# *ENVIRONMENTAL SYSTEMS LLC.*

*2358 HWY# 23*
*MORA MN. 55051*
*Ph. 320-241-7036*


*06/20/2024*

# *DESIGN*

**LOCATION: 37940 207th Lane McGregor MN**

**OWNER: Mille Lacs Band of Ojibwe**

**SYSTEM TYPE:** TYPE III Mound

**DESIGN FLOW:** 2 BEDROOM DESIGNED @ 300 GPD

**TREATMENT AREA:** 380 SQ.FT.

**SLOPE:** 4 %

**SEPTIC TANK:** 2000 GAL. SPLIT/COMBO

**PUMP TANK:** 1000 GAL.

**PUMP:** GOULDS WE511
**FILTER:** POLYLOC PL-122 WITH ALARM
**FLOW METER:** SJE ROHMBUS
#EZP11W6COH1JV8G10EP17A22C

KEVIN HERWIG M.P.C.A. 3945

# INSTALLATION AND REMOVAL NOTES

It is necessary to remove the existing mound to gain access to install the new pump tank.

Remove all material including piping, rock and debris from existing mound and dispose of off site.

After removal, the existing mound site is to be graded and covered with 6 inches of topsoil seeded and mulched.

The existing septic tank is to be pumped, crushed and filled.

# ENVIRONMENTAL SYSTEMS LLC.

# DESIGN-INSPECTION

**2358 HYY#23 MORA MN. 55051**

**06/20/2024**

**Ph. 320-679-4031**

# CONSTRUCTION NOTES

**PRODUCT BRAND & MODEL LISTED IN DESIGN MUST BE USED: BROWN-WILBERT 2000HD SPLIT SEPTIC TANK**

**BROWN-WILBERT 1000 PUMP TANK**

*****PUMP CHAMBER AND PUMP SETTINGS WILL NOT BE CORRECT IF OTHER PRODUCTS ARE USED.**

**GOULDS WE511 PUMP**

**A TWO WAY CLEANOUT IS TO BE INSTALLED 1 FOOT OUTSIDE HOME**

**FLOW CONTROL, METER, AND ALARM: SJE RHOMBUS EZP11W6COH1JV8G10EP17A22C**

**IT IS THE DESIGNERS DISCRETION TO APPROVE OR DISAPPROVE SUBSTITUTIONS.THE INSTALLER WILL BE RESPONSIBLE FOR DESIGN CHANGE FEE.**

**KEVIN HERWIG LIC # 3945**

Onsite Sewage Treatment Program

# Preliminary Evaluation Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

v 04.02.2024

## 1. Contact Information

Property Owner/Client: Mille Lacs Band of Ojibwe | Date Completed:

Site Address: 37940 207th Place McGregor | 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.: 1500 | Unfinished sq.ft.:

# Adults: na | # 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: 300 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 | Deep well | | | | | | |
| 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:

**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: 504B  Slope Range: 6-25 %

List landforms: moraines

Landform position(s): Back/ Side Slope

Parent materials: Till

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

Map Unit Ratings

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

## 5. Local Government Unit Information

Name of LGU: MLB

LGU Contact: Carla

LGU-specific setbacks:

LGU-specific design requirements:

LGU-specific installation requirements:

Notes:

Onsite Sewage Treatment Program

# Field Evaluation Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

v 04.02.2024

## 1. Project Information

**Property Owner/Client:** Mille Lacs Band of Ojibwe  Project ID:

Site Address: 37940 207th Place McGregor  Date Completed: 6/20/2024

## 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: Back/ Side Slope

Percent slope: 4.0 %  Slope shape: Linear, Linear  Slope direction:

Describe the flooding or run-on potential of site:

Describe the need for Type III or Type IV system: Water @ 6"

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): No

## 5. Phase I. Reporting Information

| | Depth | | Elevation | |
|---|---|---|---|---|
| **Limiting Condition*:** | 6 | in | **96.70** | ft |
| Periodically saturated soil: | 6 | in | 96.70 | ft |
| Standing water: | 6 | in | 96.70 | ft |
| Bedrock: | NA | in | | 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

Benchmark Elevation: 100.0 ft  Elevations and Benchmark on map? (Y/N): Yes

Benchmark Elevation Location: HOME NE CORNER BOTTOM OF SIDING ORANGE MARKER

Differences between soil survey and field evaluation: REDOX @ 6"

Site evaluation issues / comments:

Anticipated construction issues: OLD MOUND NEED TO BE REMOVED

# Soil Observation Log

Project ID: v 04.02.2024

| | | | |
|---|---|---|---|
| Client: | Mille Lacs Band of Ojibwe | Location / Address: | 37940 207th Place McGregor |

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

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Landscape Position: | Back/Side Slope | Slope %: | 4.0 | Slope shape: | Linear, Linear | Flooding/Run-On potential: | Yes |
| Vegetation: | Forest | Soil survey map units: | 504B | | | Surface Elevation-Relative to benchmark: | 97.10 |
| Date/Time of Day/Weather Conditions: | | 11AM OVERCAST | | | | Limiting Layer Elevation: | 96.50 |
| **Observation #/Location:** | 1 | SOUTH 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-4 | Fine Sandy Loam | 3 | 10YR | 3/2 | | | | | Granular | Weak | Friable |
| 4-7 | Fine Sandy Loam | 3 | 10YR | 5/3 | | | | | Platy | Weak | Friable |
| 7-18 | Fine Sandy Loam | 2 | 10YR | 5/3 | 10YR | 5/8 | Concentrations | S2 | Platy | Weak | Friable |
| | | | | | 7.5YR | 5/6 | Concentrations | S4 | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Comments: WATER @ 7"

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

| KEVIN HERWIG | | 3945 | 6/20/2024 |
|---|---|---|---|
| (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) |

# Soil Observation Log

Project ID:

v 04.02.2024

| | | | |
|---|---|---|---|
| Client: | Mille Lacs Band of Ojibwe | Location / Address: | 37940 207th Place McGregor |

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

| | | | | | |
|---|---|---|---|---|---|
| Landscape Position: | Back/Side Slope | Slope %: | 4.0 | Slope shape: | Linear, Linear |
| Flooding/Run-On potential: | | | | | |
| Vegetation: | Forest | Soil survey map units: | 504B | Surface Elevation-Relative to benchmark: | 96.80 |
| Date/Time of Day/Weather Conditions: | 11AM OVERCAST | | | Limiting Layer Elevation: | 96.20 |
| **Observation #/Location:** | 2 | NE | | Observation Type: | Auger |

| 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 | 3 | 10YR 3/2 | | | | Granular | Weak | Friable |
| 4-6 | Fine Sandy Loam | 3 | 10YR 5/3 | | | | Platy | Weak | Friable |
| 6-16 | Fine Sandy Loam | 2 | 10YR 5/3 | 10YR 5/8 | Concentrations | S2 | Platy | Weak | Friable |
| | | | | 7.5YR 5/6 | Concentrations | S4 | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Comments: WATER AT 6" TO MUCH WATER TO TEST ANY DEEPER

