

# Preliminary & Field Evaluation Form

www.SepticResource.com vers 12.4

## Owner Information

Date 5/16/2023 Sec / Twp / Rng S-21, T-46, R-23  
 Parcel ID 26-0-035101 LUG (county, city, township) Aitkin Co.  
 Property Owner: Raymond Newkirk Owners address (if different)  
 Property Address: 19184 State Hwy 27 McGregor Mn 55760 1489 Shoreline Dr.  
 City / State / Zip: 612-670-0212 Wayzata MN 55391

## Flow Information and Waste Type / Strength

Estimated Design flow 450 Anticipated Waste strength  Hi Strength  Domestic  
 Comments: Gravity flow from house 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)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Well casing depth	Existing deep well
Easements on lot located (see site map)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Drainfield w/in 100' of residential well	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Property lines determined (see site map)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Site w/in 200' of transient noncommunity water supply (TNCWS)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Req'd setbacks determined (see site map)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Site w/in an inner wellhead mgmt zone (CWS/NTNCWS)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Utilities located & identified (gopher state one call)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Buried water supply pipe w/in 50' of system	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Access for system maintenance (shown on site map)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Site located in Shoreland (w/in 1000' of lake, 300' of river)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Soil treatment area protected	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Site map prepared with previous items included	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Construction related issues Owner is going to landscape area where tank is going Installer to check cover depth on top of tank must get drainback from mound

## Soil Information

		Evidence of site: Cut <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Filled <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Compacted <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Disturbed <input type="checkbox"/> Yes <input checked="" 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 <sup>2</sup> )	<u>0.60</u>	Percolation rate (if applicable) _____
Depth/elev to SHWT	<u>21"</u>	Flooding or run-on potential (comments) <input type="checkbox"/> Yes <input type="checkbox"/> No
Depth to system bottom maximum (or elev minimum)	<u>( + 18" 0</u>	Flood elevation (if applicable) <u>NA</u>
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

Brummer Septic LLC.  
 \_\_\_\_\_  
 Company

L-1347  
 \_\_\_\_\_  
 License #

# Soil Observation Log

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Owner Information	
Property Owner / project: <u>Raymond Newkirk</u>	Date <u>5/16/2023</u>
Property Address / PID: <u>19184 State Hwy 27 McGregor Mn 5</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 type="checkbox"/> Shoulder <input checked="" type="checkbox"/> Side slope <input type="checkbox"/> Toe slope
soil survey map units:	<u>C71C</u> slope <u>5</u> %    direction- <u>North</u>

Soil Log #1							
		<input checked="" type="checkbox"/> Boring <input type="checkbox"/> Pit	Elevation <u>98.4'</u>		Depth to SHWT <u>21"</u>		
Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0 - 7	Topsoil Loam	<35	10YR3/2		Loose	Loose	Granular
7 - 21	Loam	<35	10YR5/4		Loose	Loose	Granular
21 - 28	Loam	<35	10YR4/4	7.5YR5/6	Loose	Loose	Granular

Comments:

**Soil Log #2**

		<input checked="" type="checkbox"/> Boring	<input type="checkbox"/> Pit	Elevation <u>98.4'</u>		Depth to SHWT <u>22"</u>	
Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0 - 8	Topsoil Loam	<35	10YR3/2		Loose	Loose	Granular
8 - 22	Loam	<35	10YR5/4		Loose	Loose	Granular
22 - 30	Loam	<35	10YR4/4	7.5YR5/6	Loose	Loose	Granular

**Soil Log #3**

		<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 

Brummer Septic LLC.  
Company

L-1347  
License #

# Mound Design - Aitkin county

Property Owner: Raymond Newkirk

Date: 5/16/2023

Site Address: 19184 State Hwy 27 McGregor Mn 55760

PID: 26-0-035101

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    Install 1650 Jacobson 2/Compartment tank
- 4)  Gal Septic tank (code minimum)     Gal Septic tank (design size / LUG req'd)  
Tank options: Effluent filter & alarm req'd
- 5)  GPD/ft<sup>2</sup> 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)
- 12)  inch diameter laterals must be used to meet "4x pipe volume" requirement    1.50 5x
- 13)  feet of  inch supply line    leads to  gallons of drainback volume    2.00 3x  
(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)   $\text{gpd}/\text{ft}^2$  Absorption area Soil Loading Rate, which gives a mound ratio of  (minimum)  
 (this must match the soil boring log) desired mound ratio

24)  percent site slope (0-20% range)  (% downslope site slope, if different than upslope)

25)  inches, or  ft. to Redox or other limiting condition (need at least 12" to be a Type I)  
 Treatment zone contains  inches of 0% soil credit, and  inches of 50% soil credit. Giving a:  
 26)  inch, or  ft. Sand Lift Mound **CRITICAL FOR FUTURE CERTIFICATIONS!!!**

