

ENVIRONMENTAL ASSESSMENT WORKSHEET

This Environmental Assessment Worksheet (EAW) form and EAW Guidelines are available at the Environmental Quality Board's website at:

<http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm>. The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.

Cumulative potential effects can either be addressed under each applicable EAW Item, or can be addresses collectively under EAW Item 19.

Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. Project title: Traverse Lake RV Park

2. Proposer: Big Dog Development

Contact person: **Dan Binsfeld**
Title: **Owner**
Address: **29534 County Road 20**
City, State, ZIP: **Paynesville, MN 56362**
Phone: **320-293-5769**
Email: **bigdoglanddevelopment@gmail.com**

3. RGU: Traverse County

Contact person: **Ben Oleson**
Title: **Zoning Administrator**
Address: **PO Box 487**
City, State, ZIP: **Wheaton, MN 56296**
Phone: **320-759-1560**
Email: **oleson@hometownplanning.com**

4. Reason for EAW Preparation: (check one)

Required:

- EIS Scoping
 Mandatory EAW

Discretionary:

- Citizen petition
 RGU discretion
 Proposer initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s):

The originally proposed project contained 49 RV sites, which is below the 50 RV site threshold for a Mandatory EAW. On July 17, 2018, Traverse County ordered that an EAW must be completed, per the Traverse County Land Use Ordinance Section 22.08(2), because it involved the expansion of a planned unit development involving more than six (6) sites. The requirement for EAW was ordered, the Applicant chose to amend the proposed project to include 88 RV sites, which exceeds the mandatory threshold per MN Rule 4410.4300 Subp. 20(A). This added number of RV units is below the 200 RV units threshold for a mandatory EIS per MN Rule 4410.4400 Subp. 26.

5. Project Location:

County: **Traverse**

City/Township: **Windsor Township**

PLS Location (¼, ¼, Section, Township, Range): **Frac NW¼, SW¼, plus SW¼, SW¼, all in Section 31, Township 126, Range 48**

Watershed (81 major watershed scale): **Bois de Sioux River**

GPS Coordinates: **(center portion of property) Lat: 45.675763 Long: -96.759206**

Tax Parcel Number:

15-0166001 (proposed RV campground site)

15-0192080 (existing RV campground site which the current proposal would expand)

At a minimum attach each of the following to the EAW:

- County map showing the general location of the project; **(Figure 1)**
- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable); **(Figure 2)** and
- Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan. **(Appendix A)**

COMPLETE ATTACHMENT LIST

Appendix A: RV Park Design (8-22-2018)

Appendix B: Custom Soil Resource Report

Appendix C: DNR Natural Heritage Review

Appendix D: State Historic Preservation Office Review

Appendix E: Wetland Delineation Report

Appendix F: Wetland Delineation Approval

Appendix G: SSTS Design

Appendix H: SSTS Design Approval

Appendix I: MnDOT Letter

Appendix J: Nearby Well Records

Figure 1 – County Parcel Map

Figure 2 – USGS Topographic Map

6. Project Description:

- a. Provide the brief project summary to be published in the *EQB Monitor*, (approximately 50 words).

The proposed project is an 88 site RV Park expansion to the existing 74-unit Rosebud RV Park located along Lake Traverse in Traverse County (Project). The parcel totals 28.52 acres with 78.6% of the area remaining in greenspace. The purpose of this project is to provide affordable summertime recreation for area families.

- b. Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment

or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.

- The proposed Project includes 88 RV sites on an undeveloped, heavily-forested 28.52 acre property and features gravel access roads to each camp site.
- The Rosebud RV Park is located immediately west of the Project. This active RV Park has 74 units.
- Both the current and proposed RV park are located on riparian parcels of Lake Traverse, a 10,849 acre lake with 78.62 miles of shoreline that straddles the Minnesota/South Dakota border. Lake Traverse has a maximum depth of 12 feet and a mean depth of 9 feet.
- The project site is located approximately 6.4 miles northeast of the City of Browns Valley and 15.3 miles southwest of the City of Wheaton and abuts State Highway 27, from which the site is proposed to gain access.
- The proposed Project is divided into four (4) tiers as outlined in the Project plan (Appendix A). The impervious surface for each tier is as follows:

- Tier:	Impervious Surface Area (Units)	Impervious Surface Area (Roads)
- Tier 1	0 square feet	0 square feet
- Tier 2	24,640 square feet	6,809 square feet
- Tier 3	65,120 square feet	10,439 square feet
- Tier 4	65,120 square feet	15,671 square feet
- The Project was designed to avoid all wetlands delineated within the Project parcel. The majority of the Project parcel is forested with several small areas of open grasslands
- There are currently no existing structures on the property proposed for the new RV sites. No permanent buildings or structures are proposed as part of the Project. Development of individual sites would contain parking areas and potentially free-standing decks and small storage sheds.
- The Project would involve the construction of graveled access roads and 88 RV sites. The construction would require some tree and brush removal (approximately 11.1 acres of the existing 19.51 acres of forested land would be cleared in a selective fashion as needed for the proposed RV sites, roadways and other improvements). As many trees as possible will be avoided to provide shade and privacy for the RV sites. Any vegetation alterations would need to comply with the Traverse County Land Use Ordinance Section 22.05(3)(A).
- All RV sites will be provided with electricity, sewer, and water.
- A septic system consisting of three (3) mounds will be installed on the southeast side of the parcel in a previously farmed area. The system is designed to accommodate approx. 4,200 gallons per day and is considered a Type I (commercial) system.
- The Project will take 1-2 years to become fully operational.

b. Project magnitude:

Total Project Acreage	± 28.52 acres
Linear project length	± 1,550 feet
Number and type of residential units	88 RV units
Commercial building area (in square feet)	0 ft ²

Industrial building area (in square feet)	0 ft²
Institutional building area (in square feet)	0 ft²
Other uses – specify (in square feet)	NA
Structure height(s)	<10 ft

- d. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

The purpose of the project is to provide affordable lake access to area families in an RV campground and to provide economic stimulus to the greater Traverse County area.

- e. Are future stages of this development including development on any other property planned or likely to happen? Yes No

If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review. **The proposed Project encompasses all available portions of the parcel and no other land is available. Therefore, there are no future stages or plans.**

- f. Is this project a subsequent stage of an earlier project? Yes No

The proposed Project is located on land recently purchased from a 3rd party. Therefore, it was not a planned expansion associated with the Rosebud RV Park.

If yes, briefly describe the past development, timeline and any past environmental review.

7. **Cover types:** Estimate the acreage of the site with each of the following cover types before and after development:

	Before	After		Before	After
Wetlands/shrub swamp	±6.30	±6.30	Lawn/landscaping/septic system	0	±7.77
Deep water/streams	0	0	Impervious surface	0	±4.31
Wooded/forest	±19.51	±8.41	Stormwater pond	0	±0.5
Brush/grassland	±1.94	±1.23	Other (describe)	0	0
Cropland	±0.77	0			
			TOTAL	28.52	28.52

8. **Permits and approvals required:** List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. *All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.*

<u>Unit of government</u>	<u>Type of application</u>	<u>Status</u>
Traverse County	Conditional Use Permit	Tabled
Traverse County	Sewage Permit	Future
MPCA	Stormwater Permit	Future
MnDOT	Access Permit	Future

Since no permits can be issued until after completion of the Environmental Review process, all the above permits are on hold pending the completion of the Environmental Review process and future applications. In addition, since projects are often amended during the Conditional Use Permit process, the above permits will be applied for following the CUP process when the final project scale is known. There are no forms of public financial assistance associated with the proposed Project.

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 9-18, or the RGU can address all cumulative potential effects in response to EAW Item No. 19. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 19

9. Land use:

a. Describe:

- i. Existing land use of the site as well as areas adjacent to and near the site, including parks, trails, prime or unique farmlands.
 - The majority of the proposed Project parcel is currently forested (approx. 19.51 acres) with small areas of grassland (approx. 1.94 acres) and two (2) delineated wetlands (approx. 6.30 acres) which are also mostly forested.
 - The proposed Project parcel appears to have been previously pastured with small portions being previously tilled for crop production.
 - The land immediately east of the proposed Project is in crop production.
 - The land immediately west of the proposed Project is the Rosebud RV Park, with land further to the west platted and partially developed with single-family residential homes and private RV sites.
 - Lake Traverse borders the north side of the proposed Project
 - Minnesota State Highway 27 borders the south side of the proposed Project followed by additional forested areas on the east side of Highway 27.
- ii. Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

The Traverse County Comprehensive Plan notes that the economy of many areas is related to the fate of water bodies and use of their shoreland. Moreover, the Traverse County Comprehensive Plan notes that development within the Shoreland District can be problematic and notes that establishment of the Shoreland District regulations in the Zoning Ordinance were intended to provide a balance between use and

conservation, and that they serve as minimum guidelines for County Shoreland Management Programs.

- iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

The proposed Project is completely within the Shoreland District outlined in the Traverse County Land Use Ordinance Section 22. The shoreland district is identified in the Traverse County Comprehensive Plan as an overlay district, with the underlying zoning district in this case being the County’s “Agricultural (A) District”. Portions of the property nearest Lake Traverse are also within the County’s “Floodplain District”, although none of the proposed RV sites, roadways or other improvements are proposed to be at or below the Base Flood Elevation of 982.3 (NAVD88) or the Regulatory Flood Protection Elevation of 983.3 (NAVD88).

- b. Discuss the project’s compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.

The proposed Project is compatible with the current RV Park immediately to the west in that it is the same use and it would not impair the ability of the adjacent farmland to the east from continuing operations. The Project is identified as an allowable conditional use within the Shoreland zoning district in which it is located. A number of the residentially-platted properties to the west are also used as seasonal RV sites, while others have been developed with single-family residential dwellings capable of year-round living. In some cases, owners of individual lots have expressed a dislike for the presence of an RV park in the vicinity of their property.

- c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 9b above.

The existing Rosebud RV Park is located between the proposed Project and the nearest single family lots along Lake Traverse. This will provide separation between proposed Project and those lots.

10. Geology, soils and topography/land forms:

- a. Geology - Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.

