University of Minnesota Onsite Sewage Treatment Program

Design Summary Page

Minnesota Pollution Control Agency

1. PROJECT INFORMATION

v 04.02.2019

Property Owner/Client:	Bruce and Cathleen Trebnick	Project ID:	20
Site Address:	Parcel: 12-0-051400 (No address yet)	Date:	04/30/19
Email Address:		Phone:	

2. DESIGN FLOW & WASTE STRENGTH

Attach data / estimate basis for Other Establishments

Design Flow: 600 GPD Anticipated Waste Type: Residential

BOD: mg/L TSS: mg/L Oil & Grease: mg/L

Treatment Level: C *Select Treatment Level C for residential septic tank effluent*

3. HOLDING TANK SIZING

Minimum Capacity: Residential =400 gal/bedroom, Other Establishment = Design Flow x 5.0, Minimum size 1000 gallons

Code Minimum **Holding Tank** Capacity: Gallons in Tanks or Compartments

Recommended **Holding Tank** Capacity: Gallons in Tanks or Compartments

Type of High Level Alarm: (Set @ 75% tank capacity)

Comments:

4. SEPTIC TANK SIZING

A. Residential dwellings:

Number of Bedrooms (Residential): 4

Code Minimum **Septic Tank** Capacity: 1500 Gallons in 1 Tanks or Compartments

Recommended **Septic Tank** Capacity: 1500 Gallons in 1 Tanks or Compartments

Effluent Screen & Alarm (Y/N): Yes Model/Type: Tank Alert XT

B. Other Establishments:

Waste received by: GPD x Days Hyd. Retention Time

Code Minimum **Septic Tank** Capacity: Gallons In Tanks or Compartments

Recommended **Septic Tank** Capacity: Gallons In Tanks or Compartments

Effluent Screen & Alarm (Y/N): Model/Type:

5. PUMP TANK SIZING

Pump Tank 1 Capacity (Minimum):	600 Gal	Pump Tank 2 Capacity (Minimum):	Gal
Pump Tank 1 Capacity (Recommended):	600 Gal	Pump Tank 2 Capacity (Recommended):	Gal
Pump 1 38.0 GPM Total Head	24.6 ft	Pump 2 GPM Total Head	ft
Supply Pipe Dia. 2.00 in Dose Vol:	120.0 gal	Supply Pipe Dia. Dose Vol:	Gal

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MINNESOTA POLLUTION CONTROL AGENCY

6. SYSTEM AND DISTRIBUTION TYPE

Project ID: 20

Soil Treatment Type:	Mound	Distribution Type:	Pressure Distribution-Level
Elevation Benchmark:	100 ft	Benchmark Location:	Nail on Tree
MPCA System Type:	Type III	Distribution Media:	Rock
Type III/IV Details:	Type 3 system because only 6" of good soil		

7. SITE EVALUATION SUMMARY:

Describe Limiting Condition: Redoximorphic Features/Saturated Soils

Layers with >35% Rock Fragments? (yes/no) No If yes, describe below: % rock and layer thickness, amount of soil credit and any additional information for addressing the rock fragments in this design.

Note:

	Depth		Depth		Elevation		
Limiting Condition:	6	inches	0.5	ft		ft	
Minimum Req'd Separation:	36	inches	3.0	ft			***Critical for system compliance***
Code Max System Depth:	Mound	inches	-2.5	ft	Elevation 3.0	ft	

This is the maximimum depth to the bottom of the distribution media. Negative Depth (ft) means it must be a mound.

Soil Texture:	Clay Loam		
Soil Hyd. Loading Rate:	0.45 GPD/ft^2	Percolation Rate:	MPI
Contour Loading Rate:	12	Note:	
Measured Land Slope:	2.0 %	Note:	
Comments:			

8. SOIL TREATMENT AREA DESIGN SUMMARY

Trench:

Dispersal Area	ft^2	Sidewall Depth	in	Trench Width	ft
Total Lineal Feet	ft	No. of Trenches		Code Max. Trench Depth	in
Contour Loading Rate	ft	Min. Length	ft	Designed Trench Depth	in

Bed:

Dispersal Area	ft^2	Sidewall Depth	in	Maximum Bed Depth	in
Bed Width	ft	Bed Length	ft	Designed Bed Depth	in

Mound:

Dispersal Area	500.0 ft^2	Bed Length	50.0 ft	Bed Width	10.0 ft
Absorption Width	10.0 ft	Clean Sand Lift	2.5 ft	Berm Width (0-1%)	ft
Upslope Berm Width	13.6 ft	Downslope Berm	16.0 ft	Endslope Berm Width	20.0 ft
Total System Length	90.0 ft	System Width	39.5 ft	Contour Loading Rate	12.0 gal/ft

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Minnesota Pollution Control Agency

Project ID: #REF!

At-Grade:

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

Level & Equal Pressure Distribution

No. of Laterals	3		Perforation Spacing	3	ft	Perforation Diameter	1/4	in
Lateral Diameter	2.00	in	Min Dose Volume	98	gal	Max Dose Volume	150	gal

Non-Level and Unequal Pressure Distribution

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

Minimum Dose Volume: _____ gal

Maximum Dose Volume: _____ gal

9. Additional Info for At-Risk, HSW or Type IV Design

A. Starting BOD Concentration = Design Flow X Starting BOD (mg/L) X 8.35 ÷ 1,000,000

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

B. Target BOD Concentration = Design Flow X Target BOD (mg/L) X 8.35 ÷ 1,000,000

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

Lbs. BOD To Be Removed: _____

PreTreatment Technology: _____ *Must Meet or Exceed Target

Disinfection Technology: _____ *Required for Levels A & B

C. Organic Loading to Soil Treatment Area:

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

10. Comments/Special Design Considerations:

There needs to be an event counter installed on the pump tank in order to keep track of the amount of water usage.

