E-Z EXCAVATING LLC.

2358 HWY# 23
MORA MN. 55051
Ph. 320-679-4031
Cell 320-241-7036

DESIGN

LOCATION: XXXXXX HWY 65 McGREGOR MN.
PID# 30.0.027400 & 30.0.027500

OWNER: MILLE LACS BAND OF OJIBWE
SYSTEM TYPE: TYPE III MOUND

DESIGN FLOW:2450 GPD

TREATMENT AREA: 10'X204' 2040 SQ.FT.
MOUND SIZE: 40.8' X 232.4'
SLOPE: 2%

SEPTIC TANKS: 3- 2500 gal. COMBO/SPLIT
FILTER: YES 3- POLYLOC

PUMP TANK: 5000 gal.

PUMP: GOULDS WE2012H

FLOW METER/ TIMER/ ALARM: SJE-RHOMBUS
TD1W114H8AC10EK21E

Terry Henry #1472 7/14/15

DESIGN NOTES

TYPE III MOUND SYSTEM: FLOW CALCULATIONS

9 RV SITES WITH FULL HOOKUPS @ 100 GPD. = 900 GPD.

24 CAMP SITES NO HOOKUPS WITH

SHOWER HOUSE AND DUMP STATION @ 63 GPD. = 1512 GPD.

TOTAL CALCULATED FLOW 2412 GPD.

SYSTEM DESIGNED FOR 2450 GPD. WITH TIMED DOSING

SHOWER HOUSE IS SHOWERS ONLY NO TOILETS

PORTABLE RESTROOMS WILL BE SET UP DURING EVENTS

Site Elevation Sheet

LOCATION

BENCHMARK LOCATION: STAKE BETWEEN MOUND AND RV PARKING ELEVATION 100.00

TANK #1 DUMP STATION surface 96.10 inlet 94.25 OUTLET 94.00

TANK #2 RV HOOKUPS surface 97.00 inlet 94.25 OUTLET 94.00

TANK #3 SHOWER HOUSE surface 97.30 inlet 93.25 OUTLET 93.00

PUMP TANK surface 97.49 inlet 92.66 OUTLET 92.50

ROCK BED SURFACE

N.E. 97.85

N.W. 97.65

S.E. 97.85

S.W. 97.70

BERM SURFACE

N.E. 98.15

N.W. 97.30

S.E. 97.40

S.W. 97.30

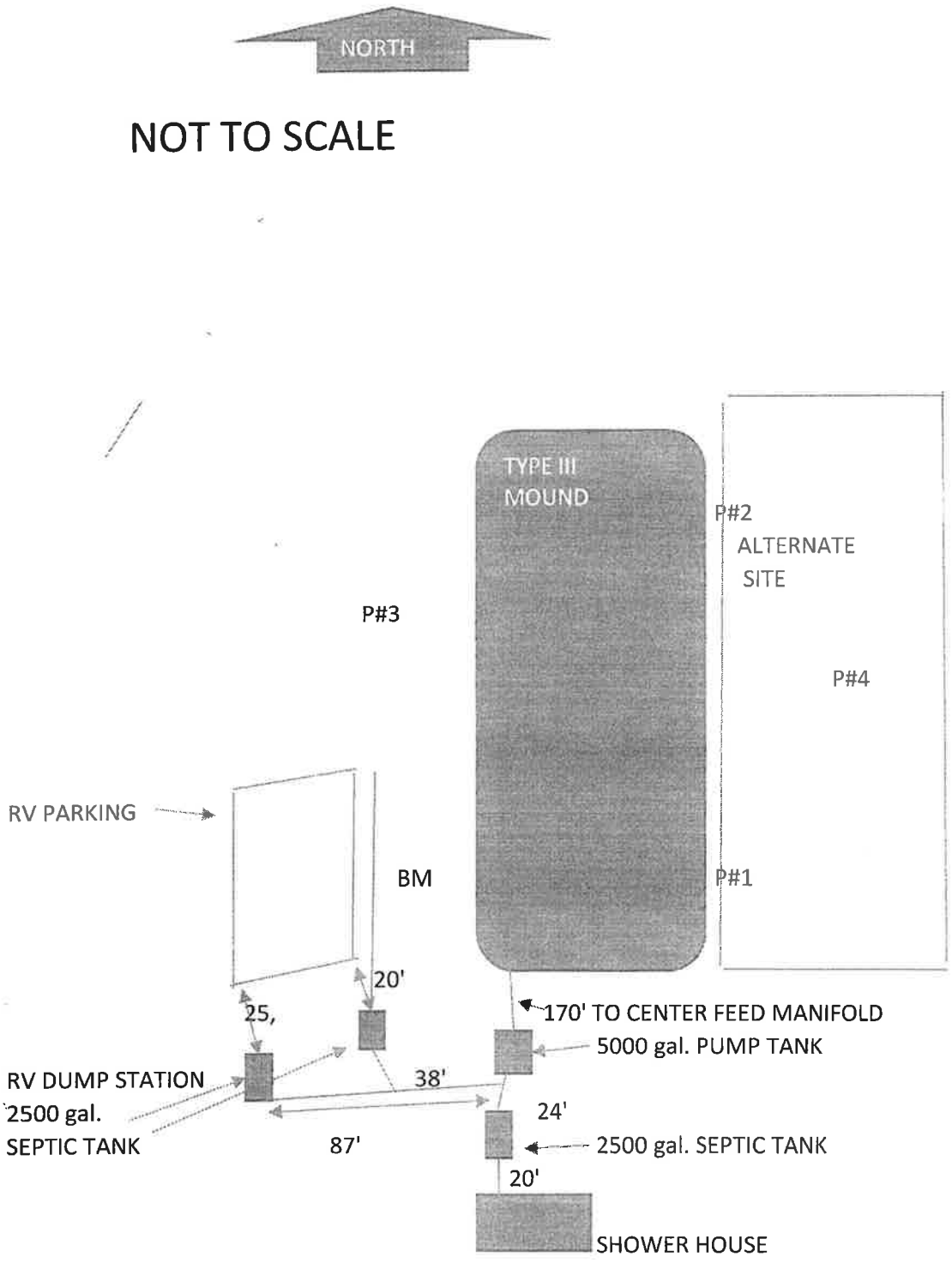
SAND TO ROCK BED INTERFACE ELEVATION: 100.85

