

E-Z EXCAVATING LLC.

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

***MOUND DESIGN ON EXISTING MOUND
LOCATION***

LOCATION : 20954 363RD LN. McGREGOR MN

PID 30.0.033202 SEC 47 T 20 R 23

**OWNER: THOMAS BENJAMIN/MILLE LACS BAND OF
CHIPPEWA**

SYSTEM TYPE: TYPE III MOUND

DESIGN FLOW: 4 BEDROOM DESIGNED @ 750 GPD

TREATMENT AREA: 625 SQ.FT.

MOUND SIZE: 53 X 107 '

SLOPE: 4 %

SEPTIC TANK: 2500 SPLIT + 1575 OF SECOND TANK

FILTER: YES

PUMP TANK: 925 GAL SIDE OF SECOND TANK

PUMP: GOULDS WE0511H

FLOW METER: SJE-RHOMBUS W/EVENT COUNTER

KEVIN HERWIG M.P.C.A. 1472

Preliminary & Field Evaluation Form

www.SepticResource.com vers 12.4

Owner Information

Date 8/7/2020 Sec / Twp / Rng 47-20-23
 Parcel ID 30-0-033202 LUG (county, city, township) AITKIN COUNTY
 Property Owner: TOM BENJAMIN/MILLE LACS BAN Owners address (if different)
 Property Address: 20954 363RD LN MCGREGOR MN. 43408 OODENA DRIVE
 City / State / Zip: _____ OMAIMIA MN. 56359

Flow Information and Waste Type / Strength

Estimated Design flow 750 Anticipated Waste strength Hi Strength Domestic
 Comments: Any Non-Domestic Waste Yes (class V) No
 Sewage ejector/grinder pump Yes No
 Water softener Yes No
 Garbage Disposal Yes No
 Daycare / In home business Yes No

Site Information

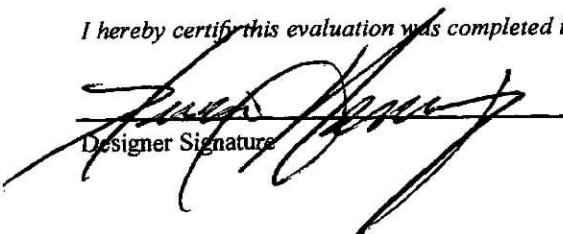
Existing & proposed lot improvements located (see site map) Yes No Well casing depth NA
 Easements on lot located (see site map) Yes No Drainfield w/in 100' of residential well Yes No
 Property lines determined (see site map) Yes No Site w/in 200' of transient noncommunity water supply (TNCWS) Yes No
 Req'd setbacks determined (see site map) Yes No Site w/in an inner wellhead mgmt zone (CWS/NTNCWS) Yes No
 Utilities located & identified (gopher state one call) Yes No Buried water supply pipe w/in 50' of system Yes No
 Access for system maintenance (shown on site map) Yes No Site located in Shoreland (w/in 1000' of lake, 300' of river) Yes No
 Soil treatment area protected Yes No Site map prepared with previous items included Yes No

Construction related issues _____

Soil Information

		Evidence of site: Cut <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Filled <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Compacted <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Disturbed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Original soils	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Soil logs completed and attached	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Perk test completed and attached (if applicable) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Soil loading rate (gpd/ft ²)	<u>0.60</u>	Percolation rate (if applicable) _____
Depth/elev to SHWT	<u>6.00</u>	Flooding or run-on potential <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (comments)
Depth to system bottom maximum (or elev minimum)	<u>-36.00</u>	Flood elevation (if applicable) _____
Depth/elev to standing water (if applicable)	_____	Elevation of ordinary high water level (if applicable) _____
Depth/elev to bedrock (if applicable)	_____	Floodplain designation and elev - 100 yr/10 yr (if applicable) _____
Soil Survey information determined (see attachment)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Differences between soil survey and field evaluation (if applicable)	_____ _____	

I hereby certify this evaluation was completed in accordance with MN 7080 and any local req's.


