



ST. LOUIS COUNTY BOARD OF ADJUSTMENT STAFF REPORT

INSPECTION DATE: 6/18/2024

REPORT DATE: 6/21/2024

MEETING DATE: 7/11/2024

APPLICANT INFORMATION

APPLICANT NAME: Kurt Peterson

APPLICANT ADDRESS: 625 Grand Ave, Center City, MN 55012

OWNER NAME:
(IF DIFFERENT THAN ABOVE)

SITE ADDRESS: 94700 Bradley Island, Tower, MN 55790

LEGAL DESCRIPTION: Government Lot 7, S32, T63N, R16W (Greenwood)

PARCEL IDENTIFICATION NUMBER (PIN): 387-0020-04090

VARIANCE REQUEST: The applicant is requesting relief from St. Louis County SSTS Ordinance 61 adopted Technical Standards 7080.2150, Subpart 2 (F), to allow a subsurface sewage treatment system installation at a reduced shoreline setback.

PROPOSAL DETAILS: The applicant is proposing a replacement subsurface sewage treatment system at a reduced shoreline setback of 30 feet where 50 feet is required on a general development lake. The system is replacing a noncompliant system.

PARCEL AND SITE INFORMATION

ROAD ACCESS NAME/NUMBER: N/A

ROAD FUNCTIONAL CLASS: N/A

LAKE NAME: Vermilion Lake

LAKE CLASSIFICATION: GD

RIVER NAME: N/A

RIVER CLASSIFICATION: N/A

DESCRIPTION OF DEVELOPMENT ON PARCEL: Current development on the property includes main dwelling and three "sleeper" accessory dwellings, sauna, multiple storage structures, and failed drywell septic system.

ZONE DISTRICT: RES 9

PARCEL ACREAGE: 1.5 ACRES

LOT WIDTH: 230 FEET

FEET OF ROAD FRONTAGE: N/A

FEET OF SHORELINE FRONTAGE: 885 FEET

PARCEL AND SITE INFORMATION

VEGETATIVE COVER/SCREENING: Adequate screening at shoreline, no adjacent parcels.

TOPOGRAPHY: Island is relatively flat.

FLOODPLAIN ISSUES: Parcel contains mapped floodplain. The proposed septic location will be outside floodplain area and meet FEMA floodplain requirements.

WETLAND ISSUES: N/A

ADDITIONAL COMMENTS ON PARCEL: This parcel is water access and has areas of bedrock outcropping.

FACTS AND FINDINGS

A. Official Controls:

1. Ordinance 61 and technical standards states that septic systems shall meet setbacks as required in section 7080.2150, subpart 2, item F, table VII. The table requires a 50 foot setback from a general development lake and the applicant is requesting a 30 foot setback.
2. All other setbacks will be met

B. Practical Difficulty:

1. The island is small in area and is comprised of primarily bedrock outcroppings which leaves only one small option for a soil treatment area. This soil treatment area is still smaller than a required standard sized soil treatment area would be, so the system is proposed of time dosed peat filters on a downsized treatment area mound bed.
2. An alternative that would not require variance may be to remove plumbing and pressurized water to utilize hand carried water only with a vaulted privy.

C. Essential Character of the Locality:

1. A few islands in the area are developed. Of the developed islands, there are some structures with pressurized water and some without.

D. Other Factor(s):

1. The proposed septic system replaces a noncompliant drywell septic system.

BOARD OF ADJUSTMENT CRITERIA FOR APPROVAL OF A VARIANCE

1. Is the variance request in harmony with the general purpose and intent of official controls?
2. Has a practical difficulty been demonstrated in complying with the official controls?
3. Will the variance alter the essential character of the locality?
4. What, if any, other factors should be taken into consideration on this case?

CONDITIONS

Conditions that may mitigate the variance for relief from St. Louis County SSTS Ordinance 61 adopted Technical Standards 7080.2150 Subpart 2 (F) to allow the replacement of a subsurface sewage treatment system at a reduced shoreline setback as proposed include, but are not limited to:

1. All other Onsite Wastewater SSTS standards shall be met.
2. Following system installation, an inspection shall be performed by a qualified inspector to ensure setbacks are met prior to issuing Certificate of Compliance.
3. All other local, county, state and federal regulations shall be met.

**ST. LOUIS COUNTY, MN
PLANNING AND ZONING DEPARTMENT
(Onsite Wastewater Division)**

Duluth

Government Services Center

320 West 2nd Street, Suite 301
Duluth, MN 55802
Phone (218) 725-5200
Toll Free (800) 450-9278

Virginia

Government Services
Center
201 South 3rd Avenue West
Virginia, MN 55792
Phone (218) 749-0625
Toll Free (800) 450-9278

Permit Construction Application Subsurface Sewage Treatment System

General

- This permit application form is used to apply for a Permit to Construct. Additional information:

www.stlouiscountymn.gov/septic

Enter the Primary PIN and Associated PIN (if applicable) of the property to be reviewed.

PIN is found on your Property Tax Statement. For example, 123-1234-12345. Primary PIN: Parcel where Structure/SSTS are located. Associated PIN: Additional and/or adjacent property that you own or that is related to the project.

County Land Explorer: <https://www.stlouiscountymn.gov/explorer>

Property Lookup: <http://apps.stlouiscountymn.gov/auditor/parcelInfo2005Iframe>

Primary PIN **387-0020-04090**

Associated PINs

Enter Applicant Information

| | |
|---------------------------|-------------------------------|
| I am a: | Contractor |
| Are you an LLC Business? | No |
| Applicant Name: | Bodri Enterprises Inc. |
| Address: | 8650 Highway 115 |
| | -- |
| City: | Cook |
| State: | MN |
| Zip: | 55723 |
| Primary Phone: | (218)410-3477 |
| Mobile Phone: | -- |
| Email: | michaelbodri@gmail.com |
| Preferred Contact Method: | Any |
| Contact Person Name: | -- |
| Contact Person Phone: | -- |

Property Owner Name and Contact Information.

If the property owner information we have on file is not correct, please enter the current owner information.

Property Owner Name: **PETERSON KURT R**

Site Address: **94700 BRADLEY ISLAND**
 --
 City: **TOWER**
 State/Province: **MN**
 Zip: **55790**
 Primary Phone: **(651)347-5554**
 Mobile Phone: **--**
 Email: **kpeters447@gmail.com**
 Preferred Contact Method: **Any**
 Contact Person Name: **--**
 Contact Person Phone: **--**

Mailing Address Information

This address can default from the address you selected. If the values defaulted are not correct, please enter the correct information.

Same as Property address? Yes
 Same as Applicant address? Yes
 Name: **PETERSON KURT R**
 Address: **625 Grand Ave.**
 --
 City: **Center City**
 State/Province: **MN**
 Zip: **55012**
 Primary Phone: **(651)347-5554**
 Mobile Phone: **--**
 Email: **kpeters447@gmail.com**

Provide additional email recipients Yes

SITE INFORMATION

Enter Site information

Do you need to request a 911 address number and sign? **No**

Is this a leased property? **No**

Is this for Residential or Commercial?
Residential

Is the property used year round or used seasonally?
Seasonal Use

Is this project within 300 feet of a river/stream or 1,000 feet of a lake?

Yes

River/Lake Name

Vermilion**Is this property connected to a Common Interest Community?****No****Is this serving multiple dwellings sharing a SSTS component?****No****Is this related to a Point of Sale Requirement?****Yes****Is the SSTS located in a floodplain?****No**

APPLICATION REASON

What are you applying for?

Replacing the existing SSTS

Explain why:

Failed Drywells

Permit Number (being replaced, if known):

--

WORKSHEET

Select the System Type

Type I System

*"Type I System" means an ISTS that follows a standard trench, bed, at-grade, mound, or graywater system design in accordance with MPCA rules, Minnesota Rules, Chapter 7080.2200 through 7080.2240.***No**

Type II System

*"Type II System" means an ISTS with acceptable modifications or sewage containment system that may be permitted for use on a site not meeting the conditions acceptable for a standard Type I system. These include systems on lots with rapidly permeable soils or lots in floodplains and privies or holding tanks.***No**

Type III System

*"Type III System" means a custom designed ISTS having acceptable flow restriction devices to allow its use on a lot that cannot accommodate a standard Type I soil treatment and dispersal system.***No**

Type IV System

*"Type IV System" means an ISTS, having an MPCA registered pretreatment device and incorporating pressure distribution and dosing, that is capable of providing suitable treatment for use where the separation distance to a shallow saturated zone is less than the minimum allowed.***Yes**

System Type

Registered Treatment Product

Type V System

"Type V System" means an ISTS, which is a custom engineered design to accommodate the site taking into account pretreatment effluent quality, loading rates, loading methods, groundwater mounding, and other soil and other relevant soil, site, and wastewater characteristics such that groundwater contamination by viable fecal coliforms is prevented.

No

Select the gallons per day (GPD) for the system.

Gallons per Day **Less than 2,500 GPD**

WELL INFORMATION

Enter information about the well.

Do you have a proposed water source?

No

Enter # of existing water sources on the property

1

After completing the following information for the 1st water source, please use the Add Another Water Source button to add the additional water source(s) information.

Water Source Type **Surface/Lake Water**

Well # --

Well Depth (Feet) --

Case Depth (Feet) --

Well Type --

DESIGNER & INSTALLER INFORMATION

Select the Designer

Licensed Business **Bodri Enterprise Incorporated**

Name or Designer

Name

License # **4284**

Certification # **8748**

Designer's Comments (To On-Site Wastewater Staff) **SYSTEM WILL ONLY BE 6 X 30' BED DUE TO BEDROCK OUTCROPPING ON EITHER SIDE TO PREVENT SYSTEM FROM BEING LARGER. THE BUNKHOUSESES WILL BE CONVERTED INTO STORAGE AND SAUNA IS A DRY SAUNA PER OWNER. SITE WAS VISITED WITH THE PERSPECTIVE INSTALLER AT THE TIME OF THE DESIGN.**

Select the Installer (if known)

Licensed Business --

Name or Installer Name

License # --

Certification # --

Installer's Comments --
(To On-Site Wastewater
Staff)

STRUCTURE - RESIDENTIAL

Enter Building Type and Water Uses

Home, mobile home, hunting shack, cabin, RV

Dwelling **Yes**

Dwelling

of Bedrooms **3**

Plumbing **Yes**

Basement Plumbing **Yes**

Garbage Disposal **Yes**

Clothes Washer **Yes**

Dishwasher **Yes**

Water Conditioning Unit **Yes**

Furnace w/Humidifier **Yes**

Bathtub > 40 gal. **Yes**

Sewer Grinder Pump **Yes**

Multi-Family **No**

Accessory Dwelling **No**

Accessory Structure --

w/water

Other **No**

Other information to be considered for this application

--

Will this project require a Septic Variance?

Yes

VARIANCE WORKSHEET

Enter Variance information. About SSTS Variances Pursuant to Ordinance 61, Article V, Section 3.0 A property owner may request a variance from the standards specified in the Ordinance pursuant to county policies and procedures. Variances shall only be permitted when they are in harmony with the general purposes and intent of this Ordinance where there are practical difficulties or particular hardship in meeting the strict letter of this Ordinance, excluding the technical standards. Certain deviations may require the approval of the MPCA or the MN Department of Health.

Describe the specific provision(s) in the ordinance from which the variance is requested.

Requesting to be allowed to put septic components within 30' of the lake instead of the standard 50' setback

Describe the practical difficulty that prevents compliance with the rule.

The island is almost entirely bedrock with only one spot where the peat filters could actually go

Describe the alternative measures that will be taken to achieve a comparable degree of compliance with the purposes and intent of the applicable provisions.

System will be replacing existing drywells that are 20' from the lake. Existing tank is

27' from the lake, so all components will be further away from the lake than they currently are

Identify cost considerations preventing reasonable use of the property under the terms of this ordinance

If tanks cannot go within 30' of the lake, then a grinder pump will be needed, which upsizes the septic tanks by 50%. It would also cause the supply line to the peat filters to have no drainback without blasting the tanks into the rock.