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

| KEVIN HERWIG | | 3945 | 6/20/2024 |
|---|---|---|---|
| (Designer/Inspector) | (Signature) | (License #) | (Date) |

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

# Soil Observation Log

Project ID:

v 04.02.2024

Client: **Mille Lacs Band of Ojibwe** Location / Address: 37940 207th Place McGregor

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

| | | | |
|---|---|---|---|
| Landscape Position: Back/Side Slope | Slope %: 4.0 | Slope shape: Linear, Linear | Flooding/Run-On potential: |
| Vegetation: Forest | Soil survey map units: 504B | | Surface Elevation-Relative to benchmark: 96.75 |
| Date/Time of Day/Weather Conditions: | 11AM OVERCAST | | Limiting Layer Elevation: 96.25 |
| **Observation #/Location:** 3 | NW | Observation Type: Auger | |

| 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 | 3 | 10YR 3/2 | | | | Granular | Weak | Friable |
| 4-6 | Fine Sandy Loam | 3 | 10YR 5/3 | | | | Platy | Weak | Friable |
| 6-15 | Fine Sandy Loam | 2 | 10YR 5/3 | 10YR 5/8 | Concentrations | S2 | Platy | Weak | Friable |
| | | | | 7.5YR 5/6 | Concentrations | S4 | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Comments: WATER AT 6" TO MUCH WATER TO TEST ANY DEEPER

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

| KEVIN HERWIG | | 3945 | 6/20/2024 |
|---|---|---|---|
| (Designer/Inspector) | (Signature) | (License #) | (Date) |

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

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

## 1. PROJECT INFORMATION

v 04.02.2024

Property Owner/Client: Mille Lacs Band of Ojibwe | Project ID:

Site Address: 37940 207th Place McGregor | Date: 06/20/24

Email Address: | Phone:

## 2. DESIGN FLOW & WASTE STRENGTH

Design Flow: 300 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 *Holding Tank Sizing: see 7080.2290*

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

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

The holding tank(s) will be: *Existing tank reuse requires a tank integrity assessment*

Type of High Level Alarm:

(Alarm Set @ 75% tank capacity measured from inlet to bottom)

Comments:

## 4. SEPTIC TANK SIZING *Sizing: See 7080.1930*

**A. Residential dwellings:**

Number of Bedrooms (Residential): 2

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

*Recommended* **Septic Tank** Capacity: 2000 Gallons with 2 Tanks or Compartments

The septic tank(s) will be: *Existing tank reuse requires a tank integrity assessment*

Comments:

Effluent Screen & Alarm (Y/N): Yes | Model/Type: POLYLOC PL-122

**B. Other Establishments:**

Waste received by: GPD x Days Hyd. Retention Time

*7080 Minimum* **Septic Tank** Capacity: Gallons with Tanks or Compartments

*Designed* **Septic Tank** Capacity: Gallons with Tanks or Compartments

The septic tank(s) will be: *Existing tank reuse requires a tank integrity assessment*

Comments:

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

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

Onsite Sewage Treatment Program

# Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

## 5. PUMP TANK SIZING *Sizing: see 7080.2100*

| Soil Treatment Dosing Tank | | Other Component Dosing Tank: | |
|---|---|---|---|
| Pump Tank Capacity (7080 Minimum): | 500 Gal | Pump Tank Capacity (7080 Minimum): | Gal |
| Pump Tank Capacity (Designed): | 1000 Gal | Pump Tank Capacity (Designed): | Gal |
| Pump Req: | 29.0 GPM | Pump Req: | GPM |
| Total Head | 17.7 ft | Total Head | ft |
| Supply Pipe Dia. | 2.00 in | Supply Pipe Dia. | in |
| Dose Vol: | 75.0 gal | Dose Vol: | Gal |

*** Flow measurement device must be incorporated for any system with a pump ***

## 6. SYSTEM AND DISTRIBUTION TYPE

Project ID:

| | | | |
|---|---|---|---|
| Soil Treatment Type: | Mound | Distribution Type: | Pressure Distribution-Level |
| Elevation Benchmark: | 100.00 ft | Benchmark Location: | HOME NE CORNER BOTTOM OF SID |
| MPCA System Type: | Type III | Distribution Media: | Rock |
| Type III/IV/V Details: | WATER AT 6" | | |

## 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 | |
|---|---|---|---|---|---|---|
| Limiting Condition: | 6.0 | inches | 0.50 | ft | 96.70 | ft |
| Minimum Req'd Separation: | 36 | inches | 3.00 | ft | | |
| Distribution Media Bottom*: | Mound | inches | -2.50 | ft | Elevation 99.70 | ft |

***Elevations are critical for system compliance.***

**Media Bottom 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 Bottom Elevation: 100.20 ft Mound Minimum Sand Depth: 30 inches

A. Soil Texture: Fine Sandy Loam

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

D. Contour Loading Rate: 12.0 Note:

E. Measured Land Slope: 4.0 % 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 |

Onsite Sewage Treatment Program

# Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

Project ID:

**Mound:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Dispersal Area | 380.0 | sq.ft | Bed Length | 38.0 | ft | Bed Width | 10.0 ft |
| Absorption Width | 18.0 | ft | Clean Sand Lift | 3.0 | ft | Berm Width (0-1%) | ft |
| Upslope Berm Width | 14.4 | ft | Downslope Berm | 25.8 | ft | Endslope Berm Width | 22.7 ft |
| Total System Length | 83.5 | ft | System Width | 50.2 | ft | Contour Loading Rate | 12.0 gal/ft |

**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 | 3.2 ft |
| Perforation Spacing | 3.0 | ft | Perforation Diameter | 1/4 | in | Drainback Volume | 4.1 gal |
| Min Dose Volume | 73.4 | gal | Max Dose Volume | 75.0 | gal | Total Dosing Volume | 79.1 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 HSW or Type IV/V Design - See Organic Loading tab**

**Organic Loading to Soil Treatment (Based on Waste Strength Data and Organic Loading Design)**

**A.** Organic Loading Based on: **B.** Minumum required area sq.ft

**Technology Strength Reduction (Tretment Level or HSW)**

**A.** Starting Waste Strength Treatment desinged to meet:

Pretreatment Technology: *Must Meet or Exceed Target Level

Model: Units:

Disinfection Technology: *Required for Levels A & B

Model: Units:

