FIELD EVALUATION SHEET

PRELIMINARY EVALUATION DATE 8/3/17, FIELD EVALUATION DATE 8/3/17
PROPERTY OWNER: Fran Schmitz PHONE 6573038580
ADDRESS: 49558 202nd Pl CITY,STATE,ZIP: McGregor MN 55760
LEGAL DESCRIPTION: Lot 23
PIN# 29.1.325600 SEC 17 T 49 R 23 TWP NAME Shamrock
FIRE# LAKE/RIVER Big Sandy LAKE CLASS gen OHWL 1216 FT.

DESCRIPTION OF SOIL TREATMENT AREAS

	AREA #1	AREA #2
DISTURBED AREAS	YES NO ✓	YES NO
COMPACTED AREAS	YES NO ✓	YES NO
FLOODING	YES NO ✓	YES NO
RUN ON POTENTIAL	YES NO ✓	YES NO
SLOPE %	Pgout 0% existing 2%	
DIRECTION OF SLOPE	N-Slight	
LANDSCAPE POSITION	Summit	
VEGETATION TYPES	small trees Brush	

REFERENCE BM ELEV. 1256 FT.
REFERENCE BM DESCRIPTION
Roadway pvmt edge

DEPTH TO STANDING WATER OR MOTTLED SOIL: BORING# 1 7, 8, 9, 2A soil verification

BOTTOM ELEVATION--FIRST TRENCH OR BOTTOM OF ROCK BED: #1 FT., #2 X FT.

SOIL SIZING FACTOR: SITE # 1 , SITE #2 X

CONSTRUCTION RELATED ISSUES: Clear all Brush/Trees if, install retaining wall 3 sides, Build from Roadside

LIC# 1790 SITE EVALUATOR SIGNATURE: Scot Roseveld

SITE EVALUATOR NAME: Scot Roseveld TELEPHONE# 7633893963
cell 6128592695

LUG REVIEW DATE

Comments:

SOIL BORING LOGS ON REVERSE SIDE

PARCEL_ID	29-1-325600
GIS ACRES	0.35576924
DEEDED ACRES	
SQ_FT	15497.246140551575
TAX DISTRICT	SHAMROCK TWP
OWNER NAME	NORDSTROM, WARREN & MARGERY
ADDR_1	9720 RUSH CREEK BLVD
ADDR_2	CORCORAN MN 55374
ADDR_3	
ADDR_4	
TOWNSHIP	49
SECTION	17
RANGE	23
Physical_House_Num	49558
Physical_Address	49558 202nd Pl
Physical_City	MCGREGOR
Physical_Zip	55760
PLATTED SUBDIVISION	BELLHORN HEIGHTS
LAKE NUMBER	1006200
LAKE NAME	BIG SANDY LAKE
BRIEF LEGAL DESC	LOT 23
SCHOOL DISTRICT	4
SCHOOL DIST NAME	MCGREGOR

UNIVERSITY OF MINNESOTA

OSTP Soil Observation Log

Project ID:

v 04.06.2017

Client/ Address:	Fran Schmitz	Legal Description/ GPS:	29.1.32.5600

Soil parent material(s): (Check all that apply) ☐ Outwash ☐ Lacustrine ☐ Loess ☑ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter

Landscape Position: (check one) ☑ Summit ☑ Shoulder ☐ Back/Side Slope ☐ Foot Slope ☐ Toe Slope

Slope shape	dig out flat					
Vegetation:	Forest	Soil survey map units:	928C	Slope %:	0.0	Elevation: 1254
Weather Conditions/Time of Day:	partly cloudy then sunny 75 degrees				Date	08/03/17
Observation #/Location:	B-1				Observation Type:	Auger

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0 - 3	Loam	<35%	10YR 3/2				Blocky	Structureless	Loose
3 - 15 9" redox	Fine Sandy Loam	<35%	10YR 6/3	10YR 5/6	Concentrations	S1	Blocky	Structureless	Loose

Comments

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

Scot Rosevold		1790	8/3/2017
(Designer/Inspector)	(Signature)	(License #)	(Date)

Additional Soil Observation Logs

Project ID:

University of Minnesota Onsite Sewage Treatment Program

Client/ Address:	Fran Schmitz	Legal Description/ GPS:	29.1.32.5600

Soil parent material(s): (Check all that apply) ☐ Outwash ☐ Lacustrine ☐ Loess ☑ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter

Landscape Position: (check one) ☑ Summit ☑ Shoulder ☐ Back/Side Slope ☐ Foot Slope ☐ Toe Slope — Slope shape: dig out flat

Vegetation:	small trees brush	Soil survey map units:	928C	Slope %:	0.0	Elevation:	1254.4

Weather Conditions/Time of Day:	partly cloudy to sunny 75 degrees	Date:	08/03/17

Observation #/Location:	B-2	Observation Type:	Auger

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0 - 4	Loam	<35%	10YR 3/2				Blocky	Structureless	Loose
4 - 15	Fine Sandy Loam	<35%	5YR 5/3	7.5YR 5/6	Concentrations	S1	Platy	Structureless	Loose
8" redox									

Comments:

#/Location/Elevation:	B-3	Observation Type:	Auger

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0 - 3	Loam	<35%	10YR 3/2				Blocky	Structureless	Loose
3 - 15	Fine Sandy Loam	<35%	7.5YR 5/3	10YR 5/6	Concentrations	S1	Blocky	Structureless	Loose
9" redox									

Comments:

Aitkin County, Minnesota

928C—Cushing-Mahtomedi complex, 2 to 10 percent slopes

Map Unit Setting

National map unit symbol: gjk4
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: 50 percent
Mahtomedi and similar soils: 35 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): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy till

Typical profile

E - 0 to 16 inches: very fine sandy loam
B/E - 16 to 19 inches: loam
Bt - 19 to 44 inches: loam
C - 44 to 60 inches: loam

Properties and qualities

Slope: 2 to 10 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 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Other vegetative classification: Sloping Upland, Acid (G090AN006MN)

SKETCH SHEET

CLIENT: Fran Schmitz DATE: 8/13/17

MAP DRAWN TO SCALE [redacted] WITH A NORTH ARROW

See next to Pages
survey & siteplan

CHECK OFF LIST--HAVE ALL OF THE FOLLOWING BEEN DRAWN ON THE MAP??