 Designer Signature

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 Company

1472
 License #

CONSTRUCTION NOTES

PRODUCT BRAND & MODEL LISTED IN DESIGN MUST BE USED. (CEMSTONE TANKS –1 SEPTIC 2500 GAL. COMBO(#9552501) W/ POLYLOK PL-122 FILTER WITH ALARM, 1-PUMP TANK 2500 GAL.(# 9552501) PUMP – GOULDS WE511H) PUMP CHAMBER AND PUMP SETTINGS WILL NOT BE CORRECT IF OTHER PRODUCTS ARE USED.**

SJE RHOMBUS CONTROL MODEL 1121W914H17A CYCLE COUNTER WITH ALARM

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



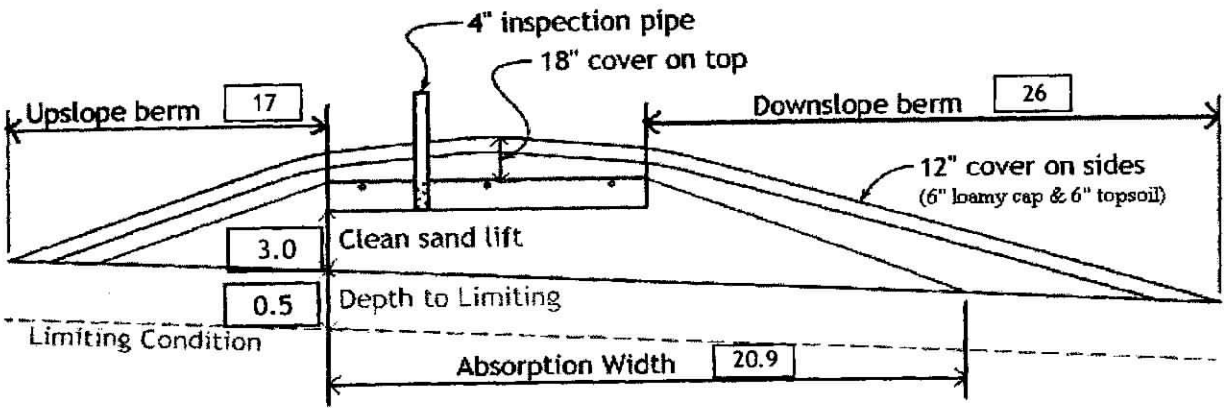
Mound Design - Aitkin county

Property Owner: TOM BENJAMIN/MILLE LACS BAND Date: 8/7/2020
 Site Address: 20954 363RD LN MCGREGOR MN. PID: 30-0-033202
 Comments: _____

Instructions: = enter data = adjust if desired = computer calculated - DO NOT CHANGE!

- 1) bedroom Type Residential System
- 2) GPD design flow
- 3) Garbage disposal or pumped to septic 50% larger tank with multiple comp/tanks
- 4) Gal Septic tank (code minimum) Gal Septic tank (design size / LUG req'd)
 Tank options: none
- 5) GPD/ft² mound sand loading rate contour loading rate of req's a min ft. long rockbed
- 6) ft rockbed width ft rockbed length
- 7) ft lateral spacing ft perforation spacing (maximum of 3 for both)
 manifold connection
- 8) laterals feet long perfs / lateral perfs total
 (1/2 a perf means the first perf starts at the middle feed manifold)
- 9) inch perfs at feet residual head gives gpm flow rate per perforation
 for this perf size & spacing, & pipe size on line 12, max perfs/lateral = , line #8 must be less --- OK
- 10) doses per day (4 minimum)
- 11) gallons per dose (treatment volume) 2.00 5x
- 12) inch diameter laterals must be used to meet "4x pipe volume" requirement 2.00 3x
- 13) feet of inch supply line leads to gallons of drainback volume
 (Tip: "top feed" manifold to control the drainback)
- 14) gallons TOTAL pump out volume (treatment + drainback)
- 15) feet vertical lift from pump to mound laterals, leads to a:
- 16) GPM @ feet of head, Pump requirement (note: >50gpm may require an extra 3-6' of head)
- 17) gal Dose tank (code minimum) gal Dose tank (design size / LUG req'd) at gpi
 leads to a
- 18) inch swing on Demand float, or timed dosing of min ON (confirm pump rate with drawdown
 (this delivers Average flow, =70% of Peak design flow) hrs OFF test and adjust as necessary)
- 19) inches from bottom of tank to "Pump OFF" float
- 20) inches from bottom of tank to "Pump ON" float, or inches to "Timer ON" float if time dosed
- 21) Inches from bottom of tank to "Hi Level" float, or inches to "Hi Level" float if time dosed
- 22) gallons reserve capacity (after High Level Alarm is activated)

