONCRETE FOUNDATION	
AT NW CORNER OF GARAGE	- 100.00
NW ROCKBED CORNER	- 98.20
SW ROCKBED CORNER	- 98.20
NE ROCKBED CORNER	- 98.20
SE ROCKBED CORNER	- 98.20
BOTTOM OF ROCKBED	- 100.20
GRADE AT HOUSE	- 99.30
GRADE AT NEW SEPTIC TANK	- 98.30

PREPARED FOR:	PROPERTY LOCATION	LEGAL DESCRIPTION			PAGE TITLE	SHEET NUMBER
JOEL SCHILLING	38039 STATE HWY 18 AITKIN, MN 56431	Aitkin County, Minnesota. PID# 36-0-033302	SEPTIC CHECK 6074 KEYSTONE RD MILACA, MN 56353 (320)-983-2447 (FAX) (320)-983-2151	I hereby certify that this site plan was prepared by me or under my direct supervision. Melissa Besser M. P. C. A. License # 2624 DATE 10/22/19	SEPTIC DESIGN	1 OF 1



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SCALE – 1" = 40'

PREPARED FOR:	PROPERTY LOCATION	LEGAL DESCRIPTION			PAGE TITLE	SHEET NUMBER
JOEL SCHILLING	38039 State Hwy 18 Aitkin, MN. 56431	Aitkin County, Minnesota. PID#36-0-033302	SEPTIC CHECK 6074 KEYSTONE RD MILACA, MN 56353 (320)-983-2447 (FAX) (320)-983-2151	I hereby certify that this site plan was prepared by me or under my direct supervision. Melissa Besser M. P. C. A. License # 2624 DATE 10/21/19	Holding Tank	1 OF 1

SEPTIC CHECK

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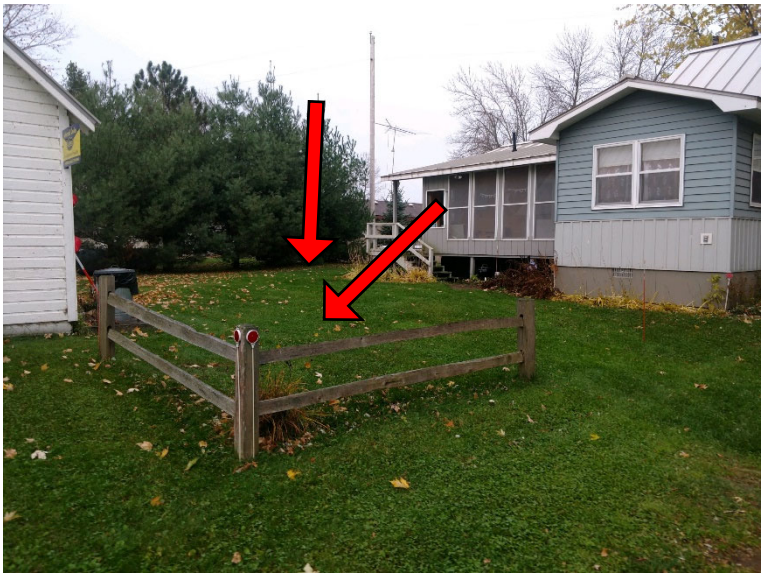
Joel Schilling
38039 State Hwy 18 - Aitkin, MN 56431



EXISTING TANK AND DRAINFIELD AREA

BENCHMARK

FENCE/GARDEN TO BE REMOVED BY HOMEOWNER PRIOR TO INSTALLATION
&
STAKED ROCKBED AREA

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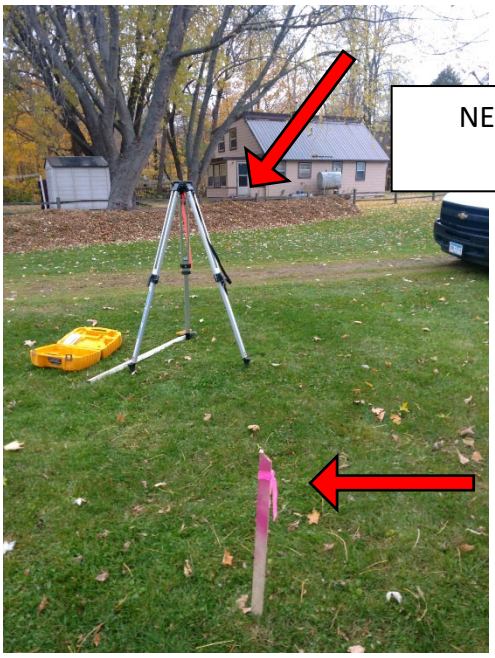
NEW TANK LOCATION



NEIGHBORING HOME WITH SHALLOW WELL.

STAKED 100’ SETBACK

SEPTIC CHECK

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WASHTUB ONLY WHICH IS CONNECTED TO A PUMP THAT GOES INTO THE SEPTIC SYSTEM.

OLD PLUMBING THAT GOES OUT TO THE SEPTIC SYSTEM ON ITS OWN 4” LINE.

NEWER PLUMBING THAT ALSO GOES OUT TO THE SEPTIC SYSTEM ON ITS OWN 4” LINE.

Minnesota Pollution Control Agency

OSTP Design Summary Worksheet

University of Minnesota

Property Owner/Client: Joel Schilling | **Project ID:** | v 07.14.15

Site Address: 38039 State Hwy 18, Aitkin, MN. 56431 | **Date:** 10/21/19

1. DESIGN FLOW AND TANKS

A. *Design Flow:* 450 Gallons Per Day (GPD)

Note: The estimated design flow is considered a peak flow rate including a safety factor. For long term performance, the average daily flow is recommended to be < 60% of this value.

B. *Septic Tanks:*

Minimum Code Required Septic Tank Capacity: 1000 Gallons, in 1 Tanks or Compartments

Recommended Septic Tank Capacity: 1000 Gallons, in 1 Tanks or Compartments

Effluent Screen: Alarm:

C. *Holding Tanks Only:*

Minimum Code Required Capacity: Gallons, in Tanks

Designer Recommended Capacity: Gallons, in Tanks

Type of High Level Alarm:

D. *Pump Tank 1* Capacity (Code Minimum): 500 Gallons *Pump Tank 2* Capacity (Code Minimum): Gallons

Pump Tank 1 Capacity (Designer Rec): 500 Gallons *Pump Tank 2* Capacity (Designer Rec): Gallons

Pump 1 29.0 GPM Total Head 17.6 ft Pump 2 GPM Total Head ft

Supply Pipe Dia. 2.00 in Dose Volume: 80.0 gal Supply Pipe Dia. in Dose Volume: gal

2. SYSTEM TYPE

○ Trench ○ Bed ◉ Mound ○ At-Grade ○ Gravity Distribution ◉ Pressure Distribution-Level ○ Pressure Distribution-Unlevel

○ Drip ○ Holding Tank ○ Other *** Selection Required**

Benchmark Elevation: 100.00 ft

Benchmark Location: Foundation NW Garage Corner

System Type				
☑ Type I	☐ Type II	☐ Type III	☐ Type IV	☐ Type V

Type of Distribution Media:

☑ Drainfield Rock ☐ Registered Treatment Media:

3. SITE EVALUATION:

A. Depth to Limiting Layer: 12 in 1.0 ft **B.** Measured Land Slope %: 0.0 %

C. Elevation of Limiting Layer: 97.2 **D.** Soil Texture: Fine Sand

E. Loc. of Restricive Elevation: SE Rockbed Corner **F.** Soil Hyd. Loading Rate: 0.60 GPD/ft^2

G. Minimum Required Separation: 36 in 3.0 ft **H.** Perc Rate: MPI

I. Code Maximum Depth of System: Mound in Comments:

4. DESIGN SUMMARY

Trench Design Summary

Dispersal Area ft^2 Sidewall Depth in Trench Width ft

Total Lineal Feet ft Number of Trenches Code Maximum Trench Depth in

Contour Loading Rate ft Designer's Max Trench Depth in

Bed Design Summary

Absorption Area ft^2 Depth of sidewall in Code Maximum Bed Depth in

Bed Width ft Bed Length ft Designer's Max Bed Depth in

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Mound Design Summary

Absorption Bed Area	380.0	ft^2	Bed Length	38.0	ft	Bed Width	10.0	ft
Absorption Width	20.0	ft	Clean Sand Lift	2.0	ft	Berm Width (0-1%)	15.0	ft
Upslope Berm Width	15.0	ft	Downslope Berm Width	15.0	ft	Endslope Berm Width	15.0	ft
Total System Length	68.0	ft	Total System Width	40.0	ft	Contour Loading Rate	12.0	gal/ft

At-Grade Design Summary

Absorption Bed Width		ft	Absorption Bed Length		ft	System Height		ft
Contour Loading Rate		gal/ft	Upslope Berm Width		ft	Downslope Berm Width		ft
Endslope Berm Width		ft	System Length		ft	System Width		ft

Level & Equal Pressure Distribution Summary

No. of Perforated Laterals	3		Perforation Spacing	3	ft	Perforation Diameter	1/4	in
Lateral Diameter	1.50	in	Min. Delivered Volume	48	gal	Maximum Delivered Volume	113	gal

Non-Level and Unequal Pressure Distribution Summary

	Elevation (ft)	Pipe Size (in)	Pipe Volume (gal/ft)	Pipe Length (ft)	Perforation Size (in)	Spacing (ft)	Spacing (in)
Lateral 1							
Lateral 2							
Lateral 3							
Lateral 4							
Lateral 5							
Lateral 6							

Minimum Delivered Volume _____ gal

Maximum Delivered Volume _____ gal

5. Additional Info for Type IV/Pretreatment Design

A. ***Calculate the organic loading***

1. *Organic Loading to Pretreatment Unit = Design Flow* X *Estimated BOD* in mg/L in the effluent X 8.35 ÷ 1,000,000

_____ gpd X _____ mg/L X 8.35 ÷ 1,000,000 = _____ lbs BOD/day

2. Type of Pretreatment Unit Being Installed: _____

3. Calculate *Soil Treatment System Organic Loading: BOD concentration after pretreatment ÷ Bottom Area* = lbs/day/ft^2

_____ mg/L X 8.35 ÷ 1,000,000 ÷ _____ ft^2 = _____ lbs/day/ft^2

Comments/Special Design Considerations:

I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

Melissa Besser		2624	10/21/19
(Designer)	(Signature)	(License #)	(Date)

OSTP Mound Design Worksheet <1% Slope

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1. SYSTEM SIZING: Project ID: v 07.14.15

A. Design Flow :	450	GPD
B. Soil Loading Rate:	0.60	GPD/ft^2
C. Depth to Limiting Condition:	1.0	ft
D. Percent Land Slope:	0.0	%
E. Design Media Loading Rate:	1.2	GPD/ft^2
F. Mound Absorption Ratio:	2.00	

Table I
MOUND CONTOUR LOADING RATES:

Measured Perc Rate	← OR →	Texture - derived mound absorption ratio		Contour Loading Rate:
≤ 60mpi		1.0, 1.3, 2.0, 2.4, 2.6	→	≤12
61-120 mpi	← OR →	5.0	→	≤12
≥ 120 mpi*		>5.0*	→	≤6*

TABLE IXa
LOADING RATES FOR DETERMINING BOTTOM ABSORPTION AREA AND ABSORPTION RATIOS USING PERCOLATION TESTS

Percolation Rate (MPI)	Treatment Level C		Treatment Level A, A-2, B,	
	Absorption Area Loading Rate (gpd/ft^2)	Mound Absorption Ratio	Absorption Area Loading Rate (gpd/ft^2)	Mound Absorption Ratio
<0.1	-	1	-	1
0.1 to 5	1.2	1	1.6	1
0.1 to 5 (fine sand and loamy fine sand)	0.6	2	1	1.6
6 to 15	0.78	1.5	1	1.6
16 to 30	0.6	2	0.78	2
31 to 45	0.5	2.4	0.78	2
46 to 60	0.45	2.6	0.6	2.6
61 to 120	-	5	0.3	5.3
>120	-	-	-	-

*Systems with these values are not Type I systems. Contour Loading Rate (linear loading rate) is a recommended value.

