FIELD EVALUATION SHEET

PRELIMINARY EVALUATION DATE 5-20-24 , FIELD EVALUATION DATE 5-20-24

PROPERTY OWNER: Bernard & Patricia Chamberlin   PHONE 218-256-1732

ADDRESS: 44916 State Hwy 210   CITY, STATE, ZIP: Aitkin Mn 56431

LEGAL DESCRIPTION: Part Lot1 N of Hwy.

PIN# 01-0-070601   SEC 29 T 47 R27 TWP NAME Aitkin

FIRE#_____ LAKE/RIVER_____   LAKE CLASS_____ OHWL____ F

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		
LANDSCAPE POSITION	flat	
VEGETATION TYPES	grass	

REFERENCE BM ELEV. 100

REFERENCE BM DESCRIPTION_

100

DEPTH TO STANDING WATER OR MOTTLED SOIL: BORING# 1 40", 1A_____,2_____,2A_____

BOTTOM ELEVATION--FIRST TRENCH OR BOTTOM OF ROCK BED: #1 97 FT., #2____ FT.

SOIL SIZING FACTOR: SITE # 1 1.27_____, SITE #2_____

CONSTRUCTION RELATED ISSUES:_____

LIC# 2264_____ SITE EVALUATOR SIGNATURE: Lou Ann Maschler

SITE EVALUATOR NAME: Lou Ann Maschler_____ TELEPHONE# 218-839-3042

LUG REVIEW_____   DATE 5-20-24

Comments:_____
_____
_____
_____

SOIL BORING LOGS ON REVERSE SIDE

Form des 2/20/98

SOILS CHARTS FOR BOTH PROPOSED AND ALTERNATE SITES

1 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
0-8	Topsoil	10YR 3/2
8-33	Sand	10YR 5/4
33-40	sandy loam	10YR 5/6
40"	mottling	

2 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
0-8	Topsoil	10YR 3/2
8-33	Sand	10YR 5/4
33-36	sandy loam	10YR 5/3
36	mottling	

1 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR

2 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR

ADDITIONAL SOIL BORINGS MAY BE REQUIRED

UND DESIGN WORK SHEET (For Flows up to 1200 gpd)

Average Design FLOW

Estimated _300_ gpd *(see figure A-1)*
or measured _____ x 1.5 *(safety factor)* = _____ gpd

B. **SEPTIC TANK Capacity**

_1000_ gallons *(see figure C-1)* *use 1500 combo*

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 = _3_ 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 capac. with disposal lift inside
2 or less	750	1125	1500
3 or 4	1000	1500	2000
5 or 6	1500	2250	3000
7, 8 or 9	2000	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 = _10.00_ 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 = _9.3_ cuyd
3. Multiply cubic yards by 1.4 to get weight of rock in tons
   _9.3_ cuyd x 1.4 ton/cuyd = _13_ tons

F. **SEWAGE ABSORPTION WIDTH**

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

_1.5_ 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*			

*Systems designed for these soils must be other or performance

G. Mound Slope Width and Length
(landslope less than or equal to 1%)

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 - __3__ ft = __1__ 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)
__1__ ft + 1ft + 1ft = __3__ ft

c. Berm width = upslope mound height (G2b) times 4 (4 is recommended, but could be 3-12)
__3__ x 4 = __12__ ft

