ONSITE SEWAGE TREATMENT PROGRAM

Preliminary Evaluation Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

1. Contact Information

v 04.01.2021

Property Owner/Client:	Kristie and Mike Fuqua	Date Completed:	6/18/2021
Site Address:	43281 110th Ave Tamarack, MN 55787	Project ID:	
Email:	fouquet@ymail.com	Phone:	
Mailing Address:	2284 Spanish Dr. Clearwater FL 33763	Alt Phone:	
Legal Description:			

Parcel ID:	05-0-017100	SEC:	48	TWP:	13	RNG:	22

2. Flow and General System Information

A. Client-Provided Information

Project Type: ☑ New Construction ☐ Replacement ☐ Expansion ☐ Repair

Project Use: ☑ Residential ☐ Other Establishment:

Residential use: # Bedrooms:	3	Dwelling Sq.ft.:	1456	Unfinished Sq. Ft.:	
# Adults:	2	# Children:		# Teenagers:	
In-home business (Y/N):	No	If yes, describe:			

Water-using devices: *(check all that apply)*

☐ Garbage Disposal/Grinder	☑ Dishwasher	☐ Hot Tub*
☐ Sewage pump in basement	☐ Water Softener*	☐ Sump Pump*
☐ Large Bathtub >40 gallons	☐ Iron Filter*	☐ Self-Cleaning Humidifier*
☑ Clothes Washing Machine	☐ High Eff. Furnace*	☐ Other:

* Clear water source - should not go into system

Additional current or future uses:

Anticipated non-domestic waste:

The above is complete & accurate: ***Client signature & date***

B. Designer-determined flow Information

Attach additional information as necessary.

Design Flow:	450	GPD		Anticipated Waste Type:	Residential		
BOD:	<170	mg/L	TSS	<60	mg/L	Oil & Grease	<25 mg/L

3. Preliminary Site Information

A. Water Supply Wells

#	Description	Mn. ID#	Well Depth (ft.)	Casing Depth (ft.)	Confining Layer	STA Setback	Source
1	To Be Determined						
2							
3							
4							

Additional Well Information: Well to be drilled. Proposed well location Staked

ONSITE SEWAGE TREATMENT PROGRAM

Preliminary Evaluation Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

Site within 200' of noncommunity transient well (Y/N)	No	Yes, source:	
Site within a drinking water supply management area (Y/N)	No	Yes, source:	
Site in Well Head Protection inner wellhead management zone (Y/N)	No	Yes, source:	
Buried water supply pipes within 50 ft of proposed system (Y/N)	No		
B. Site located in a shoreland district/area?	No	Yes, name:	
Elevation of ordinary high water level:	ft	Source:	
Classification:	Tank Setback: ft.	STA Setbk: ft.	
C. Site located in a floodplain?	No	Yes, Type(s):	N/A
Floodplain designation/elevation (10 Year):	N/A ft	Source:	N/A
Floodplain designation/elevation (100 Year):	N/A ft	Source:	N/A

D. Property Line Id / Source: ☐ Owner ☐ Survey ☑ County GIS ☐ Plat Map ☐ Other:

E. ID distance of relevant setbacks on map: ☐ Water ☐ Easements ☐ Well(s) ☐ Building(s) ☐ Property Lines ☐ OHWL ☐ Other:

4. Preliminary Soil Profile Information From Web Soil Survey (attach map & description)

Map Units: 502 Slope Range: 0-2 %

List landforms: Moraines

Landform position(s): Foot Slope

Parent materials: Till

Depth to Bedrock/Restrictive Feature: 80+ in Depth to Watertable: 6 in

Map Unit Ratings

Septic Tank Absorption Field- At-grade:	Extremely Limited
Septic Tank Absorption Field- Mound:	Very Limited
Septic Tank Absorption Field- Trench:	Extremely Limited

5. Local Government Unit Information

Name of LGU: Atkin County

LGU Contact:

LGU-specific setbacks:

LGU-specific design requirements:

LGU-specific installation requirements:

Notes:

ONSITE SEWAGE TREATMENT PROGRAM

Field Evaluation Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

1. Project Information

v 04.01.2021

Property Owner/Client: Kristie and Mike Fuqua | Project ID:

Site Address: 43281 110th Ave Tamarack, MN 55787 | Date Completed: 7/9/2021

2. Utility and Structure Information

Utility Locations Identified ☐ Gopher State One Call # ☐ Any Private Utilities:

Locate and Verify (*see Site Evaluation map*) ☐ Existing Buildings ☐ Improvements ☐ Easements ☑ Setbacks

3. Site Information

Vegetation type(s): Ag. Land | Landscape position: Foot Slope

Percent slope: 1 % | Slope shape: Linear, Linear | Slope direction: south

Describe the flooding or run-on potential of site:

Describe the need for Type III or Type IV system: Less than 12" of unsaturated soil

Note:

Proposed soil treatment area protected? (Y/N): Yes | If yes, describe: Staked

4. General Soils Information

Filled, Compacted, Disturbed areas (Y/N): No

If yes, describe:

Soil observations were conducted in the proposed system location (Y/N): Yes

A soil observation in the most limiting area of the proposed system (Y/N): Yes

Number of soil observations: 3 | Soil observation logs attached (Y/N): Yes

Percolation tests performed & attached (Y/N):

5. Phase I. Reporting Information

	Depth		Elevation		
Limiting Condition*:	3	in		ft	**Most Restrictive Depth Identified from List Below*
Periodically saturated soil:	3	in		ft	Soil Texture: Silt Loam
Standing water:		in		ft	Percolation Rate: min/inch
Bedrock:	80+	in		ft	Soil Hyd Loading Rate: 0.5 gpd/ft^2
Benchmark Elevation:	100.0	ft			Elevations and Benchmark on map? (Y/N): Yes

Benchmark Elevation Location: Center of road bed across from west end of proposed house

Differences between soil survey and field evaluation:

Site evaluation issues / comments:

Anticipated construction issues:

Soil Observation Log

Project ID:

v 04.01.2021

Client:	**Kristie and Mike Fuqua**	Location / Address:	43281 110th Ave Tamarack, MN 55787

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

Landscape Position: (select one)	Foot Slope	Slope %: 1.0	Slope shape: Linear, Linear	Elevation-relative to benchmark:
Vegetation:	Ag. Land	Soil survey map units:	502	Limiting Layer Elevation:
Weather Conditions/Time of Day:	sunny	Afternoon	Date	07/09/21
Observation #/Location:	#1	East end	Observation Type:	Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0-6	Silt Loam	<35%	10YR 3/2	2.5YR 3/6	Concentrations	T5	Granular	Strong	Friable
6-12	Fine Sandy Loam	<35%	10YR 4/3	5YR 5/8	Concentrations	S1	Granular	Moderate	Friable
12+	Fine Sandy Loam	<35%	10YR 5/4	5YR 4/6	Concentrations	S1	Platy	Moderate	Firm