2. DISPERSAL MEDIA SIZING

A. Calculate Dispersal Bed Area: Design Flow (1.A) ÷ Design Media Loading Rate (1.E) = ft^2

450 GPD ÷ 1.2 GPD/ft^2 = 375 ft^2

If a larger dispersal media area is desired, enter size: 380 ft^2

B. Enter Dispersal Bed Width: 10 ft *Can not exceed 10 feet.*

C. Calculate Contour Loading Rate: Bed Width (2.B) X Design Media Loading Rate (1.E)

10 ft^2 X 1.2 GPD/ft^2 = 12.0 gal/ft *Can not exceed Table 1*

D. Calculate Minimum Dispersal Bed Length: Dispersal Bed Area (2.A) ÷ Bed Width (2.B) = Bed Length

380 ft^2 ÷ 10 ft = 38.0 ft

3. ABSORPTION AREA SIZING

A. Calculate Absorption Width: Bed Width (2.B) X Mound Absorption Ratio (1.F) = Absorption Width

10.0 ft X 2.0 = 20.0 ft

B. For slopes from 0 to 1%, the Absorption Width is measured from the bed equally in both directions.

Absorption Width Beyond the Bed: Absorption Width (3.A) - Bed Width (2.B) ÷ 2 = Width beyond Bed

(20.0 ft - 10.0 ft) ÷ 2 = 5.0 ft

4. DISTRIBUTION MEDIA: ROCK

A. Media Volume: Media Depth below and above pipe X Length X Width

0.75 ft X 38.0 ft X 10.0 ft = 285 ft^3 ÷ 27 = 10.6 yd^3

5. DISTRIBUTION MEDIA: REGISTERED TREATMENT PRODUCTS: CHAMBERS AND EZFLOW

A. Enter Dispersal Media:

B. Enter the Component: Length: ft Width: ft Depth: ft

C. Number of Components per Row = Bed Length divided by Component Length (Round up)

ft ÷ ft = components/row

D. Actual Bed Length = Number of Components/row X Component Length:

components **X** ft = ft

E. Number of Rows = Bed Width divided by Component Width

ft ÷ ft = rows *Adjust width so this is an whole number.*

F. Total Number of Components = Number of Components per Row X Number of Rows

X = components

6. MOUND SIZING

A. Calculate Clean Sand Lift: 3 feet minus Depth to Limiting Condition = Clean Sand Lift (1 ft minimum)

3.0 ft - 1.0 ft = 2.0 ft Design Sand Lift (optional): 2.0 ft

B. Upslope Mound Height = Clean Sand Lift + Depth of Media + Depth of Cover (1 ft)

2.0 ft + 0.75 ft + 1.0 ft = 3.8 ft

C. Berm Width = Upslope Mound Height (4.B) X 4 (4 is recommended, but could be 3-12)

3.8 ft X 4.0 ft = 15.0 ft

D. Total Landscape Width = Berm Width + Dispersal Bed Width + Berm Width

15.0 ft + 10.0 ft + 15.0 ft = 40.0 ft

E. Additional Berm Width necessary for absorption - Absorption Width - Total Landscape Width

20.0 ft - 40.0 ft = 0 ft if number is negative (<0), value is **ZERO**

F. Final Berm Width = Additional Berm Width + Berm Width

0 ft + 15.0 ft = 15.0 ft

G. Total Mound Width = Final Berm Width + Dispersal Bed Width + Final Berm Width

15.0 ft + 10.0 ft + 15.0 ft = 40.0 ft

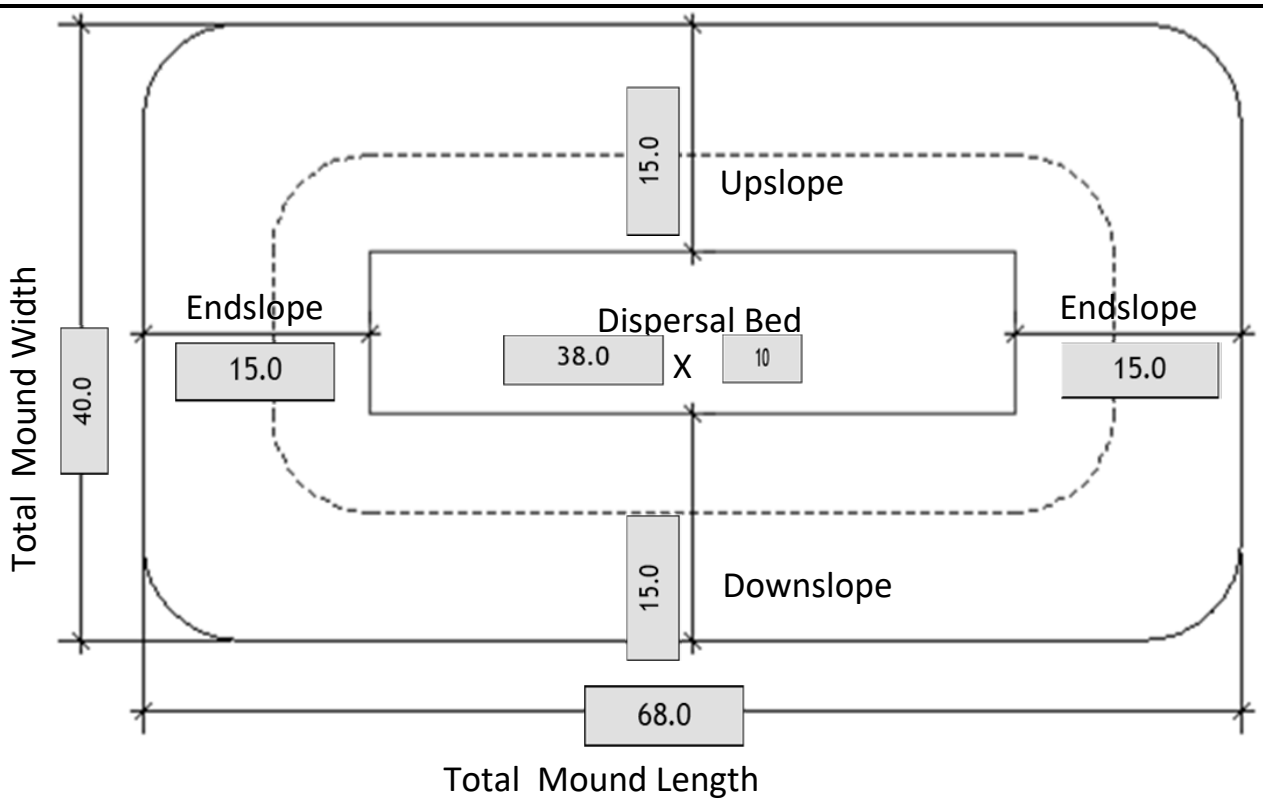
H. Total Mound Length = Final Berm Width + Dispersal Bed Length + Final Berm Width

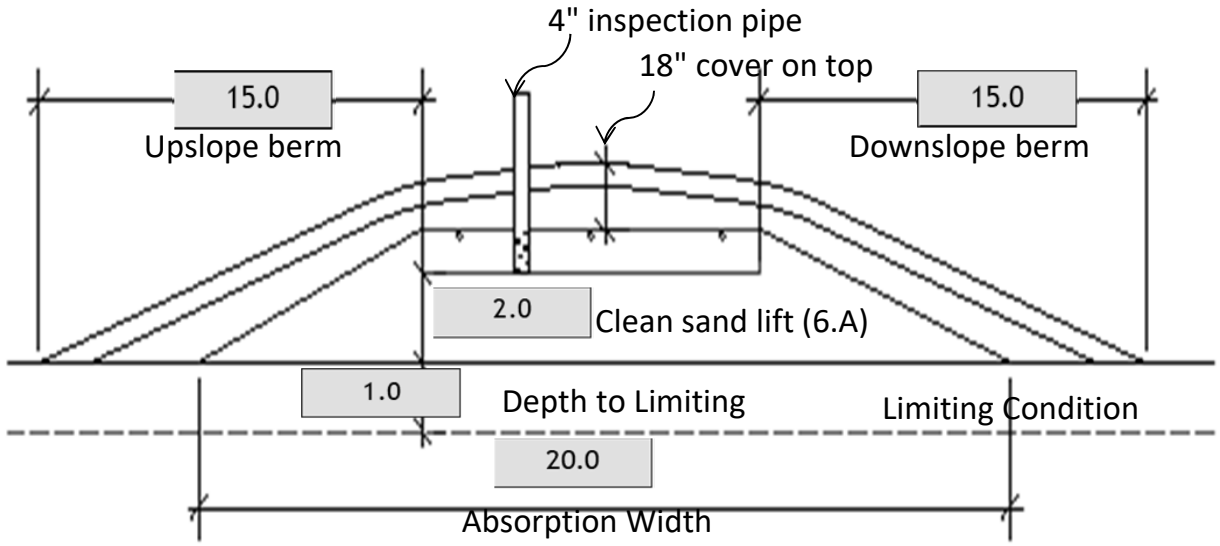
15.0 ft + 38.0 ft + 15.0 ft = 68.0 ft

I. Setbacks from the Bed: Absorption Width - Dispersal Bed Width divided by 2

(20.0 ft - 10.0) / 2 = 5.0 ft

7. MOUND DIMENSIONS





Comments:

OSTP Mound Materials Worksheet

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v 07.14.15

A. Calculate *Bed* (rock) *Volume*: *Bed Length* (2.C) X *Bed Width* (2.B) X *Depth* = *Volume* (ft^3)

	38.0	ft	X	10.0	ft	X	1.0	=	380.0	ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards:

	380.0	ft^3	÷	27	=	14.1	yd^3
Add 20% for constructability:	14.1	yd^3	X	1.2	=	16.9	yd^3

B. Calculate *Clean Sand Volume:*

Volume Under Rock bed: *Average Sand Depth* x *Media Width* x *Media Length* = cubic feet

	1.8	ft	X	10.0	ft	X	38.0	ft	=	665.0	ft^3

For a Mound on a slope from 0-1%

Volume from Length = ((Upslope Mound Height - 1) X Absorption Width Beyond Bed X Media Bed Length)

	3.75	ft - 1)	X	5.00	X	38	ft	=	522.50	

Volume from Width = ((Upslope Mound Height - 1) X Absorption Width Beyond Bed X Media Bed Width)

	3.75	ft - 1)	X	5.00	X	10	ft	=	137.50	

Total Clean Sand Volume: *Volume from Length* + *Volume from Width* + *Volume Under Media*

	522.5	ft^3	+	137.5	ft^3	+	665	ft^3	=	1325.0	ft^3

For a Mound on a slope greater than 1%

Upslope Volume: ((*Upslope Mound Height - 1*) x 3 x *Bed Length*) ÷ 2 = cubic feet

((		ft - 1)	X	3.0 ft	X		) ÷ 2 =			ft^3

Downslope Volume: ((*Downslope Height - 1)* x Downslope Absorption Width x *Media Length*) ÷ 2 = cubic feet

((		ft - 1)	X		ft	X		) ÷ 2 =		ft^3

Endslope Volume: (*Downslope Mound Height - 1)* x 3 x *Media Width* = cubic feet

(		ft - 1)	X	3.0 ft	X		ft	=		ft^3

Total Clean Sand Volume: *Upslope Volume* + *Downslope Volume* + *Endslope Volume* + *Volume Under Media*

	ft^3	+		ft^3	+		ft^3	+		ft^3	=		ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards:	1325.0	ft^3	÷	27	=	49.1 yd^3
Add 20% for constructability:	49.1	yd^3	X	1.2	=	58.9 yd^3

C. Calculate *Sandy Berm Volume:*

Total Berm Volume (approx): ((Avg. Mound Height - 0.5 ft topsoil) x Mound Width x Mound Length) ÷ 2 = cubic feet

(	3.8	-	0.5	)ft	X	40.0	ft	X	68.0	) ÷ 2 =	4420.0	ft^3

Total Mound Volume - Clean Sand volume -Rock Volume = cubic feet

	4420.0	ft^3	-	1325.0	ft^3	-	380.0	ft^3	=	2715.0	ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards:	2715.0	ft^3	÷	27	=	100.6 yd^3
Add 20% for constructability:	100.6	yd^3	x	1.2	=	120.7 yd^3

D. Calculate *Topsoil Material Volume: Total Mound Width X Total Mound Length X .5 ft*

	40.0	ft	X	68.0	ft	X	0.5 ft	=	1360.0	ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards:	1360.0	ft^3	÷	27	=	50.4 yd^3
Add 20% for constructability:	50.4	yd^3	x	1.2	=	60.4 yd^3

OSTP Pressure Distribution Design Worksheet

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Project ID: v 07.14.15

1. Media Bed Width: 10 ft

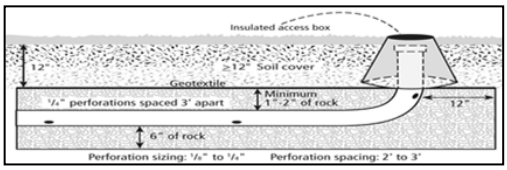
2. Minimum Number of Laterals in system/zone = Rounded up number of [(Media Bed Width - 4) ÷ 3] + 1.

(10 - 4) + 1 = 3 laterals *Does not apply to at-grades*

3. Designer Selected *Number of Laterals*: 3 laterals
Cannot be less than line 2 (accept in at-grades)

4. Select *Perforation Spacing*: 3.0 ft

5. Select *Perforation Diameter Size:* 1/4 in



6. *Length of Laterals* = Media Bed Length - 2 Feet.

38 - 2ft = 36 ft *Perforation can not be closer then 1 foot from edge.*

7. Determine the *Number of Perforation Spaces*. Divide the *Length of Laterals* by the *Perforation Spacing* and round down to the nearest whole number.

Number of Perforation Spaces = 36 ft ÷ 3 ft = 12 Spaces

8. *Number of Perforations per Lateral* is equal to 1.0 plus the *Number of Perforation Spaces*. Check table below to verify the number of perforations per lateral guarantees less than a 10% discharge variation. The value is double with a center manifold.

Perforations Per Lateral = 12 Spaces + 1 = 13 Perfs. Per Lateral

Maximum Number of Perforations Per Lateral to Guarantee <10% Discharge Variation

¼ Inch Perforations						7/32 Inch Perforations					
Perforation Spacing (Feet)	Pipe Diameter (Inches)					Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3		1	1¼	1½	2	3
2	10	13	18	30	60	2	11	16	21	34	68
2½	8	12	16	28	54	2½	10	14	20	32	64
3	8	12	16	25	52	3	9	14	19	30	60
3/16 Inch Perforations						1/8 Inch Perforations					
Perforation Spacing (Feet)	Pipe Diameter (Inches)					Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3		1	1¼	1½	2	3
2	12	18	26	46	87	2	21	33	44	74	149
2½	12	17	24	40	80	2½	20	30	41	69	135
3	12	16	22	37	75	3	20	29	38	64	128

9. *Total Number of Perforations* equals the *Number of Perforations per Lateral* multiplied by the *Number of Perforated Laterals.*

13 Perf. Per Lat. X 3 Number of Perf. Lat. = 39 Total Number of Perf.

10. Select *Type of Manifold Connection* (End or Center): ☑ End ☐ Center

11. *Select Lateral Diameter (See Table)*: 1.50 in

OSTP Pressure Distribution Design Worksheet

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12. Calculate the *Square Feet per Perforation. Recommended value is 4-11 ft² per perforation.*
Does not apply to At-Grades

a. *Bed Area* = Bed Width (ft) X Bed Length (ft)

10	ft	X	38	ft	=	380 ft²

b. *Square Foot per Perforation* = *Bed Area* divided by the *Total Number of Perforations*.

