

FIELD EVALUATION SHEET

PRELIMINARY EVALUATION DATE 5-7-22, FIELD EVALUATION DATE 5-13-22
PROPERTY OWNER: Dan Hale PHONE 612-269-4166
ADDRESS: TBD Lot 4 on 216th CITY, STATE, ZIP: McGregor, MN: 55760
LEGAL DESCRIPTION: Lot 4
PIN# 29-0-040610 SEC 19 T 49 R 23 TWP NAME Shamrock
FIRE# _____ LAKE/RIVER Big Sandy River LAKE CLASS _____ OHWL _____ FT

DESCRIPTION OF SOIL TREATMENT AREAS

	AREA #1	AREA #2	REFERENCE BM ELEV. _____ F
DISTURBED AREAS	YES _____ NO <u>X</u>	YES _____ NO _____	REFERENCE BM DESCRIPTION _____
COMPACTED AREAS	YES _____ NO <u>X</u>	YES _____ NO _____	_____
FLOODING	YES _____ NO <u>X</u>	YES _____ NO _____	_____
RUN ON POTENTIAL	YES _____ NO <u>X</u>	YES _____ NO _____	_____
SLOPE %	<u>0</u>	_____	_____
DIRECTION OF SLOPE	<u>NA</u>	_____	_____
LANDSCAPE POSITION	<u>Side slope</u>	_____	_____
VEGETATION TYPES	<u>wooded</u>	_____	_____

DEPTH TO STANDING WATER OR MOTTLED SOIL: BORING# 1 66", 1A _____, 2 66", 2A _____

BOTTOM ELEVATION—FIRST TRENCH OR BOTTOM OF ROCK BED: #1 _____ FT., #2 _____ FT.

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

CONSTRUCTION RELATED ISSUES: _____

LIC# 910 SITE EVALUATOR SIGNATURE: Ernie Darlow Jr

SITE EVALUATOR NAME: Ernie Darlow Jr. TELEPHONE# 218-426-4320

LUG REVIEW _____ DATE _____

Comments: Gravity line from camper site to a 11650 gallon combo tank. Pumped up to a 4 bedroom pressure bed with 6" of rock below the pipe.

SOIL BORING LOGS ON REVERSE SIDE

SOILS CHARTS FOR BOTH PROPOSED AND ALTERNATE SITES

1 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
0-4"	Top Soil	10yr 3/2
4"-26"	Sand	10yr 4/4
26"-66"	Sand	10yr 5/4

2 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
0-4"	Top Soil	10yr 3/2
4"-26"	Sand	10yr 4/4
26"-66"	Sand	10yr 5/4

1 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR

2 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR

ADDITIONAL SOIL BORINGS MAY BE REQUIRED

TRENCH AND BED WORKSHEET

1. AVERAGE DESIGN FLOW

- A. Estimated 600 gpd (see figure A-1)
 or measured x 1.5 (safety factor) = gpd
 B. Septic tank capacity gal (see figure C-1)

2. SOILS (Site evaluation data)

- C. Depth to restricting layer = 5.5 ft
 D. Max depth of system Item 2C - 3 ft = 5.5 ft - 3 ft = 2.5 ft
 E. Texture Sand Percolation rate MPI
 F. Soil Sizing Factor (SSF) 1.27 sqft/gpd (see figure D-15)
 G. % Land Slope 0 %

3. TRENCH or BED BOTTOM AREA

- H. For trenches with 6 inches of rock below the pipe:
 $A \times F = 600 \text{ gpd} \times 1.27 \text{ sqft/gpd} = 762 \text{ sqft}$
 I. For trenches with 12 inches of rock below the pipe:
 $A \times F \times 0.8 = \text{ } \text{ gpd} \times \text{ } \text{ sqft/gpd} \times 0.8 = \text{ } \text{ sqft}$
 J. For trenches with 18 inches of rock below the pipe:
 $A \times F \times 0.66 = \text{ } \text{ gpd} \times \text{ } \text{ sqft/gpd} \times 0.66 = \text{ } \text{ sqft}$
 K. For trenches with 24 inches of rock below the pipe:
 $A \times F \times 0.6 = \text{ } \text{ gpd} \times \text{ } \text{ sqft/gpd} \times 0.6 = \text{ } \text{ sqft}$
 L. For gravity beds with 6 or 12 inches of rock below the pipe:
 $1.5 \times A \times F = 1.5 \times \text{ } \text{ gpd} \times \text{ } \text{ sqft/gpd} = \text{ } \text{ sqft}$
 For pressure beds with 6 or 12 inches of rock below the pipe:
 $A \times F = \text{ } \text{ gpd} \times \text{ } \text{ sqft/gpd} = \text{ } \text{ sqft}$

