ENVIRONMENTAL SYSTEMS LLC.

2358 HWY# 23
MORA MN. 55051
Ph. 320-241-7036
7/21/2023

BOX MOUND DESIGN

LOCATION: 63885 BADGER RD SANDSTONE MN

OWNER: MILLE LACS BAND OF OJIBWE

SYSTEM TYPE: TYPE III REDUCED SIZE BOX MOUND

DESIGN FLOW: 2 BEDROOM DESIGNED @ 200 GPD

TREATMENT AREA: 420 SQ.FT.

SLOPE: 0 %

SEPTIC TANK: 1600 GAL. SPLIT/COMBO BROWN-WILBERT

PUMP TANK: BROWN -WILBERT 1000 GAL.

PUMP: GOULDS WE 0311M

FLOW METER: SJE RHOMBUS
MODEL# TD1W114H8AC21E TIMED DOSING CONTROL

KEVIN HERWIG M.P.C.A. 3945

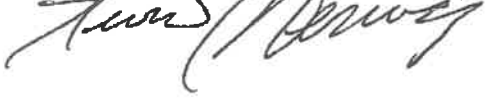
CONSTRUCTION NOTES

PRODUCT BRAND & MODEL LISTED IN DESIGN MUST BE USED. BROWN-WILBERT TANKS – SEPTIC 1600 GAL. COMBO WITH POLYLOK PL-122 FILTER AND ALARM, PUMP TANK 1000 GAL. BROWN-WIFLBERT PUMP – GOULDS WE511H ** PUMP CHAMBER AND PUMP SETTINGS WILL NOT BE CORRECT IF OTHER PRODUCTS ARE USED. 2-WAY CLEANOUTS ARE TO BE INSTALLED 1 FOOT OUTSIDE THE HOME

SJE RHOMBUS MODEL# TD1W114H8AC21E TIMED DOSING CONTROL. (IT IS THE DESIGNER'S DISCRETION TO APPROVE OR DISAPPROVE SUBSTITUTIONS) THE INSTALLER WILL BE RESPONSIBLE FOR DESIGN CHANGE FEE.

ALL PRODUCTS AND CONSTRUCTION PRACTICES ARE TO MEET M.P.C.A. 7080 RULE AND MILLE LACS BAND SPECIFICATION FOR SEWAGE TREATMENT SYSTEMS

KEVIN HERWIG LIC # 3945



Site preparation and grading for mound box

Site is to be cleared of brush and branches.

The South end of the box area needs to be graded to an elevation of 93.90 to achieve a level area for the box.

Care must be exercised while drilling the post holes, so the box area does not become compacted from equipment traffic.

Posts are to be installed and backfilled before the final rough up of the absorption area is completed.

ONSITE SEWAGE TREATMENT PROGRAM

Preliminary Evaluation Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

v 03.15.2023

1. Contact Information

Property Owner/Client: MILLE LACS BAND OF OJIBWE | Date Completed: 7/21/2023

Site Address: 63885 BADGER RD. SANDSTONE/HINCKLEY MN | Project ID:

Email: | Phone:

Mailing Address: | Alt Phone:

Legal Description:

Parcel ID: | SEC: | TWP: | RNG:

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: 2 | Dwelling sq.ft.: 936 | 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 and Anticipated Waste Strength Information

Attach additional information as necessary.

Design Flow: 200 GPD | Anticipated Waste Type: Residential

Maximum Concentration 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							
2							
3							
4							

Additional Well Information:

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:	N/A
Elevation of ordinary high water level:	N/A ft	Source:	N/A
Classification: N/A	Tank Setback: N/A ft.	STA Setback:	N/A 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: OWNER

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: C22B Slope Range: 2-10 %

List landforms: MORAINES DRUMLINS

Landform position(s): Foot Slope

Parent materials: Till

Depth to Bedrock/Restrictive Feature: in Depth to Watertable: 11 in

Map Unit Ratings

Septic Tank Absorption Field- At-grade:	
Septic Tank Absorption Field- Mound:	Slightly Limited
Septic Tank Absorption Field- Trench:	

5. Local Government Unit Information

Name of LGU: PINE 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

v 03.15.2023

1. Project Information

Property Owner/Client: MILLE LACS BAND OF OJIBWE | Project ID:

Site Address: 63885 BADGER RD. SANDSTONE/HINCKLEY MN | Date Completed: 7/21/2023

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): Forest | Landscape position: Foot Slope

Percent slope: 0 % | Slope shape: Linear, Linear | Slope direction:

Describe the flooding or run-on potential of site: NO PROBLEMS

Describe the need for Type III or Type IV system: REDOX@16" GRADED FOR BOX MOUND

Note:

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

4. General Soils Information

Filled, Compacted, Disturbed areas (Y/N): Yes

If yes, describe: SOUTH END WILL BE GRADED FOR LEVEL BOX MOUND

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): No

5. Phase I. Reporting Information

	Depth		Elevation	
Limiting Condition*:	0	in	93.9	ft
Periodically saturated soil:	16	in	92.4	ft
Standing water:		in		ft
Bedrock:		in		ft
Benchmark Elevation:		ft		

*Most Restrictive Depth Identified from List Below

Soil Texture: Fine Sandy Loam

Percolation Rate: min/inch

Soil Hyd Loading Rate: 0.68 gpd/sq.ft

Elevations and Benchmark on map? (Y/N): Yes

Benchmark Elevation Location: BOTTOM OF SIDING

Differences between soil survey and field evaluation: CLOSE

Site evaluation issues / comments: VERY DRY

Anticipated construction issues: ROCKY SOIL

University of Minnesota Onsite Sewage Treatment Program

Soil Observation Log

Project ID:

v 03.15.2023

Client:	MILLE LACS BAND OF OJIBWE	Location / Address:	63885 BADGER RD. SANDSTONE/HINCKLEY MN