380	ft²	÷	39	perforations	=	9.7 ft²/perforations

13. Select *Minimum Average Head*: 1.0 ft

14. Select *Perforation Discharge* (GPM) based on Table: 0.74 GPM per Perforation

15. Determine required *Flow Rate* by multiplying the *Total Number of Perfs.* by the *Perforation Discharge.*

39	Perfs	X	0.74	GPM per Perforation =	29	GPM

16. *Volume of Liquid Per Foot of Distribution Piping (Table II)*: 0.110 Gallons/ft

17. *Volume of Distribution Piping* =

= [*Number of Perforated Laterals* X *Length of Laterals* X (Volume of Liquid Per Foot of Distribution Piping]

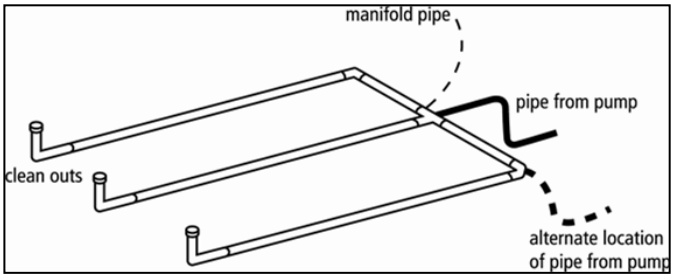
3	X	36	ft	X	0.110	gal/ft	=	11.9 Gallons

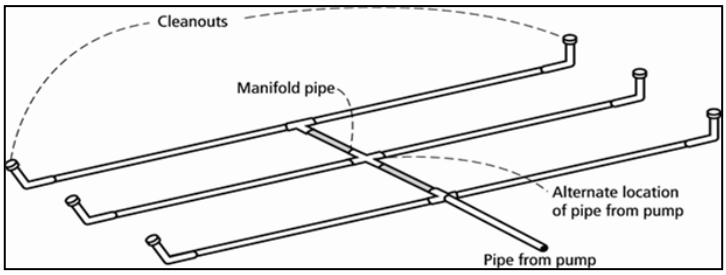
18. Minimum Delivered Volume = Volume of Distribution Piping X 4

11.9	gals	X	4	=	47.5 Gallons

Table II
Volume of Liquid in Pipe

Pipe Diameter (inches)	Liquid Per Foot (Gallons)
1	0.045
1.25	0.078
1.5	0.110
2	0.170
3	0.380
4	0.661





Comments/Special Design Considerations:

OSTP Basic Pump Selection Design Worksheet

Minnesota Pollution Control Agency

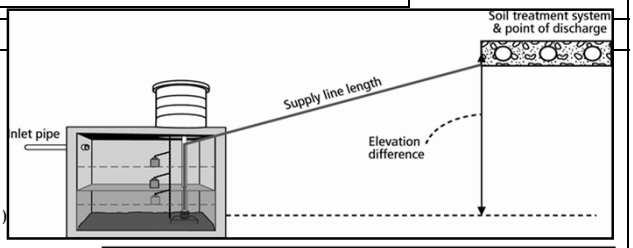
University of Minnesota

1. PUMP CAPACITY Project ID:

Pumping to Gravity or Pressure Distribution: ○ Gravity ◉ Pressure **Selection required**

1. If pumping to gravity enter the gallon per minute of the pump: _____ GPM *(10 - 45 gpm)*
2. If pumping to a pressurized distribution system: 29.0 GPM
3. Enter pump description: Demand Dosing Soil Treatment

2. HEAD REQUIREMENTS



A. Elevation Difference between pump and point of discharge: 12 ft

B. Distribution Head Loss: 5 ft

C. Additional Head Loss: _____ ft (due to special equipment, etc.)

Distribution Head Loss	
Gravity Distribution = 0ft	
Pressure Distribution based on Minimum Average Head Value on Pressure Distribution Worksheet:	
Minimum Average Head	**Distribution Head Loss**
1ft	5ft
2ft	6ft
5ft	10ft

D. 1. Supply Pipe Diameter: 2.0 in

2. Supply Pipe Length: 20 ft

E. **Friction Loss in Plastic Pipe per 100ft** from Table I:

Friction Loss = 2.23 ft per 100ft of pipe

Table I. Friction Loss in Plastic Pipe per 100ft

Flow Rate (GPM)	Pipe Diameter (inches)			
	1	1.25	1.5	2
10	9.1	3.1	1.3	0.3
12	12.8	4.3	1.8	0.4
14	17.0	5.7	2.4	0.6
16	21.8	7.3	3.0	0.7
18		9.1	3.8	0.9
20		11.1	4.6	1.1
25		16.8	6.9	1.7
30		23.5	9.7	2.4
35			12.9	3.2
40			16.5	4.1
45			20.5	5.0
50				6.1
55				7.3
60				8.6
65				10.0
70				11.4
75				13.0
85				16.4
95				20.1

F. Determine *Equivalent Pipe Length* from pump discharge to soil dispersal area discharg point. Estimate by adding 25% to supply pipe length for fitting loss. *Supply Pipe Length (D.2)* X 1.25 = *Equivalent Pipe Length*

20 ft X 1.25 = 25.0 ft

G. Calculate *Supply Friction Loss* by multiplying *Friction Loss Per 100ft* (Line E) by the *Equivalent Pipe Length* (Line F) and divide by 100.

Supply Friction Loss =

2.23 ft per 100ft X 25.0 ft ÷ 100 = 0.6 ft

H. *Total Head* requirement is the sum of the *Elevation Difference* (Line A), the Distribution Head Loss (Line B), Additional Head Loss (Line C), and the Supply Friction Loss (Line G)

12.0 ft + 5.0 ft + _____ ft + 0.6 ft = 17.6 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **29.0** GPM (Line 1 or Line 2) with at least **17.6** feet of total head.

Comments:

Minnesota Pollution Control Agency

OSTP Pump Tank Design Worksheet

University of Minnesota

DETERMINE TANK CAPACITY AND DIMENSIONS | Project ID: | v 07.14.15

1. A. *Design Flow (Design Sum.1A)*: 450 GPD

   B. Min. required pump tank capacity: 500 Gal C. Recommended pump tank capacity: 500 Gal

   D. Pump tank description: Demand to Pressure

MEASURED TANK CAPACITY (existing tanks):

2. A. Rectangle area = Length (L) X Width (W)

   ____ ft X ____ ft = ____ ft^2

   B. Circle area = $3.14r^2$ (3.14 X radius X radius)

   3.14 X ____ ^{2} ft = ____ ft^2

   C. Calculate Gallons Per Inch. Multiply the area from 1.A or 1.B, by 7.5 to determine the gallons per foot the tank holds and divide by 12 to calculate the gallons per inch.

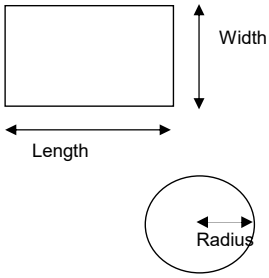
   ____ ft^2 X 7.5 gal/ft^3 ÷ 12 in/ft = ____ Gallons per inch

   D. Calculate *Total Tank Volume*

   Depth from bottom of inlet pipe to tank bottom: ____ in

   Total Tank Volume = Depth from bottom of inlet pipe (Line 4.A) X *Gallons/Inch* (Line 2)

   ____ in X 11.7 Gallons Per Inch = ____ Gallons



MANUFACTURER'S SPECIFIED TANK CAPACITY (when available):

3. A. Tank Manufacturer: Brown Wilbert

   B. Tank Model: 1500 Gal. Combo - Use 500 gal. compartment

   C. Capacity from manufacturer: 507 Gallons

   D. Gallons per inch from manufacturer: 11.7 Gallons per inch

   E. Liquid depth of tank from manufacturer: 43.0 inches

Note: Design calculations are based on this specific tank. Substituting a different tank model will change the pump float or timer settings. Contact designer if changes are necessary.

DETERMINE DOSING VOLUME

4. Calculate *Volume to Cover Pump* (The inlet of the pump must be at least 4-inches from the bottom of the pump tank & 2 inches of water covering the pump is recommended)

   (Pump and block height + 2 inches) X *Gallons Per Inch* (2C or 3E)

   (12 in + 2 inches) X 11.7 Gallons Per Inch = 164 Gallons

5. *Minimum Delivered Volume* = 4 X Volume of Distribution Piping:

   - Line 17 of the Pressure Distribution or Line 11 of Non-level 48 Gallons (minimum dose)

6. Calculate *Maximum Pumpout Volume* (25% of Design Flow)

   Design Flow: 450 GPD X 0.25 = 113 Gallons (maximum dose)

7. *Select a pumpout volume that meets both Minimum and Maximum:* 80 Gallons

8. Calculate *Doses Per Day* = Design Flow ÷ *Delivered Volume*

   450 gpd ÷ 80 gal = 5 *Doses*

9. Calculate Drainback:

   A. *Diameter of Supply Pipe* = 2 inches

   B. Length of Supply Pipe = 20 feet

   C. *Volume of Liquid Per Lineal Foot of Pipe* = 0.170 Gallons/ft

   D. *Drainback = Length of Supply Pipe* X *Volume of Liquid Per Lineal Foot of Pipe*

   20 ft X 0.170 gal/ft = 3.4 Gallons

10. *Total Dosing Volume = Delivered Volume* plus *Drainback*

    80 gal + 3.4 gal = 83 Gallons

11. Minimum Alarm Volume = Depth of alarm (2 or 3 inches) X gallons per inch of tank

    3 in X 11.7 gal/in = 35.2 Gallons

Volume of Liquid in Pipe	
Pipe Diameter (inches)	Liquid Per Foot (Gallons)
1	0.045
1.25	0.078
1.5	0.110
2	0.170
3	0.380
4	0.661

Minnesota Pollution Control Agency

OSTP Pump Tank Design Worksheet

University of Minnesota

TIMER or DEMAND FLOAT SETTINGS

Select Timer or Demand Dosing: ○ Timer ◉ Demand Dose

A. Timer Settings

12. Required *Flow Rate* :

A. From Design (Line 12 of Pressure, Line 10 of Non-Level or Line 6 of Pump*): _____ GPM

B. Or calculated: GPM = Change in Depth (in) x Gallons Per Inch / Time Interval in Minutes

_____ in X _____ gal/in ÷ _____ min = _____ GPM

**Note: This value must be adjusted after installation based on pump calibration.*

13. Flow Rate from Line 12.A or 12.B above. _____ GPM

14. Calculate **TIMER ON** setting:

Total Dosing Volume/GPM

_____ gal ÷ _____ gpm = _____ Minutes ON

15. Calculate **TIMER OFF** setting:

Minutes Per Day (1440)/*Doses Per Day* - Minutes On

1440 min ÷ _____ doses/day - _____ min = _____ Minutes OFF

16. Pump Off Float - Measuring from bottom of tank:

Distance to set Pump Off Float=Gallons to Cover Pump / Gallons Per Inch:

_____ gal ÷ _____ gal/in = _____ Inches

17. Alarm Float - Measuring from bottom of tank:

Distance to set Alarm Float = Tank Depth(4A) X 90% of Tank Depth

_____ in X 0.90 = _____ in

B. DEMAND DOSE FLOAT SETTINGS

18. Calculate *Float Separation Distance* using *Dosing Volume* .

Total Dosing Volume /Gallons Per Inch

83 gal ÷ 11.7 gal/in = 7.1 Inches

19. Measuring from bottom of tank:

A. *Distance to set Pump Off Float* = Pump + block height + 2 inches

12 in + 3 in = 15 Inches

B. *Distance to set Pump On Float=Distance to Set Pump-Off Float + Float Separation Distance*

15 in + 7.1 in = 22 Inches

C. *Distance to set Alarm Float = Distance to set Pump-On Float + Alarm Depth* (2-3 inches)

22 in + 3.0 in = 25 Inches

FLOAT SETTINGS

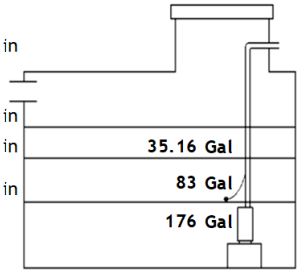
DEMAND DOSING

Inches for Dose: 7.1 in

Alarm Depth 25.1 in

Pump On 22.1 in

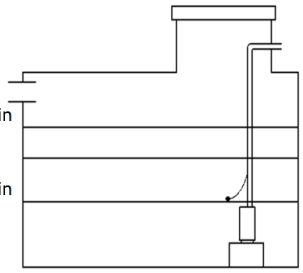
Pump Off 15.0 in



TIMED DOSING

Alarm Depth _____ in

Pump Off _____ in



Soil Profile Description

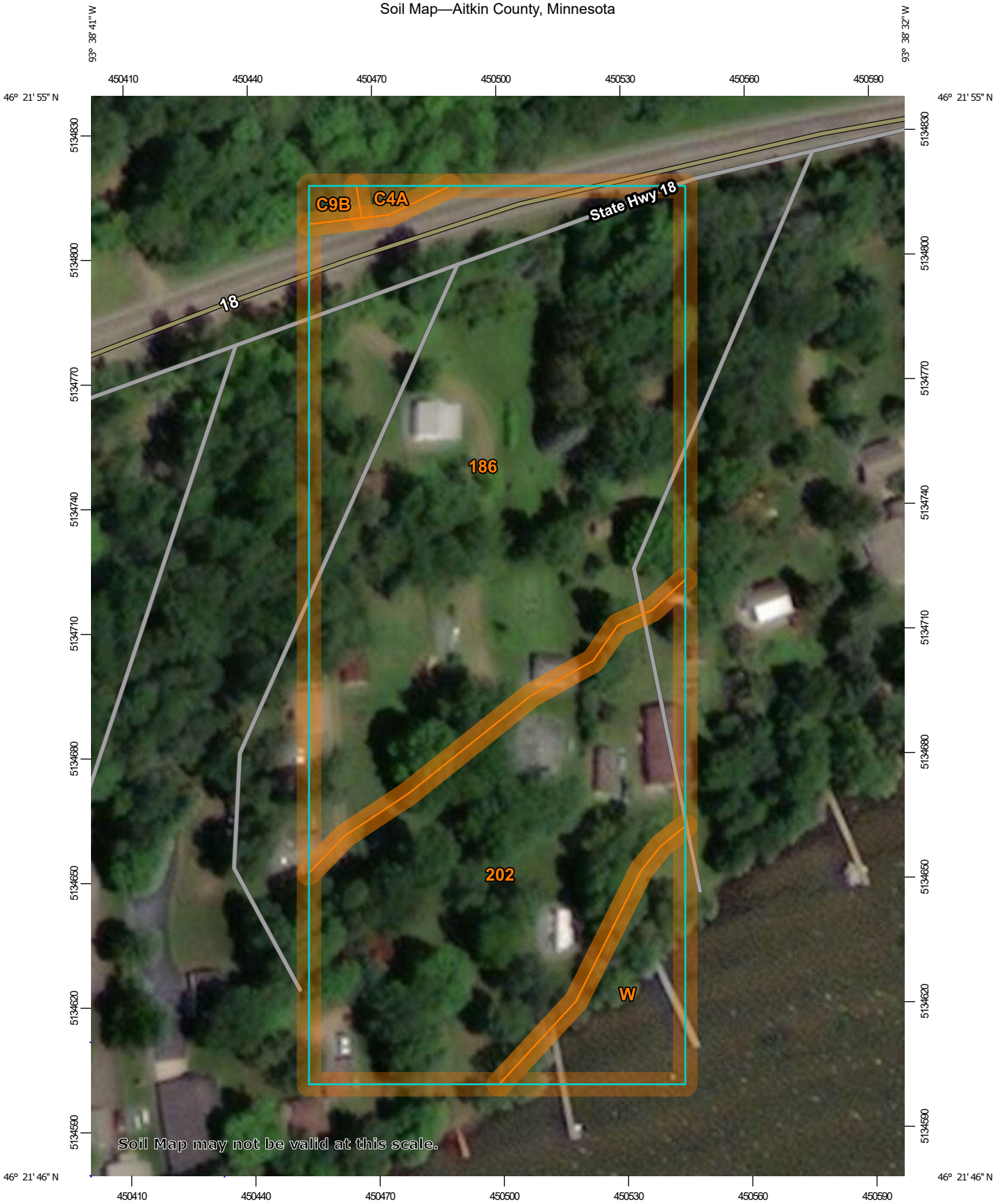
Date Completed :	10/21/2019	**Observation # :**	Soil Borings 1 - 3
Completed By :	Traci Beckstrom/Melissa Besser	**Equipment :**	Hand Auger
Client / Project :	Joel Schilling	**Limiting Layer :**	13"
Landscape position :	Side slope/Toe	**Vegitation :**	Grass
Mapped soil type :	186	**Weather :**	Cloudy

Observation # : 1	***Primary Site***					
Horizon Depth	**Soil Texture**	**Matrix Color**	**Redox features**	**Shape**	**Grade**	**Consistence**
0" - 8"	Loamy Sand	10YR 2/1		Granular	Strong	Friable
8" - 13"	Fine Sand	10YR 3/4		Single Grain	Structureless	Loose
13" - 16"	Fine Sand	10YR3/4	Redox at 13" 10YR 4/6	Single Grain	Structureless	Loose
Observation # : 2	***Primary Site***					
Horizon Depth	**Soil Texture**	**Matrix Color**	**Redox features**	**Shape**	**Grade**	**Consistence**
0" - 9"	Loamy Sand	10YR 2/1		Granular	Strong	Friable
9" - 12"	Fine Sand	10YR 3/4		Single Grain	Structureless	Loose
12" - 18"	Fine Sand	10YR3/4	Redox at 12" 10YR 4/6	Single Grain	Structureless	Loose
Observation # : 3	***Primary Site***					
Horizon Depth	**Soil Texture**	**Matrix Color**	**Redox features**	**Shape**	**Grade**	**Consistence**
0" - 8"	Loamy Sand	10YR 2/1		Granular	Strong	Friable
8" - 13"	Fine Sand	10YR 3/4		Single Grain	Structureless	Loose
13" - 16"	Fine Sand	10YR3/4	Redox at 13" 10YR 4/6	Single Grain	Structureless	Loose

SEPTIC CHECK

6074 Keystone Rd Milaca, MN 56353

Phone: (320)-983-2447 Fax: (320)-983-2151 info@septiccheck.com www.SepticCheck.com



Map Scale: 1:1,270 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Aitkin County, Minnesota
Survey Area Data: Version 20, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 24, 2016—Sep 23, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
186	Nemadji loamy fine sand	2.9	58.9%
202	Meehan loamy sand	1.6	33.1%
C4A	Cebana-Giese, frequently ponded-Ronneby complex, 0 to 3 percent slopes, stony	0.0	0.5%
C9B	Mora-Ronneby complex, 1 to 4 percent slopes, stony	0.0	0.5%
W	Water	0.3	6.9%
Totals for Area of Interest		**4.9**	**100.0%**

Aitkin County, Minnesota

186—Nemadji loamy fine sand

Map Unit Setting

National map unit symbol: gjfh
Elevation: 980 to 1,640 feet
Mean annual precipitation: 25 to 30 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

Nemadji and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nemadji

Setting

Landform: Flats on outwash plains
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Sandy outwash

Typical profile

Ap - 0 to 6 inches: loamy fine sand
E,Bw,Bhs - 6 to 34 inches: fine sand
C1,C2 - 34 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Sloping Upland, Low AWC, Acid (G090AN008MN)
Hydric soil rating: No

Minor Components

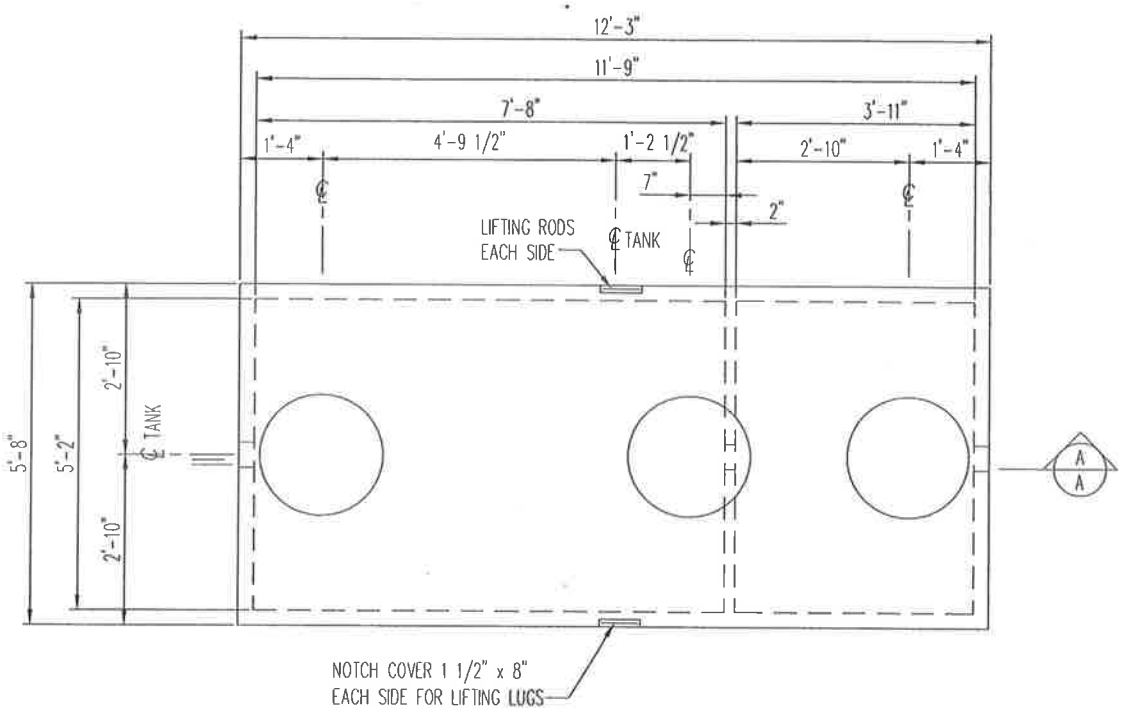
Newson and similar soils
Percent of map unit: 5 percent
Landform: Swales
Hydric soil rating: Yes

Omega and similar soils
Percent of map unit: 5 percent
Hydric soil rating: No

Leafriver and similar soils
Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

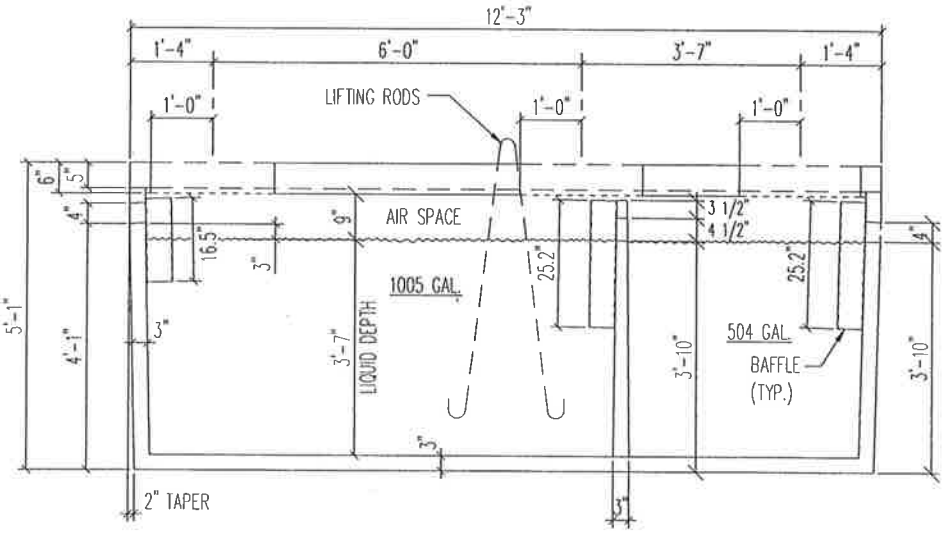
Data Source Information

Soil Survey Area: Aitkin County, Minnesota
Survey Area Data: Version 20, Sep 16, 2019



1500 GALLON 2 COMP. TANK

1/2" = 1'-0"



A/A SECTION

1/2" = 1'-0"

NOTE:

1. PROVIDE MINIMUM 1" CLEAR BETWEEN TOP OF BAFFLE AND UNDERSIDE OF LID.

1500 GALLON 2 COMP. SEPTIC TANK (1500-2C)	Brown Wilbert	WEIGHT=13,600# MAX. SOIL COVER= 7'-0" TOTAL LIQUID VOLUME= 1509 GAL.

TECHNICAL BROCHURE
BPE R1

FEATURES

- Corrosion resistant construction
- Cast iron body
- Thermoplastic impeller and cover.
- Upper sleeve and lower heavy duty ball bearing construction.
- Motor is permanently lubricated for extended service life.
- Powered for continuous operation.
- All ratings are within the working limits of the motor.
- Quick disconnect power cord, 20' standard length, heavy duty 16/3 SJTW with 115 or 230 volt grounding plug.
- Complete unit is heavy duty, portable and compact.
- Mechanical seal is carbon, ceramic, BUNA and stainless steel.
- Stainless steel fasteners

PE

SUBMERSIBLE EFFLUENT PUMP

BUILT IN THE USA
ENGINEERED, ASSEMBLED & TESTED

GOULDS WATER TECHNOLOGY
a xylem brand

APPLICATIONS

Specially designed for the following uses:

- Mound Systems
- Effluent/Dosing Systems
- Low Pressure Pipe Systems
- Basement Draining
- Heavy Duty Sump/Dewatering

SPECIFICATIONS

Pump – General:

- Discharge: 1½" NPT
- Temperature: 104°F (40°C) maximum, continuous when fully submerged.
- Solids handling: ½" maximum sphere.
- Automatic models include a float switch.
- Manual models available.
- Pumping range: see performance chart or curve.