**10. Comments/Special Design Considerations:**

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

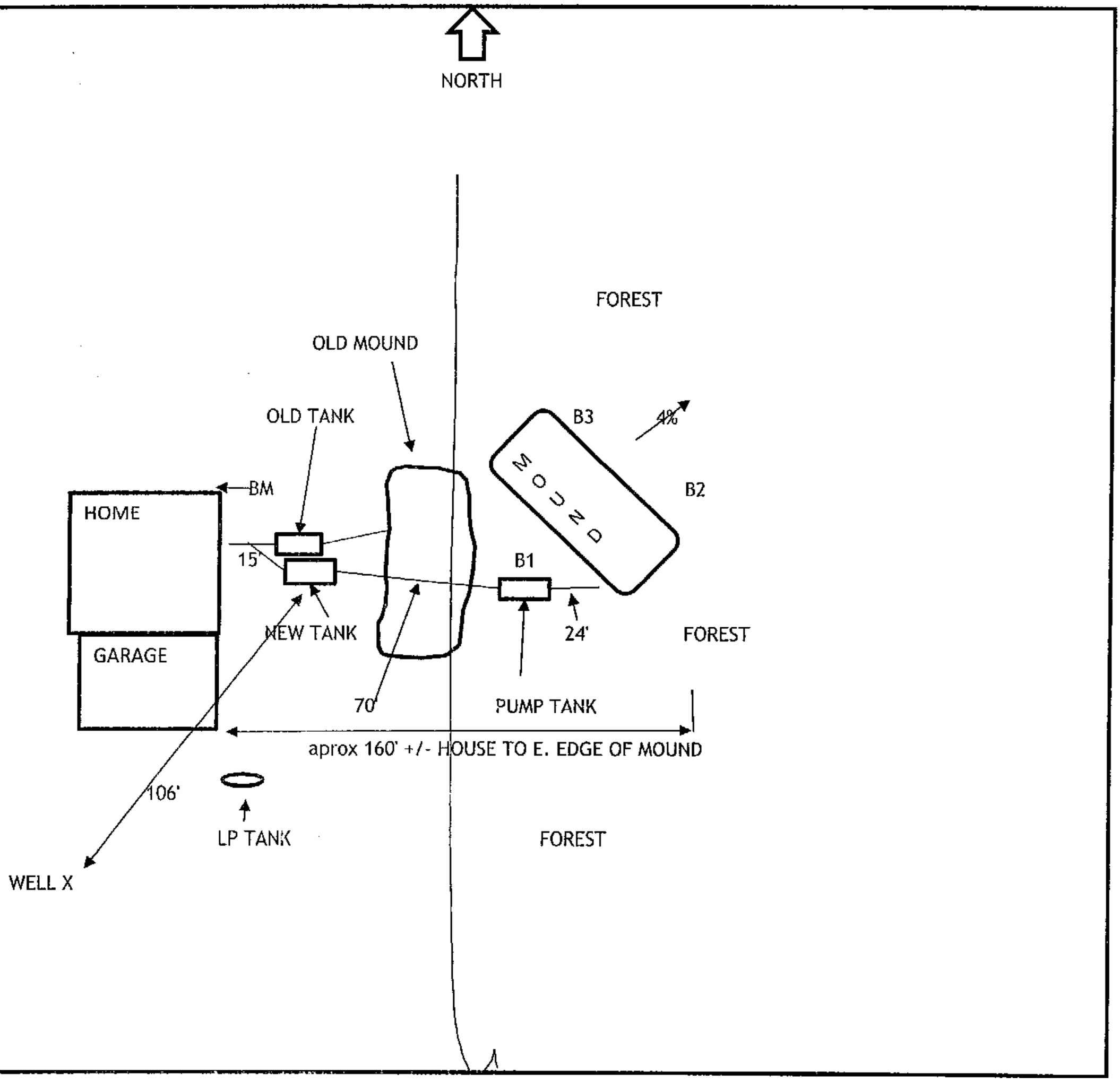
| | | | |
|---|---|---|---|
| KEVIN HERWIG | | 3945 | 6/20/2024 |

# Proposed Design Map

MINNESOTA POLLUTION CONTROL AGENCY

Project ID: v 04.02.2024

**Property Owner/Client:** Mille Lacs Band of Ojibwe




Map scale: NONE  Indicated north  Show slope/contours

**System Corners**

1 2 ↑

3 4 N

## Elevations in feet

Benchmark Elev: 100 ft  Benchmark Location: BOTTOM OF SIDING

| | Rockbed | | Soil Observation: | | | |
|---|---|---|---|---|---|---|
| Corner 1 | 97.05 ft | #1: | 97.1 ft | Tank INLET | 95.5 | ft |
| Corner 2 | 96.8 ft | #2: | 96.8 ft | Other: | | |
| Corner 3 | 97.2 ft | #3: | 96.75 ft | Pump Tank Inlet | 93.8 | ft |
| Corner 4 | 97.2 ft | #4: | ft | | | ft |

Date Completed: 6/20/2024

**Property Owner/Client:** Mille Lacs Band of Ojibwe

## Mapping Checklist

### Locate

- [ ] Lot Dimensions/Property Lines
- [x] Dwellings and Other Improvements
- [x] Existing or Proposed System(s)
- [x] Replacement Area
- [ ] Unsuitable Area(s)
- [ ] Public Water Supply Wells
- [ ] Pumping Access
- [ ] Inner Wellhead Zone
- [ ] Other: _____
- [ ] Other: _____

### Easements

- [ ] Phone
- [ ] Electric
- [ ] Gas
- [ ] Other: _____
- [ ] Other: _____

### Elevations

- [x] Benchmark
- [x] Borings
- [ ] Perc Tests
- [ ] Horizontal and Vertical Reference Points

### Setbacks

- [x] Building
- [ ] All water wells within 100 feet
- [ ] Pressure Pipe
- [ ] Water Suction
- [ ] Streams, Lakes
- [ ] Floodway and Fringe
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

Comments:

Onsite Sewage Treatment Program

# Design Elevations Summary

MINNESOTA POLLUTION CONTROL AGENCY

Project ID: v 04.02.2

**Property Owner/Client:** Mille Lacs Band of Ojibwe

**Property Address:** 37940 207th Place McGregor

Date Completed: 06+/20/2024

**Elevations in feet** Benchmark: 100.0 ft BM Location - HOME NE CORNER BOTTOM OF SIDING ORANGE MARK

**Primary STA**

Elevations From Soil Logs

| **STA Area** | | **Soil Observation Location Elev** | | **Restictive Layer Depth** | **Restictive Layer Elev** |
|---|---|---|---|---|---|
| Corner 1 | 97.1 ft | SO 1 | 97.1 ft | inches | 96.5 ft |
| Corner 2 | 96.8 ft | SO 2 | 96.8 ft | inches | 96.2 ft |
| Corner 3 | 97.2 ft | SO 3 | 96.8 ft | inches | 96.3 ft |
| Corner 4 | 97.2 ft | SO 4 | ft | inches | ft |
| Average Slope | 4.0 % | SO 5 | ft | inches | ft |
| | | SO 6 | ft | inches | ft |
| | | SO 7 | ft | inches | ft |