SOIL PITS OR BORINGS

#1 SURFACE 97.21 REDOX 96.54

#2 SURFACE 98.30 REDOX 97.64

#3 SURFACE 96.80 REDOX 96.14


NORTH
NOT TO SCALE
TYPE III
MOUND
P#2
ALTERNATE
SITE
P#3
P#4
RV PARKING
BM
P#1
20'
25,
170' TO CENTER FEED MANIFOLD
5000 gal. PUMP TANK
RV DUMP STATION
2500 gal.
SEPTIC TANK
38'
24'
87'
2500 gal. SEPTIC TANK
20'
SHOWER HOUSE

FIELD EVALUATION SHEET

PRELIMINARY EVALUATION DATE 7/14/15, FIELD EVALUATION DATE 7-14-15
PROPERTY OWNER: MILLE LACS BAND OF OJIBWE PHONE
ADDRESS: CITY,STATE ZIP:
LEGAL DESCRIPTION:
PIN# 30.0.027400 and 500 SEC 19 T 47 R 25 TWP NAME
FIRE# LAKE/RIVER CLASS OHWL FT.

DESCRIPTION OF SOIL TREATMENT AREAS

	AREA #1	AREA #2
DISTURBED AREAS	YES X NO	YES X NO
COMPACTED AREAS	YES X NO	YES X NO
FLOODING	YES NO X	YES NO X
RUN ON POTENTIAL	YES NO X	YES NO X
SLOPE %	2	
DIRECTION OF SLOPE	W	
LANDSCAPE POSITION	Summit	
VEGETATION TYPES	HAY FIELD	

REFERENCE BM ELEV. 100 FT.
REFERENCE BM DESCRIPTION
BM STAKE By MOUND AREA

DEPTH TO STANDING WATER OR MOTTLED SOIL: #1 (8") #2 (8') #3 (8') #4 (8")
REDOX

BOTTOM ELEVATION–FIRST TRENCH OR BOTTOM OF PROPOSED: #1 100.85 FT., #2 FT.

SOIL SIZING FACTOR: SITE #1 .68, SITE #2 .68

CONSTRUCTION RELATED ISSUES:

LIC# 1472 SITE EVALUATOR SIGNATURE:

SITE EVALUATOR NAME: KEVIN HERWIG TELEPHONE# 320-241-7036

LUG REVIEW DATE

Comments:

SOIL BORING LOGS OR REPORT ATTACHED

Form des 2/20/98

University of Minnesota Site Evaluation Form 5/16/2005

Onsite Sewage Treatment Program

Property Owner(s) MILLE LACS BAND OF OJIBWE Phone Number 320-532-4181

Address 3XXXX HWY 65 McGREGOR MN.

P.I.D. 30.0.027400 & 30.0.027500 Section # ___ Township 47 N Range 23

Date 7/14/2015 Time 2PM Weather conditions OVERCAST

Location Information (*check all that apply*)
__ shoreland __ dwelling __ replacement system
__ protection area X other establishment __ new home construction

Homeowner Information

No. of bedrooms (*if applicable*) NONE bedrooms (includes possible additions)
No. of residents in home __ adults __ children
Estimated flow 2450 gpd
Well casing depth N/A feet

Water using devices (*check*) — Discharge location if checked
__ Garbage disposal __ Water softener
__ Dishwasher __ Sump pump
__ Large bathtub __ High eff. furnace
__ Laundry/large tub on 2nd floor __ Jucuzzi/hottub

Water use concerns (*check*)
__ Toilet/faucet leaks __ Max load laundry/day __ Long term prescription medications
__ Home business __ Lint screen __ Antibact. soap __ Frequent parties or out of town guests

Soil Data

Soil texture classification: FINE SANDY LOAM
Unnatural soil (*check*) X Yes __ No
Type of observation (*check*) __ Probe X Pit __ Boring
Parent material (*check*) __ Till X Outwash __ Loess __ Bedrock __ Alluvium
Vegetation type (*check*) __ Wet __ Dry X Unknown
Slope form (*check*) X Summit __ Shoulder __ Back __ Foot __ Toe
Drainage (*check*) __ Good X Fair __ Poor __ Ponding __ Flooding
Located in floodplain (*check*) __ Yes X No

Site Summary Data

Standing water: ___ inches
Bedrock: ___ inches
Saturated soil: 8 inches
Maximum depth of system: 0 inches
Max elevation at system bottom: 100.85 feet
Soil sizing factor (SSF): 0.68 gpd/ft^2
Linear loading rate (LLR): 12 gpd/ft
Was a perc test done ? __ Yes ___ mpi
X No

Soil Survey Data	Soil #1	Soil #2
Map unit sym & name	DULUTH	DULUTH
Landscape position	SUMMIT	SUMMIT
Flooding		
Slope	1 - 6%	1-6%
Watertable depth		
Bedrock depth		
Possible system depth	0	0
Texture at depth	FSL	FSL
Permeability (P)		
Perc(MPI) = 60 / P		
NRCS onsite suitability	V. LIMITED	V. LIMITED

Soil Boring Data

Boring 1 Elevation: Location:

Soil Horizons Depth (inches)	Texture	Color	Structure	Consistence
0-8	FIELD MIXED SOIL	10YR 3/3	NONE	FRIABLE
8"-12"	SANDY CLAY LOAM	10YR4/3 REDOX 7.5YR4/4	PLATY	FIRM

Boring 2 Elevation: Location:

Soil Horizons Depth (inches)	Texture	Color	Structure	Consistence
0-8	FIELD MIXED SOIL	10YR3/3	NONE	FRIABLE
8"-12"	SANDY CLAY LOAM	10YR4/3 REDOX 7.5 YR4/4	PLATY	FIRM