4. DISTRIBUTION (Check all that apply)

- Bed (< 6% slope) Drop boxes (any slope) Rock
 Trenches Distribution box (< 3%) Chamber
 Pressure Gravity Gravelless

5. SYSTEM WIDTH, LENGTH and VOLUME

- M. Select trench width = 15 ft
 N. If using rock, divide bottom area by width: $(H, I, J, K \text{ or } L) \div M =$
 $762 \text{ sqft} \div 15 \text{ ft} = 51 \text{ lineal feet}$
 Rock depth below distribution pipe plus 0.5 foot times bottom area:
 Rock depth in feet + 0.5 feet x Area (H, I, J, K, or L)
 $(1.5 \text{ ft} + 0.5 \text{ ft}) \times 762 \text{ sqft} = 762 \text{ cuft}$
 Volume in cubic yards = cuft $\div 27$
 $762 \text{ cuft} \div 27 = 28 \text{ cu yds}$
 Weight of rock in tons = cubic yds x 1.4
 $28 \text{ cu yds} \times 1.4 = 39 \text{ tons}$
 O. If using 10" Gravelless Pipe, Flow (A) x Gravelless SSF (see figure D-9)
 gpd x lineal feet/gpd = lineal feet
 P. If using Chambers, H, I, J, or K (based on height of chamber slats) \div
 width of chamber in feet (M)
 sqft \div ft = lineal ft

6. LAWN AREA

- Q. Select trench spacing, center to center = 15 feet
 R. Multiply trench spacing by lineal feet $R \times Q =$ sqft of lawn area
 $15 \text{ ft} \times 51 \text{ ft} = 762 \text{ sqft}$
 7. Include a drawing with scale (one inch = 40 ft). Show pertinent boundaries, right of way, easements, location of house, garage, driveway, all other improvements, existing or proposed soil treatment system, well and dimensions of all elevations, setbacks and separation distances.

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.

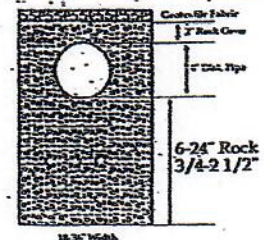
Number of Bedrooms	Minimum Liquid Capacity	Liquid capacity with garbage disposal	Liquid capacity with disposal & lift inside
2 or less	750	1125	1500
3 or 4	1000	1500	2000
5 or 6	1500	2250	3000
7, 8 or 9	2000	3000	4000

Percolation Rate (minutes per inch (MPI))	Soil Texture	Soil Sizing Factor (square feet/gallon per day/sqft/gpd)
faster than 0.1"	Coarse sand Medium sand Loamy sand Fine sand	0.83
0.1 to 5"		0.83
6 to 15"	Loam Silt loam Silt	1.67
16 to 30"		1.67
31 to 45"		2.00
46 to 60"	Clay loam Sandy clay Clay	2.20
over 61 to 120"		4.20
slower than 120"	Silty clay	

*Use systems for rapidly permeable soils pressure distribution or central distribution with no trench > 25% of the total system.
 **Soil having 50% or more fine sand plus very fine sand
 ***A mound must be used.
 ****An other or performance system must be used

percolation rate (minutes/inch)	soil texture	lineal feet/gallon/day
Faster than 0.1"	Coarse Sand Medium Sand Loamy Sand Fine Sand **	—
0.1 to 5"		0.28
6 to 15"	Sandy Loam Loam Silt Loam Silt	0.6
16 to 30"		0.42
31 to 45"		0.56
46 to 60"	Clay Loam (Cl) Sandy Cl Silty Cl Clay	0.74
slower than 60"		—

*Soil too coarse for sewage treatment.
 Use systems for rapidly permeable soils.
 **Soil having 50% or more fine sand + very fine sand.
 ***Soil with too high a percentage of clay for installation of a standard inground system.



