

University of Minnesota Site Evaluation Form 5/16/2005



Property Owner(s) Robert Merrit Phone Number _____
 Address 15111 Goshawk St., Tamarack, Mn. 55787 3 Bed Room Pressure bed onsite septic design.
 P.I.D. 05-0-008200 Section _____ Township _____ 48 N Range _____ 23
 Date 6/20/2021 Time 10:00 AM Weather conditions sunny and clear

Location Information _____ new system _____ connecting to a compliant system replacement system
 (check all that apply) pressure bed _____ other establishment _____ new home construction

Homeowner Information

No. of bedrooms (if applicable) 3 bedrooms (includes possible additions)
 No. of residents in home 2 adults _____ children
 Estimated flow 450 gpd
 Well casing depth deep well feet Discharge location if checked
 Water using devices (check) _____ Garbage disposal _____ Water softener _____
 _____ Dishwasher _____ Sump pump _____
 _____ Large bathtub _____ High eff. furnace _____
 _____ Laundry/large tub on 2nd floor _____ Jacuzzi/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: sandy loam
 Unnatural soil (check) _____ Yes _____ No
 Type of observation (check) _____ Probe _____ Pit Boring
 Parent material (check) Till _____ Outwash _____ Loess _____ Bedrock _____ Alluvium
 Vegetation type (check) _____ Wet _____ Dry Unknown
 Slope form (check) Summit _____ Shoulder _____ Back _____ Foot _____ Toe
 Drainage (check) Good _____ Fair _____ Poor _____ Ponding _____ Flooding
 Located in floodplain (check) _____ Yes _____ No

Site Summary Data

Standing water: _____ n/a _____ inches
 Bedrock: _____ n/a _____ inches
 Saturated soil: _____ 60 plus _____ inches
 Maximum depth of system: _____ 24 _____ inches
 Max elevation at system bottom: _____ 101.4 _____ feet
 Soil sizing factor (SSF): _____ 1.27 _____ gpd/ft²
 Linear loading rate (LLR): _____ 0.79 _____ gpd/ft
 Was a perc test done? _____ Yes _____ mpi
 No

Soil Survey Data	Soil #1	Soil #2
Map unit sym & name		
Landscape position		
Flooding		
Slope		
Watertable depth		
Bedrock depth		
Possible system depth		
Texture at depth		
Permeability (P)		
Perc(MPI) = 60 / P		
NRCS onsite suitability		

Soil Boring Data

Boring 1		Elevation:	Location:	
Soil Horizons Depth (inches)	Texture	Color	Structure	Consistence
0-4	top soil	10 yr 3/2	s.g.	loose
4-64"	sandy loam	10 yr 4/6	s.g.	loose
	no mottles @ 64"			

Boring 2		Elevation:	Location:	
Soil Horizons Depth (inches)	Texture	Color	Structure	Consistence
0-5"	top soil	10 yr 3/2	s.g.	loose
5-66"	sandy loam	10 yr 4/6	s.g.	loose
	no mottles @ 66"			

Elevations:

Bench Mark = 100.0

Out let of House = 99.0

In let of New tank = 97.4

Top of Pump = 94.3

Pipe @ Dispersal Field = 102.3

List any construction issues: _____

Mapping Checklist

Map scale: _____ indicate north _____ show slope _____ % direction _____

Locate

- ___ lot dimensions/property lines
- ___ dwellings and other improvements
- ___ existing and/or proposed system(s)
- ___ replacement area
- ___ unsuitable area(s)
- ___ public water supply wells
- ___ pumping access
- ___ inner wellhead zone

Easements

- ___ phone
- ___ electric
- ___ gas

Elevations

- ___ borings
- ___ benchmark
- ___ perc tests
- ___ horiz&vert reference pts

Setbacks

- ___ building
- ___ all water wells within 100ft
- ___ pressure pipe
- ___ water suction pipe
- ___ streams, lakes, rivers
- ___ floodway and fringe

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

_____ (signature)

6/202021 (date)

L-1919

(license #)

218-839-4737

(phone number)

University of Minnesota Trench and Bed Worksheet

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

1. Flow

A. Estimated Flow gpd (Fig. A-1)



Number of Bedrooms	Class			
	I	II	III	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	

Pump Tank Minimum Sizing
500 gallons or 100% of Average Design Flow (A-1) or dual alternating pump system