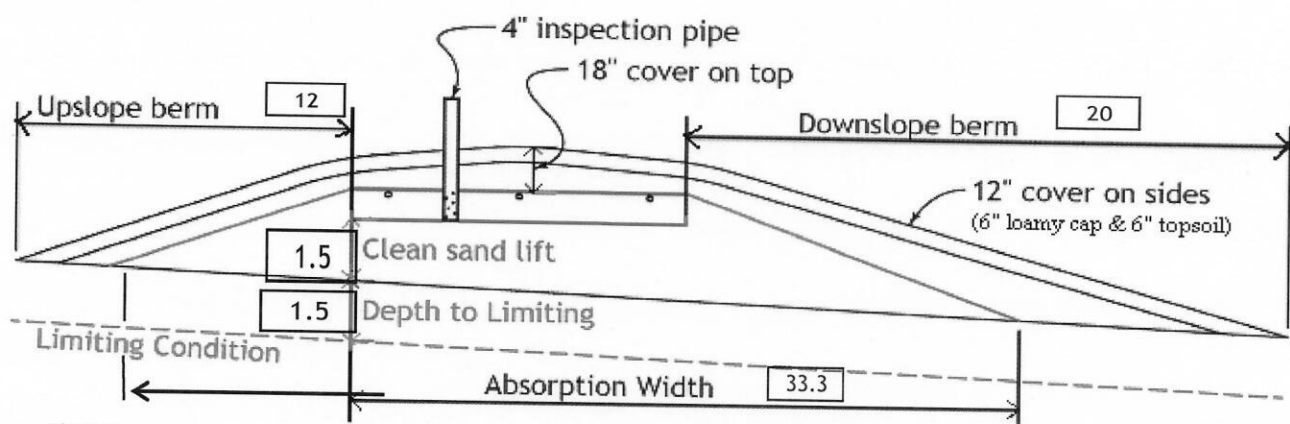
27)  ft. base absorption width (with sand beyond rockbed as follows):  
 greater of: absorption width OR sand slope

28)	<input type="text" value="0.0"/> ft. upslope and sideslope	sand upslope	<input type="text" value="8.3"/>
	<input type="text" value="10.0"/> ft. Downslope	sand down slope	<input type="text" value="15.0"/>

Individual slope ratios give BERM widths (topsoil beyond rockbed) of:

29)	<input type="text" value="4:1"/> upslope ratio	<input type="text" value="12"/> ft. upslope berm
30)	<input type="text" value="4:1"/> sideslope	<input type="text" value="16"/> ft. sideslope berms
31)	<input type="text" value="4:1"/> downslope	<input type="text" value="20"/> ft. downslope berm

32) Overall Dimensions:  ft. wide by  ft. long Rock bed  
 ft. wide by  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.

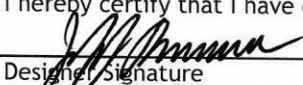
33) Rock Bed:  ft. by  ft. by  inches under pipe, plus 20% gives   $\text{yd}^3$  or  $\ast 1.4 =$   ton

34) Mound Sand: (note: volume is based on 3:1/4:1 slope from top of rockbed, Exchange sand for loamy cap if desired)  
 up +  downslope +  ends +  under rock =   $\text{yd}^3$  or  $\ast 1.4 =$   ton  
 plus 20%

35) Loamy Cap:  ft. by  ft. 6" deep, plus 20% gives   $\text{yd}^3$  or  $\ast 1.4 =$   ton

36) Topsoil:  ft. by  ft. 6" deep, plus 20% gives   $\text{yd}^3$  or  $\ast 1.4 =$   ton

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

	Brummer Septic LLC.	L-1347	5/16/2023
Designer Signature	Company	License#	Date

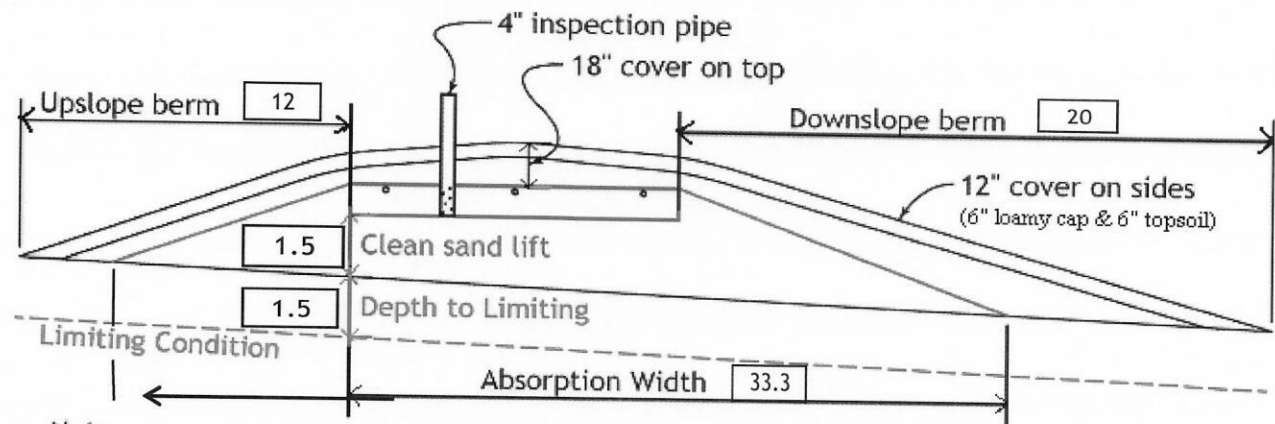
# Installer Summary

- 1000 gallon Septic tank (minimum) Tank options: Effluent filter & alarm req'd  
 Install 1650 Jacobson 2/Compartment tank at 12.69 gpi
- 533 gallon Dose tank (minimum)
- 27 GPM @ 27 ft. of head, Pump required  
 6.7 inch swing on Demand float which translates to roughly 4.4 inches of float tether length  
 if time dosing is required --> 3.1 minutes ON time & 5.1 hours OFF time
- 19 inches from bottom of tank to "pump ON" float, or 12 inches to "timer ON" float  
 22 inches from bottom of tank to "Hi Level Alarm" or 32 inches to "Hi level alarm" if time dosed
- 125 ft. of 2.0 inch supply line with end feed manifold connection  
 (Tip: "top feed" manifold to control drainback)
- 18 inch, or 1.5 ft. Sand Lift Mound  
 10.0 ft. wide by 37.5 ft. long Rock bed  
 3 laterals 1.50 inch diameter 35.5 ft. long 3.0 ft. lateral spacing  
 1/4" inch perfs 3.0 ft. perforation spacing
- Yes Effluent filter & alarm  
 3 clean out & valve box assemblies