Comments: Redox observed at 3" around 12" soil gets very firm with a weak platy shape and grade

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

Jason Weller	Jason Weller	2906	7-19-21
(Designer/Inspector)	(Signature)	(License #)	(Date)

ONSITE SEWAGE TREATMENT PROGRAM

Soil Observation Log

Project ID:

v 04.01.2021

Client:	**Kristie and Mike Fuqua**	Location / Address:	43281 110th Ave Tamarack, MN 55787

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

Landscape Position: (select one)	Foot Slope	Slope %: 1.0	Slope shape: Linear, Linear	Elevation-relative to benchmark:
Vegetation:	Ag. Land	Soil survey map units:	502	Limiting Layer Elevation:
Weather Conditions/Time of Day:	sunny	afternoon	Date	07/09/21
Observation #/Location:	#2	Center	Observation Type:	Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0-7	Silt Loam	<35%	10YR 3/2	2.5YR 3/6	Concentrations	T5	Granular	Moderate	Friable
7-9	Silt Loam	<35%	10YR 3/2	5YR 5/8	Concentrations	S1	Granular	Moderate	Friable
9+	Fine Sandy Loam	<35%	10YR 4/3	5YR 4/6	Concentrations	S1	Granular	Weak	Firm

Comments: Redox Observed at 2" subsoil around 12" gets very firm and weak platy shape.

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

Jason Weller	Jason DeVos	2906	7-19-21
(Designer/Inspector)	(Signature)	(License #)	(Date)

Soil Observation Log

Project ID:

v 04.01.2021

Client:	**Kristie and Mike Fuqua**	Location / Address:	43281 110th Ave Tamarack, MN 55787

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

Landscape Position: (select one)	Foot Slope	Slope %: 1.0	Slope shape Linear, Linear	Elevation-relative to benchmark:
Vegetation:	Ag. Land	Soil survey map units: 502		Limiting Layer Elevation:
Weather Conditions/Time of Day:	sunny	Afternoon	Date	07/09/21
Observation #/Location:	#3	West end	Observation Type:	Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0-6	Silt Loam	<35%	10YR 3/2	2.5YR 3/6	Concentrations	T5	Granular	Moderate	Friable
7-12	Fine Sandy Loam	<35%	10YR 4/3	5YR 5/8	Concentrations	S1	Granular	Moderate	Friable
12+	Fine Sandy Loam	<35%	10YR 5/4	5YR 4/6	Concentrations	S1	Granular	Weak	Friable

Comments: Redox observed at 3" Soil gets very firm at about 12" weakly platy

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

Jason Weller	Jason Weller	2906	7-19-21
(Designer/Inspector)	(Signature)	(License #)	(Date)

ONSITE SEWAGE TREATMENT PROGRAM

Soil Observation Log

Project ID:

v 04.01.2021

Client:	**Kristie and Mike Fuqua**	Location / Address:	43281 110th Ave Tamarack, MN 55787

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

Landscape Position: (select one)	Foot Slope	Slope %: 1.0	Slope shape	Linear, Linear	Elevation-relative to benchmark:
Vegetation:	Ag. Land	Soil survey map units:	502		Limiting Layer Elevation:
Weather Conditions/Time of Day:	sunny		afternoon	Date	07/09/21
Observation #/Location:	#1 Alternate site	East end		Observation Type:	Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0-6	Silt Loam	<35%	10YR 3/2	2.5YR 3/6	Concentrations	T5	Granular	Strong	Friable
6-12	Fine Sandy Loam	<35%	10YR 5/4	5YR 4/6	Concentrations	S1	Granular	Moderate	Friable

Comments: Redox at 3" very firm platy around 12"

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

Jason Weller	Jason Weller	2906	7-19-21
(Designer/Inspector)	(Signature)	(License #)	(Date)

Soil Observation Log

Project ID:

v 04.01.2021

Client:	**Kristie and Mike Fuqua**	Location / Address:	43281 110th Ave Tamarack, MN 55787

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

Landscape Position: (select one)	Foot Slope	Slope %: 1.0	Slope shape	Linear, Linear	Elevation-relative to benchmark:
Vegetation:	Ag. Land	Soil survey map units:	502		Limiting Layer Elevation:
Weather Conditions/Time of Day:	sunny		afternoon	Date	07/09/21
Observation #/Location:	#2 alternate site	West end		Observation Type:	Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0-6	Silt Loam	<35%	10YR 3/2	2.5YR 3/6	Concentrations	T5	Granular	Strong	Friable
6-12	Fine Sandy Loam	<35%	10YR 5/4	5YR 4/6	Concentrations	S1	Granular	Moderate	Friable

Comments: redox at 3" same as other pits. Gets very firm around 12".

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

Jason Weller	Jason Weller	2906	7-19-21
(Designer/Inspector)	(Signature)	(License #)	(Date)

ONSITE SEWAGE TREATMENT PROGRAM

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

1. PROJECT INFORMATION

v 04.01.2021

Property Owner/Client:	Kristie and Mike Fuqua	Project ID:	
Site Address:	43281 110th Ave Tamarack, MN 55787	Date:	07/13/21
Email Address:	fouquet@ymail.com	Phone:	

2. DESIGN FLOW & WASTE STRENGTH

Attach data / estimate basis for Other Establishments

Design Flow: 450 GPD Anticipated Waste Type: Residential

BOD: <170 mg/L TSS: <60 mg/L Oil & Grease: <25 mg/L

Treatment Level: C *Select Treatment Level C for residential septic tank effluent*

3. HOLDING TANK SIZING

Minimum Capacity: Residential =400 gal/bedroom, Other Establishment = Design Flow x 5.0, Minimum size 1000 gallons

Code Minimum **Holding Tank** Capacity: _____ Gallons in _____ Tanks or Compartments

Recommended **Holding Tank** Capacity: _____ Gallons in _____ Tanks or Compartments

Type of High Level Alarm: _____ (Set @ 75% tank capacity)

Comments: _____

4. SEPTIC TANK SIZING

A. Residential dwellings:

Number of Bedrooms (Residential): 3

Code Minimum **Septic Tank** Capacity: 1000 Gallons in 1 Tanks or Compartments

Recommended **Septic Tank** Capacity: 1000 Gallons in 1 Tanks or Compartments

Effluent Screen & Alarm (Y/N): Yes Model/Type: pl122

B. Other Establishments:

Waste received by: _____ _____ GPD x _____ Days Hyd. Retention Time

Code Minimum **Septic Tank** Capacity: _____ Gallons In _____ Tanks or Compartments

Recommended **Septic Tank** Capacity: _____ Gallons In _____ Tanks or Compartments

