FIELD EVALUATION SHEET

PRELIMINARY EVALUATION DATE 5-10-16, FIELD EVALUATION DATE 5-12-16
PROPERTY OWNER: Jean Ocker
ADDRESS: 21382 Pike Ave CITY,STATE,ZIP: Aitkin 56431 PHONE
LEGAL DESCRIPTION: Lot 2 Mount; McQuil
PIN# 11-1-074800 SEC 16 T 44 R 27 TWP NAME Hazelton
FIRE# LAKE/RIVER Mille Lacs LAKE CLASS 60 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 %	1%	
DIRECTION OF SLOPE	Northerly	
LANDSCAPE POSITION		
VEGETATION TYPES	Maples Oaks	

REFERENCE BM ELEV. 100 " F
REFERENCE BM DESCRIPTION top of Drive way

DEPTH TO STANDING WATER OR MOTTLED SOIL: BORING# 1 14", 1A ____, 2 16", 2A ____

BOTTOM ELEVATION–FIRST TRENCH OR BOTTOM OF ROCK BED: #1 124" FT., #2 ____ FT.

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

CONSTRUCTION RELATED ISSUES: 1820 combo to 10'x25' Rock Bed or 2' Sand Base

LIC# 2088 SITE EVALUATOR SIGNATURE: Bob Bartel

SITE EVALUATOR NAME: Bob Bartel TELEPHONE# 218-831-6430

LUG REVIEW DATE

Comments:

SOIL BORING LOGS ON REVERSE SIDE

Form des 2/20/98

11-1-074800
Jean Dock

SOILS CHARTS FOR BOTH PROPOSED AND ALTERNATE SITES

1 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
4"	Topsoil	10yr 3/3
14	Sandy Loam	10yr 4/4

2 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
4"	Topsoil	10yr 3/3
16"	Sandy Loam	10yr 4/4

1 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR

2 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR

ADDITIONAL SOIL BORINGS MAY BE REQUIRED

11-1-07 4800

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

A. Average Design FLOW

Estimated 300 gpd *(see figure A-1)*
or measured _____ x 1.5 (safety *factor*) = _____ gpd

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

B. SEPTIC TANK Capacity

1160 gallons *(see figure C-1)*

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	1500
3 or 4	1000	1500	2000
5 or 6	1500	2250	3000
7, 8 or 9	2000	3000	4000

C. SOILS *(refer to site evaluation)*

1. Depth to restricting layer = 14" feet
2. Depth of percolation tests = _____ feet
3. Texture Sandy Loam 1.27
   Percolation rate _____ mpi
4. Soil loading rate _____ gpd/sqft *(see figure D-33)*
5. Percent land slope 1 %

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 = 9 cuyd
3. Multiply cubic yards by 1.4 to get weight of rock in tons
   9 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)

1.50 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	0.50	2.40
	Silt		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	0.34	3.00
Slower than 120*			

*System designed for these soils must be other or performance

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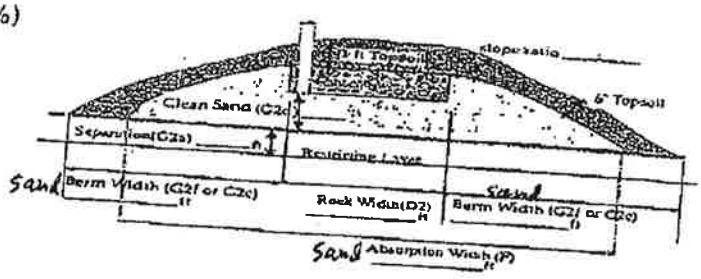
G. **Mound Slope Width and Length** (landslope less than or equal to 1%) <=1% land slope



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)*

3.85 x 4 = 15.4 ft

d. The total landscape width is the sum of berm (G2c) width plus rock layer width (D2) plus berm w (G2c): 10 ft + 15 ft + 15 ft = 40 ft

e. Additional width necessary for absorption = absorption width (F) minus the landscape width (G2c