OFFICE USE ONLY

| | |
|---------------------|-----------------|
| ES Area | EB |
| Office | Virginia |
| Section | 32 |
| Township | 63 |
| Range | 16 |
| Variance Department | -- |
| Recommendation | |

Specify reasons for recommendation:

Hint: (Reference pertinent sections of the Ordinance and ISTS Construction Standards)

| | |
|---------------------------|----|
| | -- |
| Hearing Info. and Outcome | -- |
| Board of Adjustment | -- |
| Hearing Date | |
| Permit # | -- |
| Variance Granted | -- |
| Case # | -- |

VARIANCE AGREEMENT

By submitting this request for variance from the Ordinance and the Construction Standards, I certify and agree that no substantial health hazard is likely to occur therefrom and an unnecessary hardship might result in strict compliance with the Ordinance and Standards.

I further agree to install a sewage treatment system in accordance with the permit application, plans, and specification that are made as part of this variance request, in addition to paying the Variance Fee associated with this request.

Site Design of Septic 5/9/2024

94700 Bradley Island

Township: Greenwood

+/- 1.5 acres

City: Tower

Inspected by Michael Bodri

Bodri Enterprises Inc.

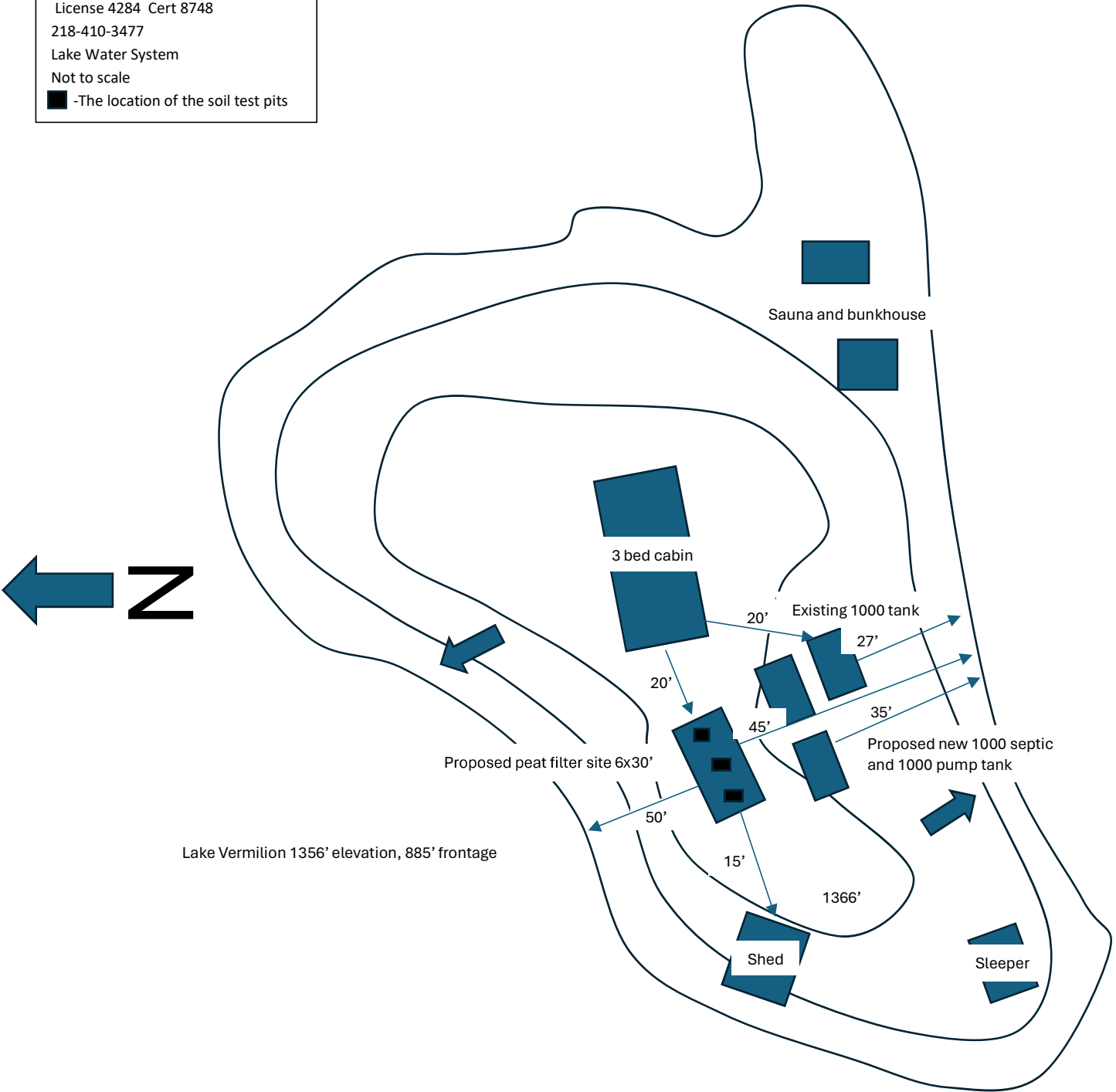
License 4284 Cert 8748

218-410-3477

Lake Water System

Not to scale

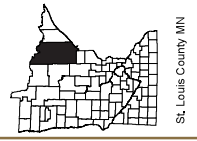
■ -The location of the soil test pits





St. Louis County

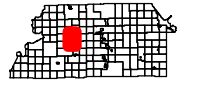
July BOA Meeting



Kurt Peterson

Location Map

387-0020-04090



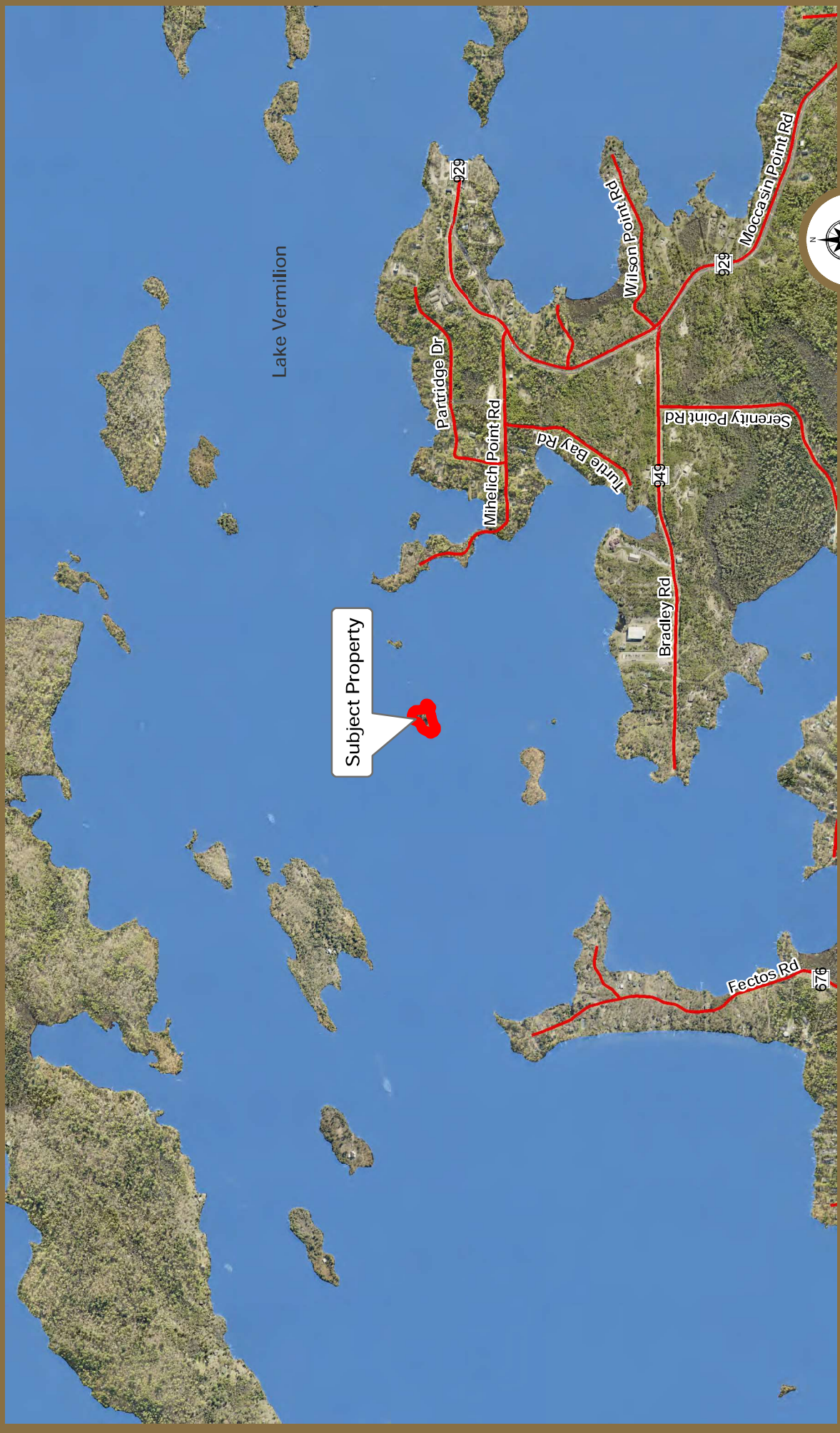
Prepared By: **Planning & Zoning**
Department
(218) 725-5000
www.stlouiscountymn.gov
Source: St. Louis County
Map Created: 6/13/2024

Disclaimer: This is a compilation of records as they appear in the St. Louis County Offices affecting the area shown. This drawing is to be used only for reference purposes and the County is not responsible for any inaccuracies herein contained.

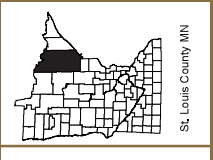
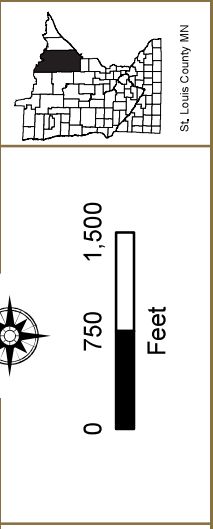
© Copyright St. Louis County All Rights Reserved