UNIVERSITY OF MINNESOTA

OSTP Soil Observation Log

v 11.3.28

Date 7/14/2015

Time 2PM

Client/ Address:

Legal Description/ GPS PID 30.0.027400 & 500

Landscape position SUMMIT

Vegetation HAY FIELD

Soil parent materials (Check all that apply) ☐ Outwash ☐ Lacustrine ☐ Loess ☑ Till ☐ Alluvium ☐ Bedrock ☐ Organic

Observation #/Location: 3

Slope% 2.0

Soil survey map units

Slope shape LIN

Depth (in)	Texture	Coarse Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
PLOWED SOIL 0-8	fine sandy loam	5	10YR3/3				Granular	Structureless	Friable
8-12	sandy clay loam	5	10YR4/3	7.5YR4/4	Concentrations, depletions	S4	Platey	Weak	Firm

Comments OLD PLOWED FIELD COMPACTED SOILS

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

KEVIN HERWIG (Designer)

(Signature)

1472 (License #)

7/14/2015 (Date)

UNIVERSITY OF MINNESOTA

OSTP Soil Observation Log

v 11.3.28

Date 7/14/2015

Time 2PM

Client/ Address:

Legal Description/ GPS: PID 30.0.027400 & 500

Landscape position: SUMMIT

Vegetation: HAY FIELD

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

Observation #/Location: 4

Slope%: 2.0

Soil survey map units:

Slope shape: LIN

Depth (in)	Texture	Coarse Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
PLOWED SOIL 0-8	fine sandy loam	5	10YR3/3				Granular	Structureless	Friable
8-12	sandy clay loam	5	10YR4/3	7.5YR4/4	Concentrations, depletions	S4	Platey	Weak	Firm

Comments: OLD PLOWED FIELD COMPACTED SOILS

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

KEVIN HERWIG (Designer)

(Signature)

1472 (License #)

7/14/2015 (Date)

ONSITE SEWAGE TREATMENT PROGRAM

Job #

University of Minnesota Mound Design Worksheet

Greater than 1% Slopes

A. FLOW

Estimated	2450	gpd *(see figure A-1)*	
or measured		x 1.5 (safety factor) =	0 gpd

B. SEPTIC TANK LIQUID VOLUMES

Septic tank capacity	7500	gallons *(see figure C-1)*
Number of tanks/compartments	6	
Effluent Filter (yes/no)	YES	

C-1 Septic Tank Capacity in Gallons

Number of Bedrooms	Minimum Capacity	Capacity with Garb. Disp.	Capacity with Disp. and Lift
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 *(Site evaluation data)*

1.	Depth to restricting layer=	0.0	feet
2.	Depth of percolation tests =		inches
3.	Texture	FSL	
4.	Soil loading rate *(see Figure D-33)*	0.68	gpd/ ft^2
	Percolation rate		MPI
5.	% Land Slope	2.0	%

D. ROCK LAYER DIMENSIONS

1. Multiply average design flow (A) by 0.83 to obtain required area of rock layer: Item A x 0.83=

   2450 gpd x 0.83 ft^2/gpd = 2040 ft^2

2. Determine rock layer width = 0.83 ft^2/gpd x Linear Loading Rate (LLR) (see LLR chart)

   0.83 ft^2/gpd x 12.00 = 10.0 ft

LLR Chart	
Perk Rate	LLR
<120 MPI	<=12
>=120 MPI	<=6

3. Length of rock layer = area divided by width =

   2040.0 ft^2 / 10.0 feet = 204.0 ft

E. ROCK VOLUME

1. Multiply rock area by rock depth to get cubic feet of rock

   2040.0 X 1.0 ft = 2040.0 ft^3

2. Divide ft^3 by 27 ft^3/yd^3 to get cubic yards

   2040.0 ft^3 / 27 = 75.6 yd^3

3. Multiply cubic yards by 1.4 to get weight of rock in tons;

   75.6 yd^3 X 1.4 ton/yd^3 = 105.8 tons

F. ABSORPTION WIDTH **Absorption ratio:** 2

1. Absorption width equals absorption ratio times rock layer width

2.00 x 10.0 ft = 20.0 ft

G. MOUND SLOPE WIDTH & LENGTH (Greater than 1%)

1. Downslope absorption width = absorption width minus rock layer width

20.0 feet - 10.0 feet = 10.0 ft

2. Calculate mound size

UPSLOPE

a. Depth of clean sand at upslope edge of rock layer = 3 feet minus distance to restricting layer(C1)

3.0 ft - 0.0 ft = 3.0 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 foot) to depth of cover (1 foot)

3 ft + 1ft + 1 ft = 5.0 ft

c. Upslope berm multiplier based on land slope *(see figure D-34)*

Selected berm multiplier: 2.83

d. Upslope width = berm multiplier(G2c) times upslope mound height(G2b):

2.83 x 5.0 ft = 14.2 ft

DOWNSLOPE

e. Drop in elevation = rock layer width (D2) times percent landslope(C5) / 100

10.0 ft x 2.0 % / 100 = 0.2 ft

f. Downslope mound height = depth of clean sand for slope difference (G2e) at downslope rock edge plus the mound height at the upslope edge of rock layer (2b)

0.2 ft + 5.0 ft = 5.2 ft

g. Downslope berm multiplier based on percent land slope *(see Figure D-34)*

Selected berm multiplier: 3.19

h. Downslope width = downslope multiplier(G2g) times downslope mound height(G2f)

3.19 x 5.2 = 16.6 ft

i. Select greater of G1 and G2h as the downslope width 16.6 ft

j. Total mound width is the sum of upslope (G2d) width plus rock layer width (D2) plus downslope width (G2i)

14.2 ft + 10.0 ft + 16.6 ft = 40.8 ft

k. Total mound length is the sum of upslope width (G2d) plus rock layer length (D3) plus upslope width (G2d)

14.2 ft + 204.0 ft + 14.2 ft = 232.4 ft

Final Dimensions (slope >1%)	40.8 ft x 232.4 ft

I hereby certify that all work has been completed in accordance with all applicable ordinances, rules & laws.