- 33.3 ft. Total sand ABSORPTION width (minimum)  
 8.3 ft. upslope and sideslope (sand beyond rockbed, minimum)  
 15.0 ft. Downslope (sand beyond rockbed, minimum)

Specific slope ratios give BERM widths (topsoil beyond rockbed) of:

- |                   |                        |
|-------------------|------------------------|
| 4:1 upslope ratio | 12 ft. upslope berm    |
| 4:1 sideslope     | 16 ft. sideslope berms |
| 4:1 downslope     | 20 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:	17.0 yd <sup>3</sup> or *1.4=	24 ton	9 inches under pipe
Mound Sand:	135 yd <sup>3</sup> or *1.4=	189 ton	
Loamy Cap:	56 yd <sup>3</sup> or *1.4=	78 ton	6" deep
Topsoil:	65 yd <sup>3</sup> or *1.4=	91 ton	6" deep

# INSPECTOR CHECKLIST - mound

19184 State Hwy 2 / McGregor Mn 55760

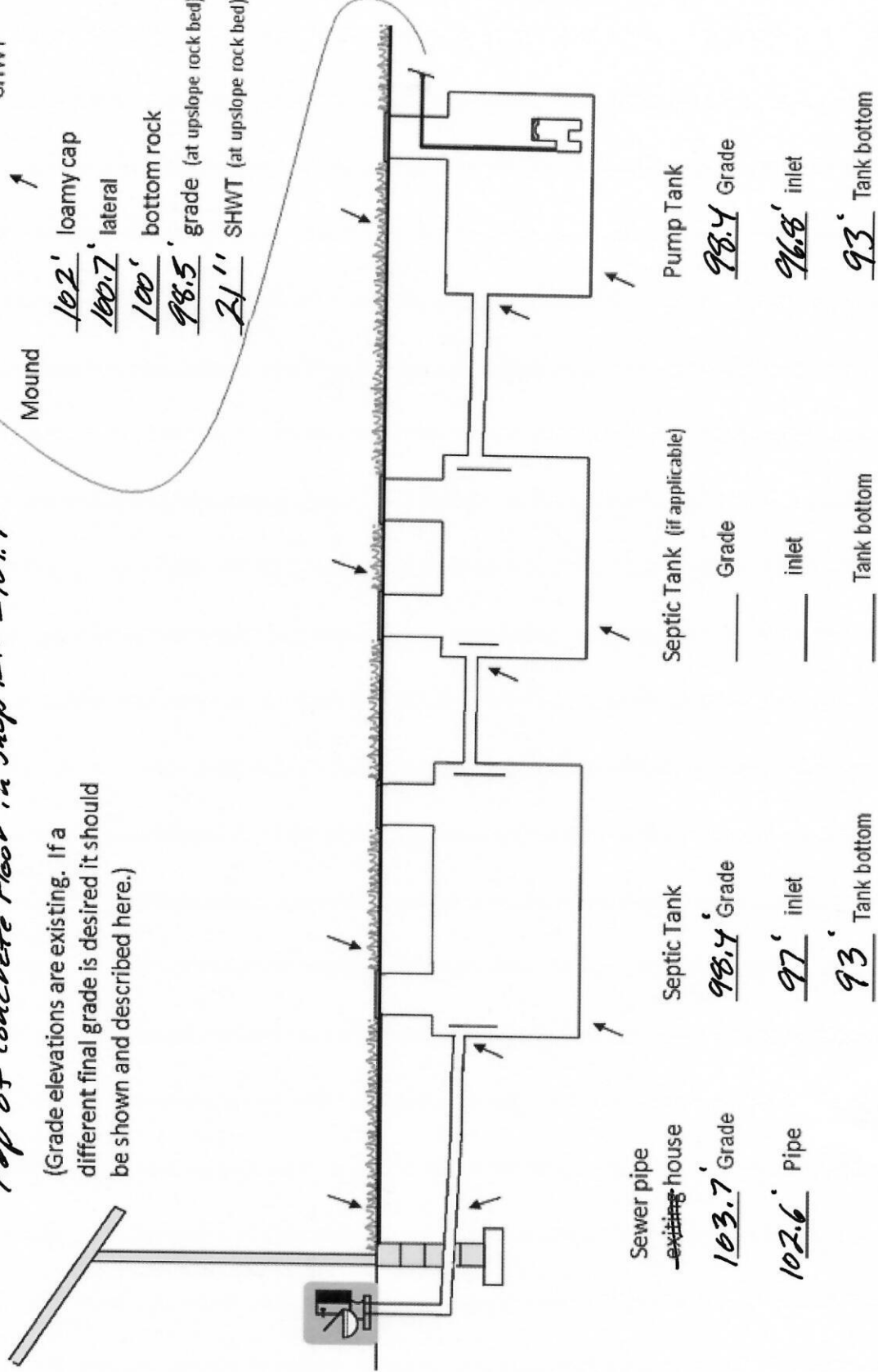
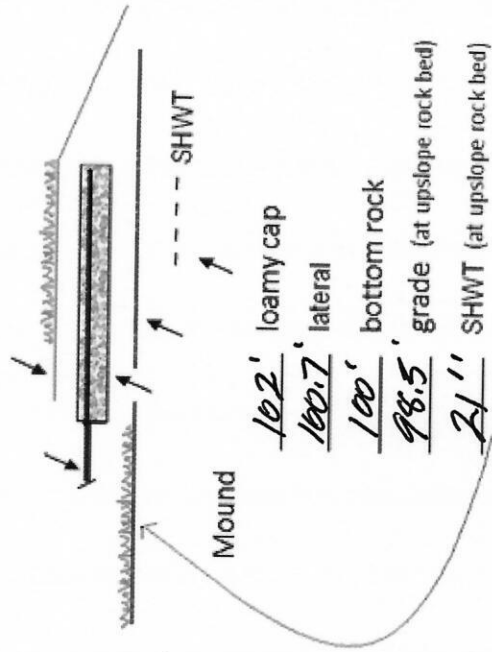
- WELL setbacks: 20' to pressure tested sewer line (5 psi for 15 min)  
50' to everything 100' to dispersal area with shallow well
- PROPERTY LINES setback: 10' to everything
- Road setback: platted: 10' prop line. Metes & bounds: out of road easement, or outer ditch.
- LAKE / BLUFF setback: 20' for bluff. Lakes: GD \_\_\_\_, RD \_\_\_\_, NE \_\_\_\_\_. Protected wetland \_\_\_\_.
- Building setbacks: 10' for everything, 20' for dispersal area.
- WATER LINE under pressure se 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 \_\_\_\_\_ 1000 gallons Effluent filter & alarm req'd \_\_\_\_\_
  