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

Landscape Position:	Foot Slope	Slope %:	Slope shape:	Linear, Linear	Flooding/Run-On potential:
Vegetation:	Forest	Soil survey map units:	C22B	Surface Elevation-Relative to benchmark:	92.9
Date/Time of Day/Weather Conditions:	7/21/2023	10AM	PC	Limiting Layer Elevation:	91.5
Observation #/Location:	1	W.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	Fine Sandy Loam	30	10YR 3/2				Blocky	Weak	Friable
7-14	Fine Sandy Loam	35	7.5YR 4/4				Platy	Weak	Friable
14-20	Very Fine Sand	35	7.5YR 4/4	5YR 5/6 7.5YR 6/4	Concentrations Depletions	S2 S2	Platy	Weak	Friable

Comments: SLIGHT DEP. AT 11"

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

KEVIN HERWIG		3945	7/21/2023
(Designer/Inspector)	(Signature)	(License #)	(Date)

Optional Verification: I hereby certify that this soil observation was verified according to Minn. R. 7082.0500 subp. 3 A. The signature below represents an infield verification of the periodically saturated soil or bedrock at the proposed soil treatment and dispersal site.

(LGU/Designer/Inspector)	(Signature)	(Cert #)	(Date)

University of Minnesota Onsite Sewage Treatment Program

Soil Observation Log

Project ID:

v 03.15.2023

Client:	MILLE LACS BAND OF OJIBWE	Location / Address:	63885 BADGER RD. SANDSTONE/HINCKLEY MN

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

Landscape Position:	Foot Slope	Slope %:	2.0	Slope shape:	Linear, Linear
Flooding/Run-On potential:					
Vegetation:	Forest	Soil survey map units:	C22B	Surface Elevation-Relative to benchmark:	93.7
Date/Time of Day/Weather Conditions:	7/21/2023	10:30	PC	Limiting Layer Elevation:	
Observation #/Location:	2	SE		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
0-4	Fine Sandy Loam	10	10YR 3/2				Blocky	Weak	Friable
4-25	Fine Sandy Loam	5	7.5YR 4/6				Platy	Weak	Friable
25-30	Fine Sandy Loam	5	7.5YR 3/4	5YR 5/6	Concentrations	S2	Platy	Weak	Friable

Comments:

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

KEVIN HERWUG		3945	7/21/2023
(Designer/Inspector)	(Signature)	(License #)	(Date)

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(LGU/Designer/Inspector)	(Signature)	(Cert #)	(Date)

University of Minnesota Onsite Sewage Treatment Program

Soil Observation Log

Project ID:

v 03.15.2023

Client:	MILLE LACS BAND OF OJIBWE	Location / Address:	63885 BADGER RD. SANDSTONE/HINCKLEY MN.

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

Landscape Position:	Foot Slope	Slope %: 2.0	Slope shape: Linear, Linear
Flooding/Run-On potential:			
Vegetation:	Forest	Soil survey map units:	C22B
Surface Elevation-Relative to benchmark:	93.4		
Date/Time of Day/Weather Conditions:	7/21/2023	10:45	PC
Limiting Layer Elevation:			
Observation #/Location:	3	NE	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
0-4	Fine Sandy Loam	10	10YR 3/2				Blocky	Weak	Friable
4-20	Fine Sandy Loam	5	7.5YR 4/6				Platy	Weak	Friable

Comments:

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

KEVIN HERWIG		3945	7/21/2023
(Designer/Inspector)	(Signature)	(License #)	(Date)

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(LGU/Designer/Inspector)	(Signature)	(Cert #)	(Date)