St. Louis County

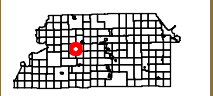
July BOA Meeting



Subject Property



Kurt Peterson
Location Map
387-0020-04090



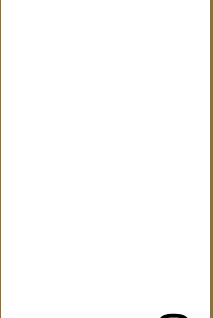
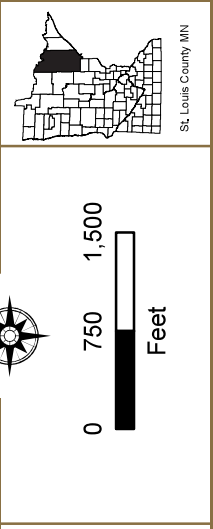
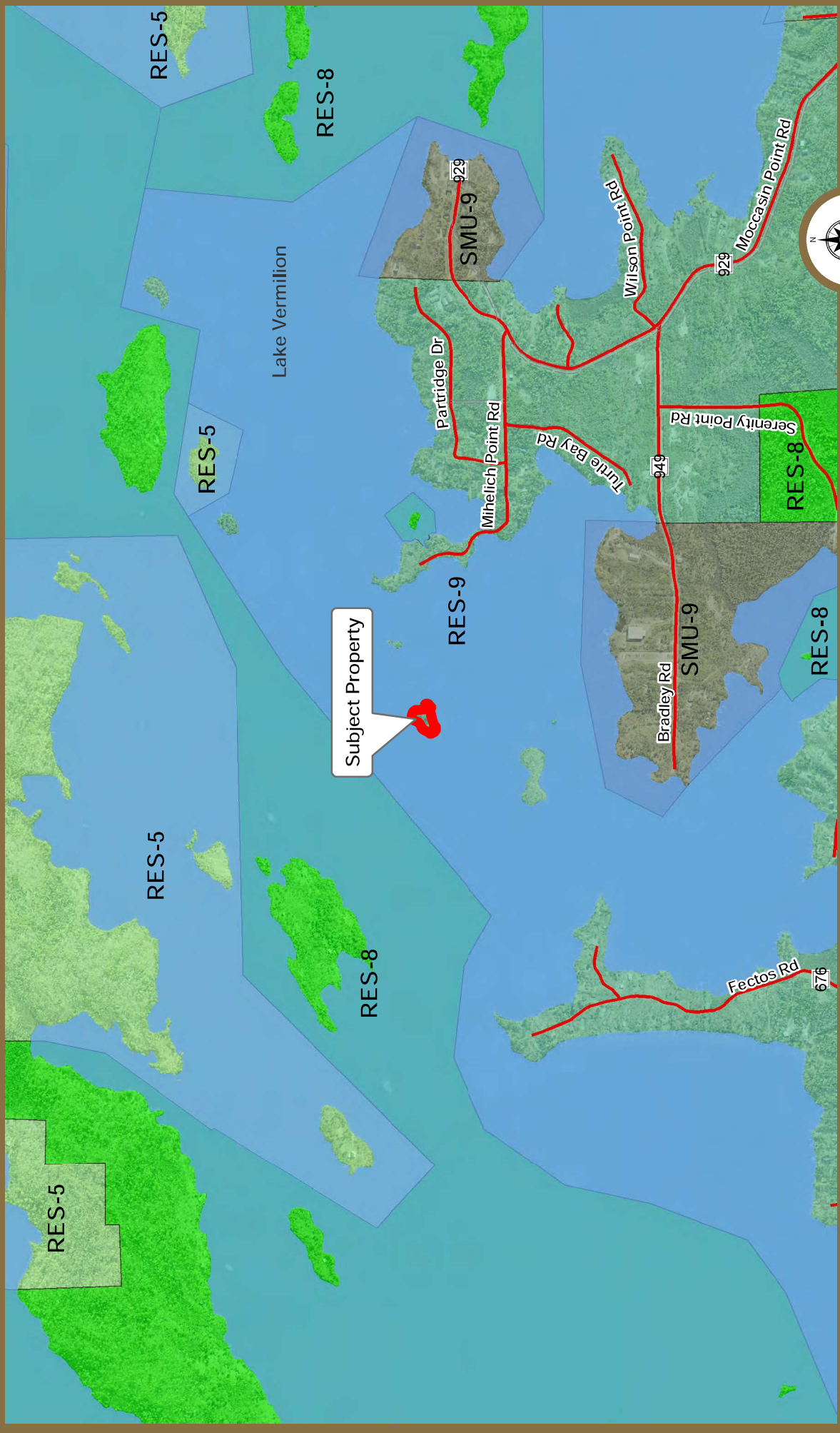
Prepared By: Planning & Zoning Department
 (218) 725-5000
www.stlouiscountymn.gov
 Source: St. Louis County
 Map Created: 6/13/2024

Disclaimer: This is a compilation of records as they appear in the St. Louis County Offices affecting the area shown. This drawing is to be used only for reference purposes and the County is not responsible for any inaccuracies herein contained.

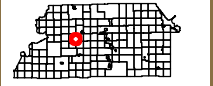
© Copyright St. Louis County All Rights Reserved

St. Louis County

July BOA Meeting



Kurt Peterson
Zoning Map
387-0020-04090



Prepared By: Planning & Zoning Department
 (218) 725-5000
www.stlouiscountymn.gov
 Source: St. Louis County
 Map Created: 6/13/2024

Disclaimer: This is a compilation of records as they appear in the St. Louis County Offices affecting the area shown. This drawing is to be used only for reference purposes and the County is not responsible for any inaccuracies herein contained.

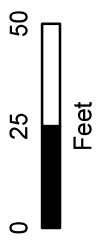
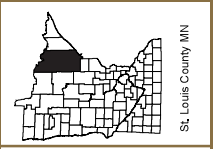
© Copyright St. Louis County All Rights Reserved

St. Louis County

July BOA Meeting



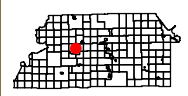
Lake Vermilion



Kurt Peterson

Site Map

387-0020-04090



Prepared By: Planning & Zoning
Department
(218) 726-5000
www.stlouiscountymn.gov

Source: St. Louis County

Map Created: 6/13/2024

Disclaimer: This is a compilation of records as they appear in the St. Louis County Offices affecting the area shown. This drawing is to be used only for reference purposes and the County is not responsible for any inaccuracies herein contained.

© Copyright St. Louis County All Rights Reserved



St. Louis County, MN

PERMIT

Residential Construction Application

Subsurface Sewage Treatment System

Form

3000

Rev. 01-02-2024

This permit application form is used to apply for a Permit to Construct. Additional Information: www.stlouiscountymn.gov/septic.

PROPERTY IDENTIFICATION NUMBER (PIN) and SITE

| | | | | | | | | | | | | | | | | | | | | |
|-------------|------------------------------------|----------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Primary PIN | 3 8 7 - 0 0 2 0 - 0 4 0 9 0 | Associated PIN | | | | | | | | | | | | | | | | | | |
|-------------|------------------------------------|----------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

PIN is found on your Property Tax Statement (E.g. 123-1234-12345), searching the County Land Explorer at <https://qls.stlouiscountymn.gov/landexplorer/>, or searching the Property Lookup at <http://apps.stlouiscountymn.gov/auditor/parcelInfo2005Iframe/>.

| | | | | | |
|--------------|-----------------------------|------|--------------|-----|--------------|
| Site Address | 94700 Bradley Island | City | Tower | Zip | 55790 |
|--------------|-----------------------------|------|--------------|-----|--------------|

Check to request a 911 address number and sign. Visit <https://www.stlouiscountymn.gov/departments-a-z/sheriff/emergency/911-emergency#5143571-obtaining-a-911-address> for addressing information.

APPLICANT (Property Owner)

| | | | | | | | |
|---------|-----------------------------|-------|---------------------|-------|-----------|-----|--------------|
| Name | Kurt Peterson | Date | 5/26/2024 | | | | |
| Address | 625 Grand Ave. | City | Center City | State | MN | Zip | 55012 |
| Email | kpeters447@gmail.com | Phone | 651-347-5554 | Phone | | | |

CONTACT (If Different than Applicant Above)

| | | | | | |
|-------|--|-------|--|-------|--|
| Name | | Phone | | Phone | |
| Email | | Phone | | Phone | |

MAILING INFORMATION (If Different than Site Address)

| | | | | |
|---|---------|-------------------------------|-------|-----|
| <input type="checkbox"/> US Mail | Address | City | State | Zip |
| <input checked="" type="checkbox"/> Email | Email | michaelbodri@gmail.com | | |

REASON FOR APPLICATION

| | | |
|-----------------------------------|--|---|
| <input type="checkbox"/> New SSTS | <input checked="" type="checkbox"/> Replacing the Existing SSTS Why Failed Drywells | <input checked="" type="checkbox"/> Point of Sale Requirement |
|-----------------------------------|--|---|

SYSTEM TYPE (refer to design summary) and PERMIT FEES

| Type I | | Type II | | Type III | | Type IV | | Type V | |
|--|-------|--|-------|--|-------|--|-------|--|-------|
| <input type="checkbox"/> Non-Shoreland | \$325 | <input type="checkbox"/> Holding Tank | \$270 | <input type="checkbox"/> System | \$365 | <input checked="" type="checkbox"/> System | \$420 | <input type="checkbox"/> System | \$525 |
| <input type="checkbox"/> Shoreland | \$565 | <input type="checkbox"/> Privy/Outhouse | \$110 | <input type="checkbox"/> Component Add/Replace | \$215 | <input type="checkbox"/> Component Add/Replace | \$215 | <input type="checkbox"/> Component Add/Replace | \$215 |
| <input type="checkbox"/> Component Add/Replace | \$215 | <input type="checkbox"/> Floodplain-Shoreland | \$330 | | | | | | |
| | | <input type="checkbox"/> Component Add/Replace | \$215 | | | | | | |

Please make checks payable to: St. Louis County Auditor

SITE INFORMATION (Check all that apply)

| | | | | | |
|---|--|--|----------------------------------|--|--------------------------------|
| <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | Is the SSTS within 1,000 feet of a lake or 300 feet of a river? | Lake/River Name Vermilion | | |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Is the property used year round? | | | |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Is the property part of a CIC (Common Interest Community)? If yes, include the Associated PIN on this Application. | | | |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Is this property serving multiple dwellings sharing a SSTS component? | | | |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Is this leased property? If yes, you must obtain & attach the Lessor's written authorization for this project. | | | |
| Leased From | <input type="checkbox"/> MN Power | <input type="checkbox"/> St. Louis County | <input type="checkbox"/> MN DNR | <input type="checkbox"/> US Forest Service | <input type="checkbox"/> Other |

WELL INFORMATION (Check all that apply)

| | | | | | |
|--------------|--|--|---------------------------------------|--|---|
| Water Source | <input type="checkbox"/> Proposed Well | <input type="checkbox"/> Existing Well | <input type="checkbox"/> Hand Carried | <input checked="" type="checkbox"/> Surface/Lake Water | <input type="checkbox"/> Municipal |
| Well Type | <input type="checkbox"/> Drilled | <input type="checkbox"/> Sandpoint | <input type="checkbox"/> Dug | More than one well? | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Well # | | Well Depth Feet | | Case Depth Feet | |



St. Louis County, MN

PERMIT

Residential Construction Application

Subsurface Sewage Treatment System

Form

3000

Rev. 01-02-2024

DESIGNER

Licensed Business Name **Bodri Enterprises Inc.**

License # **4284**

Certification # **8748**

Designer's Comments *(To Onsite Wastewater Staff)*

System will only be 6x30' bed due to bedrock outcropping on either side to prevent system from being larger. The bunkhouses will be converted into storage and sauna is a dry sauna per owner. Site was visited with the perspective installer at the time of the design.

STRUCTURE

| Building Type and Water Uses Check all that apply | | # of Bedrooms | Seasonal Use Only | Plumbing | Basement Plumbing | Garbage Disposal | Clothes Washer | Dishwasher | Water Conditioning Unit | Furnace w/Humidifier | Bathtub > 40 gal | Sewer Grinder Pump |
|--|---|---------------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|-------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input checked="" type="checkbox"/> Dwelling | Home, mobile home, hunting shack, cabin, RV | 3 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Multi-Family | Multiple units | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Accessory Dwelling | Guest cottage, bunk house | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Accessory Structure | Garage, pole building, shed, sauna, gazebo screen-house | 0 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Other | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Other information to be considered for this application

AGREEMENT

By submitting this application, the entire contents of which are considered to be public data, I certify and agree that I am the owner or the authorized agent of the owner of the above property, and that all uses will conform to the provisions of St. Louis County. I further certify and agree that I will comply with all conditions imposed in connection with the approval of the application. Applicants may be required to submit additional property descriptions, property surveys, site plans, building plans and other information before the application is accepted or approved. **Intentional or unintentional falsification of this application or any attachments thereto will make the application, any approval of the application and any resulting permit invalid.** I authorize St. Louis County staff to inspect the property to review the application and for compliance inspections. Furthermore, by submitting this application, I release St. Louis County and its employees from any and all liability and claims for damages to person or property in any manner or form that may arise from the approval of the application or any related plans, the issuance of any resulting permit or the subsequent location, construction, alteration, repair, extension, operation or maintenance of the subject matter of the application.

