FIELD EVALUATION SHEET

PRELIMINARY EVALUATION DATE **7-15-20**, FIELD EVALUATION DATE **7-15-20**

PROPERTY OWNER: **David Graeme**

ADDRESS: **222 69 St. Hwy 47** CITY,STATE,ZIP: **Aitkin 56431** PHONE

LEGAL DESCRIPTION: **6.38 Acres Lot 5**

PIN# **21-0-051310** SEC **32** T **45** R **23** TWP NAME **Maimo**

FIRE# _____ LAKE/RIVER **N/A** LAKE CLASS **N/A** OHWL ____ FT.

DESCRIPTION OF SOIL TREATMENT AREAS

	AREA #1	AREA #2
DISTURBED AREAS	YES ___ NO **X**	YES ___ NO ___
COMPACTED AREAS	YES ___ NO **X**	YES ___ NO ___
FLOODING	YES ___ NO **X**	YES ___ NO ___
RUN ON POTENTIAL	YES ___ NO **X**	YES ___ NO ___
SLOPE %	**0**	
DIRECTION OF SLOPE	**0**	
LANDSCAPE POSITION	**level**	
VEGETATION TYPES	**grass yard**	

REFERENCE BM ELEV. **100"** FT
REFERENCE BM DESCRIPTION
Cap of old tank to be cracked and filled after pumping

DEPTH TO STANDING WATER OR MOTTLED SOIL: BORING# 1 **14"**, 1A ____, 2 **13"**, 2A ____

BOTTOM ELEVATION--FIRST TRENCH OR BOTTOM OF ROCK BED: #1 **2' Sand Base** FT., #2 ____ FT.

SOIL SIZING FACTOR: SITE # 1 **1.27**, SITE #2 ____

CONSTRUCTION RELATED ISSUES: **1500 combo to 10'x25' Rock Bed on 2' wash Sand Base**

LIC# **2088** SITE EVALUATOR SIGNATURE: **Bob Bartel**

SITE EVALUATOR NAME: **Bob Bartel**

UG REVIEW TELEPHONE# **218-931-6430**

Comments: DATE

_____

_____

_____

SOIL BORING LOGS ON REVERSE SIDE

Form des 2/20/98

21-0-05/310

SOILS CHARTS FOR BOTH PROPOSED AND ALTERNATE SITES

1 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
5"	Topsoil	10R 3/3
	Sand Loam	10R 4/4
14"	mottles	10R 4/2

2 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
4"	Topsoil	10R 3/3
	Sandy	10R 4/4
13"	mottles	10R 4/2

1 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR

2 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR

ADDITIONAL SOIL BORINGS MAY BE REQUIRED

A. Average Design FLOW

Estimated ___300___ gpd (see figure A-1)

or measured _____ x 1.5 (safety factor) =_____ gpd

B. SEPTIC TANK Capacity

___1500___ com 50 ___ gallons (see figure C-1)

A-1: Estimated Sewage Flows in Gallons per Day

number of bedrooms	Class I	Class II	Class III	Class IV
2	300	225	180	60%
3	450	300	218	of the
4	600	375	256	values
5	750	450	294	in the
6	900	525	332	Class I,
7	1050	600	370	II, or III
8	1200	675	408	columns.

C. SOILS (refer to site evaluation)

1. Depth to restricting layer = ___13"___ feet
2. Depth of percolation tests = _____ feet
3. Texture ___Sandy loam___
   Percolation rate _____ mpi
4. Soil loading rate ___.79___ gpd/sqft (see figure D-33)
5. Percent land slope ___0___ %

C-1: Septic Tank Capacities (in gallons)

Number of Bedrooms	Minimum Liquid Capacity	Liquid capacity with garbage disposal	Liquid capacity with disposal & lift inside
2 or less	750	1125	
3 or 4	1000	1500	1500
5 or 6	1500	2250	2000
7, 8 or 9	2000	3000	3000
			4000

D. ROCK LAYER DIMENSIONS

1. Multiply average design flow (A) by 0.83 to obtain required rock layer area.
   ___300___ gpd x 0.83 sqft/gpd = ___250___ sqft
2. Determine rock layer width = 0.83 sqft/gpd x linear Loading Rate (LLR)
   0.83 sqft/gpd x _____ gpd/sqft = ___10___ ft
3. Length of rock layer = area ÷ width =
   ___250___ sqft (D1) ÷ ___10___ ft (D2) = ___25___ ft

