Radtke

Subsurface Sewage Treatment System Management Plan

Property Owner: Tom Ernsting Phone: _____ Date: 6/10/2019

Mailing Address: 34285 248th St. City: Lesueur MN Zip: 56058

Site Address: 36374 Nature Ave. City: Aitkin MN Zip: 56431

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 service provider.

System Designer: check every 36 months.
Local Government: check every _____ months.
State Requirement: check every 36 months.

(State requirements are based on MN Rules Chapter 7080.2450, Subp. 2 & 3)

My System needs to be checked every 36 months.

Homeowner Management Tasks

Leaks – Check (look, listen) for leaks in toilets and dripping faucets. Repair leaks promptly.

Surfacing sewage – Regularly check for wet or spongy soil around your soil treatment area.

Effluent filter – Inspect and clean twice a year or more.

Alarms – Alarm signals when there is a problem. Contact a service provider any time an alarm signals.

Event counter or water meter – Record your water use.

-recommend meter readings be conducted (*circle one:* DAILY WEEKLY MONTHLY)

Professional Management Tasks

- ☐ Check to make sure tank is not leaking
- ☐ Check and clean the in-tank effluent filter
- ☐ Check the sludge/scum layer levels in all septic tanks
- ☐ Recommend if tank should be pumped
- ☐ Check inlet and outlet baffles
- ☐ Check the drainfield effluent levels in the rock layer
- ☐ Check the pump and alarm system functions
- ☐ Check wiring for corrosion and function
- ☐ Check dissolved oxygen and effluent temperature in tank
- ☐ Provide homeowner with list of results and any action to be taken
- ☐ Flush and clean laterals if cleanouts exist

"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 the 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: _____

Designer Signature: Jeff Brummer Date: 6/10/2019

See Reverse Side for Management Log

Maintenance Log

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										
Water usage rate (monitor frequency _____)										
Check annually:										
Caps: inspect, replace if needed										
Sludge & Scum/Pump										
Inlet & Outlet baffles										
Drainfield effluent leaks										
Pump, alarm, wiring										
Flush & clean laterals if cleanouts exists										
Other:_____										
Other:_____										

Notes: Check & Clean Effluent filter at least twice a year. Check all alarms at least once a year.

Check alarms and pumps at least once a year Pump septic & pump tanks at least once every three years.

Mow Mound area at least once a year to keep trees and brush from growing in mound area.

No Traffic on mound area, No Snowmobiles, No ATV's, No Parking.

Mitigation/corrective action plan:_____

Preliminary & Field Evaluation Form

www.SepticResource.com vers 12.4

Owner Information

Date	6/10/2019	Sec / Twp / Rng	S-23, T-47, R-25
Parcel ID	15-0-040200	LUG (county, city, township)	Aitkin Co.
Property Owner:	Tom Ernsting (Sue Radke)	Owners address (if different)	
Property Address:	36374 Nature Ave. Aitkin MN 56431	34285 248th St.	
City / State / Zip:		Lesueur MN 56058	

Flow Information and Waste Type / Strength

Estimated Design flow: 450

Comments:
Replacement for Non-Comforming system.

Anticipated Waste strength	☐ Hi Strength	☑ Domestic
Any Non-Domestic Waste	☐ Yes (class V)	☑ No
Sewage ejector/grinder pump	☐ Yes	☑ No
Water softener	☐ Yes	☑ No
Garbage Disposal	☐ Yes	☑ No
Daycare / In home business	☐ Yes	☑ No

Site Information

Existing & proposed lot improvements located (see site map)	☐ Yes	☑ No	Well casing depth	deep well North of House	
Easements on lot located (see site map)	☐ Yes	☑ No	Drainfield w/in 100' of residential well	☐ Yes	☑ No
Property lines determined (see site map)	☑ Yes	☐ No	Site w/in 200' of transient noncommunity water supply (TNCWS)	☐ Yes	☑ No
Req'd setbacks determined (see site map)	☑ Yes	☐ No	Site w/in an inner wellhead mgmt zone (CWS/NTNCWS)	☐ Yes	☑ No
Utilities located & identified (gopher state one call)	☐ Yes	☑ No	Buried water supply pipe w/in 50' of system	☐ Yes	☑ No
Access for system maintenance (shown on site map)	☑ Yes	☐ No	Site located in Shoreland (w/in 1000' of lake, 300' of river)	☐ Yes	☑ No
Soil treatment area protected	☑ Yes	☐ No	Site map prepared with previous items included	☑ Yes	☐ No

Construction related issues: Installer may have to build mound before setting tank.