- Riser over outlet, riser over inlet or center, and 6"+ inspection pipe over any remaining baffles.  
Yes \_\_\_\_\_ effluent filter & alarm
- Dose tank risers and piping (water tight, insulated, proper depth, drainback)  
mfg \_\_\_\_\_ 533 gallons
  
- dose pump \_\_\_\_\_ 27 gpm 27 head VERIFY PUMP CURVE 3.1 min ON 5.1 hr OFF
  
- float setting drop 6.7 inches at 12.7 gpi "DESIGNED" 4.4 inches approx float tether length  
85.0 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 37.5  
Sand lift depth 18 inches. (Jar test : 2" sand leaves < 1/8" silt after 30 min)
  
- Absorption Sand beyond rock 8.3 upslope 15.0 downslope
  
- Bermed topsoil beyond rockbed 12 upslope 16 sideslope 20 downslope
  
- cover depth of 12-18"+ VERIFY  
3 laterals (1-2' from edge of rock)  
1.50 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, and at top feed manifold if necessary. VERIFY  
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

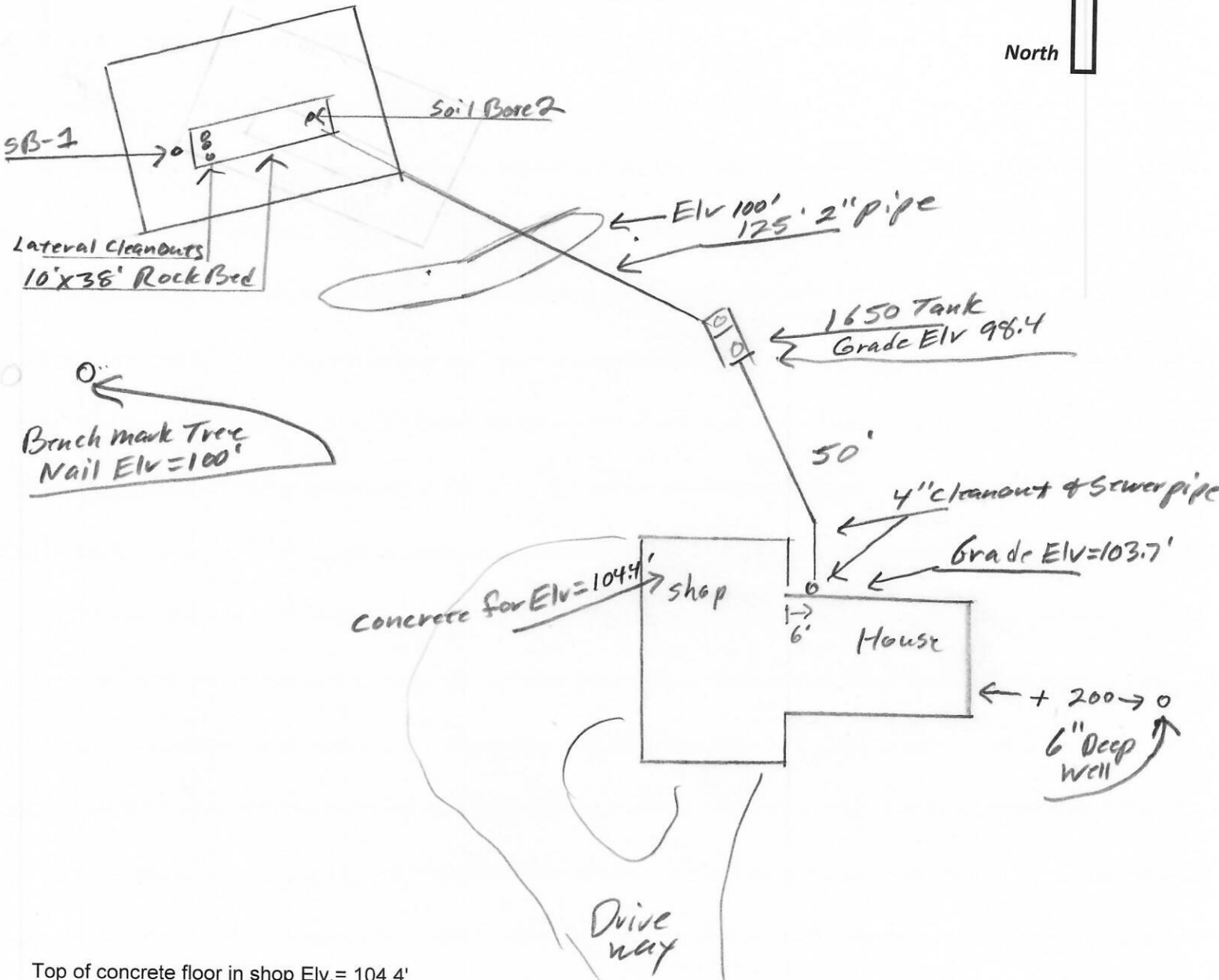
ELV = 100' benchmark N. 100' Tree SW of mound  
Top of concrete floor in shop ELV = 104.4'

