# LE LACS COUNTY LAND SERVICES/ZONING

All components and setbacks shall be shown on the sketch VER SHEET (to accompany all designs) provided by the Designer Owner Telephone # Cell# ner Name: RAND OF OTIBUE MILLE ner Address: OODENA DA DNAM (M MN. 4.369 iress of Property where system is to be installed: ARRISON MAI. 56450 Installer Telephone # taller Address: License # installer FAX # isigner name: License # Designer Telephone # Cell# KEVIN HERWIG 1472 <u> 320-241-7636</u> signer address: Designer E-mail (if used) Designer FAX # 2358 Hay EZEKCAUATING @ VAHOO.COM 09.972,0040 + 09.972.0020 /pe of Dwelling: # of bedrooms: Flow (gpd): **EW SYSTEM** REPLACEMENT SYSTEM **UPGRADE** (Please Circle) **EPTIC/PUMP TANKS:** County recommends sizing septic tank based on garbage disposal if there is a new dishwasher in the home ump tank capacity: ump in basement : Yes / (No Septic Tank Capacity: 2000 ILTER/ALARM: (Yes ) No Pressure Test Required Yes / No lan for existing tank, if any: NONE Distance from nearest well, (show all wells win 100 on sketch). Well type deep or shallow ncluding neighboring wells: Distance from nearest building(s Distance from OHWL Distance from all property lines (show all property lines in sketch) Distance to Road 100 DRAINFIELD Size of drainfield: IOX SX' ROCKBED Type of drainfield Depth to restricting layer: Height of Lift to be added: Circle One: Standard Sys. (Type I) Holding Tanks (Type II) Other Sys. (Type III) Pretreatment Sys. (IV) Distance from nearest well Well type: deep or shallow Distance from building(s) Distance from OHWL Distance from property lines Distance to Road I hereby certify that I am the owner or authorized representative hereby certify that I am a currently licensed SSTS designer certified to design this system and that I have followed all of the parcel and have authorized the above licensed designer to submit this design and application on my behalf. By signing, I requirements of State and County SSTS Codes. agree to comply with the requirements of State and County DesignerSignature: ∽ SSTS codes, and the operating permit, monitoring and mitigation agreement, management plan, and other documents contained herein. Homeowner Signature:

F:Excell.Data.Septic.Forms 2014

Date:

# E-Z EXCAVATING LLC.

2358 HWY# 23 MORA MN. 55051 Ph. 320-679-4031 Cell 320-241-7036

# **DESIGN**

LOCATION: 46748 & 46784 MULLIGAN RD. GARRISON MN.

**OWNER: MILLE LACS BAND OF OJIBWE** 

PID 09-972-0040/09-972-0020

**SYSTEM TYPE:** TYPE III MOUND

**DESIGN FLOW:** 7 BEDROOM DESIGNED @ 1050 GPD

(2- HOMES SHARING 1 MOUND)

TREATMENT AREA: 10'X 88' 880 SQ.FT.

**MOUND SIZE:** 46.8' X 119.3'

**SLOPE: 3%** 

SEPTIC TANK: 2000 GAL. SPLIT/COMBO EACH HOME

FILTER: SIM/TECH HIGH PRESSURE # STF-100A2

**PUMP TANK: 1500 GAL** 

PUMP: GOULDS WE0511H

FLOW METER: SJE-RHOMBUS AB DUO W/EVENT

COUNTER

KEVIN HERWIG M.P.C.A. 1472

# **CONSTRUCTION NOTES**

PRODUCT BRAND & MODEL LISTED IN DESIGN MUST BE USED. (CEMSTONE TANKS –2 SEPTIC 2000 GAL. COMBO(#9552001) 1 SIM/TECH # STF-100A2 FILTER 1-PUMP TANK 1500 GAL. INFILTRATOR IM1530 2-COMPARTMENT. 1 PUMP – GOULDS WE0511H \*\*
PUMP CHAMBER AND PUMP SETTINGS WILL NOT BE CORRECT IF OTHER PRODUCTS ARE USED. \*\*

1-SJE RHOMBUS AB DUO CONTROL WITH EVENT COUNTER 1-SIM/TECH STF-100A2 FILTER

IT IS THE DESIGNERS 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 # 1472** 

# **OSTP Preliminary Evaluation Form**



1. Contact Information			<del>-</del>		v 05.13.14
Property Own	er/Cilent: MILLE LACS BAND OF O	JIBWE		Client Phone Number:	
Mailing Address				Project ID:	*
Site Address	46748/46784 MULLIGAN RD GAR	RISON MIN,	Legal Description		
Parcel ID:	09-972-0040/0020	Latitude		Longitude	
Evaluation for system type	New Construction		Date	October 31, 2017	
2. Flow information					
Client-Provided Information					
Type(s) of use (all that app	(y) Eksidential	Commercial	Dither (Specify)		
No. of bedrooms" (If applic	able) 7		Unfinished space (ft	?)	
No. of residents in home	4 Adults	NA Children	Teenagers		
Existing flow measurement	yes (If Yes, attach readings)				
	Garbage Disposal		☐Vater Softener*	□ron Filter*	
Water-using devices (check			Dump Pump*	Other (specify)	
apply)	☐arge Bethrub/Jacuszi ☐aundry/Large Tub on 2	ad Floor	☐ ligh Efficiency Furnace*		
<u> </u>	Laurory/Large Tub on 2	nd Hoor	Hot Tub*	* Clear water source	
Water use concerns (check	= -			Jong-Term Prescription Meds	Se of Anti-Bacterial Scep
apply)	n-Home Business	lo Lint Screen	<u></u>	Frequent Entertaining of Out-of-Town Guests	<u> </u>
Any additional current or fu	iture uses on this parcel (specify)	<u></u>	<u></u>		
Any non-sewage discharges	to system (specify)				
Sewage ejector or grinder (	oump in home? D'es	<b>2</b> 6		<u> </u>	
I acknowledge the above is	complete and accurate	(Client	(s) signature and date)		
Designer-determined Flow		1050	1		
A. Estimated Design Flow		1050		200.	
Anticipated waste strength	76.12.5.		_	300: mg	
CB00:		r\$S):	mg/L	0&G:	mg/L
3. Preliminary Site Informati					
	within 100 ft of absorption area		⊒ka	Ath Holous Wall Id 8:	<del></del>
	Direct Observation County We		ersonal Communication	MN Unique Well Id #:	
Depth of well(s)	> 50'		Well casing depth(s)	ft	Source MB/DNR
Impervious Layer ☐ <sup>io</sup>	☐re If Yes, Define & Sour			Required Setback:	n
B(Z). Site within 200 ft of	noncommunity transient supply w	ell		Source	
	water supply management area ng and proposed buildings and (mp	rovements on lot (see	De Die Site Evaluation map )	5ource	
• •	pipes within 50 ft of proposed syst	•			
C. Location of all easemen	ts on lot (see Site Evaluation map)		Source		
D. Elevation of ordinary hi	gh water level (OWHL) - MN DNR (i	f adjacent to parcel	) [	NA NA	-
E. Floodplain designation a	and flood elevation			Sou	irce
F. Determine property line	es (see Site Evaluation map )	☐urvey ☑tet	Map ☑Dther:		
Site located in a shoreland	district/area 👉	<b>⊡</b> lo	<u>`</u>		
G. Distance of setbacks	Property Lines	<b>□</b> HWL	☐Water Supply Pipes		
	Dither Buildings	☐ Essements	- Well(s)		