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

Walker Maasch		L 2900	4/30/2019
(Designer)	(Signature)	(License #)	(Date)

University of Minnesota Onsite Sewage Treatment Program

Mound Materials Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

Project ID: 20 v 04.02.2019

A. Rock *Volume* : (Rock Below Pipe + Rock to cover pipe (*pipe outside dia + ~2 inch)*) X *Bed Length* X *Bed Width* = *Volume*

(6 in + 5.0 in) ÷ 12 50.0 ft X 10.0 ft = 458.3 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 458.3 ft^3 ÷ 27 = 17.0 yd^3

Add 30% for constructability: 17.0 yd^3 X 1.3 = 22.1 yd^3

B. Calculate *Clean Sand Volume:*

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

2.9 ft X 10.0 ft X 50.0 ft = 1450.0 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)

(ft - 1) X X ft =

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

(ft - 1) X X ft =

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

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

((4.8 ft - 1) X 3.0 ft X 50.0) ÷ 2 = 285.0 ft^3

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

((5.0 ft - 1) X ft X 50.0) ÷ 2 = ft^3

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

(5.0 ft - 1) X 3.0 ft X 10.0 ft = 120.0 ft^3

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

285.0 ft^3 + ft^3 + 120.0 ft^3 + 1450.0 ft^3 = 1855.0 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 1855.0 ft^3 ÷ 27 = 68.7 yd^3

Add 30% for constructability: 68.7 yd^3 X 1.3 = 89.3 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

(4.9 - 0.5)ft X 39.5 ft X 90.0) ÷ 2 = 7827.7 ft^3

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

7827.7 ft^3 - 1855.0 ft^3 - 458.3 ft^3 = 5514.4 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 5514.4 ft^3 ÷ 27 = 204.2 yd^3

Add 30% for constructability: 204.2 yd^3 x 1.2 = 265.5 yd^3

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

39.5 ft X 90.0 ft X 0.5 ft = 1779.0 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 1779.0 ft^3 ÷ 27 = 65.9 yd^3

Add 30% for constructability:	65.9	yd^3	x	1.3	=	85.7	yd^3

Mound Design Worksheet
≥1% Slope

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1. SYSTEM SIZING: Project ID: 20 v 04.02.2019

A. Design Flow:	600	GPD
B. Soil Loading Rate:	0.45	GPD/ft^2
C. Depth to Limiting Condition	0.5	ft
D. Percent Land Slope:	2.0	%
E. Design Media Loading Rate:	1.2	GPD/ft^2
F. Mound Absorption Ratio:	1.00	

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 ÷ Design Media Loading Rate = ft^2

600 GPD ÷ 1.2 GPD/ft^2 = 500 ft^2

If a larger dispersal media area is desired, enter size: 500 ft^2

B. Enter Dispersal Bed Width: 10.0 ft *Can not exceed 10 feet*

C. Calculate Contour Loading Rate: Bed Width X Design Media Loading Rate

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 ÷ Bed Width = Bed Length

500 ft^2 ÷ 10.0 ft = 50.0 ft

3. ABSORPTION AREA SIZING

A. Calculate Absorption Width: Bed Width X Mound Absorption Ratio = Absorption Width

10.0 ft X 1.0 = 10.0 ft

B. For slopes >1%, the Absorption Width is measured downhill from the upslope edge of the Bed.

Calculate Downslope Absorption Width: Absorption Width - Bed Width

10.0 ft - 10.0 ft = ft

4. DISTRIBUTION MEDIA: ROCK Project ID: #REF!

A. Rock Depth Below Distribution Pipe

6 in 0.50 ft

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

Check registered product information for specific application details and design

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

_____ components **X** _____ ft = _____

E. Number of Rows = Bed Width divided by Component Width (Round up)

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

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

_____ X _____ = _____ components

6. MOUND SIZING

A. Calculate Minimum Clean Sand Lift: 3 feet minus Depth to Limiting Condition = Clean Sand Lift

3.0 ft - 0.5 ft = 2.5 ft Design Sand Lift (optional): 2.5 ft

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

2.5 ft + 0.8 ft + 1.5 ft = 4.8 ft

Land Slope %		0	1	2	3	4	5	6	7	8	9	10	11	12
Upslope Berm Ratio	3:1	3.00	2.91	2.83	2.75	2.68	2.61	2.54	2.48	2.42	2.36	2.31	2.26	2.21
	4:1	4.00	3.85	3.70	3.57	3.45	3.33	3.23	3.12	3.03	2.94	2.86	2.78	2.70

C. Select Upslope Berm Multiplier (based on land slope): 2.83

D. Calculate Upslope Berm Width: Multiplier X Upslope Mound Height = Upslope Berm Width

2.83 ft X 4.8 ft = 13.6 ft

E. Calculate Drop in Elevation Under Bed: Bed Width X Land Slope ÷ 100 = Drop (ft)

10.0 ft X 2.0 % ÷ 100 = 0.20 ft

F. Calculate Downslope Mound Height: Upslope Height + Drop in Elevation = Downslope Height

4.8 ft + 0.20 ft = 5.0 ft

Land Slope %		0	1	2	3	4	5	6	7	8	9	10	11	12
Downslope Berm Ratio	3:1	3.00	3.09	3.19	3.30	3.41	3.53	3.66	3.80	3.95	4.11	4.29	4.48	4.69
	4:1	4.00	4.17	4.35	4.54	4.76	5.00	5.26	5.56	5.88	6.25	6.67	7.14	7.69