2. Minimum Septic Tank Capacity

B. Septic tank capacity (Fig C-1) gallons Number of tanks/compartments

C. Effluent filter (yes/no)

Number of Bedrooms	Minimum Capacity	Capacity with GD*	Capacity with GD and pump in basement **
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

* GD = garbage disposal, Must have multiple tanks or compartments

** Must have multiple tanks, compartments or effluent screen

3. Pump Tank Specifications

D. Pump tank needed (yes/no) Minimum size if needed gallons

4. SOILS (Site evaluation data)

E. Depth to restricting layer = ft

F. Maximum depth of system Item E - 3 ft = 5 - 3 = 2 ft

G. Texture Percolation Rate mpi if available

H. SSF ft²/gpd (see figure D-15)

I. % Slope %

Perc Rate mpi	Soil Texture	Soil Sizing Factors ft ² /gpd
< 0.1 *	Coarse sand	0.83
0.1 - 5	Medium sand Loamy sand	0.83
0.1 - 5**	Fine sand	1.67
6 - 15	Sandy loam	1.27
16 - 30	Loam	1.67
31 - 45	Silt loam, silt	2.00
46 - 60	Clay loam, sandy clay loam or silty clay loam	2.20
61 - 120***	Clay, sandy or silty clay	4.20
>120****		

* No trench >25% of total system
** Soil with >50% fine sand particles
*** A mound must be used
**** An other or performance system

5. System Type

x	Pressure Bed (<6% slope)
	Gravity Bed (<6% slope)
	Trenches

Distribution Media Type

x	Rock
	Chamber
	Gravelless
	Other: _____

Method of Distribution

x	Pressure
	Drop Boxes
	Dist. Box (<3% slope)
	Other: _____

6. TRENCH OR BED BOTTOM AREA

J. For trenches with 6 inches of wide wall beneath the pipe or 10" diameter gravelless pipe:

$$A \times H = \underline{450} \text{ gpd} \times \underline{1.27} \text{ ft/gpd} = \underline{NA} \text{ ft}^2$$

K. For trenches with 12 inches of sidewall:

$$A \times H \times 0.8 = \underline{450} \text{ gpd} \times \underline{1.27} \text{ ft/gpd} \times 0.8 = \underline{NA} \text{ ft}^2$$

L. For trenches with 18 inches of sidewall:

$$A \times H \times 0.66 = \underline{450} \text{ gpd} \times \underline{1.27} \text{ ft/gpd} \times 0.66 = \underline{NA} \text{ ft}^2$$

M. For trenches with 24 inches of sidewall:

$$A \times H \times 0.6 = \underline{450} \text{ gpd} \times \underline{1.27} \text{ ft/gpd} \times 0.6 = \underline{NA} \text{ ft}^2$$

N. For gravity beds with 6 or 12 inches of rock below the pipe;

$$1.5 \times A \times H = 1.5 \times \underline{450} \text{ gpd} \times \underline{1.27} \text{ ft/gpd} = \underline{NA} \text{ ft}^2$$

O. For pressure beds with 6 or 12 inches of rock below the pipe;

$$A \times H = \underline{450} \text{ gpd} \times \underline{1.27} \text{ ft/gpd} = \underline{571.5} \text{ ft}^2$$

7. Trench and Bed Dimensions

P. Select required square feet of bottom area required based on depth of rock/gravelless pipe or height of chamber slats

$$\underline{571.5} \text{ ft}^2$$

(must use 6" of rock square footage for beds)

Q. Select width of trench or bed 12.0 ft

(use 3' for gravelless pipe, width of chamber or width of excavation for rock in trenches & beds can not be wider the 25')

R. For trenches or pressure beds the lineal feet required = required square footage / width of bottom of trench or bed

$$\underline{571.5} \text{ ft}^2 / \underline{12.0} \text{ ft} = \underline{47.6} \text{ lineal feet}$$

S. For gravity beds the lineal feet required = required square footage / width of bed

$$\underline{571.5} \text{ ft}^2 / \underline{12.0} \text{ ft} = \underline{\hspace{2cm}} \text{ lineal feet}$$

8. Rock Sizing and Volume

T. Depth of media below pipe 0.5 ft

Cubic feet of rock needed = Rock depth below distribution pipe plus 0.5 foot times bottom area:

(Rock depth + 0.5 foot) x Area (J, K, L, M)

$$(\underline{0.5} \text{ ft} + 0.5 \text{ ft}) \times \underline{571.5} \text{ ft}^2 = \underline{571.5} \text{ ft}^3$$

Volume in cubic yards = volume in cubic feet divided by 27

$$\underline{571.5} / 27 = \underline{21.2} \text{ yd}^3$$

Weight of rock in tons = cubic yards times 1.4

$$\underline{21.2} \times 1.4 = \underline{29.6} \text{ tons}$$

Add in 10% extra for constructability = 1.1 X 29.6 = 32.6 tons

9. Layout

Select an appropriate scale; one inch = ft

Show pertinent property boundaries, rights-of-way, easements.