# **OSTP Preliminary Evaluation Form**



List landforms   ATTACHED   Stope Range	H. Soil Survey i	nformation (from we	b soil survey)		☐4ep	Map Units on Pare	cel	ATTACHED			
Person materials -check of their gopt    Deliver		List landforms	ATTACHED		-	Sloo	e Range	,	ì		
Date   Date   Decirio	<u> </u>			poly		1	-		ion (check all	that apply)	
Decision					□Da/Fit	☐ Summit	Shou				□Plain
May Unit Ratings Septic Tank Absorption Field - Trench (MN) Septic Tank Absorption Field - Trench (MN) Septic Tank Absorption Field - Trench (MN) Septic Tank Absorption Field - An-grade (MN) Septic Tank Absorption Field - Trenture(s) Structure(s) Structure	Dubwash	□.oess	Bedrock	Drganic		Depression	Direc	ип/Тепасс	Hanmade	Toe Slope	
May Unit Ratings Septic Tank Absorption Field - Trench (MN) Septic Tank Absorption Field - Trench (MN) Septic Tank Absorption Field - Trench (MN) Septic Tank Absorption Field - An-grade (MN) Septic Tank Absorption Field - Trenture(s) Structure(s) Structure	416-	denim hadrock danth	. The chart		Min	mem badrack dam	h	lincher			
Septic Tank Abrophion Field - Trench (MN) Septic Tank Abrophion Field - Art probe (MN) Septic Tank Abrophion Field (MN) Septic Tank Abrophion Septic Tank Abrophion Septic Tank Abrophion Septic Tank Abrophion			7					5			
Asp Unit  Asp Un	Max	dinum bedrock depth:			Max	mum bedrock depi	in:	Inches			
Septic Tank Absorption Field - Mound (WII) PERY LIMITED  4. Preliminary Soil Profile information (From web soil survey - m  Enter information here or attach map and description.  Map Unit    Depth   Texture(t)   Structure(t)   Consistence   Restrictions   Color			Septic Tank Ab:	iorption Fie	eld - Trench (WN)						
4. Preliminary Soil Profile Information (from web soil survey - m  Enter Information here or attach map and description.  Map Unit	Map Unit Rating	s	Septic Tank Abso	rption Field	d - At-grade (MN)						
Enter Information here or attach map and description.  Map Unit  Depth Texture(s) Structure(s) Consistence  Nortzon 1  Horizon 2  Horizon 3  Horizon 1  Horizon 1  Horizon 3  Horizon 3  Horizon 1  Horizon 3  Horizon 1  Horizon 5  Map Unit  Depth Texture(s) Structure(s) Consistence  Restrictions  Color  Restrictions  Color  Consistence  Restrictions  Color  Restrictions  Color  Restrictions  Color  Nortzon 1  Horizon 2  Horizon 3  Horizon 1  Horizon 1  Horizon 1  Horizon 3  Horizon 1  Horizon 3  Horizon 1  Horizon 5  Map Unit  Depth Texture(s) Structure(s) Consistence  Restrictions  Color  Color  Nortzon 3  Horizon 4  Horizon 5  Map Unit  Depth Texture(s) Structure(s) Consistence  Restrictions  Color  Color  Color  Nortzon 1  Horizon 1  Horizon 2  Horizon 3  Horizon 4  Horizon 3  Horizon 4  Horizon 5  Louisectific design requirements  Louisectific design requirements  Louisectific design requirements  Louisectific installation requirements  Louisectific design requirements  Louisectific installation requirements  Louisectific installation requirements  Louisectific design require			Septic Tank Ab	sorption Fi	eld - Mound (MN) VE	RY LIMITED					
Depth   Texture(s)   Structure(s)   Consistence   Restrictions   Color	4. Preliminary Soi	l Profile Information	(from web soil sur	vey - m							
Aprizon 1   Horizon 3   Horizon 4   Horizon 5   Color	Enter Informatio	on here or attach map	and description.								
Nortzon 1 Nortzon 3 Nortzon 4 Nortzon 5 Nap Unit  Pepth Texture(s) Structure(s) Consistence Restrictions Color  Hortzon 1 Nortzon 2 Hortzon 3 Hortzon 3 Hortzon 5 Nap Unit  Depth Texture(s) Structure(s) Consistence Restrictions Color  Texture(s) Structure(s) Consistence Color  Other Restrictions Color  Nortzon 1 Nortzon 1 Nortzon 2 Nortzon 3 Nortzon 4 Nortzon 3 Nortzon 4 Nortzon 4 Nortzon 5 Nap Unit  Depth Texture(s) Structure(s) Consistence Restrictions Color  Nortzon 1 Nortzon 3 Nortzon 4 Nortzon 5 Nortzon 3 Nortzon 4 Nortzon 5 Nortzon 5 Nortzon 5 Nortzon 1 Nortzon 5 Nortzon 1 Nortzon 5 Nortzon 1 Nortzon 5 Nortzon 6 Nortzon 6 Nortzon 7 Nortzon 7 Nortzon 7 Nortzon 7 Nortzon 8 Nortzon 8 Nortzon 9 Nortzon 9 Nortzon 9 Nortzon 1 Nortzon 3 Nortzon 1 Nortzon 1 Nortzon 3 Nortzon 1 Nortzon 1 Nortzon 3 Nortzon 1 Nortzon 5 Nortzon 1 Nortzon 5 Nortzon 1 Nortzon 5 Nortzon 1 Nortzon 5 Nortzon 1 N	Map Unit									Other	
Nortzon 2			Depth		Texture(s)	Structure(s)		Consistence		Restrictions	Color
Hortzon 3		Horizon 1									
Hortzon 5		Horizon 2						<u> </u>			
Hortzon 5											
Map Unit    Depth   Texture(s)   Structure(s)   Consistence   Restrictions   Color								ļ			
Horizon 1 Horizon 2 Horizon 3 Horizon 4 Horizon 5  Map Unit  Depth Texture(s) Structure(s)  Nap Unit  Depth Texture(s) Structure(s)  Consistence  Restrictions  Color  Other Restrictions  Color  Horizon 7 Horizon 1 Horizon 3 Horizon 4 Horizon 5  Map Unit  Depth Texture(s) Structure(s)  Consistence  Restrictions  Color  Nap Unit  Marizon 1 Horizon 5  Horizon 1 Horizon 2 Horizon 3 Horizon 1 Horiz	11 15-15	Hortzon 5			l	<u> </u>		<u> </u>			
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Horizon 3 Horizon 4 Horizon 5  Map Unit    Depth   Texture(s)   Structure(s)   Consistence   Restrictions   Color		Horizon 1	1		12.03.0427	3		Constant	T		
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Map Unit    Horizon 5   Depth   Texture(s)   Structure(s)   Consistence   Restrictions   Color						<del>                                     </del>					
Map Unit    Depth   Texture(s)   Structure(s)   Consistence   Restrictions   Color		Horizon 4				i					
Depth Texture(s) Structure(s) Consistence Restrictions Color  Horizon 1 Horizon 3 Horizon 4 Horizon 5  Map Unit  Depth Texture(s) Structure(s) Consistence  Other Restrictions Color  Horizon 1 Horizon 1 Horizon 3 Horizon 3 Horizon 3 Horizon 3 Horizon 4 Horizon 5  Local Government Unit Information  Name of LGU LGU-specific design requirements  LGU-specific design requirements  LGU-specific design requirements  LGU-specific firstallation requirements  LGU-specific firstallation requirements  LGU-specific installation requirements  LGU-specific firstallation requirements		Horizon 5									
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Horizon 2 Horizon 3 Horizon 4 Horizon 5  Map Unit  Depth Texture(s) Structure(s)  Other Restrictions  Color  Horizon 1 Horizon 2 Horizon 3 Horizon 3 Horizon 4 Horizon 5  Local Government Unit Information  Name of LGU LGU-specific design requirements LGU-specific installation requirements  LGU-specific installation requirements  LGU-specific installation requirements  LGU-specific installation requirements  LGU-specific metallation requirements  LGU-specific metallation requirements  LGU-specific metallation requirements  LGU-specific installation requirements  LGU-specific metallation requirements			Depth		Texture(s)	Structure(s)		Consistence		Restrictions	Cotor
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Horizon 4 Horizon 5  Map Unit  Depth Texture(s) Structure(s) Consistence Restrictions Color  Horizon 1 Horizon 2 Horizon 3 Horizon 4 Horizon 5  Local Government Unit Information  Name of LGU LGU-specific setbacks LGU-specific setbacks LGU-specific installation requirements LGU-specific installation requirements  I hereby certify that I have completed this work in accordance with all applicable ordinances, rule and laws. \( \text{NEVIN HERWIG} \)  KEVIN HERWIG  MILLE LACS COUNTY  LGU Contact  1472 10/31/17											<b></b>
Horizon 5  Map Unit  Depth Texture(s) Structure(s) Consistence  Horizon 1  Horizon 2  Horizon 3  Horizon 4  Horizon 5  Local Government Unit Information  Name of LGU  LGU-specific setbacks  LGU-specific design requirements  LGU-specific firstallation requirements						<del> </del>					94
Map Unit    Depth   Texture(s)   Structure(s)   Consistence   Restrictions   Color					<u> </u>	<del> </del>					
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Horizon 4 Horizon 5  S. Local Government Unit Information  Name of LGU LGU-specific setbacks  LGU-specific design requirements  LGU-specific Installation requirements  I hereby certify that I have completed this work in accordance with all applicable ordinances, ruley and laws.   KEVIN HERWIG  1472 10/31/17		Hortzon 2		1							
Horizon 5  5. Local Government Unit Information  Name of LGU		Horizon 3									
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I hereby certify that I have completed this work in accordance with all applicable ordinances, rule and laws. A  KEVIN HERWIG  1472  10/31/17	LGU-specific des	sign requirements					_				
KEVIN HERWIG 1472 10/31/17	LGU-specific ins	tallation requirement	3								
- felle / Belley -	I hereby certify	that I have completed	this work in accord	sance with	all applicable ordin	ances, rules and la	ws. ^				
- Level Belley -		KE	/IN HERWIG		_/	101	,	141	72	10/31/17	
(Designer) (License #) (Date)					Luci-	Peru	1/				
		(	Designer)	-/-		iguitore)		(Licen	se #)	(Date)	

# **OSTP Field Evaluation Form**



1. Contact Information		Project ID:			v 05.13.14
	MILLE LACS BAND OF OJIE			Client Phone Number:	
	46748/46784 MULLIGAN RI				
Date 10/31/2017	Weather Condition	ons		OVERCAST DAMP	
2. Utility and Structure Informat	ion				
Utility Locations Identified	Gopher State One Call #		Any Private Utilities		
Property Lines	Determined and Approved by	Client		Client's Approval (initial)	i
	Determined but not Approved				
İ					
	Property Lines Surveyed				
Locate and Verify (see Site Evalua	ıtlon map )				
	Existing Buildings	Improvements	Easements [	Setbacks	
3. Site Information					
			et 81	<del>- ·</del>	
Percent Slope	3		Slope Direction		<b>⊣</b> I
Landscape Position	SHOULDER		Slope Shape		
Vegetation type(s)			IS/LAWN		i
Evidence of cut, fill, com	pacted or disturbed areas	Ø/es C	No		
Discuss the flooding	or run-on potential of site				
Identify hen	chmarks and elevations (S	ite Evaluation Map ) TO	OP OF FLECTRIC BOX WE	FST LOT 100.00	
			No	31 201 100,00	
Proposed soil treatment area adec	dratery buotecred				
4. General Soils Information			_ <del>_</del>		
14.19	☑/es	□No	L		
Type of observation	Soil Probe	☐Soll Boring :	Soil Pit		ľ
Number of soil observations	3	]			
Soil observations were conducted	in the proposed system to	cation	∐res □No		i
A soil observation was made withi	in the most limiting area o	f the proposed system	ØYes [	No	l
Soil boring log forms completed a	nd attached	☑Yes □No			
Percolation tests performed, form		∏Yes ☑No			
5. Phase I. Reporting informatio	on.				
Depth to standing war	ter 10	Inches	○ Ar	nticipated construction issues	
Flood elevati		feet			i
		Inches			
Depth to bedro		200			
Depth to periodically saturated s		inches		<del></del>	<u> </u>
Maximum depth of syste	em	inches		<u></u>	
Elevation at system botto	om 98.7	feet	Differences I	between soil survey and field evaluation	
Percolation ra	te	min/inch			
Loading ra	ate 0.42	gpd/ft <sup>2</sup>	Fal =		
Contour loading ra		gpd/ft			77
Site evaluation issues / comments		Jar			
Dire evaluation issues / comments					
			-		
	<u> </u>				
					i
I					
I hereby certify that I have compl	eted this work in accordar	nce with all applicable	ordinances, rules and la	IWS.	
			~ <i>i//</i>		
KE\	VIN HERWIG	Puelo	Hanne	1472 10/31/1	7
	Designer)	Jan K	gnature)	(License #) (Date)	— I
<u> </u>		<del>~ / / / \</del>	<del></del>	(mate)	