15 ft - _____ ft = _____ ft, *if number is negative (<0) skip to g*

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

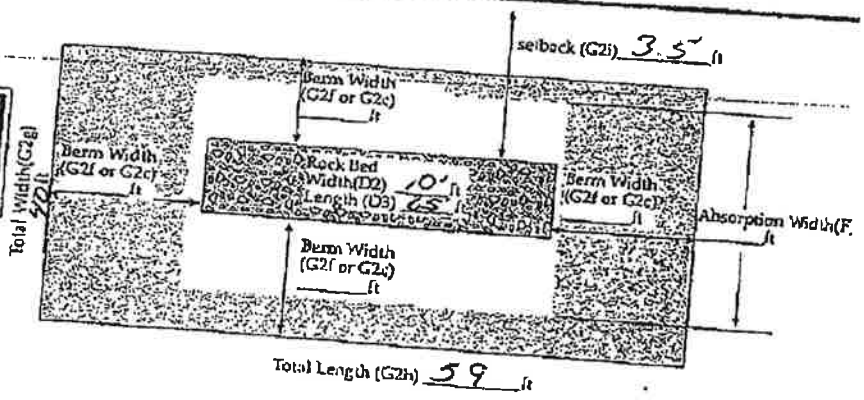
_____ ft + _____ ft = _____ ft

g. Total mound width is the sum of berm width (G2f or G2c) plus rock layer width (D2) plus berm width (G2f or G2c): 15 ft + 10 ft + 15 ft = 40 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 = 59 ft

i. Setbacks from the rockbed are calculated as follows: the absorption width (F) minus the rock bed wi (D2) divided by 2: (17 ft - 10 ft) ÷ 2 = 3.5 ft

Final Dimensions:
40 x 59'



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

Bob Ball (signature) 2088 (license #) 5-12-16 (date)

11-1-074800

PRESSURE DISTRIBUTION SYSTEM

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.

25 (Rock layer length) - 2 ft = 23 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 ÷ 3 ft = 7 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

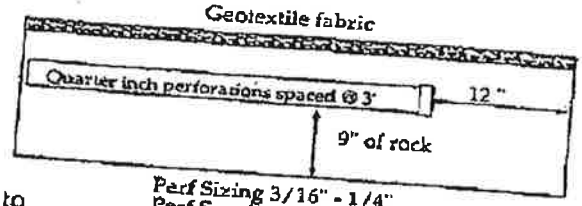
B. Calculate the square footage per perforation.
Should be 6-10 sqft/perf. *Does not apply to at-grades.*
Rock bed area = rock width (ft) x rock length (ft)
10 ft x 25 ft = 250 sqft
Square foot per perforation = Rock bed area ÷ number of perfs (6)
250 sqft ÷ 24 perfs = 10 sqft/perf

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.



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

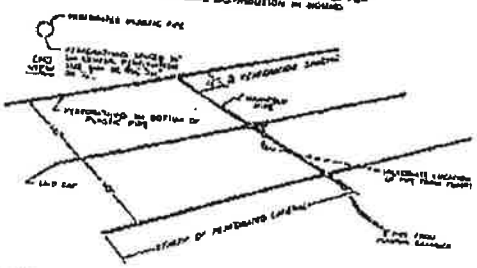
perforation spacing (feet)	1 inch	1.25 inch	1.5 inch	2.0 inch
2.5	8	14	18	28
3.0	8	13	17	26
3.3	7	12	16	25
4.0	7	11	15	23
5.0	6	10	14	22

E-6: Perforation Discharge in gpm

head (feet)	perforation diameter (inches) 1/8	3/16	7/32	1/4
1.0[a]	0.18	0.42	0.56	0.74
2.0[b]	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.

LAYOUT OF PERFORATED PIPE LATERALS FOR PRESSURE DISTRIBUTION IN MOUND



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BoG Bartlo (signature) 2688 (license #) 5-12-16 (date)

11-1-074800

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

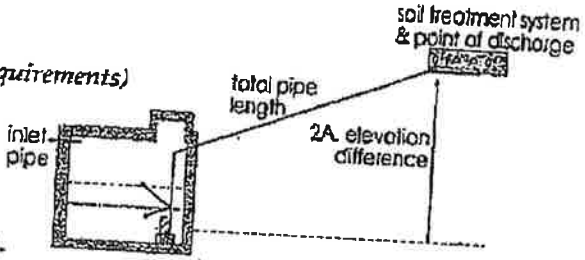
See pressure distribution work sheet

From A or B Selected pump capacity: 18 gpm

2. Determine pump head requirements:

A. Elevation difference between pump and point of discharge?
8 feet

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



Special Head Requirements	
Gravity Distribution	0 ft
Pressure Distribution	5 ft

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
   40 feet x 1.25 = 50 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 50 ÷100 = .4 ft

D. Total head required is the sum of elevation difference (A), special head requirements (B), and total friction loss (C4)
10 ft + 5 ft + .4 ft =

Total head: 15.5 feet

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

3. Pump selection

A pump must be selected to deliver at least 18 gpm (1A or B) with at least 16 feet of total head (2D)

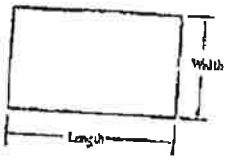
I hereby certify that I have completed this work in accordance with applicable ordinances, rules and laws.