Effluent Screen & Alarm (Y/N): _____ Model/Type: _____

5. PUMP TANK SIZING

Pump Tank 1 Capacity (Minimum):	500 Gal	Pump Tank 2 Capacity (Minimum):	Gal
Pump Tank 1 Capacity (Recommended):	500 Gal	Pump Tank 2 Capacity (Recommended):	Gal
Pump 1	27.0 GPM Total Head 14.5 ft	Pump 2	GPM Total Head ft
Supply Pipe Dia.	2.00 in Dose Vol: 75.0 gal	Supply Pipe Dia.	Dose Vol: Gal

University of Minnesota Onsite Sewage Treatment Program

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

6. SYSTEM AND DISTRIBUTION TYPE

Project ID:

Soil Treatment Type:	Mound	Distribution Type:	Pressure Distribution-Level
Elevation Benchmark:	100 ft	Benchmark Location:	Center of road bed across from w
MPCA System Type:	Type III	Distribution Media:	Rock
Type III/IV Details:	less than 12" of unsaturated soil		

7. SITE EVALUATION SUMMARY:

Describe Limiting Condition: Redoximorphic Features/Saturated Soils

Layers with >35% Rock Fragments? (yes/no) No If yes, describe below: % rock and layer thickness, amount of soil credit and any additional information for addressing the rock fragments in this design.

Note:

	Depth		Depth		Elevation of Limiting Condition	
Limiting Condition:	3	inches	0.3	ft	98.00	ft
Minimum Req'd Separation:	36	inches	3.0	ft		
			Elevation			
Code Max System Depth:	Mound	inches	-2.8	ft	101.00	ft

Critical for system compliance

This is the maximimum depth to the bottom of the distribution media for required separation. Negative Depth (ft) means it must be a mound.

Soil Texture:	Silt Loam		
Soil Hyd. Loading Rate:	0.50 GPD/ft^2	Percolation Rate:	MPI
Contour Loading Rate:	10	Note:	
Measured Land Slope:	1.0 %	Note:	
Comments:			

8. SOIL TREATMENT AREA DESIGN SUMMARY

Trench:

Dispersal Area	ft^2	Sidewall Depth	in	Trench Width	ft
Total Lineal Feet	ft	No. of Trenches		Code Max. Trench Depth	in
Contour Loading Rate	ft	Minimum Length	ft	Designed Trench Depth	in

Bed:

Dispersal Area	ft^2	Sidewall Depth	in	Maximum Bed Depth	in
Bed Width	ft	Bed Length	ft	Designed Bed Depth	in

Mound:

Dispersal Area	#VALUE!	ft^2	Bed Length	37.5	ft	Bed Width	10.0 ft
Absorption Width	24.0	ft	Clean Sand Lift	3.0	ft	Berm Width (0-1%)	ft
Upslope Berm Width		ft	Downslope Berm		ft	Endslope Berm Width	19.4 ft
Total System Length	76.3	ft	System Width	48.5	ft	Contour Loading Rate	12.0 gal/ft

ONSITE SEWAGE TREATMENT PROGRAM

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

Project ID:

At-Grade:

Bed Width		ft	Bed Length		ft	Finished Height	ft
Contour Loading Rate		gal/ft	Upslope Berm		ft	Downslope Berm	ft
Endslope Berm		ft	System Length		ft	System Width	ft

Level & Equal Pressure Distribution

No. of Laterals	3		Perforation Spacing	3	ft	Perforation Diameter	1/4 in
Lateral Diameter	1.50	in	Min Dose Volume	45	gal	Max Dose Volume	113 gal

Non-Level and Unequal Pressure Distribution

	Elevation (ft)	Pipe Size (in)	Pipe Volume (gal/ft)	Pipe Length (ft)	Perf Size (in)	Spacing (ft)	Spacing (in)
Lateral 1							
Lateral 2							
Lateral 3							
Lateral 4							
Lateral 5							
Lateral 6							

Minimum Dose Volume _____ gal

Maximum Dose Volume _____ gal

9. Additional Info for At-Risk, HSW or Type IV Design

A. Starting BOD Concentration = Design Flow X Starting BOD (mg/L) X 8.35 ÷ 1,000,000

_____ gpd X _____ mg/L X 8.35 ÷ 1,000,00 = _____ lbs. BOD/day

B. Target BOD Concentration = Design Flow X Target BOD (mg/L) X 8.35 ÷ 1,000,000

_____ gpd X _____ mg/L X 8.35 ÷ 1,000,00 = _____ lbs. BOD/day

Lbs. BOD To Be Removed: _____

PreTreatment Technology: _____ *Must Meet or Exceed Target

Disinfection Technology: _____ *Required for Levels A & B

C. Organic Loading to Soil Treatment Area:

_____ mg/L X _____ gpd x 8.35 ÷ 1,000,000 ÷ _____ ft^2 = _____ lbs./day/ft^2

10. Comments/Special Design Considerations:

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

Jason Weller	Jason Weller	2906	7-19-21
(Designer)	(Signature)	(License #)	(Date)

Onsite Sewage Treatment Program

Mound Design Worksheet
≥1% Slope

MINNESOTA POLLUTION CONTROL AGENCY

1. SYSTEM SIZING: Project ID: v 04.01.2021

A. Design Flow:	450	GPD
B. Soil Loading Rate:	0.50	GPD/ft²
C. Depth to Limiting Condition	0.3	ft
D. Percent Land Slope:	1.0	%
E. Design Media Loading Rate:	1.2	GPD/ft²
F. Mound Absorption Ratio:	2.40	

Table I
MOUND CONTOUR LOADING RATES:

Measured Perc Rate	* OR *	Texture - derived mound absorption ratio	*	Contour Loading Rate:
≤ 60mpi		1.0, 1.3, 2.0, 2.4, 2.6	*	≤12
61-120 mpi	* OR *	5.0	*	≤12
≥ 120 mpi*		>5.0*	*	≤6*

TABLE IXa

LOADING RATES FOR DETERMINING BOTTOM ABSORPTION AREA AND ABSORPTION RATIOS USING PERCOLATION TESTS

Percolation Rate (MPI)	Treatment Level C		Treatment Level A, A-2, B,	
	Absorption Area Loading Rate (gpd/ft²)	Mound Absorption Ratio	Absorption Area Loading Rate (gpd/ft²)	Mound Absorption Ratio
<0.1	-	1	-	1
0.1 to 5	1.2	1	1.6	1
0.1 to 5 (fine sand and loamy fine sand)	0.6	2	1	1.6
6 to 15	0.78	1.5	1	1.6
16 to 30	0.6	2	0.78	2
31 to 45	0.5	2.4	0.78	2
46 to 60	0.45	2.6	0.6	2.6
61 to 120	-	5	0.3	5.3
>120	-	-	-	-

*Systems with these values are not Type I systems. Contour Loading Rate (linear loading rate) is a recommended value.