# OSTP Soil Observation Log

v 05.13.14

Project ID:

ਰ	Client/ Address:				Legal Desc	Legal Description/ GPS:			
Soil parent r	Soil parent material(s): (Check all that apply)	heck all t		Outwash   Lacustrine	e ∐toess ☑Till	Fill Alturium	um Bedrock		Organic Matter
Landscape P	Landscape Position: (check one)	k one)	Summit (35h	✓ Shoulder Back/Side Slope	pe Troot Stope	Toe Slope	Toe Stope Stope shape		rin
Vegetation		GRASS	\ <u>\</u>	Soil survey map units		Stope%	3.0	Elevation:	98.88
Weather Co	Weather Conditions/Time of Day:	of Day:		11AM CLOUDY	UDY		Date		10/31/17
Observatio	Observation #/Location:			1		asq0	Observation Type:		Soil Pit
Denth (in)	Tevture	Rock	Matrix Color(s)	Mottle Colories	Dodov Vindel	Indicatorical	-	Structure	
fund madaa	200	Frag. %		יייטרנופ שייטן (א)	nedok niiku(s)	וווטורמנטו (א)	Shape	Grade	Consistence
0-7	Fill Soil	<35%	7.5YR 3/2				Blocky	Weak	Friable
7-12	Fill Soil	<35%	7.5YR 3/4	7.5YR 4/6	Concentrations	S1	Platey	Weak	Friable
50g									
			50						
Comments									
I hereby certi	I hereby certify that I have completed this work i	completed	d this work in accor	in accordance with all applicable ordinances, rules and laws.	able ordinances, i	rules and laws			
X	KEVIN HERWIG		The state of the s	1 Money	. 6		1472		10/31/2017
(Desi	(Designer/Inspector)	ر. د		// (Signature)		•	(License #)		(Date)
			1	101		133	0.525	20 00 00%	

# Additional Soil Observation Logs



Project ID:

:E	Client/ Address:					Legal D	Legal Description/ GPS:	ı/ GPS:				W.
Soil parent r	Soil parent material(s): (Check all that apply	heck all th	hat apply)		Outwash   Lacustrine	SSOT 🗌	<b>#</b>	∏ Altunum	n   Bedrock		Organic Matter	
Landscape P	Landscape Position: (check one)	k one)	Summit	Shot	Shoulder Back/Side Slope	ppe   Foot Slope		Toe Stope 5	Toe Stope Stope shape		I	
Vegetation		GRASS		Soil	Solt survey map units			Stope%	3.0	Elevation:	98.2	
Weather Cor	Weather Conditions/Time of Day:	of Day:			SAME				Date		10/31/17	
Observatio	Observation #/Location:				2			Observa	Observation Type:		Soil Pit	
Denth (in)	Texture	Rock	Matrix Col	Color(e)	Mottle Color(c)	Dodov Windle)		10,101		J Structure	Ure	Γ
		Frag. %		2	יווסרויב במימו (ב)	ייכחסי עוווחני		marcator (s)	Shape	Grade	Consistence	به
4-0	Loam	<35%	10YR 3/2	7,2	237				Blocky	Weak	Friable	
4-10	Silt Loam	<35%	10YR 5/2	72	7.5YR 4/6	Concentrations		S1	Platey	Moderate	Friable	
11-14	Silt Loam	<35%										
Comments	Comments WATER AT 10'											
												1

Observatio	Observation #/Location:			3		Obse	Observation Type:		Soll Pit
Depth (in) Texture	Texture	Rock	Watrly Colories	l.	Mottle Color(s) Bodov Mind(s) Indicator(s)	Indicatorici	1	Structure	
, , ,		Frag. %	(c) 1000 VI 1771	- 1	וובחמץ עווומ(א)	יווחורמות (א)	Shape	Grade	Consistence
6-0	Fill Soil	<35%	7.5YR 3/2	7.5YR 4/6	Concentrations	S1	Platey	Weak	Friable
10-13	Fill Soit	<35%	7.5YR 3/4				Platey	Weak	Friable
	0								
Comments	49						***		

LOCATION DUSLER

MN

Established Series Rev. RRL-AGG 01/2011

# **DUSLER SERIES**

The Dusler series consists of very deep, somewhat poorly drained soils that formed in loamy glacial till on till floored lake plains, and moraines. Permeability is moderate in the mantle and slow in the underlying material. Slopes range from 0 to 3 percent. Mean annual air temperature is about 38 degrees F. Mean annual precipitation is about 28 inches.

TAXONOMIC CLASS: Fine-loamy, mixed, superactive, frigid Aquic Glossudalfs

**TYPICAL PEDON:** Dusler silt loam on a concave slope of 1 percent in a pasture. (Colors are for moist soil unless otherwise stated.)

A-0 to 4 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; strong fine granular and strong very fine subangular blocky structure; friable; many fine and very fine roots; 2 percent gravel; strongly acid; clear wavy boundary. (3 to 7 inches thick)

E1--4 to 11 inches; very dark gray (10YR 3/1) silt loam, light brownish gray (10YR 6/2) dry; moderate fine platy structure; very friable; many fine and very fine roots; many very fine continuous vertical pores; few fine iron and manganese oxide concretions; 2 percent gravel; strongly acid; clear wavy boundary.

E2-11 to 15 inches; gray (10YR 6/1) fine sandy loam, very pale brown (10YR 8/2) dry; weak fine and medium platy structure; very friable; common fine and very fine roots; many very fine continuous vertical pores; common fine prominent strong brown (7.5YR 5/6) Fe concentrations; few fine iron and manganese oxide concretions; 2 percent gravel; strongly acid; clear wavy boundary. (combined thickness of the E horizons is 3 to 12 inches)

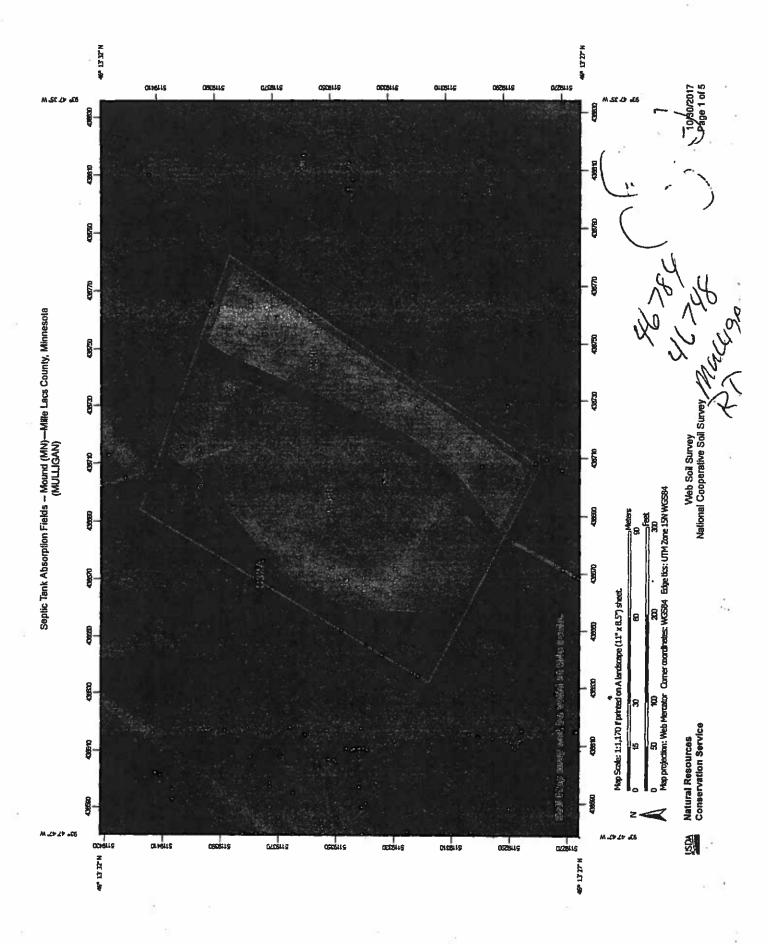
E/B--15 to 22 inches; 65 percent reddish gray (5YR 5/2) sandy loam, pinkish white (5YR 8/2) dry (E); 35 percent reddish brown (5YR 4/3) loam, reddish brown (5YR 5/3) dry (B); moderate coarse platy structure; firm; slightly hard; brittle; few roots; few vesicular pores; common fine distinct yellowish red (5YR 5/8) Fe concentrations; 2 percent gravel; strongly acid; clear wavy boundary. (2 to 10 inches thick)

Bt1--22 to 37 inches; reddish brown (5YR 4/3) loam; moderate coarse prismatic structure parting to strong medium subangular blocky; firm; hard; few moderately thick dark gray (5YR 4/1) clay films on faces of prisms and in roots channels; common thin dark reddish brown (5YR 3/3) clay films on horizontal and vertical faces of blocky peds; common fine prominent yellowish red (5YR 5/8) Fe concentrations; 2 percent gravel; moderately acid; diffuse smooth boundary.