Soil Information

Original soils	☑ Yes	☐ No	Evidence of site:	
			Cut	☐ Yes ☑ No
			Filled	☐ Yes ☑ No
			Compacted	☐ Yes ☑ No
			Disturbed	☐ Yes ☑ No
Soil logs completed and attached	☑ Yes	☐ No	Perk test completed and attached (if applicable)	☐ Yes ☑ No
Soil loading rate (gpd/ft^2)	0.50		Percolation rate (if applicable)	
Depth/elev to SHWT	14"		Flooding or run-on potential (comments)	☐ Yes ☑ No
Depth to system bottom maximum (or elev minimum)	(+24")			
Depth/elev to standing water (if applicable)			Flood elevation (if applicable)	
Depth/elev to bedrock (if applicable)			Elevation of ordinary high water level (if applicable)	
Soil Survey information determined (see attachment)	☑ Yes	☐ No	Floodplain designation and elev - 100 yr/10 yr (if applicable)	
Differences between soil survey and field evaluation (if applicable)				

I hereby certify this evaluation was completed in accordance with MN 7080 and any local req's.

Designer Signature	Company	License #
	Brummer Septic LLC.	L-1347

Soil Observation Log

www.SepticResource.com vers 12.4

Owner Information

Property Owner / project: Tom Ernsting (Sue Radke) Date 6/10/2019

Property Address / PID: 36374 Nature Ave. Aitkin MN 56431

Soil Survey Information

☐ refer to attached soil survey

Parent matl's: ☑ Till ☐ Outwash ☐ Lacustrine ☐ Alluvium ☐ Organic ☐ Bedrock

landscape position: ☐ Summit ☐ Shoulder ☐ Side slope ☐ Toe slope

soil survey map units: 504B & 504E slope ____ % direction- East

10% rockbed & 5% downslope 6%

Soil Log #1

☑ Boring ☐ Pit Elevation 96.8' Depth to SHWT 16"

Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0 - 6	Topsoil Sandy Loam	<35	10YR3/2		Loose	Loose	Granular
6 - 16	Loam	<35	7.5YR5/4		Friable	Loose	Granular
16 - 22	Loam	<35	7.5YR5/4	7.5YR5/6 & 7.5YR6/2	Friable	Loose	Granular
22	Clay	<35	5YR5/3		Firm	Moderate	Platy
		<35					

Comments:

36374 Nature Ave. Aitkin MN 56431			**Soil Log #2**				
	☑ Boring	☐ Pit	Elevation 97.9'		Depth to SHWT 14"		
Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0 - 6	Topsoil Sandy Loam	<35	10YR3/2		Loose	Loose	Granular
6 - 14	Loam	<35	7.5YR5/4		Friable	Loose	Granular
14 - 18	Loam	<35	7.5YR5/4	7.5YR5/6 & 7.5YR6/2	Friable	Loose	Granular
18	Clay	<35	5YR5/3		Firm	Moderate	Platy
		<35					

36374 Nature Ave. Aitkin MN 56431			**Soil Log #3**				
	☐ Boring	☐ Pit	Elevation ______		Depth to SHWT ______		
Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive

I hereby certify this work was completed in accordance with MN 7080 and any local req's.

Jeff Brummer
Designer Signature

Brummer Septic LLC.
Company

L-1347
License #

2011 purple code

Mound Design - Aitkin county

www.SepticResource.com (vers 15.2)

Property Owner: Tom Ernsting (Sue Radke) **Date:** 6/10/2019

Site Address: 36374 Nature Ave. Aitkin MN 56431 **PID:** 15-0-040200

Comments: Replacement for a Non-Comforming Septic System

instructions: [ ] = enter data [ ] = adjust if desired [ ] = computer calculated - DO NOT CHANGE!