2. DISPERSAL MEDIA SIZING

A. Calculate Dispersal Bed Area: Design Flow ÷ Design Media Loading Rate

450 GPD ÷ 1.2 GPD/ft² = 375 ft²

If a larger dispersal media area is desired, enter size: _____ ft²

B. Enter Dispersal Bed Width: 10.0 ft *Can not exceed 10 feet*

C. Calculate Contour Loading Rate: Bed Width X Design Media Loading Rate

10 ft² X 1.2 GPD/ft² = 12.0 gal/ft *Can not exceed Table 1*

D. Calculate Minimum Dispersal Bed Length: Dispersal Bed Area ÷ Bed Width

375 ft² ÷ 10.0 ft = 37.5 ft

If a larger dispersal media Length is desired, enter size: _____ ft

3. ABSORPTION AREA SIZING

A. Calculate Absorption Width: Bed Width X Mound Absorption Ratio

10.0 ft X 2.4 = 24.0 ft

B. For slopes >1%, the Absorption Width is measured downhill from the upslope edge of the Bed.

Calculate Downslope Absorption Width: Absorption Width - Bed Width

24.0 ft - 10.0 ft = 14.0 ft

4. DISTRIBUTION MEDIA: Project ID:

Select Dispersal Media: Rock Enter Either A. or B.

A. Rock Depth Below Distribution Pipe

6 in

B. Registered Media _____

Registered Media Depth _____ in

Check registered product information for specific application details and design

Specific Media Comments:

6. MOUND SIZING

Project ID:

A. Clean Sand Lift: Required Separation - Depth to Limiting Condition = Clean Sand Lift (1 ft minimum)

3.0 ft - 0.3 ft = 2.8 ft Design Sand Lift (optional): 3 ft

B. Upslope Height: Clean Sand Lift + Depth of Media +Depth to Cover Pipe+ Depth of Cover (1 ft)

3.0 ft + 0.50 ft + 0.25 ft + 1.0 ft = 4.8 ft

Land Slope %		0	1	2	3	4	5	6	7	8	9	10	11	12
Upslope Berm Ratio	3:1	3.00	2.91	2.83	2.75	2.68	2.61	2.54	2.48	2.42	2.36	2.31	2.26	2.21
	4:1	4.00	3.85	3.70	3.57	3.45	3.33	3.23	3.12	3.03	2.94	2.86	2.78	2.70

C. Select Upslope Berm Multiplier (based on land slope): 3.85

D. Calculate Upslope Berm Width: Multiplier X Upslope Mound Height

3.85 ft X 4.8 ft = 18.3 ft

E. Calculate Drop in Elevation Under Bed: Bed Width X Land Slope ÷ 100 = Drop (ft)

10.0 ft X 1.0 % ÷ 100 = 0.10 ft

F. Calculate Downslope Mound Height: Upslope Height + Drop in Elevation

4.8 ft + 0.10 ft = 4.9 ft

Land Slope %		0	1	2	3	4	5	6	7	8	9	10	11	12
Downslope Berm Ratio	3:1	3.00	3.09	3.19	3.30	3.41	3.53	3.66	3.80	3.95	4.11	4.29	4.48	4.69
	4:1	4.00	4.17	4.35	4.54	4.76	5.00	5.26	5.56	5.88	6.25	6.67	7.14	7.69

G. Select Downslope Berm Multiplier (based on land slope): 4.17

H. Calculate Downslope Berm Width: Downslope Multiplier X Downslope Height

4.17 x 4.9 ft = 20.2 ft

I. Calculate Minimum Berm to Cover Absorption Area: Downslope Absorption Width + 4 feet

14.0 ft + 4 ft = 18.0 ft

J. Design Downslope Berm = greater of 4H and 4I: 20.2 ft

K. Select Endslope Berm Multiplier: 4.00 *(usually 3.0 or 4.0)*

L. Calculate Endslope Berm X Downslope Mound Height = Endslope Berm Width

4.00 ft X 4.9 ft = 19.4 ft

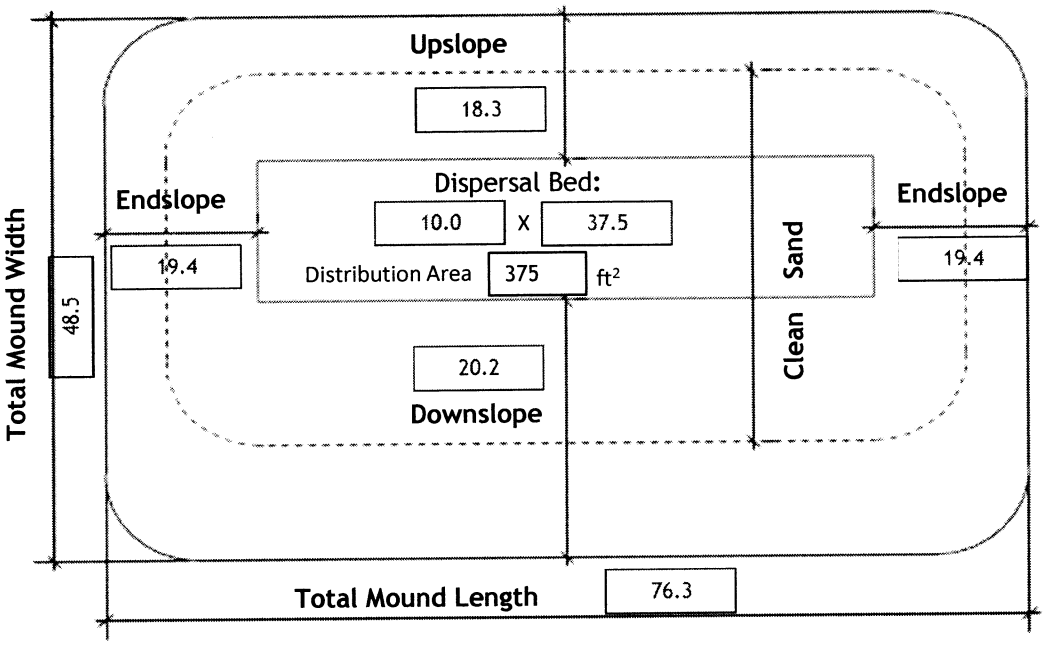
M. Calculate Mound Width: Upslope Berm Width + Bed Width + Downslope Berm Width