# Septic Tank Absorption Fields — Mound (MN)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
C32A	Elisburg sitt loam, 0 to 2	Extremely limited	Elisburg (80%)	Soil saturation (1.00)	D.3	12.1%
	percent slopes		Baden,	Ponding (1.00)	i	
			depressional (10%)	Soil saturation (1.00)		
C34B	complex, 0 to	Very limited	Ousler (50%)	Soil saturation (0.88)	1.6	58.0%
	5 percent slopes	Moderately limited	-955 KG -0-0-	Slope (0.02)	3-00	sasses or in
C50B	Culver-Dusler complex, 1 to		Culver (60%)	Soil saturation (0.52)	0.8	29.9%
	8 percent slopes		34.	Slope (0.26)	ļ	
Totals for Area o	of Interest				2.7	100.0%

Rating	Acres in AOI Percent of AOI	
Very limited	1.6	58.0%
Moderately limited	0.8	29.9%
Extremely limited	0.3	12.1%
Totals for Area of Interest	2.7	00.0%



# Site Elevation Sheet

#### LOCATION: MULLIGAN RD

BENCHMARK LOCATION TOP OF ELECTRIC BOX

**ELEVATION 100.00** 

TANK #1

surface E. HOME 101.00 Inlet 99.00

TANK #2 surface W. HOME 99.10

inlet 97.40

PUMP TANK surface 99.70

inlet 96.00

#### **ROCK BED SURFACE**

N.E. 98.50

N.W. 98.40

S.E. 98.70

S.W. 98.70

#### **BERM SURFACE**

N.E. 98.00

N.W. 98.00

S.E. 99.10

S.W. 99.05

#### SAND TO ROCK BED INTERFACE ELEVATION 101.70

#### **SOIL PITS OR BORINGS**

#1 SURFACE 98.88

REDOX

WATER

#2 SURFACE 98.20

REDOX 97.70

**WATER 97.60** 

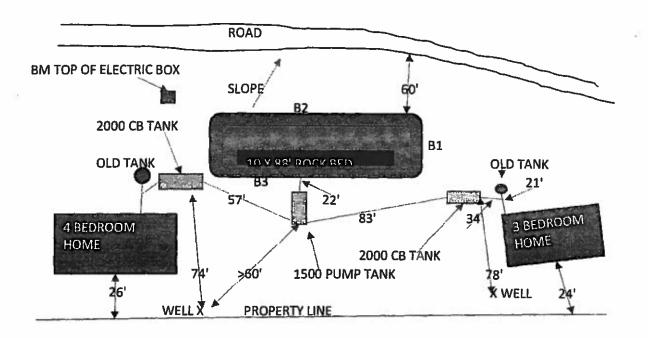
#3 SURFACE 98.10

REDOX

WATER

# **NOT TO SCALE**







# **OSTP Design Summary Worksheet**

University of Minnesota



Property Owner/Client: MILLE LACS	Project ID: v 04.20.2016
Site Address: 46748 & 46784 MULLIGAN RD GARRISON MN. 56450	Date: 10/31/17
1. DESIGN FLOW, STRENGTH OF WASTE, AND TANKS	
A. Design Flow: 1050 Gallons Per Day (GPD) Number of Bedrooms (Residen	ntial): 7
Type of Wastewater: Residential Treatment Level	trients:
Commercial (select method and provide data):	Estimated Flow: GPD
B. Septic Tanks:	
Minimum Code Required Septic Tank Capacity (Dwellings): 2000 Gallons, in	1 Tanks or Compartments
Minimum Septic Tank Capacity for Other Establishments = Design Flow X 3.0 If received by gravity or 4	` <del></del>
Waste received by:	- Gallons
Recommended Septic Tank Capacity: Gallons, in	Tanks or Compartments
Effluent Screen & Alarm: 🗹 Yes 🗀 No 🔲 Optional 🗀 Screen Only Effluent Screen Manufacturer/Model:	SIM/TECH STF-100A2
C. Holding Tanks Only: Minimum Capacity: Residential =400 gal/bedroom, Other Establishment = Design Fl	
Minimum Code Required Capacity: Gallons, in Tanks	Type of High Level Alarm:
Designer Recommended Capacity: Gallons, in Tanks	
D. Pump Tank 1 Capacity (Code Minimum): 1050 Gallons Pump Tank 2 Capacity (Code	Minimum): Gallons
Pump Tank 1 Capacity (Designer Rec): 1500 Gallons Pump Tank 2 Capacity (Designer Rec)	gner Rec): Gallons
Pump 1 65.0 GPM Total Head 18.7 ft Pump 2 GPM	Total Head ft
Supply Pipe Dia. 2.00 in Dose Volume: 250.0 gal Supply Pipe Dia.	in Dose Volume: gal
2. SYSTEM AND DISTRIBUTION TYPE	
Soil Treatment Area Type: Mound Distribution Type: Pres	ssure Distribution-Level
Benchmark Reference Elevation: 100.00 ft Benchmark Location; TOP OF POWER I	BOX
MPCA Type: Type III Type of Distribution Media: ☑Drainfield Rox	ck Registered Treatment Media:
Comments:	
3. SITE EVALUATION:	· · · · · · · · · · · · · · · · · · ·
A. Depth to Limiting Layer: 0 in 0.0 ft G. Soll T	exture: Silt Loam
B. Elevation of Limiting Layer: 97.7 H. Soil Hyd. Loadin	ng Rate: 0.42 GPD/ft <sup>2</sup>
C. Loc. of Restrictve Elevation: B2 I. Per	rc Rate: MPI
D. Minimum Required Separation: 36 in 3.0 ft J. Soil with >35% Rock	Fragments Present?
If yes describe below: % rock	and layer thickness, amount of soil credit and any essing the rock fragments in this design.
F. Measured Land Slope %: 3.0 %	
Comments:	
4. DESIGN SUMMARY	
Trench Design Summary	
Dispersal Area ft <sup>2</sup> Sidewall Depth in	Trench Width ft
Total Lineal Feet ft Number of Trenches Cod	le Maximum Trench Depth in
Contour Loading Rate ft Min Trench Length ft De	signer's Max Trench Depth in



# **OSTP Design Summary Worksheet**

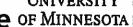
University of Minnesota



					Design 30	attition y				
	Absorpt	tion Area	ft²	Depth of	sidewall		in	Code Max	dmum Bed Depth	ín
	В	ed Width	ft	Ber	d Length		ft	Designer	's Max Bed Depth	[ព
				Mour	d Design !	Summa	гу			
	Absorption	Bed Area	875.0 ft <sup>2</sup>	Bed	d Length	87.	5 ft	B	ed Width 10.0 f	ı.
	Absorpti	on Width	29.0 ft	Clean S	sand Lift	3.0	ft	Berm Wid	th (0-1%)f	t
	Upstope Ber	rm Width	13.8 ft	Downslope Bern	n Width	23.	0 ft	Endslope Be	rm Width 15.9 f	t
	Total System	m Length	119.3 ft	Total Syste	m Width	46.	8 ft	Contour Loa	ding Rate 12.0 g	al/ft
<u> </u>	<del></del>			At-Gra	de Design	Summ	ary			
4	bsorption B	ed Width	ft	Absorption Be	d Length		ft	System	n Finished Height	ft
	Contour Load	ling Rate	gal/ft	Upslope Ber	m Width		ft	Down	slope Berm Width	ft
	indslope Be		ft	Systen	n Length		ft		System Width	==  <sub>ft</sub>
	-		<del></del>	evel & Equal P	ressure Di	istribut	ion Summary			
No. a	Perforated	Laterals	3	Perforation		3		Peri	foration Diameter 1/4	in
		Diameter	2.00 in	Min. Delivered		17	===	Maximum	Delivered Volume 26	
				evel and Uneq				534		
			<del>T</del>						<del>.,</del> . 	
	Elevation (ft)	Pipe Size (ir	Pipe Volume n) (gal/ft)	Pipe Length (ft)	Perforation (in)		Spacing (ft)	Spacing (in)		
Lateral 1									Minimum Delivered	Volume
Lateral 2										al
Lateral 3										!
Lateral 4			+						Maximum Delivered	
Lateral 5 Lateral 6			<del></del>						<u> </u>	<b>Ja</b> l
	onal lofo fo	r Tyne IV/Pre	etreatment Desig	n				<u></u>	<u> </u>	
				·· <u> </u>			<u>-</u>			
i		anic loading		51 N.S. N.S. N.S.	- 4 BOD 1-			W 0 35 . 4 600		
1, Organi		_	nt Unit = Design	-		1	n the effluent	,	,000	
	- C-2	gpd X		mg/L X 8.35 +	1,000,000	)-		lbs BOD/day		
2. Type o	f Pretreatm	ent Unit Bein	ig Installed:							
3. Calcul	ate Soil Tre	atment Syster	m Organic Loadin			er preti	reatment + Bo	ttom Area = l	bs/day/ft <sup>2</sup>	
		mg/L X 8.35	÷ 1,000,000 ÷		ft² =		lbs/da	y/ft <sup>2</sup>		
Comments/Sp	ecial Desig	n Considerat	ions:							
				<u>-</u>		_	<del></del>			:
										,
										1
	I hereby ce	rtify that I ha	ave completed th	ls work in accor	dance wit	h all an	olicable ordina	ancet, rides an	d laws.	
	•		are compressed the		-1//	ar est ab	hanne Amili		ng. tot 77 <i>3</i> +	
		N HERWIG		Tund 1	Kene	ver	· -	1472	10/31/17	
	(D	esigner)	//		ig/ture)		(L	icense #)	(Date)	