[signature] (signature) 1472 (license #) 7-14-2015 (date)

H. SAND VOLUME

1. Upslope Volume + Volume under rockbed + Downslope Volume

a. Upslope Volume: (depth of clean sand + 1) x (upslope berm) x (mound length) / 2 = ft^3

4.0	ft	x	14.2	ft	x	232.4	ft / 2 =	6600.2 ft^3

b. Volume under rockbed: (average depth of sand under rock) x (rockbed width) x (mound length) = ft^3

3.1	ft	x	10.0	ft	x	232.4	ft =	7204.4 ft^3

c. Downslope Volume: (depth of clean sand + 1) x (downslope berm) x (mound length) / 2 = ft^3

4.2	ft	x	16.6	ft	x	232.4	ft / 2 =	8101.5 ft^3

Total cubic feet: = 21906.0 ft^3

2. Divide ft^3 by 27 ft^3/yd^3 to get cubic yards

21906.0 / 27 = 811.3 yds^3

3. Multiply cubic yards by 1.4 to get weight of sand in tons

811.3 yds^3 x 1.4 = 1135.9 tons

4 Add 10% for Constructability

1135.9 tons x 1.1 = 1249.5 tons

A-1 Estimated Sewage Flows in GPD

No. of Bdrms	Class I	Class II	Class III	Class IV
2	300	225	180	60% of the values in the Class I, II or II 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	

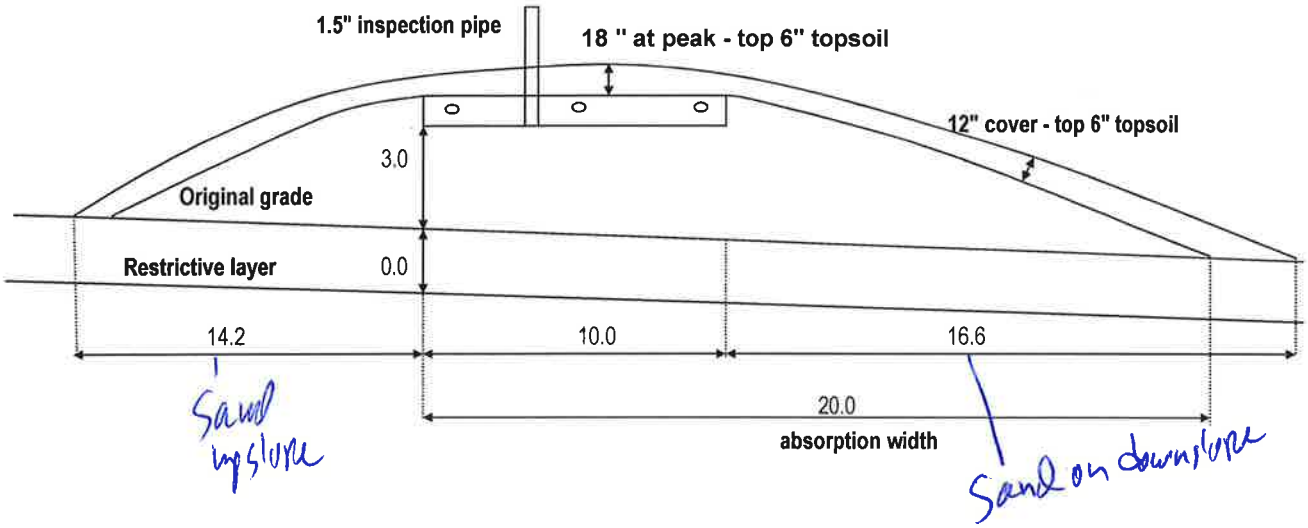
D-33 Absorption Width Sizing Table

Perc Rate mpi	Soil Texture	Loading Rate gpd/sq ft	Absorption Ratio
<5	Coarse sand Loamy sand Med., Fine sand	1.20	1.00
6 -15	Sandy loam	0.79	1.50
16-30	Loam	0.60	2.00
31-45	Silt Loam, Silt	0.50	2.40
46 - 60	Clay loam, Silty or Sandy Clay Loam	0.45	2.67
61-120 >120*	Silty or Sandy Clay or Clay	0.24	5

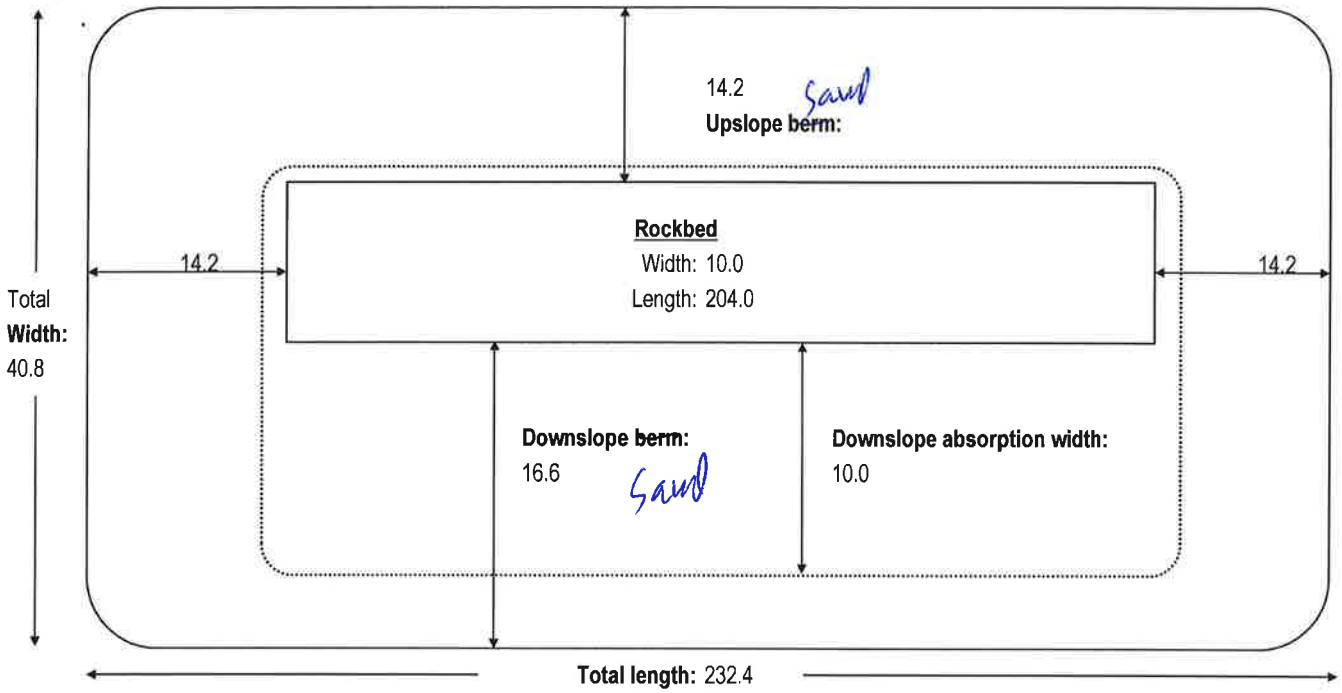
*Must be other or performance.