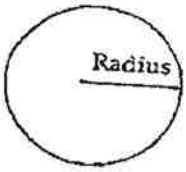
Bob Bartl (signature) 2088 (license #) 5-12-16 (date)

11-1-074800

DOSING CHAMBER SIZING

1. Determine area
   A. Rectangle area = L x W
   4.3 x 6 = 25.5 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 25.5 sqft





2. Calculate gallons per inch
   There are 7.5 gallons per cubic foot of volume, therefore multiply the area (1A, B or C) 666
   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 = 15.9 gallon per inch

3. Calculate total tank volume
   A. Depth from bottom of inlet pipe to tank bottom 42.0" in
   B. Total tank volume = depth from bottom of inlet pipe to tank bottom (3A) x gal/in (2)
   = 42 in x 15.9 gal/in = 666 gal

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

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 15.9 gal/in = 223 gallon Tank supplies #

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, 40 feet
      2. Determine liquid volume of pipe, .17 gal per ft (*see figure E-20*)
      3. Drainback quantity = 40 ft (5B1) x .17 gal per ft (5B2) = 3.6 gal
   C. Total pump out volume = dose volume (5A) + drainback (5B3)
   75 gal + 5.6 gal = 80.6 Total gallon

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

6. Float separation distance (using total pumpout volume)
   Total pumpout volume (5C) ÷ gal/inch (2)
   80.6 gal ÷ 15.9 gal/in= 5 inch

7. ~~Calculate volume for alarm (typically 2 to 3 inches)~~
   Alarm depth (inch) x gallon/inch (2) = 3 in x 15.9 gal/in) = 48 gal

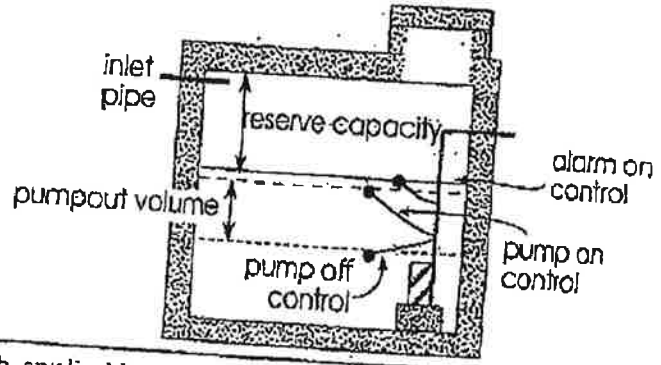
E-20: Volume of Liquid in Pipe

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

8. Calculate total gallon = gallons over pump (4) + gallons pumpout (5C) + gallons alarm (7)
   223 gal + 80.6 gal + 48 gal = 352 gallons

9. Total Tank Depth = total gallon (8) ÷ gallon/inch (2)
   352 gal ÷ 15.9 gal/in = 22 in

Recommended:
Calculate reserve capacity (75% the daily flow)
Daily flow x .75 = 300 x .75 = 225 gallons