CONTACT Planning and Zoning (Onsite Wastewater Division)

Duluth Office

Government Services Center
320 W 2nd Street, Suite 301
Duluth, MN 55802

Phone (218) 471-7103
Toll Free (800) 450-9777
www.stlouiscountymn.gov/septic

Virginia Office

Government Services Center
201 South 3rd Avenue West
Virginia, MN 55792

Phone (218) 471-7103
Toll Free (800) 450-9777
www.stlouiscountymn.gov/septic

OFFICE USE ONLY

| | | | | |
|--------------|-------------|---|----------|----------|
| Amount Paid | Paid by | Cash | Check # | Permit # |
| Revenue Code | Received By | <input type="checkbox"/> Mail <input type="checkbox"/> IP | Date RIO | |



St. Louis County, MN

PERMIT SSTS Design Summary Subsurface Sewage Treatment System

Form

3002

Rev. 01-02-2024

This form is used to complete a SSTS Design. Additional Information: www.stlouiscountymn.gov/septic

SITE INFORMATION

Site Address **94700 Bradley Island** City **Tower** Zip **55790** Parcel ID **387-0020-04090**

DESIGNER

Name **Michael Bodri** Date **5/26/2024**

Email **michaelbodri@gmail.com** Phone **218-410-3477** Phone

SYSTEM INFORMATION

MPCA Type Type I Type II Type III Type IV Type V Dwelling Classification I II III IV

Residential Commercial Seasonal Other Well Casing Depth

Bedrooms **3** # Water using devices **1** Total Finished Sq ft **1452** Sq ft / Bedroom **484**

Design Flow **180** Water Meter **no** Pressure Test **no** Grinder or Disposal

CLR **6** SLR **0.6** Limiting Soil Type **bedrock** Limiting Layer Depth (in) **15**

SSTS Flow Description

A 3 bedroom cabin to a 1000 septic tank. This goes to a 1000 pump tank, which does to a 6x30' rock bed with 2 peat filters.

TANK INFORMATION

| Type (Septic, Pump, Holding etc.) | Size (gallons) | Status (New, Existing) | Material (Precast, Plastic) | Alarm (Yes, No) | Insulated (Yes, No) | Bedded (Yes, No) | Building Sewer (Gravity, Pressure, Both) |
|--------------------------------------|-------------------|---------------------------|--------------------------------|--------------------|------------------------|---------------------|---|
| Septic | 1000 | new | plastic | no | ** | yes | gravity |
| Pump | 1000 | new | plastic | yes | ** | yes | gravity |
| | | | | | | | |
| | | | | | | | |

Gallons per inch of pump tank **25**

Tank Installation & Pumping comments

**** If tank is buried less than 2 feet underground, then both the riser lids and top of tank must be insulated to a value of at least R10.**

DISTRIBUTION INFORMATION

Gravity Drop Box Distribution Box

Pressure Gal/Min **40** Ft Head **19** Pump Model **Goulds PE51 or Equivalent**

Event Counter ETM Time Dose Panel **SJE Rhombus** Timer On **0.63** Timer Off **2hr**

Max Dose Min. Dose Drainback **10** Dose + Drainback **25** Float Tether (in) **20**

Manifold

Laterals

Location Center End Number Length (ft)

Size (in) **2** Size (in)

Insulated **no** Orifices

Size (in) # Per lateral

Spacing (in) Shields



St. Louis County, MN

PERMIT

SSTS Design Summary

Subsurface Sewage Treatment System

Form

3002

Rev. 01-02-2024

DRAINFIELD INFORMATION

Trench

| | | | |
|----------------|------------|-------------|-----------------|
| Number | Width (ft) | Length (ft) | Media Type |
| Max Depth (in) | Rock (in) | Cover (in) | Sand Liner (in) |

Bed

| | | | |
|----------------|------------|-------------|-----------------|
| Number | Width (ft) | Length (ft) | Media Type |
| Max Depth (in) | Rock (in) | Cover (in) | Sand Liner (in) |

At-Grade

| | | | | |
|------------|-------------|--------|--------------|----------------|
| Width (ft) | Length (ft) | Number | Up Berm (ft) | Down Berm (ft) |
|------------|-------------|--------|--------------|----------------|

Mound

| | | | |
|--------------|----------------|-------------------------|-------------------|
| Number | Bed Width (ft) | Bed Length (ft) | Media Type |
| Sand (in) to | Rock (in) | Cover (in) | Total Width (ft) |
| Up Berm (ft) | Down Berm (ft) | Sand (yd ³) | Total Length (ft) |

Registered Filter Product

Filter Class Intermittent/Single Pass Recirculating Subsurface Flow Other

Media Type Sand Peat Textile/Synthetic Constructed Wetlands

No. of Filters **2** Rock Bed Dimensions (ft) **6 x 30** Bed Media Depth (in) **18**

Manufacturer **Anua**

Registered Aerobic Treatment System

Type Suspended Growth Fixed Film Sequencing Batch Other

Gallons/day No. of Units Disinfection (yes or no) If yes, chemical or UV

Manufacturer

Designer Comments

If pipes are to be run in any areas where foot or vehicle traffic is expected in the winter, insulating these lines is highly recommended. Bunkhouses are going to be turned into storage and have the beds removed per owner. System will tentatively be installed by Northern Waters Company. System is surrounded by bedrock to the North, East, and West, making future inspections difficult.

CONTACT Planning and Zoning (Onsite Wastewater Division)

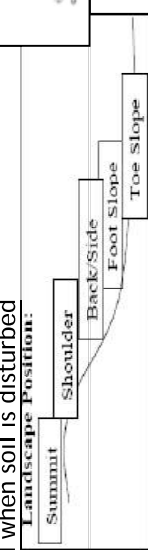
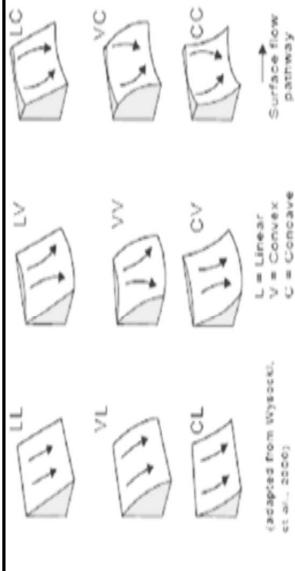
| Duluth Office | | Virginia Office | |
|---|--|---|--|
| Government Services Center 320 W 2nd Street, Suite 301 Duluth, MN 55802 | Phone (218) 471-7103 Toll Free (800) 450-9777 www.stlouiscountymn.gov/septic | Government Services Center 201 South 3rd Avenue West Virginia, MN 55792 | Phone (218) 471-7103 Toll Free (800) 450-9777 www.stlouiscountymn.gov/septic |



| Client/ Address: Kurt Peterson 94700 Bradley Island | | Legal Description/ GPS: 387-0020-04090 | | | | | | | |
|--|---------------------------------|--|-----------------------------|-----------------|---------------|--------------|--------|----------|-------------|
| Soil parent material(s): (Check all that apply) <input type="checkbox"/> Outwash <input type="checkbox"/> Lacustrine <input type="checkbox"/> Loess <input type="checkbox"/> Till <input type="checkbox"/> Alluvium <input type="checkbox"/> Bedrock <input type="checkbox"/> Organic Matter | | | | | | | | | |
| Landscape Position: (check one) <input type="checkbox"/> Summit <input type="checkbox"/> Shoulder <input type="checkbox"/> Back/Side Slope <input type="checkbox"/> Foot Slope <input type="checkbox"/> Toe Slope Slope shape LL | | | | | | | | | |
| Vegetation | cedar, aspen, birch, white pine | Soil survey map units NA | Slope% 7.0 Elevation: 1366' | | | | | | |
| Weather Conditions/Time of Day: | | Date 05/09/24 | | | | | | | |
| Observation #/Location: Hole 1 | | Observation Type: Soil Pit | | | | | | | |
| Depth (in) | Texture | Rock Frag. % | Matrix Color(s) | Mottle Color(s) | Redox Kind(s) | Indicator(s) | Shape | Grade | Consistence |
| 0-5 | Sandy Loam | <35% | 10YR 2/2 | | | | Blocky | Moderate | Firm |
| 5-15 | Sandy Loam | 35-50% | 10YR 3/2 | | | | Blocky | Moderate | Firm |
| 15+ | Bedrock | | | | | | | | |
| Comments: No soil rating on the web soil survey website. Hole on the SW end of the system | | | | | | | | | |
| I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws. | | | | | | | | | |
| Michael Bodri | | | | | Michael Bodri | | | | |
| | | | | | #REF! | | | | |
| | | | | | 4284 | | | | |
| | | | | | 5/26/2024 | | | | |

| | |
|----------|---------------------------|
| Comments | Hole closest to the cabin |
|----------|---------------------------|

| | | |
|---|--|--|
| <p>Textures:</p> <p>c-clay s1c-silty clay sc-sandy clay cl-clay loam</p> <p>s1cl-silty clay loam scl-sandy clay loam si-silt sil-silt loam l-loam sl-sandy loam* ls-loamy sand* s-sand*</p> | <p>Subsoil Indicator(s) of Saturation:</p> <p>S1. Distinct gray or red redox features S2. Depleted matrix (value >/=4 and chroma </=2) S3. 5Y chroma </= 3 S4. 7.5 YR or redder faint redox concentrations or redox depletion</p> <p>If yes to one of the above indicators then: Topsoil Indicator(s) of Saturation:</p> <p>T1. Wetland Vegetation T2. Depressional Landscape T3. Organic texture or organic modifiers T4. N 2.5/ 0 color T5. Redox features in topsoil T6. Hydraulic indicators</p> | <p>Consistence:</p> <p><u>Loose-</u> Intact specimen not available <u>Friable-</u> Slight force between fingers <u>Firm-</u> Moderate force between fingers <u>Extremely firm-</u> Moderate force between hands or slight foot pressure <u>Rigid-</u> Foot pressure</p> <p>Slope Shape: Slope shape is described in two directions: up and down slope (perpendicular to the contour), and across slope (along the horizontal contour); e.g. Linear, Convex or LV.</p> |
| <p>Soil Structure</p> <p>Grade:</p> <p><u>Massive-</u> No observable aggregates, or no orderly arrangement of natural lines of weakness <u>Weak-</u> Poorly formed, indistinct peds, barely observable in place <u>Moderate-</u> Well formed, distinct peds, moderately durable and evident, but not distinct in undisturbed <u>Strong-</u> Durable peds that are quite evident in un-displaced soil, adhere weakly to one another, withstand displacement, and become separated when soil is disturbed <u>Loose-</u> No peds, sandy soil</p> | <p>Soil Structure</p> <p>Shape:</p> <p><u>Granular-</u> The peds are approximately spherical or polyhedral and are commonly found in topsoil. These are the small, rounded peds that hang onto roots <u>Platy-</u> The peds are flat and plate like. They are oriented horizontally and are usually overlapping. Platy structure is commonly found in forested areas <u>Blocky-</u> The peds are block-like or polyhedral, and are bounded by flat or slightly rounded surface that are casting of the faces of surrounding peds. <u>Prismatic-</u> Flat or slightly rounded vertical faces bound the individual peds. Peds are distinctly longer vertically, and faces are typically cast or molds of <u>Single Grain-</u> The structure found in a sandy soil. The individual particles are not held together.</p> | <p>Soil Structure</p> <p>Shape:</p> <p><u>Granular-</u> The peds are approximately spherical or polyhedral and are commonly found in topsoil. These are the small, rounded peds that hang onto roots <u>Platy-</u> The peds are flat and plate like. They are oriented horizontally and are usually overlapping. Platy structure is commonly found in forested areas <u>Blocky-</u> The peds are block-like or polyhedral, and are bounded by flat or slightly rounded surface that are casting of the faces of surrounding peds. <u>Prismatic-</u> Flat or slightly rounded vertical faces bound the individual peds. Peds are distinctly longer vertically, and faces are typically cast or molds of <u>Single Grain-</u> The structure found in a sandy soil. The individual particles are not held together.</p> |
| <p>Soil Structure</p> <p>Grade:</p> <p><u>Massive-</u> No observable aggregates, or no orderly arrangement of natural lines of weakness <u>Weak-</u> Poorly formed, indistinct peds, barely observable in place <u>Moderate-</u> Well formed, distinct peds, moderately durable and evident, but not distinct in undisturbed <u>Strong-</u> Durable peds that are quite evident in un-displaced soil, adhere weakly to one another, withstand displacement, and become separated when soil is disturbed <u>Loose-</u> No peds, sandy soil</p> | <p>Soil Structure</p> <p>Shape:</p> <p><u>Granular-</u> The peds are approximately spherical or polyhedral and are commonly found in topsoil. These are the small, rounded peds that hang onto roots <u>Platy-</u> The peds are flat and plate like. They are oriented horizontally and are usually overlapping. Platy structure is commonly found in forested areas <u>Blocky-</u> The peds are block-like or polyhedral, and are bounded by flat or slightly rounded surface that are casting of the faces of surrounding peds. <u>Prismatic-</u> Flat or slightly rounded vertical faces bound the individual peds. Peds are distinctly longer vertically, and faces are typically cast or molds of <u>Single Grain-</u> The structure found in a sandy soil. The individual particles are not held together.</p> | <p>Soil Structure</p> <p>Shape:</p> <p><u>Granular-</u> The peds are approximately spherical or polyhedral and are commonly found in topsoil. These are the small, rounded peds that hang onto roots <u>Platy-</u> The peds are flat and plate like. They are oriented horizontally and are usually overlapping. Platy structure is commonly found in forested areas <u>Blocky-</u> The peds are block-like or polyhedral, and are bounded by flat or slightly rounded surface that are casting of the faces of surrounding peds. <u>Prismatic-</u> Flat or slightly rounded vertical faces bound the individual peds. Peds are distinctly longer vertically, and faces are typically cast or molds of <u>Single Grain-</u> The structure found in a sandy soil. The individual particles are not held together.</p> |
| <p>Soil Structure</p> <p>Grade:</p> <p><u>Massive-</u> No observable aggregates, or no orderly arrangement of natural lines of weakness <u>Weak-</u> Poorly formed, indistinct peds, barely observable in place <u>Moderate-</u> Well formed, distinct peds, moderately durable and evident, but not distinct in undisturbed <u>Strong-</u> Durable peds that are quite evident in un-displaced soil, adhere weakly to one another, withstand displacement, and become separated when soil is disturbed <u>Loose-</u> No peds, sandy soil</p> | <p>Soil Structure</p> <p>Shape:</p> <p><u>Granular-</u> The peds are approximately spherical or polyhedral and are commonly found in topsoil. These are the small, rounded peds that hang onto roots <u>Platy-</u> The peds are flat and plate like. They are oriented horizontally and are usually overlapping. Platy structure is commonly found in forested areas <u>Blocky-</u> The peds are block-like or polyhedral, and are bounded by flat or slightly rounded surface that are casting of the faces of surrounding peds. <u>Prismatic-</u> Flat or slightly rounded vertical faces bound the individual peds. Peds are distinctly longer vertically, and faces are typically cast or molds of <u>Single Grain-</u> The structure found in a sandy soil. The individual particles are not held together.</p> | <p>Soil Structure</p> <p>Shape:</p> <p><u>Granular-</u> The peds are approximately spherical or polyhedral and are commonly found in topsoil. These are the small, rounded peds that hang onto roots <u>Platy-</u> The peds are flat and plate like. They are oriented horizontally and are usually overlapping. Platy structure is commonly found in forested areas <u>Blocky-</u> The peds are block-like or polyhedral, and are bounded by flat or slightly rounded surface that are casting of the faces of surrounding peds. <u>Prismatic-</u> Flat or slightly rounded vertical faces bound the individual peds. Peds are distinctly longer vertically, and faces are typically cast or molds of <u>Single Grain-</u> The structure found in a sandy soil. The individual particles are not held together.</p> |