D-34 Slope Multiplier Table

Land % Slope	Upslope multipliers for various slope ratios				Downslope multipliers for various slope ratios				
	3:1	**4:1**	5:1	6:1	3:1	**4:1**	5:1	6:1	7:1
0	3.00	**4.00**	5.00	6.00	3.00	**4.00**	5.00	6.00	7.00
1	2.91	**3.85**	4.76	5.66	3.09	**4.17**	5.26	6.38	7.53
2	2.83	**3.70**	4.54	5.36	3.19	**4.35**	5.56	6.82	8.14
3	2.75	**3.57**	4.35	5.08	3.30	**4.54**	5.88	7.32	8.86
4	2.68	**3.45**	4.17	4.84	3.41	**4.76**	6.25	7.89	9.72
5	2.61	**3.33**	4.00	4.62	3.53	**5.00**	6.67	8.57	10.77
6	2.54	**3.23**	3.85	4.41	3.66	**5.26**	7.14	9.38	12.07
7	2.48	**3.12**	3.70	4.23	3.80	**5.56**	7.69	10.34	13.73
8	2.42	**3.03**	3.57	4.05	3.95	**5.88**	8.33	11.54	15.91
9	2.36	**2.94**	3.45	3.90	4.11	**6.25**	9.09	13.04	18.92
10	2.31	**2.86**	3.33	3.75	4.29	**6.67**	10.00	15.00	23.33
11	2.26	**2.78**	3.23	3.61	4.48	**7.14**	11.11	17.65	30.43
12	2.21	**2.70**	3.12	3.49	4.69	**7.69**	12.50	21.43	43.75
13	2.17	**2.62**			4.95	**8.29**			
14	2.13	**2.55**			5.24	**8.92**			
15	2.09	**2.48**			5.55	**9.57**			
16	2.06	**2.41**			5.88	**10.24**			
17	2.03	**2.35**			6.24	**10.94**			
18	2.00	**2.29**			6.63	**11.67**			
19	1.97	**2.23**			7.04	**12.42**			
20	1.95	**2.18**			7.47	**13.19**			
21	1.93	**2.13**			7.93	**13.99**			
22	1.91	**2.08**			8.42	**14.82**			
23	1.89	**2.03**			8.93	**15.67**			
24	1.87	**1.98**			9.46	**16.54**			
25	1.85	**1.93**			10.02	**17.44**			



Mound Detail: Land slope > 1%



Notes:

Divert surface water away from mound.

University of Minnesota Pump Selection Procedure - 10/25/04

All boxed rectangles must be entered, the rest will be calculated.

ONSITE SEWAGE TREATMENT PROGRAM

1. **Determine pump capacity:**

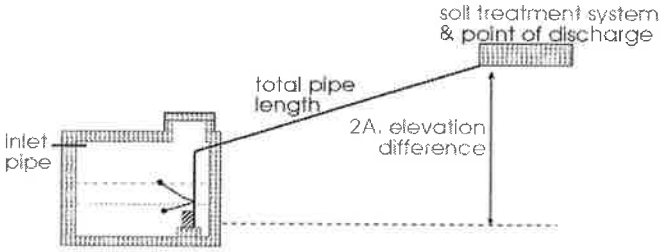
A. Gravity Distribution

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 design worksheet

Selected Pump Capacity: [120] **gpm**



2. **Determine Total Dynamic Head (TDH)**

A. Elevation difference between pump and point of discharge.
[14] feet

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

Special Head Requirements	
Gravity Distribution	0ft
Pressure Distribution	5ft

C. Friction loss in supply pipe

1. Select pipe diameter [3] 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= [1.4] ft/ 100 ft of pipe

E-9 Friction Loss in Plastic Pipe per 100 ft			
Flow Rate (gpm)	nominal pipe diameter 1.5"	2.0"	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	0.3
40	8.91	2.64	0.39
45	11.07	3.28	0.48
50	13.46	3.99	0.58
55		4.76	0.7
60		5.6	0.82
65		6.48	0.95
70		7.44	1.09

3. Determine total pipe length from pump discharge to soil system discharge point. Estimate by adding 25 percent to pipe length for friction loss in fittings.

Pipe length times 1.25 = equivalent pipe length

[175] ft x 1.25 = [218.75] feet

4. Calculate total friction loss by multiplying friction loss (C2) by the equivalent pipe length (C3) and divide by 100.

Friction Loss = [1.4] ft/100ft X [218.75] ft / 100 = [3.1] feet

D. Total head requirement is the sum of elevation difference (A), special head requirements (B), and total friction loss (C4).