Geologic/Hydrogeologic Setting

This geologic/hydrogeologic description has been summarized from the following: *Regional Hydrogeologic Assessment: Surficial Geology – Traverse-Grant Area, West Central Minnesota*, MGS (2006); *Hydrogeologic Map of Minnesota - Bedrock Hydrogeology*, MGS (1979); *Geologic Map of Minnesota - Depth to Bedrock*, MGS (1982), the *Regional Hydrogeologic Assessment: Hydrogeology of the Surficial and Buried Aquifers – Traverse-Grant Area, West Central Minnesota*, MGS (2008), the *Regional Hydrogeologic Assessment: Geologic*

Sensitivity to Pollution of the Buried Aquifers – Traverse-Grant Area, West Central Minnesota, MGS (2008).

Quaternary glacial deposits at the proposed Project are terrace deposits consisting of stratified sand, gravel, with some interbedded layers of silt and clay occurring along stream valleys above the present floodplain level. The post-glacial geologic setting of the Project area is associated with older river-channel sediments, consisting of sand, silt, clay, and disseminated organic debris, and commonly more than 3 feet thick. Bedrock is approximately 280 feet deep and consists of Cretaceous shale or sandstone with low to moderate yields and providing good quality water.

The hydrogeologic setting includes both surficial and buried aquifers. Surficial aquifers in the Project area reportedly feature sand and gravel deposits ranging between 0-20 feet thick. Buried aquifers are not well mapped in the Regional Hydrogeologic Assessment, but a well owned by Applicant (UN#755981) and located adjacent to the Project is screened in a Buried Quaternary Artesian Aquifers located between 17-30 feet below grade and separated from the surface by confining layer described as “clay” and no surface aquifer was observed. The static water level in this well is 15 feet below grade, or slightly above the buried aquifer. The groundwater sensitivity rating for the Project area is not rated. The general direction of groundwater flow is towards the nearest surface water body, or in this case, Lake Traverse.

Project Design Features

- As outlined in the Custom Soil Resource Report, the Aquifer Assessment utilizes soil data to predict the presence or absence of surficial aquifers (Appendix B). For all soil types within the proposed Project parcel, only those immediately adjacent to Lake Traverse were listed as potentially being a surficial aquifer. The proposed Project is not located within those sensitive areas (Appendix A).

Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 11.b.ii.

Soil Types and Limitations

Project soil textures range between loam and silty clay loam. A complete USDA Custom Soil Resource Report detailing all the soil types within the project area is included in the EAW for reference (Appendix B). Notable limitations for these soils are summarized below:

Permeability:

Limitations associated with soil permeability are rated by their sensitivity to agricultural related nutrient application. The majority of the soil types within the project area (+/- 57.9%) are classified “sensitive” to nutrient application. The remaining soil types within the project area (+/- 41.9%) are classified as “not sensitive” to nutrient application. The majority of the proposed project is located within the soils listed as “not sensitive”, since the sensitive soils are largely wetlands and steep slopes, which are avoided. In addition, since the proposed Project does not include any form of agricultural use, any issues associated with nutrient application are not expected. (Appendix B).

Erosion Potential:

The erosion factor (K) indicates the susceptibility of soil to sheet and rill erosion by water. The values of K range between 0.28 and 0.32 with the higher the value being more susceptible to erosion. The highest rating (0.32) was identified on the south end of the property (+/-30.1 %) bordering State Highway 27. The rating for the remainder of the soils types within project area was 0.28.

Topography

As outlined in the Custom Soil Resource Report, the representative slopes throughout the project range between 0-40 percent (Appendix B). Slopes range between 0-6 percent over approximately 70 percent of the project area. The steepest representative slope (26%) was identified along State Highway 27 on the southern portion of the Project area. The flattest slope (1%) was identified on the northern portion of the Project area nearest Lake Traverse. Existing Project elevations range between 979 feet to 1018 feet from the northwest to the southeast sides of the project area respectively.

Acreage and Volume Estimates

The total size of Tier Areas (RV lots and roads) for this project is ±4.31 acres. Size of the individual Tier Areas are as follows:

- Tier 1 - 0 acres
- Tier 2 - 0.72 acres
- Tier 3 – 1.73 acres
- Tier 4 – 1.86 acres
- TOTAL AREA 4.31 acres**

NOTE: For silica sand projects, the EAW must include a hydrogeologic investigation assessing the potential groundwater and surface water effects and geologic conditions that could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the project in EAW Item 11 must be consistent with the geology, soils and topography/land forms and potential effects described in EAW Item 10.

Not Applicable

11. Water resources:

a. Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.

- i. Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.

Two (2) wetlands exist within the Project parcel (Appendix E). These wetlands are protected by the state Wetland Conservation Act (WCA) and the Clean Water Act (CWA). Neither of these wetlands are on the DNR Protected Waters Wetland list. Lake Traverse is located immediately north of the proposed Project and is a DNR Protected Water (ID#: 78-0025P) and a General Development Lake per the Traverse County Land Use Ordinance Section 22.04 (1). Lake Traverse is the only lake within one (1) mile of the Project that is identified on the MPCA Impaired Waters List. The listed impairment is due to mercury in fish tissue.

- ii. Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

Based on information contained within the Custom Soil Resource Report, the depth to groundwater within the upland portions of the Project range between 12 and greater than 80 inches below grade (Appendix B). The Project is not located within the MDH Wellhead Protection Area. There is a Transient Non-Community Inner Wellhead Management Zone (200ft radius) established for the Rosebud RV Park well. The aquifer sensitively for this well is considered high due to the well's shallow depth. As outlined in the Custom Soil Resource Report, the Aquifer Assessment utilizes soil data to predict the presence or absence of a surficial aquifer (Appendix B). For all soil types within the proposed Project are, the aquifer assessment rating is "Not Sensitive", suggesting there is no surface aquifer present.

There are no wells located within the proposed Project itself, but based on information from the Project Proposer, he has two wells located on his property immediately to the west. The wells include the well for the Rosebud RV Park (Well 1) drilled in 2008 and located approximately 1000 feet west of the proposed Project. A second well drilled in 2018 (Well 2) along the eastern Project boundary and would provide water to the proposed Project (Figure 1). These wells will not be connected as part of this Project. Information from the MDH Well Records for each of these wells is summarized below:

Well 1 (UN#:755981)

Well Depth: 30 ft
Casing Depth: 20 ft
Aquifer Material: Brown Sand and Gravel
Static Water Level: 15 ft
Pumping Level: 17 ft (4 hours of pumping at 15 gpm)

Well 2 (UN#:823612):

Well Depth: 45 ft
Casing Depth: 35 ft
Aquifer Material: Coarse Colorful Sand
Static Water Level: 3 ft
Pumping Level: 25 ft (5 hours of pumping at 50 gpm)

Based on review of the above and the additional information contained with the MDH Well Records (Appendix J), the aquifer for Well 1 is separated from the surface by a 17 foot clayey confining layer, while the aquifer from Well 2 is separated from the surface by a 30 foot clayey confining layer. Both wells feature artesian pressure indicating they extracted water from a Buried Quaternary Artesian Aquifer, but Well 1 features less artesian pressure than Well 2 (5 ft. and 32 ft. respectively), suggesting they are likely different aquifers.

Based on review of the County Well Index (CWI), additional wells are located nearby the proposed Project. Listed below are all known wells near the proposed Project within Windsor Township (Table 1):

Table 1: All Wells within Sections 31/36 of Windsor Township, Traverse County on CWI

Unique Number	Well Name	Address	City	County	Township	Range	Section	Depth(ft)	Elevation(ft)	Casing Depth(ft)	Casing Diameter
118562	BEHRENS, LEROY	null	null	Traverse	126	48	31	48	null	42	4
727133	REINART, GREG	5489 27 HY	BROWNS VALLEY	Traverse	126	48	31	61	null	56	4
744975	YOUNG, MIKE	5381	BROWNS VALLEY	Traverse	126	48	31	414	null	374	2
755981 (Well 1)	BINSFELD, DAN	N/A RT 1	BROWNS VALLEY	Traverse	126	48	31	30	null	20	4
771415	REINART, GREG	5489 27 HY	BROWNS VALLEY	Traverse	126	48	31	61	1033.5	55	4
823612 (Well 2)	BINSFELD, DAN	RT1	BROWNS VALLEY	Traverse	126	48	31	45	null	35	4

Notes: Highlighted Wells are Field Verified. Source: Minnesota Well Index and Reinart Well Drilling

Based on review of the above information, nearby wells located within Windsor Township either extract water from a relatively shallow sandy aquifer (within 60 feet of surface grade) or from a relatively deep aquifer (greater than 400 feet below surface grade). The closest well to the proposed Project is likely the Young well (414 ft) located approximately 1700 feet west of Well 2. Based on review of the MDH website, this well was later sealed (Appendix J).

The residences closest to the proposed Project have wells located in Folsom Township. Listed below is data for all recorded wells within that Section 1 of Folsom Township (Table 2):

Table 2: All Wells within Section 1 of Folsom Township, Traverse County on CWI

Unique Number	Well Name	Address	City	County	Township	Range	Section	Depth(ft)	Elevation(ft)	Casing Depth(ft)	Casing Diameter
727144	BENSON, LELAND	5381 27 SH	BROWNS VALLEY	Traverse	125	49	1	65	991	53	4
727145	BENSON, LELAND	5381 27 SH	BROWNS VALLEY	Traverse	125	49	1	117	null	93	4
755979	PEDERSON, DAVE	5028 27 SH	BROWNS VALLEY	Traverse	125	49	1	30	null	25	4
823607	THEEDE, COREY	NA	null	Traverse	125	49	1	145	null	129	3

Notes: Highlighted Wells are Field Verified.

The above listed wells are either screened in shallow sandy aquifer within 30 feet of the surface or within a limestone formation located between 50 and 145 feet below grade. The closet well to the proposed Project is the Pederson well. The Pederson well located approximately 1,200 feet from Well 2 and set at a same shallow depth as the Rosebud RV Park well (Well 1) located approximately 80 feet away. The remaining wells in this section are: 1) 65-145 feet deep, 2) screened in the aforementioned limestone aquifer, and 3) located between 1,500 feet and 3,600 feet from Well 2 (Appendix J).

b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.

i. Wastewater - For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.

1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

Not Applicable

2) If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system.