PE31 Pump:

- Maximum capacity: 53 GPM
- Maximum head: 25′ TDH

PE41 Pump:

- Maximum capacity: 61 GPM
- Maximum head: 29' TDH

PE51 Pump:

- Maximum capacity: 70 GPM
- Maximum head: 37' TDH

MOTOR

General:

- Single phase
- 60 Hertz
- 115 and 230 volts
- Built-in thermal overload protection with automatic reset.
- Class B insulation
- Oil-filled design
- High strength carbon steel shaft

PE31 Motor:

- .33 HP, 3000 RPM
- 115 volts
- Shaded pole design

PE41 Motor:

- .40 HP, 3400 RPM
- 115 and 230 volts
- PSC design

PE51 Motor:

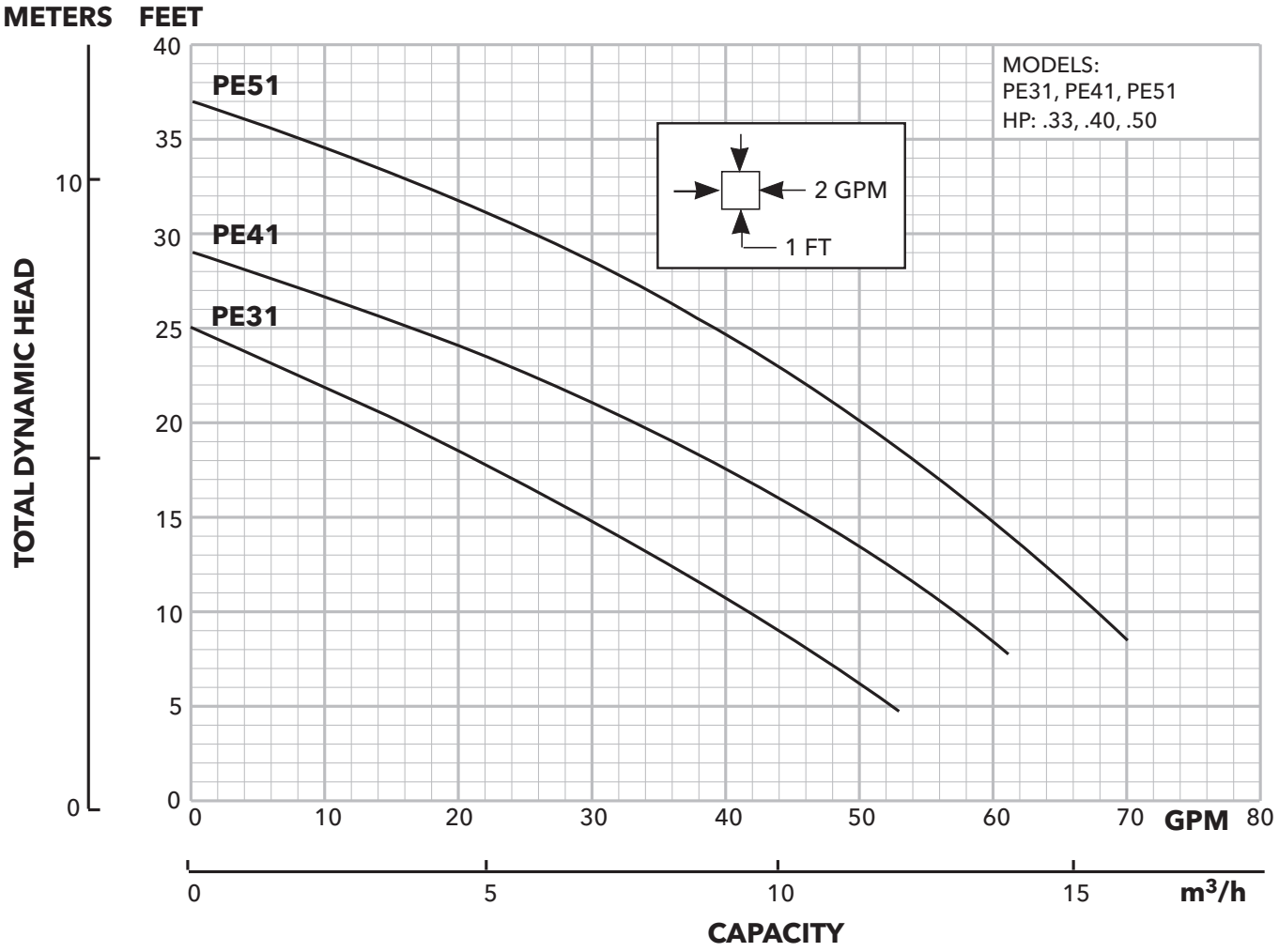
- .50 HP, 3400 RPM
- 115 and 230 volts
- PSC design

AGENCY LISTINGS

Tested to UL 778 and CSA 22.2 108 Standards
By Canadian Standards Association
File #LR38549

PUMP INFORMATION

Order No.	HP	Volts	Amps	Minimum Circuit Breaker	Phase	Float Switch Style	Cord Length	Discharge Connection	Minimum Basin Diameter	Maximum Solids Size	Shipping Weight lbs/kg
PE31M	0.33	115	12	20	1	Manual / No Switch	20'	1.5"	18"	.5"	31 / 14.1
PE31P1						Piggyback Float Switch					
PE41M	0.4		7.5	15		Manual / No Switch					
PE41P1						Piggyback Float Switch					
PE42M		230	3.7	10		Manual / No Switch					
PE42P1						Piggyback Float Switch					
PE51M	0.5	115	9.5	20		Manual / No Switch					
PE51P1						Piggyback Float Switch					
PE52M		230	4.7	10		Manual / No Switch					
PE52P1						Piggyback Float Switch					



PERFORMANCE RATINGS

PE31

Total Head (feet of water)	GPM
5	52
10	42
15	29
20	16
25	0

PE41

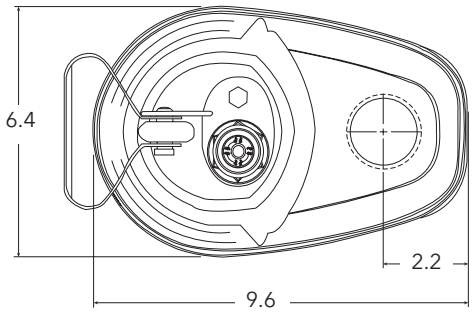
Total Head (feet of water)	GPM
8	61
10	57
15	46
20	33
25	16

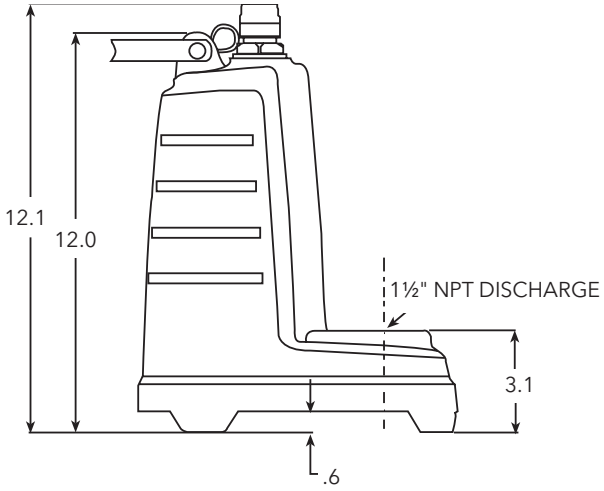
PE51

Total Head (feet of water)	GPM
10	67
15	59
20	50
25	39
30	26
35	8

DIMENSIONS

(All dimensions are in inches. Do not use for construction purposes.)





Xylem Inc.
2881 East Bayard Street Ext., Suite A
Seneca Falls, NY 13148
Phone: (866) 325-4210
Fax: (888) 322-5877
www.gouldswatertechnology.com

PS PATROL® SYSTEM

Outdoor Pedestal High Water Alarm System

The newly enhanced PS Patrol® system features all the same functions you have come to expect, plus so much more over other traditional pedestal-style alarms.

The PS Patrol® features a **built-in high water alarm** and provides a convenient location to connect all wiring required for a pumping station application. It employs a **receptacle** for easy connection of a 120V pump and piggy-back pump switch.

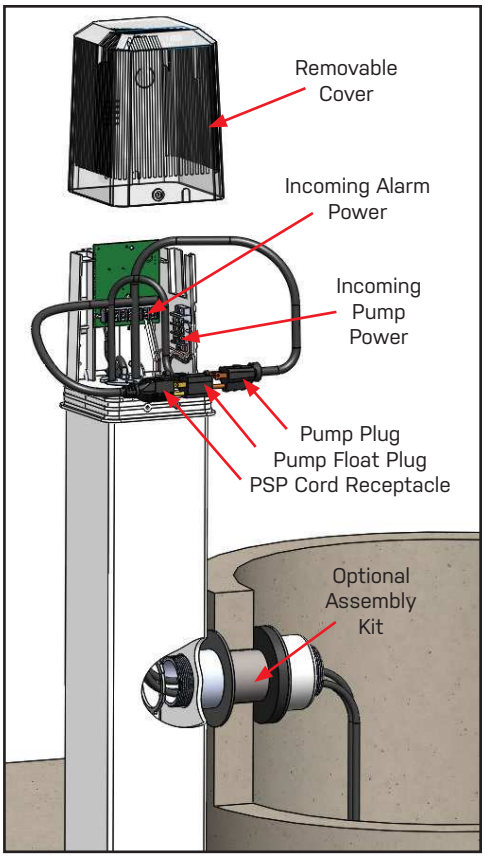
The sleek, angled design of the clear enclosure includes a **removable cover** for easy access for field wiring and viewing components. All internal components are sealed within the cover for protection from the elements. The **red LEDs illuminate the top of the cover** in an alarm condition for easy 360° visual identification. Available with or without 32" mounting post.

U.S Patent No. 9472,932
and D780,703

LR54245

FEATURES

- Enclosure meets Type 3R water-tight standards
- Innovative design allows alarm to accept a 5" square plastic post or 4" pipe/conduit for mounting
- Automatic alarm reset and green power on indicator
- Flush mount horn silence/alarm test switch
- Auxiliary alarm contacts included for easy attachment of remote devices
- Includes cord seal for sealing switch and pump cables
- Electrical potting cavity to provide easy, reliable method to seal power cables *(electrical duct seal not included)*
- Options include various switch cord lengths, riser assembly adapter, dual alarm, and elapsed time meter



PART NO.	DESCRIPTION
1022728	PSP2 120V, no pump switch, with post
1019021	PSP2 120V, no pump switch, 20A breaker, with post
1022575	PSP2 120V, ETM, with post
1022577	PSP2 120V, DUO alarm, ETM, with post
1018434	PSP2 120V, TAAB indoor alarm, with post
1011551	Assembly Kit (riser extension coupling and washers)

SJE RHOMBUS™

9500020C 08/18

www.sjerhombus.com Toll Free 888-342-5753 Phone 218-847-1317

PS PATROL® System

Provides convenient wiring connection and system monitoring for pump station applications.

The PS Patrol® system features a built-in high water alarm and provides a convenient location to connect all wiring required for a pumping station installation. The PS Patrol® system employs a receptacle to accept a 120 VAC pump and piggy-back style pump switch.

The sleek, angled design of the clear enclosure includes a **removable cover** for easy access for field wiring. All internal components are sealed within the cover for protection from the elements. The **red LED illuminates the cover** in an alarm condition for easy 360° visual identification. Available with or without 32" mounting post.

Shown with Mounting Post
U.S. Patent Nos. D 780,703 and 9,472,932

STANDARD FEATURES

- Controller meets Type 3R watertight standards and is designed for outdoor use
- Built-in high water alarm
- Removable cover provides greater access for field wiring and service
- Controller can be purchased with standard 5" square plastic post or can be mounted on 4" schedule 40/80 PVC pipe or conduit (customer supplied)
- Automatic alarm reset, horn silence and alarm test
- 360° visual alarm; audible alarm
- Red LED illuminates cover in alarm condition
- Green Power On light
- Auxiliary alarm contacts included for easy attachment of remote alarm
- Receptacle for easy connection of pump and piggy-back pump switch
- Cord seal included for sealing switches and pump cable
- Electrical potting cavity provides easy reliable method to seal power cables. (User to provide duct seal)
- CSA Certified
- Five-year limited warranty

LR54245

OPTIONS

- Mercury or mechanical pump switches
- Various cord lengths
- Riser assembly adapter
- Dual alarm (2nd alarm input - Yellow LED illuminates cover in alarm condition)
- Elapsed Time Meter (ETM)
- Pump circuit breaker
- Available with or without 32" post

SPECIFICATIONS

ALARM VOLTAGE: 120 VAC

PUMP VOLTAGE: 120 VAC

ENCLOSURE SIZE:
Controller with post 5" X 5" X 39"
Controller without post 5" X 5" x 8"

RECEPTACLE: 120 VAC - NEMA Type 5-15

AUXILIARY CONTACTS 120 VAC
0.5 amps max., 50/60 Hz
(circuit not supervised)

ALARM HORN: 82 decibels at 10 feet

ALARM FLOAT: SJE SignalMaster® control switch with mounting clamp

SJE RHOMBUS

1-888-DIAL-SJE • 1-218-847-1317
1-218-847-4617 Fax
email: customer.service@sjeinc.com
www.sjerhombus.com

California Prop 65 requires the following: ⚠ WARNING Cancer and Reproductive Harm - www.P65Warnings.ca.gov

SEE REVERSE SIDE FOR ORDERING INFORMATION.