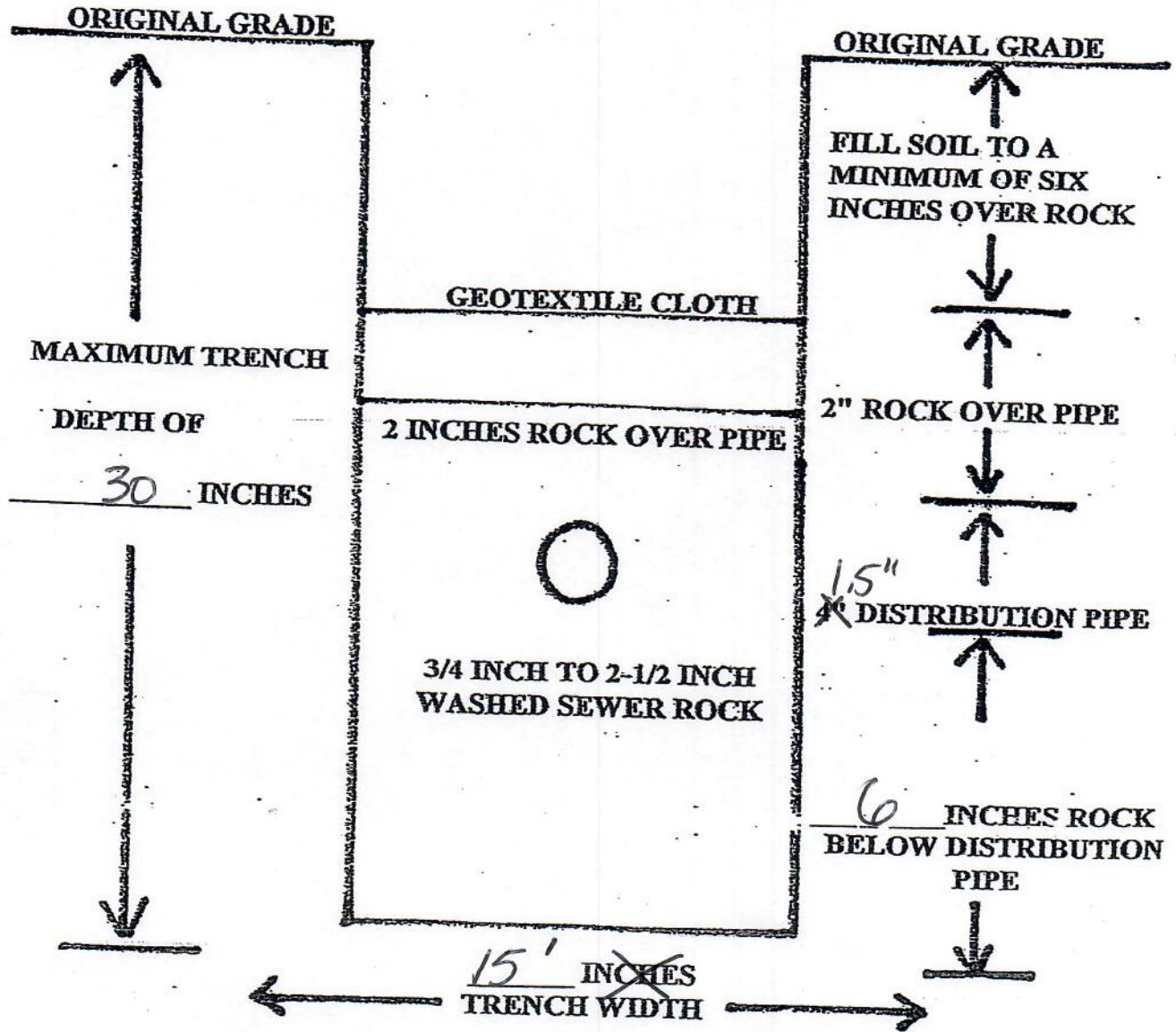
I hereby certify that I have completed this work in accordance with applicable ordinances, rules and laws.

Ernie Dardor Jr (signature) 910 (license #) 5-13-22 (date)

TRENCH CROSS-SECTION

FINISHED GRADE

20 INCHES OF BACKFILL OVER ROCK



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: 38 gpm

2. Determine pump head requirements:

A. Elevation difference between pump and point of discharge?

12 feet

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

5 feet

C. Calculate Friction loss

1. Select pipe diameter 1.5 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 = 8.91 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

80 feet x 1.25 = 100 feet

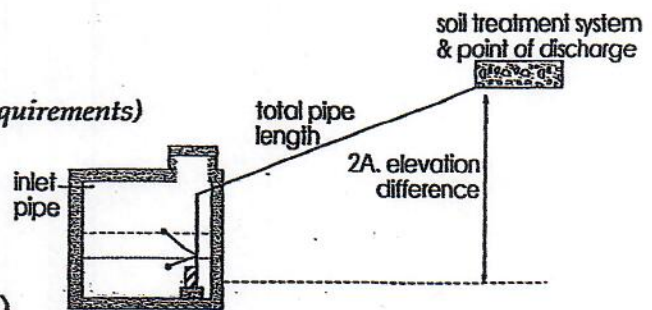
4. Calculate total friction loss by multiplying friction loss (C2) in ft/100 ft by the equivalent pipe length (C3) and divide by 100.