Mound LLR	
< 120 MPI	≤ 12
≥ 120 MPI	≤ 6

E. ROCK VOLUME

1. Multiply rock area (D1) by rock depth of 1 ft to get cubic feet of rock
   ___250___ sqft x 1 ft = ___250___ cuft
2. Divide cuft by 27 cuft/cuyd to get cubic yards
   ___250___ cuft ÷ 27 cuyd/cuft = ___10___ cuyd
3. Multiply cubic yards by 1.4 to get weight of rock in tons
   ___10___ cuyd x 1.4 ton/cuyd = ___14___ tons

F. SEWAGE ABSORPTION WIDTH

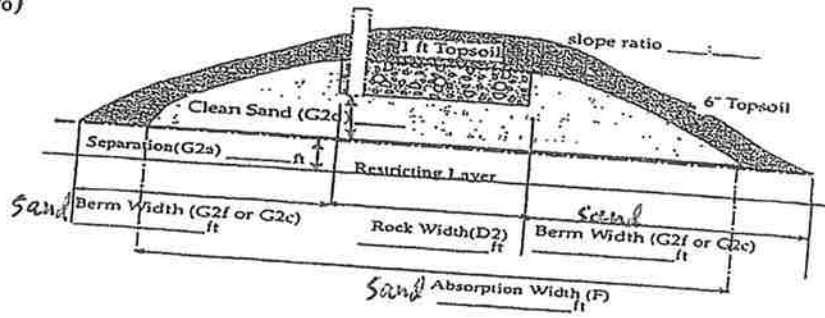Absorption width equals absorption ratio (See Figure D-33) times rock layer width (D2)

___1.50___ x ___10___ ft = ___15___ ft

D-33: Absorption Width Sizing Table

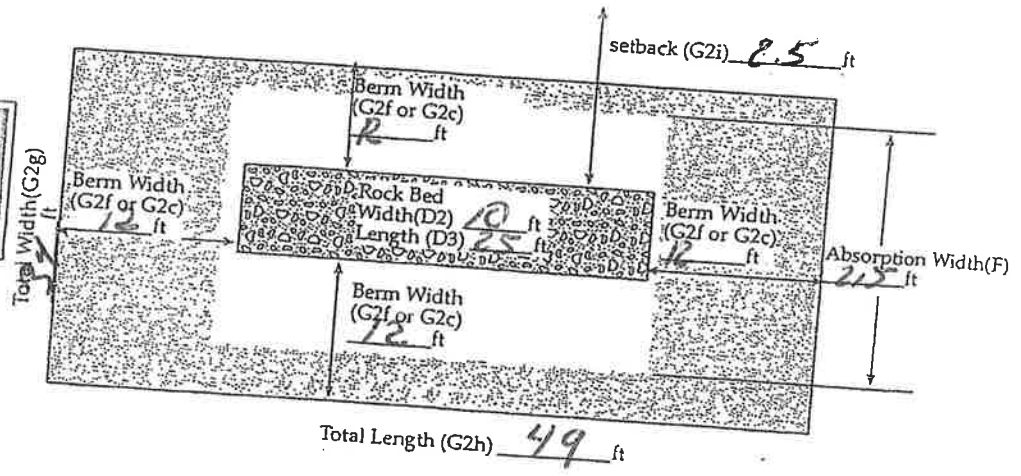| Percolation Rate in Minutes per Inch (MPI)	Soil Texture	Loading Rate Gallons per day per square foot	Absorption Ratio
Faster than 5	Coarse Sand Medium Sand Loamy Sand Fine Sand	1.20	1.00
6 to 15	Sandy Loam	0.79	1.50
16 to 30	Loam	0.60	2.00
31 to 45	Silt Loam Silt	0.50	2.40
46 to 60	Sandy Clay Loam Silty Clay Loam Clay Loam	0.45	2.67
61 to 120	Silty Clay Sandy Clay Clay	0.24	5.00
Slower than 120*			

*System designed for these soils must be other or performance

Mound Slope Width and Length (landslope less than or equal to 1%) — und slope   21-0-051310

slope ratio ___:___

1. Absorption width (F) __15__ ft
2. Calculate mound size

a. Determine depth of clean sand fill at upslope edge of rock layer = 3 ft minus the distance to restricting layer (C1)