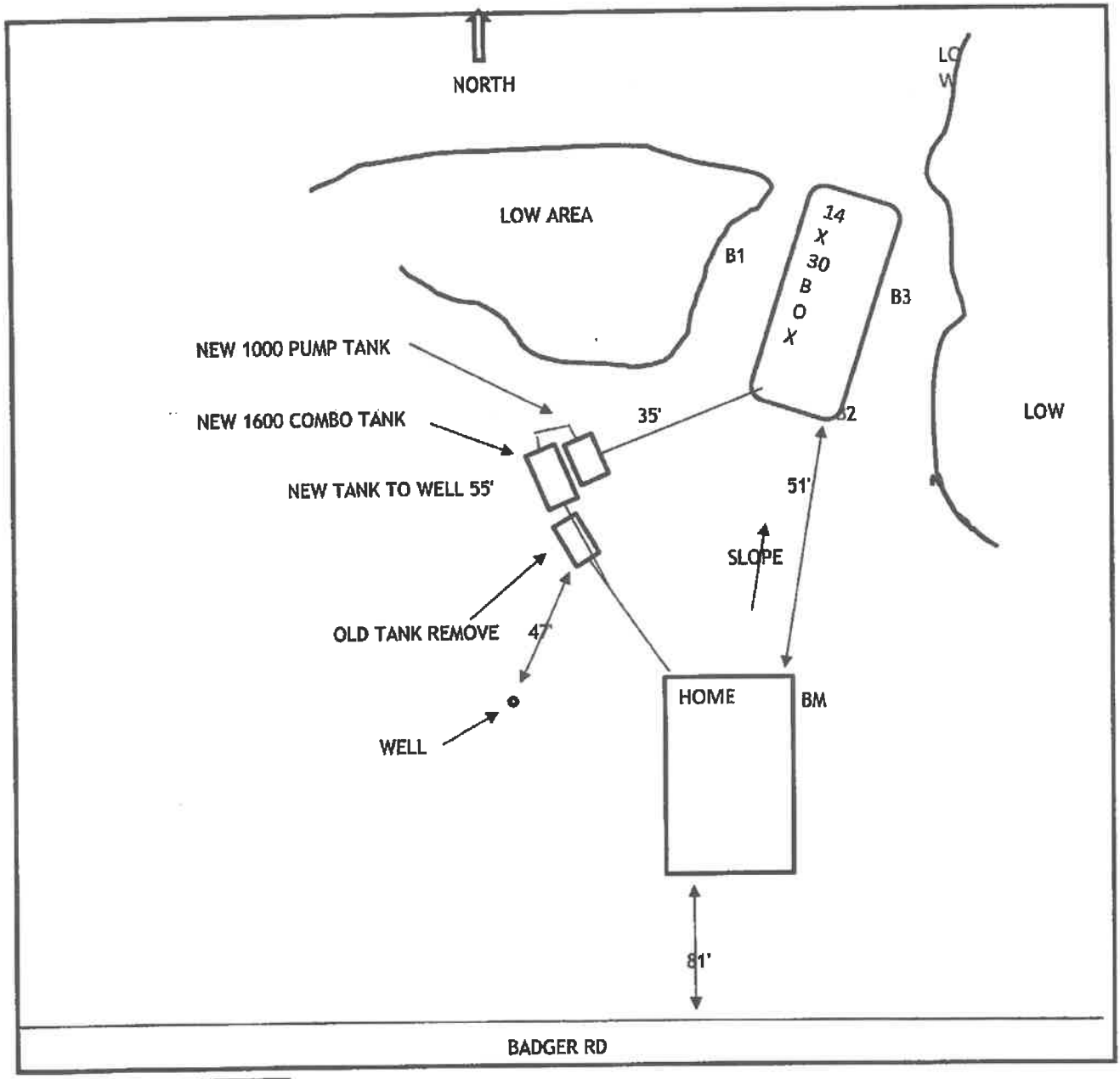
ONSITE SEWAGE TREATMENT PROGRAM

Proposed Design Map

MINNESOTA POLLUTION CONTROL AGENCY

Project ID: v 03.15.2023

Property Owner/Client: MILLE LACS BAND OF OJIBWE



Map scale: NONE ☑ Indicated north ☐ Show slope/contours

Elevations in feet Benchmark: 100 ft

System Corners:

NW:	93.9	ft
NE:	93.9	ft
SW:	93.9	ft
SE:	93.9	ft

Soil Observation:

#1:	92.9	ft
#2:	93.7	ft
#3:	93.4	ft
#4:		ft

TANK INLET	92.4	ft
Other:		
PUMP TANK INLET	91.9	ft
		ft

Date Completed: 7/21/2023

ONSITE SEWAGE TREATMENT PROGRAM

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

1. PROJECT INFORMATION

v 03.15.2023

Property Owner/Client:	MILLE LACS BAND OF OJIBWE	Project ID:	
Site Address:	63885 BADGER RD. SANDSTONE/HINCKLEY MN	Date:	07/21/23
Email Address:		Phone:	

2. DESIGN FLOW & WASTE STRENGTH

Attach waste strength data/estimated strength for Other Establishments

Design Flow: 200 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 =1000 gal or 400 gal/bedroom, Other Establishment = Design Flow x 5.0, Minimum size 1000 gallons

Code Minimum **Holding Tank Capacity:** ____ Gallons with ____ Tanks or Compartments

Recommended **Holding Tank Capacity:** ____ Gallons with ____ Tanks or Compartments

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

Comments: ____

4. SEPTIC TANK SIZING

A. Residential dwellings:

Number of Bedrooms (Residential): 2

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

Recommended **Septic Tank Capacity:** 1600 Gallons with 2 Tanks or Compartments

Effluent Screen & Alarm (Y/N): Yes Model/Type: POLYLOK PL122

B. Other Establishments:

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

Code Minimum **Septic Tank Capacity:** ____ Gallons with ____ Tanks or Compartments

Recommended **Septic Tank Capacity:** ____ Gallons with ____ Tanks or Compartments

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

*** Other Establishments Require Department of Labor and Industry Approval and Inspection for Building Sewer ***

5. PUMP TANK SIZING

Soil Treatment Dosing Tank				Other Component Dosing Tank:			
Pump Tank Capacity (Minimum):	500 Gal			Pump Tank Capacity (Minimum):	Gal		
Pump Tank Capacity (Recommended):	1000 Gal			Pump Tank Capacity (Recommended):	Gal		
Pump Req:	18.0 GPM	Total Head	17.4 ft	Pump Req:	GPM	Total Head	ft
Supply Pipe Dia.	2.00 in	Dose Vol:	50.0 gal	Supply Pipe Dia.	in	Dose Vol:	Gal

*** Flow measurement device must be incorporated for any system with a pump: Elapsed Time Meter and/or Event Counter ***

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:	ft	Benchmark Location:	BOTTOM OF SIDING
MPCA System Type:	Type III	Distribution Media:	Registered Product:
Type III/IV/V Details:	BOX MOUND		INFILTRATOR CHAMBERS

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:	0	inches	0.0	ft	93.90	ft	*Critical for system compliance*
Minimum Req'd Separation:	36	inches	3.0	ft			*Distribution Elevation >Code Max Depth*
					Elevation		
Code Max System Depth*:	Mound	inches	-3.0	ft	96.90	ft	Elevation OK

*This is the maximum depth to the bottom of the distribution media for required separation. Negative Depth (ft) requires a mound.