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



# { Design Drawing }

Property Owner: Raymond Newkirk      Date: 5/16/23      Designer's Initials: JB  
 Parcel ID. Number: 26-0-035101      Address: 19184 State Hwy 27 McGregor Mn 55760  
 one Inch = 40ft.



Top of concrete floor in shop Elv. = 104.4'  
 Estimated tank inlet Elv. = 97' Pump at Elv. 93'      Highest part of hill between tank and mound Elv. = 100.4'

Surface/ SHWT		Nail on Tree = Bench Mark 100'		Existing Grade	
Soil Bore 1	98.4' / 21"	Bench Mark	100'	Upslope Edge of Rockbed Elv. = 98.5'	
Soil Bore 2	98.4' / 22"	Ground Elv. BM	97.6'	Bottom of Rockbed Elv. = 100'	
Soil Bore 3		Ground Elv. Tank	98.4'	Top of Washed Sand Elv. = 100'	
Grade at Clean-out house			103.7'	Elv. Of Sewer pipe at House Elv. = 102.6'	

Please show all that apply ( Existing )

Wells within 100ft. Of Drain field.

Water lines within 10 ft. of Drain field.

Drain field Areas:

Please Draw to Scale with North to Top or Left Side of Page:

Disturbed/Compacted Areas	Access Route for Tank Maintenance
Component Location	Property Lines
OHW ordinary high water	Structures
Lot Easements	Setbacks

## Mound Design Notes - Aitkin county

Property Owner: Raymond Newkirk

Date: 5/16/23

Site Address: 19184 State Hwy 27 McGregor Mn 55760

PID: 26-0-035101

Comments: **Mound design may not follow Aitkin co. Auto fill form for mound design.**

- 1 This is a type I mound for a 3 bedroom House. Existing deep well location is +200' East of House.
- 2 House will gravity flow out North side. No lift, no garbage disposal.
- 3 No property line within 100 ft of any part of septic system.
- 4 Bench Mark Elevation is a nail on a tree near SW corner of mound area.
- 5 Install Jacobson 1650 2/Compartment tank for gravity flow from Slab on grade house.  
Owner may be filling tank location for slope from house. Existing grade is Elv.= 98.4'  
Install tank with drainback from mound. Highest point between tank and mound is Elv.= 100.4'
- 6 Elevation contour of rock bed upslope edge is 98.5'.  
The area size of the rock bed is 10' x 38' . Absorption area is 38' x 33.3'.  
Sand absorption area is 8.3 ft. up slope + 10 ft. rockbed + 15 downslope = approx. 33.3 ft. wide sand base.  
Berms are 12ft. Upslope, 20ft. Down slope, 10ft. Rock bed = approx. 42ft. Wide.  
Overall mound size is approx. 42' wide x 70' long and approx. 3.5' high. End Berms are 16 ft wide.
- 7 The bench mark is the nail on the tree near mound area, BM = Elv. 100'.  
Installer to double check bench mark. Installer should confirm bench mark and sand height Elv. with inspector.  
Installer should record bench mark Elv. and sand height on installation inspection form.
- 8 The top of the washed sand and bottom of rock bed is Elv. 100'.  
It is important that the soils do not get compacted, and that clean washed sand is used.
- 9 The Jacobson 1650 compartment tank will be gravity flow from dwelling. Install the pump for 7 demand doses per day. approx. 85 gallons per dose, 6.7 inches of tank level. Install alarm at 3 inches from pump on level.  
Install all manholes, inspection pipes and clean-outs to grade or above, insulate top of tank.  
Recommend raising manholes 4" above finished grade.
- 10 Install a 2" supply pipe from tank to end manifold in rock bed, install so pipe drains back to tank.  
Install 1.5" laterals with 9" of rock under them. ( Install Lateral clean-outs at far end of laterals. Recommended )
- 11 **Drill 1/4" holes for Perf sizing, 36" on centers.**  
Install 4" inspection pipe to bottom of rock bed, secure in rock bed and raise to above final grade.  
Recommend Installing an Effluent filter and Alarm on septic tank outlet.  
MPCA Recommends installing an event counter on all systems with a pump.