3 ft - __1__ ft = __2__ ft

b. Mound height at the upslope edge of rock layer = depth of clean sand for separation (G2a) at upslope edge plus depth of rock layer (1 ft) plus depth of cover (1 ft)

__2__ ft + 1ft + 1ft = __4__ ft

c. Berm width = upslope mound height (G2b) times 4 (4 is recommended, but could be 3-12)

__4__ x __3__ = __12__ ft

d. The total landscape width is the sum of berm (G2c) width plus rock layer width (D2) plus berm wid (G2c): __12__ ft + __10__ ft + __12__ ft = __34__ ft

e. Additional width necessary for absorption = absorption width (F) minus the landscape width (G2d)

__15__ ft - __34__ ft = __-0__ ft, if number is negative (<0) skip to g

f. Final berm width = additional width (G2e) plus the berm width (G2c)

_____ ft + _____ ft = _____ ft

g. Total mound width is the sum of berm width (G2f or G2c) plus rock layer width (D2) plus berm width (G2f or G2c): __12__ ft + __10__ ft + __12__ ft = __34__ ft

h. Total mound length is the sum of berm (G2f or G2c) plus rock layer length (D3) plus berm (G2f or G2c): __12__ ft + __25__ ft + __12__ ft = __49__ ft

i. Setbacks from the rockbed are calculated as follows: the absorption width (F) minus the rock bed widt (D2) divided by 2: (__15__ ft - __10__ ft) ÷ 2 = __2.5__ ft
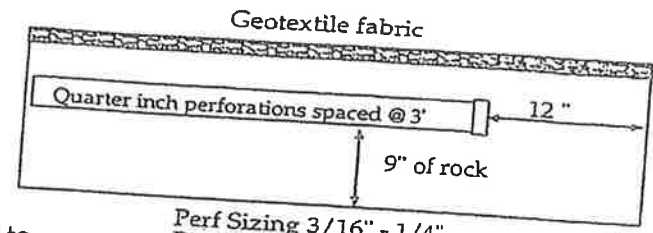
Final Dimensions:

__34__ X __49__

setback (G2i) __2.5__ ft

Berm Width (G2f or G2c) __12__ ft

Total Width (G2g) ___ ft

Berm Width (G2f or G2c) __12__ ft

D. Rock Bed Width (D2) __10__ ft Length (D3) __25__ ft

Berm Width (G2f or G2c) __12__ ft

Berm Width (G2f or G2c) __12__ ft

Absorption Width (F) __2.5__ ft

Total Length (G2h) __49__ ft

1. Select number of perforated laterals __3__

2. Select perforation spacing = __3__ ft

3. Since perforations should not be placed closer than 1 foot to the edge of the rock layer (see diagram), subtract 2 feet from the rock layer length.

$$\frac{25}{\text{Rock layer length}} - 2\,ft = \underline{23}\ ft$$

4. Determine the number of spaces between perforations. Divide the length (3) by perforation spacing (2) and <u>round down</u> to nearest whole number.

   Perforation spacing = __23__ ft ÷ __3__ ft = _____ spaces

5. Number of perforations is equal to one plus the number of perforation spaces(4). *Check figure E-4 to assure the number of perforations per lateral guarantees <10% discharge variation.*

   __7__ spaces + 1 = __8__ perforations/lateral

6. A. Total number of perforations = perforations per lateral (5) times number of laterals (1)

   __8__ perfs/lat x __3__ lat = __24__ perforations

   B. Calculate the square footage per perforation. Should be 6-10 sqft/perf. *Does not apply to at-grades.*
   Rock bed area = rock width (ft) x rock length (ft)
   __10__ ft x __25__ ft = __250__ sqft
   Square foot per perforation = Rock bed area ÷ number of perfs (6)
   __250__ sqft ÷ __24__ perfs = __10__ sqft/perf

7. Determine required flow rate by multiplying the total number of perforations (6A) by flow per perforation (*see figure E-6*)