- 23) **0.60** gpd/ft² Absorption area Soil Loading Rate, which gives a mound ratio of **2** (minimum)
 (this must match the soil boring log) desired mound ratio **2.0**
- 24) **4** percent site slope (0-20% range) **4** (% downslope site slope, if different than upslope)
- 25) **6** inches, or **0.5** ft. to Redox or other limiting condition (need at least 12" to be a Type I)
 Treatment zone contains **0** inches of 0% soil credit, and **0** inches of 50% soil credit. Giving a:
- 26) **36** inch, or **3.0** ft. Sand Lift Mound **CRITICAL FOR FUTURE CERTIFICATIONS!!!**
- 27) **20.0** ft. base absorption width (with sand beyond rockbed as follows):
20.9 greater of: absorption width OR sand slope
- 28) **0.0** ft. upslope and sideslope sand upslope **13.8**
10.0 ft. Downslope sand down slope **20.9**
- Individual slope ratios give BERM widths (topsoil beyond rockbed) of:
- 29) **4:1** upslope ratio **17** ft. upslope berm
- 30) **4:1** sideslope **22** ft. sideslope berms
- 31) **4:1** downslope **26** ft. downslope berm
- 32) Overall Dimensions: **10.0** ft. wide by **62.5** ft. long Rock bed
53 ft. wide by **107** ft. long Mound footprint



Note:
 For 0 to 1% slopes, *Absorption Width* is measured from the *Bed* equally in both directions.
 For slopes >1%, *Absorption Width* is measured downhill from the upslope edge of the *Bed*.

- 33) Rock Bed: **10.0** ft. by **62.5** ft. by **6** inches under pipe, plus 20% gives **21** yd³ or *1.4= **29** ton
- 34) Mound Sand: (note: volume is based on 3:1/4:1 slope from top of rockbed, Exchange sand for loamy cap if desired)
100.7 up + **168.1** downslope + **28.7** ends + **74.1** under rock = **446** yd³ or *1.4= **624** ton
 plus 20%
- 35) Loamy Cap: **49** ft. by **103** ft. 6" deep, plus 20% gives **112** yd³ or *1.4= **157** ton
- 36) Topsoil: **53** ft. by **107** ft. 6" deep, plus 20% gives **126** yd³ or *1.4= **176** ton

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

[Handwritten Signature]
 Designer Signature

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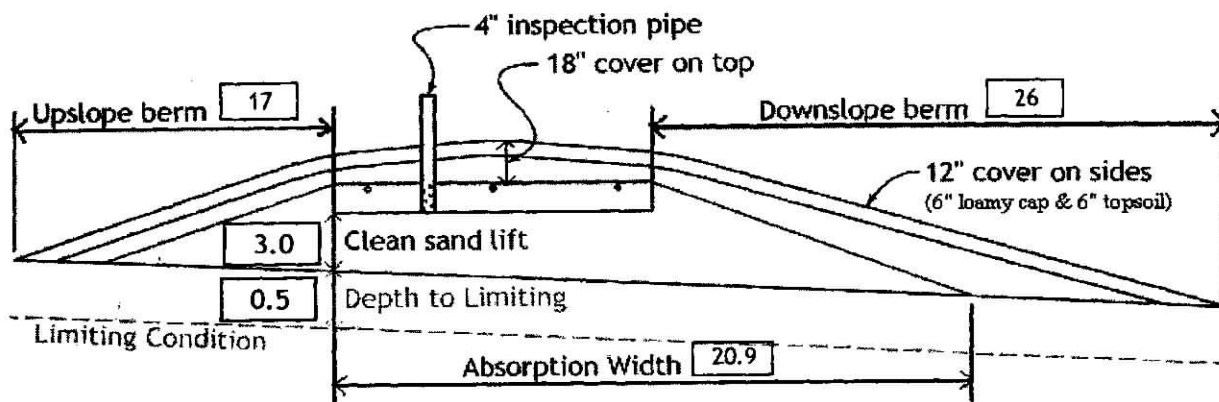
1472
 License#

