Subsurface Sewage Treatment System Management Plan

Property Owner: CRAIG BUCK Phone: 651-206-3518 Date: 9-17-2019

Mailing Address: 5435 St. Hwy 70 City: Pine City MN. Zip: 55063

Site Address: 22889 210th Ave. City: McGrath MN. Zip: 56350

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 —0— months.
Local Government: check every —0— 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.
- N/A *Event counter or water meter* – Record your water use.
  - -recommend meter readings be conducted (*circle one:* DAILY WEEKLY MONTHLY)

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 Signature: C.R. Buck Date: 9-17-2019

Designer Signature: Dave Eyfchild Date: 9/17/2019

See Reverse Side for Management Log

FIELD EVALUATION SHEET

PRELIMINARY EVALUATION DATE 9/14/19, FIELD EVALUATION DATE 9/14/19
PROPERTY OWNER: CRAIG BUCK PHONE 651-206-3518
ADDRESS: 22679 210TH AVE. CITY,STATE,ZIP: McGRATH
LEGAL DESCRIPTION:
PIN# 32-0-04850.1 SEC 31 T 45 R 23 TWP NAME White Pine
FIRE# — LAKE/RIVER — LAKE CLASS — 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	NA	
LANDSCAPE POSITION	Flat Plains	
VEGETATION TYPES	Hay Field	

REFERENCE BM ELEV. 100 FT.
REFERENCE BM DESCRIPTION
Bottom of Side Stake

DEPTH TO STANDING WATER OR MOTTLED SOIL: BORING# 1 18, 1A 20, 2 ____, 2A ____

BOTTOM ELEVATION–FIRST TRENCH OR BOTTOM OF ROCK BED: #1 +18 FT., #2 ____ FT.

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

CONSTRUCTION RELATED ISSUES: None

LIC# L2006 SITE EVALUATOR SIGNATURE: Dave Eychaner

SITE EVALUATOR NAME: Dave Eychaner TELEPHONE# 592-3606

LUG REVIEW ____ DATE ____

Comments:

SOIL BORING LOGS ON REVERSE SIDE

Form des 2/20/98

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

A. Average Design FLOW

Estimated __300__ gpd *(see figure A-1)*
or measured __X__ 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

__1,000__ 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 = __1.5__ feet
2. Depth of percolation tests = __—__ feet
3. Texture __%27__
   Percolation rate ______ mpi
4. Soil loading rate ______ gpd/sqft *(see figure D-33)*
5. Percent land slope ______ %

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 __12__ 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 = __9.3__ 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)

__10__ x __1.5__ 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	0.72	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 design for these soils must be other or performance

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: 22.2 gpm

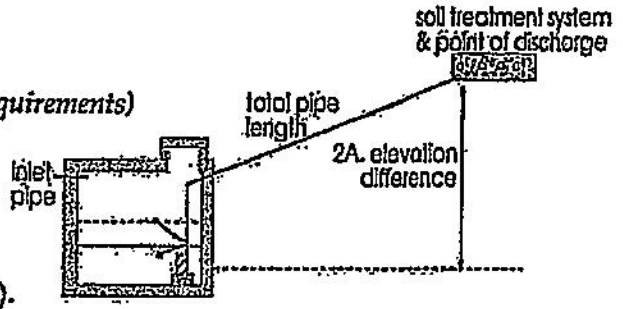
2. Determine pump head requirements:

A. Elevation difference between pump and point of discharge?

6.9 feet

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

5.0 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 = 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.
   = 37.5 ft/100ft x 1.11 ÷100 = .38(.4) ft

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

6.9 ft + 5 ft + .4 ft =

Total head: _____ feet

E-9: Friction Loss in Plastic Pipe Per 100 feet			
	nominal pipe diameter		
flow rate gpm	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

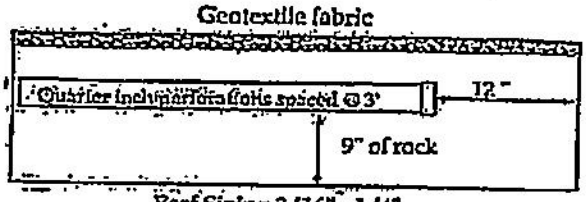
3. Pump selection

A pump must be selected to deliver at least 22.2 gpm (1A or B) with at least 12.3 feet of total head (2D)

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

Bruno Englehardt (signature) L0806 (license #) 9/17/2019 (date)

PRESSURE DISTRIBUTION SYSTEM



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

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.