   __24__ perfs x __.74__ gpm/perfs = __18__ gpm

8. If laterals are connected to header pipe as shown on upper example, to select minimum required lateral diameter; enter figure E-4 with perforation spacing (2) and number of perforations per lateral (5) Select minimum diameter for perforated lateral = __2__ inches.
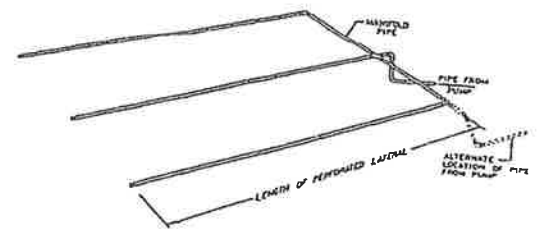
9. If perforated lateral system is attached to manifold pipe near the center, lower diagram, perforated lateral length (3) and number of perforations per lateral (5) will be approximately one half of that in step 8. Using these values, select minimum diameter for perforated lateral = __✗__ inches.
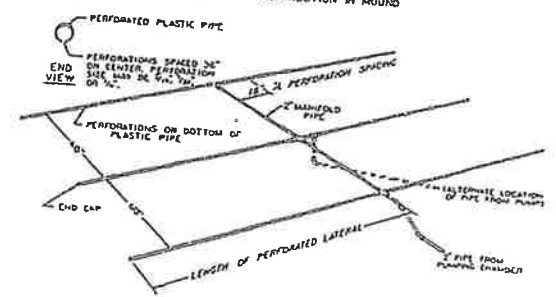
Geotextile fabric

Quarter inch perforations spaced @ 3'   ← 12 "

9" of rock

Perf Sizing 3/16" - 1/4"
Perf Spacing 1.5'- 5'

E-4: Maximum allowable number of 1/4-inch perforations per lateral to guarantee <10% discharge variation

perforation spacing (feet)	1 inch	1.25 inch	1.5 inch	2.0 inch
2.5	8	14	18	28
3.0	8	13	17	26
3.3	7	12	16	25
4.0	7	11	15	23
5.0	6	10	14	22

E-6: Perforation Discharge in gpm

head (feet)	perforation diameter (inches)			
	1/8	3/16	7/32	1/4
1.0a	0.18	0.42	0.56	0.74
2.0b	0.26	0.59	0.80	1.04
5.0	0.41	0.94	1.26	1.65

a Use 1.0 foot for single-family homes.
b Use 2.0 feet for anything else.

MANIFOLD LOCATED AT END OF PRESSURE DISTRIBUTION SYSTEM

LAYOUT OF PERFORATED PIPE LATERALS FOR PRESSURE DISTRIBUTION IN MOUND

1. Determine pump capacity:

A. Gravity distribution

1. Minimum required discharge is 10 gpm

2. Maximum suggested discharge is 45 gpm. For other establishments at least 10% greater than the water supply rate, but no faster than the rate at which effluent will flow out of the distribution device.

B. Pressure distribution

See pressure distribution work sheet

From A or B Selected pump capacity: __18__ gpm

2. Determine pump head requirements:

A. Elevation difference between pump and point of discharge?

__7__ feet

B. Special head requirement? *(See Figure at right - Special Head Requirements)*

__5__ feet

C. Calculate Friction loss

1. Select pipe diameter __2__ in

2. Enter *Figure E-9* with gpm (1A or B) and pipe diameter (C1). Read friction loss in feet per 100 feet from Figure E-9
   Friction Loss = __.73__ ft/100ft of pipe

3. Determine total pipe length from pump discharge to soil treatment discharge point. Estimate by adding 25 percent to pipe length for fitting loss. Total pipe length times 1.25 = equivalent pipe length
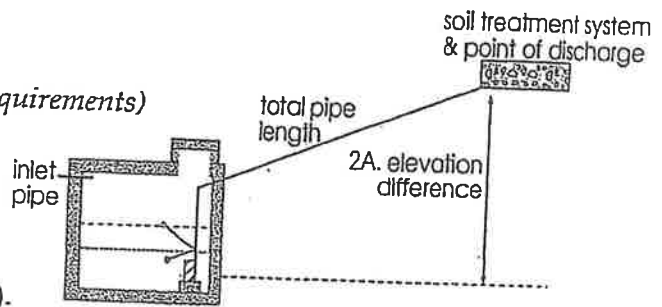   __45__ feet x 1.25 = __56__ feet