= 8.91 ft/100ft x 100 ÷ 100 = 8.91 ft

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

12 ft + 5 ft + 8.91 ft =

Total head: _____ feet



Special Head Requirements	
Gravity Distribution	0 ft
Pressure Distribution	5 ft

flow rate gpm	Per 100 feet		
	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
<u>40</u>	<u>8.91</u>	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 38 gpm (1A or B) with at least 26 feet of total head (2D)

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

Ernie Davila Jr (signature)

(signature)

910 (license #)

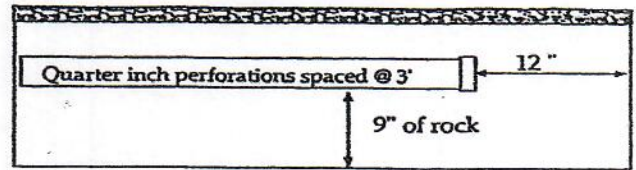
(license #)

5-13-22 (date)

(date)

PRESSURE DISTRIBUTION SYSTEM

Geotextile fabric



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

- Select number of perforated laterals 4
- Select perforation spacing = 3 ft
- 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.

$$\frac{51}{\text{Rock layer length}} - 2 \text{ ft} = \underline{49} \text{ ft}$$

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
<u>3.0</u>	8	13	<u>17</u>	26
3.3	7	12	16	25
4.0	7	11	15	23
5.0	6	10	14	22

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

$$\text{Perforation spacing} = \frac{49 \text{ ft}}{3 \text{ ft}} = \underline{16} \text{ spaces}$$

- 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.

$$\underline{16} \text{ spaces} + 1 = \underline{17} \text{ perforations/lateral}$$

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

$$\underline{17} \text{ perfs/lat} \times \underline{4} \text{ lat} = \underline{68} \text{ perforations}$$

- 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)

$$\underline{15} \text{ ft} \times \underline{51} \text{ ft} = \underline{762} \text{ sqft}$$

Square foot per perforation = Rock bed area ÷ number of perfs (6)

$$\frac{762 \text{ sqft}}{68 \text{ perfs}} = \underline{11.20} \text{ sqft/perf}$$

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

$$\underline{68} \text{ perfs} \times \underline{.56} \text{ gpm/perfs} = \underline{38} \text{ gpm}$$

- 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.

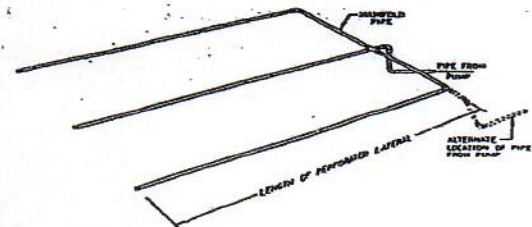
- If perforated lateral system is attached to manifold pipe near the center, lower diagram, perforated lateral length (3) and number of perforations per lateral (5) will be approximately one half of that in step 8. Using these values, select minimum diameter for perforated lateral = 1.5 inches.

E-6: Perforation Discharge in gpm

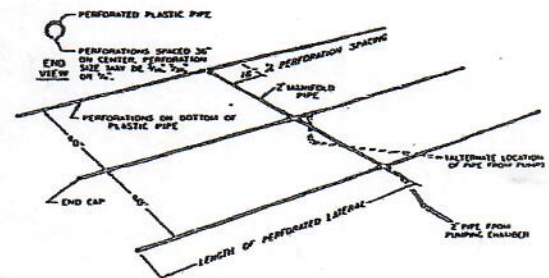
head (feet)	perforation diameter (inches)			
	1/8	3/16	<u>7/32</u>	1/4
<u>1.0^a</u>	0.18	0.42	<u>0.56</u>	0.74
2.0 ^b	0.26	0.59	0.80	1.04
5.0	0.41	0.94	1.26	1.65