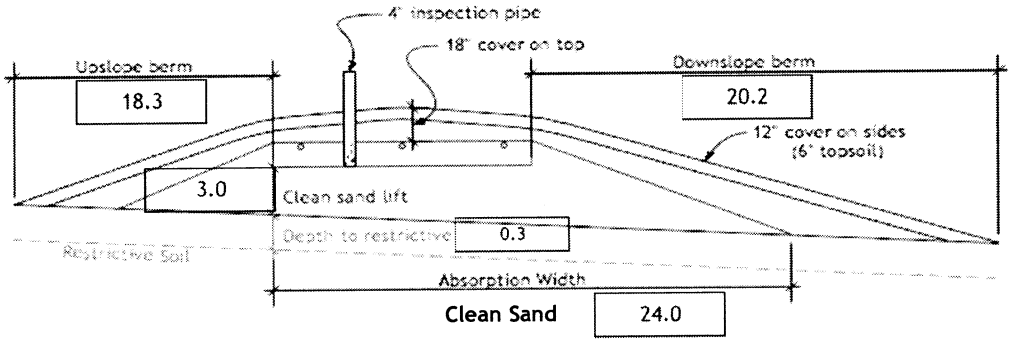
18.3 ft + 10.0 ft + 20.2 ft = 48.5 ft

N. Calculate Mound Length: Endslope Berm Width + Bed Length + Endslope Berm Width

19.4 ft + 37.5 ft + 19.4 ft = 76.3 ft

7. MOUND DIMENSIONS (Feet) Project ID:





Required Separation:	36 (in)	Distribution Media:	Rock
Manifold Connection:	End	Media Depth:	6.0 (in)
Perforation Size:	1/4 (in)	Perforation Spacing:	36.0 (in)

If Split and Non-Level Pressure Distribution Used: See Non-Level Pressure Distribution Form

Comments:

ONSITE SEWAGE TREATMENT PROGRAM

Mound Materials Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

Project ID:

v 04.01.2021

A. Rock *Volume*: (Rock Below Pipe + Rock to cover pipe (*pipe outside dia + ~2 inch*)) X *Bed Length* X *Bed Width* = *Volume*

(6 in + 3.0 in) ÷ 12 X 37.5 ft X 10.0 ft = 281.3 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 281.3 ft^3 ÷ 27 = 10.4 yd^3

Add 30% for constructability: 10.4 yd^3 X 1.3 = 13.5 yd^3

B. Calculate *Clean Sand Volume:*

Volume Under Rock bed: *Average Sand Depth* x *Media Width* x *Media Length* = cubic feet

3.0 ft X 10.0 ft X 38 ft = 1140 ft^3

For a Mound on a slope from 0-1%

Volume from Length = ((Upslope Mound Height - 1) X Absorption Width Beyond Bed X Media Bed Length)

(ft - 1) X X ft =

Volume from Width = ((Upslope Mound Height - 1) X Absorption Width Beyond Bed X Media Bed Width)

(ft - 1) X X ft =

Total Clean Sand Volume: *Volume from Length + Volume from Width + Volume Under Media*

ft^3 + ft^3 + ft^3 = ft^3

For a Mound on a slope greater than 1%

Upslope Volume: ((*Upslope Mound Height - 1*) x 3 x *Bed Length*) ÷ 2 = cubic feet

((4.8 ft - 1) X 3.0 ft X 37.5) ÷ 2 = 210.9 ft^3

Downslope Volume: ((*Downslope Height - 1*) x Downslope Absorption Width x *Media Length*) ÷ 2 = cubic feet

((4.9 ft - 1) X 14.0 ft X 37.5) ÷ 2 = 1010.6 ft^3

Endslope Volume: (*Downslope Mound Height - 1*) x 3 x *Media Width* = cubic feet

(4.9 ft - 1) X 3.0 ft X 10.0 ft = 115.5 ft^3

Total Clean Sand Volume: *Upslope Volume + Downslope Volume + Endslope Volume + Volume Under Media*

210.9 ft^3 + 1010.6 ft^3 + 115.5 ft^3 + 1140.0 ft^3 = 2477.1 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 2477.1 ft^3 ÷ 27 = 91.7 yd^3

Add 30% for constructability: 91.7 yd^3 X 1.3 = 119.3 yd^3

C. Calculate *Sandy Berm Volume:*

Total Berm Volume (approx): ((Avg. Mound Height - 0.5 ft topsoil) x Mound Width x Mound Length) ÷ 2

(4.8 - 0.5)ft X 48.5 ft X 76.3) ÷ 2 = 7958.2 ft^3

Total Mound Volume - Clean Sand volume -Rock Volume = cubic feet

7958.2 ft^3 - 2477.1 ft^3 - 281.3 ft^3 = 5199.8 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 5199.8 ft^3 ÷ 27 = 192.6 yd^3

Add 30% for constructability: 192.6 yd^3 x 1.3 = 250.4 yd^3

D. Calculate *Topsoil Material Volume: Total Mound Width X Total Mound Length X .5 ft*

48.5 ft X 76.3 ft X 0.5 ft = 1850.7 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 1850.7 ft^3 ÷ 27 = 68.5 yd^3

Add 30% for constructability: 68.5 yd^3 x 1.3 = 89.1 yd^3

Pressure Distribution Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

Project ID: v 04.01.2021

1. Media Bed Width: 10 ft

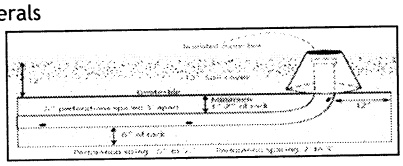
2. Minimum Number of Laterals in system/zone = Rounded up number of [(Media Bed Width - 4) ÷ 3] + 1.

[(10 - 4) ÷ 3] + 1 = 3 laterals *Does not apply to at-grades*

3. Designer Selected *Number of Laterals*: 3 laterals
Cannot be less than line 2 (Except in at-grades)

4. Select *Perforation Spacing*: 3.00 ft

5. Select *Perforation Diameter Size:* 1/4 in



6. *Length of Laterals* = Media Bed Length - 2 Feet.

36.0 - 2ft = 34.0 ft *Perforation can not be closer then 1 foot from edge.*

7. Determine the *Number of Perforation Spaces*. Divide the *Length of Laterals* by the *Perforation Spacing* and round down to the nearest whole number.

Number of Perforation Spaces = 34.0 ft ÷ 3.0 ft = 11 Spaces

8. *Number of Perforations per Lateral* is equal to 1.0 plus the *Number of Perforation Spaces*. Check table below to verify the number of perforations per lateral guarantees less than a 10% discharge variation. The value is double with a center manifold.