Designed to Aitkin Co. and MPCA recommendations and requirements.

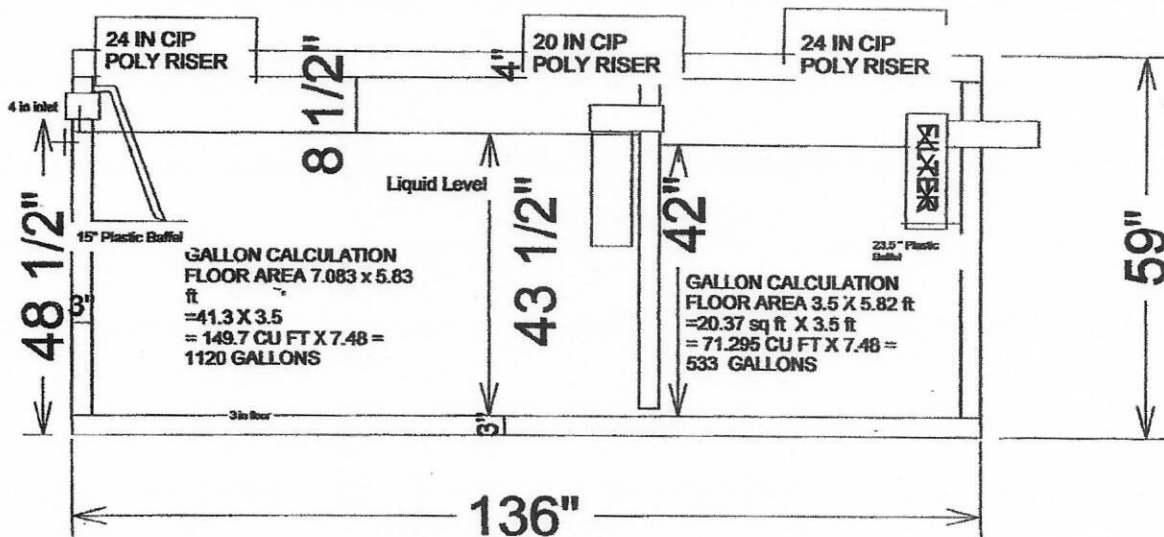
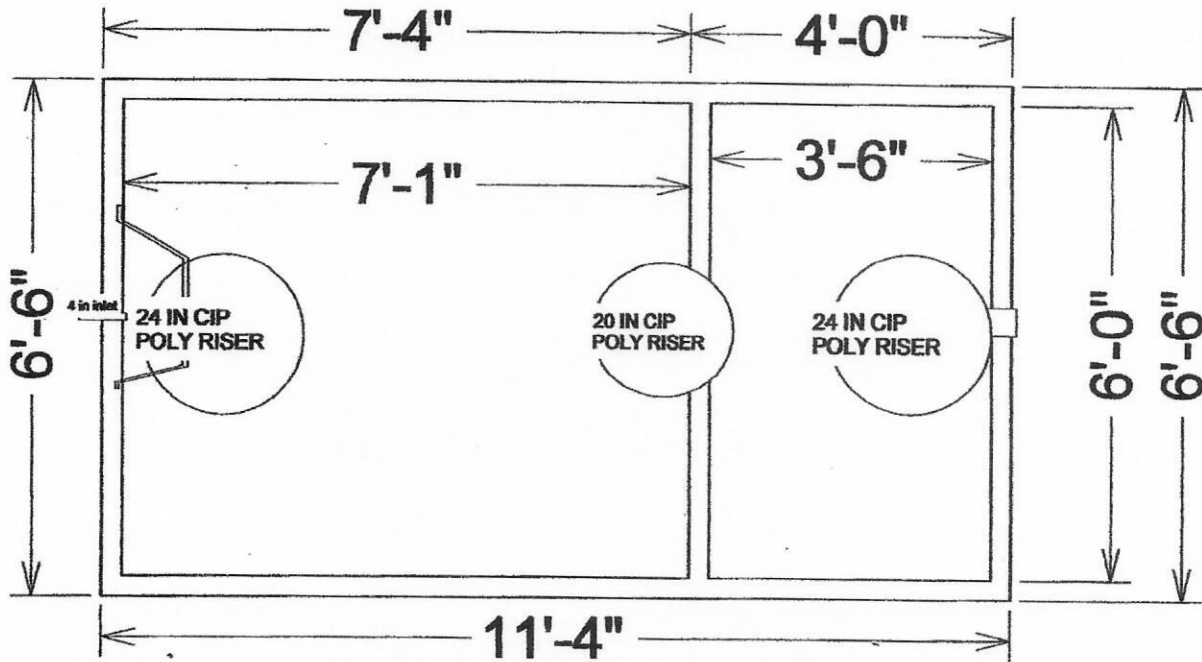
  