1) [3] bedroom Type [I] Residential System

2) [450] GPD design flow

3) [No] Garbage disposal or pumped to septic Install 1650 Jacobson Compartment tank 1120/533

4) [1000] Gal Septic tank (code minimum) [1000] Gal Septic tank (design size / LUG req'd)
Tank options: Effluent filter & alarm req'd

5) [1.2] GPD/ft^2 mound sand loading rate contour loading rate of [12] req's a min [37.5] ft. long rockbed

6) [10.0] ft rockbed width [37.5] ft rockbed length

7) [3.0] ft lateral spacing [3.0] ft perforation spacing (maximum of 3 for both)
[end feed] manifold connection

8) [3] laterals [35.5] feet long [12.0] perfs / lateral [36] perfs total
(1/2 a perf means the first perf starts at the middle feed manifold)

9) [1/4"] inch perfs at [1] feet residual head gives [0.74] gpm flow rate per perforation

for this perf size & spacing, & pipe size on line 12, max perfs/lateral = [16], line #8 must be less --> OK

10) [7.0] doses per day (4 minimum)

11) [64] gallons per dose (treatment volume)

1.50 5x

12) [1.50] inch diameter laterals must be used to meet "4x pipe volume" requirement

2.00 3x

13) [50] feet of [2.0] inch supply line leads to [9] gallons of drainback volume
(Tip: "top feed" manifold to control the drainback)

14) [73] gallons TOTAL pump out volume (treatment + drainback)

15) [12] feet vertical lift from pump to mound laterals, leads to a:

16) [27] GPM @ [19] feet of head, Pump requirement (note: >50gpm may require an extra 3-6' of head)

17) [500] gal Dose tank (code minimum) [533] gal Dose tank (design size / LUG req'd) at [12.69] gpi
leads to a

18) [5.8] inch swing on Demand float, or timed dosing of [2.7] min ON (confirm pump rate with drawdown
(this delivers Average flow, =70% of Peak design flow) [5.1] hrs OFF test and adjust as necessary)

19) [12] inches from bottom of tank to "Pump OFF" float

20) [18] inches from bottom of tank to "Pump ON" float, or [12] inches to "Timer ON" float if time dosed

21) [21] inches from bottom of tank to "Hi Level" float, or [31] inches to "Hi Level" float if time dosed

22) [267] gallons reserve capacity (after High Level Alarm is activated)

23) 0.50 gpd/ft² Absorption area Soil Loading Rate, (this must match the soil boring log) which gives a mound ratio of 2.4 (minimum) desired mound ratio 2.4

24) 10 percent site slope (0-20% range) 6 (% downslope site slope, if different than upslope)

25) 12 inches, or 1.0 ft. to Redox or other limiting condition (need at least 12" to be a Type I)
Treatment zone contains 0 inches of 0% soil credit, and 0 inches of 50% soil credit. Giving a:

26) 24 inch, or 2.0 ft. Sand Lift Mound **CRITICAL FOR FUTURE CERTIFICATIONS!!!**

27) 24.0 ft. base absorption width (with sand beyond rockbed as follows:)
39.6 greater of: absorption width OR sand slope

28) 0.0 ft. upslope and sideslope sand upslope 8.6
14.0 ft. Downslope sand down slope 21.0