SHOW EXISTING OR PROPOSED

- ☐ WATER WELLS WITHIN 100 FT OF TREATMENT AREAS
- ☐ PRESSURE WATER LINES WITHIN 10 FT OF TREATMENT AREAS
- ☐ STRUCTURES ☐ LOT IMPROVEMENTS
- ☐ ALL SOIL TREATMENT AREAS ☐ ALL ISTS COMPONENTS
- ☐ HORIZONTAL AND VERTICALREFERENCE
- ☐ POINT OF SOIL BORINGS ☐ DIRECTION OF SLOPE
- ☐ LOT EASEMENTS ☐ ALL LOT DIMENSIONS
- ☐ DISTURBED/ COMPACTED AREAS
- ☐ SITE PROTECTION--LATHE AND RIBBON EVERY 15 FT
- ☐ ACCESS ROUTE FOR TANK MAINTENANCE

REQUIRED SETBACKS

- ☐ STRUCTURES ☐ PROPERTY LINES
- ☐ OHWL

COMMENTS:

INDICATE ELEVATIONS

BENCHMARK
ELEVATION OF SEWER LINE @ HOUSE
ELEVATION @ TANK INLET
ELEVATION @ BOTTOM OF ROCK LAYER
ELEVATION @ BOTTOM OF BORING OR RESTRICTIVE LAYER
ELEVATION OF PUMP
ELEVATION OF DISTRIBUTION DEVICE

DESIGNER SIGNATURE Matt Rockwold DATE 8/13/17

LICENSE# #1790

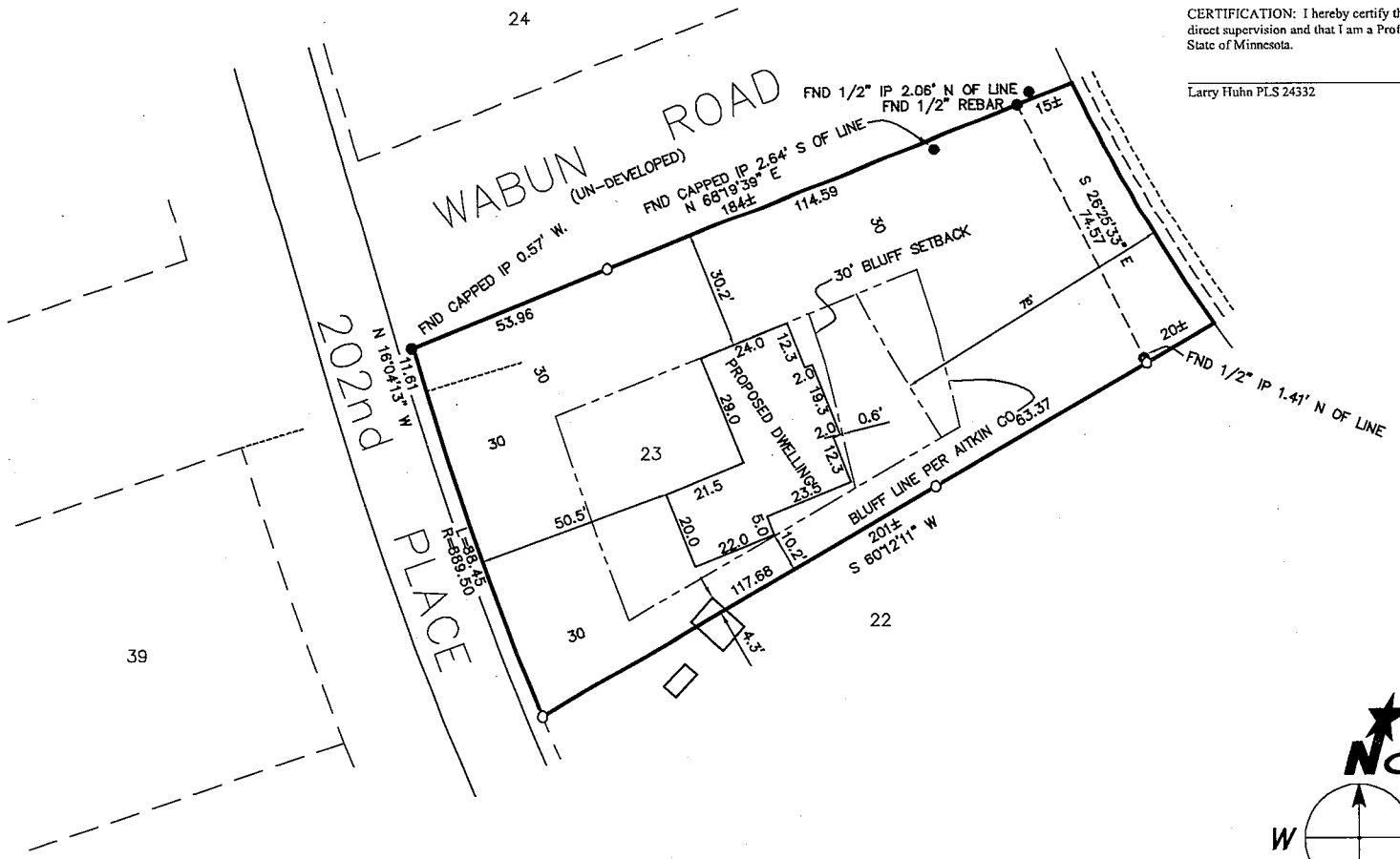
SURVEY FOR: ***Fran Schmitz***
SURVEYED: 8/07/2017 DRAFTED: 8/08/2017

DESCRIPTION:
Lot 23, Bellhorn Heights, Aitkin County, Minnesota.

STANDARD SYMBOLS & CONVENTIONS:
"6" Denotes 1/2" ID pipe with plastic plug bearing State License Number 24332, set.
"●" Denotes found iron monument.

CERTIFICATION: I hereby certify that this survey was prepared by me or under my direct supervision and that I am a Professional Licensed Surveyor under the Laws of the State of Minnesota.