8/7/2020
 Date

Installer Summary

- 2500 gallon Septic tank (minimum) Tank options: none
- 50% larger tank with multiple comp/tanks
- 925 gallon Dose tank (minimum) at 16.30 gpi
- 47 GPM @ 18 ft. of head, Pump required
- 11.8 inch swing on Demand float which translates to roughly 6.9 inches of float tether length
- if time dosing is required --> 4.1 minutes ON time & 9 hours OFF time
- 24 inches from bottom of tank to "pump ON" float, or
- 27 inches from bottom of tank to "Hi Level Alarm" or 12 inches to "timer ON" float
- 37 inches to "Hi level alarm" if time dosed
- 25 ft. of 2.0 inch supply line with end feed manifold connection
- (Tip: "top feed" manifold to control drainback)
- 36 inch, or 3.0 ft. Sand Lift Mound
- 10.0 ft. wide by 62.5 ft. long Rock bed
- 3 laterals 2.00 inch diameter 60.5 ft. long 3.0 ft. lateral spacing
- 1/4" inch perfs 3.0 ft. perforation spacing
- No Effluent filter & alarm
- 3 clean out & valve box assemblies

- 20.9 ft. Total sand ABSORPTION width (minimum)
- 13.8 ft. upslope and sideslope (sand beyond rockbed, minimum)
- 20.9 ft. Downslope (sand beyond rockbed, minimum)
- Specific slope ratios give BERM widths (topsoil beyond rockbed) of:
- 4:1 upslope ratio 17 ft. upslope berm
- 4:1 sideslope 22 ft. sideslope berms
- 4:1 downslope 26 ft. downslope berm



Note:
 For 0 to 1% slopes, *Absorption Width* is measured from the *Bed* equally in both directions.
 For slopes >1%, *Absorption Width* is measured downhill from the upslope edge of the *Bed*.

Rock Bed:	21.0 yd ³ or *1.4=	29 ton	6 inches under pipe
Mound Sand:	446 yd ³ or *1.4=	624 ton	calculation based on 3:1/4:1 slope from top of rockbed
Loamy Cap:	112 yd ³ or *1.4=	157 ton	6" deep
Topsoil:	126 yd ³ or *1.4=	176 ton	6" deep

INSPECTOR CHECKLIST - mound

ZU954 363RD LN MCGREGOR MN.

- WELL setbacks: 20' to pressure tested sewer line (5 psi for 15 min)
50' to everything 100' to dispersal area with shallow well
- PROPERTY LINES setback: 10' to everything
- Road setback: platted: 10' prop line. Metes & bounds: out of road easement, or outer ditch.
- LAKE / BLUFF setback: 20' for bluff. Lakes: GD ____, RD ____, NE ____ Protected wetland ____.
- Building setbacks: 10' for everything, 20' for dispersal area.
- WATER LINE under pressure set 10' to bed, tank & sewer line. (else sewer line > 12" below, else ok w/pvc)

- Sewer line & baffle connection (no 90's, 3' between 45's, slope min 1" in 8', max 2" in 8')
(no depth req's, clean out every 100', Sch 40 pipe)

- Septic tank and risers (water tight, insulated, proper depth, existing verified by pumping)
mfg _____ 2500 gallons none _____

- Riser over outlet, riser over inlet or center, and 6"+ inspection pipe over any remaining baffles.
- No _____ effluent filter & alarm
- Dose tank risers and piping (water tight, insulated, proper depth, drainback)
mfg _____ 925 gallons

- dose pump _____ 47 gpm 18 head VERIFY PUMP CURVE 4.1 min ON 9 hr OFF

- float setting drop 11.8 inches at 16.3 gpi "DESIGNED" 6.9 inches approx float tether length
192.0 gal dose divided by _____ gpi "INSTALLED" = _____ inches float drop (field corrected)
- LABEL pump requirements and drawdown on riser or panel

- Cam lock reachable from grade - 30" max. J-hook weep hole. Supply line access (no hard 90's)
- 2.0 inch supply pipe: Sch40, sloped 1/8"+, supported by 4" sch40 sleeve or compacted, and buried 6"+.
- splice box / control panel / electrical connections
- flow measurement: CT, ETM, time dosed, home water meter
- mound absorption area rough up
- mound rock dimensions 10.0 X 62.5
- Sand lift depth 36 inches. (Jar test : 2" sand leaves < 1/8" silt after 30 min)

- Absorption Sand beyond rock 13.8 upslope 20.9 downslope

- Bermed topsoil beyond rockbed 17 upslope 22 sideslope 26 downslope

- cover depth of 12-18"+ VERIFY
- 3 laterals (1-2' from edge of rock)
- 2.00 inch pipe size (Sch40 pipe & fittings)
- 3.0 ft lateral spacing