Designed Distribution Elevation: 96.9 ft Minimum Sand Depth: 36.0 inches

A. Soil Texture: Fine Sandy Loam B. Organic Loading Rate (optional): lbs/sq.ft/day 0

C. Soil Hyd. Loading Rate: 0.68 GPD/ft^2 D: Percolation Rate: MPI

E. Contour Loading Rate: 12 Note:

F. Measured Land Slope: 0 % Note:

Comments:

8. SOIL TREATMENT AREA DESIGN SUMMARY

Trench:

Dispersal Area	sq.ft	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	sq.ft	Sidewall Depth	in	Maximum Bed Depth	in
Bed Width	ft	Bed Length	ft	Designed Bed Depth	in

Mound:

Dispersal Area	sq.ft	Bed Length	0.0 ft	Bed Width	0.0 ft
Absorption Width	0.0 ft	Clean Sand Lift	3.0 ft	Berm Width (0-1%)	ft
Upslope Berm Width	ft	Downslope Berm	0.0 ft	Endslope Berm Width	4.7 ft
Total System Length	ft	System Width	ft	Contour Loading Rate	11.4 gal/ft

ONSITE SEWAGE TREATMENT PROGRAM

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

Project ID:

At-Grade:

Dispersal Area		sq.ft	Bed Length		ft	Bed Width	ft
Upslope Berm		ft	Downslope Berm		ft	Finished Height	ft
System Length		ft	Endslope Berm		ft	System Width	ft

Level & Equal Pressure Distribution Soil Treatment Area

No. of Laterals	3		Lateral Diameter	2.00	in	Lateral Spacing	2	ft
Perforation Spacing	3	ft	Perforation Diameter	1/4	in	Drainback Volume	6	gal
Min Dose Volume	45	gal	Max Dose Volume	50	gal	Total Dosing Volume	56	gal

Non-Level and Unequal Pressure Distribution Soil Treatment Area

	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

Total Dosing Volume: _____ gal

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

Organic Loading to Soil Treatment

A. Starting BOD Concentration = Design Flow X 0.7 X Starting BOD (mg/L) X 8.35 ÷ 1,000,000

_____ gpd X _____ mg/L X 8.35 ÷ 1,000,000 = _____ lbs. BOD/day (Organic Loading Design)

B. Organic Loading to Soil Treatment Area: (enter loading value in 7B)

_____ mg/L X _____ gpd X 0.7 X 8.35 ÷ 1,000,000 ÷ _____ sq.ft = _____ lbs./day/sqft

HSW Technology Strength Reduction

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

_____ gpd X _____ mg/L X 8.35 ÷ 1,000,000 = _____ lbs. BOD/day (HSW Technology Design)

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

_____ gpd X _____ mg/L X 8.35 ÷ 1,000,000 = _____ lbs. BOD/day (HSW Technology Design)

Lbs. BOD To Be Removed: _____ lbs. BOD/day (HSW Technology Design)

Pretreatment Technology: _____ *Must Meet or Exceed Target

Disinfection Technology: _____ *Required for Levels A & B

10. Comments/Special Design Considerations:

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

KEVIN HERWIG		3945	7/21/2023
(Designer)	(Signature)	(License #)	(Date)

ONSITE SEWAGE TREATMENT PROGRAM

Mound Design Worksheet
<1% Slope

MINNESOTA POLLUTION CONTROL AGENCY

1. SYSTEM SIZING: Project ID: v 03.15.2023

A. Design Flow :	200	GPD
B. Soil Loading Rate:	0.68	GPD/sqft
C. Depth to Limiting Condition:	0.0	ft
D. Percent Land Slope:	0	%
E. Media (Sand) Loading Rate:	1.2	GPD/sqft
F. Mound Absorption Ratio:	1.80	

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: Absorption Area Loading Rate (gpd/ft²)	Treatment Level C: Mound Absorption Ratio	Treatment Level A, A-2, B: Absorption Area Loading Rate (gpd/ft²)	Treatment Level A, A-2, B: 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	0.6	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. Hydraulic Absorption Required Bottom Area: Design Flow (1A) ÷ Design Media Loading Rate(1E)

200 GPD ÷ 1.2 GPD/sqft = 167 sq.ft

Organic Sizing (OPTIONAL)

B. Organic Absorption Bed Area = Organic Loading (Summary 9A) ÷ Organic Soil Loading Rate (Summary 7B)

_____ lbs BOD ÷ _____ lbs BOD/sq.ft = _____ sq.ft

C. Required Bed Area = Greater of Hydraulic (1D) or Organic Bed Area (1E) 167 sq.ft

D. Designed Dispersal Media Area: 228 sq.ft *Optional upsizing of area to be larger than 2C*

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

F. Calculate Contour Loading Rate: Bed Width(2E) X Design Media Loading Rate (1E)

10 ft X 1.2 GPD/sq.ft = 11.4 gal/ft *Can not exceed Table 1*

G. Calculate Minimum Dispersal Bed Length: Dispersal Media Area(2D) ÷ Bed Width (2E)

228 sqft ÷ 10 ft = 24.0 ft

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

3. ABSORPTION AREA SIZING

A. Calculate Absorption Width: Bed Width(2B) X Mound Absorption Ratio(1F)

9.5 ft X 1.5 = 14.0 ft

B. For slopes from 0 to 1%, the Absorption Width is measured from the bed equally in both directions.

Absorption Width Beyond the Bed: Absorption Width(3A) - Bed Width(2E) ÷ 2

(14.0 ft - 9.5 ft) ÷ 2 = 2.2 ft

4. DISTRIBUTION MEDIA

Project ID:

Select Dispersal Media: Registered Product: Enter Either 4A or 4B

A. Rock Depth Below Distribution Pipe

in

B. Registered Media INFILTRATOR CHAMBERS

Check registered product information for specific application details and design

Registered Media Height 8 in

Specific Media Comments:

5. MOUND SIZING

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

3.0 ft - ft = 3.0 ft Design Sand Lift (optional): 3.0 ft

B. Upslope Height = Clean Sand Lift(5A) + Depth of Media(4AorB) + Depth to Cover Pipe + Depth of Cover (1 ft)

3.0 ft + 0.67 ft + ft + 1.00 ft = 4.7 ft

C. Berm Width = Upslope Mound Height(5B) X 4 (4 is recommended, but could be 3-12)

4.7 ft X 1.0 = 4.7 ft

D. Total Landscape Width = Berm Width(5C) + Dispersal Bed Width(2B) + Berm Width(5C)

4.7 ft + 9.5 ft + 4.7 ft = 18.8 ft

E. Additional Berm Width if necessary for absorption area - Absorption Width(2A) -Total Landscape Width(5D)

14.0 ft - 18.8 ft = 0 ft if number is negative (<0), value is ZERO

F. Final Berm Width = Additional Berm Width(5E) + Berm Width(5C)

0 ft + 4.7 ft = 4.7 ft

G. Total Mound Width = Final Berm Width(5F) + Dispersal Bed Width(2B) + Final Berm Width(5F)

4.7 ft + 9.5 ft + 4.7 ft = 18.8 ft

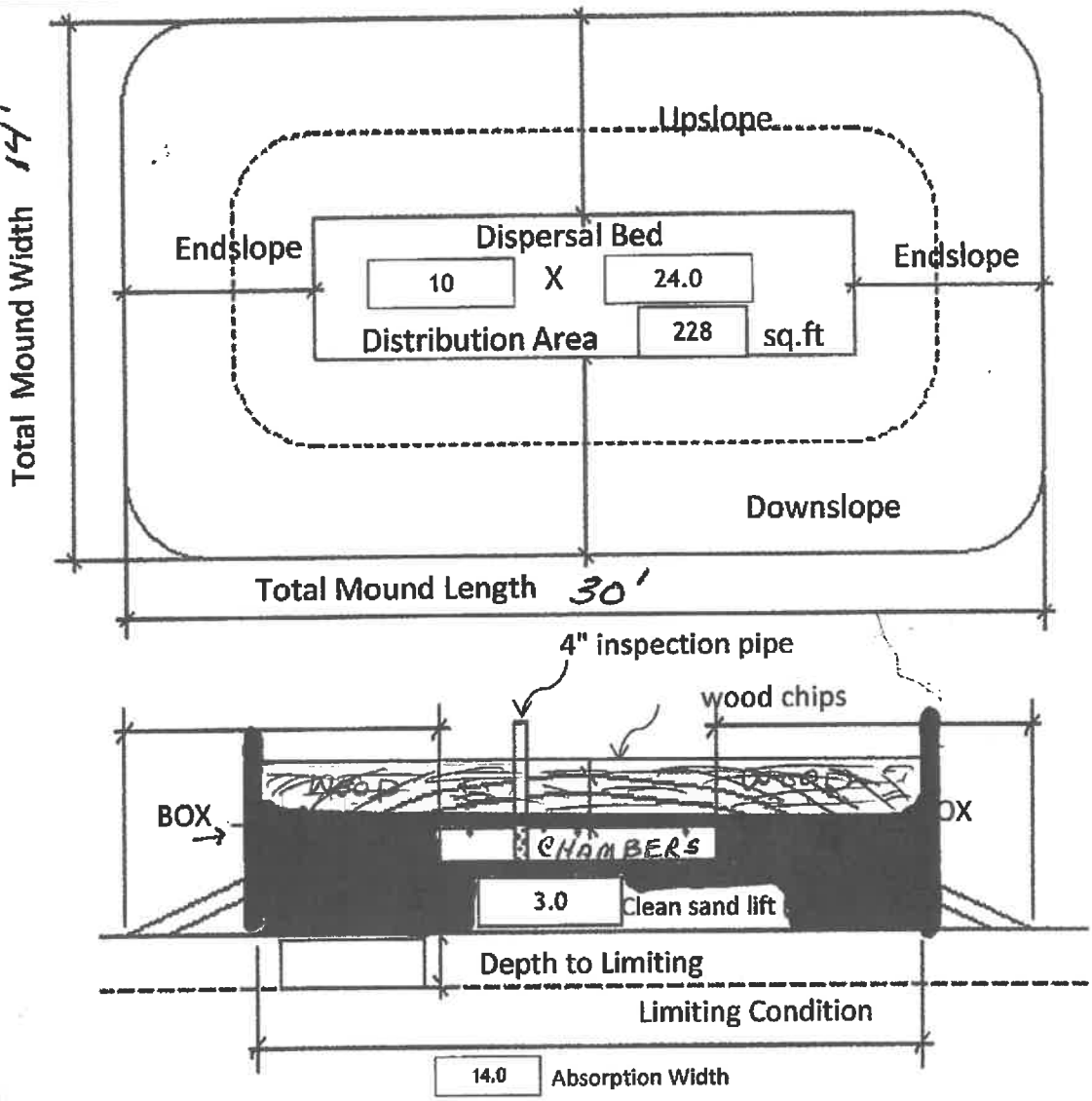
H. Total Mound Length = Final Berm Width(5F) + Dispersal Bed Length(2D) + Final Berm Width(5F)

4.7 ft + 24.0 ft + 4.7 ft = 33.3 ft

I. Setbacks from the Bed: Absorption Width (3A) - Dispersal Bed Width(2B) divided by 2

(14.0 ft - 9.5) / 2 = 2.2 ft

6. MOUND DIMENSIONS (Feet) Project ID:



Elevation to Benchmark

Required Separation	36	(in)	Elevation Limiting Layer:	93.9	ft
Distribution Media	INFILTRATOR CHAMBERS		Elevation required Separation:	96.9	ft
Media Depth	8.0	(in)	Elevation Distribution Media Bottom:	99.9	ft
Manifold Connection	End		Elevation Top of Media(min):	100.6	ft
Lateral Pipe Diameter:	2.00	(in)	Elevation Top of System(min):	101.6	ft
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

Pressure Distribution Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

Project ID: v 03.15.2023

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(1.) - 2 Feet.

   24.0 - 2ft = 22.0 ft *Perforation can not be closer then 1 foot from edge.*
7. Determine the *Number of Perforation Spaces*. Divide the *Length of Laterals(6.)* by the *Perforation Spacing* (4.) and round down to the nearest whole number.