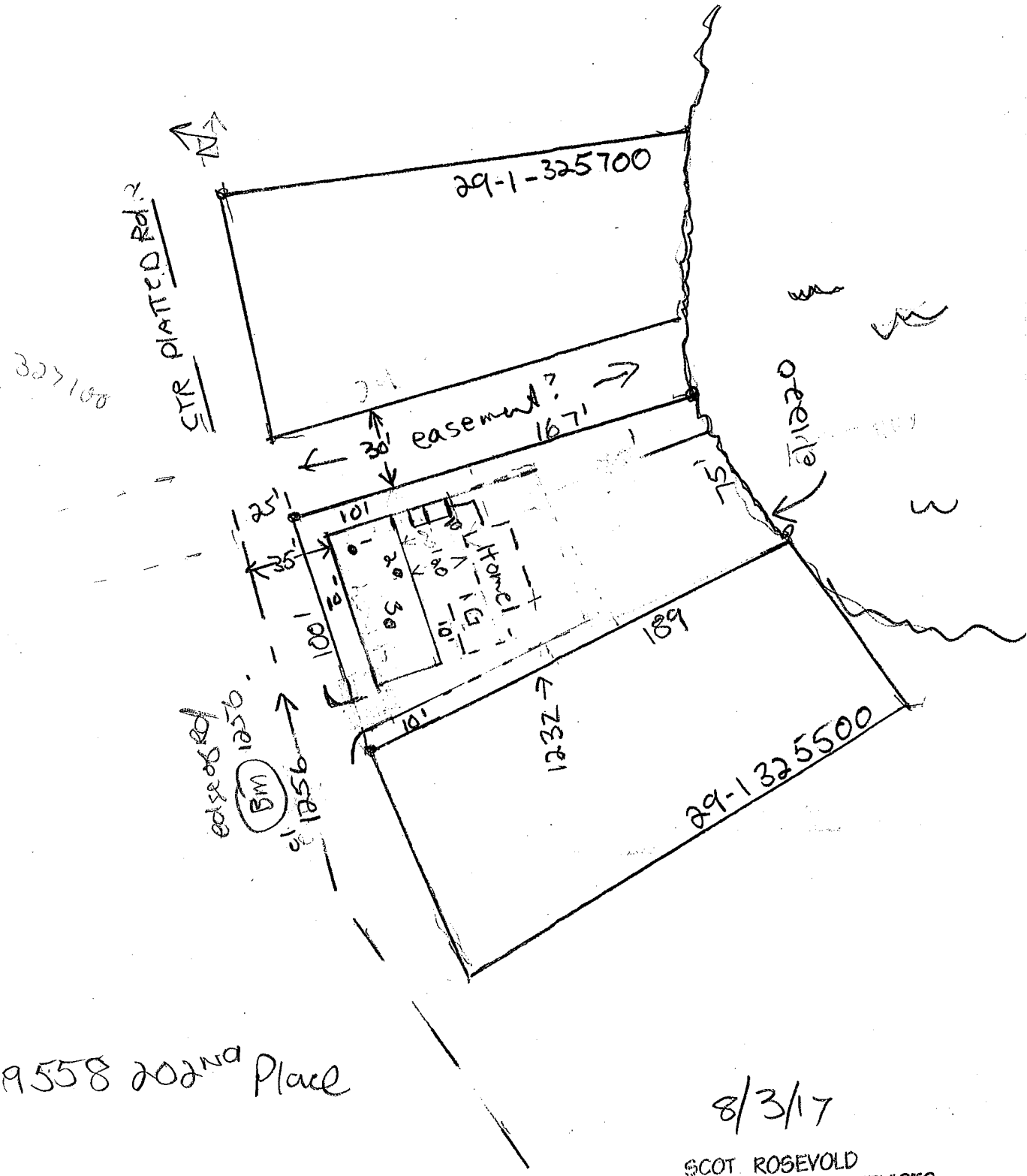
Larry Huhn PLS 24332



Northwoods Surveying

(320)583-3830
PO Box 117
Darwin, MN 55324

JOB No. 17134



49558 202nd Place

8/3/17

SCOT ROSEVOLD
ROSEVOLD INSPECTION SERVICES
307 7TH AVENUE SOUTH
PRINCETON, MN 55371

Rosevold Inspection Services
307 7th Ave. S
Princeton, MN55371
763-389-3963 or 612-859-2695
srosevold@hotmail.com

8/3/17

Fran Schmitz
5930 Woodland Dr.
Woodbury, MN 55129
651-303-8580, lora.schmitz@comcast.net

Site: 49558 202nd Place McGregor MN, PID# 29-1-32-5600

To whom it may concern,

A new 3 bedroom home with lower level lift is proposed. Existing lot of record and LGU allows one drainfield area. Due to limited area for full size mound, and soil separation, a Type III, elevated bed with retaining wall is proposed. Easiest way to calculate clean sand needed and install rock bed is to place 48" of clean sand in a 25' x 48' area. Cut a 15" x 38' rock bed in center allowing 5' absorption width around rock bed. Tapering the top soil berm cover over system from 12" in center to minimum 6" at edges with grass seed is recommended. Retaining wall at north end will be taller than the south end due to easement on north end dropping off.

Soil borings indicated loam to silty loam soils with less than 12" separation to redoxomorphic features (restrictive layer. Several trees and brush will need to be removed at STA area.

A new 2250 gallon compartmentalized tank meets minimum code. Proposed new well will be lake side. Neighboring wells are over 50' from prosed tanks and drainfield.

All manhole covers and inspection pipes shall be brought to the surface for tank(s) and drainfield. Insulation over tanks required if less than 24" from grade. Clean outs at ends of laterals required with long sweep 90's. An event counter or flow meter is required. Owner shall sign and date management plan and indicate installer and service provider. Owner shall keep records of event counter and pumping on log sheet for future compliance to designed water use. Future performance of this Type III system is the responsibility of owner of record for life of system.

Use only approved track equipment for any tree removal and trench construction. As there is no other place for a drainfield, and limited area for construction, clean sands should be installed over approved area prior to construction of home. There is only 30' from south end of property to edge of bed.

With proper installation and maintenance, this system should adequately treat onsite septic effluent effectively. Nothing other than gray water, (laundry, showers, etc) human waste, and toilet tissue shall be disposed of into the septic tank. Garbage disposals are not calculated in this design. Smaller amounts of laundry soaps, dish soaps, cleaning agents, etc, are better for prolonged life of system. Do not use anti-bacterial soaps or chlorine additives, as they will kill the bacteria needed to treat effluent effectively. The tanks shall be pumped at least every 2-3 years to ensure proper maintenance. Conditions vary.

Please contact Aitkin County for soil verification if needed, inspection procedures, and any other requirements.

Scot Rosevold - MPCA License # 1790

Minnesota Pollution Control Agency

OSTP Design Summary Worksheet

University of Minnesota

Property Owner/Client:	Fran Schmitz	Project ID:	v 04.06.2017
Site Address:	49558 202nd Place McGregor MN	Date:	8/3/17
Email Address:	lora.schmitz@comcast.net	Phone Number:	651-303-8680

1. DESIGN FLOW, STRENGTH OF WASTE, AND TANKS

A. Residential Design Flow: 450 Gallons Per Day (GPD) Number of Bedrooms (Residential): 3

Type of Wastewater: Residential Treatment Level: C *Select Treatment Level C for residential septic tank effluent*

Other Est. flow (select method and provide data): ☐ Measured Flow: GPD ☐ Estimated Flow: GPD

Waste strength (attach data/estimate basis for Other Est.): BOD: mg/L TSS: mg/L Oil&Grease: mg/L

B. Septic Tank Sizing

1. Residential dwellings

Min Code Required Septic Tank Capacity: 1500 Gallons, in 1 Tanks or Compartments

Recommended Septic Tank Capacity: 1545 Gallons, in 1 Tanks or Compartments

2. Other Establishments

Waste received by:

Min Code Required Septic Tank Capacity: GPD X = Gallons, in Tanks or Compartments

Designer Recommended Septic Tank Capacity: Gallons, in Tanks or Compartments

3. Effluent Screen & Alarm (Y/N): alarm yes,filter no Manufacturer/Model:

C. Holding Tanks Only: Minimum Capacity: Residential =400 gal/bedroom, Other Establishment = Design Flow x 5.0, Minimum size 1000 gallons

Minimum Code Required Capacity: Gallons, in Tanks Type of High Level Alarm:

Designer Recommended Capacity: Gallons, in Tanks

D. Pump Tank 1 Capacity (Code Minimum): 450 Gallons Pump Tank 2 Capacity (Code Minimum): Gallons

Pump Tank 1 Capacity (Designer Rec): 722 Gallons Pump Tank 2 Capacity (Designer Rec): Gallons

Pump 1: 48.0 GPM Total Head: 13.7 ft Pump 2: GPM Total Head: ft

Supply Pipe Dia.: 2.00 in Dose Volume: 122.0 gal Supply Pipe Dia.: in Dose Volume: gal

2. SYSTEM AND DISTRIBUTION TYPE

Soil Treatment Area Type: Bed Distribution Type: Pressure Distribution-Level

Benchmark Reference Elevation: 100.0 ft Benchmark Location: adacent roadway

MPCA System Type: Type III Type of Distribution Media: Rock

Type III/IV Details: install minimum 36" clean sand under rock bed

3. SITE EVALUATION SUMMARY:

A. Depth to Limiting Layer: 0 in 0.0 ft

B. Elevation of Limiting Layer:

C. Loc. of Restrictive Elevation: b-1,b-2, b-3

D. Minimum Required Separation: 36 in 3.0 ft

E. Code Maximum Depth of System: in

F. Measured Land Slope: 0.0 %

G. Soil Texture: Loam

H. Soil Hyd. Loading Rate: 0.78 GPD/ft^2

I. Perc Rate: MPI

J. Soil with >35% Rock Fragments Present? 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.

Comments: install 48" tall retaining wall around elevated bed area. Overall clean sand size is 25 x 48 allowing a 15 x 38 (557 sq ft) rock bed based on .78 ssf for loam soils to be installed with 5' absorbtion around perimeter.

