

Aitkin

~~Crow Wing~~ County Pressure Bed/Trench with Pump Design

Property Owner: PALME, DONALD Date: 5/28/2024

Mailing Address: 2158 64TH ST

City: LINO LAKES State: MN Zip: 55110

Home Phone Number: _____ Cell: _____

Site Address: 32891 STATE HWY 18

City: AITKIN State: MN Zip: 56431

Driving directions if no address issued: _____

Legal Description: _____

Sec: 32 Twp: 45 Range: 25 Twp Name: WEALTHWOOD

Parcel Number: 21-1-070500

Lake/ River: MILLE LACS Lake/River Classification: GD

Flow Data

Number of Bedrooms: 3

Dwelling Classification:

System Type:

GPD: 450

Estimated Flow in Gallons per Day (GPD)			
Bedrooms	Class I	Class II	Class III
2	300	225	180
3	450	300	218
4	600	375	256
5	750	450	294
6	900	525	332
7	1050	600	370
8	1200	675	408

Wells

Deep Well: Existing Deep

Shallow Well: Select One

Wells to be sealed (if applicable)? _____

Setbacks

Tank(s) to: Well 84'

Drainfield to: Well 120'

Sewer Line to well: 84'

House 50'

House 50'

Air Test: No

Property Line 10'

Property Line 30'

Additional System Notes and Information: USING EXISTING TANK AND ADDING A 500 GALLON LIFT TANK

Designer Name: TOM ANTONSEN

License Number: L1054

Address: 17633 STATE HWY 6

City: DEERWOOD State: MN Zip: 56444

Home Phone Number: 218-534-3355 Cell: 218-851-7757

E-Mail Address: antonsenexc@gmail.com

Designer Signature: *Tom Antonsen* Date: 5/28/2024

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Property Owner: PALME, DONALD

Date: 5/28/2024

Designer's Initials: tla

Tank Sizing

- A. Septic Tank Capacity: 1350 Gallons
 Tank Type: 1 Compartments Filter: No
 Garbage Disposal/Basement Lift Station: No Disposal or Lift
- B. Pump Tank Capacity: 500 Gallons (7080.2100)
 a. Alarm Type: Manual

Septic Tank Capacity		
Bedrooms	Minimum	GD/BL
3 or less	1,000	1,500
4 or 5	1,500	2,250
6 or 7	2,000	3,000

Soils

- C. Depth to Restricting Layer: 5.7 ft.
- D. Native SSF: 1.27
 (Perc. Rate [Optional] MPI)

Absorption Width Ratio Table		
Texture	SSF	AWR
Sand	0.83	1.00
Fine Sand	1.67	2.00
Sandy Loam	1.27	1.52
Loam	1.67	2.00
Silt Loam	2.00	2.40
Clay Loam	2.20	2.67

****Enter GPD next to the type of system****

Rock Trenches

- E. 6 in. Trench Depth GPD × D = 0.0 sq. ft. Cubic Yards of Rock: 0.0 yds³
- F. 12 in. Trench Depth GPD × D × .8 = 0.0 sq. ft. Cubic Yards of Rock: 0.0 yds³
- G. 18 in. Trench Depth GPD × D × .66 = 0.0 sq. ft. Cubic Yards of Rock: 0.0 yds³
- H. 24 in. Trench Depth GPD × D × .6 = 0.0 sq. ft. Cubic Yards of Rock: 0.0 yds³
- I. Divide (E-H) by Trench Width for lineal feet: 0.0 ÷ 3 = 0.0

Chamber Trenches

- J. Brand: Dimensions of one chamber (L x W): 1.0 ft. × 3.0 ft.
- K. 6-11 in. Chamber Depth GPD × D = 0.0 sq. ft.
- L. 12 in. Chamber Depth GPD × D × .8 = 0.0 sq. ft.
- M. Select from (K-L) if installing Chamber Trenches: 0.0
- N. Divide (M) by Trench Width for lineal feet: 0.0 ÷ 1 = 0.0 Lineal Feet
- O. Total Chambers Needed (Round Up): 0.0 Chambers

Pressure Beds

- P. Pressure Bed 450 GPD × D = 571.5 sq. ft.
 a. Bed Dimensions 12.0 ft. × 47.6 ft.
 b. Cubic Yards of Rock Bed Length × Bed Width × Rock Depth 1 ft. ÷ 27 = 21.2 yds³

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ADDING A 500 GALLON LIFT TANK -

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Determine Pump Capacity

1) Gravity Distribution Pump Capacity Range: 10 - 45 GPM

*Skip to Pump Head Requirements if pumping to gravity

2) Pressure Distribution:

a) Number of laterals: 4

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b) Lateral Size: 1.5 in.

c) Perforation spacing: 4.0 ft.

d) Check Table 4 to see the maximum number of perforations per lateral.