**Mound**

| | | |
|---|---|---|
| Upslope Elevation (ground) | | 97.2 ft |
| Sand Top Designed | 36 in @ | 100.2 ft |
| Distribution Bottom 7080 Min | | 99.7 ft |
| Bottom of Laterals (+0.5' min) | | 100.7 ft |
| Top of Media (+0.3' min) | | 101.0 ft |
| Top of System (+1.0') Rockbed edge | | 102.0 ft |

**Mound Dimensions** *details in mound design*

| Width | | Length | |
|---|---|---|---|
| 10.0 ft | x | 38.0 ft | Rockbed |
| 18.0 ft | x | 38.0 ft | Absorption Area |
| 50.2 ft | x | 83.5 ft | Berm |

**Corners**

1 2

3 4

Site Plan and Label Corners

**Atgrade**

| | |
|---|---|
| Upslope Elevation (ground) | ft |
| Bottom of Laterals (+0.5' min) | ft |
| Top of Media (+0.3' min) | ft |
| Top of System (+1.0') | ft |

**At Grade Dimensions** *details in atgrade design*

| Width | | Length | |
|---|---|---|---|
| ft | x | ft | Rockbed/Absorption |
| ft | x | ft | Berm |

**Trenches** *details in trench design*

Total Length ft long Width ft Total Area ft²

| | Ground Elevation | Max. Depth | Design Depth | Trench Length |
|---|---|---|---|---|
| | | in | in | Trenches at ft long |
| #1 | ft | ft | ft | ft |
| #2 | ft | ft | ft | ft |
| #3 | ft | ft | ft | ft |
| #4 | ft | ft | ft | ft |
| #5 | ft | ft | ft | ft |
| #6 | ft | ft | ft | ft |
| #7 | ft | ft | ft | ft |

**Bed**

| | |
|---|---|
| Upslope Elevation (ground) | ft |
| Bottom of Bed (excavation depth) | ft |
| Bottom of Laterals (+0.5' min) | ft |
| Top of Media (+0.3' min) | ft |
| Top of System (+1.0') | ft |

**Bed Corners**

| | |
|---|---|
| Corner 1 | ft |
| Corner 2 | ft |
| Corner 3 | ft |
| Corner 4 | ft |

**Bed Dimensions** details in bed design

| Width | | Length | |
|---|---|---|---|
| ft | x | ft | Rockbed |

# Mound Design Worksheet
## ≥1% Slope

MINNESOTA POLLUTION CONTROL AGENCY

**1. SYSTEM SIZING:** Project ID: v 04.02.2024

| | | |
|---|---|---|
| **A.** Design Flow: | 300 | GPD |
| **B.** Soil Loading Rate: | 0.68 | GPD/sqft |
| **C.** Depth to Limiting Condition | 0.5 | ft |
| **D.** Percent Land Slope: | 4.0 | % |
| **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 | * OR ** | Contour Loading Rate: |
|---|---|---|---|---|
| ≤ 60mpi | OR | 1.0, 1.3, 2.0, 2.4, 2.6 | OR | ≤12 |
| 61-120 mpi | OR | 5.0 | OR | ≤12 |
| ≥ 120 mpi* | OR | >5.0* | OR | ≤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 | 0.6 | 2.4 | 0.78 | 2 |
| 46 to 60 | 0.46 | 2.6 | 0.6 | 2.6 |
| 61 to 120 | - | 6 | 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)

300 GPD ÷ 1.20 GPD/sqft = 250.0 sq.ft

**Optional** Upsizing of Dispersal Media Area

**B.** Larger Bed Area Size or Organic Sizing of Bed Area *[see organic loading sheet(2G)]* 380.0 sq.ft

**C.** Designed Dispersal Media Area: 380.0 sq.ft *Larger of 2A or 2B*

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

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

10.0 ft X 1.2 GPD/sqft = 12.0 gal/ft *Can not exceed Table 1*

**F.** Calculate Minimum Dispersal Bed Length: Dispersal Bed Area(2C) ÷ Bed Width(2D)

380 sqft ÷ 10.0 ft = 38.0 ft

If a larger dispersal media Length is desired, enter Length(ft): 38 ft

**3. ABSORPTION AREA SIZING**

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

10.0 ft X 1.8 = 18.0 ft

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

Calculate Downslope Absorption Width: Absorption Width(3A) - Bed Width(2D)

18.0 ft - 10.0 ft = 8.0 ft

## 4. DISTRIBUTION MEDIA: Project ID:

Select Dispersal Media: Rock — Enter Either 4A or 4B

**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:

## 5. MOUND SIZING Project ID:

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

3.00 ft - 0.50 ft = 2.50 ft Design Sand Lift (optional): 3 ft

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

3.00 ft + 0.50 ft + 2.68 ft + 1.00 ft = 7.18 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): 2.00

**D.** Calculate Upslope Berm Width: Multiplier (5C) X Upslope Mound Height (5B)

2.00 X 7.18 ft = 14.36 ft

**E.** Calculate Drop in Elevation Under Bed: Bed Width(2D) X Land Slope(1D) ÷ 100 = Drop (ft)

10.00 ft X 4.0 % ÷ 100 = 0.40 ft

**F.** Calculate Downslope Mound Height: Upslope Height(5B) + Drop in Elevation(5E)

7.18 ft + 0.40 ft = 7.58 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): 3.41