G. Select Downslope Berm Multiplier (based on land slope): 3.19

H. Calculate Downslope Berm Width: Multiplier X Downslope Height = Downslope Berm Width

3.19 x 5.0 ft = 16.0 ft

I. Calculate Minimum Berm to Cover Absorption Area: Downslope Absorption Width + 4 feet

_____ ft + 4 ft = 4.0 ft

J. Design Downslope Berm = greater of 4H and 4I: 16.0 ft

K. Select Endslope Berm Multiplier: 4.00 *(usually 3.0 or 4.0)*

L. Calculate Endslope Berm X Downslope Mound Height = Endslope Berm Width

4.00 ft X 5.0 ft = 20.0 ft

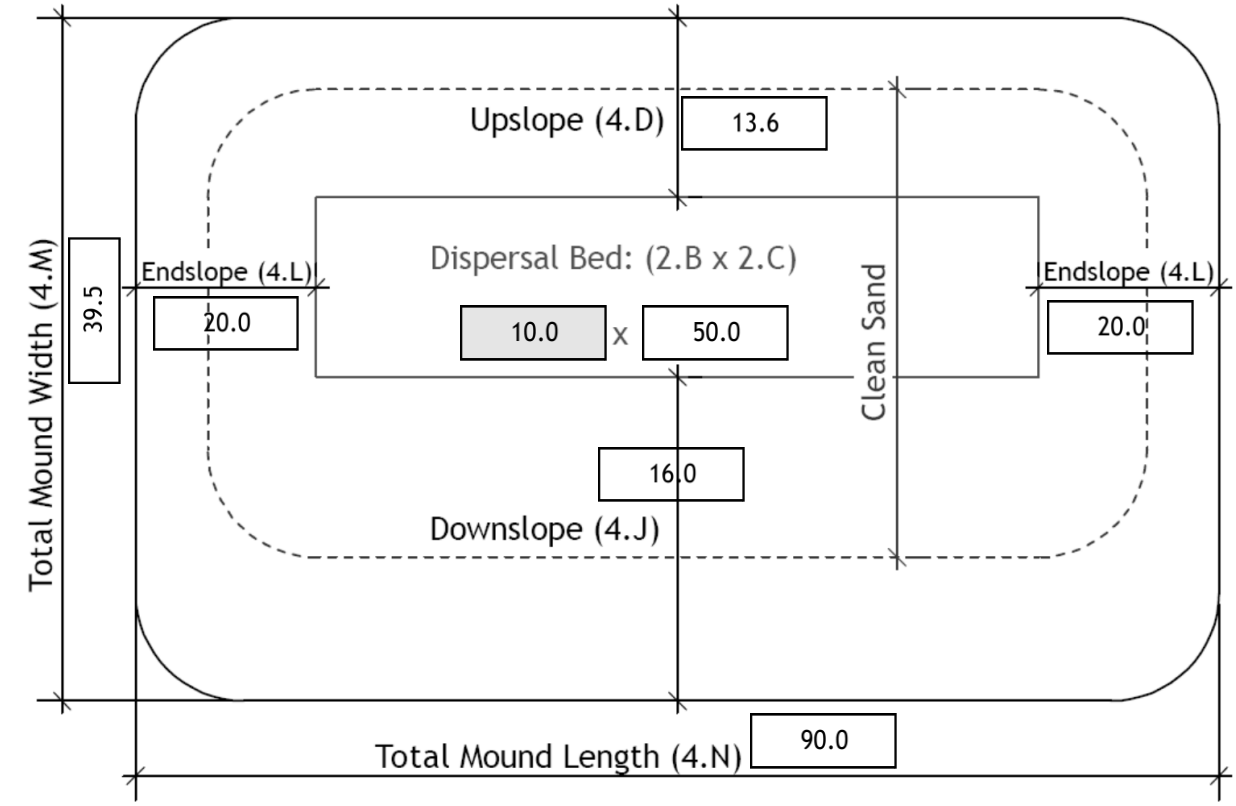
M. Calculate Mound Width: Upslope Berm Width + Bed Width + Downslope Berm Width