The Project consists of 88 proposed RV units with a SSTS to treat all generated domestic sewage. The design flow for the proposed SSTS is 47.75 gallons per day (gpd) per site, or a total design flow of 4,202 gpd. The proposed SSTS would be a mound system located on the east portion parcel. Features of the proposed SSTS are:

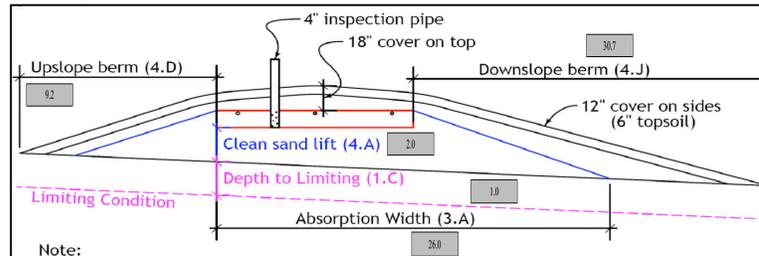
Collection System: 4,300 feet of 4-inch SDR-35 gasketed sewer collection pipe with inlets at each RV Site, and 400 feet 2-inch SCH40 pipe for the pump tanks.

Tanking: two 2,500 gallon septic tanks, nine 2250 gallon septic tanks, one 1500 gallon lift tank, and two 2250 lift tanks

Pumps System: 4,122 gallon reserve capacity in pump tanks with three (3) 58 gallon per minute alternating pumps with time dose.

Treatment Area: A mound system with 10'X100' rock bed split into three (3) zones and atop two (2) feet of washed sand to achieve the required 3 feet of separation to the high water table.

Mound Cross Section



Specific SSTS Design features are outlined in the attached SSTS Design (Appendix G). This Design was reviewed by David Gustafson (MPCA Inspector #1481) and deemed to be suitable for the proposed Project and in compliance with MN Rules 7080 as well as the Traverse County Land Use Ordinance Section 22.08. A sewage permit for the proposed Project can be applied for after the Environmental Review process is complete and after a Conditional Use Permit is issued. Based on the provided approved SSTS Design, the Project parcel is suitable for domestic sewage treatment and the location of such a system is not considered a significant environmental effect.

- 3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges.

Not Applicable

- ii. Stormwater - Describe the quantity and quality of stormwater runoff at the site prior to and post construction. Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters). Discuss any environmental effects from stormwater discharges. Describe stormwater pollution prevention plans including temporary and permanent runoff controls and potential BMP site locations to manage or treat stormwater runoff. Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction.

The existing and future stormwater quantity and quality are discussed separately below:

Stormwater Quantity

- Following a topographic review of all surrounding properties, both on USGS topographic maps and during field visits, all existing run-off from the Project parcel goes to large wetland located along the shore of Lake Traverse. Since the proposed Project does not alter any natural pathways, no potential impacts from run-off into neighboring properties is expected.
- No significant changes in the quantity of stormwater runoff from the Project are expected since the amount of proposed impervious surface (15%) is well below the maximum allowed (25%) per the Traverse County Land Use Ordinance Section 22.05(5)(B).

Stormwater Quality

- The proposed Project is consistent with the Traverse County Land Use Ordinance Section 22.05(5)(A), whereas it utilizes existing natural drainage ways and wetlands to retain stormwater runoff before it enters any public waters. Specifically, stormwater runoff will continue to flow to the large wetland located between the proposed RV sites and Lake Traverse. By maintaining this natural drainage way, stormwater runoff will be retained and filtered before reaching Lake Traverse.
- The proposed Project includes the construction of gravel public access roads for the RV sites. As outlined in the Traverse County Land Use Ordinance Section 22.05(4)(A), before construction of those roads can begin, documentation must be provided to the County by a qualified individual that all roads are designed and constructed to minimize and control erosion to public waters consistent with technical guidance from the water conservation district. Therefore, existing protections are in place to avoid negative impacts to stormwater quality.
- The proposed Project will expose more than one (1) acre of land, therefore a Construction Stormwater Permit from the MPCA we be required prior to beginning any construction. The proposed project is not within one (1) mile and up-stream of any specially protected waters as defined by the MPCA, therefore no additional controls beyond those outlined for Construction Stormwater Permits are required. Prior to submitting the Stormwater Permit Application, the regulated party will need to prepare and submit a complete Stormwater Pollution Prevent Plan (SWPPP) in accordance with Section 5 of the Rule to the MPCA. A partial list of what the SWPP must include: 1) proposed erosion control measures, 2) final stabilization methods for exposed soils, 3) training documentation for responsible individuals, 4) stormwater design specifications/calculations for proposed stormwater management systems (ie. stormwater ponds).
- The proposed Project will create more than one (1) acre of new impervious surface. As such, a permanent stormwater management system will be designed and constructed in accordance with MPCA permit requirements.

This MPCA Stormwater Permit would be obtained following Environmental Review process and after the Conditional Use Permitting process when the size and actual existence of the Project is known. As an added level of assurance, the

Applicant proposes that Special Condition be included in any future Conditional Use Permit requiring that this MPCA Stormwater Permit be obtained and provided with the Traverse County SWCD Office for review to ensure the project complies with the Traverse County Land Use Ordinance.

Since the changes to the quantity of stormwater runoff from the Project are not expected to be excessive or unusual, and there are existing regulatory protections in place including the Traverse County Land Use Ordinance and the MPCA Stormwater Permitting process to protect stormwater runoff quality, significant environmental effects associated stormwater are not expected for the proposed Project.

- iii. Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.

The source of water for the proposed Project will be Well 2. No water appropriation permit will be needed for the proposed Project. The proposed Project design flow for the proposed RV Park is 47.75 gallons per day (gpd) per site. With 88 sites, with projected water usage for the proposed Project would be 4,202 gpd. In the event the Rosebud RV Park and proposed Project were considered one project for the purpose of appropriation permitting, the existing RV Park has 74 sites; with an estimated water usage of 3,533.5 gpd. Therefore, the total water usage for both RV parks together would be 7,735.5 gpd, which is below the 10,000 gpd threshold for a DNR Water Appropriation Permit. In addition, the seasonal nature of the proposed Project will significantly limit total annual water use.

Even though the water appropriation for the proposed Project will be below permitting thresholds, neighboring landowners have expressed concern that the proposed Project may limit drinking water availability near the proposed Project. To obtain additional information concerning this matter, Joe Reinart was interviewed several times between March 13, 2019 and March 18, 2019. Mr. Reinart is a MDH Certified Well Driller, has installed most of the wells in the area, and has almost 50 years of experience with wells in this area. A summary of the expert testimony provided by Mr. Reinart is listed below:

- **Sometimes it can be challenging to find good water near the proposed Project and it can take additional effort to locate an aquifer to set a well.**
- **Aquifers can either be: 1) fairly shallow (<60ft) and consist of near surface or buried sandy or gravel material 2) moderately deep (60-150ft) and consist of a limestone formation known as Greenhorn, or 3) deep (>400ft) and consist of buried sand lenses of various thicknesses.**

- The amount of water available from these aquifers can range significantly and can sometimes be relatively low. The amount of water available on any given lot is based on the thickness or texture of the aquifer identified, not on the amount of water used on neighboring properties.
- The Rosebud RV Park Well (Well 1) is screened in a buried aquifer consisting of brown sand/gravel between 17-30 feet deep below grade. The aquifer is located beneath a thin clay layer and has a little artesian pressure. The well produced 17- 25 gpd and he installed a 10 gpm pump.
- The new Binsfeld well (Well 2) was deeper than Well 1 and was screened in a thicker aquifer with a different type of sand than identified for Well 1. Mr. Reinart can't say for sure whether the aquifers for Well 1 and Well 2 are connected or separated, but he knows that the artesian pressures are different and Well 2 easily produced 50 gpm and could likely produce 70-80 gpm, which is much different than Well 1.
- Although no pump is yet installed in Well 2, Mr. Reinart mentioned the well would easily support a 35 gpm pump based on the high available yield.
- Mr. Reinart mentioned that sometime after Well 1 became operational, Dave Pederson had some problems with his well. The Pederson well is screened at the same depth as Well 1 and is located approximately 80 feet away. Mr. Reinart mentioned that he then lowered the pump in the Pederson well and was not aware of any problems with the Pederson well since he lowered that pump.
- Mr. Reinart stated he couldn't imagine how operation of Well 2 could interfere with any of the landowners located near the proposed Project and mentioned several reasons including: 1) the distance between Well 2 and the wells of concern (>1,200 feet away), 2) the fact that most of the wells near the site are screened in a completely different aquifer than Well 2, and 3) the low amount of water proposed for use by the proposed Project.
- Mr. Reinart offered to discuss the above information with anyone at any time, including at a public hearing if necessary.

In addition to the above expert testimony, there are at least two (2) in-place protections that would help prevent or resolve any potential well interference issues:

1) MDH source water protection rules require that all public water suppliers (PWS) manage all land use within 200 feet radius around their well. This radius is known as an Inner Wellhead Management Zone (IWNZ). The closest property to Well 2, not managed by the Applicant, is located approximately 1,200 feet away. Therefore, the well for the proposed Project is located approximately 5-times further than the required MDH minimum for a public water supply well. Additionally, any future public water supply wells for the Project would also need to comply with these requirements.

2) MN Rule 6115.0730 *Interference Problems Involving Appropriation* could be utilized to offer direct protections to neighboring well owners in the event that any well inference from the proposed Project occurred. Under this Rule, the

Applicant would be required to correct any well interference issues at no cost to the affected well owner.

Based on the combination of the expert testimony and the listed in-place protections listed above, it is not expected that potential well-interference concerns from the neighboring landowners would constitute a significant environmental effect. Additionally, as outlined in MN Rule 4410.1700 Subp 7A, the reversibility of any environmental effect shall be considered when evaluating if there is a potential significance. In this case, any potential well interference would be completely reversible and therefore would not be considered significant for this environmental review.

iv. Surface Waters

- a) Wetlands - Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed, and identify those probable locations.