Show location of house, garage, driveway, and all other improvements, existing or proposed.

Show location and layout of sewage treatment system, well and dimensions of all elevations

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

[Signature] (signature) L-1919 (license #) 6/20/2021 (date)

Local Unit of Government Approval

_____ (signature) _____ (registration #) _____ (date)

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

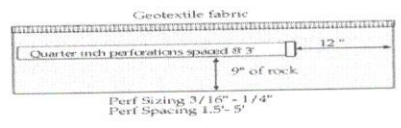
All boxed rectangles must be entered, the rest will be calculated.



1. Select number of perforated laterals: 4

2. Select perforation spacing = 3.2 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
 $\frac{48}{12} - 2 \text{ ft} = \underline{46} \text{ ft}$



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 = $\frac{46}{3.2} \text{ ft} = \underline{14}$

5. Select perforation size 7/32 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.
 $14 \text{ spaces} + 1 = \underline{15} \text{ perforations/lateral}$

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

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).
 $15 \text{ perfs/lat} \times 4 \text{ laterals} = \underline{60} \text{ perforations}$

B. Calculate the square footage per perforation.
 Recommended value is 6-10 sqft/perf. Does not apply to at-grades.

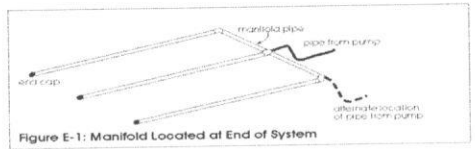
1. Rock bed area = rock width (ft) x rock length (ft)
 $\frac{12}{48} \text{ ft} \times \underline{48} \text{ ft} = \underline{576} \text{ ft}^2$

2. Square foot per perforation = Rock Bed Area / number of perfs (6)
 $\frac{576.0 \text{ ft}^2}{60 \text{ perfs}} = \underline{9.6} \text{ ft}^2 / \text{perf}$

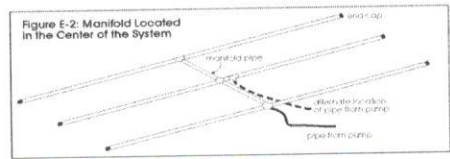
8. Determine required flow rate by multiplying the total number of perforations (6A) by flow per perforations (see figure E-6)
 $60 \text{ perfs} \times \underline{0.56} \text{ gpm / perfs} = \underline{33.6} \text{ gpm}$

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



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 = 1.5 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 = n/a inches

I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.
[Signature] (signature) L-1919 _____ (license #) 5/26/2021 (date)

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

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



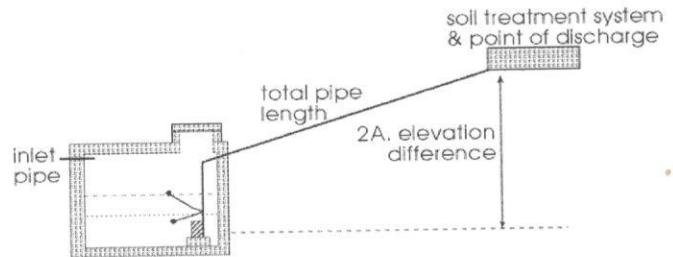
1. Determine pump capacity:

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: gpm



2. Determine Total Dynamic Head (TDH)

A. Elevation difference between pump and point of discharge.

feet

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

feet

Special Head Requirements	
Gravity Distribution	0ft
Pressure Distribution	5ft

C. Friction loss in supply pipe

1. Select pipe diameter 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 = ft/ 100 ft of pipe

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

ft x 1.25 = feet

4. Calculate total friction loss by multiplying friction loss (C2)

by the equivalent pipe length (C3) and divide by 100.