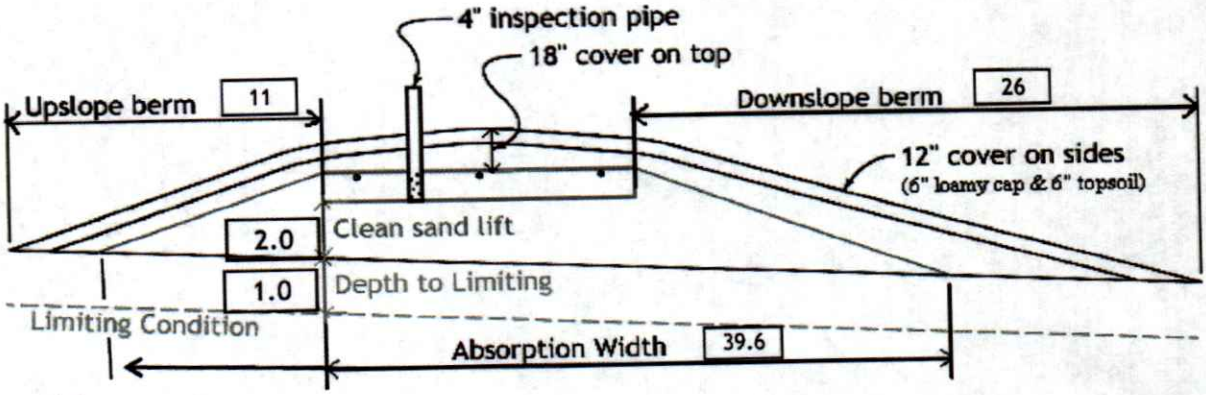
Individual slope ratios give BERM widths (topsoil beyond rockbed) of:

29) 4:1 upslope ratio 11 ft. upslope berm

30) 4:1 sideslope 20 ft. sideslope berms

31) 4:1 downslope 26 ft. downslope berm

32) Overall Dimensions: 10.0 ft. wide by 37.5 ft. long Rock bed
47 ft. wide by 78 ft. long Mound footprint



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***.

33) Rock Bed:
10.0 ft. by 37.5 ft. by 9 inches under pipe, plus 20% gives 17 yd³ or *1.4= 24 ton

34) Mound Sand: (note: volume is based on 3:1/4:1 slope from top of rockbed, Exchange sand for loamy cap if desired
33.1 up + 108.3 downslope + 23.7 ends + 34.7 under rock = 240 yd³ or *1.4= 336 ton
plus 20%

35) Loamy Cap:
43 ft. by 74 ft. 6" deep, plus 20% gives 71 yd³ or *1.4= 99 ton

36) Topsoil:
47 ft. by 78 ft. 6" deep, plus 20% gives 81 yd³ or *1.4= 113 ton

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

Designer Signature	Company	License#	Date
	Brummer Septic LLC.	L-1347	6/10/2019

Installer Summary

1000 gallon Septic tank (minimum)

Tank options: Effluent filter & alarm req'd
Install 1650 Jacobson Compartment tank
at 12.69 gpi

533 gallon Dose tank (minimum)

27 GPM @ 19 ft. of head, Pump required
5.8 inch swing on Demand float which translates to roughly 3.9 inches of float tether length
if time dosing is required --> 2.7 minutes ON time & 5.1 hours OFF time
18 inches from bottom of tank to "pump ON" float, or 12 inches to "timer ON" float
21 inches from bottom of tank to "Hi Level Alarm" or 31 inches to "Hi level alarm" if time dosed

50 ft. of 2.0 inch supply line with end feed manifold connection
(Tip: "top feed" manifold to control drainback)

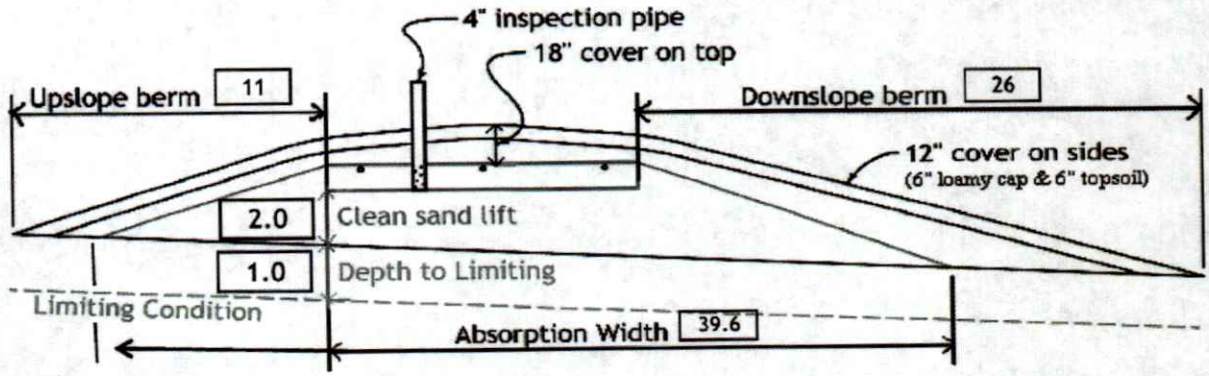
24 inch, or 2.0 ft. Sand Lift Mound
10.0 ft. wide by 37.5 ft. long Rock bed
3 laterals 1.50 inch diameter 35.5 ft. long 3.0 ft. lateral spacing
1/4" inch perfs 3.0 ft. perforation spacing