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

e. Additional width necessary for absorption = absorption width (F) minus the landscape width (G2d)
_____ ft - _____ ft = _____ 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 width (D2) divided by 2: (__15__ ft - __10__ ft) ÷ 2 = __2.5__ ft
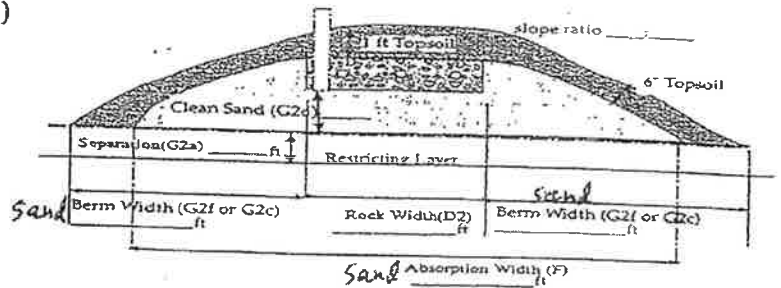
Final Dimensions:
__34__ x __49__
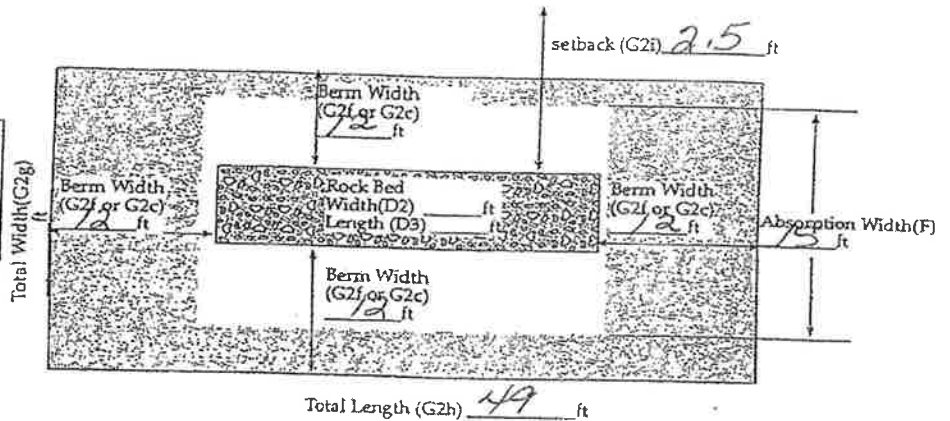
setback (G2i) __2.5__ ft

Total Length (G2h) __49__ ft

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

LouAnn Maschler (signature) __2264__ (license #) __5-20-24__ (date)

PRESSURE DISTRIBUTION SYSTEM

1. Select number of perforated laterals __3__

2. Select perforation spacing = __2.5__ 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.

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

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

   Perforation spacing = __23__ ft ÷ __2.5__ ft = __9__ 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.*

   __9__ spaces + 1 = __10__ perforations/lateral

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

   __10__ perfs/lat x __3__ lat = __30__ 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 ÷ __30__ perfs = __8.3__ sqft/perf

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

   __30__ perfs x __.74__ gpm/perfs = __22__ 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 = __1.5__ 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
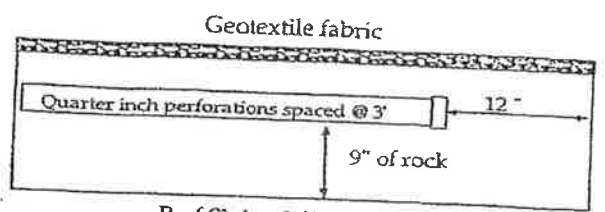
Perf Sizing 3/16" - 1/4"
Perf Spacing 1.5'- 5'

**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
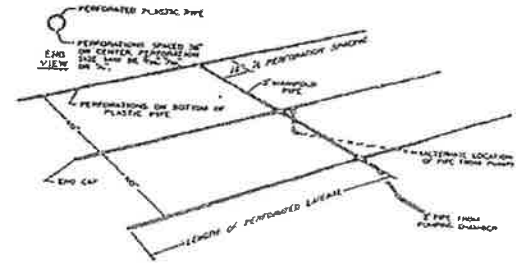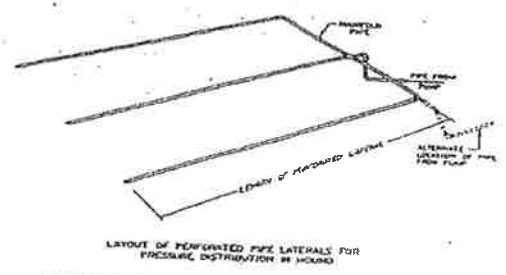
LAYOUT OF PERFORATED PIPE LATERALS FOR PRESSURE DISTRIBUTION IN MOUND

PUMP SELECTION PROCEDURE

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: __22__ 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 = __1.11__ 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
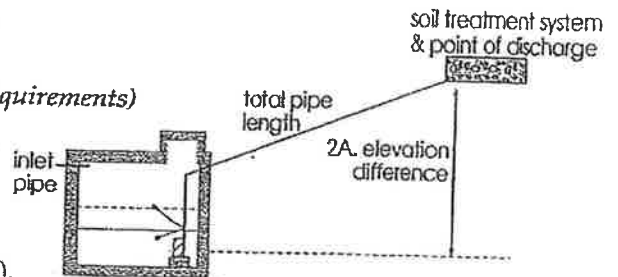   __30__ feet x 1.25 = __37.5__ feet

   4. Calculate total friction loss by multiplying friction loss (C2) in ft/100 ft by the equivalent pipe length (C3) and divide by 100.
   = __1.11__ ft/100ft x __37.5__ ÷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 __22__ gpm (1A or B) with at least __12.4__ 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.