Minnesota Pollution Control Agency

OSTP Design Summary Worksheet

University of Minnesota

4. SOIL TREATMENT AREA DESIGN SUMMARY

Trench Design Summary

Dispersal Area	ft²	Sidewall Depth	in	Trench Width	ft
Total Lineal Feet	ft	Number of Trenches		Code Maximum Trench Depth	in
Contour Loading Rate	ft	Min Trench Length	ft	Designer's Max Trench Depth	in

Bed Design Summary

Absorption Area	1200 ft²	Depth of sidewall	6.0 in	Code Maximum Bed Depth	36+ in
Bed Width	15 ft	Bed Length	38.0 ft	Designer's Max Bed Depth	36+ in

Mound Design Summary

Absorption Bed Area	ft²	Bed Length	ft	Bed Width	ft
Absorption Width	ft	Clean Sand Lift	ft	Berm Width (0-1%)	ft
Upslope Berm Width	ft	Downslope Berm Width	ft	Endslope Berm Width	ft
Total System Length	ft	Total System Width	ft	Contour Loading Rate	gal/ft

At-Grade Design Summary

Absorption Bed Width	ft	Absorption Bed Length	ft	System Finished 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	5	Perforation Spacing	3 ft	Perforation Diameter	1/4 in
Lateral Diameter	2.00 in	Min. Delivered Volume	122 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 At-Risk, HSW or Type IV 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/ft²

____ mg/L X 8.35 ÷ 1,000,000 ÷ ____ ft² = ____ lbs./day/ft²

Comments/Special Design Considerations:

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

Scot Rosevold	Scot Rosevold	1790	08/03/17
(Designer)	(Signature)	(License #)	(Date)

Minnesota Pollution Control Agency

OSTP Bed Design Worksheet

University of Minnesota

1. SYSTEM SIZING:

Project ID:

v 04.06.2017

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

B. Code Maximum Depth*: 36 inches Designers Maximum Depth: 36 inches

C. Soil Loading Rate: 0.78 GPD/ft²

D. Required Bottom Area: Design Flow (1.A) ÷ Loading Rate (1.C) = Initial Required Bottom Area

450 GPD ÷ 0.78 GPD/ft² = 577 ft²

E. Select Distribution Method: ☑ Pressure ☐ Gravity

F. Select Dispersal Type: ☑ Rock ☐ Registered

G. If distribution media is installed in contact with sand or loamy sand or with a percolation rate of 0.1 to 5 mpi indicate distribution or treatment method: Pressure distribution

2. BED CONFIGURATION: (for sites with less than 6% slope)

A. Select size Multiplier: 1.0 1.0 = pressurized or 1.5 = gravity

B. Req'd Bottom Area = Bottom Area (1.D) X Size Multiplier =

576.9 ft² X 1.0 ft = 577 ft²

C. Designed Bottom Area: 577 ft *Optional upsizing of bed area*

D. Select Bed Width: 15 ft

E. Calculate Bed Length: Designed Bottom Area ÷ Bed Width = Bed Length

577 ft² ÷ 15.0 ft = 38.0 ft

3. MATERIAL CALCULATION: ROCK

A. If drainfield rock is being used, select sidewall height

6 in 0.50 ft

B. Media Volume: (Media Depth + depth to cover pipe) X Designed Bottom Area = ft³

(0.50 ft + 0.33 ft) X 577.0 ft² = 479 ft³

C. Calculate Volume in cubic yards: Media volume in cubic feet ÷ 27 = cubic yards

479 ft³ ÷ 27 = 18 yd³

4. MATERIAL CALCULATION: REGISTERED PRODUCTS - CHAMBERS AND EZFLOW

A. Registered Product:

B. Component Length: ft

C. Component Width: ft

D. Component depth (louver or depth of sidewall loading) in

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

ft ÷ ft = components

F. Actual Bed Length = Number of Components X Component Length:

components X ft = ft

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

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

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

X = components

Minnesota Pollution Control Agency

OSTP Pressure Distribution Design Worksheet

University of Minnesota

Project ID: v 04.06.2017

1. Media Bed Width: 15 ft

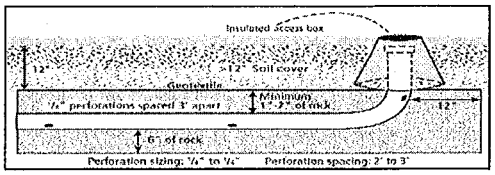
2. Minimum Number of Laterals in system/zone = Rounded up number of [(Media Bed Width - 4) ÷ 3] + 1.

[(15 - 4) ÷ 3] + 1 = 5 laterals *Does not apply to at-grades*

3. Designer Selected *Number of Laterals*: 5 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

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.*

13 Perf. Per Lat. X 5 Number of Perf. Lat. = 65 Total Number of Perf.

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

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

Minnesota Pollution Control Agency

OSTP Pressure Distribution Design Worksheet

University of Minnesota

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)

15	ft	X	38	ft	=	570 ft²

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

570	ft²	÷	65	perforations	=	8.8 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.*

65	Perfs	X	0.74	GPM per Perforation	=	48 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]

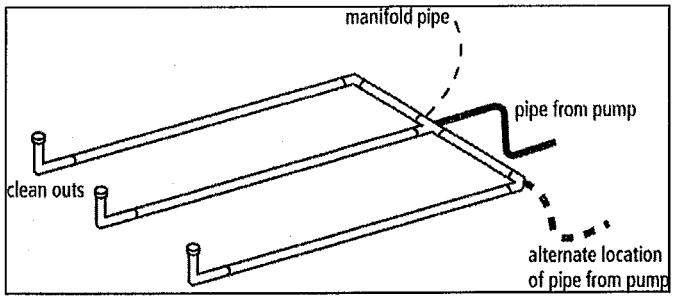
5	X	36	ft	X	0.170	gal/ft	=	30.6 Gallons

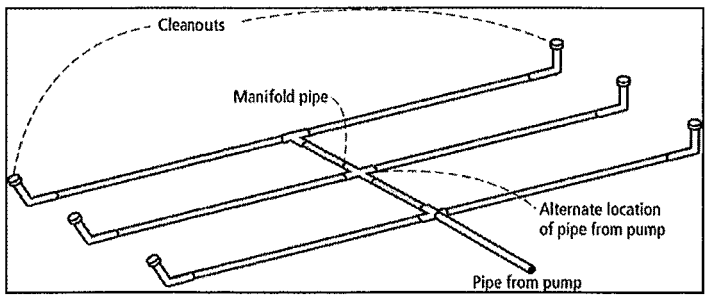
18. Minimum Delivered Volume = Volume of Distribution Piping X 4