yes Effluent filter & alarm
3 clean out & valve box assemblies

39.6 ft.Total sand ABSORPTION width (minimum)
8.6 ft. upslope and sideslope (sand beyond rockbed, minimum)
21.0 ft. Downslope (sand beyond rockbed, minimum)

Specific slope ratios give BERM widths (topsoil beyond rockbed) of:

4:1 upslope ratio 11 ft. upslope berm
4:1 sideslope 20 ft. sideslope berms
4:1 downslope 26 ft. downslope berm



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*.

Rock Bed:	17.0	yd^3 or *1.4=	24	ton
Mound Sand:	240	yd^3 or *1.4=	336	ton
Loamy Cap:	71	yd^3 or *1.4=	99	ton
Topsoil:	81	yd^3 or *1.4=	113	ton

9 inches under pipe
calculation based on 3:1/4:1 slope from top of rockbe
6" deep
6" deep

INSPECTOR CHECKLIST - mound

36374 Nature Ave. Aitkin MN 56431

☐ WELL setbacks: 20' to pressure tested sewer line (5 psi for 15 min)
50' to everything 100' to dispersal area with shallow well

☐ PROPERTY LINES setback: 10' to everything

☐ Road setback: platted: 10' prop line. Metes & bounds: out of road easement, or outer ditch.

☐ LAKE / BLUFF setback: 20' for bluff. Lakes: GD ___, RD ___, NE ____. Protected wetland ___.

☐ Building setbacks: 10' for everything, 20' for dispersal area.

☐ WATER LINE under pressure se 10' to bed,tank & sewer line. (else sewer line > 12" below, else ok w/pvc)

☐ Sewer line & baffle connection (no 90's, 3' between 45's, slope min 1" in 8', max 2" in 8')
(no depth req's, clean out every 100', Sch 40 pipe)

☐ Septic tank and risers (water tight, insulated, proper depth, existing verified by pumping)
mfg_____ 1000 gallons Effluent filter & alarm req'd

☐ Riser over outlet, riser over inlet or center, and 6"+ inspection pipe over any remaining baffles.

☐ yes effluent filter & alarm

☐ Dose tank risers and piping (water tight, insulated, proper depth, drainback)
mfg_____ 533 gallons

☐ dose pump _____ 27 gpm 19 head VERIFY PUMP CURVE 2.7 min ON 5.1 hr OFF

☐ float setting drop 5.8 inches at 12.7 gpi "DESIGNED" 3.9 inches approx float tether length
73.0 gal dose divided by _____ gpi "INSTALLED" = _____ inches float drop (field corrected
LABEL pump requirements and drawdown on riser or panel

☐ Cam lock reachable from grade - 30" max. J-hook weep hole. Supply line access (no hard 90's)

☐ 2.0 inch supply pipe: Sch40, sloped 1/8"+, supported by 4" sch40 sleeve or compacted, and buried 6"+.