# Minnesota Pollution Control Agency

# **OSTP Mound Design** Worksheet >1% Slope of MINNESOTA

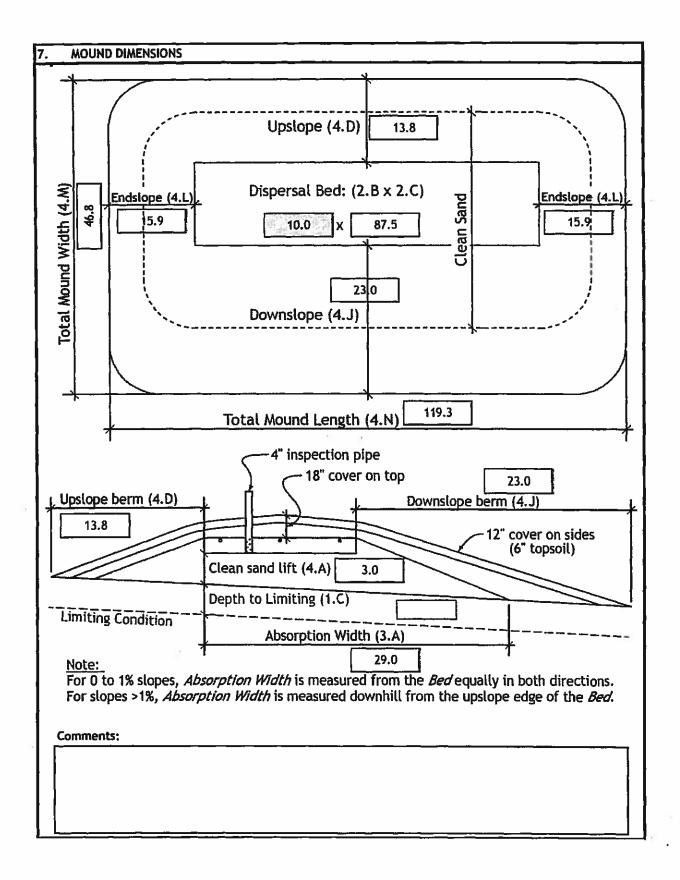




1.	SYSTEM SIZING:		Proje	ct ID:				٧0	4.20.2016
	A. Design Flow:	10	)50	GPD	<b>不能</b>	<sub>æ</sub> √TAΒ	LE IXa		
- 5	B. Soil Loading Rate:	0.	.42	GPD/ft <sup>2</sup>	LOADING RATES I	TION RATIO	S USING PE	RCOLATION	TESTS
	C. Depth to Limiting Condition:			ft		Treatmen	Level C	Treatment Le	Vel A, A-2, B,
	D. Percent Land Slope:	3	.0	]%	Percolation Rate (API)	Absorption Area Loading Rate (gpd/R <sup>2</sup> )	Movind Absorption Ratio	Absorption Area Loading Rate (gpd/ft <sup>2</sup> )	Mound Absorption Ratio
	E. Design Media Loading Rate:	1	.2	GPD/ft <sup>2</sup>	<0.1	1000000000	F20554	4.1.70()	1119 2111
	F. Mound Absorption Ratio:	2.	.90	i	0.1 to 5	1.2	1	1.6	1
	<b>Table</b> I	Learn F.	10000000000000000000000000000000000000	(BASIL	0.1 to 5 (fine sand and loamy fine sand)	0.6	2	1	1.5
	MOUND CONTOUR LOADING	RÂTES:		17.7	6 to 15	0.78	1.5	1	1,6
	ANTERNA COMPUBLICATION CONTRACTOR	0(2	Contr	erič	16 to 30	0.6	2	0.78	2
	Measured "Texture - derived Perc Rate OR mound absorption rate		Load	Table N	31 to 45	0.5	2.4	0.78	2
	Perc yatu	(3)	Rati	K P	46 to 60	0.45	2.6	0.6	2.6
į.	404220242		<b>±1</b> 7		61 to 120		6	0.3	5.3
	≤ 60mpi 1.0, 1.3, 2.0, 2.4, 2.	<b>6</b> ] →	314		>120	-		-	
	61-120 mpi OR 5,0		<b>51</b> 2	2	L			. T	
		-	<u> </u>	<b>—</b>   "	Systems with the				
	≥ 120 mpi* >5.0*	-	≤6°	.	Contour Loadi	ng kate (i ecomment		• .	15 a
_						Comment	Jeu vatut		
2.	DISPERSAL MEDIA SIZING								
	A. Calculate Dispersal Bed Area: De	sign F	low +	Design Me	edia Loading Ra	$te = ft^2$			
	1050 GPD +	1.	.2	GPD/ft <sup>2</sup>	= 875	ft <sup>2</sup>			
	16 a larger dispersal mode area is desired auto-strail								
	if a larger dispersal media area is desired, enter size:								
	B. Enter Dispersal Bed Width:	10	0.0	ft C	an not exceed	10 feet			
	C. Calculate Contour Loading Rate:	Bed V	Vidth	z X Design	Media Loading	Rate			
		2	GPD/		12.0 gal		Can nat	exceed Ta	hin i
			J	· .					ole i
İ	D. Calculate Minimum Dispersal Be	i Leng	th: Dis	spersal Be	ed Area ÷ Bed '	Width = B	ed Lengt	:h	
	875 ft <sup>2</sup> + 10	.0	ft =	87.5	ft				
3.	ABSORPTION AREA SIZING	_					<del></del>	<del></del> .	
Г	A. Calculate Absorption Width: Bed	Width	V Mc	und Aben	ration Batio -	Absoratio	n Width		
			וויא נו ו		<del></del>	ADSOLPTIO	ii widus		
	10.0 ft X 2.	9	=	29.0	ft				
	B. For slopes >1%, the Absorption V	/idth i	s meas	sured dov	nhill from the	unsione e	dge of ti	ne Red	
	Calculate Downslope Absorption					• •	-50 0, 0	re vey.	
	Calculate Downstope Absorption			, <u> </u>					
	7.	29	9.0	∫ft · L	10.0 ft	= 19.	0 ft		
4.	DISTRIBUTION MEDIA: ROCK			_					
	A. Rock Media Depth Below Distrib	ution I	Pine	·				<del></del> _	
	·	adon I	, ihe						
	0.75 ft			estimate	ed volume of ro	ick on moi	una mate	erials page	

5. DISTRIBUTION MEDIA: REGISTERED TREATMENT PRODUCTS: CHAMBERS AND EZFLOW
A. Enter Dispersal Media:
B. Enter the Component: Length: ft Width: ft Depth:
C. Number of Components per Row = Bed Length divided by Component Length (Round up)
ft ÷ ft = components/row
D. Actual Bed Length = Number of Components/row X Component Length:
components X   ft =   ft
E. Number of Rows - Bed Width divided by Component Width (Round up)
ft ÷ ft = rows Adjust width so this is an whole number.
F. Total Number of Components = Number of Components per Row X Number of Rows
X = components
6. MOUND SIZING
A. Calculate Minimum Clean Sand Lift: 3 feet minus Depth to Limiting Condition = Clean Sand Lift
3.0 ft - ft = 3.0 ft Design Sand Lift (optional): ft
B. Calculate Upslope Height: Clean Sand Lift + media depth + cover (1 ft.) = Upslope Height
3.0 ft + 1.0 ft + 1.0 ft = $5.0$ ft
C. Select Upslope Berm Multiplier (based on land slope): 2.75
312 Land Slope % 0 1 2 3 4 5 6 7 8 9 10 11 12
Upslope Berm 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 Ratio 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
Ratio 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  D. Calculate Upslope Berm Width: Multiplier X Upslope Mound Height = Upslope Berm Width
2.75 ft X 5.0 ft = 13.8 ft
E. Calculate Drop in Elevation Under Bed: Bed Width X Land Slope ÷ 100 = Drop (ft)
10.0 ft X 3.0 % ÷ 100 = 0.30 ft
F. Calculate Downslope Mound Height: Upslope Height + Drop in Elevation = Downslope Height
5.0   ft + 0.30   ft = 5.3   ft
G. Select Downslope Berm Multiplier (based on land slope): 3.30
Land Slope,% 0 1 2 3 4 5 5 6 7 8 9 10% 11 12 Downslope 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
Berm Ratio 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
H. Calculate Downslope Berm Width: Multiplier X Downslope Height = Downslope Berm Width
3.30 x 5.3 ft = 17.5 ft
I. Calculate Minimum Berm to Cover Absorption Area: Downslope Absorption Width + 4 feet
19.0 ft + 4 ft = 23.0 ft
J. Design Downslope Berm = greater of 4H and 4I: 23.0 ft
K. Select Endslope Berm Multiplier: 3.00 (usually 3.0 or 4.0)
L. Calculate Endslope Berm X Downslope Mound Height = Endslope Berm Width
3.00 ft X 5.3 ft = 15.9 ft
M. Calculate Mound Width: Upslope Berm Width + Bed Width + Downslope Berm Width
13.8 ft + 10.0 ft + 23.0 ft = 46.8 ft
N. Calculate Mound Length: Endslope Berm Width + Bed Length + Endslope Berm Width
15.9 ft + 87.5 ft + 15.9 ft = 119.3 ft

, ii.