   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 ÷ 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 = 22.2 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 = 1¼ 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 = X inches.

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

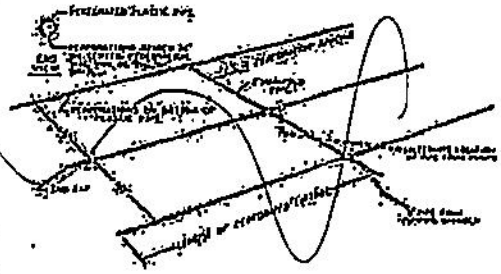
E-6: Perforation Discharge in gpm

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 foot for anything else.

MANIFOLD LOCATED AT END OF PRESSURE DISTRIBUTION SYSTEM

LAYOUT OF PERFORATED PIPE LATERALS FOR PRESSURE DISTRIBUTION SYSTEMS



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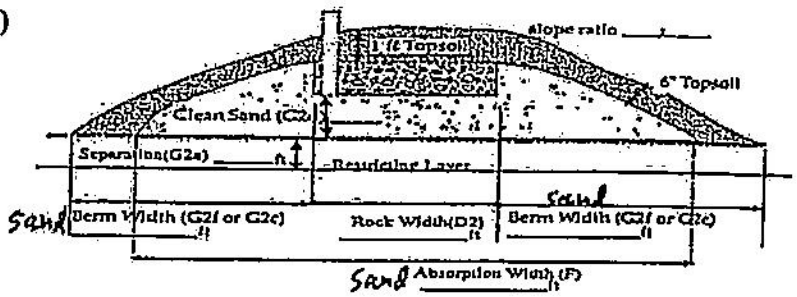
Dave Gilbert (signature) 20006 (license #) 9/17/2019 (date)

<=1% land slope

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 - 1.5 ft = 1.5 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)

1.5 ft + 1ft + 1ft = 3.5 ft

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

3.5 x 4 = 14 ft

d. The total landscape width is the sum of berm (G2c) width plus rock layer width (D2) plus berm width (G2c): 14 ft + 10 ft + 14 ft = 38 ft

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

15 ft - 38 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

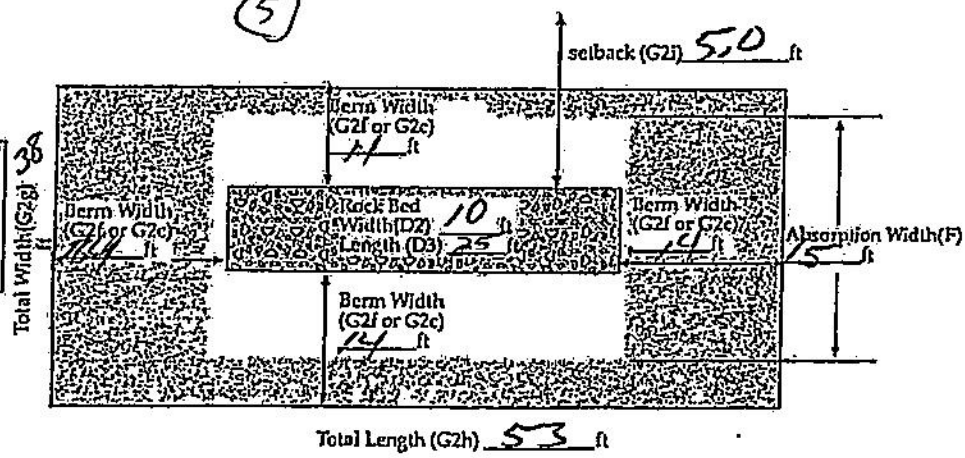
g. Total mound width is the sum of berm width (G2f or G2c) plus rock layer width (D2) plus berm width (G2f or G2c): 14 ft + 10 ft + 14 ft = 38 ft

h. Total mound length is the sum of berm (G2f or G2c) plus rock layer length (D3) plus berm (G2f or G2c): 14 ft + 25 ft + 14 ft = 53 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 (5)