**H.** Calculate Downslope Berm Width: Downslope Multiplier(5G) X Downslope Height (5F)

3.41 x 7.58 ft = 25.85 ft

**I.** Calculate Minimum Berm to Cover Absorption Area: Downslope Absorption Width(3B) + 4 feet

8.00 ft + 4.00 ft = 12.00 ft

**J.** Design Downslope Berm = greater of 5H and 5I: 25.85 ft

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

**L.** Calculate Endslope Berm Width = Endslope Berm Multiplier(5K) X Downslope Mound Height(5F)

3.00 X 7.6 ft = 22.74 ft

**M.** Calculate Mound Width: Upslope Berm Width(5D) + Bed Width(2D) + Downslope Berm Width(5J)

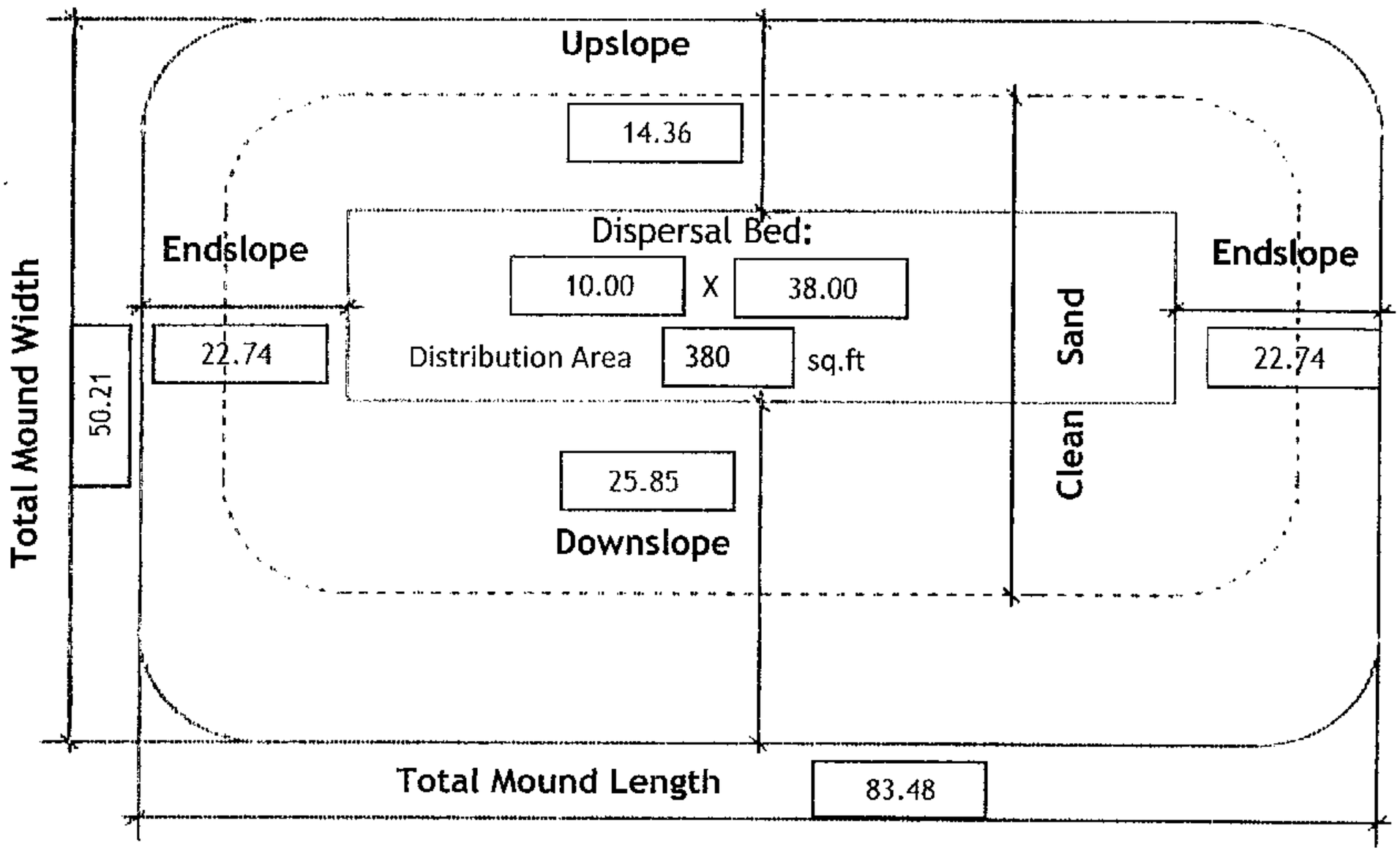
14.36 ft + 10.00 ft + 25.85 ft = 50.21 ft

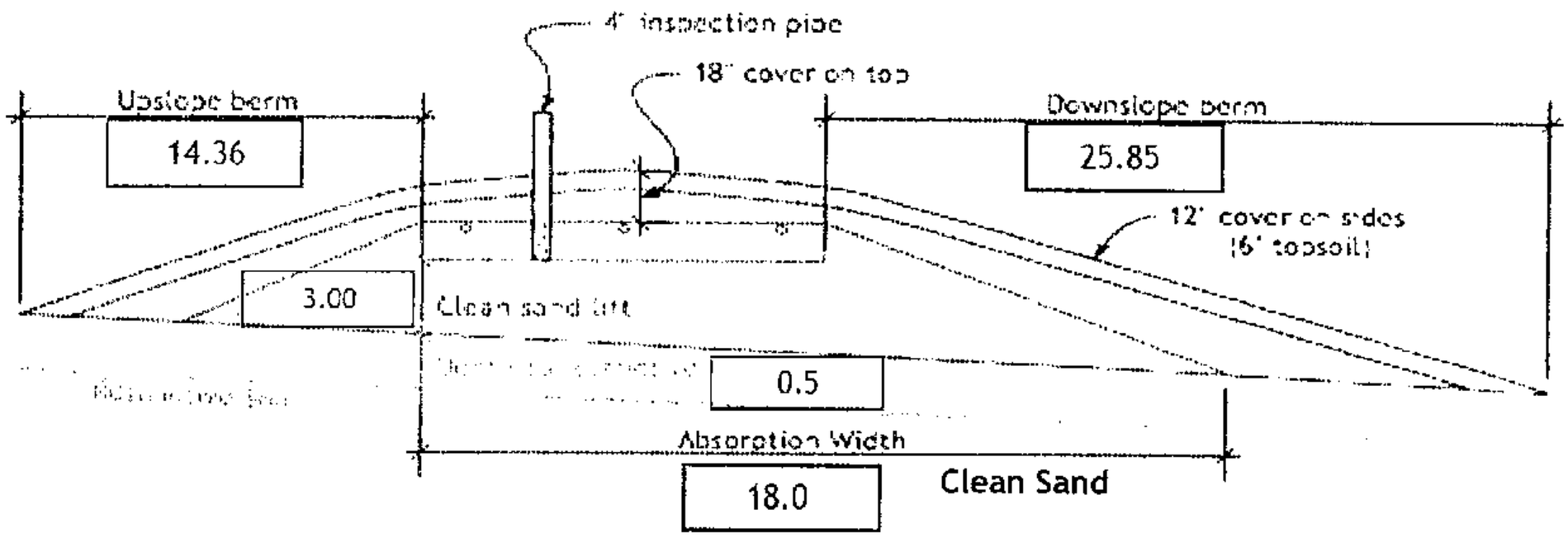
**N.** Calculate Mound Length: Endslope Berm Width (5L) + Bed Length(2F) + Endslope Berm Width(5L)

22.74 ft + 38.00 ft + 22.74 ft = 83.48 ft

## 6. MOUND DIMENSIONS (Feet)

Project ID:




Elevation to Benchmark

Required Separation: 36.0 (in)

Elevation Limiting Layer: 96.70 ft

Distribution Media: Rock

Elevation required Separation: 99.70 ft

Media Depth *Below Pipe* 6 (in)

Elevation Distribution Media Bottom: 100.20 ft

Manifold Connection: end

Lateral Pipe Diameter: 2.00 (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

# Estimated Mound Materials Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

Mound to be constructed to dimensions in design. This is an estimate of materials needed.
Individual construction practices may vary quantities.