Puraflo® & Dispersal Field Design Guide



| | | |
|--------------------------------|------------------------------------|--------------------------|
| Design Parameters | Design flow | 180 gpd |
| | Occupancy | 2 people |
| | Soil loading rate | 0.60 gpd/ft ² |
| | Slope % | 5% |
| | Depth to limiting layer | 6 inches |
| | Req'd separation to limiting layer | 18 inches |
| | Contour loading rate | 6.0 gpd/ft |
| Dispersal option, req'd | Mound | |

DIRECTIONS: Fill-in cells highlighted **GREEN**, if applicable.

Project Information

| | | |
|---------------------------|--|----------------------------|
| Septic Tank Sizing | Min (NSF model configuration), or Garbage Disp or Sewage Pump | 200 gallons 300 gallons |
| | Septic tank size, req'd | 1,000 gallons |

| | | |
|-------------------------|--|-------------------------------------|
| Pump Tank Sizing | Min (NSF model configuration), or Use other min | 200 gallons 1,000 gallons |
| | Pump tank size, req'd | 1,000 gallons |

| | | |
|-------------------------------|--------------------------------|-----------------------|
| Puraflo® Module Sizing | # Puraflo® modules | 2 per flow loading |
| | # Puraflo® modules | 1 per organic loading |
| | Puraflo® modules, req'd | 2 |

| | | |
|-------------------|---------------------|---------------------|
| Bed Design | Bed size multiplier | 1.0 |
| | Bed, W | 10.0 ft |
| | Bed, L | 30.0 ft |
| | Bottom area | 300 ft ² |

| | | |
|--|--------------------|-----------------------|
| | Slope ratio | 3 :1 |
| | Absorption bed, W | 10.0 ft |
| | Absorption bed, L | 30.0 ft |
| | Absorption area | 300 ft ² |
| | System, H | 2.0 ft |
| | Upslope multiplier | 2.61 Based on slope % |
| | Upslope, W | 5.2 ft |

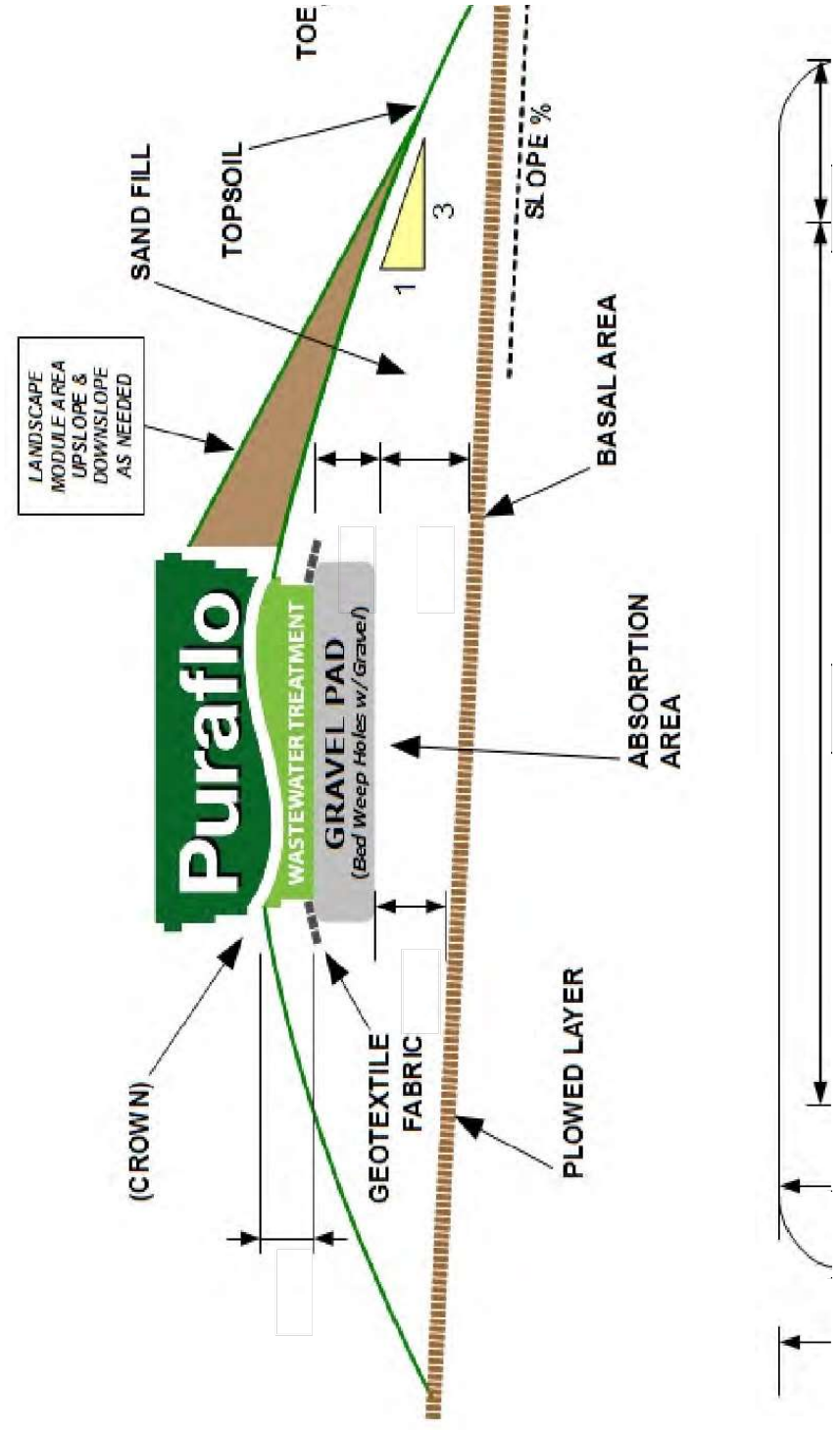
| | |
|-----------------------------|----------|
| Slope ratio | 3 |
| Sand media loading rate | 1.0 |
| Mound absorption ratio | 1.67 |
| Dispersal bed, W | 6.0 |
| Dispersal bed, L | 30.0 |
| Dispersal bed area | 180 |
| Absorption area, W | 10.0 |
| Absorption, W (per slope %) | 4.0 |
| Clean sand lift/fill | 1.00 |
| Upslope, H | 2.0 |
| Upslope multiplier | 2.61 |
| Upslope, W | 5.2 |
| Bed elevation drop | 3.6 |
| Downslope, H | 2.3 |

Mound Design

| At-grade Design | Downslope multiplier | 3.53 Based on slope % | Downslope multiplier | 3.53 |
|--------------------------|----------------------|-----------------------|--------------------------|------------|
| Downslope berm, W | 7.1 ft | | Downslope berm, W | 8.1 |
| Min downslope berm cover | 5.0 ft | | Min downslope berm cover | 5.0 |
| Downslope, W | 15.0 ft | | Downslope, W | 9.0 |
| Endslope multiplier | 3 :1 | | Endslope multiplier | 3 |
| Endslope, L | 6.0 ft | | Endslope, L | 6.9 |
| Total system, W | 30.2 ft | | Total mound, W | 20.2 |
| Total system, L | 42.0 ft | | Total mound, L | 43.8 |

Mound Diagram

NOTES: 1. NOT TO SCALE 2. MODULE DIMENSIONS: 7.08' L x 4.58' W x 2.5' H 3. DIMENSIONS: SIDE VIEW = FEET, TOP VIEW



TDH Calculations for Selecting System Pump

Assumes $f = 0.022$ for 2 inch pipe typical operating range
 Static Head in Feet = Measured/Estimated
 Friction Head in Feet = $(fL^3)/(2gD) = (2.1355 \times 10^{-5})LQ^2$ (Q in gpm, L in feet)
 Pressure Head in Feet = $0.10524(Q/\text{No. Mod.})^2$ (Q in gpm) from Orifice Equations

BOX 1.

| Q (gpm) | # Modules | L (feet) | h_{stat} (feet) | h_f (feet) | h_p (feet) | TDH |
|---------|-----------|----------|-------------------|--------------|--------------|--------|
| 0.0 | 2 | 122.00 | 7.00 | 0.00 | 0.00 | 7.00 |
| 10.0 | | | | 0.26 | 2.63 | 9.89 |
| 20.0 | | | | 1.04 | 10.52 | 18.57 |
| 30.0 | | | | 2.34 | 23.68 | 33.02 |
| 40.0 | | | | 4.17 | 42.10 | 53.26 |
| 50.0 | | | | 6.51 | 65.78 | 79.29 |
| 60.0 | | | | 9.38 | 94.72 | 111.10 |
| 70.0 | | | | 12.77 | 128.92 | 148.69 |
| 80.0 | | | | 16.67 | 168.38 | 192.06 |
| 90.0 | | | | 21.10 | 213.11 | 241.21 |
| 100.0 | | | | 26.05 | 263.10 | 296.15 |