Designer Signature

Brummer Septic LLC.  
Design Company

L-1347  
License#

# 1650 Gallon 2 Compartment Septic Tank

TOP VIEW



$533 / 42" = 12.69 \text{ GPI}$

SIDE VIEW

Drawings Owned BY Jacobson Precast, Inc.  
36641 HWY 169, Aitkin, Mn 56431



# Detailed Parcel Report

Parcel Number: 26-0-035101

## General Information

<b>Township/City:</b>	RICE RIVER TWP	<b>Lake Number:</b>	0
<b>Taxpayer Name:</b>	NEWKIRK, RAYMOND	<b>Lake Name:</b>	
<b>Taxpayer Address:</b>	1489 SHORELINE DR WAYZATA MN 55391	<b>Acres:</b>	34.18
<b>Property Address:</b>	19184 STATE HWY 27	<b>School District:</b>	4.00
<b>Township:</b>	46		
<b>Range:</b>	23		
<b>Section:</b>	21		
<b>Green Acres:</b>	No		
<b>Plat:</b>			
<b>Brief Legal Description:</b>	SE OF SE LESS 5.82 AC		

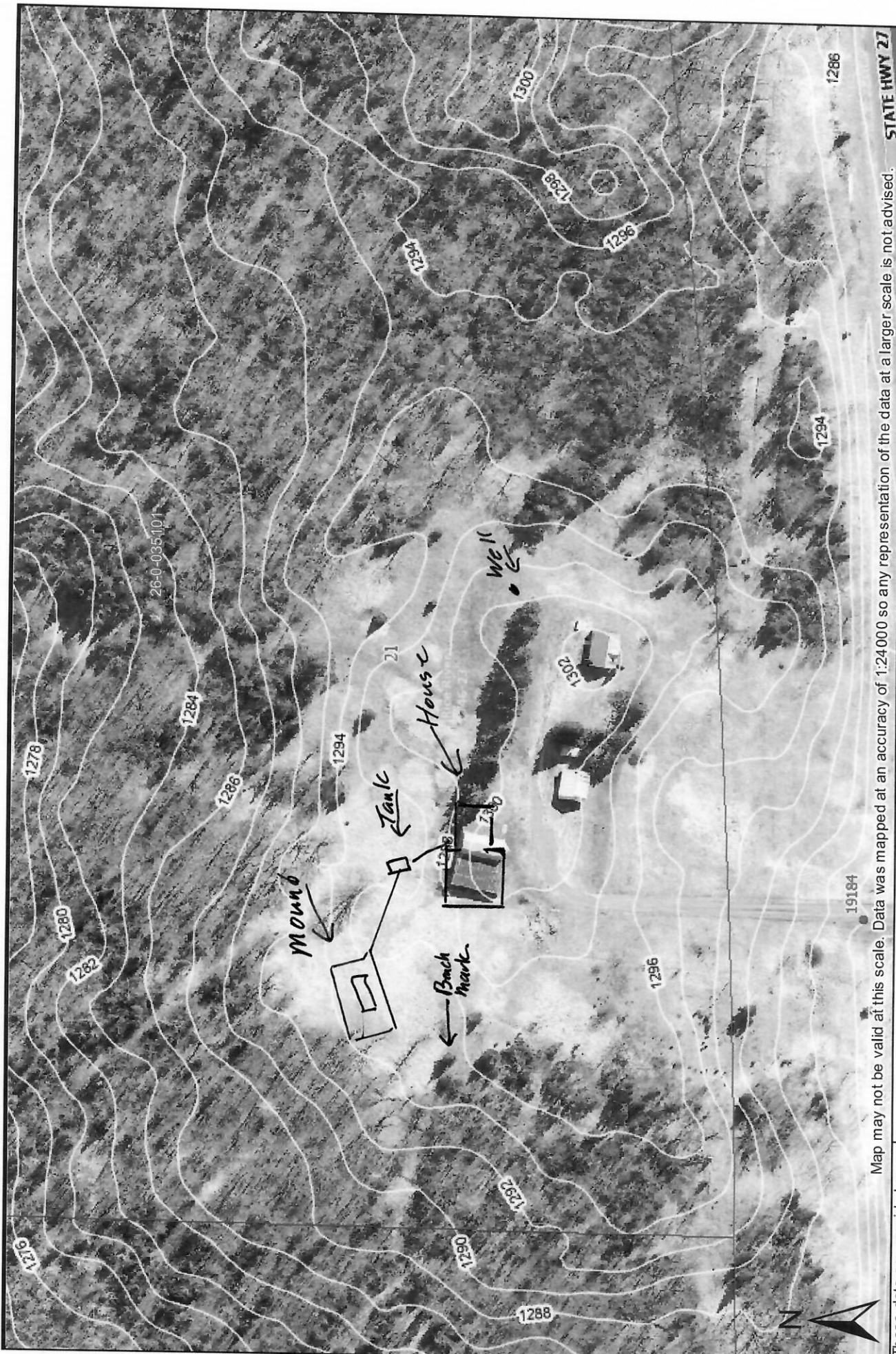
## Tax Information

<b>Class Code 1:</b>	Non-Homestead Qualifying Single Res Unit
<b>Class Code 2:</b>	Rural Vacant Land
<b>Class Code 3:</b>	Unclassified
<b>Homestead:</b>	Non Homestead
<b>Assessment Year:</b>	2023

<b>Estimated Land Value:</b>	\$81,400.00
<b>Estimated Building Value:</b>	\$60,400.00
<b>Estimated Total Value:</b>	<u>\$141,800.00</u>
<b>Prior Year Total Taxable Value:</b>	\$119,600.00
<b>Current Year Net Tax (Specials Not Included):</b>	\$690.00
<b>Total Special Assessments:</b>	\$0.00
<b>**Current Year Balance Not Including Penalty:</b>	\$345.00
<b>Delinquent Taxes:</b>	No

\* For more information on delinquent taxes, please call the Aitkin County Treasurer's Office at 218-927-7325.