# **OSTP Mound Materials Worksheet**

University of Minnesota



Project ID: v 04.20	.2016
A. Calculate Rock Volume: (Rock Below Pipe + Rock to cover pipe (pipe dia + 1 inch)) X Bed Length (2.D) X Bed Width (2.B) = Volume (ft <sup>3</sup> )	
( 9 in + 3 in) + 12 x 87.5 ft x 10.0 ft = 875.0 ft <sup>2</sup>	
Divide ft <sup>3</sup> by 27 ft <sup>3</sup> /yd <sup>3</sup> to calculate cubic yards:	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1
Add 20% for constructability: 32.4 yd <sup>3</sup> X 1.2 = 38.9 yd	•
For systems using other distribution media - see product registration for material required	
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 87.5 ft = 2756.3 ft <sup>2</sup>	
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)	
	5
Volume from Width = ((Upslope Mound Height - 1) X Absorption Width Beyond Bed X Media Bed Width)	
Total Clean Sand Volume: Volume from Length + Volume from Width + Volume Under Media	
ft <sup>3</sup> + ft <sup>3</sup> + ft <sup>3</sup> = ft <sup>3</sup>	
For a Mound on a slope greater than 1%	
Upslope Volume : ((Upslope Mound Height - 1) x 3 x Bed Length ) + 2 = cubic feet	
(( 5.0 ft - 1) X 3.0 ft X 87.5 )+2 = 525.0 ft	
Downslope Volume: ((Downslope Height - 1) × Downslope Absorption Width × Media Length) + 2 = cubic feet	] !
(( 5.3 ft - 1) X 19.0 ft X 87.5 )+2 = 3574.4 ft <sup>2</sup>	
Endslope Valume: (Dawnslope Mound Height - 1) x 3 x Media Width = cubic feet	
( 5.3 ft - 1) X 3.0 ft X 10.0 ft = 129.0 ft <sup>2</sup>	
Total Clean Sand Volume: Upslope Volume + Downslope Volume + Endslope Volume + Volume Under Media	
525.0 ft <sup>3</sup> + 3574.4 ft <sup>3</sup> + 129.0 ft <sup>3</sup> + 2756.3 ft <sup>3</sup> = 6984.6 ft <sup>2</sup>	
Divide ft <sup>3</sup> by 27 ft <sup>3</sup> /yd <sup>3</sup> to calculate cubic yards: 6984.6 ft <sup>3</sup> + 27 = 258.7 yd	<u>,                                    </u>
Add 20% for constructability: 258.7 yd 3 x 1.2 = 310.4 yd	]
C. Calculate Sandy Berm Volume:  Total Berm Volume (approx): ((Avg. Mound Height - 0.5 ft topsoil) x Mound Width x Mound Length) + 2 = cubic feet	
(5.2 - 0.5 )ft X 46.8 ft X 119.3 ) + 2 = 12967.2 ft <sup>2</sup>	
Total Mound Volume - Clean Sand volume - Rock Volume = cubic feet	
12967.2 $ft^3$ - 6984.6 $ft^3$ - 875.0 $ft^3$ = 5107.5 $ft^3$	1
Divide ft <sup>3</sup> by 27 ft <sup>3</sup> /yd <sup>3</sup> to calculate cubic yards: 5107.5 ft <sup>3</sup> + 27 = 189.2 yd	3
Add 20% for constructability: 189.2 $yd^3 \times 1.2 = 227.0 yd^3 \times 1.2 = $	3
D. Calculate Topsoil Material Volume: Total Mound Width X Total Mound Length X .5 ft	
46.8 ft X 119.3 ft X 0,5 ft = 2788.6 ft <sup>2</sup>	
Divide ft <sup>3</sup> by 27 ft <sup>3</sup> /yd <sup>3</sup> to calculate cubic yards: 2788.6 ft <sup>3</sup> + 27 = 103.3 yd	3
Add 20% for constructability:	3



# OSTP Pressure Distribution Design Worksheet OF MINNESOTA



				Pi	roject II	D:				v 04	.20.201
1. Media Bed Width	1:					10 ft					
2. Minimum Numbe	r of Lat	erals in	system	/zone =	Rounde	d up number of [	(Media	Bed Wi	dth - 4)	÷ 3] + 1.	
	[(	10	-4)	÷ 3] + 1	=	3 latera	ls	Does	not app	ly to at-	grades
-	Designer Selected Number of Laterals:  Cannot be less than line 2 (accept in at-grades)					3 latera	is		-		
4. Select Perforation			орс <i>III</i> а		´ [	3.0 ft	Period	Fig. (c)		~ M	Ŋ
5. Select Perforation	on Diam	ieter Si:	ze:			1/4 in	e Sansassa	and spares If an	A Part Train	Took .	312
6. Length of Latero	als = Me	edia Bed	d Length	ı - 2 Feel	t.		Perk	Malein Hirling: 'A'	to V." Perfer	soon spacing, 2' is	P
7. Determine the Nand round down		of Perf	oration	-		rforation can no the Length of Lo			-	•	===
Number of Perfo	oration	Spaces	= 8	6 ft	i.	÷ 3	ft	= [	28	Spa	ces
value is double v	orations <b>Pa</b> d	s Per La	iteral = i <b>ber of Per</b>	28		aces + 1 =	charge V	riation	Walley St.	er Latera	l
	V₄ Inch I	Perforation					7/321	nch Perfor			
Perforation Spacing (Feet)	1	Pipe I	Diameter (	inches)	3	Perforation Spacing (Feet)	1	Pipe I	Diameter (1 112	nches)	3
<b>建筑的中央大学的企业</b>	50 10 50	(2012)	AS 18 53	30	15 60 P	系统统。 <b>2</b> 指数结晶	第11音	146 AV	21	<b>高麗 1 論</b>	92
21/1	8	12	16	28	54	21/2	10	14	20	32	64
1		验12等	16	75 25	52	进行14年上	19	7.4	19	30	.00
	3/16 inch						1/8 1	nch Perfor			
Perforation Spacing (Feet)	Pipe Diameter (incl				<del></del>	Perforation Spacing (Feet)	•		Diameter (1	<del>, , , , , , , , , , , , , , , , , , , </del>	
Learning sharing (Leer)			112	2	3	heen	1	114	11/2	2	
	1	114	S4.26	46	87.75	2405	21	33	3.00° 4.4 5° 55°	74	3
	JF 12	18	24 24	46	87 🚠 80	2 <u>je</u> s 201	21 20	33 30	場44階 41	74 -3 69	1 <b>#</b>
2			24 22 22	-			21 20 20	33 30 29	44 41 38	74 -, 69	
7th  9. Total Number of Perforated Late	12 12 12 F Perfor	18 17 16 ations	24 22 equals t	40 37 the Numi	80 75 ber of P	21/1	20 20 Lateral	30 29 multip	4i 38 lied by i	69 **64	135 135 ber of
9. Total Number of Perforated Late	12 12 12 f Perforerals.	18 17 16 rations	24 22 equals t	the Numb	80 75 ber of P	2h The 3 erforations per	20 20 Lateral	30 29 multip	4i 38 lied by i	69 64 the <i>Num</i>	135 135 ber of



# OSTP Pressure Distribution Design Worksheet OF MIN

University of Minnesota



12.	Calculate the Square Feet per Perforation. Recommended value is 4-11 ft <sup>2</sup> per perfo	ration.	
	Does not apply to At-Grades	8	
a.	Bed Area = Bed Width (ft) X Bed Length (ft)	ं	
	10 ft X 88 ft = 880 ft <sup>2</sup>		
b.	. Square Foot per Perforation = Bed Area divided by the Total Number of Perforations	•	
	880 $ft^2$ ÷ 87 perforations = 10.1 $ft^2$ /perforation	S	
13.	Select Minimum Average Head: 1.0 ft		
14.	Select Perforation Discharge (GPM) based on Table: 0.74 GPM per	Perforation	
15.	Determine required Flow Rate by multiplying the Total Number of Perfs. by the Pe	erforation Di	scharge.
	87 Perfs X 0.74 GPM per Perforation = 65 GPM		
16.	Volume of Liquid Per Foot of Distribution Piping (Table II): 0.170 Gallons/	ft	
17.	Volume of Distribution Piping =		le II 🖫
	= [Number of Perforated Laterals X Length of Laterals X (Volume of Liquid Per Foot of Distribution Piping]	Volume of	f Liquid in pe
		Pipe	Liquid
	3 X 86 ft X 0.170 gal/ft = 43.9 Gallons	Diameter (inches)	Per Foot (Gallons)
18.	Minimum Delivered Volume = Volume of Distribution Piping X 4	1	0.045
	43.9 gals X 4 = 175.4 Gallons	1.25	0.078
	43.9 gats x 4 - 173.4 Gattons	1.5	0.110 0.170
	manifold pipe	3	0.380
	tradution pube /	4	0.661
	pipe from pump	· ·	
1	Manifold pipe		R
clean			
1	alternate location of pipe from pump	Alter	nate location
			pe from pump
i		Pipe from pum	e
Comi	ments/Special Design Considerations:		
1			