3) Lateral Length (choose):

a) End manifold: rock bed length: 0.0 - 2 ft. = -2.0 ft.

b) Center manifold: rock bed length /2: 0.0 - 1 ft. = -1.0 ft.

c) Choose 3a or 3b: 46.0 ft.

4) Total Perforation Determination:

a) Length (3c) ÷ Spacing (2c): 4.0 + 1 = 12.5 Perforations / Lateral

b) (4a): 12.5 × (2a): 4 = 50.0 Total Number of Perforations

c) Select perforation discharge from Table 1 = 0.74 GPM/Perf.

d) (4b): 50.0 × (4c): 0.74 GPM/Perf. = 37.0 GPM

PUMP HEAD REQUIREMENTS

5) Elevation difference:

a) Elevation difference between pump and point of discharge 7.0 ft.

b) If pumping to a pressure distribution system, (5a) 7.0 + 5 = 12.0 ft.

c) Choose 5a if pumping to gravity or 5b for pressure: 12 ft.

6) Friction loss:

a) Select a value from Table 2: 2.64 ft. / 100 ft. of pipe

b) Pipe length to drainfield: 100 ft. × 1.25 = 125.0 ft.

c) (6a): 2.64 × (6b): 125.0 ÷ 100 = 3.3 Total Friction Loss

7) Drainback:

a) Actual Pipe length 100 ft. × 0.17 gal/ft. (Table 3) = 17.0 gal

8) (5c): 12 ft. + (6c): 3.3 ft. = 15.3 Total Head Required

9) Minimum Pump Size 37.0 GPM (4d) & 15.3 ft. of dynamic head (8)

Designer's Initials: tla

Table 1 Perforation Discharge (GPM/perf.)		
Ft. of Head	7/32 Perf Diameter	1/4 Perf Diameter
1.0	0.56 in.	0.74 in.
2.0	0.80 in.	1.04 in.

Table 2 Friction Loss in Plastic Pipe			
Flow (GPM)	1.5"	2"	3"
20	2.47	0.73	0.11
25	3.73	1.11	0.16
30	5.23	1.55	0.23
35	6.96	2.06	0.30
40	8.91	2.64	0.39
45	11.07	3.28	0.48
50	13.46	3.99	0.58
55		4.76	0.70
60		5.60	0.82
65		6.48	0.95
70		7.44	1.09

Use 1.0 for single homes, 2.0 for everything else

Table 3 Volume of Liquid in Pipe	
Pipe Diameter	Gal/Ft.
1.25 in.	0.078
1.5 in.	0.11
2.0 in.	0.17

Table 4 Max Perforations/Lateral			
Perf. Spacing	1.25" Pipe	1.5" Pipe	2" Pipe
2.5 ft.	14	18	28
3 ft.	13	17	26
3.3 ft.	12	16	25
4 ft.	11	15	23
5 ft.	10	14	22

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Designer's Initials: ta

Proposed Site Boring #1

Depth (in)	Texture	Coarse Frag. %	Color	Structure	Redox
15	TOPSOIL		10YR 2/1		
26	SAND		10YR 3/3		
66	SAND		10YR 3/6		

Proposed Site Boring #2

Depth (in)	Texture	Coarse Frag. %	Color	Structure	Redox
15	TOPSOIL		10YR 2/1		
28	SAND		10YR 3/3		
68	SAND		10YR 3/6		
75	COARSE SAND		10YR 5/3		

Alternate Site Boring #1

Depth (in)	Texture	Coarse Frag. %	Color	Structure	Redox

Alternate Site Boring #2

Depth (in)	Texture	Coarse Frag. %	Color	Structure	Redox

Soil Sizing Factors/Hydraulic Loading Rates							
Perc. Rate	Texture	SSF	HLR	Perc. Rate	Texture	SSF	HLR
<0.1	Coarse Sand			16 to 30	Loam	1.67	0.60
0.1 to 5	Sand	0.83	1.20	31 to 45	Silt Loam	2.00	0.50
0.1 to 5	Fine Sand	1.67	0.60	46 to 60	Clay Loam	2.20	0.45
6 to 15	Sandy Loam	1.27	0.78	> 60	Clay Loam	****	0.24