Perforations Per Lateral = 11 Spaces + 1 = 12 Perfs. Per Lateral

Maximum Number of Perforations Per Lateral to Guarantee <10% Discharge Variation

1/4 Inch Perforations

Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	10	13	18	30	60
2½	8	12	16	28	54
3	8	12	16	25	52

7/32 Inch Perforations

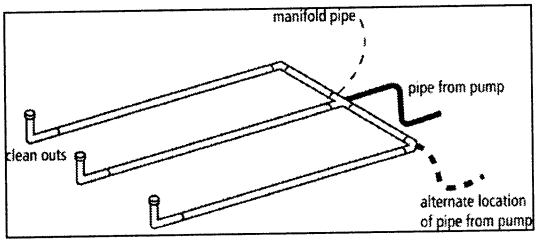
Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	11	16	21	34	68
2½	10	14	20	32	64
3	9	14	19	30	60

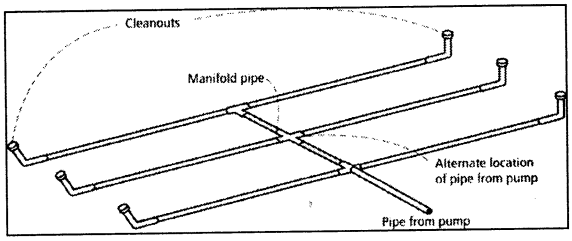
3/16 Inch Perforations

Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	12	18	26	46	87
2½	12	17	24	40	80
3	12	16	22	37	75

1/8 Inch Perforations

Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	21	33	44	74	149
2½	20	30	41	69	135
3	20	29	38	64	128





9. *Total Number of Perforations* equals the *Number of Perforations per Lateral* multiplied by the *Number of Perforated Laterals.*

12 Perf. Per Lat. X 3 Number of Perf. Lat. = 36 Total Number of Perf.

10. Spacing of laterals; Must be greater than 1 foot and no more than 3 feet: 3.0 ft

11. Select *Type of Manifold Connection* (End or Center): End

12. *Select Lateral Diameter (See Table)*: 1.50 in

Pressure Distribution Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

13. Calculate the *Square Feet per Perforation.*

Recommended value is 4-11 ft2 per perforation, Does not apply to At-Grades

a. *Bed Area* = Bed Width (ft) X Bed Length (ft)

10	ft	X	36	ft =	360	ft^2

b. *Square Foot per Perforation* = *Bed Area* ÷ by the *Total Number of Perfs*

360	ft^2 ÷		36	perf =	10.0	ft^2/perf

14. Select *Minimum Average Head*: 1.0 ft

15. Select *Perforation Discharge* based on Table: 0.74 GPM per Perf

16. *Flow Rate* = *Total Number of Perfs X Perforation Discharge.*

36	Perfs	X	0.74	GPM per Perforation =	27 GPM

17. *Volume of Liquid Per Foot of Distribution Piping (Table II)*: 0.110 Gallons/ft

18. *Volume of Distribution Piping* =

= [*Number of Perforated Laterals* X *Length of Laterals* X (Volume of Liquid Per Foot of Distribution Piping]

3	X		34	ft	X	0.110	gal/ft =	11.2 Gallons

19. Minimum Delivered Volume = Volume of Distribution Piping X 4

11.2	gals	X	4	=	44.9 Gallons

Perforation Discharge (GPM)

Head (ft)	Perforation Diameter 1/8	5/32	3/16	1/4
1.0	0.18	0.41	0.56	0.74
1.5	0.22	0.51	0.69	0.9
2.0	0.26	0.59	0.80	1.04
2.5	0.29	0.65	0.89	1.17
3.0	0.32	0.72	0.98	1.28
4.0	0.37	0.83	1.13	1.47
5.0	0.41	0.93	1.26	1.65

1 foot	Dwellings with 3/16 inch to 1/4 inch perforations
2 feet	Dwellings with 1/8 inch perforations
	Other establishments and MSTS with 3/16 inch to 1/4 inch perforations
5 feet	Other establishments and MSTS with 1/8 inch perforations

Table II
Volume of Liquid in Pipe

Pipe Diameter (inches)	Liquid Per Foot (Gallons)
1	0.045
1.25	0.078
1.5	0.110
2	0.170
3	0.380
4	0.661

Comments/Special Design Considerations:

Basic Pump Selection Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

1. PUMP CAPACITY Project ID: v 04.01.2021

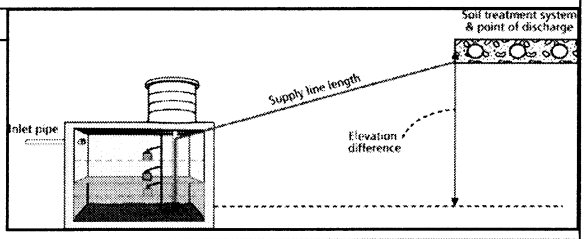
Pumping to Gravity or Pressure Distribution: Pressure

A. If pumping to gravity enter the gallon per minute of the pump: _____ GPM *(10 - 45 gpm)*

B. If pumping to a pressurized distribution system: 27.0 GPM

C. Enter pump description: Demand Dosing

2. HEAD REQUIREMENTS



A. Elevation Difference between pump and point of discharge: 9 ft

B. Distribution Head Loss: 5 ft

C. Additional Head Loss: _____ ft (due to special equipment, etc.)

Distribution Head Loss	
Gravity Distribution = 0ft	
Pressure Distribution based on Minimum Average Head Value on Pressure Distribution Worksheet:	
Minimum Average Head	**Distribution Head Loss**
1ft	5ft
2ft	6ft
5ft	10ft

D. 1. Supply Pipe Diameter: 2.0 in

2. Supply Pipe Length: 20 ft

E. **Friction Loss in Plastic Pipe per 100ft** from Table I:

Friction Loss = 1.95 ft per 100ft of pipe

F. Determine *Equivalent Pipe Length* from pump discharge to soil dispersal area discharge point. Estimate by adding 25% to supply pipe length for fitting loss.
Supply Pipe Length X 1.25 = *Equivalent Pipe Length*

20 ft X 1.25 = 25.0 ft

Table I.Friction Loss in Plastic Pipe per 100ft

Flow Rate (GPM)	Pipe Diameter (inches)			
	1	1.25	1.5	2
10	9.1	3.1	1.3	0.3
12	12.8	4.3	1.8	0.4
14	17.0	5.7	2.4	0.6
16	21.8	7.3	3.0	0.7
18		9.1	3.8	0.9
20		11.1	4.6	1.1
25		16.8	6.9	1.7
30		23.5	9.7	2.4
35			12.9	3.2
40			16.5	4.1
45			20.5	5.0
50				6.1
55				7.3
60				8.6
65				10.0
70				11.4
75				13.0
85				16.4
95				20.1

G. Calculate *Supply Friction Loss* by multiplying *Friction Loss Per 100ft* by the *Equivalent Pipe Length* and divide by 100.

Supply Friction Loss =

1.95 ft per 100ft X 25.0 ft ÷ 100 = 0.5 ft

H. *Total Head* requirement is the sum of the *Elevation Difference* + Distribution Head Loss, + Additional Head Loss + Supply Friction Loss

9.0 ft + 5.0 ft + _____ ft + 0.5 ft = 14.5 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **27.0** GPM with at least **14.5** feet of total head.