LauAnn Maschku (signature) __2264__ (license #) __5-20-24__ (date)

1.5" inspection pipe   18 " at peak - top 6" topsoil

12" cover - top 6" topsoil

1.0

Original grade

3.0

Restrictive layer

berm: 12.0   10.0   berm: 12.0

absorption width: 15.0

Mound Detail: Land slope < or = to 1%

12.0

12.0

Rockbed
Width: 10.0
Length: 25.0

Total absorption width:
15.0

12.0

Total
Width:
34.0

Rockbed setback
2.5
(all sides)

12.0

Total length: 49.0

MAP DRAWN TO SCALE ~~□□□□□~~ WITH A NORTH ARROW

10x25 mound

existing mound

1650 combo tank

Existing House 2 Bd.

garage

SOB

10x25 mound

○SOB

30'

deep well

50

new 1500 combo tank

10'

2 Bedroom existing house
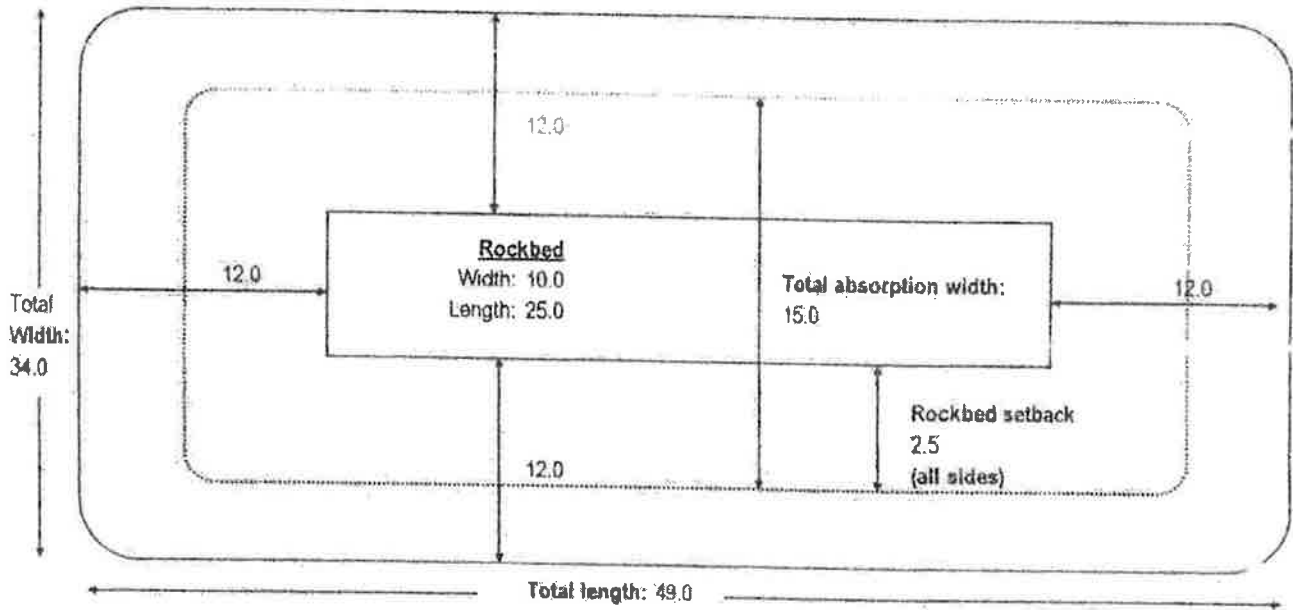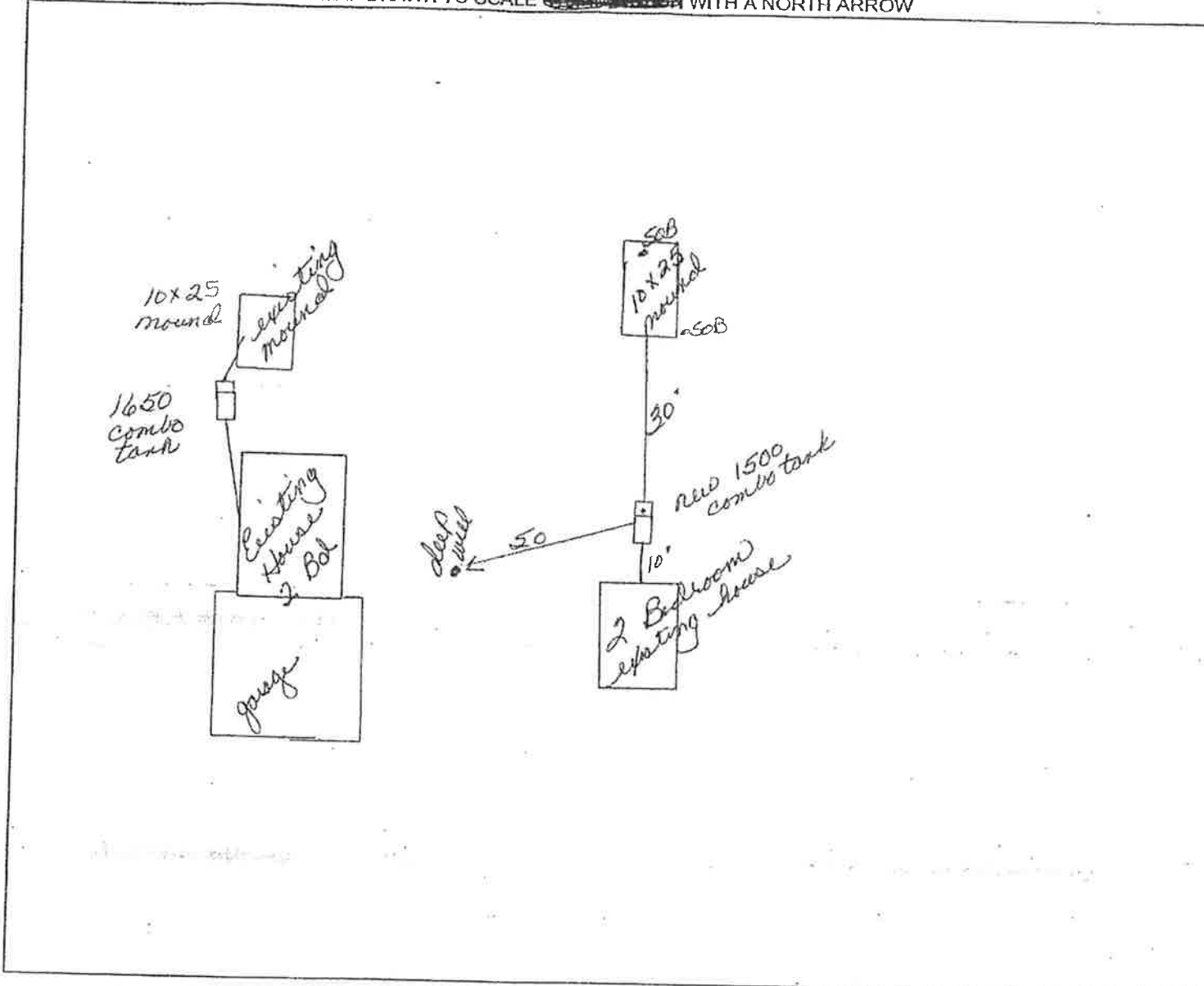
CHECK OFF LIST--HAVE ALL OF THE FOLLOWING BEEN DRAWN ON THE MAP??

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 VERTICAL REFERENCE
- [ ] 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 *LauAnn Maschler*
LICENSE# 2264

DATE 5-20-24

Subsurface Sewage Treatment System Management Plan

Property Owner: Bernard & Patricia Chamberlin   Phone: 218-256-1732   Date: 5/20/2024

Mailing Address: 44916 State Highway 210   City: Aitkin   Zip: 56431

Site Address: 44916 State Highway 210   City: Aitkin   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 _____ months.
Local Government: check every _____ months.
State Requirement: check every _____ 36 _____ months.

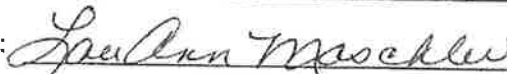> **My System needs to be checked every _____ 36 _____ months.**

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 (*choose one:* Daily ○ Monthly ○ Yearly ○)

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 Name: Bernard & Patricia Chamberlin   5/20/2024

Designer Signature: _LauAnn Maschler_   5/20/2024

See Reverse Side for Home Owner Management Log

Home Owner 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:_____

_____

_____

_____

_____