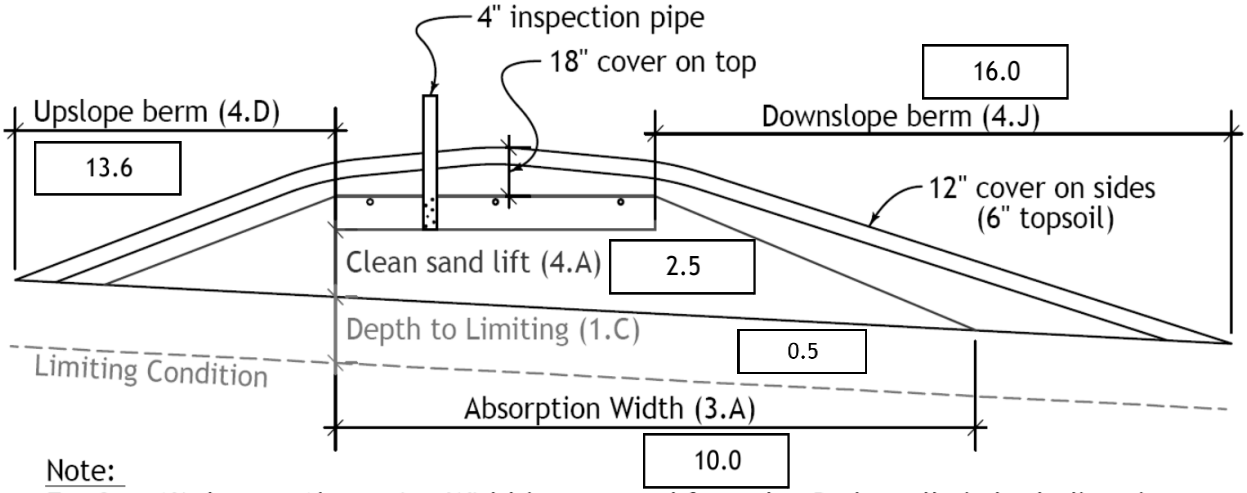
13.6 ft + 10.0 ft + 16.0 ft = 39.5 ft

N. Calculate Mound Length: Endslope Berm Width + Bed Length + Endslope Berm Width

20.0	ft	+	50.0	ft	+	20.0	ft	=	90.0	ft

7. MOUND DIMENSIONS Project ID: #REF!





Note:
For 0 to 1% slopes, *Absorption Width* is measured from the *Bed* equally in both directions.
For slopes >1%, *Absorption Width* is measured downhill from the upslope edge of the *Bed*.

Comments:

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Pressure Distribution Design Worksheet

Minnesota Pollution Control Agency

Project ID: 20 v 04.02.2019

1. Media Bed Width: 10 ft

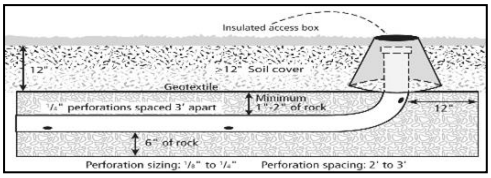
2. Minimum Number of Laterals in system/zone = Rounded up number of [(Media Bed Width - 4) ÷ 3] + 1.

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

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

4. Select *Perforation Spacing*: 3.00 ft

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



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

50.0 - 2ft = 48.0 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 = 48.0 ft ÷ 3.0 ft = 16 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 = 16 Spaces + 1 = 17 Perfs. Per Lateral

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

1/4 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.*

17 Perf. Per Lat. X 3 Number of Perf. Lat. = 51 Total Number of Perf.

10. Spacing of laterals; Must be greater than 1 foot and no more than 3 feet: 3.0 ft

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

Pressure Distribution Design Worksheet

11. *Select Lateral Diameter (See Table)* :	2.00	in

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Pressure Distribution Design Worksheet

Minnesota Pollution Control Agency

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	50	ft	=	500 ft²

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

500	ft²	÷	51	perforations	=	9.8 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.*

51	Perfs	X	0.74	GPM per Perforation =		38 GPM

16. *Volume of Liquid Per Foot of Distribution Piping (Table II)*: 0.170 Gallons/ft

17. *Volume of Distribution Piping* =

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

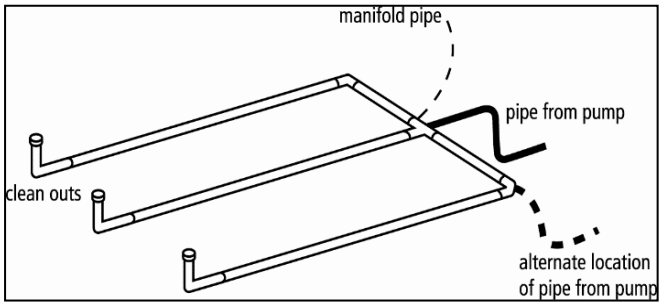
3	X	48	ft	X	0.170	gal/ft	=	24.5 Gallons

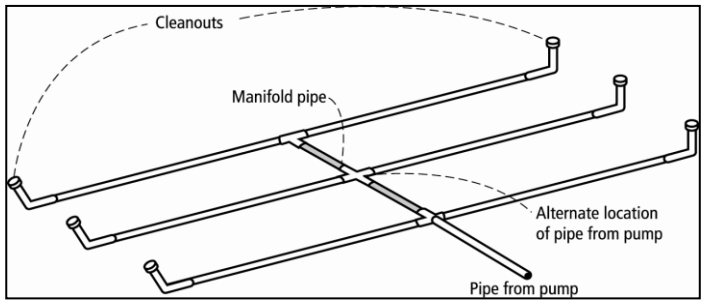
18. Minimum Delivered Volume = Volume of Distribution Piping X 4

24.5	gals	X	4	=	97.9 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:

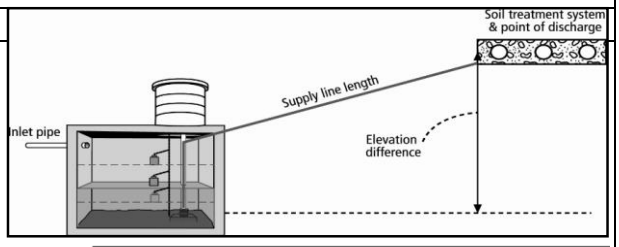
Basic Pump Selection Design Worksheet

1. PUMP CAPACITY Project ID: 20 v 04.02.2019

Pumping to Gravity or Pressure Distribution: Pressure

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: 38.0 GPM
3. Enter pump description: Demand Dosing

2. HEAD REQUIREMENTS



A. Elevation Difference between pump and point of discharge: 15 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: 100 ft

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

Friction Loss = 3.67 ft per 100ft of pipe

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

100 ft X 1.25 = 125.0 ft

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

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 =

3.67 ft per 100ft X 125.0 ft ÷ 100 = 4.6 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)

15.0 ft + 5.0 ft + ____ ft + 4.6 ft = 24.6 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **38.0** GPM (Line 1 or Line 2) with at least **24.6** feet of total head.