BOX 2.

| EQUIVALENT LENGTH ESTIMATE | | | |
|----------------------------|--------------------|--------|---------------|
| Element | 2" Ftg. Eq. Length | Number | Eq. Length |
| Length | 20.00 | 1.00 | 20.00 |
| Reg. 90 deg | 9.00 | 3.00 | 27.00 |
| Reg. 45 deg | 4.00 | 5.00 | 20.00 |
| T (Diversion) | 11.00 | 5.00 | 55.00 |
| Coupling (Disconnect) | 2.00 | | 0.00 |
| Check Valve | 17.00 | | 0.00 |
| Ball Valve (fully open) | 54.00 | | 0.00 |
| TOTAL EQ. LENGTH | | | 122.00 |

BOX 3 - Programmable Timer Settings

| | |
|---|---------------------------|
| Anticipated pump rate | 40 gpm |
| Treatment design flow | 180 gpd |
| Drainback volume per dose | 10 gal. |
| Dosing Interval (pump rest time) | 2.00 hrs. |
| Number of doses | 12 d ⁻¹ |
| Drainback volume per day | 120 gpd |
| Pump design flow | 300 gpd |
| Approx. volume per dose | 25 gal. |
| Dose volume per module | 7.50 gal. |
| Pump run time per dose | 0.63 min. |
| Pump run time per dose | 37.50 sec. |
| Tank volume (gal. per inch) ESTIMATE | 25 gal. in. ⁻¹ |

From system versus pump curve for selected pump

From design flow for facility

Typically 2 hrs.

Treatment plus Drainback

Generally should not exceed 12.5 gallons - decrease dosing interval if necessary.

From pump tank dimensions or manufacturer's data

Draw down per dose*

1.0 in.

*Prior to drainback

Loss through drainback hole while pump is active is assumed to be negligible

INSTRUCTIONS:

1. ENTER THE NUMBER OF MODULES IN BOX 1.
2. ENTER THE STATIC HEAD IN BOX 1.
3. ENTER THE PIPE LENGTH IN BOX 2.
4. ENTER THE NUMBER OF FITTINGS IN BOX 2.
5. WITH ALL ABOVE ENTERED - PLOT TDH FROM BOX 1. ON PUMP CURVE
6. DETERMINE ANTICIPATED FLOW FROM PLOT
7. ENTER ANTICIPATED FLOW IN BOX 3.
8. ENTER DESIGN FLOW, DOSING INTERVAL AND TANK VOLUME PER INCH IN BOX 3.
9. ENTER PUMP TANK VOLUME (GAL/IN) BOX 3.



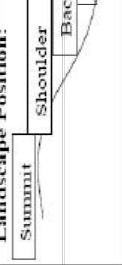
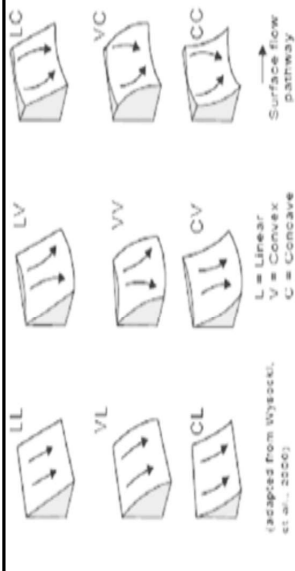
Additional Soil Observation Logs

Project ID: #REF!

| Client/ Address: | | Kurt Peterson 94700 Bradley Island | | Legal Description/ GPS: | | 387-0020-04090 | |
|---|------------|------------------------------------|-------------------------------------|---|-------------------------------------|--------------------------------|---|
| Soil parent material(s): (Check all that apply) | | | | | | | |
| | | <input type="checkbox"/> Summit | <input type="checkbox"/> Shoulder | <input type="checkbox"/> Outwash | <input type="checkbox"/> Lacustrine | <input type="checkbox"/> Loess | <input type="checkbox"/> Till |
| | | <input type="checkbox"/> Alluvium | <input type="checkbox"/> Bedrock | <input type="checkbox"/> Organic Matter | | | |
| Landscape Position: (check one) | | | | | | | |
| | | <input type="checkbox"/> Toe Slope | <input type="checkbox"/> Foot Slope | Slope shape | | LL | |
| Vegetation | | aspen, birch, white pine | | Soil survey map units NA | | Elevation: 1366' | |
| Weather Conditions/Time of Day: | | Sunny, 5pm | | Date | | 05/09/24 | |
| Observation #/Location: | | hole 2 | | Observation Type: | | Soil Pit | |
| Depth (in) | Texture | Rock Frag. % | Matrix Color(s) | Mottle Color(s) | Redox Kind(s) | Indicator(s) | Structure----- Shape Grade Consistence |
| 0-6 | Sandy Loam | <35% | 10YR 2/2 | | | | Blocky Moderate Firm |
| 6-24 | Sandy Loam | <35% | 10YR 3/2 | | | | Blocky Moderate Firm |
| 24+ | Bedrock | | | | | | |
| Comments Middle hole in line | | | | | | | |

| Observation #/Location: | | hole 3 | | Observation Type: | | Soil Pit | |
|-------------------------|------------|--------------|-----------------|-------------------|---------------|--------------|---|
| Depth (in) | Texture | Rock Frag. % | Matrix Color(s) | Mottle Color(s) | Redox Kind(s) | Indicator(s) | Structure----- Shape Grade Consistence |
| 0-6 | Sandy Loam | <35% | 10YR 2/2 | | | | Blocky Moderate Firm |
| 6-18 | Sandy Loam | <35% | 10YR 3/2 | | | | Blocky Moderate Firm |
| 18+ | Bedrock | | | | | | |

| | |
|----------|---------------------------|
| Comments | Hole closest to the cabin |
|----------|---------------------------|

| | | |
|---|---|---|
| <p>Textures:</p> <ul style="list-style-type: none"> c-clay sic-silty clay sc-sandy clay cl-clay loam sicl-silty clay loam sccl-sandy clay loam si-silt sil-silt loam l-loam sl-sandy loam* ls-loamy sand* s-sand* | <p>Subsoil Indicator(s) of Saturation:</p> <ul style="list-style-type: none"> S1. Distinct gray or red redox features S2. Depleted matrix (value >/=4 and chroma </=2) S3. 5Y chroma </= 3 S4. 7.5 YR or redder faint redox concentrations or redox depletion | <p>Consistence:</p> <ul style="list-style-type: none"> <u>Loose-</u> Intact specimen not available <u>Friable-</u> Slight force between fingers <u>Firm-</u> Moderate force between fingers <u>Extremely firm-</u> Moderate force between hands or slight foot pressure <u>Rigid-</u> Foot pressure |
| <p>If yes to one of the above indicators then:</p> <p>Topsoil Indicator(s) of Saturation:</p> <ul style="list-style-type: none"> T1. Wetland Vegetation T2. Depressional Landscape T3. Organic texture or organic modifiers T4. N 2.5/ 0 color T5. Redox features in topsoil T6. Hydraulic indicators | <p>*Sand Modifiers</p> <ul style="list-style-type: none"> co-coarse m-medium f-fine vf-very fine | <p>Slope Shape:</p> <p>Slope shape is described in two directions: up and down slope (perpendicular to the contour), and across slope (along the horizontal contour); e.g. Linear, Convex or LV.</p> |
| <p>Soil Structure</p> <p>Grade:</p> <ul style="list-style-type: none"> <u>Massive-</u> No observable aggregates, or no orderly arrangement of natural lines of weakness <u>Weak-</u> Poorly formed, indistinct peds, barely observable in place <u>Moderate-</u> Well formed, distinct peds, moderately durable and evident, but not distinct in undisturbed <u>Strong-</u> Durable peds that are quite evident in un-displaced soil, adhere weakly to one another, withstand displacement, and become separated when soil is disturbed <u>Loose-</u> No peds, sandy soil | <p>Landscape Position:</p>  |  |
| <p>Soil Structure</p> <p>Shape:</p> <ul style="list-style-type: none"> <u>Granular-</u> The peds are approximately spherical or polyhedral and are commonly found in topsoil. These are the small, rounded peds that hang onto roots <u>Platy-</u> The peds are flat and plate like. They are oriented horizontally and are usually overlapping. Platy structure is commonly found in forested areas <u>Blocky-</u> The peds are block-like or polyhedral, and are bounded by flat or slightly rounded surface that are casting of the faces of surrounding peds. <u>Prismatic-</u> Flat or slightly rounded vertical faces bound the individual peds. Peds are distinctly longer vertically, and faces are typically cast or molds of <u>Single Grain-</u> The structure found in a sandy soil. The individual particles are not held together. | | |



St. Louis County, MN

VARIANCE

Variance Worksheet

Subsurface Sewage Treatment System

Form

3090

Rev. 03-2021

About SSTS Variances Pursuant to Ordinance 61, Article V, Section 3.0

A property owner may request a variance from the standards specified in the Ordinance pursuant to county policies and procedures. Variances shall only be permitted when they are in harmony with the general purposes and intent of this Ordinance where there are practical difficulties or particular hardship in meeting the strict letter of this Ordinance, excluding the technical standards. Certain deviations may require the approval of the MPCA or the MN Department of Health.

Please Complete the Following Sections

Describe the specific provision or provisions in the ordinance from which the variance is requested.

Looking to put septic system components within 30' of the ordinary high water level of Lake Vermilion instead of the standard 50'.

Describe the practical difficulty that prevents compliance with the rule.

The island is small and is comprised of primarily bedrock outcroppings which leaves only one viable option for putting a peat filter system. This system will still have to be smaller than normal due to having one area 30' long that is adequate for peat filters.

Describe the alternative measures that will be taken to achieve a comparable degree of compliance with the purposes and intent of the applicable provisions.

The existing tank is 27' from the lake and the existing drywells are 20' from the lake. The new system will move the tank back several feet and will move the treatment area 20' further away from the lake while better treating the effluent.

Identify cost considerations preventing reasonable use of the property under the terms of this ordinance.

If the tanks cannot be put in the proposed location, then they will have to go on top of the bedrock between the cabin and the system. This would require the installation of a grinder pump, which increases the septic tank size by 50%. This would also require having the feed line to the peat filters remain full of effluent throughout the season instead of draining back to the pump tank. That line would have to be drained manually every fall to prevent freezing and cracking.

AGREEMENT

By submitting this request for variance from the Ordinance and the Construction Standards, I certify and agree that no substantial health hazard is likely to occur therefrom and an unnecessary hardship might result in strict compliance with the Ordinance and Standards. I further agree to install a sewage treatment system in accordance with the permit application, plans, and specification that are made as part of this variance request, in addition to paying the Variance Fee associated with this request.

Site Design of Septic 5/9/2024

94700 Bradley Island

Township: Greenwood

+/- 1.5 acres

City: Tower

Inspected by Michael Bodri

Bodri Enterprises Inc.