\*\* Balance Due on a parcel does not include late payment penalties.



Map may not be valid at this scale. Data was mapped at an accuracy of 1:24,000 so any representation of the data at a larger scale is not advised. STATE HWY 27

These data are provided on an "AS-IS" basis, without warranty of any type, expressed or implied, including but not limited to any warranty as to their performance, merchantability, or fitness for any particular purpose.

Newkirk



Web AppBuilder for ArcGIS

1:2,257 0 0.01 0.02 m 1 inch = 188 feet

Date: 5/12/2023

Soil Map—Aitkin County, Minnesota  
(Newkirk)



Soil Map may not be valid at this scale.

Map Scale: 1:3,000 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

## Aitkin County, Minnesota

### C71C—Milaca-Mora complex, 1 to 7 percent slopes, stony

#### Map Unit Setting

*National map unit symbol:* 2z19x

*Elevation:* 790 to 1,970 feet

*Mean annual precipitation:* 27 to 36 inches

*Mean annual air temperature:* 37 to 46 degrees F

*Frost-free period:* 80 to 150 days

*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Milaca, stony, and similar soils:* 75 percent

*Mora, stony, and similar soils:* 15 percent

*Minor components:* 10 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Milaca, Stony

##### Setting

*Landform:* Moraines, drumlins

*Landform position (two-dimensional):* Shoulder, backslope, summit

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Convex

*Across-slope shape:* Linear, convex

*Parent material:* Coarse-loamy lodgment till

##### Typical profile

*A - 0 to 7 inches:* silt loam

*E - 7 to 9 inches:* fine sandy loam

*B/E - 9 to 16 inches:* fine sandy loam

*Bt - 16 to 40 inches:* fine sandy loam

*BCd - 40 to 79 inches:* fine sandy loam

##### Properties and qualities

*Slope:* 1 to 7 percent

*Surface area covered with cobbles, stones or boulders:* 0.1 percent

*Depth to restrictive feature:* 31 to 52 inches to densic material

*Drainage class:* Moderately well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately high (0.00 to 0.20 in/hr)

*Depth to water table:* About 24 to 43 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water supply, 0 to 60 inches:* Moderate (about 6.3 inches)



### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 3e  
*Hydrologic Soil Group:* C  
*Ecological site:* F090AY014WI - Loamy Bedrock Upland  
*Forage suitability group:* Sloping Upland, Acid (G090XN006MN)  
*Other vegetative classification:* Sloping Upland, Acid  
(G090XN006MN)  
*Hydric soil rating:* No

### Description of Mora, Stony

#### Setting

*Landform:* Moraines  
*Landform position (two-dimensional):* Footslope, backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Convex, linear  
*Across-slope shape:* Linear  
*Parent material:* Coarse-loamy lodgment till

#### Typical profile

*A - 0 to 8 inches:* silt loam  
*E - 8 to 11 inches:* fine sandy loam  
*B/E - 11 to 15 inches:* fine sandy loam  
*Bt1 - 15 to 23 inches:* fine sandy loam  
*Bt2 - 23 to 42 inches:* fine sandy loam  
*BCd - 42 to 79 inches:* fine sandy loam

#### Properties and qualities

*Slope:* 1 to 6 percent  
*Surface area covered with cobbles, stones or boulders:* 0.1 percent  
*Depth to restrictive feature:* 31 to 52 inches to densic material  
*Drainage class:* Somewhat poorly drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low  
to moderately high (0.00 to 0.20 in/hr)  
*Depth to water table:* About 16 to 24 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0  
mmhos/cm)  
*Available water supply, 0 to 60 inches:* Moderate (about 6.1  
inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 3s  
*Hydrologic Soil Group:* B/D  
*Ecological site:* F090AY011WI - Moist Loamy Lowland  
*Forage suitability group:* Level Swale, Acid (G090XN005MN)  
*Other vegetative classification:* Level Swale, Acid  
(G090XN005MN)  
*Hydric soil rating:* No

## Minor Components

### Ronneby, stony

*Percent of map unit:* 5 percent

*Landform:* Moraines, drumlins

*Landform position (two-dimensional):* Footslope

*Landform position (three-dimensional):* Side slope, talf

*Down-slope shape:* Concave

*Across-slope shape:* Linear

*Ecological site:* F090AY011WI - Moist Loamy Lowland

*Other vegetative classification:* Level Swale, Acid (G090XN005MN)

*Hydric soil rating:* No

### Cebana, stony

*Percent of map unit:* 5 percent

*Landform:* Moraines, interdrumlins

*Landform position (two-dimensional):* Footslope, toeslope

*Landform position (three-dimensional):* Talf

*Down-slope shape:* Concave

*Across-slope shape:* Linear

*Ecological site:* F090AY006WI - Wet Loamy Lowland

*Other vegetative classification:* Level Swale, Acid (G090XN005MN)

*Hydric soil rating:* Yes

## Data Source Information

Soil Survey Area: Aitkin County, Minnesota

Survey Area Data: Version 23, Sep 6, 2022