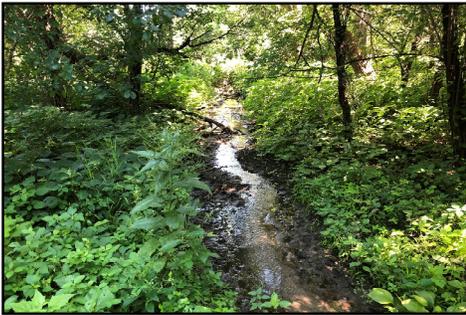
Two wetlands (W1 and W2) were identified, classified, and delineated as outlined in the Wetland Delineation Report dated July 30, 2018 (Appendix E). That Wetland Delineation Report was approved by Traverse County by a Notice of Decision on October 5, 2018 (Appendix F). Features of each of these wetlands are outlined below:

Wetland W1

- **Wetland W1 is approximately 6.11 acres in size and is located along the majority of the Lake Traverse shoreline within the proposed Project parcel.**
- **This wetland is considered a *Type 6 Shrub Swamp* wetland which typically is waterlogged to the surface for much of the growing season and dominated by shrubs including willows and dogwoods.**
- **Dominant hydrophytic vegetation included: *Fraxinus pennsylvanica* (Green Ash) *Rhamnus cathartica* (European Buckthorn), *Phalaris arundinacea* (Reed Canary Grass), and *Vitis vulpina* (Riverbank Grape).**



Wetland W2

- Wetland W2 is a small wetland on the east side of the property that consists of a drainage way which runs under Highway 27 through a culvert and flows west into the property where it eventually ends where run-off water soaks into the ground.
 - The amount of water flowing in wetland fluctuates up and down with precipitation levels.
 - This wetland is approximately 0.19 acres in size.
 - It is located approximately 350 feet from Lake Traverse
 - It is surrounded by deciduous trees and shrubs on all sides.
- 
- This wetland was classified as a Type 1 Seasonally Flooded Basin or Floodplain Wetland, with vegetation varying by season.

The Project is designed to directly avoid all wetland impacts. All RV sites are located on the south half which preserves the large wetland (W1) located between the site and Lake Traverse. The narrow Type 1 Wetland (W2) runs within the RV proposed RV sites and will be crossed by the proposed access road. The Applicant plans to construct a bridge over the narrow wetland which will avoid all wetland impacts. All natural drainage ways leading to these identified wetlands will be maintained. Based on these direct and indirect efforts to avoid wetland impacts, significant environmental effects associated with wetland impacts are not expected for the proposed Project.

- b) Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.

The Project does not alter any surface water on or near the proposed Project. Lake Traverse is a DNR Protected Water (ID#: 78-0025P) and is considered a General Development Lake per the to the Traverse County Land Use Ordinance Section 22. Lake Traverse is located immediately north of the proposed Project and the setbacks for structures (75 feet) and sewer (50 feet) have been greatly exceeded (Appendix A), therefore direct or indirect impacts associated with those activities are not expected. In addition, the large wetland (W2) located

between the proposed Project and Lake Traverse will be avoided and will continue to act as a buffer between the proposed Project and the lake. With regards to construction related impacts to Lake Traverse, prior to completing any construction, the Applicant must submit a complete Stormwater Pollution Prevention Plan, including all proposed erosion control measures, to the MPCA for review prior to obtaining the required MPCA Stormwater Permit.

Current watercraft traffic on Lake Traverse is considered relatively low. The addition of this 88 site RV park will add watercraft to Lake Traverse. Based on observed watercraft usage at the Rosebud RV Park, it is estimated that the proposed Project will add 1-2 watercraft on weekdays, 6-12 boats on Saturdays, and 2-3 boats on Sundays. On July 4th, watercraft useage on Lake Traverse may increase by 12-24 boats. These estimates are subject to change based on weather and time of year. Due to the large size Lake Traverse, and the current relatively low watercraft usage, the estiamted increase in watercraft usage from the proposed Project is not expected increase watercraft usage levels frequently observed in more developed Minnesota lakes. Therefore, the increased watercraft usage for the proposed Project is not expected to pose a significant environmental effect.

12. Contamination/Hazardous Materials/Wastes:

- a. Pre-project site conditions - Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.

There is no known contamination, hazardous materials, or wastes within the Project parcel. Based on the proposed land use, the potential for contamination or hazardous wastes as part of the Project is not considered to be a significant environmental effect.

- b. Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.

All solid waste generated as part of the proposed Project will consist of residential garbage. This solid waste will be handled along with solid waste from the Rosebud RV Park, which is collected and properly disposed of by Dakota Waste of Sisseton, South Dakota.

- c. Project related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any above or below ground tanks to store petroleum or other materials. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the

use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

No hazardous materials will be used or stored at the proposed Project.

- d. Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.

No hazardous wastes will be generated or stored during the construction or operation of the proposed Project.

13. Fish, wildlife, plant communities, and sensitive ecological resources (rare features):

- a. Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

Of the 28.52 acres making up the proposed Project, approximately 19.5 acres is forested, 6.30 acres are forested wetland, approximately two (2) acres are grassland, and approximately one (1) acre is former cropland (Appendix A). Much of the forested areas have been infested with Eurasian Buckthorn which may be related to past grazing activities. The forested areas and wetlands would provide habitat for various wildlife species notably including deer, turkeys, songbirds, as well as, predators such as the red fox, coyote, and raccoons.

There are no fish resources or related habitats within the proposed Project. The proposed Project is located along Lake Traverse which is a General Development lake.

- b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-____) and/or correspondence number (**ERDB# 20190120**) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

As outlined in the DNR correspondence dated October 18, 2018, the Minnesota Biological Survey (MBS) did not identify any rare species or other significant natural features within a one (1) mile radius of the proposed Project (Appendix C). According to the MBS, Lakes of Biological Significance can be ranked as *Outstanding*, *High*, or *Moderate* based on unique plant and animal presence; Lake Traverse was identified as a lake with *High* Biological Significance due to its fish and bird populations. The DNR noted that deterioration of water quality should be minimized along with erosion prevention and sediment control during the project design and implementation. It was also noted that indirect impacts, such as spread of invasive species, should be considered during the duration of the project.

- c. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

Fish Communities

There are no fish communities within the Project boundary; therefore no direct impacts are expected. The Project is near Lake Traverse, but based on review, indirect impacts are not expected because 1) the units are located approximately 220 feet away from the lake, and 2) all runoff from the Project will follow natural pathways which enter the large wetland located between the RV sites and Lake Traverse. A permanent stormwater management system will also be required to be designed and constructed as per MPCA permit requirements.

Wildlife Communities

The Applicant designed the Project to impact up to 11.1 acres of forested areas while avoiding approximately to 8.5 acres of forested areas within the larger property. These avoided areas largely serve as buffers between Highway 27 and provide shade. These avoided areas, as well as similar areas on adjacent properties, would provide similar habitat for wildlife communities potentially displaced by the Project. Additionally, the proposed project will not be occupied during the off-season and wildlife communities will likely continue using the property undisturbed during that time.

Plant Communities

The majority of the proposed Project is forested with deciduous trees and shrubs, with some areas of open grasslands. The dominant vegetation identified in the forested areas included Green Ash (*Fraxinus pennsylvanica*), Basswood (*Tilia Americana*), and European Buckthorn (*Rhamnus cathartica*), and Riverbank Grape (*Vitis vulpine*). Dominant vegetation in the open areas included Reed Canary Grass (*Phalaris arundinacea*) and Smooth Brome (*Bromus inermis*). Vegetation clearing within the proposed Project will be minimized to maintain shade and privacy for the RV sites, and shield the RV Park from neighboring properties. In addition, all wetlands identified within the parcel will be avoided, thereby lessening the disturbance associated with the proposed Project.

Rare Features or Ecosystems

No rare features or ecosystems were identified within one (1) mile of the Project. According to the MBS, Lakes of Biological Significance can be ranked as *Outstanding*, *High*, or *Moderate* based on unique plant and animal presence; Lake Traverse was identified as a lake with *High* Biological Significance due to its fish and bird populations (Appendix C). Disturbance to Lake Traverse from the proposed Project will be minimized via the protection of the large wetland between the RV sites and the lake and the permanent stormwater management system that will need to be designed and constructed as per MPCA permit requirements.

- d. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to fish, wildlife, plant communities, and sensitive ecological resources.

The Applicant designed the project to avoid and/or minimize impacts to all fish, wildlife, native plant communities, and aquatic resources on or near the proposed Project parcel. These efforts include, but are not limited to 1) avoiding all wetlands within the property, 2) meeting or exceeding all setbacks to Lake Traverse, 3) minimizing tree clearing as much as possible, 4) minimizing impervious surfaces, 5) maintaining natural drainage ways to prevent stormwater runoff from running directly to Lake Traverse, and 6) design and installation of a permanent stormwater management system.

14. Historic properties:

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

- **No known historic structures, significant archeological sites, and/or traditional cultural properties have been identified within the Project parcel.**
- **Several known significant archeological sites have been identified on other properties within one (1) mile of the proposed Project.**
- **The State Historic Preservation Office (SHPO) recommended that a Phase I archaeological survey be completed on the Project parcel to evaluate if there are any unknown archeological sites present that could be considered significant (Appendix D).**
- **The SHPO office also stated they would reconsider the recommendation for the Phase I survey if the project area is considered disturbed.**
- **Small portions of the proposed Project parcel have been tilled and may or may not be considered disturbed, but the forested areas making up the majority of the Project parcel would likely be considered undisturbed.**
- **As outlined in the Traverse County Land Use Ordinance Section 22.05 (2.B.4), no structure may be placed on a significant historic site in a manner that affects the values of the site. There are no known Significant Historic Sites, as defined in the Traverse County Land Use Ordinance Section 5.01, within the proposed Project.**
- **It is unknown if any archeological surveys were previously completed on the Project parcel to identify any Significant Historic Sites, but it is known that past archeologic surveys identified Significant Historic Sites on several properties within one (1) mile.**
- **The proposed Project does not include any *Structures* as defined in the Traverse County Land Use Ordinance Section 5.01. Therefore, the proposed Project is in compliance with these provisions of the Traverse County Land Use Ordinance, regardless of whether known Significant Historic Sites existed within Project parcel or not.**
- **Since the proposed project is not proposed to include the placement of any permanent structures, any potential impacts to unknown and/or non-existent significant historic properties are not considered a significant environmental effect.**

15. Visual:

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

The Project parcel is mostly forested and does not afford scenic views or vistas beyond those of the parcel border itself. The Applicant plans to minimize tree removal within the proposed RV sites and avoid all vegetation clearing along State Highway 27 (Appendix A). Therefore, any views of the proposed Project from State Highway 27 would be all or partially obscured, and those views are not expected to constitute a significant environmental effect.