Project ID:

v 04.02.2024

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

( 6 in + 5.0 in ) ÷ 12 X 38.0 ft X 10.0 ft = 348.3 cu.ft

Divide cu.ft by 27 cu.ft/cu.yd to calculate cubic yards: 348.3 cu.ft ÷ 27 = 12.9 cu.yd

Add 30% for constructability: 12.9 cu.yd X 1.3 = 16.8 cu.yd

**B.** Calculate *Clean Sand Volume*:

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

3.2 ft X 10.0 ft X 38 ft = 1216 cu.ft

**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*

cu.ft + cu.ft + cu.ft = cu.ft

**For a Mound on a slope greater than 1%**

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

(( 7.2 ft - 1) X 3.0 ft X 38.0 ) ÷ 2 = 352.3 cu.ft

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

(( 7.6 ft - 1) X 8.0 ft X 38.0 ) ÷ 2 = 1000.2 cu.ft

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

( 7.6 ft - 1 ) X 3.0 ft X 10.0 ft = 197.4 cu.ft

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

352.3 cu.ft + 1000.2 cu.ft + 197.4 cu.ft + 1216.0 cu.ft = 2765.8 cu.ft

Divide cu.ft by 27 cu.ft/cu.yd to calculate cubic yards: 2765.8 cu.ft ÷ 27 = 102.4 cu.yd

Add 30% for constructability: 102.4 cu.yd X 1.3 = 133.2 cu.yd

**C.** Calculate *Sandy Berm Volume*:

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

( 7.4 - 0.5 )ft X 50.2 ft X 83.5 ) ÷ 2 = 14418.2 cu.ft

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

14418.2 cu.ft - 2765.8 cu.ft - 348.3 cu.ft = 11304.1 cu.ft

Divide cu.ft by 27 cu.ft/cu.yd to calculate cubic yards: 11304.1 cu.ft ÷ 27 = 418.7 cu.yd

Add 30% for constructability: 418.7 $yd^3$ x 1.3 = 544.3 cu.yd

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

50.2 ft X 83.5 ft X 0.5 ft = 2095.7 cu.ft

Divide cu.ft by 27 cu.ft/cu.yd to calculate cubic yards: 2095.7 cu.ft ÷ 27 = 77.6 cu.yd

Add 30% for constructability: 77.6 cu.yd X 1.3 = 100.9 cu.yd

Onsite Sewage Treatment Program

# Pressure Distribution Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

Project ID: v 04.02.2024

1. Media Bed Width: 10.0 ft

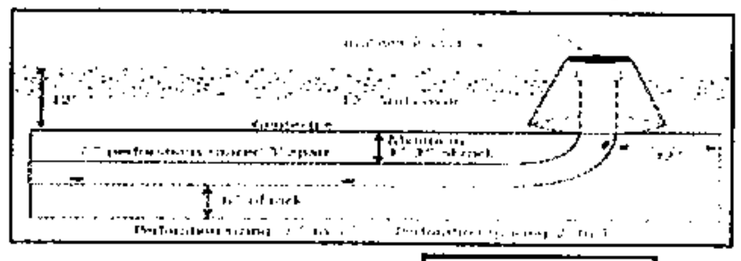
2. Media Bed Length: 38.0 ft

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

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

4. Designer Selected *Number of Laterals*: 3 laterals

   *Cannot be less than line 2 (Except in at-grades)*



5. Lateral spacing in Bed; *Must be greater than 1 foot and no more than 2 feet from Edge*: 3.20 ft

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

   38.0 - 2ft = 36.0 ft *Perforation can not be closer then 1 foot from edge.*

7. Select *Perforation Spacing*: 3.0 ft

8. Determine the *Number of Perforation Spaces*. Divide the *Length of Laterals(6.)* by the *Perforation Spacing* (7.) and round down to the nearest whole number.

   *Number of Perforation Spaces* = 36.0 ft ÷ 3.0 ft = 12 Spaces

9. *Number of Perforations per Lateral* is equal to 1.0 plus the *Number of Perforation Spaces(8.)*. 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* = 12 Spaces + 1 = 13 Perfs. Per Lateral

10. Select *Perforation Diameter Size:* 1/4 in 0.25

11. *Select Lateral Diameter (See Table)*: 2.00 in

12. Select *Manifold Connection* (End or Center): end

If Center Manifold Connection the max number of perfs per lateral in the table can be doubled.