- 1/4" inch perforations
- 3.0 ft perforation spacing

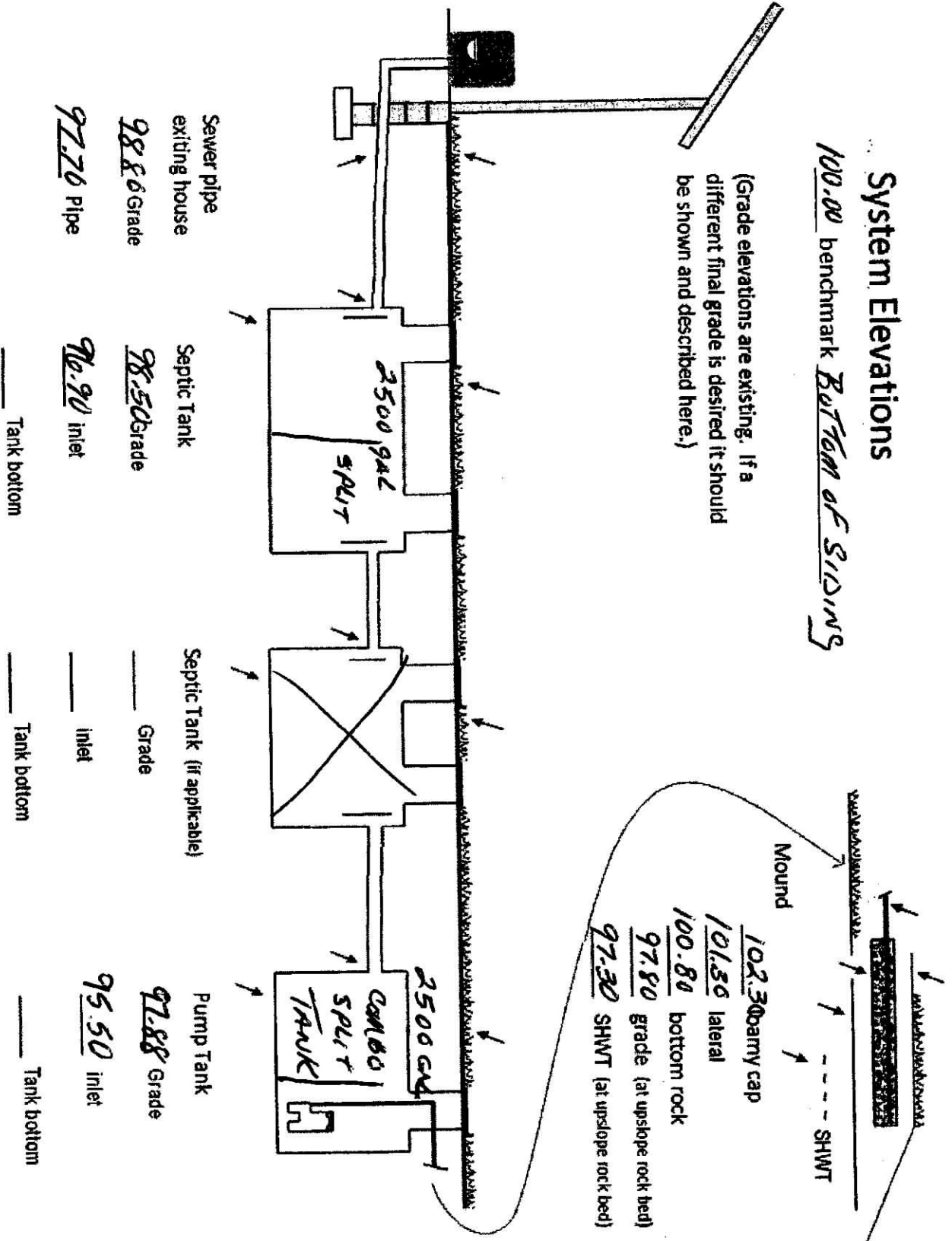
- Air inlet at end of laterals, a 100 feed manifold if nec bottom of siding
- clean outs (no hard 90's)
- 4" inspection pipe to bottom of rock, anchored VERIFY

- Abandon existing system - if necessary Re-use existing tank certification
- monitoring plan and type _____
- well abandonment form - if necessary _____

System Elevations

100.00 benchmark BOTTOM OF SIDING

(Grade elevations are existing. If a different final grade is desired it should be shown and described here.)