Comments:

Goulds PE31 Pump

Onsite Sewage Treatment Program

Pump Tank Design Worksheet (Demand Dose)

MINNESOTA POLLUTION CONTROL AGENCY

DETERMINE TANK CAPACITY AND DIMENSIONS | Project ID: | v 04.01.2021

1. A. *Design Flow (Design Sum.1A)*: 450 GPD — C. Tank Use: **Dosing**
   B. Min. required pump tank capacity: 500 Gal — D. Recommended pump tank capacity: 500 Gal

2. A. Tank Manufacturer: Del Zotto — B. Tank Model: 1000/500 combo
   C. Capacity from manufacturer: 500 Gallons
   D. Gallons per inch from manufacturer: 11.4 Gallons per inch
   E. Liquid depth of tank from manufacturer: 44.0 inches

Note: Design calculations are based on this specific tank. Substituting a different tank model will change the pump float or timer settings. Contact designer if changes are necessary.

DETERMINE DOSING VOLUME

3 Calculate *Volume to Cover Pump* (The inlet of the pump must be at least 4-inches from the bottom of the pump tank & 2 inches of water covering the pump is recommended)

(Pump and block height + 2 inches) X *Gallons Per Inch*

(17 in + 2 inches) X 11.4 Gallons Per Inch = 217 Gallons

4 ***Minimum** Delivered Volume* = 4 X Volume of Distribution Piping:

-Item 18 of the Pressure Distribution or Item 11 of Non-level 45 **Gallons (Minimum dose)** 3.9 inches/dose

5 Calculate ***Maximum** Pumpout Volume* (25% of Design Flow)

Design Flow: 450 GPD X 0.25 = 113 **Gallons (Maximum dose)** 9.9 inches/dose

6 *Select a pumpout volume that meets both Minimum and Maximum:* 75 Gallons

7 Calculate *Doses Per Day* = Design Flow ÷ *Delivered Volume*

450 gpd ÷ 75 gal = 6.00 *Doses*

8 Calculate Drainback:

A. *Diameter of Supply Pipe* = 2 inches

B. Length of Supply Pipe = 20 feet

C. *Volume of Liquid Per Lineal Foot of Pipe* = 0.170 Gallons/ft

D. *Drainback = Length of Supply Pipe X Volume of Liquid Per Lineal Foot of Pipe*

20 ft X 0.170 gal/ft = 3.4 Gallons

9. *Total Dosing Volume = Delivered Volume* plus *Drainback*

75 gal + 3.4 gal = 78 Gallons

10. Minimum Alarm Volume = Depth of alarm (2 or 3 inches) X gallons per inch of tank

3 in X 11.4 gal/in = 34.2 Gallons

Volume of Liquid in Pipe	
Pipe Diameter (inches)	**Liquid Per Foot (Gallons)**
1	0.045
1.25	0.078
1.5	0.110
2	0.170
3	0.380
4	0.661

DEMAND DOSE FLOAT SETTINGS

11. Calculate *Float Separation Distance* using *Dosing Volume*.

Total Dosing Volume /Gallons Per Inch

78 gal ÷ 11.4 gal/in = 6.9 Inches

12. Measuring from bottom of tank:

A. *Distance to set Pump Off Float* = Pump + block height + 2 inches

17 in + 2 in = 19 Inches

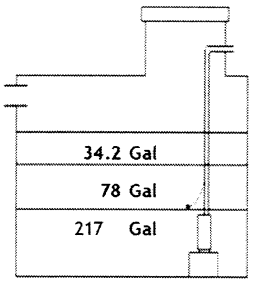
B. *Distance to set Pump On Float=Distance to Set Pump-Off Float + Float Separation Distance*

19 in + 6.9 in = 26 Inches

C. *Distance to set Alarm Float = Distance to set Pump-On Float + Alarm Depth* (2-3 inches)

26 in + 3.0 in = 29 Inches

Inches for Dose:	6.9	in
Alarm Depth	28.9	in
Pump On	25.9	in
Pump Off	19.0	in



FIELD EVALUATION SHEET

PRELIMINARY EVALUATION DATE 6/18/21, FIELD EVALUATION DATE 7/9/21
PROPERTY OWNER: Mike, Kristie Fuqua PHONE
ADDRESS: 2284 Spanish Dr. [redacted] CITY,STATE,ZIP: Clearwater FL, 33763
LEGAL DESCRIPTION:
PIN# 05-0-017100 SEC 48 T 13 R 22 TWP NAME Clark
FIRE# LAKE/RIVER LAKE CLASS OHWL FT.

DESCRIPTION OF SOIL TREATMENT AREAS

	AREA #1	AREA #2
DISTURBED AREAS	YES NO ✓	YES NO ✓
COMPACTED AREAS	YES NO ✓	YES NO ✓
FLOODING	YES NO ✓	YES NO ✓
RUN ON POTENTIAL	YES NO ✓	YES NO ✓
SLOPE %	1	1
DIRECTION OF SLOPE	S	S
LANDSCAPE POSITION	FootslopE	
VEGETATION TYPES	Grass Fields	

REFERENCE BM ELEV. FT.
REFERENCE BM DESCRIPTION

DEPTH TO STANDING WATER OR MOTTLED SOIL: BORING# 1 3", 1A 2", 2 3", 2A 3"

BOTTOM ELEVATION--FIRST TRENCH OR BOTTOM OF ROCK BED: #1 101.3 FT., #2 101.3 FT.

SOIL SIZING FACTOR: SITE # 1 .5, SITE #2 .5

CONSTRUCTION RELATED ISSUES: None

LIC# 2906 SITE EVALUATOR SIGNATURE: Jason Weller
SITE EVALUATOR NAME: Jason Weller TELEPHONE# 218-310-3819
LUG REVIEW DATE