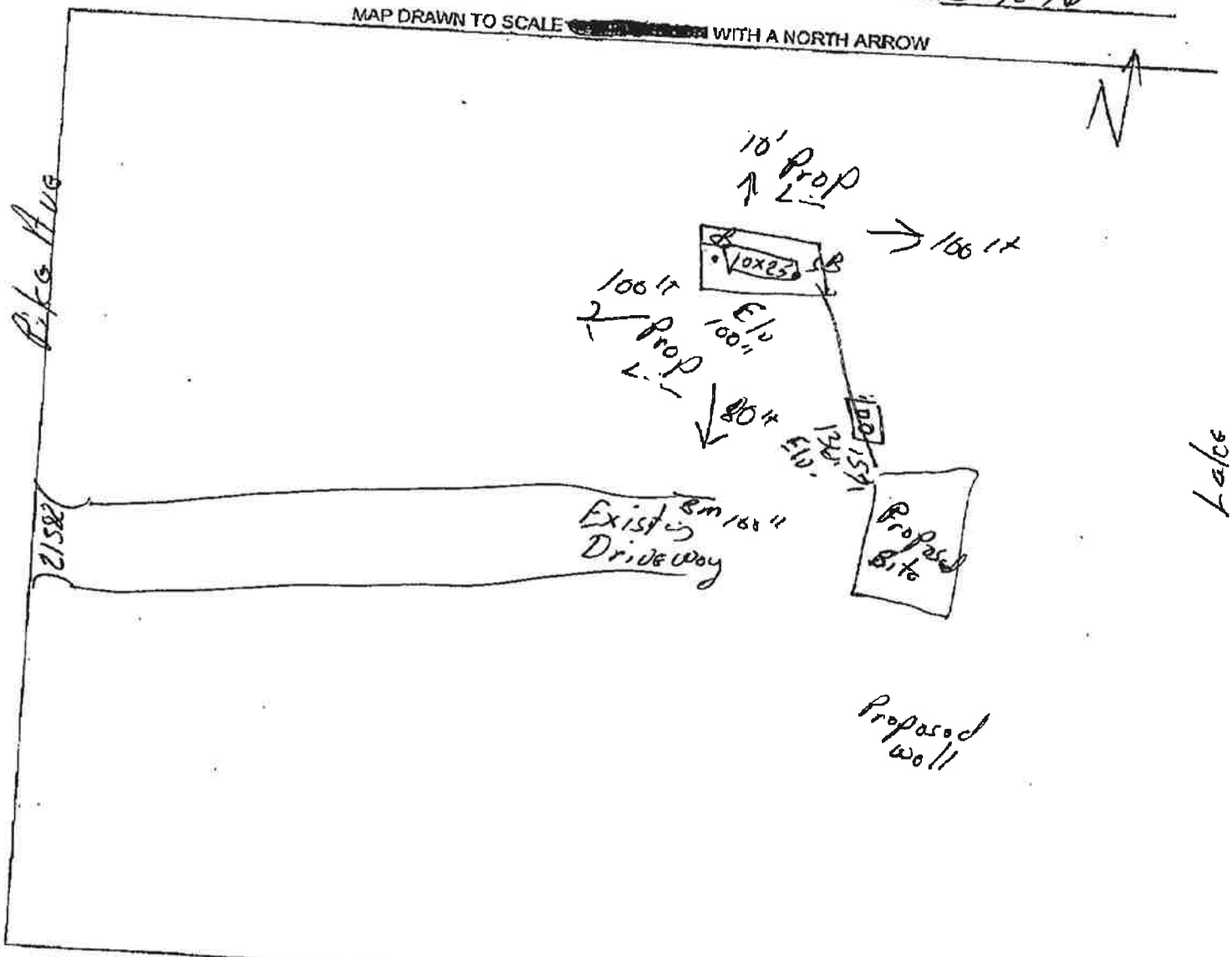


I hereby certify that I have completed this work in accordance with applicable ordinances, rules and laws.
Bob Bastl (signature) 2088 (license #) 5-12-16 (date)

CLIENT: Jean Docker 11-1-074800

DATE: 5-12-16

MAP DRAWN TO SCALE [redacted] WITH A NORTH ARROW



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 100"
ELEVATION OF SEWER LINE @ HOUSE 105"
ELEVATION @ TANK INLET 56"
ELEVATION @ BOTTOM OF ROCK LAYER 124"
ELEVATION @ BOTTOM OF BORING OR RESTRICTIVE LAYER 86"
ELEVATION OF PUMP 12"
ELEVATION OF DISTRIBUTION DEVICE 133"

DESIGNER SIGNATURE Bob Baetke
LICENSE# 2088

DATE 5-12-16

11-1-07480

Subsurface Sewage Treatment System Management Plan

Property Owner: Jean Oeckel Phone: _____ Date: 5-12-16

Mailing Address: _____ City: _____ Zip: _____

Site Address: 21382 Pike Ave 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 (*circle one:* DAILY WEEKLY MONTHLY)

Professional Management Tasks

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

Designer Signature: Bob Bartl Date: 5-12-16

See Reverse Side for Management Log

11-1-07480

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: _____

Bob Bartl