INSTALLATION ON EXISTING MOUND SITE

This mound system is a four bedroom designed at 750 gal per day. The existing mound absorption area be increased. The existing mound is to be stripped down to the original rough up in all existing mound areas, upslope, downslope and end slopes are to be stripped to virgin soil. All existing sand is to be replaced with new washed sand. The new down slope and end extension absorption area is to be roughed up and cover with washed sand. Sufficient time is to be allowed for drying of the existing mound site after material removal to eliminate any chance of compaction during the installation. The remainder of the construction of the mound is normal Type III mound construction and practices.

Topsoil and loamcover may be reused.

Contaminated sand, rock and piping are to be disposed of offsite.

KEVIN HERWIG M.P.C.A. 1472



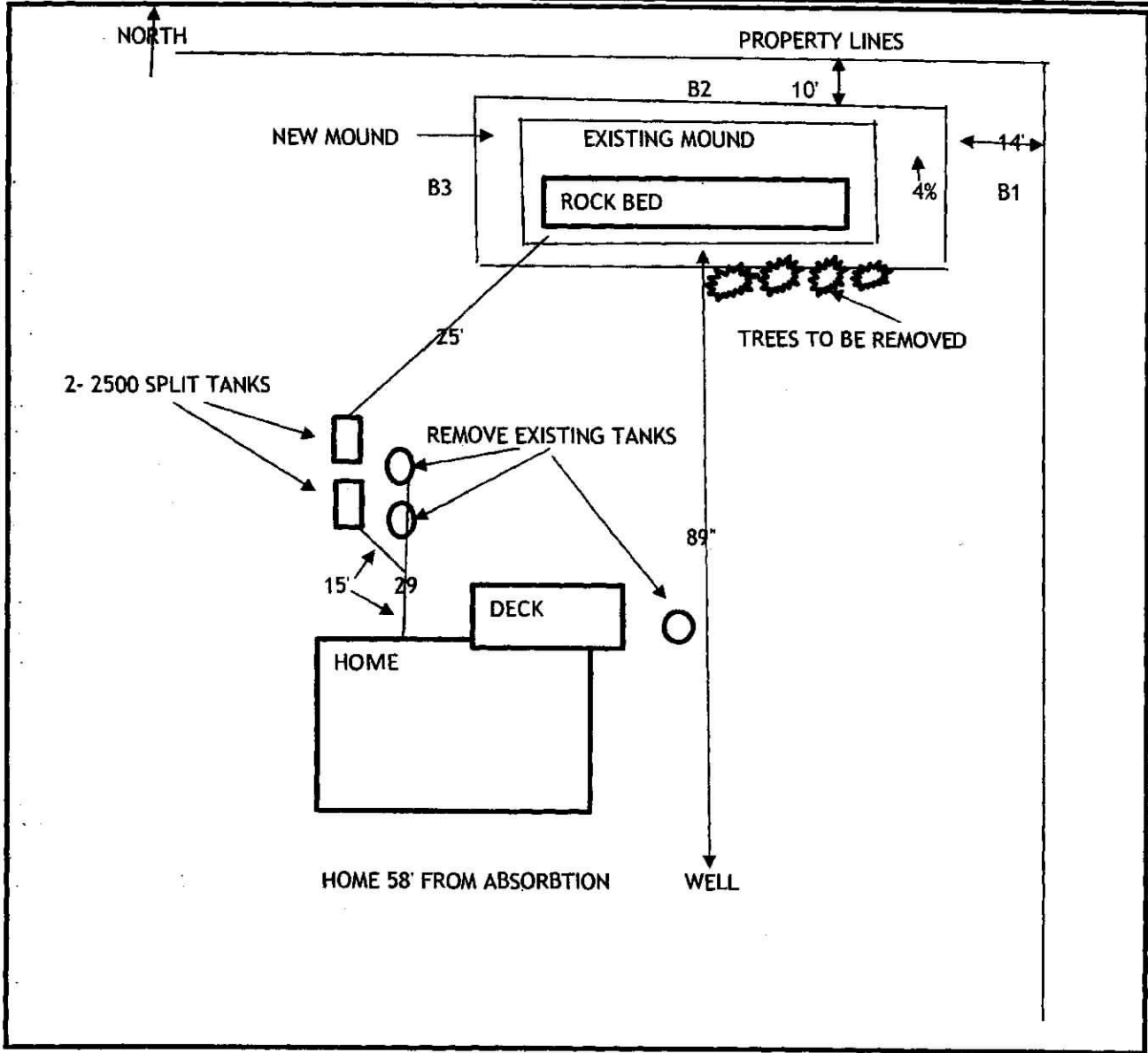
Contact Information

Project ID:

v 04.17.2018

Property Owner/Client:

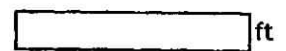
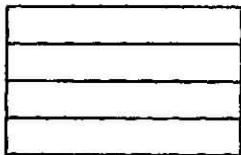
TOM BENJAMIN



Map scale:

Indicated north

Show slope/contours



ft

Owners Septic System Management Plan

Date: 8/15/2020

Property Address: 20954 383RD LN. MCGREGOR

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 1-800-876-8836.