[14] ft + [5] ft + [3.1] ft

Total Head: [22.1] feet

3. **Pump Selection**

1. A pump must be selected to deliver at least 120 gpm (1A or B)
with at least 22.1 feet of total head (2D).

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

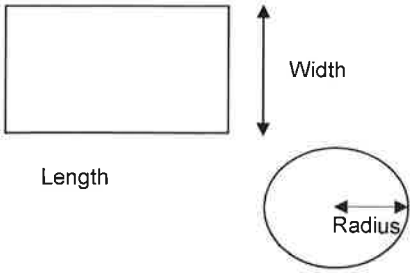
(signature) 1472 (license #) 7/1/2015

University of Minnesota Dosing Chamber Sizing with a Timer

All boxed rectangles must be entered, the rest will be calculated.

ONSITE SEWAGE TREATMENT PROGRAM

1. Determine area
   A. Rectangle area = L x W
   [ ] ft x [ ] ft = 0 ft²
   B. Circle area = 3.14 x radius²
   3.14 x [ ]² ft = 0.0 ft²
   C. Get area from manufacture [ ] ft²



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.
   Surface area x 7.5 / 12 = 0.0 ft² x 7.5 / 12in/ft = 70.1 gallon per inch
   MANUFACTURER

3. Calculate recommended capacity = average design flow *(see chart A-1)* x 2
   [2450] gpd x 2 = 4900 gal

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

4. Calculate total tank volume
   A. Depth from bottom of inlet pipe to tank bottom = [72] in
   B. Total tank volume = depth from bottom of inlet pipe to tank bottom(4A) x gal/in(2)
   = 72 in x 70.1 gal/in = 5044.3 gallons

5. Calculate gallons to cover pump (with 2-3 inches of water covering pump)
   (Pump and block height + 2 inches) x gallon per inch(2)
   ([14] + 2 in) x 70.1 gal/in = 1121.0 gallons

6. Calculate total usable tank volume
   total tank volume in gallons (4) - gallons to cover pump(5)
   5044.3 gal - 1121.0 gal = 3923.4 gal

A-1 Estimated Sewage Flows in GPD

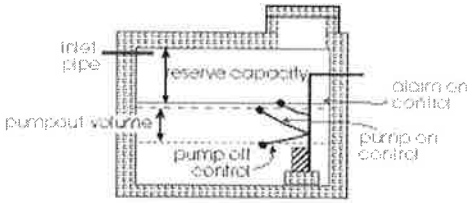
Number of Bedrooms	Class I	Class II	Class III	Class IV
2	300	225	180	60% of
3	450	300	218	the
4	600	375	256	values
5	750	450	294	in the
6	900	525	332	Class I,
7	1050	600	370	II or II
8	1200	675	408	columns

7. Calculate total pumpout volume
   A. Select pump size for 4-5 doses per day. Gallon per dose = gpd *(see Figure A-1)* / doses per day =
   2450 gpd / [4] doses/day = 612.5 gallons
   B. Calculate drainback
      1. Determine total pipe length [175.0] ft
      2. Determine liquid volume of pipe, [0.38] gal/ft *(see figure E-20)*
      3. Drainback quantity = 175 ft (7B1) x 0.38 gal/ft(7B2) 66.5 gallons
   C. Total pump out volume = dose volume(7A) + drainback (7B3)
   612.5 gallons + 66.5 gallons = 679.0 gallons

E-20 Volume of Liquid in Pipe

Pipe Diameter inches	Liquid per foot gallons
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. Pump Rate
   From design [120] gpm
   or calculated:
   change in depth (in) x gallon per inch(2) / time interval in min = gpm
   [ ] in x 70.1 gal/in / [ ] min = 0.0 gpm



9. Calculate the timer ON setting
   Dose gallons(7C) / gpm (8)
   679.0 gal / 120.0 gpm = 5.7 minutes ON

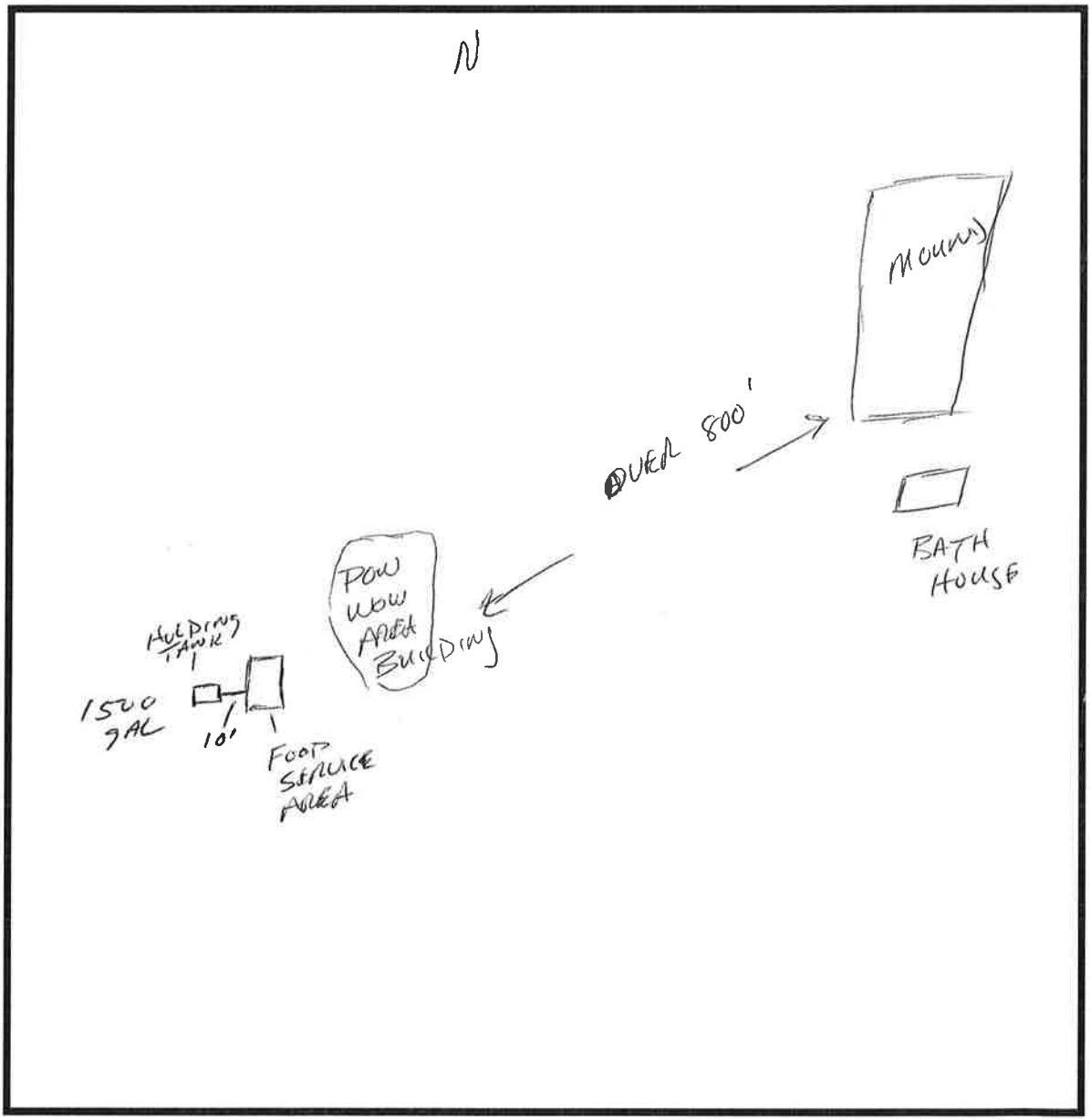
10. Calculate the timer OFF setting
    minutes per day / doses per day - minutes on
    1440 / 4 doses/day - min on(9) 354.3 minutes OFF