# Minnesota Pollution Control Agency

# OSTP Basic Pump Selection Design Worksheet UNIVERSITY OF MINNESOTA





1. PUMP CAPACITY Project ID:					v 0	4.20.2016
Pumping to Gravity or Pressure Distribution: Pres	ssure	80 FES 2 Mg				
1. If pumping to gravity enter the gallon per minute of the pump:		GPM (10 - 45 g)	om)			
2. If pumping to a pressurized distribution system:	65.0	GPM				
3. Enter pump description:			_			
2. HEAD REQUIREMENTS		200 - 000000 - 1000	-1.5%-34 ··			attront system it of discharge
A. Elevation Difference 11 ft					100	0.0
between pump and point of discharge:	- 1		SUPPLY BOX		3.22	
	niet pipe	Biologico de la cital		Elevation /		
B. Distribution Head Loss: 5 ft	i i			gnierings		- 1
C. Additional Head Loss:   ft (due to special equipment)	, etc.)				t	
*		Table I.Frictio	n Loss i	n Plastic	Pipe pe	r 100ft
	A. 1. 10	Flow Rate			er (inch	-
Gravity Distribution = Oft		(GPM)	1	1.25	1.5	2
Pressure Distribution based on Minimum Average He	ad l	10	9.1	3.1	1.3	0.3
Value on Pressure Distribution Worksheet:		12	12.8	4.3	1.8	0.4
Minimum Average Head Distribution Head L	OSS	14	17.0	5.7	2.4	0.6
1ft 5ft		16	21.8	7.3	3.0	0.7
2ft 6ft		18		9.1	3.8	0.9
5ft 10ft		20	THUS !	11.1	4.6	1.1
		25		16.8	6.9	1.7
D. 1. Supply Pipe Diameter: 2.0 in		30	i e	23.5	9.7	2.4
2. Supply Pipe Length: 22 Ift		35			12.9	3.2
2. Supply Pipe Length: 22 ft		40	1	_X* 9	16.5	4.1
E. Friction Loss in Plastic Pipe per 100ft from Table i:		45		1	20.5	5.0
<del></del>		50 55	93 12 9 13 9	501.033	17	6.1
Friction Loss = 9.92 ft per 100ft of pipe		60		Sec. 32	ERV	7.3 8.6
F. Determine Equivalent Pipe Length from pump discharge to soil dispersal	l area discharge	65	100	F441 17	r manag	10.0
point. Estimate by adding 25% to supply pipe length for fitting loss. Sup		70	2.19 = 17	3	Š _ 93	11.4
(D.2) X 1.25 = Equivalent Pipe Length		75				13.0
		85	[	227	37.2	16.4
22 ft X 1.25 = 27.5 ft		95				20.1
G. Calculate Supply Friction Loss by multiplying Friction Loss Per 100ft (Li	ne E) by the <i>Equi</i>	valent Pipe Length	(Line F)	and divide	by 100.	
Supply Friction Loss =						
9.92 ft per 100ft X 27.5 ft	+ 100	- 2.7	ft			
H. Total Head requirement is the sum of the Elevation Difference (Line A), the Supply Friction Loss (Line G )	, the Distribution	Head Loss (Line B)	, Addition	al Head L	oss (Line	C), and
11.0 ft + 5.0 ft +	ft +	2.7 ft	- [	18.7	T <sub>ft</sub>	
3. PUMP SELECTION			A 1000			2.7
	ine 1 or Line 2) w	rith at least	18.7	feet	of total h	ead.
Comments:			- 35/20			
				-		
						1



# OSTP Pump Tank Design Worksheet (Demand Dose)

University of Minnesota



_	DETERA	MINE TANK CAPACITY AND	DIMENSIONS		Pro	ect ID:			v 04.20.2016
1.	Α.	Design Flow (Design Sum. 1	A):	1050	GPD				
		Min. required pump tank		1050	1	nmmendec	l pump tank capacity:	1500	Gal
	B. 	Mitt. Tequired puttip talk							
2,	A.	Tank Manufacturer:	INFILTRAT	OR	B. Tank i	Model:	IM1530 PART# 340	1786	
	C.	Capacity from manufactu	rer:		Gallons		Note: Design calculations are Substituting a different tank	•	-
	D.	Gallons per inch from ma	nufacturer:		Gattons per inc	h	float or timer settings. Cont		
	E.	Liquid depth of tank from		<u> </u>	inches		necessary.		
L			The total control cont	<u> </u>					
		DOSING VOLUME	The idea of the pure must	t be at least 4 (a)	char from the he	ttom of th	e pump tank & 2 inches of wat	toe covering the ave	- 77
,		mmended)	the arecordie bomb mos	r De ar reast 4-iti	tues it du tue of	ACCOUNT OF THE	ie pomp cank a z menes or war	tet covering the pur	iip
	(Pump	and block height + 2 inches	X Gallons Per Inch (2C oc	3E)					
		`			Per Inch	=	554 Gallons		- 3
4		um Delivered Volume = 4)		-			476		
		17 of the Pressure Distribut					175 Gallons (m	inimum dose)	
5	Calcula Design	te Maximum Pumpout Volu	me (25% of Design Flow) 050 GPD X	0.25			263 Gallons (m	aximum dose)	3.
L	neziği	rtow:	030 A				Zes dations (in	dyniniti oose)	
6	Select	a pumpout volume that me	ets both MinImum and Max	imum:	250	Gallons	Volume o	f Liquid in	
7	Calcula	te Doses Per Day - Design		3		_	\$255 P. \$250 P. \$480 P. \$	pe -	
١		1050 gpd ÷	250	gal =	4	Doses	Pipe	Liquid	
8	Calcula	ite Drainback:					Diameter	Per Foot	
	A.	Diameter of Supply Pipe	•	L	2 Inche	5	(inches)	(Gallons)	
	В.	Length of Supply Pipe =			22 feet		1	0.045	
l	c.	Volume of Liquid Per Line	nal Foot of Dine =		.170 Gallo	ne/fr	1.25	0.078	
ı	D.		pply Pipe X Volume of Liqu			iis et	1.5	0.110	
	υ.	22 ft X			3.7 Gallor	ns	2	0.170	
,و	. Total E	Cosing Volume = Delivered		L	100		3	0.380	
"	18	250 gal +	3.7 gal =	254	Gallons		4	0.661	
10	. Mintmu	ım Alarm Volume = Depth o		llons per inch of	_l tank				
		2 in X	34.6 gal/in		69.3 Gallo	ns			
DE	MAND DO	OSE FLOAT SETTINGS						<u>.</u>	
11	. Calcula	ite Float Separation Distant	ce using Dosing Volume.						
1	Total D	Oosing Volume /Gallons Per	Inch	_		_			
l		254 gal ÷	34.6	gal/in =	7.3	inches		_	
12	. Measur	ing from bottom of tank:					Inches for Dose:	·	
A.	. Distano	te to set Pump Off Float = 1	Pump + block height + 2 inc	hes					~ \ \
		14 In+	2	in =	16 Inche	s	Alarm Depth 25.3 In		
B.	. Distanc	te to set Pump On Float=Dis		)			Pump On 23.3 in		
		16 in+	7.3	in =	23 Inche	\$	Pump Off 16.0 In		
۲.	. Distano	te to set Alarm Float = Dist		1 <u> </u>		_		554 Gal	Щ
		23 in +	2.0	in=	25 Inche	5		L	

# MONITORING AND MITIGATION

#### SEPTIC SYSTEM CLASSIFIED AS TYPE III

Should the system failed 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 County and Kevin Herwig 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 any and 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 system must be reported to the county within 24 hours.

Any and all expenses are inspections, maintenance, or repair is the homeowner's responsibility.

I Mille Lacs Band of Ojibwe, property owner of 46748 & 46784 Mulligan Dr. Garrison 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.

10-		
	Owner	
4.		
	Date	



## Septic System Management Plan for Above Grade Systems

The goal of a septic system is to protect human health and the environment by properly treating wastewater before returning it to the environment. Your septic system is designed to kill harmful organisms and remove pollutants before the water is recycled back into our lakes, streams and groundwater.

This management plan will identify the operation and maintenance activities necessary to ensure long-term performance of your septic system. Some of these activities must be performed by you, the homeowner. Other tasks must be performed by a licensed septic maintainer or service provider. However, it is <u>YOUR</u> responsibility to make sure all tasks get accomplished in a timely manner.

The University of Minnesota's Septic System Owner's Guide contains additional tips and recommendations designed to extend the effective life of your system and save you money over time.

Proper septic system design, installation, operation and maintenance means safe and clean water!

Property Owner MILLE LACS BAND OF OJIBWE	Email
Property Address 46748/46784 MULLIGAN DR. GARRIS	Property ID 09.972.0040/0020
System Designer KEVIN HERWIG	Contact Info 320-241-7036
System Installer	Contact Info
Service Provider/Maintainer	Contact Info
Permitting Authority MILLE LACS COUNTY	Contact Info
Permit #	Date Inspected

Keep this Management Plan with your Septic System Owner's Guide. The Septic System Owner's Guide includes a folder to hold maintenance records including pumping, inspection and evaluation reports. Ask your septic professional to also:

- Attach permit information, designer drawings and as-built of your system, if they are available.
- Keep copies of all pumping records and other maintenance and repair invoices with this document.
- Review this document with your maintenance professional at each visit; discuss any changes in product use, activities, or water-use appliances.

For a copy of the Septic System Owner's Guide, visit <u>www.bookstores.umn.edu</u> and search for the word "septic" or call 800-322-8642.

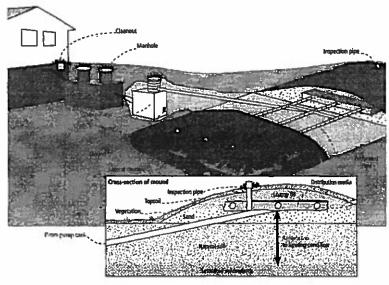
## For more information see http://septic.umn.edu

Version: August 2015

### Septic System Management Plan for Above Grade Systems



# Your Septic System



Septic Systen	Septic System Specifics							
System Type: I II III IV* V* (Based on MN Rules Chapter 7080.2200 – 2400)  *Additional Management Plan required	System is subject to operating permit*  System uses UV disinfection unit*  Type of advanced treatment unit							
Dwelling Type	Well Construction							
Number of bedrooms: 7  System capacity/ design flow (gpd): 1050  Anticipated average daily flow (gpd): 900  Comments  Business?: Y N What type?	Well depth (ft):  Cased well Casing depth:  Other (specify):  Distance from septic (ft):  Is the well on the design drawing? OY N							
Septic 7	<b>Fank</b>							
☐ First tank Tank volume: 2000CB gallons Does tank have two compartments?	Pump Tank 1500 gallons  Effluent Pump make/model: WE051H GOULDS  Pump capacity 60 GPM  TDH 30 Feet of head  Alarm location							
Soil Treatment Area (STA)								
Mound/At-Grade area (width x length): 46.8 ft x 119.3 ft Rock bed size (width x length): 10 ft x 88 ft Location of additional STA:  Type of distribution media:	✓ Inspection ports ✓ Cleanouts  Surface water diversions  Additional STA not available							

#### Septic System Management Plan for Above Grade Systems



#### Homeowner Management Tasks

These operation and maintenance activities are your responsibility. Chart on page 6 can help track your activities.