MODEL PSP2 ..... $328.00

MODEL

☐ 120V ..... Base

STARTING DEVICE

☐ 1 = SJE PumpMaster® pump switch (0-13 FLA) ● $49.00
☐ 2 = SJE PumpMaster® Plus pump switch (0-15 FLA) ● $65.00
☐ 3 = 120 VAC Double Float® pump switch (0-15 FLA) ▲ $111.00
☐ 5 = Super Single® pump switch (120V = 0-15 FLA) ▲ $87.00
☐ 6 = No pump switch ..... Base
☐ 7 = 120 VAC Double Float® Master pump switch (0-15 FLA) ● ..... $97.00 _____

FLOAT SWITCH APPLICATION

☐ H = pump down (select 17 option) ..... Base
☐ X = no floats ..... -$27.00 _____

OPTIONS ***Listed below***

Total Options _____

TOTAL LIST PRICE _____

	CODE	DESCRIPTION	LIST PRICE
☐	1J	Duo alarm inputs	$74.00
☐	1V	Vertical Reed Switch *(must select 1J)*	$69.00
☐	8A	Elapsed time meter	$80.00
☐	10X	No Mounting Post	-$32.00
☐	15_P	Pump breaker	$64.00

specify 0 or 1 after number 15 followed by letter "P"
0 = 15 amp breaker (0-7 FLA)
1 = 20 amp breaker (7-15 FLA)
(Ex. 151P = 20 amp breaker, 7-15 FLA)

	CODE	DESCRIPTION	LIST PRICE
☐	16A	10' cord in lieu of 20' *(per float)*	-$3.00
		(Does not apply for Double Float® or Double Float® Master pump switch)	
☐	16B	15' cord in lieu of 20' *(per float)*	-$2.00
☐	16C	30' cord in lieu of 20' *(per float)*	$5.00
☐	16D	40' cord in lieu of 20' *(per float)*	$7.00
☐	17A	SJE SignalMaster® / pipe clamp (*alarm float*) ●	-$3.00
☐	17J	Sensor Float® / pipe clamp (*alarm float*) ▲	$4.00
☐	22F	PSP Assembly Kit	$58.00

● Mechanically-activated ▲ Mercury-activated

Part Number	Model Number	Description	FLA	List Price	Ship Weight
1022728	PSP2120V6H17A	PSP2 120V, no pump switch, 20' SJE SignalMaster®, with mounting post	0-15	$325.00	13 lbs.
1019021	PSP2120V6H151P17J	PSP2 120V, no pump switch, 20' Sensor Float®, 20A circuit breaker, with mounting post	7-15	$396.00	13 lbs.
1022575	PSP2120V6H8A17A	PSP2 120V, ETM, 20' SJE SignalMaster®, with mounting post	0-15	$405.00	14 lbs.
1022577	PSP2120V6H1JV8A17A	PSP2 120V, Duo alarm, ETM, 20' SJE SignalMaster® & VRS, with mounting post	0-15	$548.00	15 lbs.
1018434	PSP2AB6H16B17A	PSP2 120V, no alarm, no pump switch; remote TAAB, 15' SJE SignalMaster®, with mounting post	0-15	$297.00	16 lbs.
1011551	Assembly Kit	Riser Extension Coupling and Washers	n/a	$66.00	10 lbs.

Call or fax your order!
1-888-DIAL-SJE (1-888-342-5753) • Fax 218-847-4617

SJE RHOMBUS®

www.sjerhombus.com
customer.service@sjeinc.com

Product offering and pricing are subject to change without notice.
*Please visit **www.sjerhombus.com** for the most current information.*

PS Patrol® System with 120V Alarm Installation Instructions

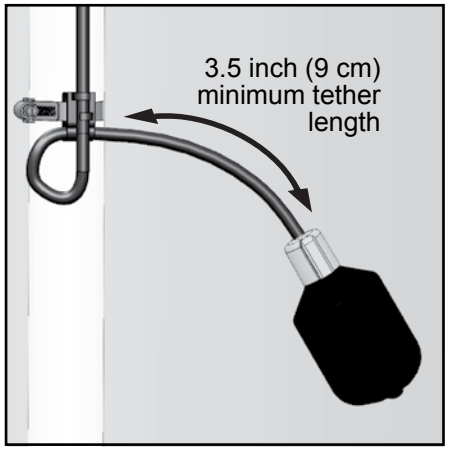
WARNING!

ELECTRICAL SHOCK HAZARD
Disconnect all power sources before servicing. Failure to do so could result in serious injury or death.

This control panel must be installed and serviced by a licensed electrician in accordance with the National Electric Code NFPA-70, state and local electrical codes.

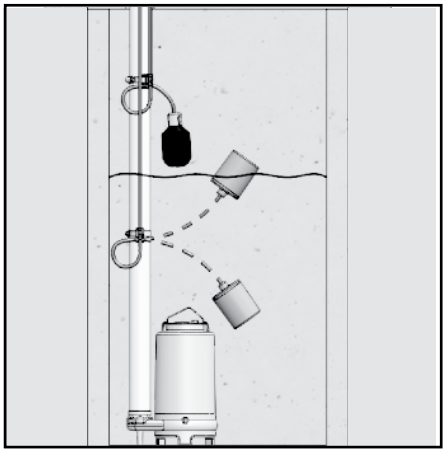
Installation Instructions

Figure 1



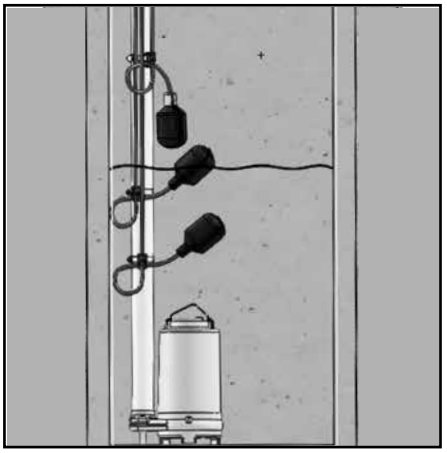
Install alarm float and pump float. (Mounting Clamp detail)

Figure 2



Wide angle* float system.
**SJE PumpMaster®, SJE PumpMaster® Plus, or Super Single® pump switches*

Figure 3



SJE Double Float® Master and Double Float® pump switches

DETERMINING PUMPING RANGE (IN INCHES)

Super Single® pumping range	tether length	3.5	5	7	9	11	13	15
	pumping range	6.5	7.5	8.5	10	11	12.5	13.5
SJE PumpMaster® & SJE PumpMaster Plus® pumping range	tether length	3.5	6	10	9	14	18	22
	pumping range	7	10	16	22	28	33	36

Use only as a guide. Pumping ranges are based on testing in non-turbulent conditions. Range may vary due to water temperature and cord shape.

***Note:** As the tether length increases, so does the variance of the pumping range.*

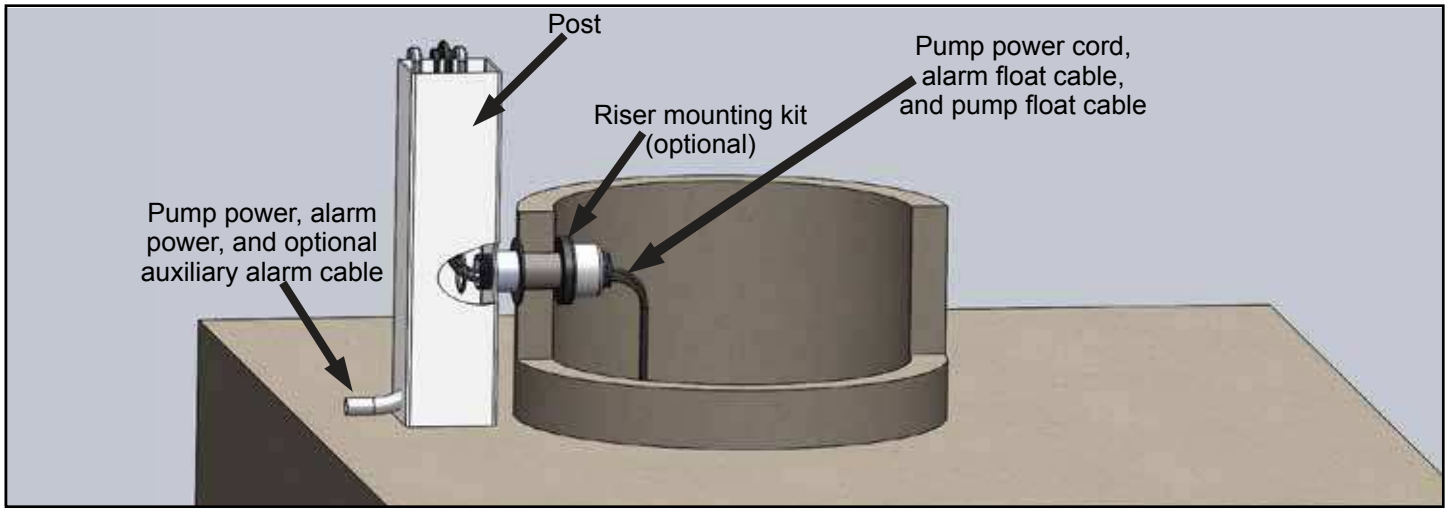
SJE-Rhombus®

22650 County Highway 6 ■ P.O. Box 1708 ■ Detroit Lakes, Minnesota 56502 USA
1-888-DIAL-SJE (1-888-342-5753) ■ Phone: 218-847-1317 ■ Fax: 218-847-4617
E-mail: customer.service@sjerhombus.com ■ Website: www.sjerhombus.com

PN1039317A • Rev 10/14

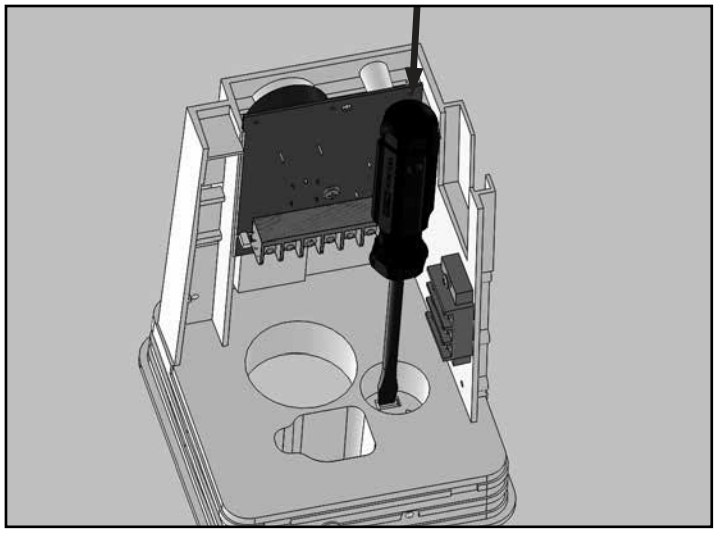
Installation Instructions

Figure 4



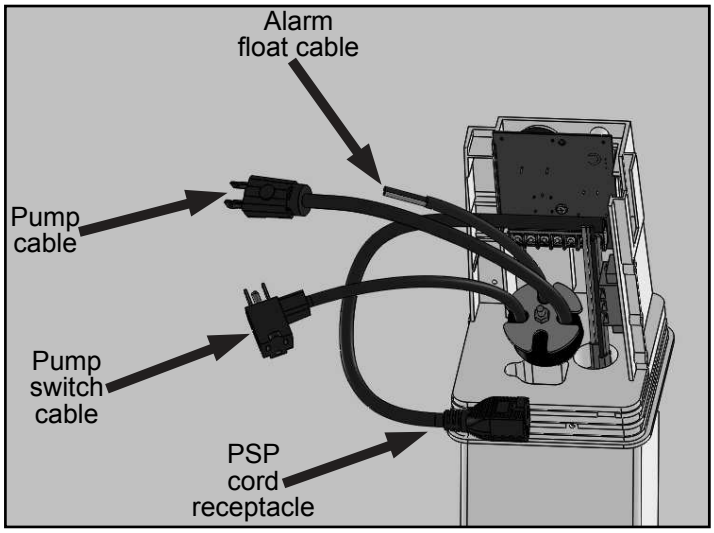
Run cables through optional riser mounting kit and post.

Figure 5



Punch out power cable knock outs as shown.
Note: Only remove knock outs for number of cables used.

Figure 6



Holding base, run cables through cord seal holes.