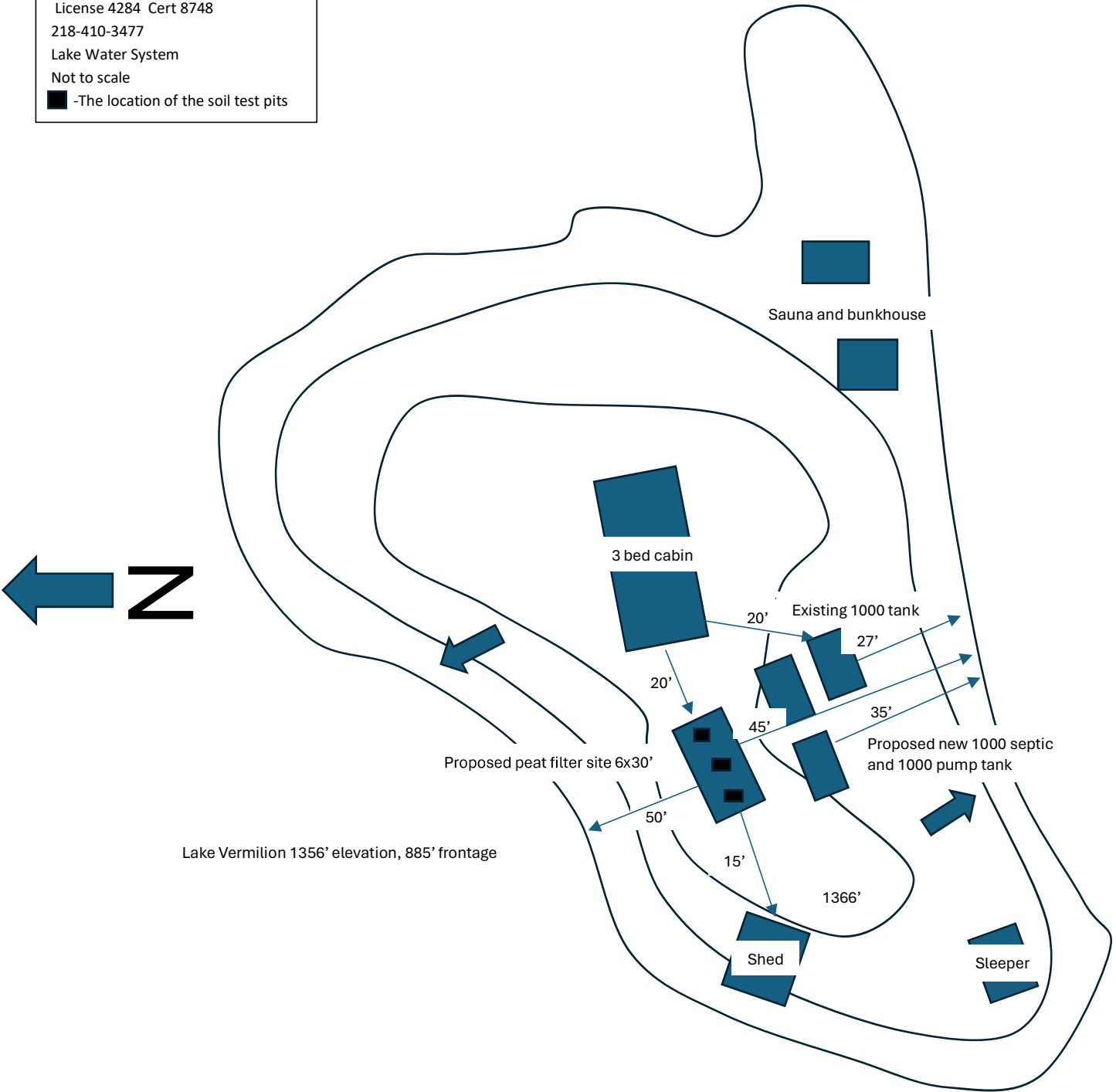
License 4284 Cert 8748

218-410-3477

Lake Water System

Not to scale

■ -The location of the soil test pits



Puraflo® & Dispersal Field Design Guide



| | | |
|--------------------------------|------------------------------------|--------------------------|
| Design Parameters | Design flow | 180 gpd |
| | Occupancy | 2 people |
| | Soil loading rate | 0.60 gpd/ft ² |
| | Slope % | 5% |
| | Depth to limiting layer | 6 inches |
| | Req'd separation to limiting layer | 18 inches |
| | Contour loading rate | 6.0 gpd/ft |
| Dispersal option, req'd | | Mound |

| | | |
|--------------------|-----------------------------------|----------------------|
| Septic Tank Sizing | Min (NSF model configuration), or | 200 gallons |
| | Garbage Disp or Sewage Pump | 300 gallons |
| | Septic tank size, req'd | 1,000 gallons |

| | | |
|------------------|-----------------------------------|----------------------|
| Pump Tank Sizing | Min (NSF model configuration), or | 200 gallons |
| | Use other min | 1,000 gallons |
| | Pump tank size, req'd | 1,000 gallons |

| | | |
|------------------------|--------------------------------|-----------------------|
| Puraflo® Module Sizing | # Puraflo® modules | 2 per flow loading |
| | # Puraflo® modules | 1 per organic loading |
| | Puraflo® modules, req'd | 2 |

| | | |
|------------|---------------------|---------------------|
| Bed Design | Bed size multiplier | 1.0 |
| | Bed, W | 10.0 ft |
| | Bed, L | 30.0 ft |
| | Bottom area | 300 ft ² |

| | | |
|--|--------------------|-----------------------|
| | Slope ratio | 3 :1 |
| | Absorption bed, W | 10.0 ft |
| | Absorption bed, L | 30.0 ft |
| | Absorption area | 300 ft ² |
| | System, H | 2.0 ft |
| | Upslope multiplier | 2.61 Based on slope % |
| | Upslope, W | 5.2 ft |

DIRECTIONS: Fill-in cells highlighted **GREEN**, if applicable.

Project Information

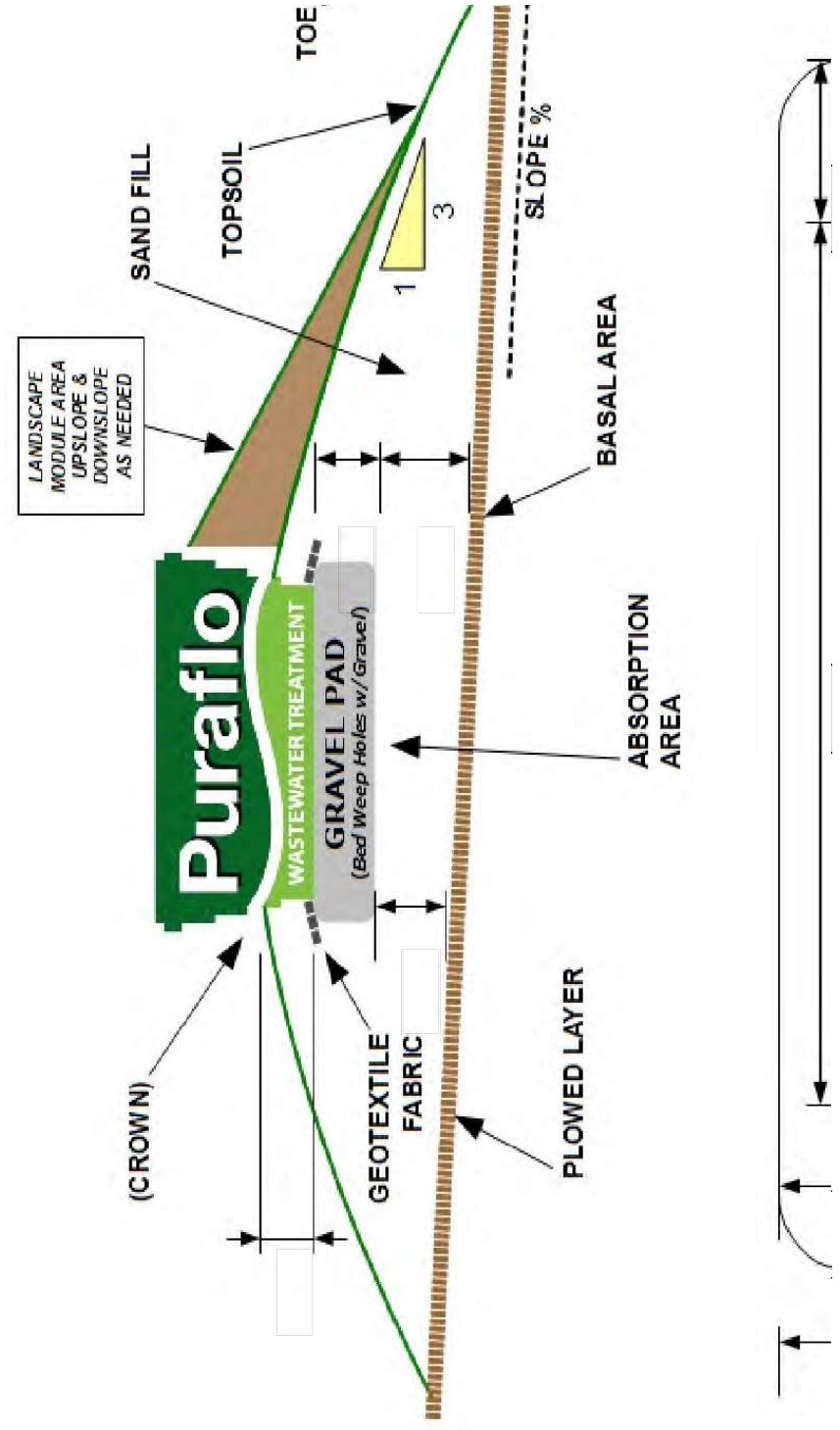
| | |
|-----------------------------|----------|
| Slope ratio | 3 |
| Sand media loading rate | 1.0 |
| Mound absorption ratio | 1.67 |
| Dispersal bed, W | 6.0 |
| Dispersal bed, L | 30.0 |
| Dispersal bed area | 180 |
| Absorption area, W | 10.0 |
| Absorption, W (per slope %) | 4.0 |
| Clean sand lift/fill | 1.00 |
| Upslope, H | 2.0 |
| Upslope multiplier | 2.61 |
| Upslope, W | 5.2 |
| Bed elevation drop | 3.6 |
| Downslope, H | 2.3 |

Mound Design

| | | | | | | |
|------------------------|--------------------------|---------|------------------|---------|--------------------------|------|
| At-grade Design | Downslope multiplier | 3.53 | Based on slope % | 3.53 | Downslope multiplier | 3.53 |
| | Downslope berm, W | 7.1 ft | | 7.1 ft | Downslope berm, W | 8.1 |
| | Min downslope berm cover | 5.0 ft | | 5.0 ft | Min downslope berm cover | 5.0 |
| | Downslope, W | 15.0 ft | | 15.0 ft | Downslope, W | 9.0 |
| | Endslope multiplier | 3 : 1 | | 3 : 1 | Endslope multiplier | 3 |
| | Endslope, L | 6.0 ft | | 6.0 ft | Endslope, L | 6.9 |
| | Total system, W | 30.2 ft | | 30.2 ft | Total mound, W | 20.2 |
| | Total system, L | 42.0 ft | | 42.0 ft | Total mound, L | 43.8 |

Mound Diagram

NOTES: 1. NOT TO SCALE 2. MODULE DIMENSIONS: 7.08' L x 4.58' W x 2.5' H 3. DIMENSIONS: SIDE VIEW = FEET, TOP VIEW



TDH Calculations for Selecting System Pump

Assumes $f = 0.022$ for 2 inch pipe typical operating range
 Static Head in Feet = Measured/Estimated
 Friction Head in Feet = $(fL^3)/(2gD) = (2.1355 \times 10^{-5})LQ^2$ (Q in gpm, L in feet)
 Pressure Head in Feet = $0.10524(Q/\text{No. Mod.})^2$ (Q in gpm) from Orifice Equations

BOX 1.

| Q (gpm) | # Modules | L (feet) | h_{stat} (feet) | h_f (feet) | h_p (feet) | TDH |
|---------|-----------|----------|-------------------|--------------|--------------|--------|
| 0.0 | 2 | 122.00 | 7.00 | 0.00 | 0.00 | 7.00 |
| 10.0 | | | | 0.26 | 2.63 | 9.89 |
| 20.0 | | | | 1.04 | 10.52 | 18.57 |
| 30.0 | | | | 2.34 | 23.68 | 33.02 |
| 40.0 | | | | 4.17 | 42.10 | 53.26 |
| 50.0 | | | | 6.51 | 65.78 | 79.29 |
| 60.0 | | | | 9.38 | 94.72 | 111.10 |
| 70.0 | | | | 12.77 | 128.92 | 148.69 |
| 80.0 | | | | 16.67 | 168.38 | 192.06 |
| 90.0 | | | | 21.10 | 213.11 | 241.21 |
| 100.0 | | | | 26.05 | 263.10 | 296.15 |

BOX 2.

| EQUIVALENT LENGTH ESTIMATE | | | |
|----------------------------|--------------------|--------|---------------|
| Element | 2" Ftg. Eq. Length | Number | Eq. Length |
| Length | 20.00 | 1.00 | 20.00 |
| Reg. 90 deg | 9.00 | 3.00 | 27.00 |
| Reg. 45 deg | 4.00 | 5.00 | 20.00 |
| T (Diversion) | 11.00 | 5.00 | 55.00 |
| Coupling (Disconnect) | 2.00 | | 0.00 |
| Check Valve | 17.00 | | 0.00 |
| Ball Valve (fully open) | 54.00 | | 0.00 |
| TOTAL EQ. LENGTH | | | 122.00 |

BOX 3 - Programmable Timer Settings

| | |
|---|---------------------------|
| Anticipated pump rate | 40 gpm |
| Treatment design flow | 180 gpd |
| Drainback volume per dose | 10 gal. |
| Dosing Interval (pump rest time) | 2.00 hrs. |
| Number of doses | 12 d ⁻¹ |
| Drainback volume per day | 120 gpd |
| Pump design flow | 300 gpd |
| Approx. volume per dose | 25 gal. |
| Dose volume per module | 7.50 gal. |
| Pump run time per dose | 0.63 min. |
| Pump run time per dose | 37.50 sec. |
| Tank volume (gal. per inch) ESTIMATE | 25 gal. in. ⁻¹ |

From system versus pump curve for selected pump

From design flow for facility

Typically 2 hrs.