30.6	gals	X	4	=	122.4 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:

Minnesota Pollution Control Agency

OSTP Basic Pump Selection Design Worksheet

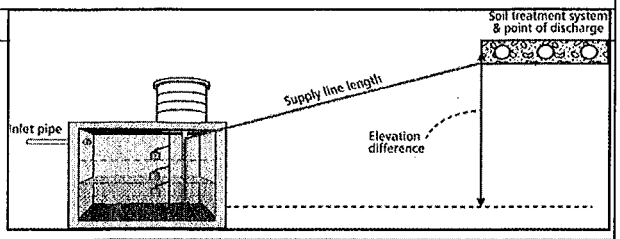
University of Minnesota

1. PUMP CAPACITY Project ID: v 04.06.2017

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: 48.0 GPM
3. Enter pump description: Demand Dosing

2. HEAD REQUIREMENTS



A. Elevation Difference between pump and point of discharge: 8 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: 10 ft

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

Friction Loss = 5.66 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 discharge point. Estimate by adding 25% to supply pipe length for fitting loss. *Supply Pipe Length (D.2)* X 1.25 = *Equivalent Pipe Length*

10 ft X 1.25 = 12.5 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 =

5.66 ft per 100ft X 12.5 ft ÷ 100 = 0.7 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)

8.0 ft + 5.0 ft + _____ ft + 0.7 ft = 13.7 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **48.0** GPM (Line 1 or Line 2) with at least **13.7** feet of total head.

Comments:

Minnesota Pollution Control Agency

OSTP Pump Tank Design Worksheet (Demand Dose)

University of Minnesota

DETERMINE TANK CAPACITY AND DIMENSIONS | Project ID: | v 04.06.2017

1. A. Design Flow: 450 GPD
   B. Min. required pump tank capacity: 450 Gal C. Recommended pump tank capacity: 722 Gal

2. A. Tank Manufacturer: Sather B. Tank Model: SCP2250GP
   C. Capacity from manufacturer: 2 Gallons
   D. Gallons per inch from manufacturer: 15.4 Gallons per inch
   E. Liquid depth of tank from manufacturer: 47.0 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

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)

(8 in + 2 inches) X 15.4 Gallons Per Inch = 154 Gallons

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

- Line 17 of the Pressure Distribution or Line 11 of Non-level 122 Gallons (minimum dose)

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

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

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

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

450 gpd ÷ gal = 4.0 Doses

8 Calculate Drainback:

A. *Diameter of Supply Pipe* = 2 inches

B. Length of Supply Pipe = 10 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*

10 ft X 0.170 gal/ft = 1.7 Gallons

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

122 gal + 1.7 gal = 124 Gallons

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

3 in X 15.4 gal/in = 46.1 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

124 gal ÷ 15.4 gal/in = 8.1 Inches

12. Measuring from bottom of tank:

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

8 in + 3 in = 11 Inches

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

11 in + 8.1 in = 19 Inches

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

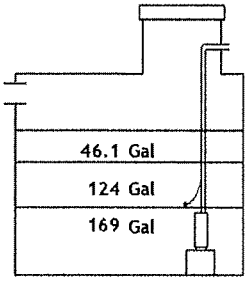
19 in + 3.0 in = 22 Inches

Inches for Dose: 8.1 in

Alarm Depth 22.1 in

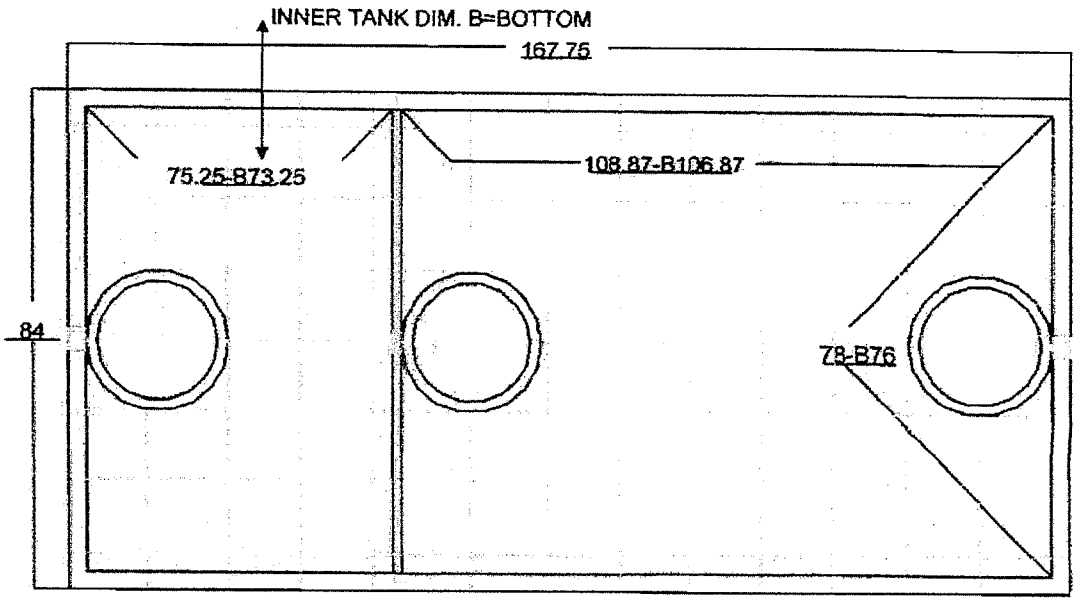
Pump On 19.1 in

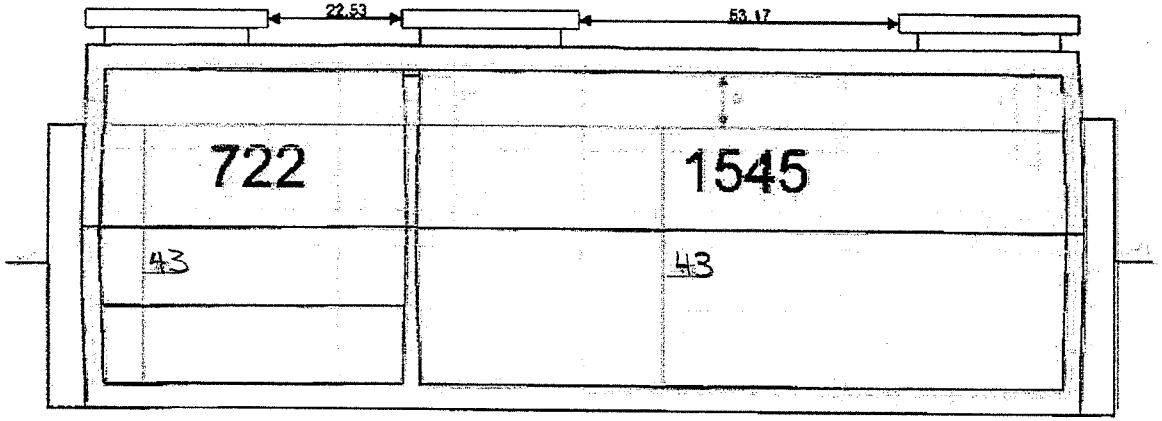
Pump Off 11.0 in



MODEL SCP2250GP

SPECS		NOTES
GALLONS	721.97/1545.85	1 RISER COUPLERS 23.75"OD-20"ID CONCRETE
GPI	16.79/35.95	2 PIPE FITTINGS 4" CAST A SEAL W/CLAMP
INLET	49	3 REINFORCEMENT
OUTLET	47	A COVER 1/2 REBAR IN 1' GRID
WIDTH	84	B TANK 1/2 REBAR RADIUS/ FORTE FIBER
LENGTH	167.75	
THICKNESS	WALL 3 COVER 4 FLOOR 4	