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

(signature) 1472 (license #) 7/14/2015

AITKIN COUNTY
BUILDING PERMIT SITE PLAN

Please indicate the location of: Wells, well setback to system components, buildings, septic system components, reserved septic system area, property lines, waterways, and buried lines. Include size, length, and appropriate distances from fixed reference points. Provide a North directional arrow!



University of Minnesota Pressure Distribution System Design - 10/25/04

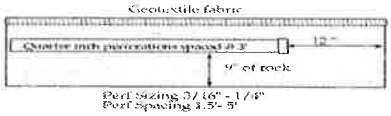
All boxed rectangles must be entered, the rest will be calculated.

ONSITE SEWAGE TREATMENT PROGRAM

1. Select number of perforated laterals: [3]

2. Select perforation spacing = [3] ft

3. Since perforations should not be placed closer that 1 foot to the edge of the rock layer (see diagram), subtract 2 feet from the rock layer length
   [204] - 2 ft = 202 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 = 202 ft / 3 ft = 67

5. Select perforation size [2] inch

6. 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.*
   67 spaces + 1 = 68 perforations/lateral

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

Perforation Spacing ft	Pipe Diameter 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-5 Maximum Number of 3/16 inch perforations per lateral to guarantee <10% discharge variation

Perforation Spacing feet	Pipe Diameter 1 inch	1.25 inch	1.5 inch	2.0 inch
2.5	12	19	25	39
3	11	18	24	37
3.3	10	17	23	36
4	10	16	21	33
5	9	15	20	31

7. A. Total number of perforations = perforations per lateral (5) times number of laterals (1).
   68 perfs/ lat x 3 laterals = 204 perforations

   B. Calculate the square footage per perforation.
   Recommended value is 6-10 sqft/perf. Does not apply to at-grades.
   1. Rock bed area = rock width (ft) x rock length (ft)
   [10] ft x 204 ft = 2040 ft^2
   2. Square foot per perforation=Rock Bed Area/number of perfs(6)
   2040.0 ft^2 / 204 perfs = 10.0 ft^2/ perf

Will send new form w/ 2-10' split & 50' cam wgt.

8. Determine required flow rate by multiplying the total number of perforations(6A) by flow per perforations (see figure E-6)
   204 perfs x [0.59] gpm / perfs = 120.4 gpm

E-6 Perforation Discharge in GPM

Head (feet)	Perforations diameter (inches) 3/16	7/32	1/4
1[a]	0.42	0.56	0.74
2[b]	0.59	0.80	1.04
5	0.94	1.26	1.65

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

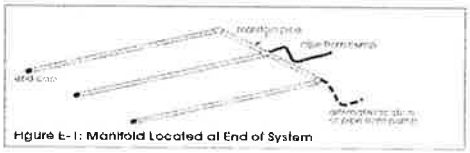


Figure E-1: Manifold Located at End of System

9. Determine Minimum Pipe Size

A. **Manifold on End.** If laterals are connected to header pipe as shown in Figure E-1, to select minimum required lateral diameter; enter figure E-4 or E-5 with perforation spacing and number of perforations per lateral. Select minimum diameter for perforated laterals = [ ] inches

B. **Center Manifold.** If perforated lateral system is attached to manifold pipe near the center, like Figure E-2, perforated lateral length (3) and number of perforations per lateral (5) will be approximately one half of that in step A. Using these values, select minimum diameter for perforated lateral = [2] inches

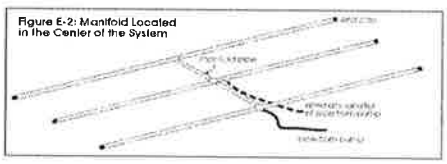


Figure E-2: Manifold Located in the Center of the System

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

[signature] (signature) 1472 (license #) 7/1/2015 (date)

AITKIN COUNTY ENVIRONMENTAL SERVICES

APPLICATION for an
OPERATING PERMIT FOR WASTEWATER TREATMENT AND DISPERSAL

PERMITTEE _____ PARCEL NUMBER 30.0.027400 & 500

ADDRESS XXXX Hwy #65 McGregor Mn.

LEGAL DESCRIPTION _____

TELEPHONE # _____ GIS LOCATION _____

A. DESCRIPTION OF WASTEWATER TREATMENT AND DISPERSAL SYSTEM: (Attach ISTS site evaluation and design; estimated cost of system construction, operation, monitoring, service, component replacement, and management; anticipated system life, hydraulic and organic loading rates)

TYPE III MOUND SYSTEM 3' SAND LIFT.