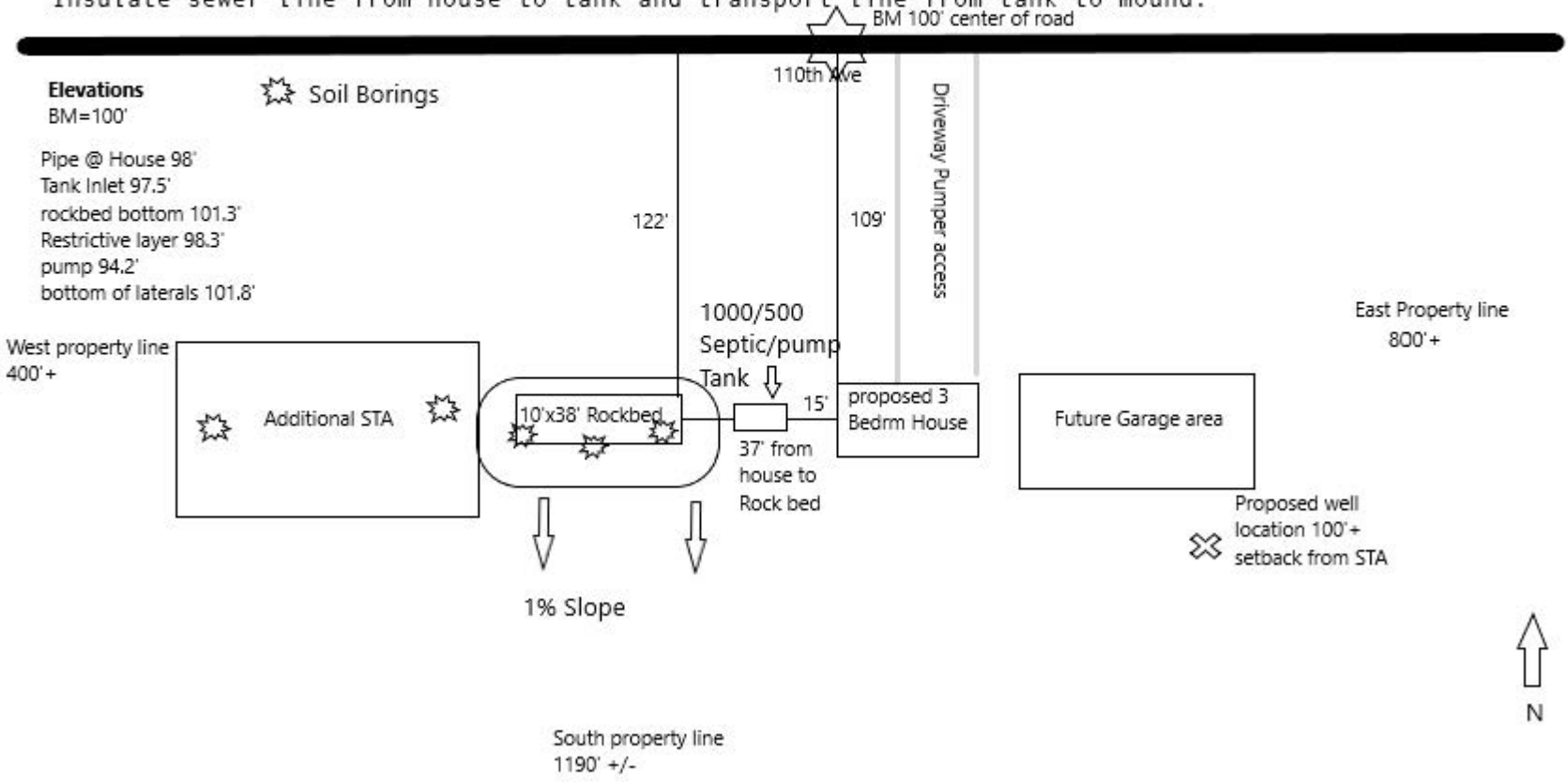
Comments:

SOIL BORING LOGS ON REVERSE SIDE

Form des 2/20/98

Mike and Kristie Fuqua 43281 110th Ave Tamarack MN 55787 (3 Bedroom Mound System)

10'x38' Rock bed with 36'' of clean sand base
6'' rock under pipe
Three 1.5'' laterals 36' long with 1/4'' perfs 3' spacing (12 perfs per lateral) with Flush ports.
2'' transport line and header.
1000/500 combo tank (DelZotto) with filter
Goulds Pe31 pump
Insulate sewer line from house to tank and transport line from tank to mound.



HOLDING TANK PUMPING SERVICE AGREEMENT

Permit #_____ Address/or Parcel# _43281 110th Ave Tamarack, MN 55787_____.
THIS AGREEMENT, entered into by and between Aitkin County Registered Septic Tank Pumper, Kangas Enterprise, Inc./Kangas Sewer Service, hereinafter referred to as "Contractor", and ___ Kristie & Michael Fuqua_____, hereinafter referred to as "Land or Homeowner".

WHEREAS, the Land/Homeowner desires and is required to retain individual sewage treatment system holding tank services to protect the environment and to obtain a certificate from the Aitkin County; and

WHEREAS, the Contractor desires to provide sewage treatment system pumping services to Land/Homeowner as necessary and in accordance with the terms and conditions outlined herein.

NOW THEREFORE, in consideration of the mutual promises contained herein, Parties do hereby agree as follows:

1. TERM. The term of this Agreement shall be from 07/20/2021 to final installation of an Aitkin County approved sewage treatment system or connection to a Municipal Sewage Treatment System, unless earlier terminated as provided herein. The parties understand and agree that this Agreement is intended to arrange for the provision of pumping services so that Homeowner may occupy the home pursuant to a certificate of compliance to be issued by the Aitkin County Environmental Services Department upon execution of this Agreement. Land/Homeowner further agrees that at the earliest possible date, Land/Homeowner shall have a permanent sewage treatment system installed in accordance with the Aitkin County Individual Sewage Treatment System and Wastewater Ordinance No.1 and as approved by the Aitkin County Environmental Services Department or connect to a Municipal Sewage Treatment System. Upon approval by the County of Aitkin of the individual sewage treatment system to a municipal sewer, or approval by Aitkin County Environmental Services of an amended or different contract, this Agreement shall terminate.

2. FREQUENCY OF PUMPING. Homeowner agrees that he/she shall not allow the holding tank to overflow or discharge in any manner. Contractor and Homeowner agree that the holding tank shall be pumped in accordance with the following:

Tank size _1-1000 gallon holding _1-500 gal pump_ tank(s)= total __1500__ gals, _/ (number of household occupants multiplied by 75 gallons per day) = frequency of pumping: or

Within 24 hours of indication by tank alarm of lack of capacity (applicable only if system has a functional alarm): Whichever is greater.

Contractor agrees to provide pumping services according to the regular pumping schedule or as needed to prevent discharge. Land/Homeowner shall compensate Contractor as agreed by the parties for pumping services rendered.

3. REPORTING. Grievances of Land/Homeowner or Contractor shall be reported to the Aitkin County Environmental Services Department by Land/Homeowner or Contractor. Land/Homeowner and Contractor understand that failure to have holding tank pumped as herein specified or the discharge of any contents from the holding tank, regardless of fault, may result in the suspension, cancellation or revocation of the certificate of compliance, and the homeowner may be required to vacate the premises.

Tom Kangas
Contractor

Date 07/20/2021

Land/Homeowner

Date 7/20/21

Kangas Enterprise, Inc.
38329 State Hwy 65
McGregor, MN 55760
(218) 768-2575 FAX: (218) 768-2577