   Number of Perforation Spaces = 22.0 ft ÷ 3.0 ft = 7 Spaces
8. *Number of Perforations per Lateral* is equal to 1.0 plus the *Number of Perforation Spaces(7.)*. 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 = 7 Spaces + 1 = 8 Perfs. Per Lateral

No. 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	12	18	30	60
2½	8	12	16	28	54
3	7	12	16	26	52

7/32 Inch Perforations

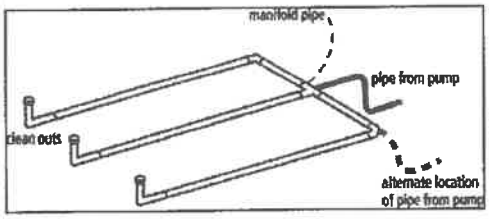
Perforation Spacing (Feet)	Pipe Diameter (Inches) 1	1¼	1½	2	3
2	11	16	21	34	68
2½	10	14	20	32	64
3	9	14	19	30	60

3/16 Inch Perforations

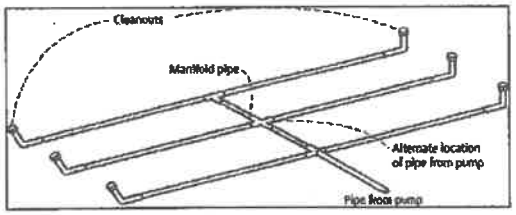
Perforation Spacing (Feet)	Pipe Diameter (Inches) 1	1¼	1½	2	3
2	12	18	26	44	87
2½	12	17	24	40	80
3	12	16	22	37	75

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



END Connection



CENTER Connection

Perf Per Lateral: 8

Perf Per Lateral Equal Split: 4 | 4

OPTIONAL Perf Per Lateral Non-Equal Split*: ____ | ____

* must not exceed maximum number perfs per lateral in table

9. *Total Number of Perforations* equals the *Number of Perforations per Lateral (8.)* multiplied by the *Number of Perforated Laterals.(3.)*

   8 Perf. Per Lat. X 3 Number of Perf. Lat. = 24 Total Number of Perf.
10. Spacing of laterals; Must be greater than 1 foot and no more than 3 feet: 2.0 ft
11. Select *Type of Manifold Connection* (End or Center): End

    If Center Manifold Connection the max number of perfs per lateral in the table can be doubled.
12. *Select Lateral Diameter (See Table)*: 2.00 in

Onsite Sewage Treatment Program

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 24 ft = 240 sq.ft

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

240 sqft ÷ 24 perf = 10.0 sq.ft/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(9.) X Perforation Discharge(15.)*

24 Perfs X 0.74 GPM per Perforation = 18 GPM

17. *Volume of Liquid Per Foot of Distribution Piping (Table II)*: 0.170 Gallons/ft

18. *Volume of Distribution Piping* = *Number of Perforated Laterals(3.) X Length of Laterals(6.) X Volume of Liquid Per Foot of Distribution Piping (17.)*

3 X 22 ft X 0.170 gal/ft = 11.2 Gallons

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

11.2 gals X 4 = 44.9 Gallons

20. Maximum Delivered Volume = Design flow x 25%

200.0 gpd X 25% = 50.0 Gallons

21. Minimum Delivered vs Maximum Delivered evaluation: Volume ratio correct

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 STA Pump Selection Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

1. PUMP CAPACITY

Project ID:

v 03.15.2023

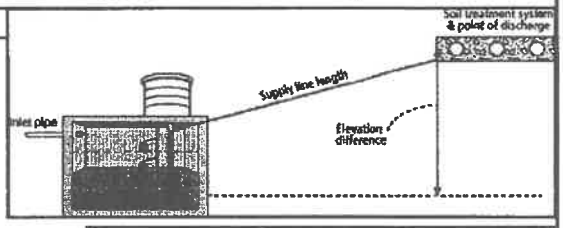
Pumping to Gravity or Pressure Distribution: Pressure

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: 18.0 GPM

C. Enter pump description: Equalization/Time Dosing

2. HEAD REQUIREMENTS



A. Elevation Difference between pump and point of discharge: 12 ft

B. Distribution Head Loss: 5 ft

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

* Common additional head loss: gate valve = 1 ft each, globe valve = 1.5 ft each, splitter valve = see manufacturers details

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

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

D. 1. Supply Pipe Diameter: 2.0 in

2. Supply Pipe Length: 35 ft

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

Friction Loss = 0.92 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*

35 ft X 1.25 = 43.8 ft

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

Supply Friction Loss =

0.92 ft per 100ft X 43.8 ft ÷ 100 = 0.4 ft

H. *Total Head* requirement is the sum of the *Elevation Difference(2A)* + Distribution Head Loss(2B) + Additional Head Loss(2C) + Supply Friction Loss(2G)

12.0 ft + 5.0 ft + _____ ft + 0.4 ft = 17.4 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **18.0** GPM with at least **17.4** feet of total head.

Comments:

STA Dosing Pump Tank Design Worksheet (Time Dose)

Onsite Sewage Treatment Program

Minnesota Pollution Control Agency

Project ID: v 03.15.2023

DETERMINE TANK CAPACITY AND DIMENSIONS

1. A. *Design Flow (Design Sum. 1A)*: 200 GPD B. Tank Use: Dosing
   C. Percentage of Design Flow 95 % 190 Gal Up to 75% design flow is normal for Design percentage
   D. Min. required pump tank capacity: 500 Gal E. Recommended capacity: 1000 Gal

2. A. Tank Manufacturer: BROWN-WILBERT B. Tank Model: 1000
   C. Capacity from manufacturer: 1089 Gallons
   D. Gallons per inch: 22.0 Gallons per inch
   E. Liquid depth of tank from manufacturer: 48.0 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. *Volume to Cover Pump* (The inlet of pump should be 4 inches from the bottom of the tank & 2 inches covering the pump recommended)

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

   (12 in + 2 inches) X 22.0 Gallons Per Inch = 308 Gallons

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

   -Item 19 of the Pressure Distribution or Item 11 of Non-level 45 Gallons (minimum dose) 2.0 inches/dose