4. Calculate total friction loss by multiplying friction loss (C2) in ft/100 ft by the equivalent pipe length (C3) and divide by 100.
   = __.73__ ft/100ft x __56__ ÷100 = __.4__ ft

D. Total head required is the sum of elevation difference (A), special head requirements (B), and total friction loss (C4)
   __7__ ft + __5__ ft + __.4__ ft =

Total head: __12.4__ feet

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3. Pump selection

A pump must be selected to deliver at least __18__ gpm (1A or B) with at least __13__ feet of total head (2D)

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soil treatment system & point of discharge

total pipe length

inlet pipe

2A. elevation difference

Special Head Requirements	
Gravity Distribution	0 ft
Pressure Distribution	5 ft

E-9: Friction Loss in Plastic Pipe		
Per 100 feet		
flow rate gpm	nominal pipe diameter		
	1.5"	2"	3"
20	2.47	0.73	0.11
25	3.73	1.11	0.16
30	5.23	1.55	0.23
35	6.96	2.06	0.30
40	8.91	2.64	0.39
45	11.07	3.28	0.48
50	13.46	3.99	0.58
55		4.76	0.70
60		5.60	0.82
65		6.48	0.95
70		7.44	1.09

I hereby certify that I have completed this work in accordance with applicable ordinances, rules and laws.
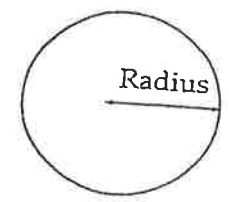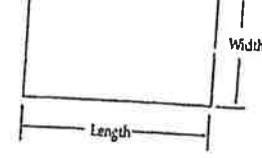
__Bob Bart__ (signature) __7-15-20__ (license #) __2088__ (date)

A. Rectangle area = L x W

_____ x _____ = _____ square feet

B. Circle area = π (3.14) x radius in feet x radius in feet

3.14 x _____ ft x _____ ft = _____ sqft

C. Get area from manufacturer _____ sqft

2. Calculate gallons per inch

There are 7.5 gallons per cubic foot of volume, therefore multiply the area (1A, B or C) times the conversion factor and divide by 12 inches per foot to calculate gallon per inch.

Area x 7.5 ÷ 12 = _____ sqft x 7.5 ÷ 12 in/ft = _11.81_ gallon per inch

3. Calculate total tank volume

A. Depth from bottom of inlet pipe to tank bottom _46_ in

B. Total tank volume = depth from bottom of inlet pipe to tank bottom (3A) x gal/in (2)

= _46_ in x _11.81_ gal/in = _543_ gal

4. Calculate gallons to cover pump (with 2-3 inches of water covering pump)

(Pump and block height (inch) + 2 inch) x gallon/inch

(_12_ in +2 in) x _____ gal/in = _165_ gallon

5. Calculate total pumpout volume

A. Select pump size for 4-5 does per day. Gallon per dose = gpd (see figure A-1)

/ doses per day = _300_ gpd ÷ _4_ doses/day = _75_ gallons

B. Calculate drainback

1. Determine total pipe length, _45_ feet

2. Determine liquid volume of pipe, _.17_ gal per ft (see figure E-20)

3. Drainback quantity = _45_ ft (5B1) x _.17_ gal per ft (5B2) = _7.7_ gal

C. Total pump out volume = dose volume (5A) + drainback (5B3)
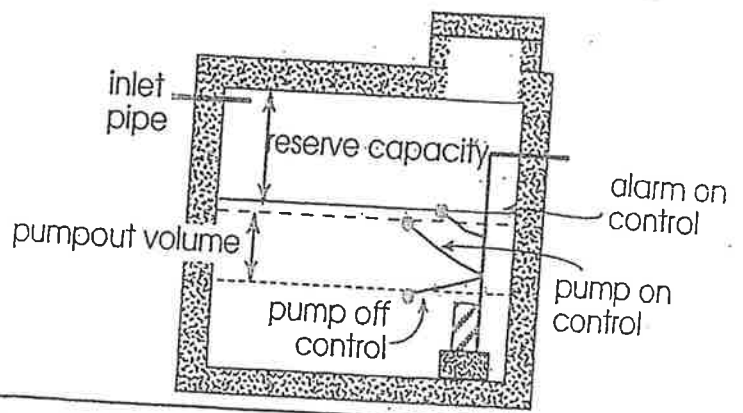
_75_ gal + _7.7_ gal = _82.7_ Total gallon