Comments:

Installer: Be sure to install an event counter on the pump tank in order to record water usage. Inspector: Be sure to check that this event counter was installed and properly programmed.

Pump Tank Design Worksheet (Demand Dose)

DETERMINE TANK CAPACITY AND DIMENSIONS Project ID: 20 v 04.02.2019

1. A. *Design Flow (Design Sum.1A)* : 600 GPD C. Tank Use: **Dosing**
   B. Min. required pump tank capacity: 600 Gal D. Recommended pump tank capacity: 600 Gal

2. A. Tank Manufacturer: Cohasset Concrete Products B. Tank Model: 2100C/P
   C. Capacity from manufacturer: 606 Gallons
   D. Gallons per inch from manufacturer: 10.7 Gallons per inch
   E. Liquid depth of tank from manufacturer: 56.5 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

3 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)

(16.1 in + 2 inches) X 10.7 Gallons Per Inch = 194 Gallons

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

-Item 18 of the Pressure Distribution or Item 11 of Non-level 98 **Gallons (Minimum dose)** 9.1 inches/dose

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

Design Flow: 600 GPD X 0.25 = 150 **Gallons (Maximum dose)** 14.0 inches/dose

6 *Select a pumpout volume that meets both Minimum and Maximum:* 120 Gallons

7 Calculate *Doses Per Day* = Design Flow ÷ *Delivered Volume*

600 gpd ÷ 120 gal = 5.00 *Doses*

8 Calculate Drainback:

A. *Diameter of Supply Pipe* = 2 inches

B. Length of Supply Pipe = 100 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*

100 ft X 0.170 gal/ft = 17.0 Gallons

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

120 gal + 17.0 gal = 137 Gallons

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

3 in X 10.7 gal/in = 32.2 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

DEMAND DOSE FLOAT SETTINGS

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

Total Dosing Volume /Gallons Per Inch

137 gal ÷ 10.7 gal/in = 12.8 Inches

12. Measuring from bottom of tank:

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

16.1 in + 2 in = 18 Inches

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

18 in + 12.8 in = 31 Inches

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

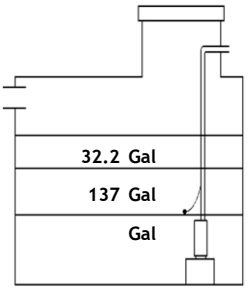
31 in + 3.0 in = 34 Inches

Inches for Dose: 12.8 in

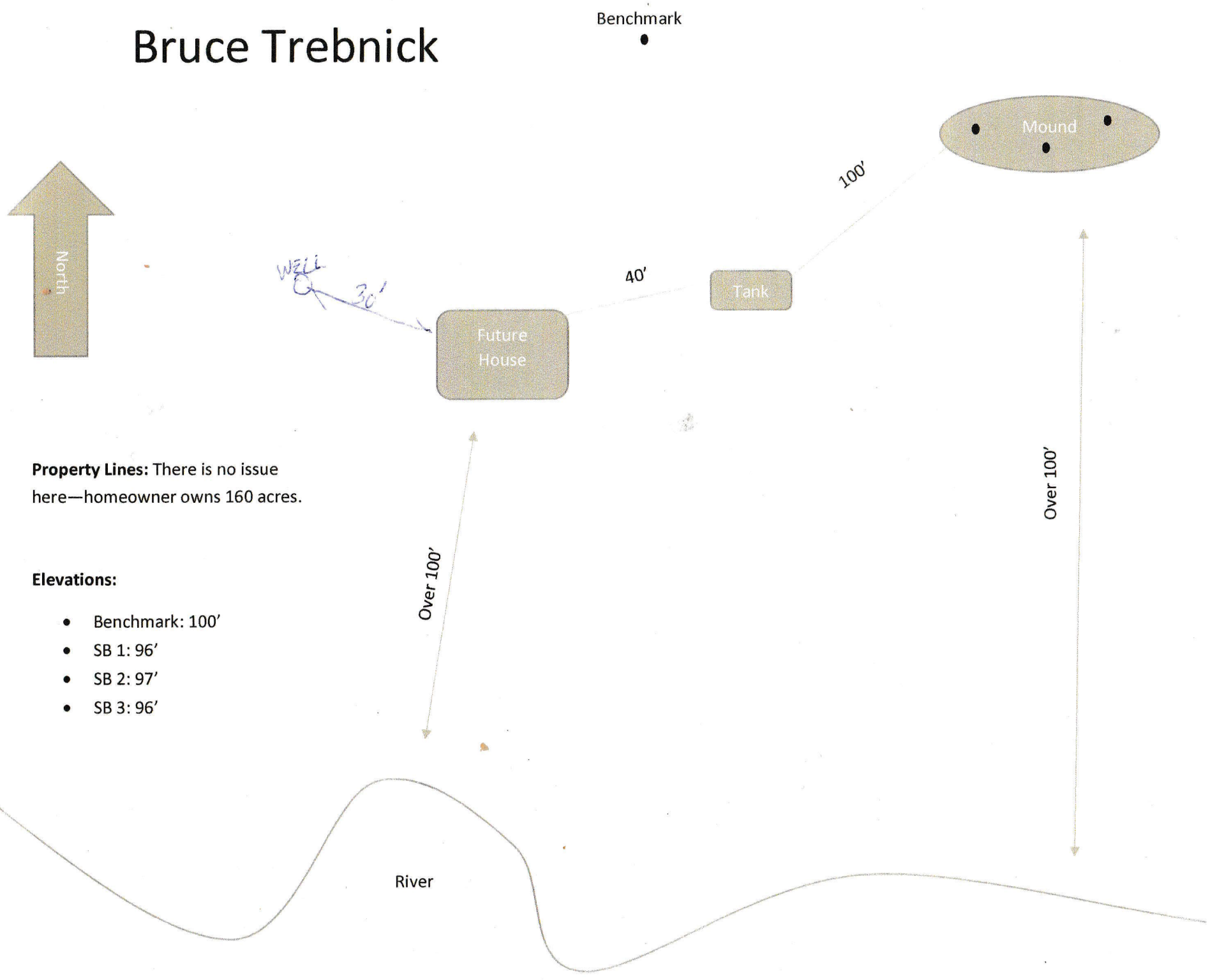
Alarm Depth 33.9 in

Pump On 30.9 in

Pump Off 18.1 in



Bruce Trebnick



Property Lines: There is no issue here—homeowner owns 160 acres.

Elevations:

- Benchmark: 100'
- SB 1: 96'
- SB 2: 97'
- SB 3: 96'

Aitkin County, Minnesota

928D—Cushing-Mahtomedi complex, 10 to 25 percent slopes

Map Unit Setting

National map unit symbol: gjk5
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

Cushing and similar soils: 45 percent
Mahtomedi and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cushing

Setting

Landform: Moraines
Landform position (two-dimensional): Shoulder, backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy till

Typical profile

E - 0 to 7 inches: loam
B/E - 7 to 17 inches: loam
Bt - 17 to 30 inches: loam
C - 30 to 60 inches: loam

Properties and qualities

Slope: 10 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Available water storage in profile: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Forage suitability group: Sloping; Fine Texture (G090AN023MN)