☐ splice box / control panel / electrical connections

☐ flow measurement: CT, ETM, time dosed, home water meter

☐ mound absorption area rough up

☐ mound rock dimensions 10.0 X 37.5

☐ Sand lift depth 24 inches. (Jar test : 2" sand leaves < 1/8" silt after 30 min)

☐ Absorption Sand beyond rock 8.6 upslope 21.0 downslope

☐ Bermed topsoil beyond rockbed 11 upslope 20 sideslope 26 downslope

☐ cover depth of 12-18"+ VERIFY

☐ 3 laterals (1-2' from edge of rock)

☐ 1.50 inch pipe size (Sch40 pipe & fittings)

☐ 3.0 ft lateral spacing

☐ 1/4" inch perforations

☐ 3.0 ft perforation spacing

☐ Air inlet at end of laterals, and at top feed manifold if necessary. VERIFY

☐ clean outs (no hard 90's)

☐ 4" inspection pipe to bottom of rock, anchored VERIFY

☐ Abandon existing system - if necessary ☐ Re-use existing tank certification

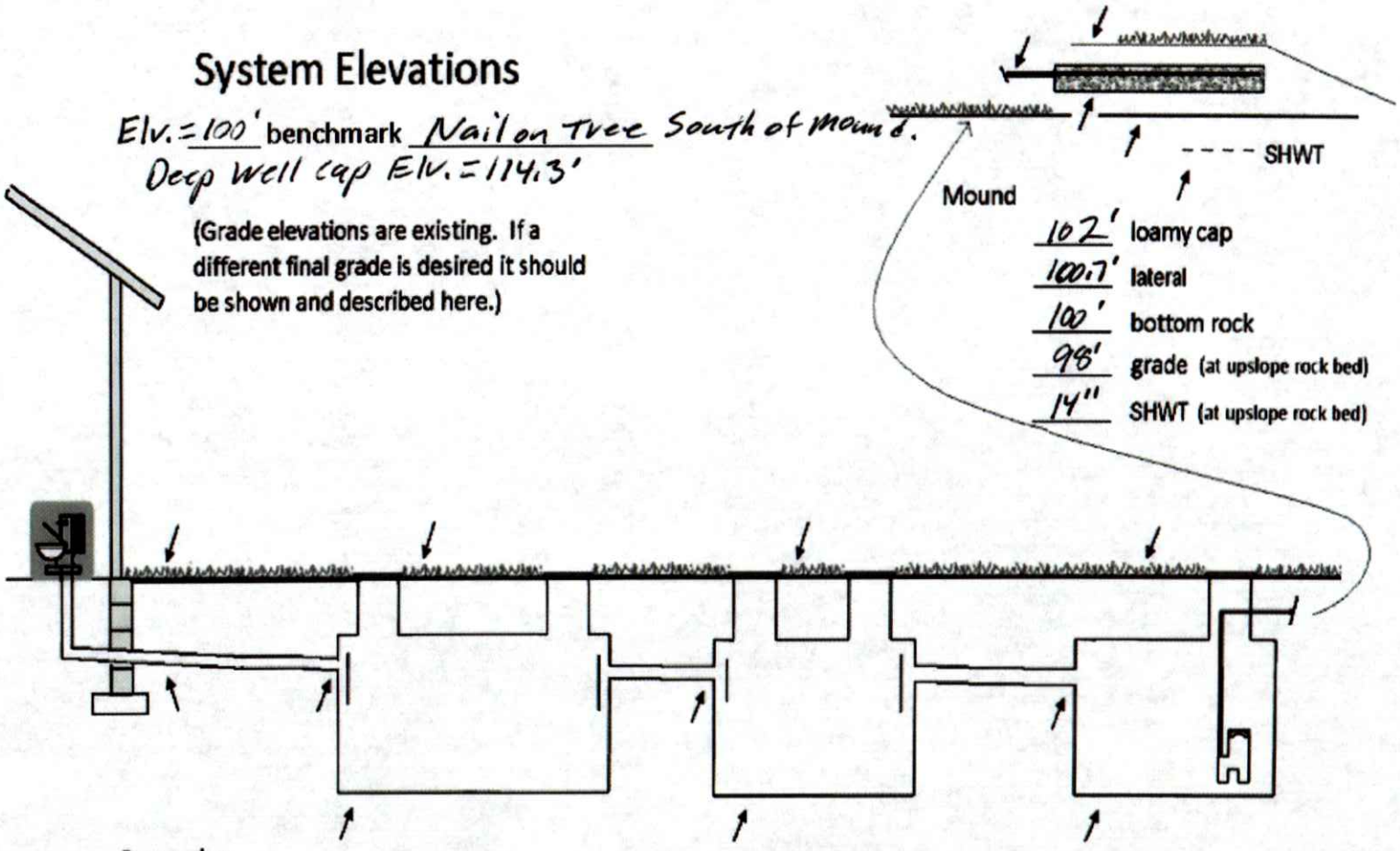
☐ monitoring plan and type _____

☐ well abandonment form - if necessary

System Elevations

Elv. = 100' benchmark Nail on Tree South of Mound.
Deep Well cap Elv. = 114.3'

(Grade elevations are existing. If a different final grade is desired it should be shown and described here.)



Sewer pipe exiting house	Septic Tank	Septic Tank (if applicable)	Pump Tank
SE corner of 109.9' Grade	99.6 Grade	____ Grade	99.6' Grade
approx. 107' Pipe	98' inlet	____ inlet	98.5' inlet
Existing Tank Inlet Elv = 102'	94' Tank bottom	____ Tank bottom	94' Tank bottom

Mound Design Notes - Aitkin county

Property Owner: Tom Ernsting (Sue Radke) **Date:** 6/10/19

Site Address: 36374 Nature Ave. Aitkin MN 56431 **PID:** 15-0-040200

Comments: ***Mound design may not follow Aitkin co. Auto fill form for mound design.***

1 This is a type I mound for an existing 3 bedroom House. Existing deep well location is North of House.
2 Existing Gravity mound is failing because of soil separation, Abandon existing mound.
Existing septic tank will be abandon, pump, collapse, fill, or remove.
3 Proposed mound area slope is 10% under rockbed, downslope is ~~5%~~.6%