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

   Design Flow: 200 GPD X 0.25 = 50 Gallons (maximum dose) 2.3 inches/dose

6. *Select a pumpout volume that meets both Minimum and Maximum:* 50 Gallons

7. Calculate *Doses Per Day* = Percentage Design Flow(1C) ÷ *Delivered Volume(6.)*

   190 gpd ÷ 50 gal = 3.8 *Doses*

8. Calculate Drainback:

   A. *Diameter of Supply Pipe* = 2 inches

   B. Length of Supply Pipe = 35 feet

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

   D. *Drainback = Length of Supply Pipe(2B) X Volume of Liquid Per Lineal Foot of Pipe(2C)*

   35 ft X 0.170 gal/ft = 6.0 Gallons

9. *Total Dosing Volume = Delivered Volume(6.) + Drainback(8D)*

   50 gal + 6.0 gal = 56 Gallons

10. Working Storage Volume = Tank Volume (2C) - Volume to Cover Pump(3.) - Reserve Capacity (22.)

    1089 gal - 308 gal - 106 = 675 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

11. Required *Flow Rate*:

    A. From Pump Curve - Must verify after install: GPM*

    B. Calculated GPM = Change in Depth (in) x Gallons Per Inch(2D) / Time Interval in Minutes

    in X 22.0 gal/in ÷ min = GPM

12. Select Flow Rate from 11 A or B: 38.0 GPM*

**Note: This value must be adjusted after installation based on pump calibration.*

University of Minnesota Onsite Sewage Treatment Program

STA Dosing Pump Tank Design Worksheet (Time Dose)

MINNESOTA POLLUTION CONTROL AGENCY

NORMAL OPERATION TIMER SETTINGS*

13. Calculate TIMER ON setting*:

Total Dosing Volume(9.) ÷ GPM(12.)

56	gal	÷	38.0	gpm	=	1.5	Minutes ON*	HR: 0	MIN: 1.0	SEC: 28

14. Calculated TIMER OFF setting*:

Minutes Per Day (1440)/*Doses Per Day(7.)* - Minutes On(13.)

1440 min ÷	4	doses/day -	1.5	min	=	377.5	Minutes OFF*	HR: 6	MIN: 17.0	SEC: 29

OPTIONAL PEAK ENABLE DOSING* - *Designers option for peak flow operation*

15. Peak Percentage of Design Flow ____ %

16. Peak Pump Volume that meets both Minimum and Maximum Volume ____ gal + Drainback 6.0 gal

17. Peak Dose Volume ____ gal

18. Peak TIMER ON ____ gal ÷ ____ gpm = ____ min ON (HR ____ MIN ____ SEC ____)

**Note: This value must be adjusted after installation based on pump calibration.*

19. Peak TIMER OFF:1440 min ÷ ____ doses/day - ____ min On ____ min Off (HR ____ MIN ____ SEC ____)

FLOAT SETTINGS — Alarm and Pump are to be wired on separate circuits and inspected by the electrical inspector

20. Pump Off Float - Measuring from bottom of tank:

Distance to set Pump Off Float=Gallons to Cover Pump(3.) ÷ Gallons Per Inch(2D):

308	gal	÷	22.0	gal/in	=	14.0	inches

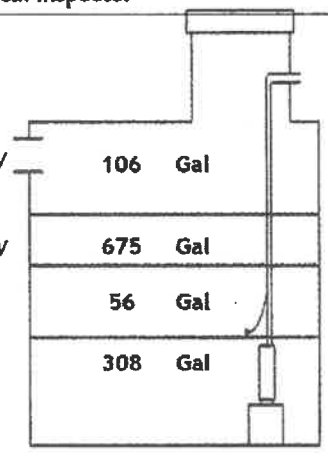
21. Alarm Float - Measuring from bottom of tank (90% recommended):

Distance to set Alarm Float = Tank Depth(2E) X % of Tank Depth (90% recommended)

48.0	in	X	90	%	=	43.2	inches

22. Reserve Capacity in gallons = Tank Depth(2E) - Alarm Depth(21.) X GPI(2D)

(48.0	in	-	43.2	in)	X	22.0	=	105.6	gallons



MONITORING AND MITIGATION

SEPTIC SYSTEM CLASSIFIED AS TYPE III BOX MOUND

Should the system fail a new site for the septic system may be considered or the owner agrees to repair the septic system if it is possible. If the septic system is not repairable the homeowner agrees to disconnect the septic tanks from the septic system and use and maintain the septic tanks as holding tanks.

MILLE LACS BAND OF OJIBWE and PINE COUNTY are to be notified as soon as possible about any operational problems. If a failure occurs the septic pump must be disconnected immediately and remain disconnected until all repairs are completed. A pumping contract will need to be set up with a septic maintenance contractor. A copy of all documents must be submitted to the county.

The system must be monitored for a minimum of three years. The mound system is to be inspected by the homeowner for leaks or saturated areas. Inspections are to be done every month for 36 months. Any leaks or failures in the system must be reported to the county within 24 hours.

All expenses for repair or replacement are the homeowner's responsibility.

Type III systems are not warranted by the Inspector, Designer, or Installer

I property owner of 63885 Badger Rd. Sandstone Mn.

Hereby agree that as long as I am the owner of the property, to accept all legal and financial responsibility for future system repair and/or replacement expense in the event that failure of the system on the above referenced property occurs.

_____

Owner

_____

Date

Owners Septic System Management Plan

Date: 7/21/2023

Property Address: 63885 BADGER RD SANDSTONE

Septic Systems can be an expensive investment, good maintenance will ensure they last a lifetime. The purpose of a septic system is to properly "decompose" the pollutants before the water is recycled back into the groundwater. If you're not taking this seriously, ask yourself where your well water comes from.

Your septic design lists all the components of your system and their location. Keep the design, this management plan and the UofM "Septic System Owners Guide" in a safe place for future reference. For a copy of the Owners guide call the University of MN at 1-800-876-8636.