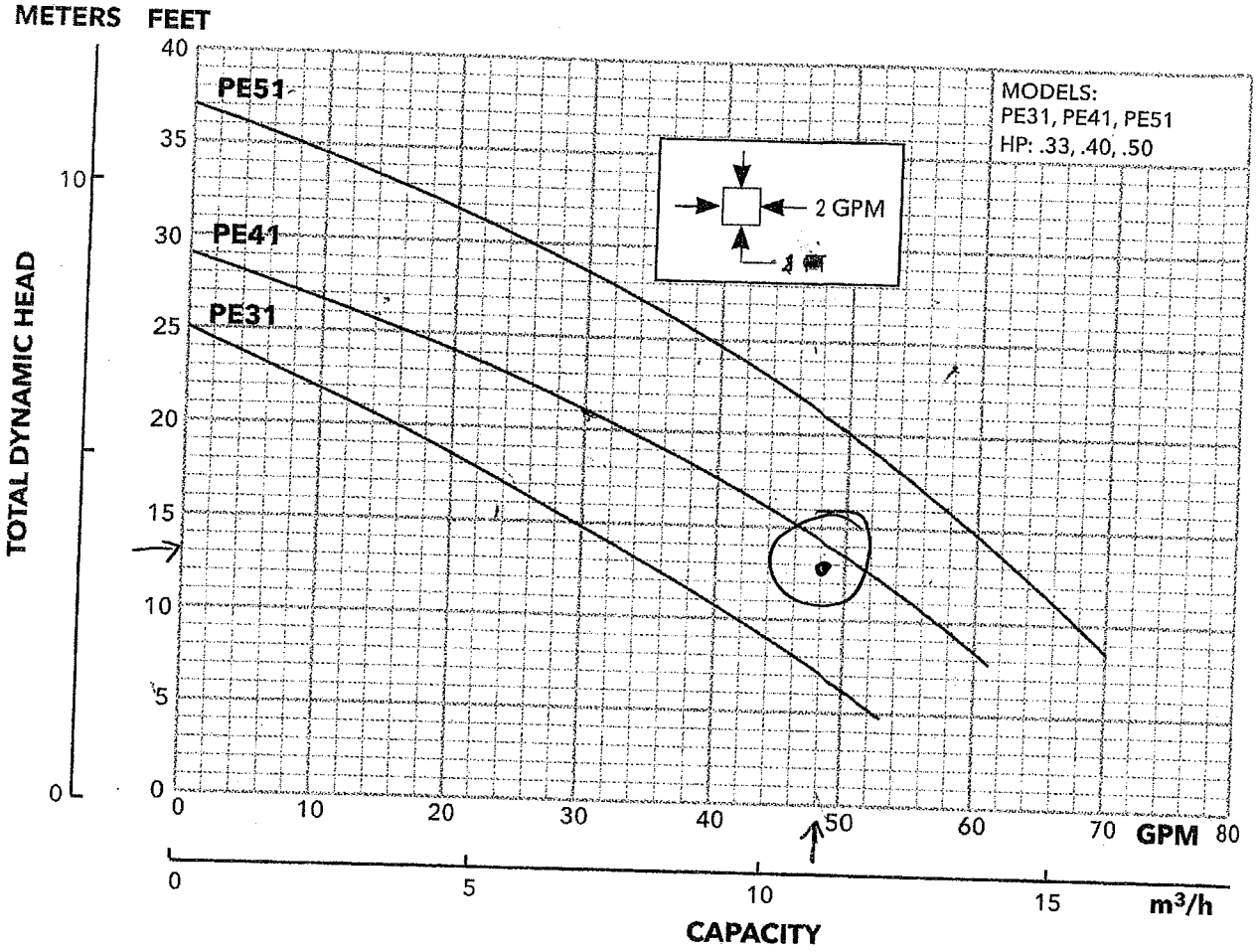


INVERTS AND MOLEHOLES
LIQUID DEPTH
AIR SPACE

SATHER SCP CONCRETE PRODUCTS Est. 1972

COMENTS:DRAWINGS TO SCALE USING VIACAD 2D
ALL MEASUREMENTS ARE IN INCHS

218-829-9678
satherconcreteproducts@live.com



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

event counter, flow meter, owner pumping record

Date	event counter reading	how many days between readings	gallons per day average		(or) Flow meter readings	how many days between readings	gallons per day average	service provider pumper	gallons pumped	date

Flow Calculations to determine compliance to design flow			
Minimum Flow	day or month		gpd
Peak Flow	day or month		gpd
1st year ave gpd		events	gpd
2nd year ave gpd		events	gpd

Clean SAND

Minnesota Pollution Control Agency

OSTP Materials Worksheet

UNIVERSITY OF MINNESOTA

Project ID: v 04.06.2017

A. Calculate Rock *Volume*: (Rock Below Pipe + Rock to cover pipe (*pipe outside dia + ~2 inch)*) X *Bed Length* (2.D) X *Bed Width* (2.B) = *Volume* (ft^3)

(____ in + ____ in) ÷ 12 X ____ ft X ____ ft = ____ ft^3

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

____ ft^3 ÷ 27 = ____ yd^3

Add 20% for constructability: ____ yd^3 X 1.2 = ____ yd^3

For systems using other distribution media - see product registration for material required

B. Calculate *Clean Sand Volume:*

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

4.0 ft X 25.0 ft X 48.0 ft = 4800.0 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 = #VALUE!