SE corner of new mound will be place in area of old building foundation approx. (2ft. X 10').
4 Bench Mark Elevation is a nail on a tree near South of mound area.
5 Install Jacobson 1650 Compartment tank for gravity flow from house, install cleanout at Jct. to existing pipe.
6 Elevation contour of rock bed upslope edge is 98'.
The area size of the rock bed is 10' x 38' . Absorption area is 38' x 39.6'.
Sand absorption area is 8.6 ft. up slope + 10 ft. rockbed + 21 downslope = approx. 39.6 ft. wide sand base.
Berms are 11ft. Upslope, 26ft. Down slope, 10ft. Rock bed = approx. 47ft. Wide. End Berms are 20 ft. wide.
Overall mound size is approx. 47' wide x 78' long and approx. 4' high.
7 The bench mark is the nail on the tree near mound area, BM = Elv. 100'.
Installer to double check bench mark. Installer should confirm bench mark and sand height Elv. with inspector.
Installer should record bench mark Elv. and sand height on installation inspection form.
8 The top of the washed sand and bottom of rock bed is Elv. 100'.
It is important that the soils do not get compacted, and that clean washed sand is used.
9 The Jacobson 1650 compartment tank will be gravity flow from dwelling. Install the pump for 7 demand doses per day. approx. 73 gallons per dose, 5.8 inches of tank level. Install alarm at 3 inches from pump on level.
Install all manholes, inspection pipes and clean-outs to grade or above, insulate top of tank.
10 Install Effluent filter on septic tank outlet, install electric alarm on filter.
Install a 2" supply pipe from tank to end manifold in rock bed, install so pipe drains back to tank.
Install 1.5" laterals with 9" of rock under them. Install clean-outs at far end of laterals.
Drill 1/4" holes for Perf sizing, 36" on centers.
Install inspection pipe to bottom of rock bed, secure in rock bed and raise to above final grade.
11 Installer will pressure test and squirt height laterals when finished.

Designed to Aitkin Co. and MPCA recommendations and requirements.

Designer Signature | Brummer Septic LLC. (Design Company) | L-1347 (License#)