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

MANIFOLD LOCATED AT END OF PRESSURE DISTRIBUTION SYSTEM



LAYOUT OF PERFORATED PIPE LATERALS FOR PRESSURE DISTRIBUTION IN MOUND



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

Ernie Dasher (signature)

(signature)

910 (license #)

(license #)

5-13-22 (date)

(date)

DOSING CHAMBER SIZING

1. Determine area

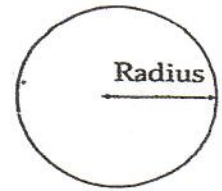
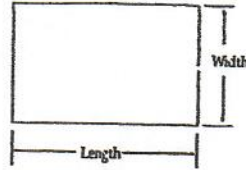
A. Rectangle area = $L \times W$

_____ x _____ = _____ square feet

B. Circle area = $\pi (3.14) \times \text{radius in feet} \times \text{radius in feet}$

$3.14 \times$ _____ 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 = 12.69 gallon per inch

3. Calculate total tank volume

A. Depth from bottom of inlet pipe to tank bottom 48.5 in

B. Total tank volume = depth from bottom of inlet pipe to tank bottom (3A) x gal/in (2)
 = 48.5 in x 12.69 gal/in = 615 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
 (14 in + 2 in) x 12.69 gal/in = 203 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 = 600 gpd ÷ 5 doses/day = 120 gallons

B. Calculate drainback

1. Determine total pipe length, 80 feet

2. Determine liquid volume of pipe, .11 gal per ft (see figure E-20)

3. Drainback quantity = 80 ft (5B1) x .11 gal per ft (5B2) = 8.8 gal

C. Total pump out volume = dose volume (5A) + drainback (5B3)
120 gal + 8.8 gal = 129 Total gallon

6. Float separation distance (using total pumpout volume)

Total pumpout volume (5C) ÷ gal/inch (2)
129 gal ÷ 12.69 gal/in = 10 inch

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

Alarm depth (inch) x gallon/inch (2) = 2 in x 12.69 gal/in = 25.4 gal

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

203 gal + 129 gal + 25.4 gal = 357.5 gallons

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

357.5 gal ÷ 12.69 gal/in = 28.17 in

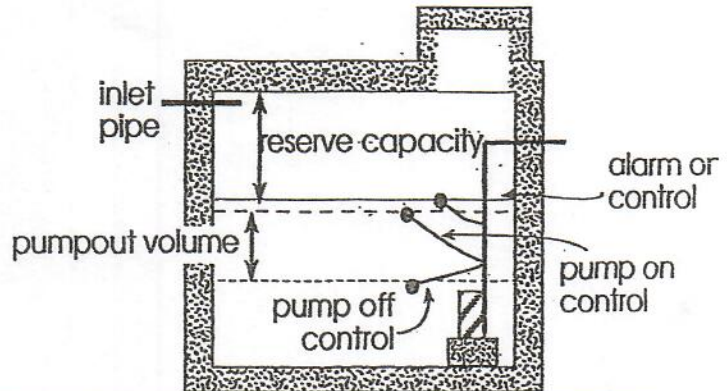
Legal Tank:
 500 gallons or
 100% the Daily flow
 or
 Alternating Pumps

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



Recommended:

Calculate reserve capacity (75% the daily flow)

Daily flow x .75 = _____ x .75 = _____ gallons

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

Ernie Parker Jr (signature)