Friction Loss = ft/100ft X ft / 100 = feet

Flow Rate (gpm)	E-9 Friction Loss in Plastic Pipe per 100 ft		
	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

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

ft + ft + ft

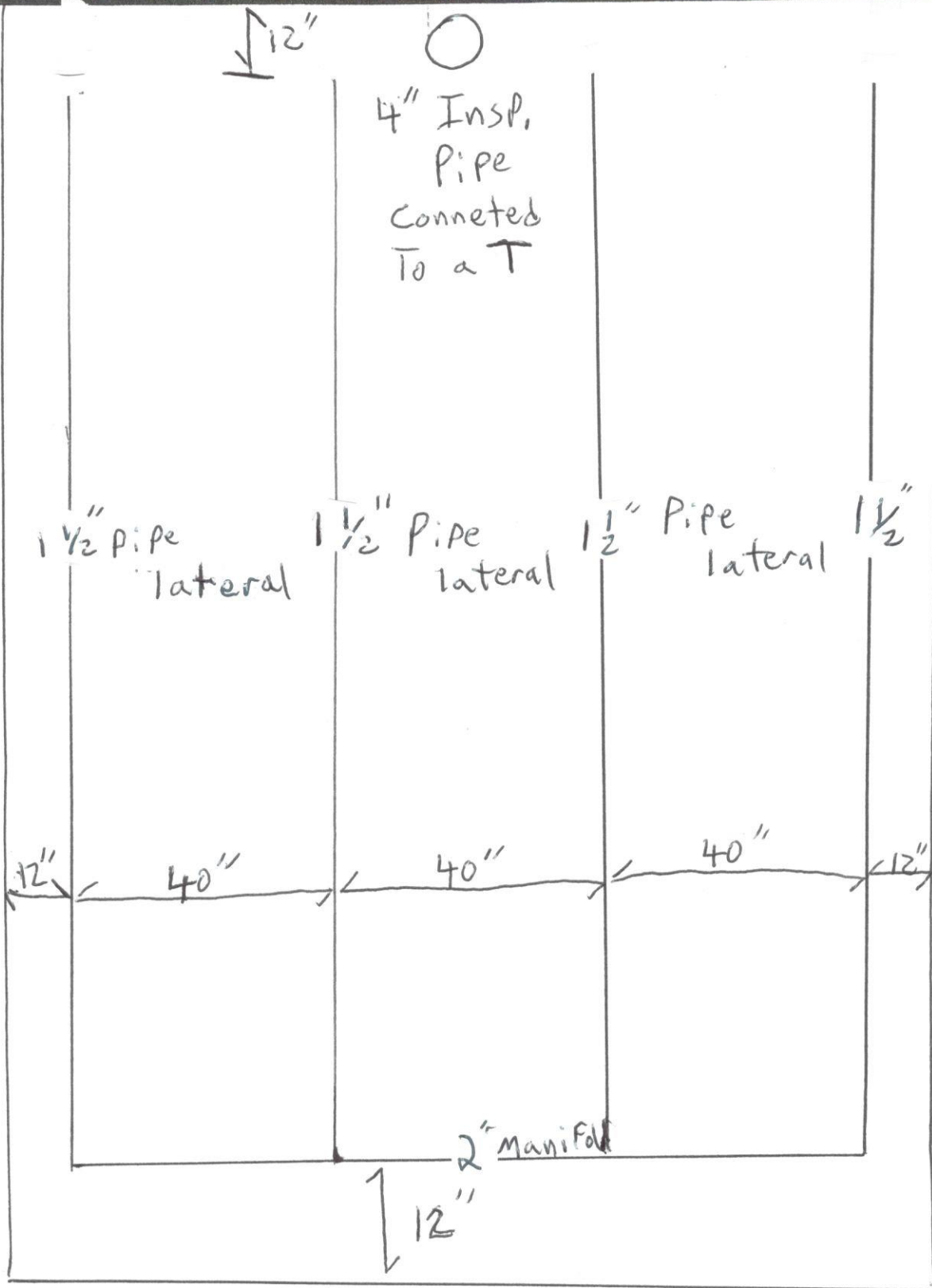
Total Head: feet

3. Pump Selection

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

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

(signature) (license #)



Layout of Pipes in The Pressure Rock Bed.