Your toilet is not a garbage can. Do not flush anything besides human waste and toilet paper. No wet wipes, cigarette butts, disposal diapers, used medicine, feminine products or other trash!

The system and septic tanks needs to be checked every 12 months

Your service provider or pumper/maintainer should evaluate if your tank needs to be pumped more or less often.

#### Seasonally or several times per year

- Leaks. Check (listen, look) for leaks in toilets and dripping faucets. Repair leaks promptly.
- Soil treatment area. Regularly check for wet or spongy soil around your soil treatment area. If
  surfaced sewage or strong odors are not corrected by pumping the tank or fixing broken caps and
  leaks, call your service professional. Untreated sewage may make humans and animals sick. Keep
  bikes, snowmobiles and other traffic off and control borrowing animals.
- Alarms. Alarms signal when there is a problem; contact your service professional any time the alarm signals.
- Lint filter. If you have a lint filter, check for lint buildup and clean when necessary. If you do not have one, consider adding one after washing machine.
- Effluent screen. If you do not have one, consider having one installed the next time the tank is cleaned along with an alarm.

#### Annually

- Water usage rate. A water meter or another device can be used to monitor your average daily water
  use. Compare your water usage rate to the design flow of your system (listed on the next page).
  Contact your septic professional if your average daily flow over the course of a month exceeds 70%
  of the design flow for your system.
- Caps. Make sure that all caps and lids are intact and in place. Inspect for damaged caps at least every fall. Fix or replace damaged caps before winter to help prevent freezing issues.
- Water conditioning devices. See Page 5 for a list of devices. When possible, program the recharge
  frequency based on water demand (gallons) rather than time (days). Recharging too frequently
  may negatively impact your septic system. Consider updating to demand operation if your system
  currently uses time,
- Review your water usage rate. Review the Water Use Appliance chart on Page 5. Discuss any major changes with your service provider or pumper/maintainer.

#### During each visit by a service provider or pumper/maintainer

- Make sure that your service professional services the tank through the manhole.
   (NOT though a 4" or 6" diameter inspection port.)
- Ask how full your tank was with sludge and scum to determine if your service interval is appropriate.
- Ask your pumper/maintainer to accomplish the tasks listed on the Professional Tasks on Page 4.

# Septic System Management Plan for Above Grade Systems



#### Professional Management Tasks

These are the operation and maintenance activities that a pumper/maintainer performs to help ensure long-term performance of your system. At each visit a written report/record must be provided to homeowner.

#### Plumbing/Source of Wastewater

- Review the Water Use Appliance Chart on Page 5 with homeowner.
   Discuss any changes in water use and the impact those changes may have on the septic system.
- Review water usage rates (if available) with homeowner.

#### Septic Tank/Pump Tanks

- Manhole lid. A riser is recommended if the lid is not accessible from the ground surface. Insulate the riser cover for frost protection.
- Liquid level. Check to make sure the tank is not leaking. The liquid level should be level with the bottom of the outlet pipe. (If the water level is below the bottom of the outlet pipe, the tank may not be watertight. If the water level is higher than the bottom of the outlet pipe of the tank, the effluent screen may need cleaning, or there may be ponding in the soil treatment area.)
- · Inspection pipes. Replace damaged or missing pipes and caps.
- Baffles. Check to make sure they are in place and attached, and that inlet/outlet baffles are clear of buildup or obstructions.
- Effluent screen. Check to make sure it is in place; clean per manufacturer recommendation.
   Recommend retrofitted installation if one is not present.
- · Alarm. Verify that the alarm works.
- Scum and sludge. Measure scum and sludge in each compartment of each septic and pump tank, pump if needed.

#### Pump

- Pump and controls. Check to make sure the pump and controls are operating correctly.
- Pump vault. Check to make sure it is in place; clean per manufacturer recommendations.
- Alarm. Verify that the alarm works.
- Drainback. Check to make sure it is draining properly.

•	Event counter or elapsed time meter. Check to see if there is an	event counter or elapsed time
	meter for the pump. If there is one or both, calculate the water i	sage rate and compare to the
	anticipated use listed on Design and Page 2. Dose Volume:	gallons: Pump run time:
	Minutes	•

#### Soil Treatment Area

- Inspection pipes. Check to make sure they are properly capped. Replace caps and pipes that are damaged.
- Surfacing of effluent. Check for surfacing effluent or other signs of problems.
- Lateral flushing. Check lateral distribution; if cleanouts exist, flush and clean at recommended frequency.
- Vegetation Check to see that a good growth of vegetation is covering the system.

All other components - evaluate as listed here:	1000	<u></u>	
<u> </u>	 		

### Septic System Management Plan for Above Grade Systems



# Water-Use Appliances and Equipment in the Home

Appliance	Impacts on System	Management Tips				
Garbage disposal	<ul> <li>Uses additional water.</li> <li>Adds solids to the tank.</li> <li>Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area.</li> </ul>	<ul> <li>Use of a garbage disposal is not recommended.</li> <li>Minimize garbage disposal use. Compost instead.</li> <li>To prevent solids from exiting the tank, have your tank pumped more frequently.</li> <li>Add an effluent screen to your tank.</li> </ul>				
Washing machine	<ul> <li>Washing several loads on one day uses a lot of water and may overload your system.</li> <li>Overloading your system may prevent solids from settling out in the tank. Unsettled solids can exit the tank and enter the soil treatment area.</li> </ul>	<ul> <li>Choose a front-loader or water-saving top-loader, these units use less water than older models.</li> <li>Limit the addition of extra solids to your tank by using liquid or easily biodegradable detergents. Limit use of bleach-based detergents and fabric softeners.</li> <li>Install a lint filter after the washer and an effluent screen to your tank</li> <li>Wash only full loads and think even – spread your laundry loads throughout the week.</li> </ul>				
Dishwasher	<ul> <li>Powdered and/or high-phosphorus detergents can negatively impact the performance of your tank and soil treatment area.</li> <li>New models promote "no scraping". They have a garbage disposal inside.</li> </ul>	<ul> <li>Use gel detergents. Powdered detergents may add solids to the tank.</li> <li>Use detergents that are low or no-phosphorus.</li> <li>Wash only full loads.</li> <li>Scrape your dishes anyways to keep undigested solids out of your septic system.</li> </ul>				
Grinder pump (in home)	Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area.	<ul> <li>Expand septic tank capacity by a factor of 1.5.</li> <li>Include pump monitoring in your maintenance schedule to ensure that it is working properly.</li> <li>Add an effluent screen.</li> </ul>				
Large bathtub (whirlpool)	Large volume of water may overload your system.     Heavy use of bath oils and soaps can impact biological activity in your tank and soil treatment area.	<ul> <li>Avoid using other water-use appliances at the same time. For example, don't wash clothes and take a bath at the same time.</li> <li>Use oils, soaps, and cleaners in the bath or shower sparingly.</li> </ul>				
Clean Water Uses	Impacts on System	Management Tips				
High-efficiency furnace	Drip may result in frozen pipes during cold weather.	Re-route water directly out of the house. Do not route furnace discharge to your septic system.				
Water softener Iron filter Reverse osmosis	Salt in recharge water may affect system performance.     Recharge water may hydraulically overload the system.	<ul> <li>These sources produce water that is not sewage and should not go into your septic system.</li> <li>Reroute water from these sources to another outlet, such as a dry well, draintile or old drainfield.</li> </ul>				
Surface drainage Footing drains	Water from these sources will overload the system and is prohibited from entering septic system.	<ul> <li>When replacing, consider using a demand-based recharge vs. a time-based recharge.</li> <li>Check valves to ensure proper operation; have un serviced per manufacturer directions</li> </ul>				

# Septic System Management Plan for Above Grade Systems



# Homeowner Maintenance Log

Track maintenance activities here for easy reference. See list of management tasks on pages 3 and 4.

Activity	#15 255	Đ <sub>2</sub>	acco	nplished	İ		
Check frequently:		y					
Leaks: check for plumbing leaks*							
Soil treatment area check for surfacing**							
Lint filter: check, clean if needed*							
Effluent screen (if owner-maintained)***							
Alarm**							
Check annually:	•	<u>-</u>		•		•	
Water usage rate (maximum gpd)							
Caps: inspect, replace if needed							
Water use appliances – review use							
Other:							
*Monthly							
**Quarterly					40-		
***Bi-Annually							
Notes:						X25,404	
**SEE MONITORI	NG 8	. MIT	<del>IG/</del>	<del>TI</del> O	N-P	LAN	**
	100000000000000000000000000000000000000				1250° 1		_
"As the owner of this SSTS, I understand it the sewage treatment system on this propert, this Management Plan are not met, I will princeessary corrective actions. If I have a narea for future use as a soil treatment sys	y, utilizi omptly not ew system,	ng the Mai ify the pe	nagement ermitti	: Plan. i ng author	If requir	rements i take	n
Property Owner Signature:			1	Date			
Management Plan Prepared By: KEVIN HE	RWIG		(	Certificat	tion #65	59	
Permitting Authority:							

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