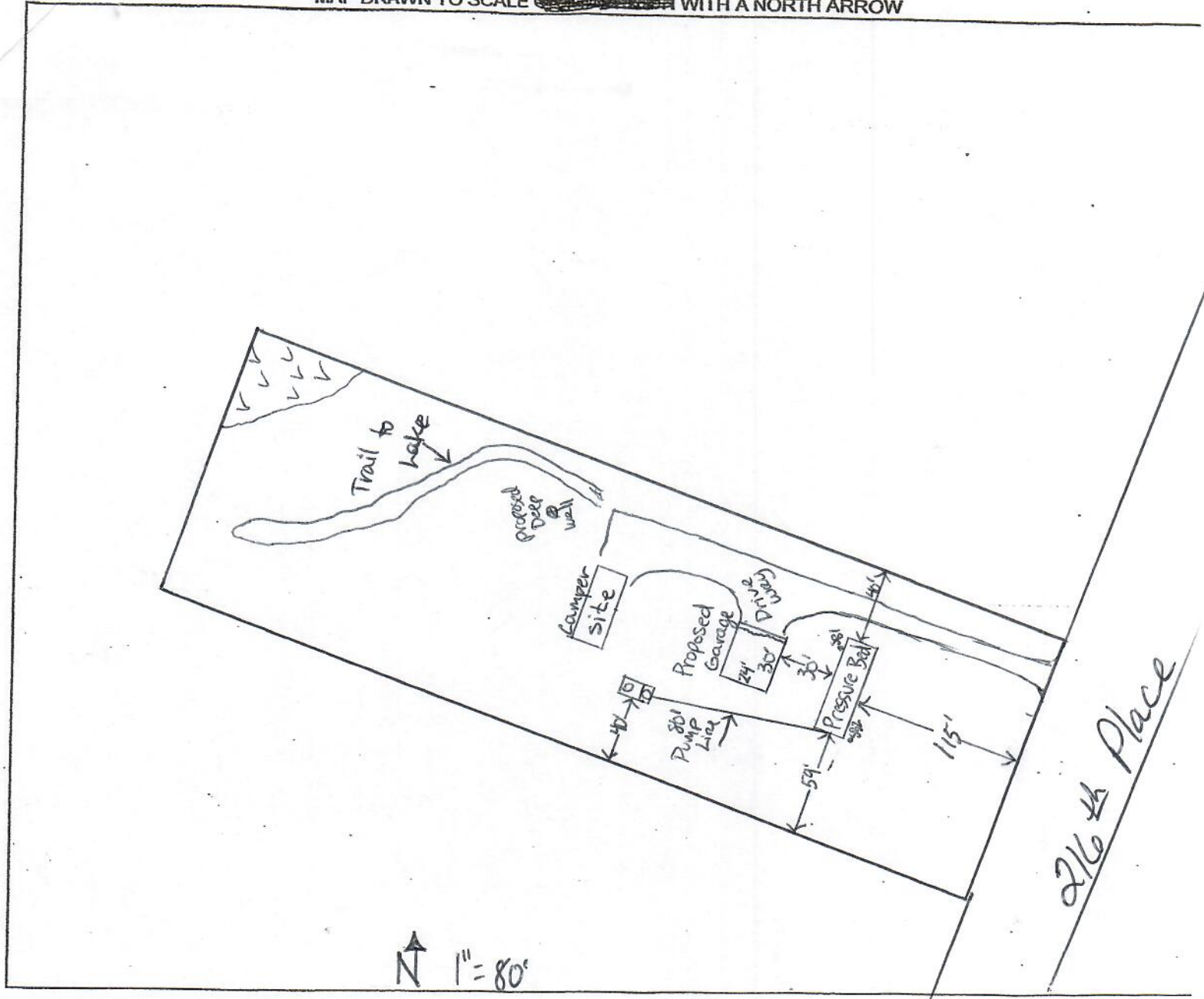
910 (license #)

5-13-22 (date)

CLIENT: Dan Hale 29-0-040610

DATE: 5-13-22

MAP DRAWN TO SCALE ~~1"=80'~~ 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
 - ALL SOIL TREATMENT AREAS
 - HORIZONTAL AND VERTICAL REFERENCE
 - POINT OF SOIL BORINGS
 - LOT EASEMENTS
 - DISTURBED/ COMPACTED AREAS
 - SITE PROTECTION--LATHE AND RIBBON EVERY 15 FT
 - ACCESS ROUTE FOR TANK MAINTENANCE
 - LOT IMPROVEMENTS
 - ALL ISTS COMPONENTS
 - DIRECTION OF SLOPE
 - ALL LOT DIMENSIONS

INDICATE ELEVATIONS

- 100.0 BENCHMARK Top of Ground @ Bed.
- N.A. ELEVATION OF SEWER LINE @ HOUSE
- 108.0 ELEVATION @ TANK INLET
- 102.0 ELEVATION @ BOTTOM OF ROCK LAYER
- 105.5 ELEVATION @ BOTTOM OF BORING OR RESTRICTIVE LAYER
- 112.0 ELEVATION OF PUMP
- 101.5 ELEVATION OF DISTRIBUTION DEVICE

- REQUIRED SETBACKS**
- STRUCTURES
 - OHWL
 - PROPERTY LINES

COMMENTS:

DESIGNER SIGNATURE Emie Dastor
LICENSE# 910

DATE 5-13-22