**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 |

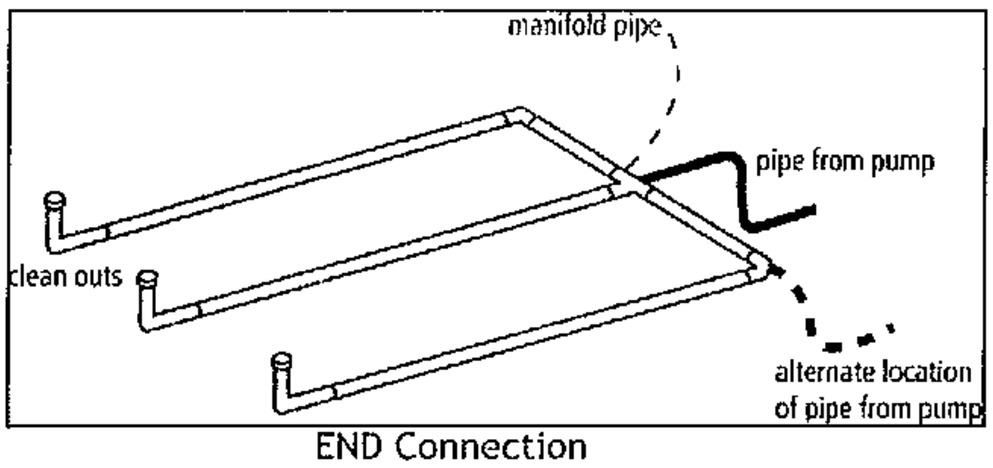
**1/8 Inch Perforations**

| 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 |

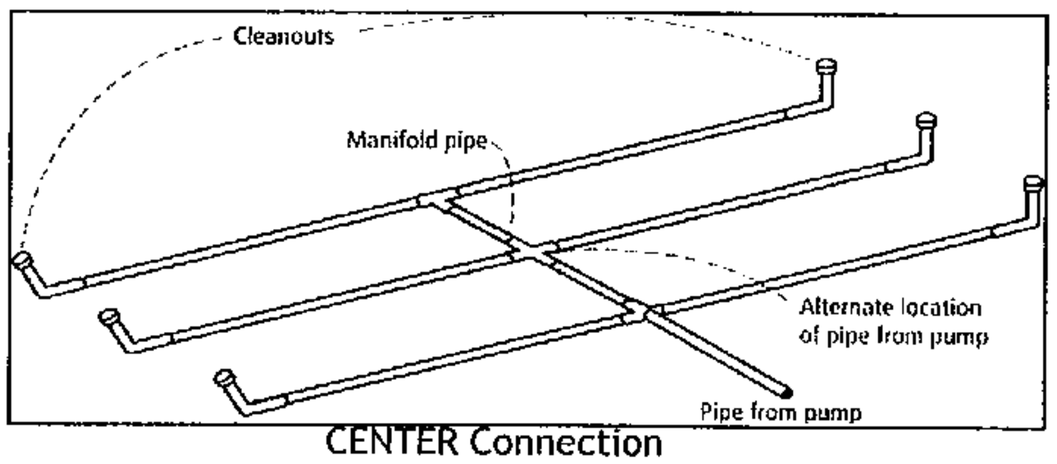
Onsite Sewage Treatment Program

# Pressure Distribution Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY




END Connection




CENTER Connection

Perf Per Lateral: 13

Perf Per Lateral Equal Split: 7 | 6

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

* must not exceed maximum number perfs per lateral in table

End Feed Lateral Min Diameter: 2.00

Center Feed Lateral Min Diameter: ____

13. *Total Number of Perforations* equals the *Number of Perforations per Lateral (9.)* multiplied by the *Number of Perforated Laterals.(4.)*

13 Perf. Per Lat. X 3 Number of Perf. Lat. = 39 Total Number of Perf.

14. 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)(1.) X Bed Length (ft)(2.)

10.00 ft X 38.00 ft = 380 sq.ft

b. *Square Foot per Perforation = Bed Area (14a)* ÷ by *Total Number of Perfs (13)*

380 sqft ÷ 39 perf = 10 sq.ft/perf

15. Select *Minimum Average Head*: 1.0 ft

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

17. *Flow Rate = Total Number of Perfs(13.) X Perforation Discharge(16.)*

39 Perfs X 0.74 GPM per Perforation = 29.0 GPM

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

19. *Volume of Distribution Piping = Number of Perforated Laterals(4.) X Length of Laterals(6.) X Volume of Liquid Per Foot of Distribution Piping (18.)*

3 X 36.0 ft X 0.170 gal/ft = 18.4 Gallons

20. Minimum Delivered Volume = Volume of Distribution Piping (19.) X 4

18.4 gal X 4 = 73.4 Gallons

21. Maximum Delivered Volume = Design flow x 25%

300 gpd X 25% = 75.0 Gallons

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

| Perforation Discharge (GPM) | | | | |
|---|---|---|---|---|
| Head (ft) | Perforation Diameter | | | |
| | 1/8 | 5/32 | 7/32 | 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:

Onsite Sewage Treatment Program

# Pressure Distribution Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

# Basic STA Pump Selection Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

## 1. PUMP CAPACITY

Project ID:

v 04.02.2024

**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: 29.0 GPM

C. Enter pump description: Demand Dosing

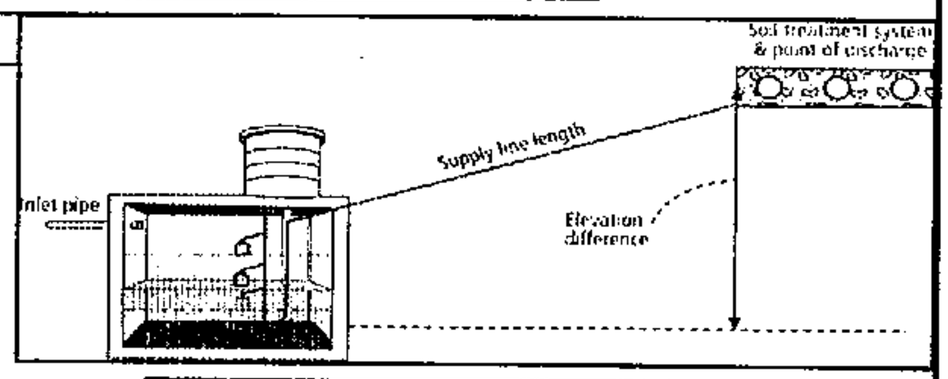
## 2. HEAD REQUIREMENTS

A. Elevation Difference between pump and point of discharge: 12.0 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 |

D. 1. Supply Pipe Diameter: 2.0 in

2. Supply Pipe Length: 24 ft

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

Friction Loss = 2.2 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*

24 ft X 1.25 = 30.0 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(E.)* by the *Equivalent Pipe Length(F.)* and divide by 100.

Supply Friction Loss =

2.2 ft per 100ft X 30.0 ft ÷ 100 = 0.7 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 ft + 5.0 ft + _____ ft + 0.7 ft = 17.7 ft

## 3. PUMP SELECTION

A pump must be selected to deliver at least **29.0** GPM with at least **17.7** feet of total head.

Comments:

# STA Dosing Pump Tank Design Worksheet (Demand Dose)

MINNESOTA POLLUTION CONTROL AGENCY

**DETERMINE TANK CAPACITY AND DIMENSIONS** — Project ID: — v 04.02.2024

1. A. Design Flow: 300 GPD — C. Tank Use: Dosing
   B. Code minimum pump tank capacity: 500 Gal — D. Designed pump tank capacity: 1000 Gal

2. A. Tank Manufacturer: BROWN WILBERT — B. Tank Model:
   C. Capacity from manufacturer: 1207 Gallons
   D. Liquid depth of tank from manufacturer: 49.3 inches
   E. Gallons per inch from manufacturer: 24.5 Gallons per inch

***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* (2E)

   ( 12 in + 2 inches) X 24.5 Gallons Per Inch = 343 Gallons

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

   *-Item 19 of the Pressure Distribution STA or Item 11 of Non-level STA* — 73.4 Gallons (Minimum dose) — 3.00 inches/dose