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*

#VALUE! ft^3 + ____ ft^3 + 4800 ft^3 = 4800.0 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: ____ ft^3 ÷ 27 = ____ yd^3

Add 20% for constructability: ____ yd^3 X 1.2 = ____ 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

(____ - 0.5)ft X ____ ft X ____) ÷ 2 = ____ ft^3

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

____ ft^3 - ____ ft^3 - ____ ft^3 = ____ ft^3

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

Add 20% for constructability: ____ yd^3 x 1.2 = ____ yd^3

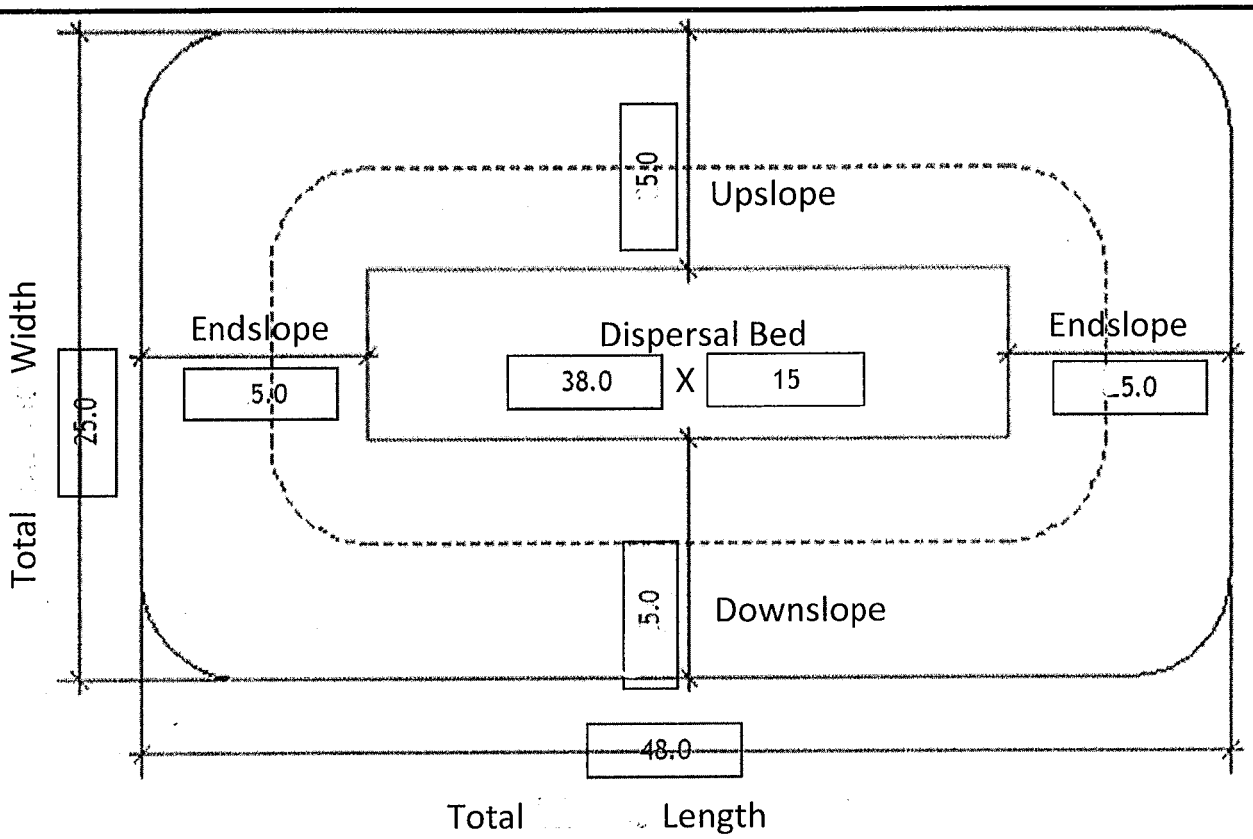
D. Calculate *Topsoil Material Volume: Total Mound Width X Total Mound Length X .5 ft*

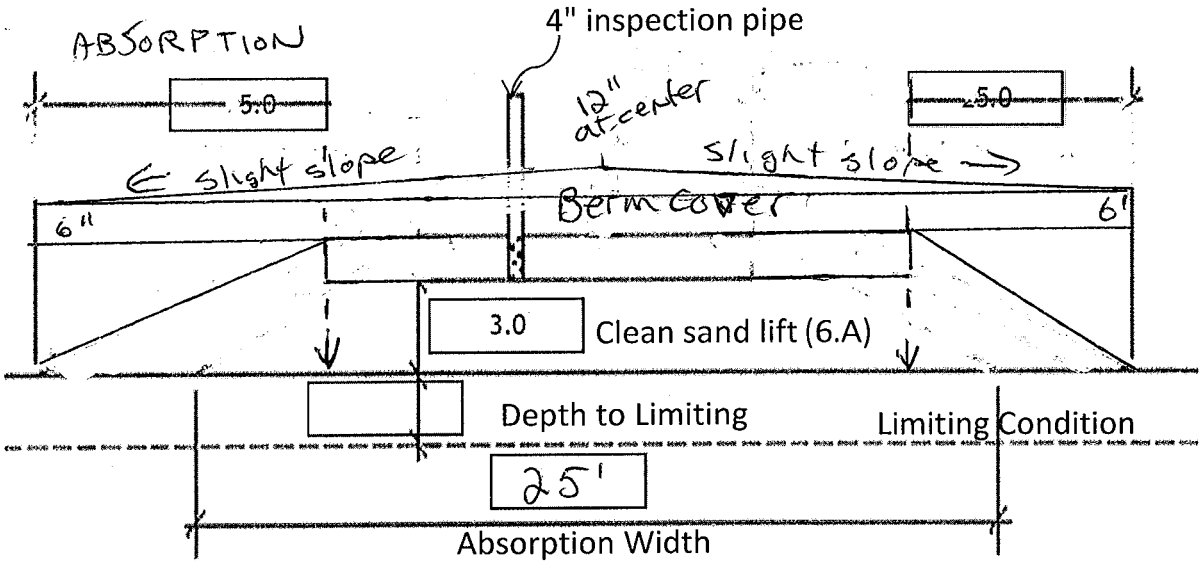
____ ft X ____ ft X 0.5 ft = ____ ft^3

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

Add 20% for constructability: ____ yd^3 x 1.2 = ____ yd^3

7. DIMENSIONS





Comments:

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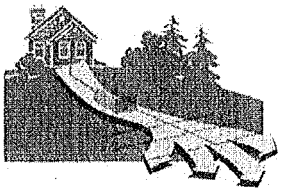


Septic System Management Plan for Below Grade Systems

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 Fran Schmitz

Property Address 49558 202nd Place McGregor MN Property ID 29-1-32-5600

System Designer Scot Rosevold Phone 763-389-3963

System Installer Phone

Service Provider/Maintainer Phone

Permitting Authority Aitkin County Phone 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:

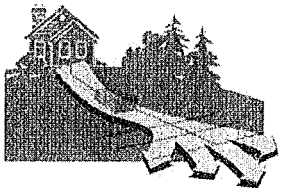
- Attach permit information, designer drawings and as-builts of your system, if they are available.
- Keep copies of all pumping records and other maintenance and repair invoices with this document.
- Review this document with your maintenance professional at each visit; discuss any changes in product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

For a copy of the *Septic System Owner's Guide*, call 1-800-876-8636 or go to http://shop.extension.umn.edu/