6. Float separation distance (using total pumpout volume)

Total pumpout volume (5C) ÷ gal/inch (2)

_82.7_ gal ÷ _11.81_ gal/in= _7_ inch

7. Calculate volume for alarm (typically 2 to 3 inches)

Alarm depth (inch) x gallon/inch (2) = _11.81_ in x _2_ gal/in) = _23.6_ gal

8. Calculate total gallon = gallons over pump (4) + gallons pumpout (5C) + gallons alarm (7)

_165_ gal + _82.7_ gal + _23.6_ gal = _271.3_ gallons

9. Total Tank Depth = total gallon (8) ÷ gallon/inch (2)

_271.3_ gal ÷ _11.81_ gal/in = _23_ in

Recommended:

Calculate reserve capacity (75% the daily flow)

Daily flow x .75 = _300_ x .75 = _225_ gallons

Legal Tank:
500 gallons or
100% the Daily flow
or
Alternating Pumps

A-1: Estimated Sewage Flows in Gallons per Day

number of bedrooms	Class I	Class II	Class III	Class IV
2	300	225	180	60%
3	450	300	218	of the
4	600	375	256	values
5	750	450	294	in the
6	900	525	332	Class I,
7	1050	600	370	II, or III
8	1200	675	408	columns.

E-20: Volume of Liquid in Pipe

Pipe Diameter inches	Gallons per foot
1	0.045
1.25	0.078
1.5	0.11
2	0.17
2.5	0.25
3	0.38
4	0.66

inlet pipe

reserve capacity

pumpout volume

pump off control

alarm on control

pump on control

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

Bob Bartl (signature) _2688_ (license #) _7-15-20_ (date)

David Growe   21-0-05/310   DATE: 7-15-20

12" shallow well

50ft

50ft shallow well

50ft

Old sewer

100'
Bld

Prop↑

New
1500g conc
tank

007

74ft

El
100"

Garage
she

Elv
100"

40ft   34

10x80   El
100"

49   → 100"

Prop↓
20"

Drive way

Ct Huy 47

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
- [ ] ALL SOIL TREATMENT AREAS   [ ] LOT IMPROVEMENTS
- [ ] HORIZONTAL AND VERTICALREFERENCE [ ] ALL ISTS COMPONENTS
- [ ] POINT OF SOIL BORINGS
- [ ] LOT EASEMENTS   [ ] DIRECTION OF SLOPE
- [ ] DISTURBED/ COMPACTED AREAS   [ ] ALL LOT DIMENSIONS
- [ ] SITE PROTECTION--LATHE AND RIBBON EVERY 15 FT
- [ ] ACCESS ROUTE FOR TANK MAINTENANCE

EQUIRED SETBACKS
- [ ] STRUCTURES
- [ ] OHWL   [ ] PROPERTY LINES

MMENTS:

ESIGNER SIGNATURE   Bob Boell

CENSE#   2088

INDICATE ELEVATIONS

BENCHMARK 100"
ELEVATION OF SEWER LINE @ HOUSE 98"
ELEVATION @ TANK INLET 92"
ELEVATION @ BOTTOM OF ROCK LAYER 124"
ELEVATION @ BOTTOM OF BORING OR
RESTRICTIVE LAYER 87"
ELEVATION OF PUMP 40"
ELEVATION OF DISTRIBUTION DEVICE 133"

DATE 7-15-20

21-0-51310

Subsurface Sewage Treatment System Management Plan

Property Owner: _David Geeve_

Mailing Address: _23269 St. Hwy 47_   Phone: _____   Date: _7-15-20_

Site Address: _SAme_   City: _Aitkin_   Zip: _56431_

    City: _____   Zip: _____

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 _____

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

- [x] Check to make sure tank is not leaking
- [x] Check and clean the in-tank effluent filter
- [ ] Check the sludge/scum layer levels in all septic tanks
- [x] Recommend if tank should be pumped
- [x] 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: _____

Designer Signature: _Bob Ball_   Date: _____

    Date: _7-15-20_

See Reverse Side for Management Log

21-0-05/310

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: _____

_____

_____

_____

_____

Mitigation/corrective action plan: _____

_____

_____

_____

_____