Figure 7

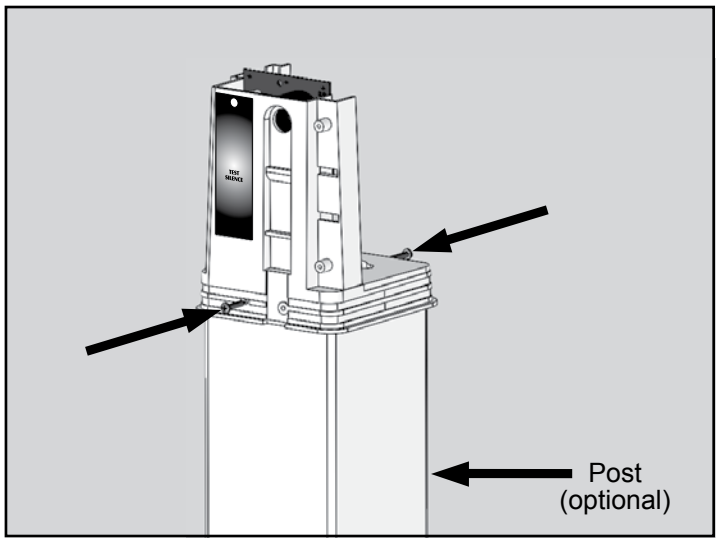
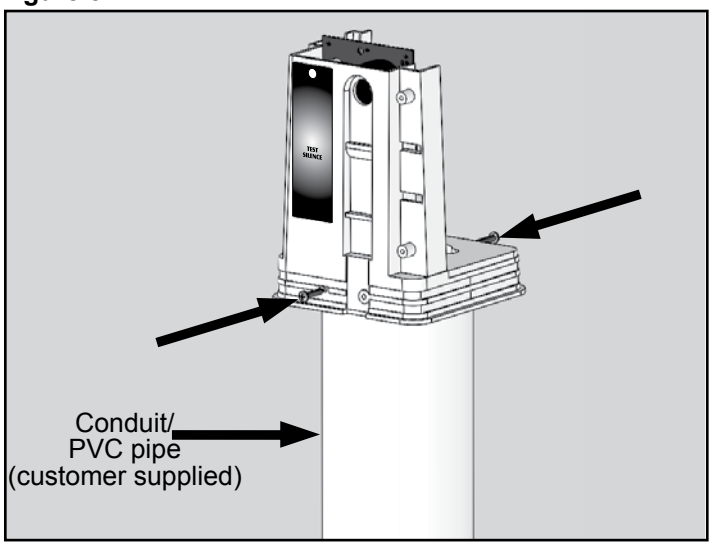


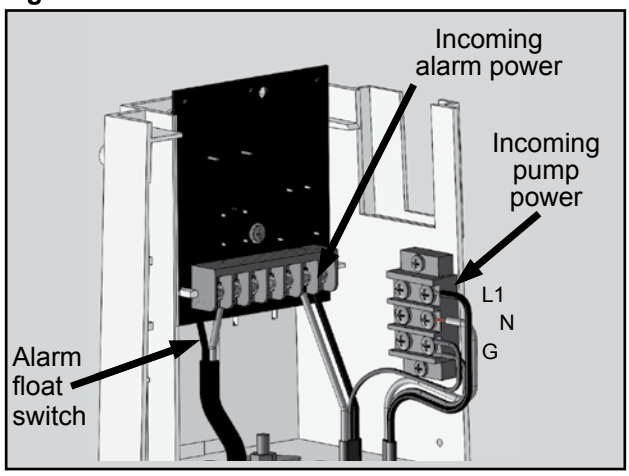
Figure 8



Mount PS Patrol® to post. **Note:** PS Patrol® can be mounted to optional square plastic post as shown in **Figure 7** or 4 inch conduit / PVC Pipe (customer supplied) as shown in **Figure 8.** Use #8 x 1" screws only.

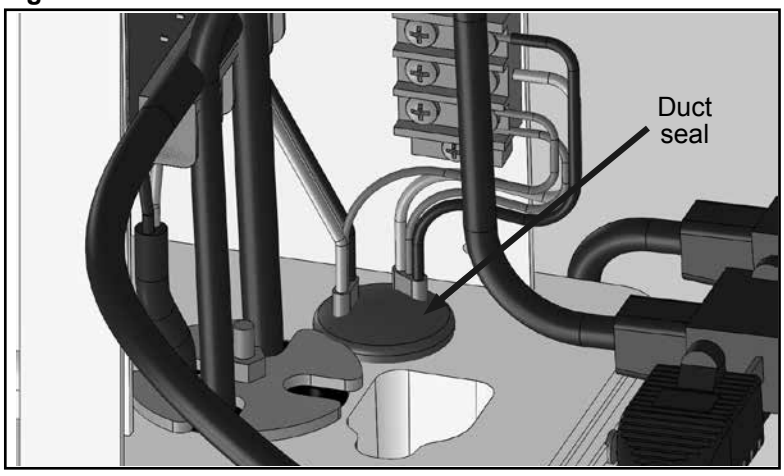
Installation Instructions

Figure 9



Connect alarm power, pump power and alarm float switch as shown.

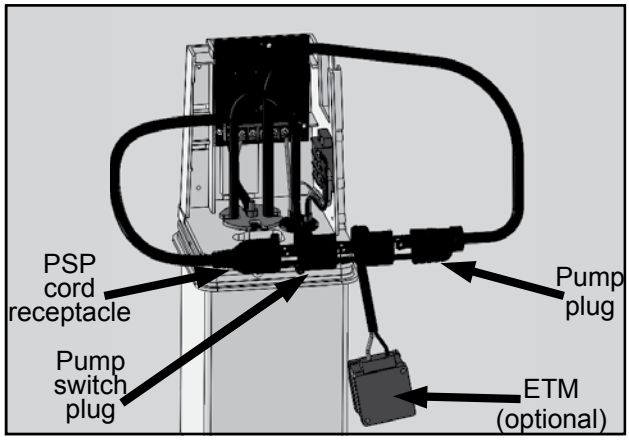
Figure 10



Use electrical duct seal to fill around incoming power cords. Ensure pocket is filled completely and the gaps filled around each cable.

WARNING: Failure to do so will allow sewer gases to enter control panel causing corrosion and failure of electrical components.

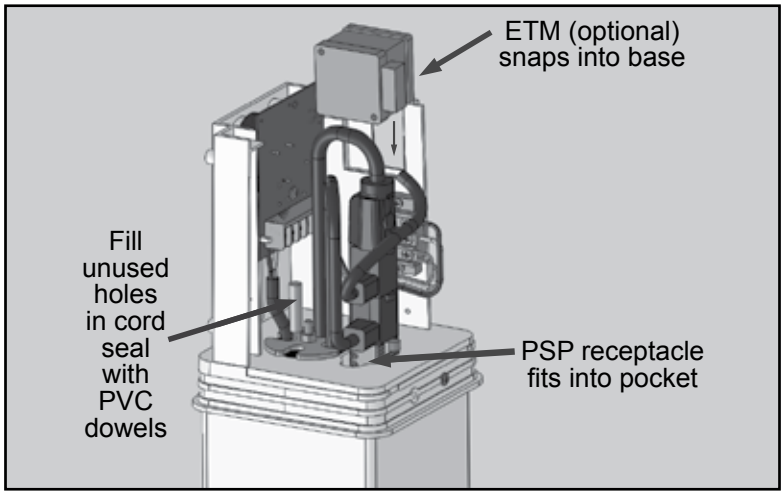
Figure 11



Plug pump switch piggy-back plug into PSP cord receptacle. If using optional ETM, plug this into back of pump switch piggy-back plug. Plug pump in last.

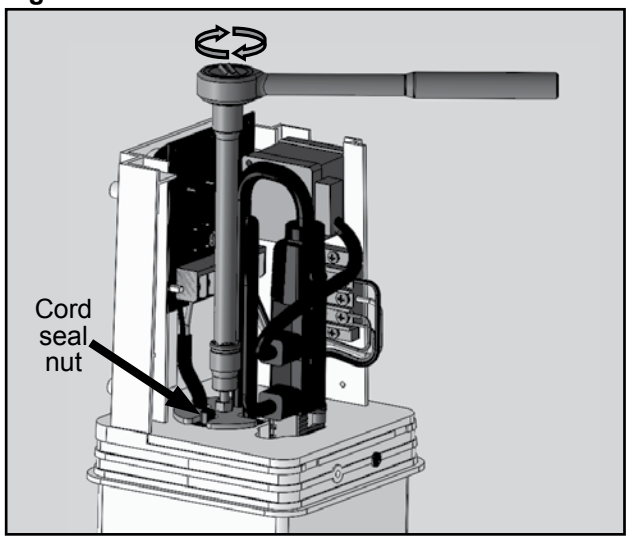
WARNING: Failure to have the plugs in order described as shown will effect proper operation of system.

Figure 12



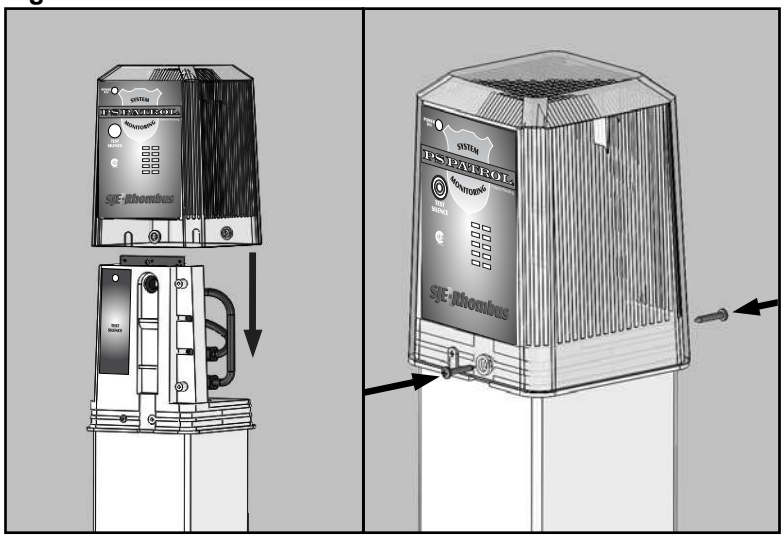
If ETM is used, snap into location as shown. Arrange cords as shown. Receptacle is inserted into pocket. Push excess cord back through cord seal. Install PVC dowels into unused holes of cord seal.

Figure 13



Firmly tighten cord seal nut so that cables do not move and cord seal is held in place.

Figure 14



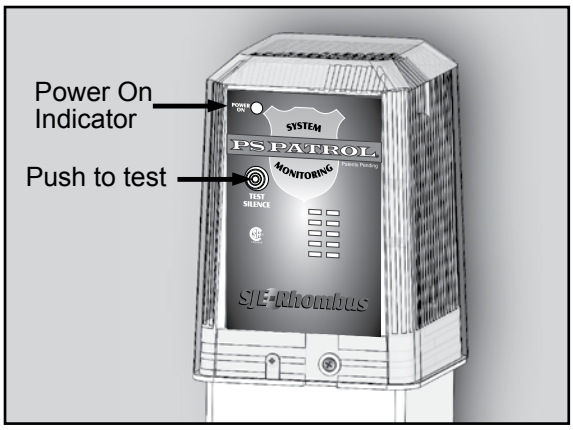
Install cover on base and screw into place.

Installation Instructions

WARNING!

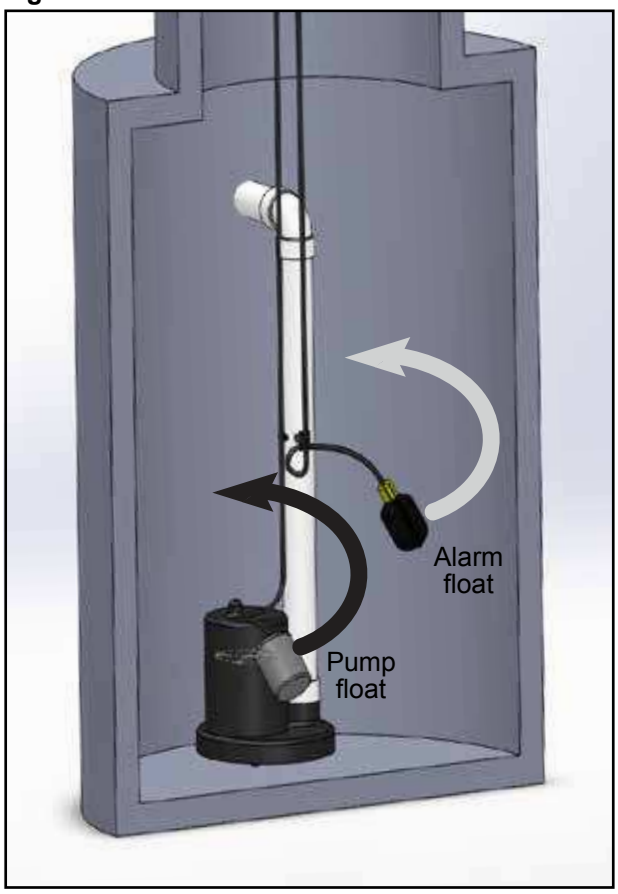
ELECTRICAL SHOCK HAZARD
Disconnect all power sources before servicing. Failure to do so could result in serious injury or death.

Figure 15



Turn on power and test alarm by pressing the test silence switch. Horn will sound and alarm light will illuminate.

Figure 16



Perform final testing on system by lifting pump and alarm float. When pump float is lifted, the pump will turn on. When alarm float is lifted, the alarm horn will sound and alarm light will illuminate.

SJE-Rhombus® Five-Year Limited Warranty

SJE-RHOMBUS® warrants to the original consumer that this product shall be free of manufacturing defects for five years after the date of consumer purchase. During that time period and subject to the conditions set forth below, **SJE-RHOMBUS®** will repair or replace, for the original consumer, any component which proves to be defective due to defective materials or workmanship of **SJE-RHOMBUS®**.

ELECTRICAL WIRING AND SERVICING OF THIS PRODUCT MUST BE PERFORMED BY A LICENSED ELECTRICIAN.

THIS WARRANTY DOES NOT APPLY: (A) to damage due to lightning or conditions beyond the control of **SJE-RHOMBUS®**; **(B)** to defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with printed instructions provided; **(C)** to failures resulting from abuse, misuse, accident, or negligence; **(D)** to units which are not installed in accordance with applicable local codes, ordinances, or accepted trade practices, and **(E)** to units repaired and/or modified without prior authorization from **SJE-RHOMBUS®**.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

TO OBTAIN WARRANTY SERVICE: The consumer shall assume all responsibility and expense for removal, reinstallation, and freight. Any item to be repaired or replaced under this warranty must be returned to **SJE-RHOMBUS®**, or such place as designated by **SJE-RHOMBUS®**.

ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS ARE LIMITED TO THE DURATION OF THIS WRITTEN WARRANTY. SJE-RHOMBUS® SHALL NOT, IN ANY MANNER, BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES AS A RESULT OF A BREACH OF THIS WRITTEN WARRANTY OR ANY IMPLIED WARRANTY.

NOTICE!
Products returned must be cleaned, sanitized, or decontaminated as necessary prior to shipment to ensure that employees will not be exposed to health hazards in handling said material. All applicable laws and regulations shall apply.