16. Air:

- a. Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants, and any greenhouse gases. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.

Permanent electrical power will be supplied from a local electric utility company at each unit location, therefore eliminating the need for portable generators.

- b. Vehicle emissions - Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.

Vehicle exhaust will be released primarily from personal vehicles driving in and out of the RV Park, maintenance equipment, and golf carts. The generated emission amounts are considered low and not expected to constitute a significant environmental effect.

- c. Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 16a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

Based on the nature of the proposed Project, the only source of dust and odors would be potentially be during the actual construction which is expected to be minimal, temporary, and not expected to rise to the level of a significant environmental effect.

17. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

There are currently no noise sources due to it being an empty lot. Noise use of the RV Park will increase once the Project is completed. Quiet hours and other rules pertaining to noise will be put into effect to ensure noise is kept to minimum acceptable levels.

18. Transportation

- a. Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip

generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.

1. **No designated parking areas currently exist within the Project parcel. There is one (1) designated parking area for each RV site for a total of 88 parking sites added (Appendix A).**
 2. **Based on factors referenced from the Institute of Transportation Engineers (ITE) Trip Generation 7th Addition, the estimated total Average Daily Traffic (ADT) for RV parks is 0.52 trips/site. Therefore, the ADT for the proposed RV Park would be 45.76. This estimate would be worst-case and would assume 100% occupancy. RV parks are typically not 100% occupied, especially RV parks located in colder winter climates with seasonal use. Therefore, the annual average daily traffic would be considerably less than the worst-case daily estimate. A realistic example of expected traffic volumes would be those observed at the existing Rosebud RV Park.**
 3. **As outlined in the Institute of Transportation Engineers (ITE) Trip Generation Rate 9th Addition, the estimated peak-hour trips for the proposed 28.5 acre RV Park are 28 peak hour trips during PM hours and 14 peak hour trips during AM hours. Based on the seasonal use of the proposed Project, these peak-hour trips will decrease significantly during spring and fall, and then decrease to at or near zero during the winter.**
 4. **No alternative modes of transportation to and from the proposed Project are available. The most common form of traffic within the proposed Project would be golf carts.**
- b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. *If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW.* Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 (available at: <http://www.dot.state.mn.us/accessmanagement/resources.html>) or a similar local guidance,

All vehicles from the proposed Project will access State Highway 27 (T.H.27), which runs along the entire south boundary of the parcel. Based on the above traffic projections, the rural location of property, and the planned seasonal use, the Project is: 1) not expected to create any traffic congestion problems, 2) not expected to have any negative impact on the regional transportation system, and 3) may or may not require any traffic improvements to area roadways. The Minnesota Department of Transportation (MnDOT) reviewed the proposed Project and provided comment in this regard (Appendix I). It was noted that they will work with the landowner and will "conduct a field review to sure that a safe ingress/egress to the property can be constructed/reconstructed. This will be for the original entrance used to access the previous development, as well as additional access/es to the requested 88 unit expansion. If suitable site distance can be established there will be no Right Turn Lane required." Therefore, since MnDOT will be involved with approving the access to State Highway 27, it is not expected that any traffic associated with the proposed Project will amount to the level which would constitute a significant environmental affect.

- c. Identify measures that will be taken to minimize or mitigate project related transportation effects.

The Applicant is required to work with MnDOT to ensure that any transportation related effects will be minimized or mitigated. The Applicant proposes that this be considered a Special Condition of any Conditional Use Permit issued for the proposed Project.

19. Cumulative potential effects: (Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

- a. Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

As outlined in *EQB Guide to Minnesota Environmental Review Rules (2010)*, and following the *CARD vs Kandiyohi County* decision at the State Supreme Court, this environmental review must also take into account similar projects in the same *environmentally relevant area* that could contribute similar environmental effects to those identified for the Project. The potential environmental effects associated with this Project are related to seasonal recreational use along the shore of Lake Traverse, groundwater impacts, impacts on archaeological sites and stormwater impacts. Therefore, with regard to *cumulative potential effects*, the *environmentally-relevant area* for this project has been defined as property in the same minor watershed and within one (1) mile of the proposed Project (Figure 2).

- b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

This proposed Project has no future plans and/or expansions, although state and county planned unit development regulations would allow for additional units to potentially be added to the proposed site in the future and the project proposer does own an approximate 15-acre non-riparian property about ½ mile to the west and another 74-acre non-riparian property to the southwest of the proposed project site. The project proposer has not indicated an intent to develop the 15-acre property in a similar manner and the 74-acre site would not lend itself to similar development due to very steep topography and its location on the opposite side of Highway 27 from Lake Traverse. In addition, most properties within the shoreline areas of the *environmentally-relevant area* (those that would be expected to have the greatest demand or value for further development anytime in the near future) have already been subdivided for individual family homes, which would make them unsuitable for future RV Parks.

The farmland to the east of the project site could potentially be developed for residential or other permitted uses, but Traverse County does not have any basis to anticipate that this will be proposed in the near future. Should such development occur in the future, the primary interaction with the current proposed project would likely be due to the increased demand for groundwater in an area that has shown inconsistent quantities of easily accessible groundwater in the recent past, and other sources of groundwater outside the *environmentally-relevant area* may or may not be needed. Therefore, there are no reasonably foreseeable future projects planned within the *environmentally-relevant area*.

- c. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.

When taking into account the: 1) existing conditions within the *environmentally-relevant area*, 2) no foreseeable future projects within the *environmentally-relevant area*, 3) the lack of any known significant environmental impacts from the current proposal that cannot be addressed with conditions; we have found no evidence to suggest there is a potential for significant environmental effects from *potential cumulative effects*. It should be noted that there has historically been challenges finding a suitable aquifer beneath some properties within the *environmentally-relevant area*, but we have found no evidence to suggest that the proposed Project will somehow impact that historic condition.

20. Other potential environmental effects: If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

RGU CERTIFICATION. (*The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.*)

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature  _____

Date March 29, 2019 _____

Title Zoning Administrator - Traverse County

Figure 1 - County Parcel Map.pdf

Figure 2 - USGS Topographic Map.pdf

Appendix A - RV Park Design (8-22-2018).pdf

Appendix B - Custom Soil Resource Report.pdf

Appendix C - DNR Natural Heritage Review.pdf

Appendix D - State Historic Preservation Office Review.pdf

Appendix E - Wetland Delineation Report.pdf

Appendix F - Wetland Delineation Approval.pdf

Appendix G - SSTS Design.pdf

Appendix H - SSTS Design Approval.pdf

Appendix I - MnDOT Letter.pdf

Appendix J - Nearby Well Records



Pro-West & Associates, Inc., Esri, Inc.

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.

Figure 1 - County Parcel Map

Traverse County, Minnesota

1:9,028

Date: 12/28/2018

This map is not a substitute for accurate field surveys or for locating actual property lines and any adjacent features.



Parcel Number: 15-0166001

General Information

Township/City: WINDSOR

Taxpayer Name: BINSFELD/DANIEL & JANET

Taxpayer Address: 29534 CO ROAD 20
PAYNESVILLE MN 56362

Property Address:

Township: 126

Range: 48

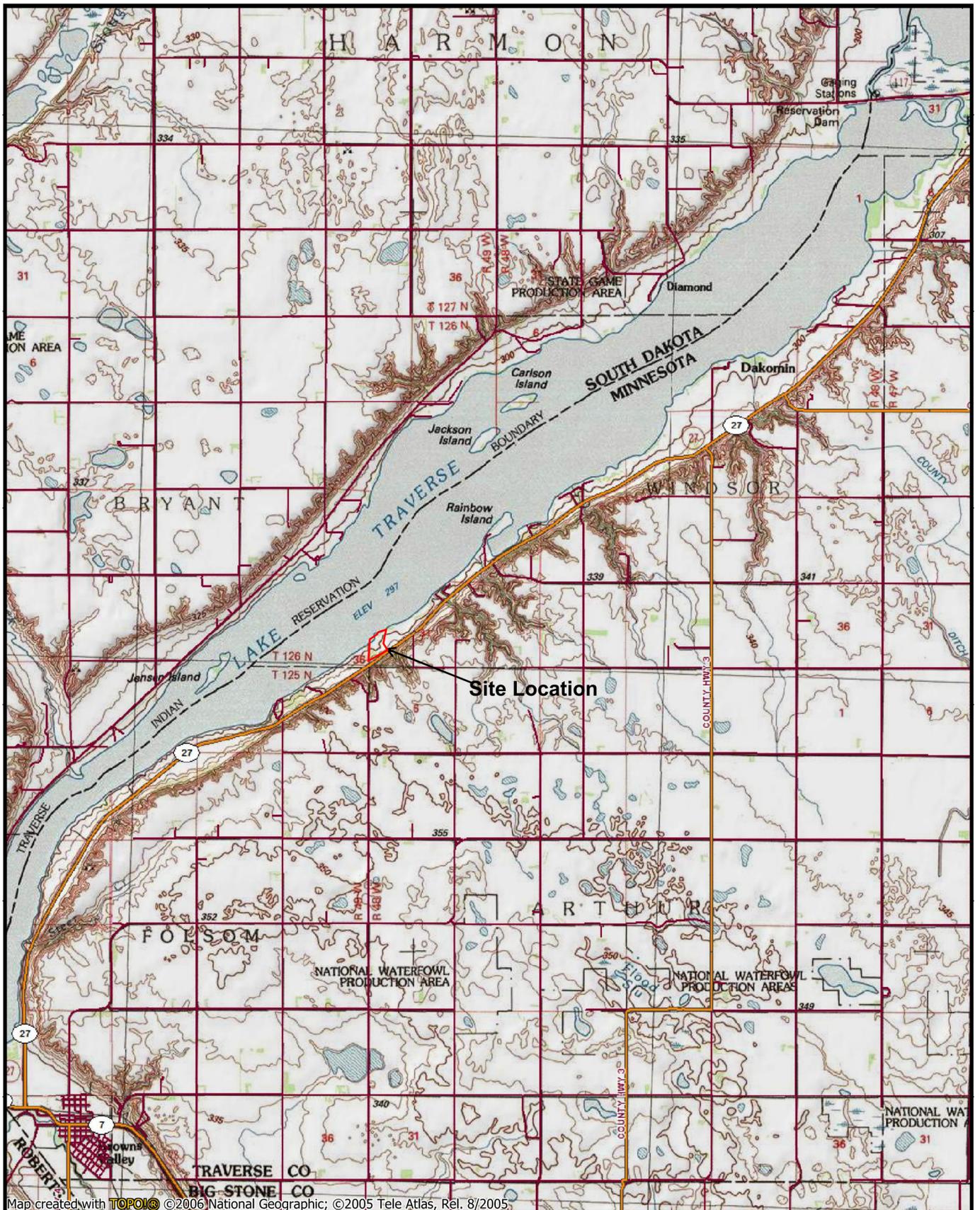
Section: 31

Plat:

Acres: 28.52

School District: 801 - BROWNS VALLEY

Tax Description: 28.52 ACRES IN GOVT LOTS 4 & 5



Map created with **TOPOIC** ©2006 National Geographic; ©2005 Tele Atlas, Rel. 8/2005

**Figure 2: USGS Topographic Site Location Map
Traverse Lake RV Park
Traverse County, MN**

**ENVIRONMENTAL
SCIENTIFIC**

APPENDIX B: CUSTOM SOIL RESOURCE REPORT



A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Traverse County, Minnesota



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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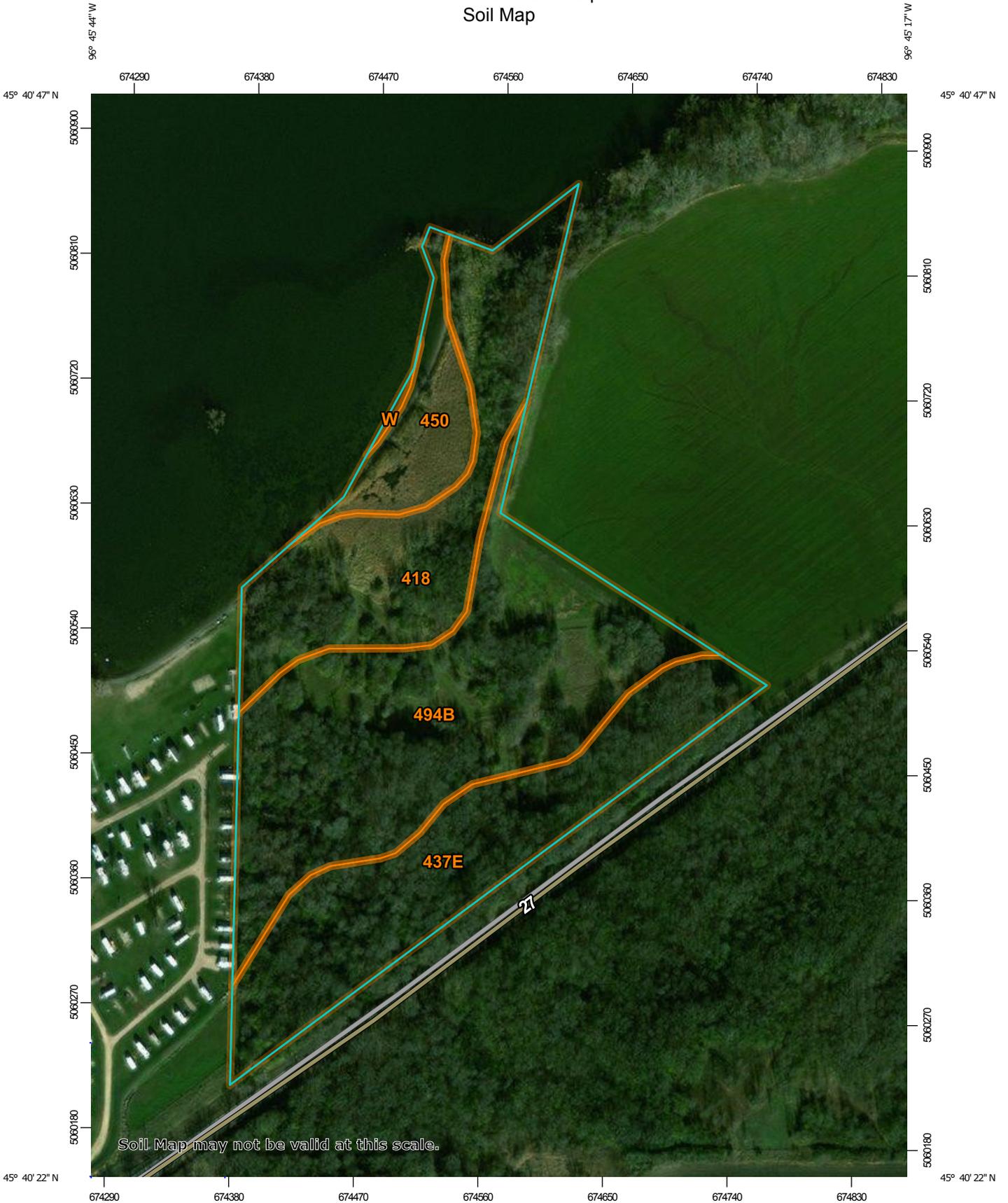
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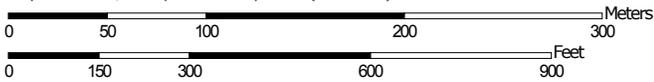
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Scale: 1:3,800 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Traverse County, Minnesota
 Survey Area Data: Version 13, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 22, 2013—Nov 14, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
418	Lamoure silty clay loam, 0 to 2 percent slopes, occasionally flooded	6.5	24.2%
437E	Langhei loam, 12 to 40 percent slopes	6.9	25.8%
450	Rauville silty clay loam, 0 to 2 percent slopes, frequently flooded	2.1	7.8%
494B	Darnen loam, 1 to 6 percent slopes	11.3	41.9%
W	Water	0.1	0.2%
Totals for Area of Interest		26.9	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

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was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Traverse County, Minnesota

418—Lamoure silty clay loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2w0mn
Elevation: 920 to 2,130 feet
Mean annual precipitation: 22 to 31 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Lamoure, occasionally flooded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lamoure, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

Ap - 0 to 8 inches: silty clay loam
A - 8 to 36 inches: silty clay loam
BCg - 36 to 52 inches: silty clay loam
Cg - 52 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: About 0 to 8 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 3.0
Available water storage in profile: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: Linear Meadow (R102AY002SD)
Forage suitability group: Subirrigated (G102AY700SD)
Hydric soil rating: Yes

Minor Components

La prairie, occasionally flooded

Percent of map unit: 8 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy Overflow (R102AY020SD)
Hydric soil rating: No

Colvin, occasionally flooded

Percent of map unit: 7 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Limy Subirrigated (R102AY006SD)
Hydric soil rating: Yes

Rauville, frequently flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Linear Meadow (R102AY002SD)
Hydric soil rating: Yes

437E—Langhei loam, 12 to 40 percent slopes

Map Unit Setting

National map unit symbol: 2w0m1
Elevation: 920 to 2,130 feet
Mean annual precipitation: 22 to 31 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Langhei and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Langhei

Setting

Landform: Moraines
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope

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Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Fine-loamy till

Typical profile

Ap - 0 to 6 inches: loam
Bk - 6 to 15 inches: loam
C1 - 15 to 60 inches: loam
C2 - 60 to 79 inches: loam

Properties and qualities

Slope: 12 to 40 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: Thin Upland (R102AY012SD)
Forage suitability group: Not suited (G102AY000SD)
Hydric soil rating: No

Minor Components

Barnes, moderately eroded

Percent of map unit: 10 percent
Landform: Moraines
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Linear
Ecological site: Loamy (R102AY010SD)
Hydric soil rating: No

Darnen

Percent of map unit: 5 percent
Landform: Moraines
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: Loamy (R102AY010SD)
Hydric soil rating: No

Lakepark

Percent of map unit: 3 percent

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Landform: Moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Linear Meadow (R102AY002SD)
Hydric soil rating: Yes

Fordville

Percent of map unit: 2 percent
Landform: Moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Loamy (R102AY010SD)
Hydric soil rating: No

450—Rauville silty clay loam, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2w0ms
Elevation: 920 to 2,130 feet
Mean annual precipitation: 22 to 31 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Rauville, frequently flooded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rauville, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy alluvium over sandy and gravelly alluvium

Typical profile

A - 0 to 27 inches: silty clay loam
Cg1 - 27 to 61 inches: silty clay loam
2Cg2 - 61 to 79 inches: gravelly sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained

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Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 2.00 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: Frequent

Frequency of ponding: Frequent

Calcium carbonate, maximum in profile: 40 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0
mmhos/cm)

Sodium adsorption ratio, maximum in profile: 3.0

Available water storage in profile: High (about 11.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: C/D

Ecological site: Shallow Marsh (R102AY001SD)

Forage suitability group: Not suited (G102AY000SD)

Hydric soil rating: Yes

Minor Components

Lamoure, occasionally flooded

Percent of map unit: 8 percent

Landform: Flood plains

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Linear Meadow (R102AY002SD)

Hydric soil rating: Yes

Marysland, frequently flooded

Percent of map unit: 7 percent

Landform: Flood plains

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Linear

Ecological site: Linear Meadow (R102AY002SD)

Hydric soil rating: Yes

La prairie

Percent of map unit: 5 percent

Landform: Flood plains

Landform position (three-dimensional): Rise

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: Loamy Overflow (R102AY020SD)

Hydric soil rating: No

494B—Darnen loam, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2w8fk
Elevation: 920 to 2,130 feet
Mean annual precipitation: 22 to 31 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 120 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Darnen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Darnen

Setting

Landform: Moraines
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-loamy colluvium

Typical profile

Ap - 0 to 8 inches: loam
A - 8 to 24 inches: loam
AB - 24 to 29 inches: loam
Bw1 - 29 to 34 inches: loam
Bw2 - 34 to 79 inches: loam

Properties and qualities

Slope: 1 to 6 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 47 to 59 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e

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Hydrologic Soil Group: B
Ecological site: Loamy Overflow (R102AY020SD)
Forage suitability group: Loam (G102AY100SD)
Hydric soil rating: No

Minor Components

Lakepark

Percent of map unit: 5 percent
Landform: Moraines
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Linear Meadow (R102AY002SD)
Hydric soil rating: Yes

Barnes

Percent of map unit: 5 percent
Landform: Moraines
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Linear
Ecological site: Loamy (R102AY010SD)
Hydric soil rating: No

Svea

Percent of map unit: 3 percent
Landform: Moraines
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Loamy (R102AY010SD)
Hydric soil rating: No

Buse, moderately eroded

Percent of map unit: 2 percent
Landform: Moraines
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Thin Upland (R102AY012SD)
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Sanitary Facilities

Sanitary Facilities interpretations are tools designed to guide the user in site selection for the safe disposal of sewage and solid waste. Example interpretations include septic tank absorption fields, sewage lagoons, and sanitary landfills.