Hydric soil rating: No

Description of Mahtomedi

Setting

Landform: Moraines
Landform position (two-dimensional): Shoulder, backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and gravelly outwash

Typical profile

A - 0 to 3 inches: loamy coarse sand
E - 3 to 13 inches: coarse sand
Bw - 13 to 25 inches: gravelly coarse sand
C - 25 to 60 inches: gravelly sand

Properties and qualities

Slope: 10 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively 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: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Sandy (G090AN022MN)
Hydric soil rating: No

Minor Components

Alstad and similar soils

Percent of map unit: 8 percent
Hydric soil rating: No

Cathro and similar soils

Percent of map unit: 7 percent
Landform: Bogs
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Aitkin County, Minnesota
Survey Area Data: Version 19, Sep 12, 2018

UNIVERSITY OF MINNESOTA

OSTP Preliminary Evaluation Form

v. 032618

1. Contact Information

Property Owner/Client: Bruce Trebnick — Client Phone Number:

Mailing Address: PO Box 67 Bovey, MN 55709

Site Address: No address yet

Parcel I.D.: 12-0-051400 — Township #: 52 — Range #: 26 W — Section: 29

Date: 4/30/19 — Township name: Hill Lake — Legal Desc or Lat/Long:

Evaluation for system type: ☑ New Construction ☐ Replacement — Parcel dimensions:

2. Flow Information

Client-Provided Information

Type(s) of use (*all that apply*): ☑ Residential ☐ Commercial ☐ Other Use (Specify)

No. of bedrooms* (*if applicable*): 4 — Unfinished space (ft²):

No. of residents in home: 2 Adults ☐ Children ☐ Teenagers ☐ Daycare

Existing flow measurements: ☐ Yes (If Yes, attach readings) ☐ No

Water-using devices (*check all that apply*):
☑ Garbage Disposal ☑ Water Softener* ☐ Iron Filter*
☑ Dishwasher ☐ Sump Pump* Other (*specify*):
☐ Large Bathtub/Jacuzzi ☐ High Efficiency Furnace*
☑ Laundry/Large Tub on 2nd Floor ☐ Hot Tub*
* Clear water source

Water use concerns (*check all that apply*):
☐ Faucet/Toilet ☐ Multiple Loads of Laundry/Day ☐ Long-Term Prescription Meds
☐ In-Home Business ☐ No Lint Screen ☐ Use of Anti-Bacterial Soap ☐ Frequent Entertaining of Out-of-Town Guests

Any additional current or future uses on this parcel (*specify*): No

Any non-sewage discharges to system (*specify*): No

Sewage ejector or grinder pump in home: ☐ Yes ☑ No

I acknowledge the above is complete and accurate (*Client(s) signature and date*):

Designer-determined Flow Information

A. Estimated Design Flow (gallons per day): 600

Anticipated waste strength values: ☑ Domestic ☐ High Strength — BOD: mg/L

CBOD: mg/L — (TSS): mg/L — O&G: mg/L

3. Preliminary Site Information

B(1). Water supply well(s) within 100 ft of absorption area: ☐ Yes ☑ No

Well(s) were located: ☑ Direct Observation ☐ County Well Index Maps ☐ Personal Communication — MN Unique Well Id #:

Depth of well(s): No Well Yet ft — Well casing depth(s): ft — Source:

B(2). Site within 200 ft of noncommunity transient supply well: ☐ Yes ☑ No — Source:

B(3). Site within a drinking water supply management area: ☐ Yes ☑ No — Source:

B(4). Location of all existing and proposed buildings and improvements on lot (*see Site Evaluation map*)