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: Thomas L. Pyman

Date: 8-23-20

MITIGATION ACTION PLAN

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.

Atkin 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.

Type III systems are not warranted by the Designer, Installer, or the Local Unit of Government. Any and all expenses for inspections, maintenance, repair, or replacement are the homeowner's responsibility.

I Tom Benjamin, property owner of 20954 363rd Ln 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.

Thomas L Benjamin Sr

Owner

5-23-22

Date

Soil Observation Log

www.SepticResource.com vers 12.4

Owner Information		
Property Owner / project:	<u>TOM BENJAMIN/MILLE LACS BA</u>	Date <u>8/7/2020</u>
Property Address / PID:	<u>20954 363RD LN MCGREGOR MN</u>	

Soil Survey Information		<input type="checkbox"/> refer to attached soil survey
Parent mat'l's:	<input checked="" type="checkbox"/> Till <input type="checkbox"/> Outwash <input type="checkbox"/> Lacustrine <input type="checkbox"/> Alluvium <input type="checkbox"/> Organic <input type="checkbox"/> Bedrock	
landscape position:	<input type="checkbox"/> Summit <input checked="" type="checkbox"/> Shoulder <input type="checkbox"/> Side slope <input type="checkbox"/> Toe slope	
soil survey map units:	_____ slope <u>4</u> % direction- <u>downhill</u>	

Soil Log #1							
	<input type="checkbox"/> Boring	<input checked="" type="checkbox"/> Pit	Elevation <u>97.62</u>	Depth to SHWT <u>6"</u>			
Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0-4	Sandy Loam	<35	10RY3/1		Friable	Weak	Granular
4-6	Sandy Loam	<35	7.5YR5/6	2.5YR4/8	Friable	Weak	Platy
6-12	Sandy Loam	<35	2.5YR5/2	2.5YR4/8	Friable	Moderate	Platy
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive
Comments:							

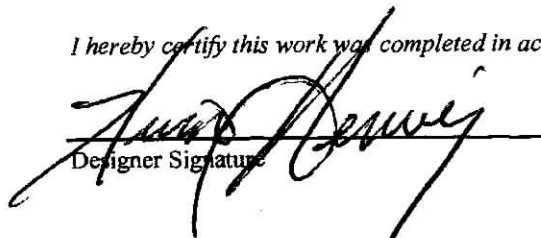
20954 363RD LN MCGREGOR MN. **Soil Log #2**

		<input type="checkbox"/> Boring	<input checked="" type="checkbox"/> Pit	Elevation <u>96.9</u>	Depth to SHWT <u>6"</u>		
Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0-3	Sandy Loam	<35	10YR3/1		Friable	Weak	Granular
3-6	Sandy Loam	<35	2.5YR5/2		Friable	Weak	Platy
6-12	Sandy Loam	<35	2.5YR6/2	10YR5/6	Friable	Weak	Platy
12-15	Sandy Loam	<35	2.5YR5/2	10YR5/6	Friable	Moderate	Blocky
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive

20954 363RD LN MCGREGOR MN. **Soil Log #3**

		<input type="checkbox"/> Boring	<input checked="" type="checkbox"/> Pit	Elevation <u>97.35</u>	Depth to SHWT <u>6"</u>		
Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0-3	Sandy Loam	<35	10YR3/1		Friable	Weak	Granular
3-6	Sandy Loam	<35	2.5YR5/2		Friable	Weak	Platy
6-11	Loamy Sand	<35	2.5YR6/2	10YR5/6	Friable	Weak	Platy
11-16	Sandy Loam	<35	2.5YR5/2	10YR5/6	Friable	Moderate	Blocky
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive

I hereby certify this work was completed in accordance with MN 7080 and any local req's.


 Designer Signature

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 Company

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 License #

20954 363RD LN MCGREGOR MN.