Aquifer Assessment (MN) (Proposed RV Park)

The Aquifer Assessment interpretation uses soil properties as a proxy to predict the presence of a sensitive surficial aquifer. Soil properties considered include the texture in the bottom horizon, the presence of bedrock, and the classification of organic soils (Histosols). The Aquifer Assessment interpretation is associated with the "desktop" evaluation of large individual sewage treatment systems to predict aquifer vulnerability and the potential risk of nitrogen impacting the aquifer. Regulatory requirements for large individual sewage treatment systems (flow greater than 2,500 gallons per day) are found in Minnesota Rule Chapter 7080.

The ratings are both verbal and numerical. Soils are assigned to rating classes based on their degree of risk. These classes are "not sensitive" (rating index of 0.00) and "sensitive" (rating index of 1.00).

The components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as the one shown for the map unit. The percent composition of each component in a particular map unit is given to help the user better understand the extent to which the rating applies to the map unit.

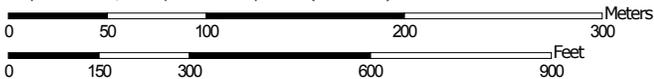
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Other components with different ratings may occur in each map unit. The ratings for all components, regardless the aggregated rating of the map unit, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

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Map—Aquifer Assessment (MN) (Proposed RV Park)



Map Scale: 1:3,800 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

-  Sensitive
-  Not sensitive
-  Not rated or not available

Soil Rating Lines

-  Sensitive
-  Not sensitive
-  Not rated or not available

Soil Rating Points

-  Sensitive
-  Not sensitive
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

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Custom Soil Resource Report

Tables—Aquifer Assessment (MN) (Proposed RV Park)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
418	Lamoure silty clay loam, 0 to 2 percent slopes, occasionally flooded	Not sensitive	Lamoure, occasionally flooded (80%)		6.5	24.2%
			La Prairie, occasionally flooded (8%)			
			Colvin, occasionally flooded (7%)			
437E	Langhei loam, 12 to 40 percent slopes	Not sensitive	Langhei (80%)		6.9	25.8%
			Barnes, moderately eroded (10%)			
			Darnen (5%)			
			Lakepark (3%)			
450	Rauville silty clay loam, 0 to 2 percent slopes, frequently flooded	Sensitive	Rauville, frequently flooded (80%)	Sand and rock (1.00)	2.1	7.8%
			Marysland, frequently flooded (7%)	Sand and rock (1.00)		
494B	Darnen loam, 1 to 6 percent slopes	Not sensitive	Darnen (85%)		11.3	41.9%
			Lakepark (5%)			
			Barnes (5%)			
			Svea (3%)			
			Buse, moderately eroded (2%)			
W	Water	Not rated	Water (100%)		0.1	0.2%
Totals for Area of Interest					26.9	100.0%

Rating	Acres in AOI	Percent of AOI
Not sensitive	24.7	91.9%
Sensitive	2.1	7.8%
Null or Not Rated	0.1	0.2%
Totals for Area of Interest	26.9	100.0%

Rating Options—Aquifer Assessment (MN) (Proposed RV Park)

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Waste Management

Waste Management interpretations are tools designed to guide the user in evaluating soils for use of organic wastes and wastewater as productive resources. Example interpretations include land application of manure, food processing waste, and municipal sewage sludge, and disposal of wastewater by irrigation or overland flow process.

Sensitive Soils for Nutrient Management (MN) (Proposed RV Park)

This interpretation generates a soil sensitivity rating for nutrient management planning in Minnesota. Nutrient management plans are developed using the sensitive soil ratings classes. NRCS Conservation Practice Standard Nutrient Management (590) discusses nutrient management practices that should be used when sensitive soils are encountered. Careful planning is needed if manure or commercial fertilizers are applied. The physical properties and limitations of these soils can result in the leaching of nutrients downward beyond the root zone or the movement of nutrients toward surface waters.

The ratings are based on physical properties of the soils and on soil features. Soils that are sensitive to nutrient applications include soils on flood plains, coarse textured soils, soils that are shallow to bedrock, soils that have a high water table, soils that are ponded, and sloping soils.

The ratings are both verbal and numerical. Soils are assigned to rating classes based on their degree of risk. A "sensitive" rating (1.00) indicates that a soil is sensitive to runoff or leaching of nutrients if manure or commercial fertilizer is applied. A "not sensitive" (0.00) rating indicates that the soil is not sensitive to runoff or leaching.

The components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as the one shown for the map unit. The percent composition of each component in a particular map unit is given to help the user better understand the extent to which the rating applies to the map unit.

Other components with different ratings may occur in each map unit. The ratings for all components, regardless the aggregated rating of the map unit, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

References:

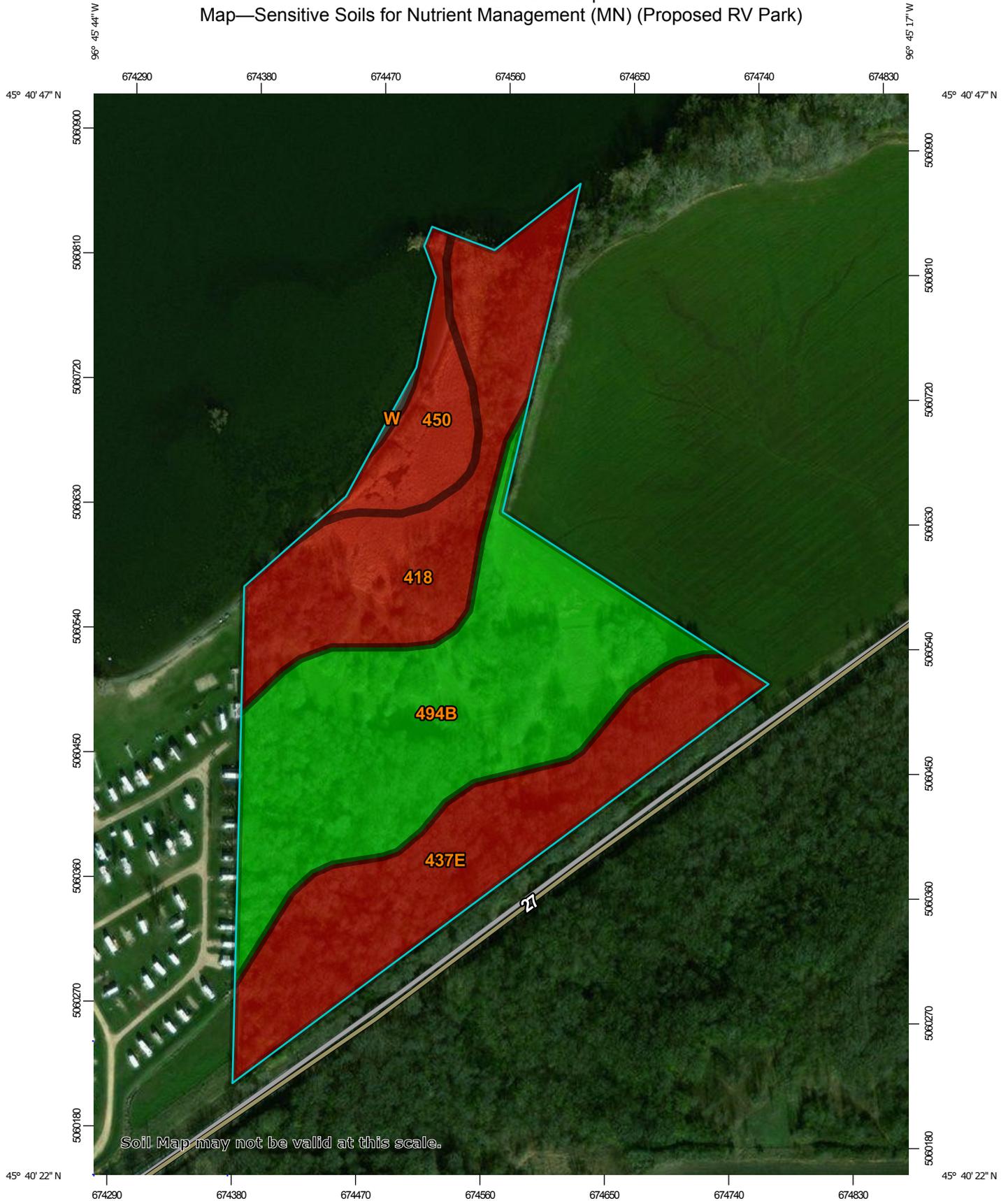
Custom Soil Resource Report

-Applying Manure in Sensitive Areas (Minnesota Pollution Control Agency and NRCS brochure on manure applications in sensitive areas) <http://www.pca.state.mn.us/publications/feedlots-manureapplication.pdf>

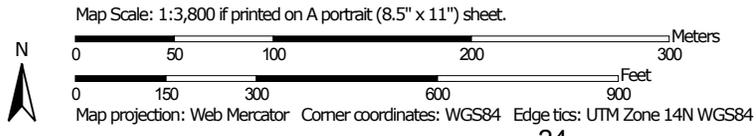
-Minnesota e-FOTG (Section II, County Soils Information, County, Waste Disposal Interpretations, Introduction to Waste Disposal Interpretations)

-NRCS Conservation Practice Standard Nutrient Management (590) discusses nutrient management practices that should be used when sensitive soils are encountered.