UNIVERSITY OF MINNESOTA

Septic System Management Plan for Above Grade Systems

The goal of a septic system is to protect human health and the environment by properly treating wastewater before returning it to the environment. Your septic system is designed to kill harmful organisms and remove pollutants before the water is recycled back into our lakes, streams and groundwater.

This **management plan** will identify the operation and maintenance activities necessary to ensure long-term performance of your septic system. Some of these activities must be performed by you, the homeowner. Other tasks must be performed by a licensed septic maintainer or service provider. However, it is **YOUR** responsibility to make sure all tasks get accomplished in a timely manner.

The University of Minnesota's *Septic System Owner's Guide* contains additional tips and recommendations designed to extend the effective life of your system and save you money over time.

Proper septic system design, installation, operation and maintenance means safe and clean water!

Property Owner	Joel Schilling	Email	134bsbcsmret@gmail.com
Property Address	38039 State Hwy 18, Aitkin, MN. 56431	Property ID	36-0-033302
System Designer	Septic Check	Contact Info	320-983-2447
System Installer	Septic Check	Contact Info	320-983-2447
Service Provider/Maintainer		Contact Info	
Permitting Authority	Aitkin County	Contact Info	218-927-7342
Permit #		Date Inspected	

Keep this Management Plan with your Septic System Owner's Guide. The Septic System Owner's Guide includes a folder to hold maintenance records including pumping, inspection and evaluation reports. Ask your septic professional to also:

- Attach permit information, designer drawings and as-built of your system, if they are available.
- Keep copies of all pumping records and other maintenance and repair invoices with this document.
- Review this document with your maintenance professional at each visit; discuss any changes in product use, activities, or water-use appliances.

For a copy of the *Septic System Owner's Guide*, visit www.bookstores.umn.edu and search for the word "septic" or call 800-322-8642.

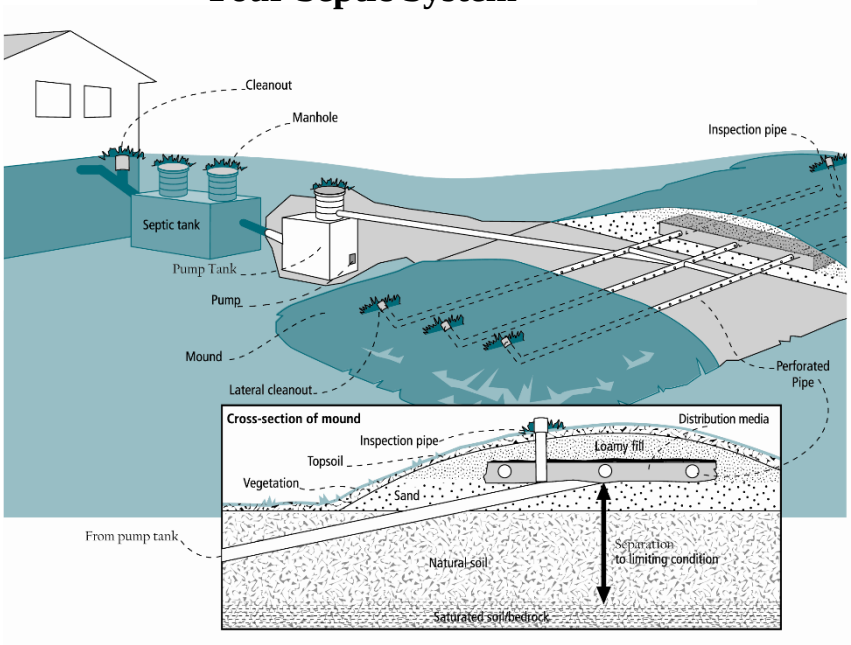
For more information see http://septic.umn.edu

Version: August 2015

UNIVERSITY OF MINNESOTA

Septic System Management Plan for Above Grade Systems

Your Septic System



Septic System Specifics

System Type: (●) I ( ) II ( ) III ( ) IV* ( ) V*

(*Based on MN Rules Chapter 7080.2200 – 2400)*

**Additional Management Plan required*

☐ System is subject to operating permit*

☐ System uses UV disinfection unit*

Type of advanced treatment unit _____

Dwelling Type

Number of bedrooms: 3

System capacity/ design flow (gpd): 450

Anticipated average daily flow (gpd): _____

Comments_____

Business? : ( ) Y (●) N What type? _____

Well Construction

Well depth (ft): _____

- ❑ Cased well Casing depth: _____
- ❑ Other (specify): _____

Distance from septic (ft): >50'

Is the well on the design drawing? (●) Y ( ) N

Septic Tank

- ❑ First tank *Tank volume:* 1000 *gallons*
  Does tank have two compartments? (●) Y ( ) N
- ❑ Second tank *Tank volume:* _____ *gallons*
- ❑ Tank is constructed of Concrete
- ❑ Effluent screen: ( ) Y (●) N Alarm (●) Y ( ) N

- ❑ Pump Tank 500 *gallons*
- ❑ Effluent Pump *make/model*: Goulds PE 41
  Pump capacity 29.0 GPM
  TDH 17.6 Feet of head
- ❑ Alarm location Outdoor Powerpost

Soil Treatment Area (STA)

Mound/At-Grade area (width x length): 40 ft x 68 ft

Rock bed size (width x length): 10 ft x 38 ft

Location of additional STA: _____

Type of distribution media: 1 1/2" washed rock

☑ Inspection ports ☑ Cleanouts

☐ Surface water diversions

☐ Additional STA not available

Homeowner Management Tasks

These op*eration and maintenance ac*tivities are your responsibility. *Chart on page 6 can help track your activities.*

Your toilet is not a garbage can. Do not flush anything besides human waste and toilet paper. No wet wipes, cigarette butts, disposal diapers, used medicine, feminine products or other trash!

The system and septic tanks needs to be checked every 36 months

Your service provider or pumper/maintainer should evaluate if your tank needs to be pumped more or less often.

Seasonally or several times per year

- *Leaks.* Check (listen, look) for leaks in toilets and dripping faucets. Repair leaks promptly.
- *Soil treatment area.* Regularly check for wet or spongy soil around your soil treatment area. If surfaced sewage or strong odors are not corrected by pumping the tank or fixing broken caps and leaks, call your service professional. *Untreated sewage may make humans and animals sick.* Keep bikes, snowmobiles and other traffic off and control borrowing animals.
- *Alarms.* Alarms signal when there is a problem; contact your service professional any time the alarm signals.
- *Lint filter.* If you have a lint filter, check for lint buildup and clean when necessary. If you do not have one, consider adding one after washing machine.
- *Effluent screen.* If you do not have one, consider having one installed the next time the tank is cleaned along with an alarm.

Annually

- *Water usage rate.* A water meter or another device can be used to monitor your average daily water use. Compare your water usage rate to the design flow of your system (listed on the next page). Contact your septic professional if your average daily flow over the course of a month exceeds 70% of the design flow for your system.
- *Caps.* Make sure that all caps and lids are intact and in place. Inspect for damaged caps at least every fall. Fix or replace damaged caps before winter to help prevent freezing issues.
- *Water conditioning devices.* See Page 5 for a list of devices. When possible, program the recharge frequency based on *water demand (gallons)* rather than *time (days)*. Recharging too frequently may negatively impact your septic system. Consider updating to demand operation if your system currently uses time,
- *Review your water usage rate.* Review the Water Use Appliance chart on Page 5. Discuss any major changes with your service provider or pumper/maintainer.

During each visit by a service provider or pumper/maintainer

- Make sure that your service professional services the tank through the manhole. (NOT though a 4" or 6" diameter inspection port.)
- Ask how full your tank was with sludge and scum to determine if your service interval is appropriate.
- Ask your pumper/maintainer to accomplish the tasks listed on the Professional Tasks on Page 4.

Professional Management Tasks

These are the operation and maintenance activities that a pumper/maintainer performs to help ensure long-term performance of your system. At each visit a written report/record must be provided to homeowner.

Plumbing/Source of Wastewater

- Review the Water Use Appliance Chart on Page 5 with homeowner.
  Discuss any changes in water use and the impact those changes may have on the septic system.
- Review water usage rates (if available) with homeowner.

Septic Tank/Pump Tanks

- *Manhole lid*. A riser is recommended if the lid is not accessible from the ground surface. Insulate the riser cover for frost protection.
- *Liquid level*. Check to make sure the tank is not leaking. The liquid level should be level with the bottom of the outlet pipe. (If the water level is below the bottom of the outlet pipe, the tank may not be watertight. If the water level is higher than the bottom of the outlet pipe of the tank, the effluent screen may need cleaning, or there may be ponding in the soil treatment area.)
- *Inspection pipes*. Replace damaged or missing pipes and caps.
- *Baffles*. Check to make sure they are in place and attached, and that inlet/outlet baffles are clear of buildup or obstructions.
- *Effluent screen*. Check to make sure it is in place; clean per manufacturer recommendation. Recommend retrofitted installation if one is not present.
- *Alarm*. Verify that the alarm works.
- *Scum and sludge*. Measure scum and sludge in each compartment of each septic and pump tank, pump if needed.

Pump

- *Pump and controls*. Check to make sure the pump and controls are operating correctly.
- *Pump vault*. Check to make sure it is in place; clean per manufacturer recommendations.
- *Alarm*. Verify that the alarm works.
- *Drainback*. Check to make sure it is draining properly.
- *Event counter or elapsed time meter*. Check to see if there is an event counter or elapsed time meter for the pump. If there is one or both, calculate the water usage rate and compare to the anticipated use listed on Design and Page 2. Dose Volume: _____ gallons: Pump run time: _____ Minutes

Soil Treatment Area

- *Inspection pipes*. Check to make sure they are properly capped. Replace caps and pipes that are damaged.
- *Surfacing of effluent*. Check for surfacing effluent or other signs of problems.
- *Lateral flushing*. Check lateral distribution; if cleanouts exist, flush and clean at recommended frequency.
- *Vegetation* - Check to see that a good growth of vegetation is covering the system.

All other components – evaluate as listed here:

Water-Use Appliances and Equipment in the Home

Appliance	Impacts on System	Management Tips
Garbage disposal	• Uses additional water. • Adds solids to the tank. • Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area.	• Use of a garbage disposal is not recommended. • Minimize garbage disposal use. Compost instead. • To prevent solids from exiting the tank, have your tank pumped more frequently. • Add an effluent screen to your tank.
Washing machine	• Washing several loads on one day uses a lot of water and may overload your system. • Overloading your system may prevent solids from settling out in the tank. Unsettled solids can exit the tank and enter the soil treatment area.	• Choose a front-loader or water-saving top-loader, these units use less water than older models. • Limit the addition of extra solids to your tank by using liquid or easily biodegradable detergents. Limit use of bleach-based detergents and fabric softeners. • Install a lint filter after the washer and an effluent screen to your tank • Wash only full loads and think even – spread your laundry loads throughout the week.
Dishwasher	• Powdered and/or high-phosphorus detergents can negatively impact the performance of your tank and soil treatment area. • New models promote “no scraping”. They have a garbage disposal inside.	• Use gel detergents. Powdered detergents may add solids to the tank. • Use detergents that are low or no-phosphorus. • Wash only full loads. • Scrape your dishes anyways to keep undigested solids out of your septic system.
Grinder pump (in home)	• Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area.	• Expand septic tank capacity by a factor of 1.5. • Include pump monitoring in your maintenance schedule to ensure that it is working properly. • Add an effluent screen.
Large bathtub (whirlpool)	• Large volume of water may overload your system. • Heavy use of bath oils and soaps can impact biological activity in your tank and soil treatment area.	• Avoid using other water-use appliances at the same time. For example, don’t wash clothes and take a bath at the same time. • Use oils, soaps, and cleaners in the bath or shower sparingly.
Clean Water Uses	**Impacts on System**	**Management Tips**
High-efficiency furnace	• Drip may result in frozen pipes during cold weather.	• Re-route water directly out of the house. Do not route furnace discharge to your septic system.
Water softener Iron filter Reverse osmosis	• Salt in recharge water may affect system performance. • Recharge water may hydraulically overload the system.	• These sources produce water that is not sewage and should not go into your septic system. • Reroute water from these sources to another outlet, such as a dry well, draintile or old drainfield. • When replacing, consider using a demand-based recharge vs. a time-based recharge. • Check valves to ensure proper operation; have unit serviced per manufacturer directions
Surface drainage Footing drains	• Water from these sources will overload the system and is prohibited from entering septic system.	

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Septic System Management Plan for Above Grade Systems

Homeowner Maintenance Log

Track maintenance activities here for easy reference. See list of management tasks on pages 3 and 4.

Activity	Date accomplished									
Check frequently:										
Leaks: check for plumbing leaks*										
Soil treatment area check for surfacing**										
Lint filter: check, clean if needed*										
Effluent screen (if owner-maintained)***										
Alarm**										
Check annually:										
Water usage rate (maximum gpd _____)										
Caps: inspect, replace if needed										
Water use appliances – review use										
Other:										

*Monthly

**Quarterly

***Bi-Annually

Notes: If flow exceeds system capacity, check for and repair any leaks into the system, including household plumbing fixtures. If system ponds or otherwise cannot handle flow, repair options include; add time dosing, adding pre-treatment, or expanding the system.

"As the owner of this SSTS, I understand it is my responsibility to properly operate and maintain the sewage treatment system on this property, utilizing the Management Plan. If requirements in this Management Plan are not met, I will promptly notify the permitting authority and take necessary corrective actions. If I have a new system, I agree to adequately protect the reserve area for future use as a soil treatment system."

Property Owner Signature: Joel Schilling Date 11-7-2019

Management Plan Prepared By: Melissa Besser Certification # 691

Permitting Authority: Aitkin County