Soil Log #4

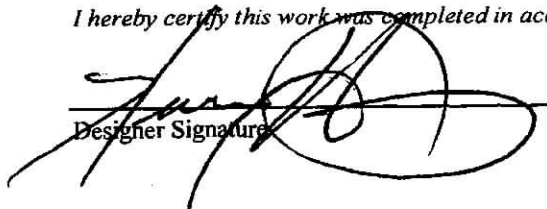
		<input type="checkbox"/> Boring	<input type="checkbox"/> Pit	Elevation _____		Depth to SHWT _____			
Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape		
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive		
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive		
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive		
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive		
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive		

20954 363RD LN MCGREGOR MN.

Soil Log #5

		<input type="checkbox"/> Boring	<input type="checkbox"/> Pit	Elevation _____		Depth to SHWT _____			
Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape		
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive		
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive		
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive		
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive		
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive		

I hereby certify this work was completed in accordance with MN 7080 and any local req's.


Designer Signature

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1472
License #

LOCATION STUNTZ

MN

Established Series
 Rev. PRCN-ROP
 02/2003

STUNTZ SERIES

The Stuntz series consists of very deep, somewhat poorly drained loamy soils formed in calcareous glacial till on ground moraines. Permeability is moderately slow. Slopes range from 0 to 3 percent. Mean annual precipitation is 25 inches. Mean annual air temperature is 39 degrees F.

TAXONOMIC CLASS: Fine-loamy, mixed, superactive, frigid Aeric Glossaqualfs

TYPICAL PEDON: Stuntz very fine sandy loam with a plane 1 percent slope on a till plain under mixed hardwood forest. (Colors are for moist soil unless otherwise noted.)

O--0 to 1 inch; black (5YR 2/1) forest litter derived from leaves, twigs and roots; abrupt smooth boundary. (0 to 3 inches thick)

A--1 to 2 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak very fine granular structure; very friable; many roots; about 2 percent gravel; moderately acid; abrupt smooth boundary. (0 to 3 inches thick)

E1--2 to 6 inches; grayish brown (2.5Y 5/2) and light brownish gray (2.5Y 6/2) very fine sandy loam, light gray (2.5Y 7/2) dry; weak very thin platy structure; very friable; many roots; common very fine vesicular pores; about 2 percent gravel; moderately acid; clear smooth boundary.

E2--6 to 11 inches; light brownish gray (2.5Y 6/2) very fine sandy loam, light gray (2.5Y 7/2) dry; moderate thin and medium platy structure; very friable; many roots; common medium prominent yellowish brown (10YR 5/6) Fe concentrations; common very fine vesicular pores; about 2 percent gravel; moderately acid; abrupt smooth boundary. (Combined thickness of E horizons is 6 to 16 inches.)

E/B--11 to 18 inches; about 70 percent grayish brown (2.5Y 5/2) very fine sandy loam (E); tongues into and surrounds about 30 percent olive brown (2.5Y 4/4) and grayish brown (2.5Y 5/2) sandy clay loam (Bt); moderate medium blocky structure; E part is friable; firm; common prominent yellowish brown (10YR 5/6) and few fine prominent yellowish red (5YR 5/6) Fe concentrations; many roots; common very fine vesicular pores (E); about 2 percent gravel; moderately acid; clear smooth boundary.

B/E--18 to 23 inches; about 70 percent olive brown (2.5Y 4/4) sandy clay loam (Bt); moderate medium and coarse angular blocky structure; firm; with tongues and interfingers (about 30 percent) of grayish brown (2.5Y 5/2) very fine sandy loam (E); massive; friable; few roots; common very fine vesicular pores (E); common faint grayish brown (2.5Y 5/2) and light brownish gray (2.5Y 6/2) clay films and silt coatings on faces of peds (Bt); few fine prominent yellowish red (5YR 5/6) Fe concentrations; about 5 percent gravel; strongly acid; clear wavy boundary. (Combined thickness of E/B or B/E is 3 to 15 inches.)

Btg1--23 to 28 inches; olive brown (2.5Y 4/4) sandy clay loam; strong medium angular blocky structure; firm; few roots; few pores; many distinct very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; common medium prominent yellowish brown (10YR 5/6) Fe concentrations; about 5 percent gravel; slightly acid; clear smooth boundary.

Btg2--28 to 35 inches; light olive brown (2.5Y 5/4) clay loam; moderate medium and coarse prismatic structure that parts to moderate medium angular blocky; firm; few roots; few pores; many faint grayish brown (2.5Y 5/2)