B(5). Buried water supply pipes within 50 ft of proposed system: ☐ Yes ☑ No

C. Location of all easements on lot (*see Site Evaluation map*) — Source:

D. Elevation of ordinary high water level (OWHL) - MN DNR (*if adjacent to parcel*): N/A

E. Floodplain designation and flood elevation: N/A — Source:

F. Determine property lines (*see Site Evaluation map*): ☐ Survey ☑ Plat Map ☐ Other

Site located in a shoreland district/area: ☐ Yes ☑ No

G. Distance of setbacks: ☑ Property Lines ☐ OHWL ☐ Easements ☐ Water Supply Pipes ☑ Well(s) ☑ Other Buildings

H. Soil Survey Information (***from web soil survey***): ☐ Map — Map Units on Parcel:

List landforms: Moraines — Slope Range: 25-Oct

Parent materials -*check all that apply*:
☑ Till ☐ Outwash ☐ Loess ☐ Bedrock ☐ Alluvium
☐ Colluvium ☐ Lacustrine ☐ Organic ☐ Cut/Fill

Landscape Position (*check all that apply*):
☐ Summit ☑ Shoulder ☑ Backslope ☐ Footslope ☐ Toeslope
☐ Depression ☐ Stream ☐ Terrace ☐ Manmade ☐ Plain

Minimum bedrock depth: inches — Minimum bedrock depth: inches

Maximum bedrock depth: inches — Maximum bedrock depth: inches

Map Unit Ratings:
Septic Tank Absorption Field - Trench (MN):
Septic Tank Absorption Field - At-grade (MN):
Septic Tank Absorption Field - Mound (MN):

UNIVERSITY OF MINNESOTA

OSTP Preliminary Evaluation Form

v. 032618

4. Preliminary Soil Profile Information *(from web soil survey - map unit description & official series descriptions)*

Enter information here or attach map and description.

Map Unit

	Depth	Texture(s)	Structure(s)	Consistence	Other (flooding, ponding, etc.)
Horizon 1	**See attached**				
Horizon 2					
Horizon 3					
Horizon 4					
Horizon 5					

Map Unit

	Depth	Texture(s)	Structure(s)	Consistence	Other (flooding, ponding, etc.)
Horizon 1					
Horizon 2					
Horizon 3					
Horizon 4					
Horizon 5					

Map Unit

	Depth	Texture(s)	Structure(s)	Consistence	Other (flooding, ponding, etc.)
Horizon 1					
Horizon 2					
Horizon 3					
Horizon 4					
Horizon 5					

Map Unit

	Depth	Texture(s)	Structure(s)	Consistence	Other (flooding, ponding, etc.)
Horizon 1					
Horizon 2					
Horizon 3					
Horizon 4					
Horizon 5					

5. Local Government Unit Information

Name of LGU		LGU Contact	
LGU-specific setbacks			
LGU-specific design requirements			
LGU-specific installation requirements			

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

Walker Maasch	Walker J Maasch	**L 2900**	**04/30/19**
(Designer)	(Signature)	(License #)	(Date)

UNIVERSITY OF MINNESOTA

OSTP Field Evaluation Form

v. 032618

1. Contact Information

Property Owner/Client: Bruce Trebnick — Client Phone Number:

Address: No address yet

Date: 4/30/2019 — Weather Conditions: Sunny

2. Utility and Structure Information

Utility Locations Identified: ☐ Gopher State One Call # — No Utilities — ☐ Any Private Utilities

Property Lines:
- ☐ Determined and Approved By Client — *Client's Approval (initial)*
- ☐ Determined But Not
- ☑ Approximate
- ☐ Property Lines Surveyed

Locate and Verify *(see Site Evaluation map)*: ☐ Existing Buildings ☐ Improvements ☐ Easements ☐ Setbacks

3. Site Information

Percent Slope	2	Slope Direction	South
Landscape Position	Shoulder, Backslope	Slope Shape	Linear, Linear
Vegetation type(s)	Grass		

Evidence of cut, fill, compacted or disturbed areas: ☐ Yes ☑ No ☐ Locate Areas on Site Evaluation Map

Discuss the flooding or run-on potential of site: Extremely low flooding potential

Identify benchmarks and elevations *(Site Evaluation Map)*:

Proposed soil treatment area adequately protected: ☑ Yes ☐ No

4. General Soils Information

Original soils: ☑ Yes ☐ No

Type of observation: ☐ Soil Probe ☐ Soil Boring ☑ Soil Pit* — **Soil pit required if determining loading rate without perc test*

Number of soil observations: 3

Soil observations were conducted in the proposed system location: ☑ Yes ☐ No

A soil observation was made within the most limiting area of the proposed system: ☑ Yes ☐ No

Soil boring log forms completed and attached: ☑ Yes ☐ No

Percolation tests performed, forms completed and attached: ☑ Yes ☐ No

5. Phase I. Reporting Information

Depth to standing water		inches
Flood elevation		feet
Depth to bedrock		inches
Depth to periodically saturated soil	6	inches
Maximum depth of system		inches
Elevation at system bottom		feet
Percolation rate		min/inch
Loading rate	1.2	gpd/ft^2
Contour loading rate	12	gpd/ft

Anticipated construction issues

Differences between soil survey and field evaluation

Site evaluation issues / comments

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

Walker Maasch	Walker Maasch	L 2900	04/30/19
(Designer)	(Signature)	(License #)	(Date)

UNIVERSITY OF MINNESOTA

OSTP Soil Observation Log

v 11.3.28

Date 4/30/2019

Time 12:00am

Client/ Address: **Bruce Trebnick**

Legal Description/ GPS: No address yet

Landscape position: Shoulder, Backslop

Vegetation: Grass

Soil parent materials (Check all that apply): ☐ Outwash ☐ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic