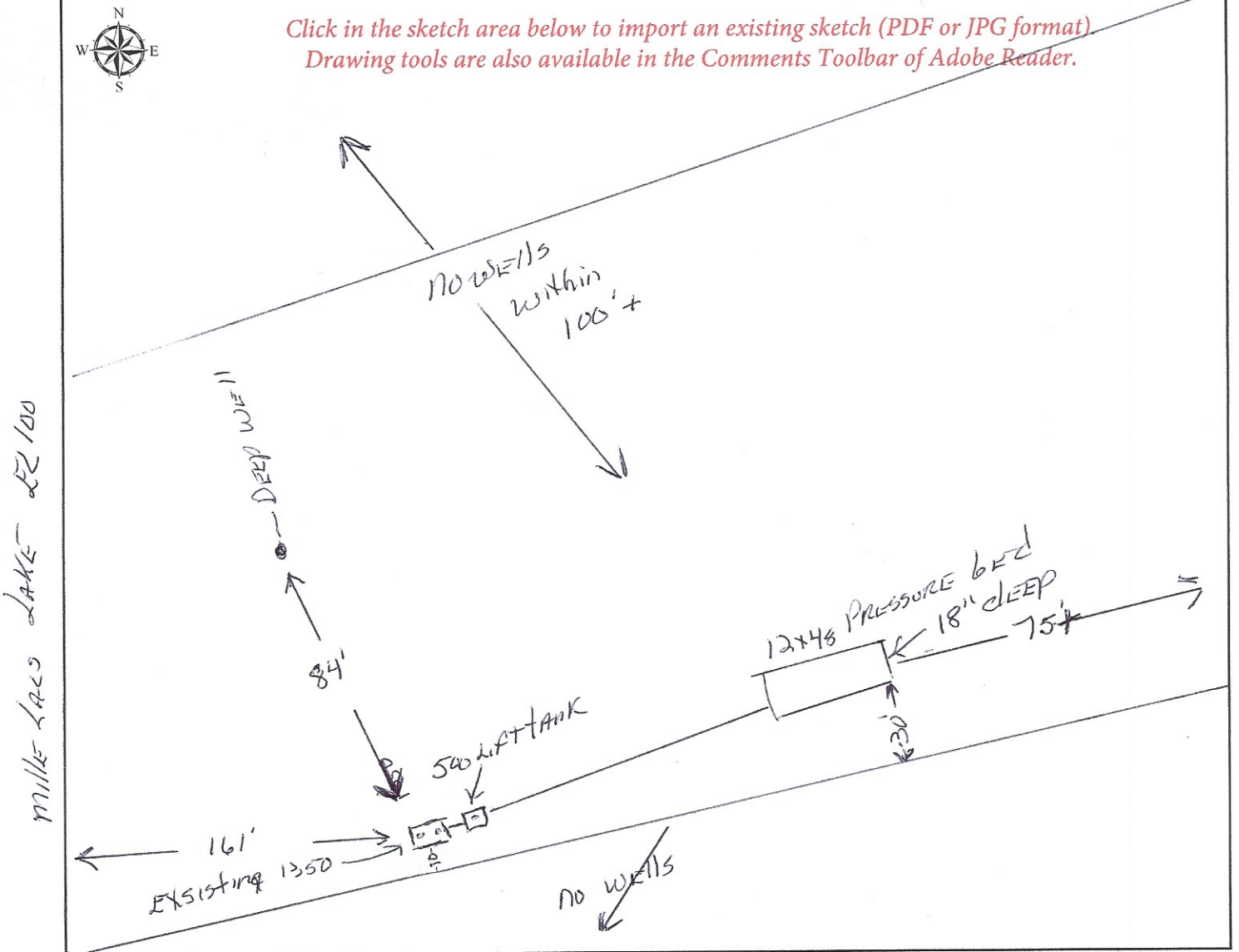
Description of Soil Treatment Areas				
	Proposed Site		Alternate Site	
Disturbed Areas?	NO			
Compacted Areas?	NO			
Flooding Potential?	NO			
Run-on Potential?	NO			
Limiting Layer Depth	Proposed #1:66	Proposed #2:75	Alternate #1:	Alternate #2:
Slope % and Direction	1% EAST TO WEST			
Landscape Position	BACKYARD			
Vegetation Types	GRASS			
Soil Texture	MEDIUM SAND			
Soil Sizing Factor	1.27			

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Please Draw to Scale with North Arrow to top or Left Side of Page

N ↑



Please show all that apply (Existing or Proposed):

- | | | |
|---|---------------------------|-----------------------------------|
| Wells within 100 ft. of a Drainfield | Disturbed/Compacted Areas | Access Route for Tank Maintenance |
| Water lines within 10 ft. of a Drainfield | Component Location | Property Lines |
| Drainfield Areas | OHW | Structures |
| Boring Locations | Lot Easements | Setbacks |

Elevations:

Benchmark Elevation: 100
 Elevation of Sewer Line at House: 108
 Tank Inlet Elevation: 107
 Drainfield Elevation: 109
 Pump Elevation: 103
 Pump Discharge Elevation: 106
 Restricting Layer Elevation: 103.5

Designer Signature: *Tom Peterson* Date: 5/28/2024 License Number: L1054

SUBMIT COMPLETED FORM

SSTS Management Plan required to be submitted with this design

Minnesota Pollution Control Agency Rules Sections 7082.0600 Subp. 1. A and B, and Section 7082.0100 Subpart 3. J