Treatment plus Drainback

Generally should not exceed 12.5 gallons - decrease dosing interval if necessary.

From pump tank dimensions or manufacturer's data

Draw down per dose*

1.0 in.

*Prior to drainback

Loss through drainback hole while pump is active is assumed to be negligible

INSTRUCTIONS:

1. ENTER THE NUMBER OF MODULES IN BOX 1.
2. ENTER THE STATIC HEAD IN BOX 1.
3. ENTER THE PIPE LENGTH IN BOX 2.
4. ENTER THE NUMBER OF FITTINGS IN BOX 2.
5. WITH ALL ABOVE ENTERED - PLOT TDH FROM BOX 1. ON PUMP CURVE
6. DETERMINE ANTICIPATED FLOW FROM PLOT
7. ENTER ANTICIPATED FLOW IN BOX 3.
8. ENTER DESIGN FLOW, DOSING INTERVAL AND TANK VOLUME PER INCH IN BOX 3.
9. ENTER PUMP TANK VOLUME (GAL/IN) BOX 3.

Septic System Maintenance Plan – Peat Filters

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 service provider or maintainer. However, it is YOUR responsibility to make sure that all tasks are accomplished in a timely manner. Keep copies of all pumping records and other maintenance/repair invoices with this document.

Property Owner: Kurt Peterson

Property Address: 94700 Bradley Island Tower

Permit #: Year installed:

Service provider/installer: Northern Waters Company Phone #:218-750-0414

Description of septic: A 3-bedroom cabin to a 1000 septic tank which goes to a 1000 pump tank. This then pumps into a 6x30' rock pad with 2 peat filters and 12" of sand underneath.

Seasonally or several times per year – homeowner's responsibility

- Leaks. Check (listen, look) for leaks in toilets and dripping faucets. Repair all leaks promptly
- Surfacing sewage. Regularly check for wet/spongy soil around your soil treatment area. Surfaced sewage or strong odors that are not corrected by tank pumping or fixing broken caps, call your service professional. Untreated sewage can make animals and humans sick
- Alarms. Alarms signal when there is a problem with your system. Contact your maintainer any time the alarm signals. Test alarm yearly to make sure that it is working.
- Lint Filter. If you have a lint filter, check for lint buildup regularly and clean if necessary.
- Caps. Make sure that all caps and lids are intact and in place. Inspect for damaged caps and lids once every year in the fall. Fixing or replacing damaged caps/lids before winter can help prevent freezing issues.
- Effluent screens should be cleaned once a year. Screen can either be replaced or cleaned off by holding the screen over the open lid of the tank and spraying with a steady stream of water. Make sure that all of the water and debris removed is going back into your septic tank and not out onto the ground. Safety dictates always wearing gloves and safety glasses while completing this task. The effluent screen is located on the outlet side of the septic tank. Otherwise schedule a service provider or maintainer to complete this task.

Septic System Maintenance – homeowner, pumper/maintainer or service provider's responsibility

Tank

- How frequently a septic tank should be cleaned depends upon the capacity of the tank, number of people using the system and number/type of water using appliances. Minnesota state rule requires assessment of every tank every three years, at the minimum.
- State recommends getting your tank pumped every 3 to 5 years or whenever the sludge and scum levels are at greater than 25% of the tank capacity.
- Make sure that your pumper pumps through the manhole, not the 4" or 6" diameter inspection port

Pump

- Pump and controls. Check to make sure that the pump and controls are operating correctly.
- Pump vault. Check to make sure that it is in place and clean per manufacturers recommendations.
- Alarm. Verify that the alarm works.
- Drain back. Check to make sure that everything is functioning properly.
- Event counter or etm. Check to see if there is an event counter or etm for the pump. Calculate the water usage and compare to the daily average flow.

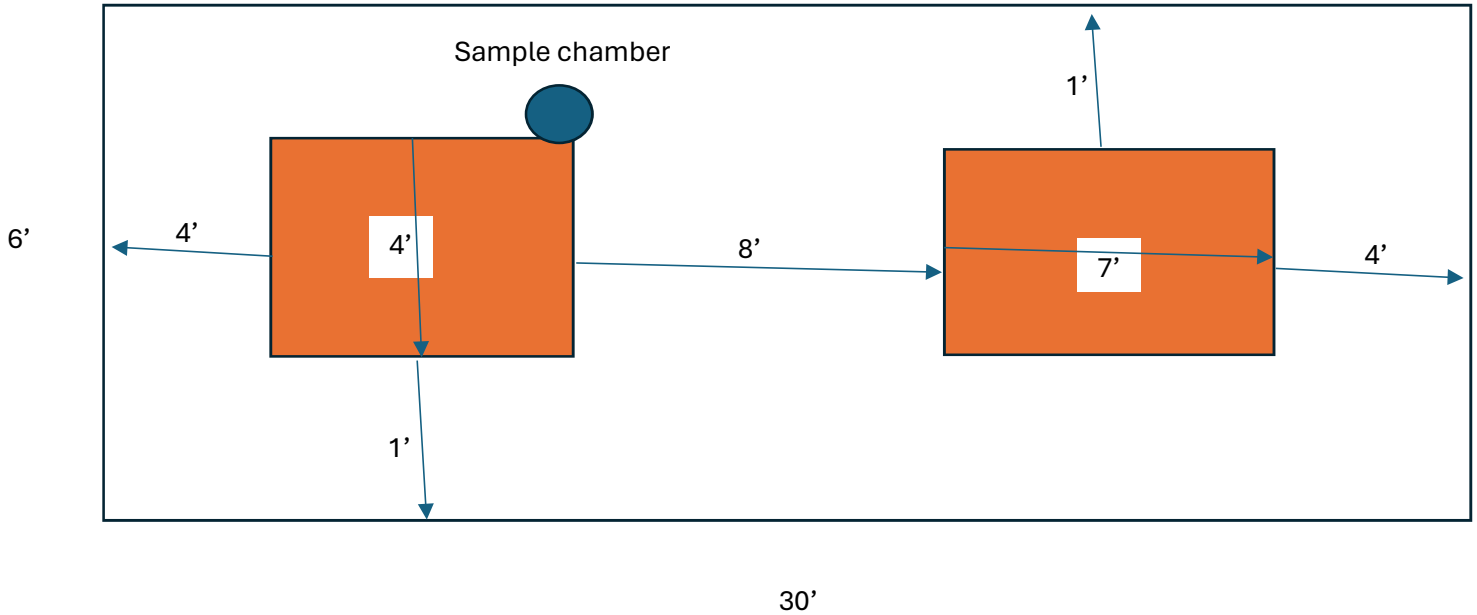
Soil Treatment Area

- Surfacing of effluent. Check for surfaced effluent or other signs of problems.
- Peat filter modules inspection – every year for manufacturer warranty or per county permit. Completed by licensed and approved service provider

Operating Permit

- Operating Permits must be renewed every three to five years per county permit. At the time of renewal, the owner must submit to the department an operating permit
 - Renewal application and application fee
 - All component operation and maintenance forms completed by the service provider.

Alternate site – need to have an alternate drain field area that is left undisturbed or replace the peat to start fresh.



Bring in the required 12" of sewer sand and level off the pad

Place a minimum of 6" of clean stone on top of the sewer sand (3/4-1")

Place peat filters on pad as listed above

Add pipe extender to spread out effluent

Cover exposed rock pad with geotextile fabric

Backfill and lightly compact cover material to top of filters



OPERATING PERMIT
OPERATING PERMIT WORKSHEET
 Subsurface Sewage Treatment System

Form
3010
 Rev. 01-02-2024

This form is for an operating permit. Additional Information: www.stlouiscountymn.gov/septic.

PROPERTY IDENTIFICATION NUMBER (PIN) and SITE

| | | | | | | | | | | | | | | | |
|--------------|-----------------------------|----------------|--|--|------|-------|--|-----|-------|--|------|-----------|--|--|--|
| Primary PIN | 3 8 7 - 0 0 2 0 - 0 4 0 9 0 | Associated PIN | | | | | | | | | | | | | |
| Site Address | 94700 Bradley Island | | | | City | Tower | | Zip | 55790 | | Date | 5/26/2024 | | | |

DESIGNER

| | | | |
|------------------------|------------------------|-----------|------|
| Licensed Business Name | Bodri Enterprises Inc. | License # | 4284 |
|------------------------|------------------------|-----------|------|

REASON FOR OPERATION PERMIT

| | | | |
|--|--|---|---------------------------------|
| <input type="checkbox"/> Holding Tank | <input type="checkbox"/> Type III | <input checked="" type="checkbox"/> Type IV | <input type="checkbox"/> Type V |
| <input type="checkbox"/> Other Establishment | <input type="checkbox"/> High Strength Waste | <input type="checkbox"/> Other | |

SYSTEM INFORMATION

| | | | |
|---|-----|-----------------|---|
| Design flow | 180 | Treatment level | C |
| System components A 2 bed cabin to 1000 septic tank to 1000 pump tank to 2 peat filters | | | |

MONITORING REQUIREMENTS (flows, pump calibration, timer settings, BOD, TSS, FOG, Fecal Coliform, etc.)

| Parameter | Effluent limits | Frequency | Location |
|----------------|-----------------|-----------|----------|
| Pump Run Times | 227 Min/month | MONTHLY | Panel |
| Event Counter | 360/month | MONTHLY | Panel |
| Alarm | | AS NEEDED | Tank |
| | | | |
| | | | |

MAINTENANCE REQUIREMENTS

| System component | Maintenance | Frequency |
|------------------|------------------|------------|
| Effluent Filter | Clean | Annually |
| Alarm | Check if working | Annually |
| Operating Permit | Renew | Per County |
| Tanks | Pump | As Needed |
| | | |

OTHER INFORMATION

Run effluent samples for BOD, TSS and FOG if needed

SIGNATURE

Michael Bodri (signed for Kurt) Date 5/26/2024

CONTACT Planning and Zoning (Onsite Wastewater Division)

| Duluth Office | | Virginia Office | |
|---|--|---|--|
| Government Services Center 320 W 2nd Street, Suite 301 Duluth, MN 55802 | Phone (218) 471-7103 Toll Free (800) 450-9777 www.stlouiscountymn.gov/septic | Government Services Center 201 South 3rd Avenue West Virginia, MN 55792 | Phone (218) 471-7103 Toll Free (800) 450-9777 www.stlouiscountymn.gov/septic |