Observation #/Location: 1

Slope%

Soil survey map units

Slope shape: Linear,

Depth (in)	Texture	Coarse Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consis
0-4	loam	12	10YR 4/2				Blocky	Moderate	Friable
5-6	clay loam	9	10YR 6/6				Blocky	Moderate	Friable
6-10	clay	3	10YR 6/6	5R 4/6		S1	Platey	Moderate	Firm

Comments

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

Walker Maasch (Designer)

Walker Maasch (Signature)

L 2900 (License #)

4/30/ (Da

UNIVERSITY OF MINNESOTA

OSTP Soil Observation Log

v 11.3.28

Date 4/30/2019

Time 12:00am

Client/ Address: **Bruce Trebnick**

Legal Description/ GPS: No address yet

Landscape position: Shoulder, Backslop

Vegetation: Grass

Soil parent materials (Check all that apply): ☐ Outwash ☐ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic

Observation #/Location: 2

Slope%:

Soil survey map units:

Slope shape: Linear,

Depth (in)	Texture	Coarse Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consis
0-4	loam	12	10YR 4/2				Blocky	Moderate	Friable
5-6	clay loam	9	10YR 6/6				Blocky	Moderate	Friable
6-10	clay	3	10YR 6/6	5R 4/6		S1	Platey	Moderate	Firm

Comments:

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

Walker Maasch	Walker J Maasch	L 2900	4/30/
(Designer)	(Signature)	(License #)	(Da

UNIVERSITY OF MINNESOTA

OSTP Soil Observation Log

v 11.3.28

Date 4/30/2019

Time 12:00am

Client/ Address: **Bruce Trebnick**

Legal Description/ GPS: No address yet

Landscape position: Shoulder, Backslop

Vegetation: Grass

Soil parent materials (Check all that apply): ☐ Outwash ☐ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic

Observation #/Location: 3

Slope%:

Soil survey map units:

Slope shape: Linear,

Depth (in)	Texture	Coarse Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consis
0-4	loam	12	10YR 4/2				Blocky	Moderate	Friable
5-6	clay loam	9	10YR 6/6				Blocky	Moderate	Friable
6-10	clay	3	10YR 6/6	5R 4/6		S1	Platey	Moderate	Firm

Comments:

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

Walker Maasch	Walker J Maasch	L 2900	4/30/
(Designer)	(Signature)	(License #)	(Da

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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 Bruce Trebnick	Email
Property Address 12-0-051400	Property ID
System Designer Walker Maasch	Contact Info 218-256-0139
System Installer Brian Maasch	Contact Info 218-259-2780
Service Provider/Maintainer	Contact Info
Permitting Authority Aitkin County	Contact Info
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.

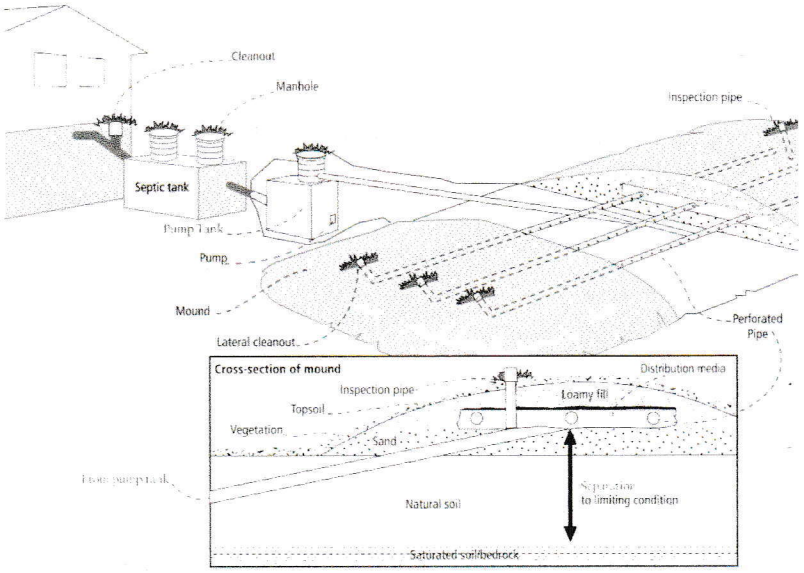
For more information see http://septic.umn.edu

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: 4

System capacity/ design flow (gpd): 600

Anticipated average daily flow (gpd): 600

Comments _____

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

Well Construction

Well depth (ft): No well

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

Distance from septic (ft): _____

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

Septic Tank

- ☐ First tank *Tank volume:* 1,500 *gallons*
  Does tank have two compartments? (✓) Y ( ) N
- ☐ Second tank *Tank volume:* 600 *gallons*
- ☐ Tank is constructed of Concrete
- ☐ Effluent screen: (✓) Y ( ) N Alarm (✓) Y ( ) N

- ☐ Pump Tank 600 *gallons*
- ☐ Effluent Pump *make/model:* PES1P1 Goulds
  Pump capacity 70 GPM
  TDH _____ Feet of head
- ☐ Alarm location _____

Soil Treatment Area (STA)

Mound/At-Grade area (width x length): 40 ft x 90 ft

Rock bed size (width x length): 10 ft x 50 ft

Location of additional STA: _____

Type of distribution media: 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: 120 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 600)										
Caps: inspect, replace if needed										
Water use appliances – review use										
Other:										

*Monthly

**Quarterly

***Bi-Annually

Notes:

"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: _____ Date 04/30/19

Management Plan Prepared By: Walker Maasch Certification # C9835

Permitting Authority: Aitkin County