Some of the following tasks you can do yourself, some require a professional, but is it YOUR responsibility to see that it gets done.

Homeowner Tasks

- Do your best to conserve water. Don't overload your septic with multiple large water uses at the same time or on the same day.
- Fix household leaks promptly (leaky toilet, dripping faucets).
- Limit bleach and anti-bacterial products. Use Biodegradable dishwasher detergent.
- Consider a lint filter on your clothes washer.
- Regularly check for wet or spongy soil around your drainfield.
- Have a septic professional check your tanks every 3 years to determine if they need pumping.
- If you have a septic tank filter (effluent filter) clean it on a regular basis (or have a professional do it).
- If a septic alarm goes off, call your septic professional to diagnose the problem.
- Notify the County/City/Township when this management plan is not being met.
- Be aware of and protect your secondary drainfield site.

Professional Tasks

- Disclose the location of the secondary drainfield (if applicable).
- Respond to alarms and diagnose problems as needed.
- Review water use with the owner, check for a "soggy" drainfield.
- Pump the septic tanks as needed and ensure they are in proper working order.
- Verify the pump, dose amount, HI Level Alarm & drainback are all working properly.

"As the owner, I understand it is my responsibility to properly operate and maintain this septic system".

Property Owner Signature: _____ **Date** _____

Box Mound Material Specifications

Poly liner-	40 Millimeter Continuous Sheet
Insulation-	1 ½" Rigid Foam
Cable-	3/8" Poly Coated Steel
Eye-Bolts	7/16" Galvanized Steel
Turn Buckles-	7/16" Galvanized Steel
Cable Clamps-	Galvanized Steel
Posts-	5"X6" Treated .60
Planks-	2"X6" Tongue and Groove Treated .40
Concrete Pads-	4"X16" Round (pole barn pad)
Chambers-	Infiltrator Low Profile Quick 4

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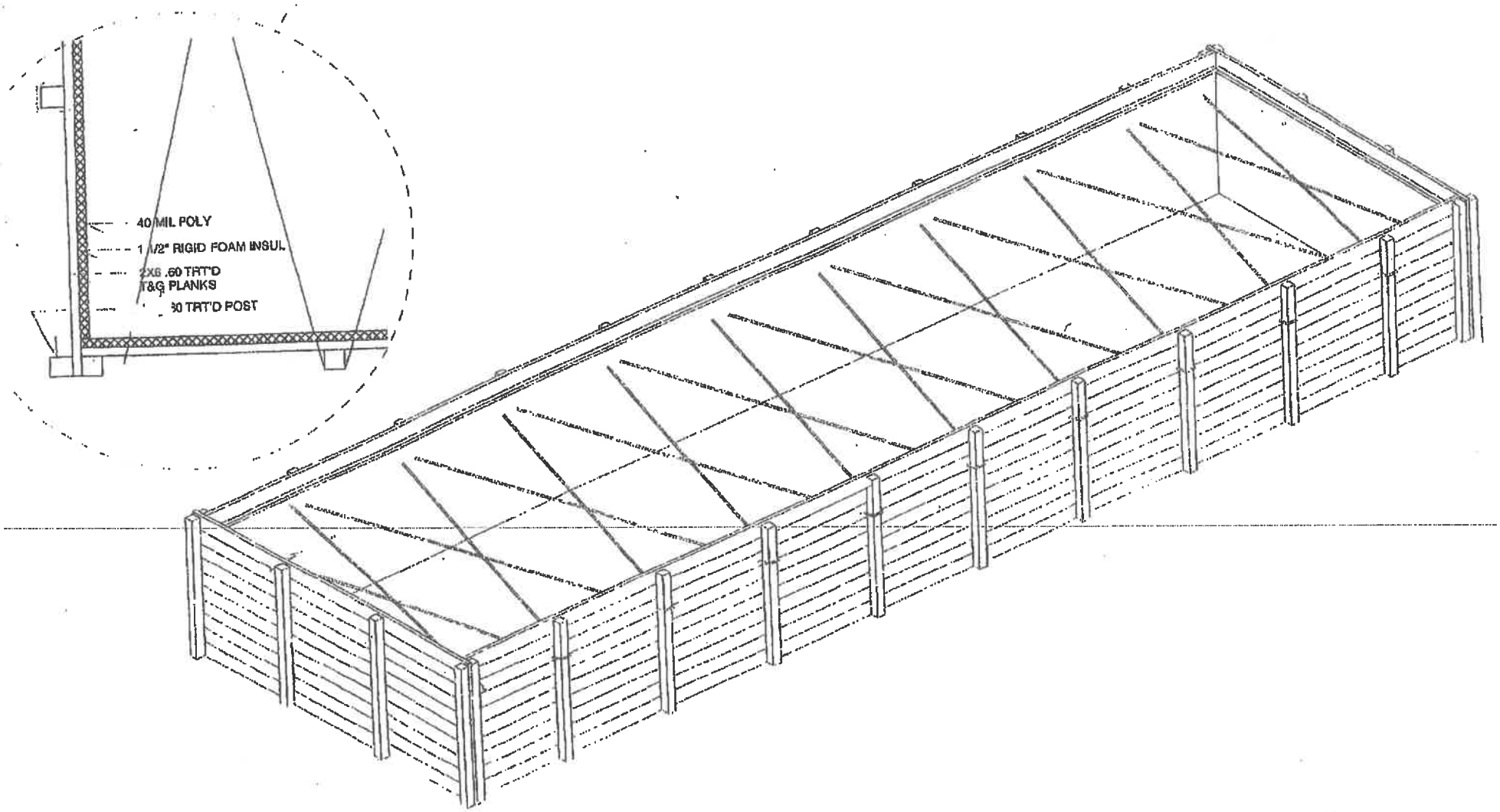
40 MIL POLY
1 1/2" RIGID FOAM INSUL.
2X6 .60 TRT'D
T&G PLANKS
TRT'D POST