FARLEY SEWER SYSTEMS

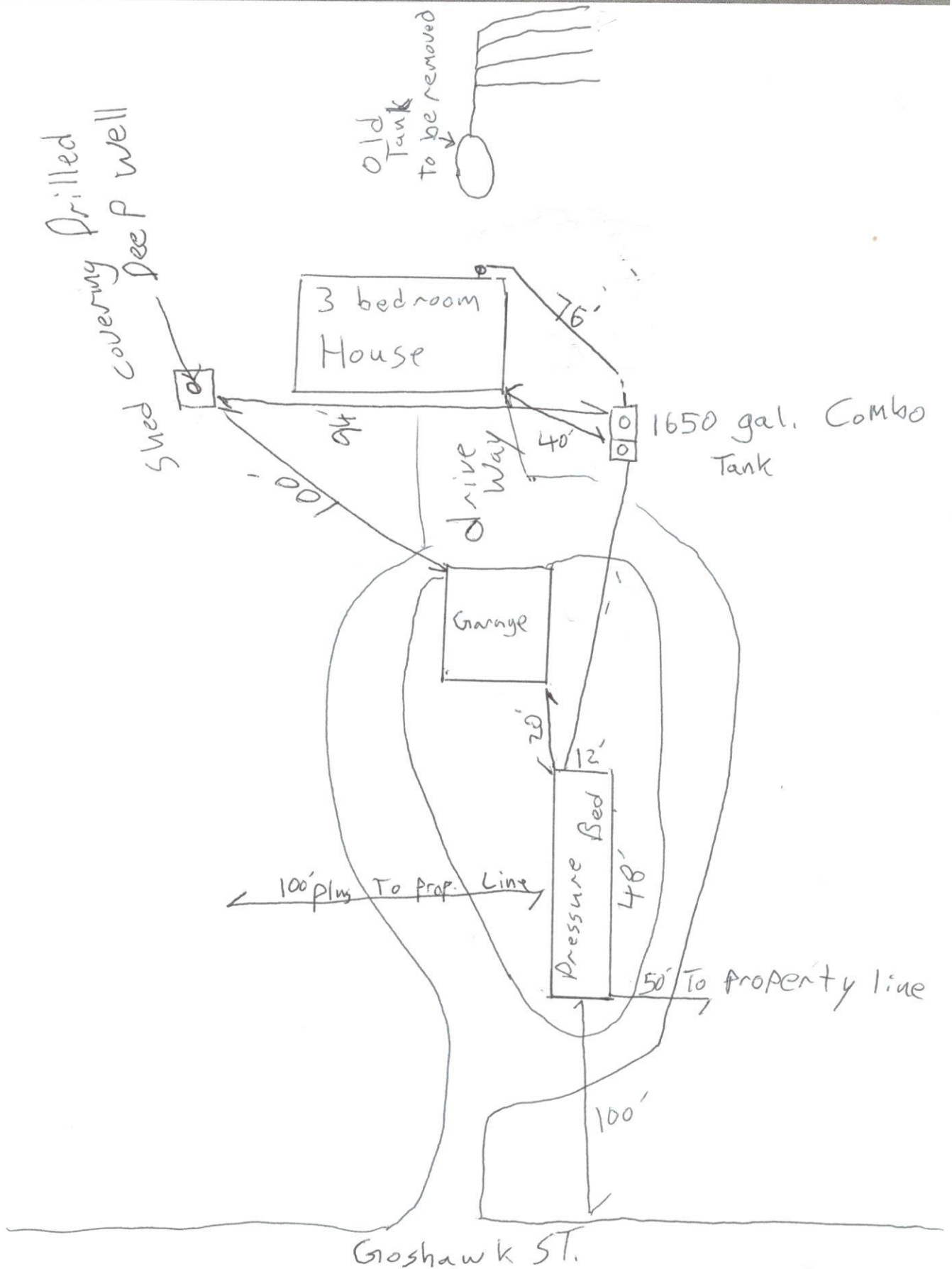
SEWER DESIGN & INSTALLATION

JAROLD R. FARLEY

P.O. Box 472
McGregor, MN 55760

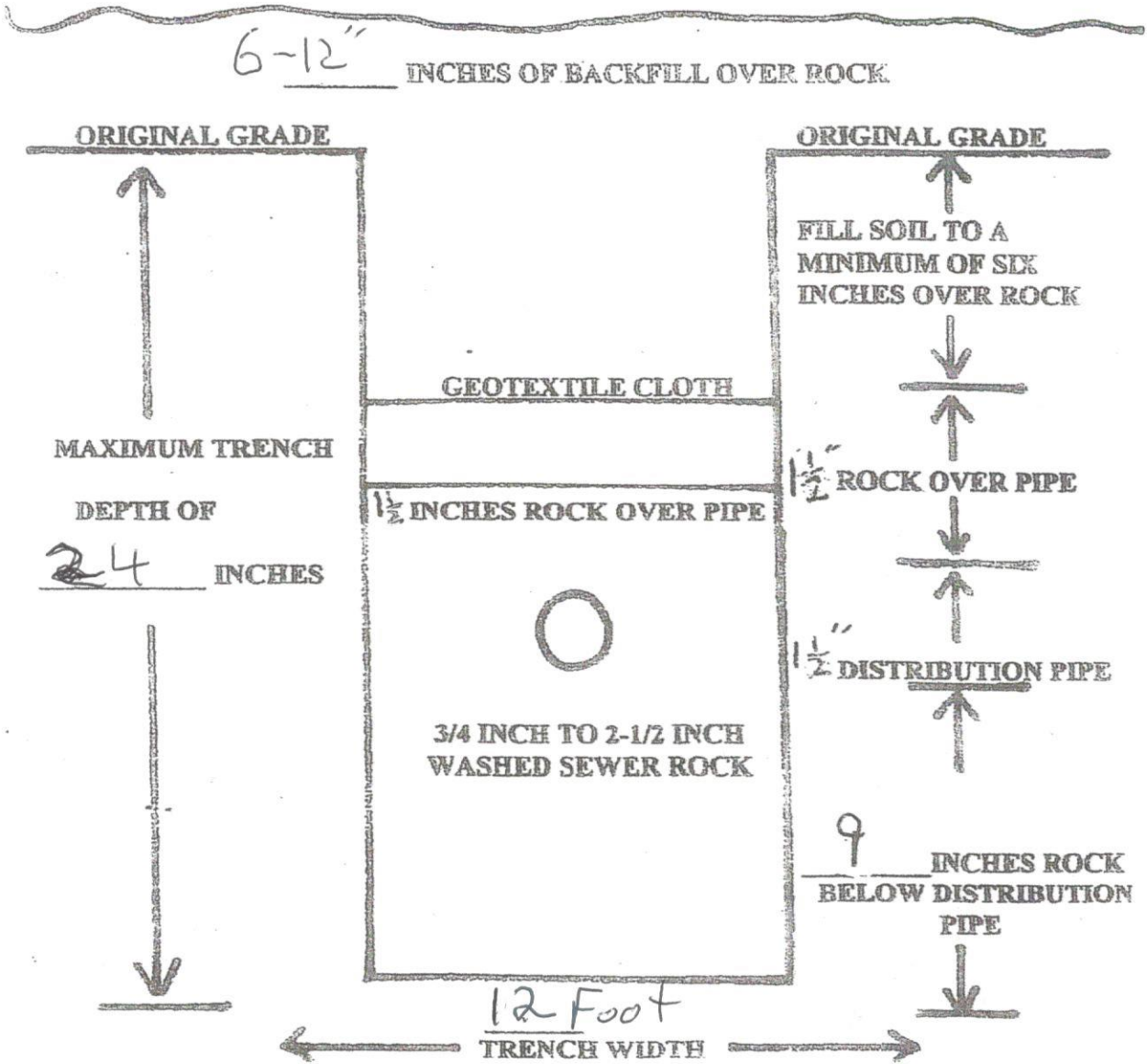
Bus. Lic. No. L1919
Reg. No. 4744

218-839-4737 cell



Pressure Bed Cross Section

FINISHED GRADE



Subsurface Sewage Treatment System Management Plan

Property Owner: Robert Merritt Phone: _____ Date: 6-20-2021
 Mailing Address: 15111 Goshawk St. City: McGregor Zip: 55760
 Site Address: 15111 Goshawk St. City: McGregor Zip: 55760

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.

(State requirements are based on MHI Rules Chapter 7000.2450, Subp. 2.8.3)


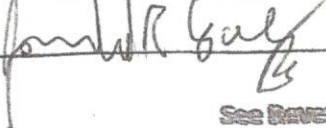
Homeowner Management Tasks

- 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

- 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:  Date: 6/20/21
 Designer Signature:  Date: 6-20-2021

See Reverse Side for Management Log

Maintenance Log

Activity	Date Accomplished
<i>Check frequently:</i>	
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 _____)	
<i>Check annually:</i>	
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: _____