5. Calculate ***Maximum Pumpout Volume*** (25% of Design Flow(1A))

   Design Flow: 300 GPD X 0.25 = 75.0 Gallons (Maximum dose) — 3.06 inches/dose

6. *Select a pumpout volume that meets both Minimum and Maximum:* 75.0 Gallons

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

   300 gpd ÷ 75.0 gal = 4.0 *Doses**

   * Doses need to be equal to or greater than 4

8. Calculate Drainback:

   A. *Diameter of Supply Pipe* = 2 inches

   B. Length of Supply Pipe = 24 feet

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

   D. *Drainback = Length of Supply Pipe(8B) X Volume of Liquid Per Lineal Foot of Pipe(8C)*

   24 ft X 0.170 gal/ft = 4.1 Gallons

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

   75.0 gal + 4.1 gal = 79.1 Gallons

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

    3 in X 24.5 gal/in = 73.5 Gallons

11. Reserve Capacity Volume = [Tank Liquid Depth(2D) - Alarm Float Depth(10.)] x gallons per inch of tank(2E)

    [ 49.3 in - 20.2 in ] X 24.5 gal/in = 711.0 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** — Alarm and Pump are to be wired on separate circuits and inspected by the electrical inspector

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

    *Total Dosing Volume(9.) ÷ Gallons Per Inch(2E)*

    79.1 gal ÷ 24.5 gal/in = 3.23 inches

13. Measuring from bottom of tank:

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

    12.0 in + 2 in = 14.0 inches

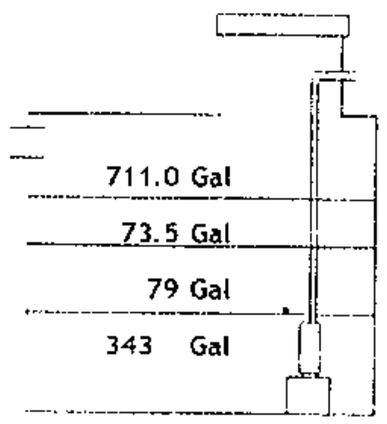
    B. *Distance to set Pump On Float=Distance to Set Pump-Off Float(13A) + Float Separation Distance(12.)*

    14.0 in + 3.2 in = 17.2 inches

    C. *Distance to set Alarm Float = Distance to set Pump-On Float(13B) + Alarm Depth* (2-3 inches)(10.)

    17.2 in + 3.0 in = 20.2 inches

| | | |
|---|---|---|
| Inches for Dose: | 3.2 | in |
| Alarm Depth | 20.2 | in |
| Pump On | 17.2 | in |
| Pump Off | 14.0 | in |



# Tank Buoyancy Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

## 1. Tank Specifications

Project ID:

v 04.02.2024

A. Tank Manufacturer: BROWN WILBERT

Tank Model: 1000

B. Outside Tank Dimensions and Specifications:

Tank Use: Dosing

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Length: | 98 | in | Width: | 68 | in | Height: | 61 | in | Diameter: | | in |
| Length: | 8.2 | ft | Width: | 5.7 | ft | Height: | 5.1 | ft | Radius of Tank: | | in |

## 2. Outside Volume of Tank

### Rectangular Tank

A. Area of Tank = Length (ft) X Width (ft)

8.2 ft X 5.7 ft = 46.3 sq.ft

B. Volume of Tank = Area of Tank (2.A) X Height (ft)

46.3 sq.ft X 5.1 ft = 235.2 cu.ft

### Circular Tank

A. Area of Tank = $\pi r^2$ = (3.14 X (Radius of Tank)$^2$)

3.14 X ( ) ft)$^2$ = sq.ft

B. Volume of Tank = Area of Tank X Height (ft)

sq.ft X ft = cu.ft

## 3. Force of Tank Weight ($F_{TW}$)

Weight of Tank (provided by manufacturer): 8650 lbs

## 4. Force of Soil Weight Over Tank ($F_{SW}$)

A. Depth of Cover Over Tank: 41 in 3.4 ft

B. Weight of Soil Per Cubic Foot: 100 lbs/cu.ft

C. Volume of Soil Over Tank = Depth of Cover(4A) (ft) X Area of Tank(2A) (ft$^2$)

3.4 ft X 46.3 sq.ft = 158.1 cu.ft

D. Weight of Soil Over Tank = Volume of Soil Over Tank(4C) X Weight of Soil Per Cubic Foot

158.1 cu.ft X 100 lbs/cu.ft = 15,811.6 lbs

*Note: Assumes saturation does not get over the lid of the tank*

| Soil Type | Weight of Soil (lbs/ft$^3$) |
|---|---|
| Sandy | 120 |
| Loamy | 100 |
| Clay | 90 |

## 5.Buoyant Force ($F_B$)

Buoyant Force ($F_B$) = Outside Volume of Tank(2B) X Weight of Water Per Cubic Foot (62.4 lbs/ft$^3$) X 1.2 (Safety Factor)

235 X 62.4 lbs/cu.ft X 1.2 = 17,615.2 lbs

## 6. Evaluation of Net Forces

A. Downward Force = Force of Tank Weight ($F_{TW}$)(3.) + Force of Soil Weight of Soil ($F_{SW}$)(4D.)

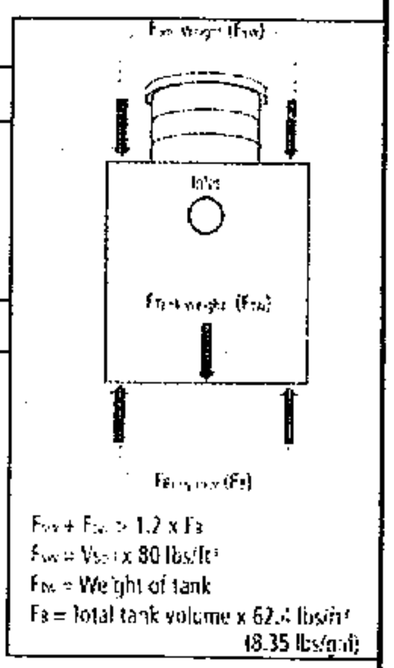
8650 lbs + 15812 lbs = 24,461.6 lbs

B. Net Difference = Downward Force(6A) - Buoyant Force Including Safety Factor (5.)

24462 lbs - 17615 lbs = 6,846.4 lbs

If the Net Difference is negative, counter measures will need to be taken to prevent the tank from floating out of the ground.

Comments/Solution:



# Owners Septic System Management Plan

**Date:** 6/20/2024

**Property Address:** 37940 207TH McGREGOR MN

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** _____

# MONITORING AND MITIGATION

## SEPTIC SYSTEM MONITORED BY OWNER

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 is 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 37940 207th lane McGregor 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