B. MONITORING PLAN AND REPORTING FREQUENCY:

PARAMETER	COMPLIANCE LIMIT	SAMPLE LOCATION	SAMPLE FREQUENCY	SAMPLE TYPE	REPORTING FREQUENCY
FLOW	2450	CYCLE COUNTER	AFTER EVENT		
5-DAY BOD					
TOTAL NITROGEN					
TOTAL PHOSPHORUS					
TSS					
FATS,OILS AND GREASE					
FECAL COLIFORM					
SEPARATION DISTANCE	3'	MOUND	AN.		

OWNER will perform the monitoring of this septic system.

C. MAINTENANCE PLANS

PARAMETER	LOCATION	FREQUENCY
Solids removal	Septic Tanks	annual
~~Pump Trouble~~ & Alarm Pump, Floats	Pump tank	
Effluent Filters	~~Pump~~ Septic Tank	
Flow	Check counter	

CLEAN FILTER EVERY 30-90 DAYS OR AS NEEDED (RECORD)
CLEAN TANKS EVERY 36 MONTHS (RECORD)
RECORD METER READINGS EVERY 30 DAYS
CHECK MOUND FOR SEEPAGE EVERY 30 DAYS

D. MITIGATION PLAN:

IF A FAILURE OCCURS NOTIFY AITKIN COUNTY AND E-Z EXCAVATING AS SOON AS POSSIBLE.
DISCONNECT THE MOUND PUMP AND USE THE TANKS AS HOLDING TANKS UNTIL THE PROBLEM IS FIXED.
CALL A SEPTIC PUMPING COMPANY AND SET UP A PUMPING CONTRACT.

I hereby certify with my signature as the designer, that all data for the operating permit application is true and correct to the best of my knowledge. I agree to indemnify and hold Aitkin County harmless from loses, damages, costs and charges that may be incurred by the County because of the information submitted with this application.

Signature	License Number	Date
	1472	7-14-15

Name (please print)	Address	Telephone #
KEVIN HERWIG	1520 E Maple Ave Merrifield	320-679-4031

c:operatpermit.doc

MAINTENANCE SERVICE, MONITORING AND INSPECTION CONTRACT
FOR INDIVIDUAL SEWAGE TREATMENT SYSTEM

It is hereby agreed this ____ day of _____, _____ by and between _____ (Inspector) and _____(client)

(Client) Name & Address
MILLE LACS BAND OF OJIBWE

Street Address XXXV Hwy #65

City, State, Zip McGregor MN.

That in consideration of the payments provided herein, the Inspector shall provide services to perform Preventative Maintenance, Monitoring and Inspection of the Individual Sewage Treatment System (ISTS) located at the property described in the Aitkin County Operating Permit.

Each inspection includes an examination of the ISTS followed by a written report to the client. This inspection report shall contain recommendations for operation and maintenance for failure-preventative measures, if any are deemed appropriate by the inspector and a list of recommended corrective measures or replacement parts. The Inspector is authorized to submit a copy of the report to the Aitkin County Environmental Services Department.

This contract does not assume any responsibilities or obligations, which are normally the responsibilities of the Client, as related to parts or labor and does not extend to cover any costs that may be associated with any recommendations made under this contract.

The Inspector can only contract or subcontract for parts or labor after authorization. Billings for service calls shall be made on a case by case basis. This contract only covers maintenance, monitoring and inspection services per current Aitkin County Operating Permit and does not cover alarm calls of any kind.

The Inspector shall be provided access to the site and the system in order to perform the following services:

SEPTIC TANK AND LIFT STATIONS INSPECTION

(check the boxes needed to fill the requirements of the Operating Permit)

✓ Check septic tank and compartments for solids buildup and general appearance. If necessary, have tanks pumped (cost of pumping is the responsibility of the client).

✓ Check effluent filter for buildup and clean, if applicable.

✓ Check pumping system, including control panel and floats.

✓ Record and date the readings of the elapsed time meter and cycle counter(s), if applicable.

____ Check dosing settings (in the control panel, if applicable).

____ Other: _____

_____

**If the septic tank or lift stations need pumping to be in compliance with the operating permit the cost of the pumping is the responsibility of the Client.

TREATMENT DEVICE

____ Inspect pretreatment unit (aerobic tank, sand filter, etc.) per manufacturer's recommendations, if applicable.

____ Inspect and clean any parts per manufacturer's recommendations.

____ Inspect and clean laterals, if applicable.

____ Inspect the appearance of the wastewater inside the unit for color, turbidity and examination of odors.

____ Sample effluent per Operating Permit monitoring requirements.

(Cost of sampling and analysis is the responsibility of the Client)

____ Other: _____

_____

DISPERSAL FIELD

✓ Inspect for visible signs of failure (surface discharge, soggy ground, wet spots, settling, etc.)

____ If liquid level monitors are installed, levels will be observed and recorded.

✓ Flush filters and clean cartridges, if applicable.

____ Check field control unit solenoid operations or manual control, if applicable.

____ Other: _____

_____

In no event shall the Inspector be responsible for special or consequential damages, including but not limited to, loss of time, injury to personal property or any other consequential damages or incidental or economic loss due to equipment failure or for any other reason. This contract does not assume any responsibilities or obligations, which are normally, the responsibility of the Client or as, related to parts or labor and does not extend to cover any costs that may be associated with any recommendations made under this contract.

This contract shall be effective: Beginning _____, _____

and Ending _____, _____

Cost for Maintenance Service, Monitoring and Inspection Contract is:

$_____/yr. For _____ years totaling $_____

The Inspector agrees to provide inspection, monitoring and routine maintenance service only under this contract. The Client remedies for breach of this contract shall be limited to refund of any of the amounts paid in advance for service. This contract may be renewed 30 days from the ending date.

Payment for all services shall be paid _____.

Client: **Inspector:**

Sign: Mike Lacy Board will do own maintenance Sign: _____

Print: _____ Print: _____

Date: _____ Date: _____