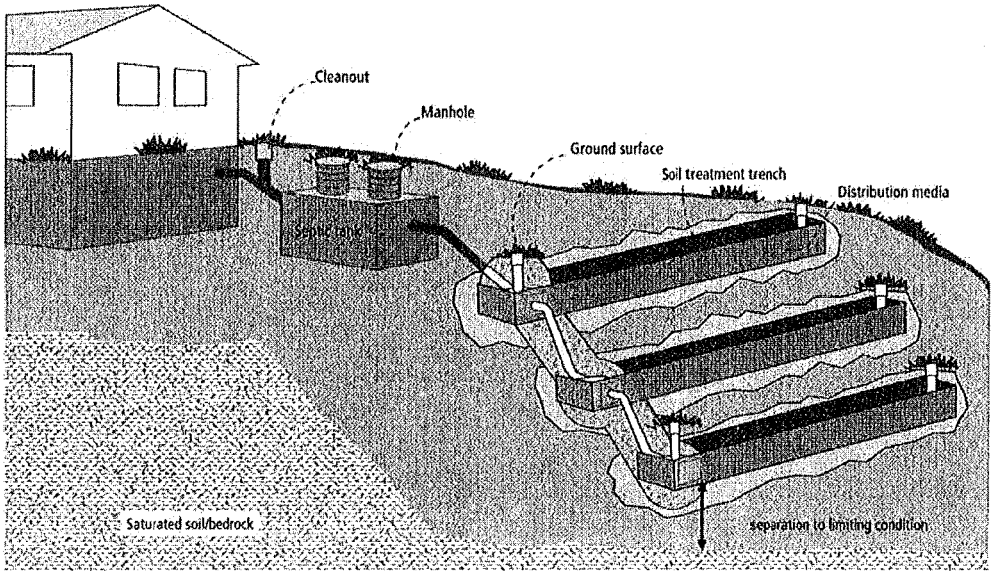
http://septic.umn.edu

UNIVERSITY OF MINNESOTA

Septic System Management Plan for Below Grade Systems



Your Septic System



Septic System Specifics

System Type: ◯I ◯II ◉III ◯IV* ◯V*
(Based on MN Rules Chapter 7080.2200 – 2400)

☐ System is subject to operating permit*
☐ System uses UV disinfection unit*
Type of advanced treatment unit _____
**Additional Management Plan required*

Dwelling Type

Number of bedrooms: 3
System capacity/ design flow (gpd): 450
Anticipated average daily flow (gpd): _____
Comments _____
Business? ☐ What type? _____

Well Construction

Well depth (ft): new deep cased well needed
☐ Cased well Casing depth: _____
☐ Other (specify): _____
Distance from septic (ft): over 50'
Is the well on the design drawing? ☑ Y ☐ N

Septic Tank

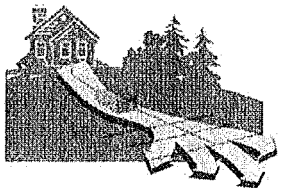
☐ One tank *Tank volume:* 1545 *gallons*
Does tank have two compartments? ☐ Y ☐ N
☐ Two tanks *Tank volume:* _____ *gallons*
☐ Tank is constructed of concrete 2250 comp
☐ Effluent Screen *type:* _____

☐ Pump Tank (*if one*) 722 gallons
☐ Effluent Pump *make/model:* _____
Pump capacity 48 GPM
TDH 13.7 Feet of head
☐ Alarm location house and lift tank

Soil Treatment Area (STA)

Trenches: elevated bed total lineal feet
Number of trenches: _____ at _____ feet each
STA size (width x length): 25 ft x 48 ft
Location of additional STA: no

☐ Gravity distribution ☑ Pressure distribution
☑ Inspection ports ☑ Cleanouts
☑ Additional STA not available



Homeowner Management Tasks

These op*eration and maintenance ac*tivities are your responsibility. *Use the chart on page 6 to track your activities.*

Identify the service intervals recommended by your system designer and your local government. The tank assessment for your system will be the **shortest interval of these three intervals**. Your pumper/maintainer will determine if your tank needs to be pumped.

System Designer: check every 24 months

Local Government: check every 36 months

State Requirement: check every 36 months

My tank needs to be checked every 24-36 months

Seasonally or several times per year

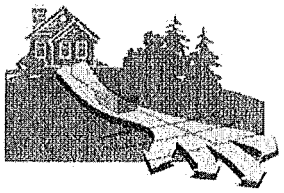
- *Leaks.* Check (listen, look) for leaks in toilets and dripping faucets. Repair leaks promptly.
- *Surfacing sewage.* Regularly check for wet or spongy soil around your soil treatment area. If surfaced sewage or strong odors are not corrected by pumping the tank or fixing broken caps and leaks, call your service professional. *Untreated sewage may make humans and animals sick.*
- *Alarms.* Alarms signal when there is a problem; contact your maintainer any time the alarm signals.
- *Lint filter.* If you have a lint filter, check for lint buildup and clean when necessary. 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.

Annually

- *Water usage rate.* A water meter 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.
- *Review your water usage rate.* Review the Water Use Appliance chart on Page 5. Discuss any major changes with your pumper/maintainer.

During each visit by a pumper/maintainer

- Ask if your pumper/maintainer is licensed in Minnesota.
- Make sure that your pumper/maintainer services the tank through the manhole. (NOT though a 4" or 6" diameter inspection port.)
- 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. Professionals should refer to the O/M Manual for detailed checklists for tanks, pumps, alarms and other components. Call 800-322-8642 for more details.

- Written record provided to homeowner after each visit.

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 drainfield.)
- *Inspection pipes.* Replace damaged 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

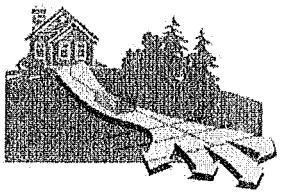
- *Pump and controls.* Check to make sure the pump and controls are operating correctly.
- *Pump vault.* Check to make sure it is in place; clean per manufacturer recommendations.
- *Alarm.* Verify that the alarm works.
- *Drainback.* Check to make sure it is operating properly.
- *Event counter or run time.* Check to see if there is an event counter or run time log for the pump. If there is one, calculate the water usage rate and compare to the anticipated average daily flow listed on Page 2.

Soil Treatment Area

- *Inspection pipes.* Check to make sure they are properly capped. Replace caps that are damaged.
- *Surfacing of effluent.* Check for surfaced effluent or other signs of problems.
- *Gravity trenches and beds.* Check the number of gravity trenches with ponded effluent. Identify the percentage of the system in use. Determine if action is needed.
- *Pressure trenches and beds - Lateral flushing.* Check lateral distribution; if cleanouts exist, flush and clean as needed.

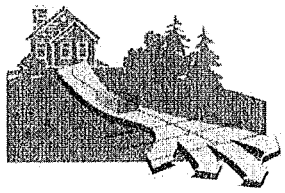
All other components – inspect as listed here:

Event counter readings and pumping records to be kept by owner for future compliance to designed water use.



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. • Install a lint filter after the washer and an effluent screen to your tank • Wash only full loads. • Limit use of bleach-based detergents. • Think even – spread your laundry loads throughout the week.
2nd floor laundry	• The rapid speed of water entering the tank may reduce performance.	• Install an effluent screen in the septic tank to prevent the release of excessive solids to the soil treatment area. • Be sure that you have adequate tank capacity.
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 into a sump pump or directly out of the house. Do not route furnace recharge 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 likely overload the system.	



Maintenance Log

Track maintenance activities here for easy reference. See list of management tasks on pages 3and 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										
Check annually:										
Water usage rate (monitor frequency____)										
Caps: inspect, replace if needed										
Water use appliances – review use										
Other:										

Notes: _____

_____

Mitigation/corrective action plan: follow management paln

_____

_____

_____

_____

"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 _____

Management Plan Prepared By: Scot Rosevold Certification # 4249

Permitting Authority: Aitkin County