Final Dimensions:

38 x 53



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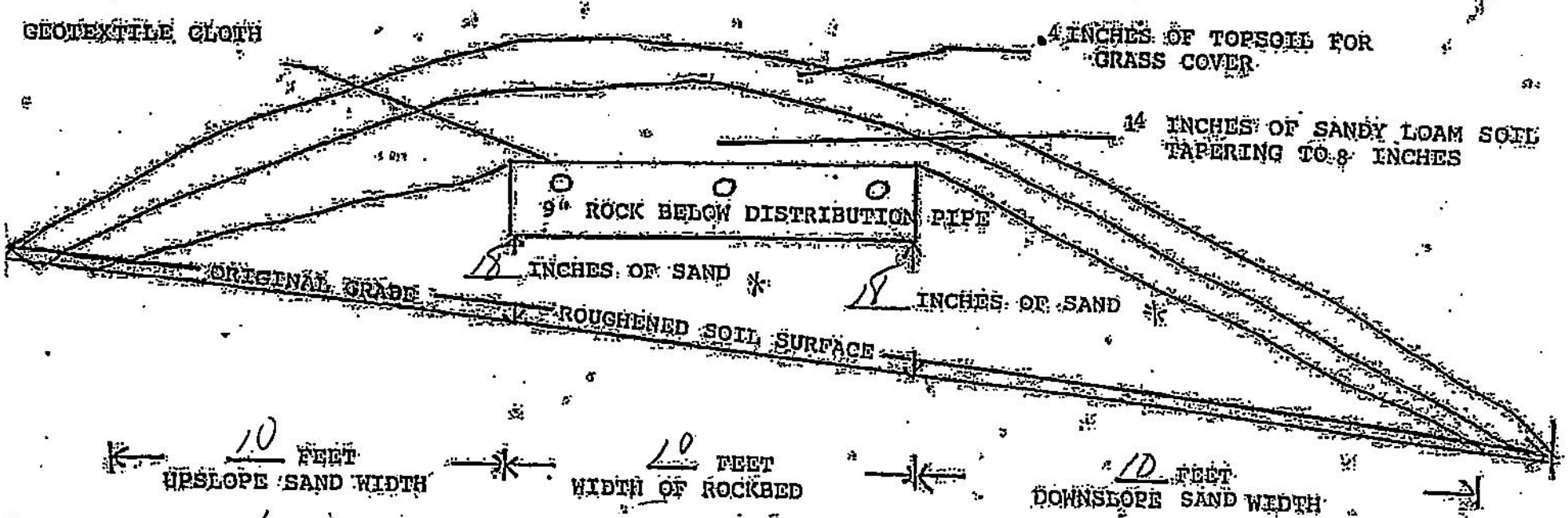
Dave Eyolfson (signature) C2006 (license #) 7/14/2015 (date)

MOUND CROSS-SECTION

5 PERCENT SLOPE OF ORIGINAL SOIL

10 FT. X 38 FT. SIZE OF ROCKBED 24 FT. X 45 FT. SIZE OF SANDBASE



10 FEET UPSLOPE SAND WIDTH

10 FEET WIDTH OF ROCKBED

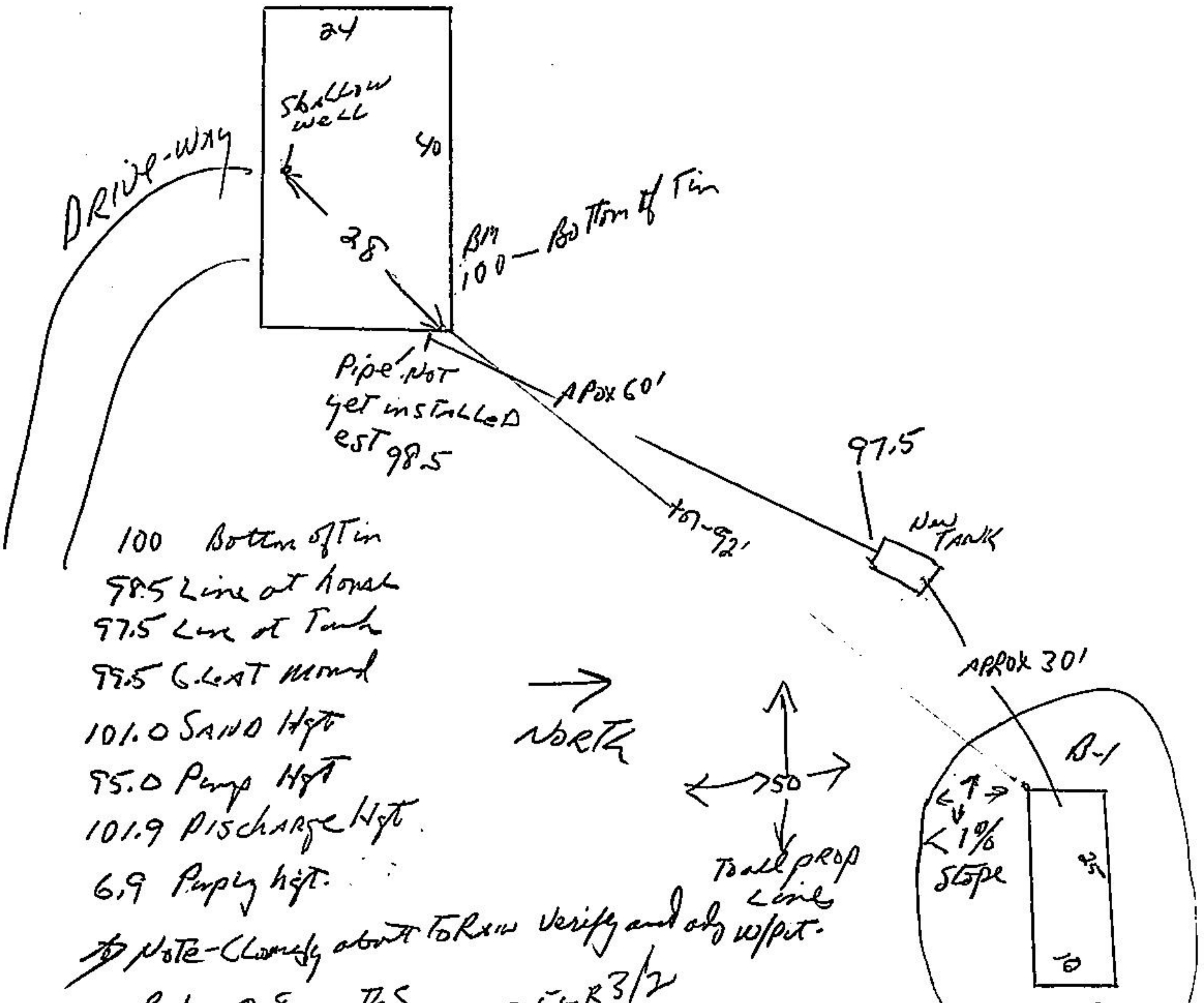
10 FEET DOWNSLOPE SAND WIDTH

14 FEET UPSLOPE COVER WIDTH

10 FEET WIDTH OF ROCK

14 FEET DOWNSLOPE COVER WIDTH

CRAIG BUCK



100 Bottom of Tin
98.5 Line at house
97.5 Line at Tank
99.5 G.L. AT Mound
101.0 SAND Hgt
95.0 Pump Hgt
101.9 Discharge Hgt.
6.9 Pumping hgt.

Note - Clarify about ToRxiw verify and adj w/pit.

B-1 0.8 T.S SANDY FRIABLE 7.5YR 3/2
8-13 SAND Loam 7.5YR 4/3
13-18 SAND Loam 7.5YR 4/4
18+ Sand Loam 7.5YR 4/6 4/4 5/2

B-2 0-10 T.S Sandy 7.5YR 3/2
10-20 Sand Loam 7.5YR 4/4
20+ Sand Loam 7.5YR Redox 4/6

Note - Soils Say Excesive Drained >80" I Don't Think So 302B?

[signature]
L2006 9/17/2019 Road 210th AVE