Custom Soil Resource Report
 Map—Sensitive Soils for Nutrient Management (MN) (Proposed RV Park)



Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

-  Sensitive
-  Not sensitive
-  Not rated or not available

Soil Rating Lines

-  Sensitive
-  Not sensitive
-  Not rated or not available

Soil Rating Points

-  Sensitive
-  Not sensitive
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Traverse County, Minnesota
 Survey Area Data: Version 13, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 22, 2013—Nov 14, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Custom Soil Resource Report

Tables—Sensitive Soils for Nutrient Management (MN) (Proposed RV Park)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
418	Lamoure silty clay loam, 0 to 2 percent slopes, occasionally flooded	Sensitive	Lamoure, occasionally flooded (80%)	Soil moisture (1.00)	6.5	24.2%
			Colvin, occasionally flooded (7%)	Soil moisture (1.00)		
			Rauville, frequently flooded (5%)	Flooding (1.00)		
				Ponding (1.00)		
437E	Langhei loam, 12 to 40 percent slopes	Sensitive	Langhei (80%)	Slope (1.00)	6.9	25.8%
			Barnes, moderately eroded (10%)	Slope (1.00)		
			Darnen (5%)	Slope (1.00)		
			Lakepark (3%)	Soil moisture (1.00)		
			Fordville (2%)	Coarse texture (1.00)		
				Slope (1.00)		
450	Rauville silty clay loam, 0 to 2 percent slopes, frequently flooded	Sensitive	Rauville, frequently flooded (80%)	Flooding (1.00)	2.1	7.8%
				Ponding (1.00)		
				Soil moisture (1.00)		
			Lamoure, occasionally flooded (8%)	Soil moisture (1.00)		
			Marysland, frequently flooded (7%)	Flooding (1.00)		
				Ponding (1.00)		
				Coarse texture (1.00)		
				Soil moisture (1.00)		
494B	Darnen loam, 1 to 6 percent slopes	Not sensitive	Darnen (85%)		11.3	41.9%
			Svea (3%)			
W	Water	Not rated	Water (100%)		0.1	0.2%
Totals for Area of Interest					26.9	100.0%

Rating	Acres in AOI	Percent of AOI
Sensitive	15.6	57.9%

Custom Soil Resource Report

Rating	Acres in AOI	Percent of AOI
Not sensitive	11.3	41.9%
Null or Not Rated	0.1	0.2%
Totals for Area of Interest	26.9	100.0%

Rating Options—Sensitive Soils for Nutrient Management (MN) (Proposed RV Park)

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Erosion Factors

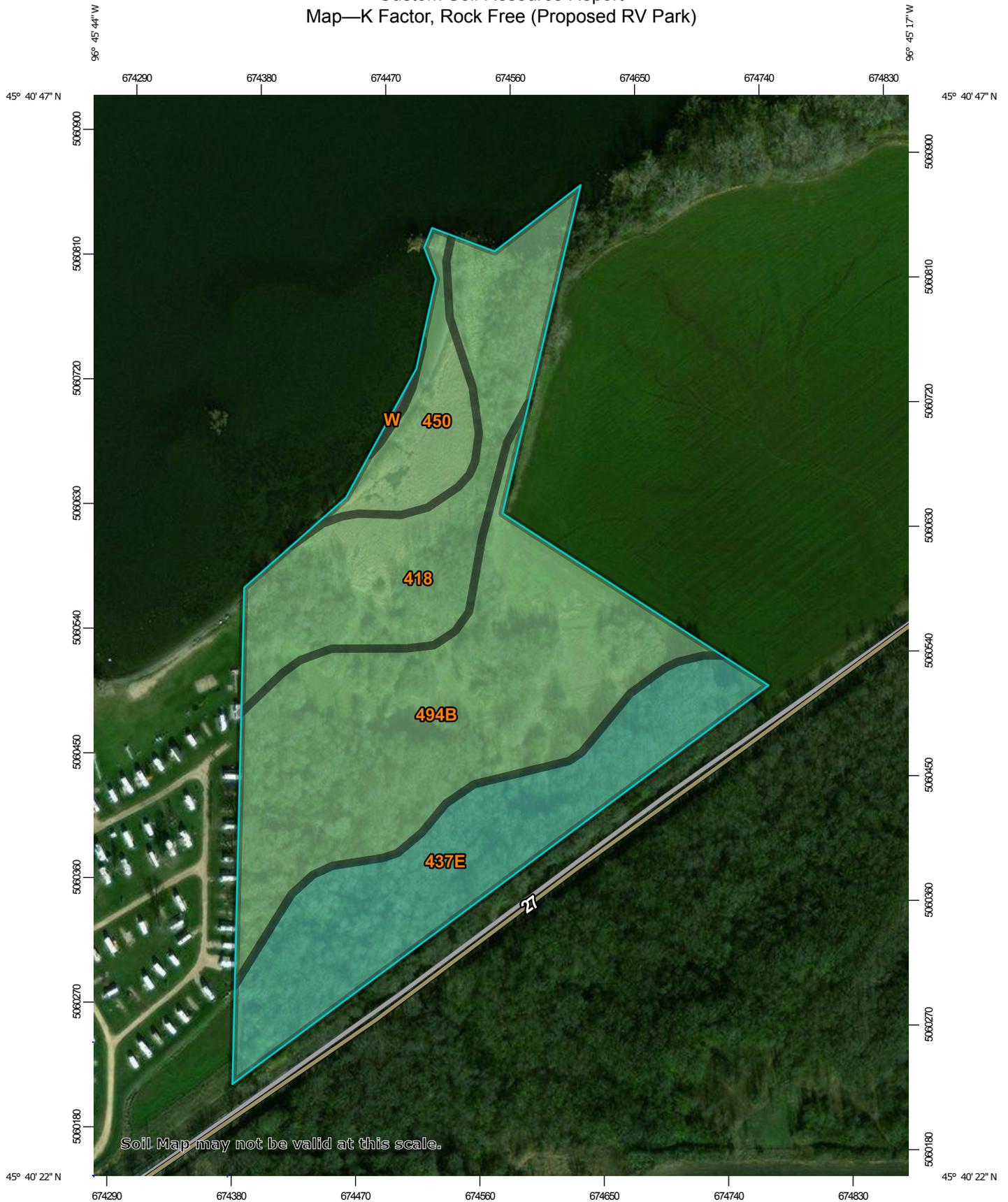
Soil Erosion Factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

K Factor, Rock Free (Proposed RV Park)

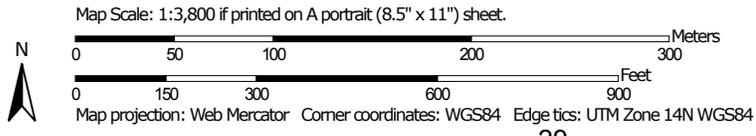
Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kf (rock free)" indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Custom Soil Resource Report
Map—K Factor, Rock Free (Proposed RV Park)



Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

-  .02
-  .05
-  .10
-  .15
-  .17
-  .20
-  .24
-  .28
-  .32
-  .37
-  .43
-  .49
-  .55
-  .64
-  Not rated or not available

Soil Rating Lines

-  .02
-  .05
-  .10
-  .15
-  .17
-  .20

-  .24
-  .28
-  .32
-  .37
-  .43
-  .49
-  .55
-  .64
-  Not rated or not available

Soil Rating Points

-  .02
-  .05
-  .10
-  .15
-  .17
-  .20
-  .24
-  .28
-  .32
-  .37
-  .43
-  .49
-  .55
-  .64
-  Not rated or not available

Water Features

-  Streams and Canals
- Transportation**
-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads
- Background**
-  Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Traverse County, Minnesota
 Survey Area Data: Version 13, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 22, 2013—Nov 14, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—K Factor, Rock Free (Proposed RV Park)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
418	Lamoure silty clay loam, 0 to 2 percent slopes, occasionally flooded	.28	6.5	24.2%
437E	Langhei loam, 12 to 40 percent slopes	.32	6.9	25.8%
450	Rauville silty clay loam, 0 to 2 percent slopes, frequently flooded	.28	2.1	7.8%
494B	Darnen loam, 1 to 6 percent slopes	.28	11.3	41.9%
W	Water		0.1	0.2%
Totals for Area of Interest			26.9	100.0%

Rating Options—K Factor, Rock Free (Proposed RV Park)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

References

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- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
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- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX C: DNR NATURAL HERITAGE REVIEW



Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

October 18, 2018

Correspondence # ERDB 20190120

Mr. Jason Kirwin
Environmental Scientific, LLC
46170 120th Street
Donnelly, MN 56235

RE: Natural Heritage Review of the proposed Lake Traverse RV Park,
T126N R48W Section 31; Traverse County

Dear Mr. Kirwin,

As requested, the Minnesota Natural Heritage Information System has been queried to determine if any rare species or other significant natural features are known to occur within an approximate one-mile radius of the proposed project. Based on this query, rare features have been documented within the search area. Please note that the following rare features may be adversely affected by the proposed project:

Ecologically Significant Areas

- Lake Traverse has been identified as a Lake of *High* Biological Significance. Lakes of Biological Significance were ranked as *Outstanding*, *High* or *Moderate* based on unique plant and animal presence. This particular lake was ranked based on its fish and bird populations. As such, it is important that deterioration of water quality is minimized and effective erosion prevention and sediment control practices are implemented and maintained throughout the duration of the project. Indirect impacts, such as the introduction or spread of invasive species, should also be considered and minimized.

Environmental Review and Permitting

- Please include a copy of this letter in any state or local license or permit application. Please note that measures to avoid or minimize disturbance to the above rare features may be included as restrictions or conditions in any required permits or licenses.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the

occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area. If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location (noted above) and the project description provided on the NHIS Data Request Form. Please contact me if project details change or for an updated review if construction has not occurred within one year.

The Natural Heritage Review does not constitute review or approval by the Department of Natural Resources as a whole. Instead, it identifies issues regarding known occurrences of rare features and potential effects to these rare features. If needed, please contact your [DNR Regional Environmental Assessment Ecologist](#) to determine whether there are other natural resource concerns associated with the proposed project. Please be aware that additional site assessments or review may be required.

Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources. An invoice will be mailed to you under separate cover.

Sincerely,

A handwritten signature in black ink that reads "Samantha Bump". The signature is written in a cursive, flowing style.

Samantha Bump
Natural Heritage Review Specialist
Samantha.Bump@state.mn.us

Links: Lakes of Biological Significance
ftp://ftp.gisdata.mn.gov/pub/gdrs/data/pub/us_mn_state_dnr/env_lakes_of_biological_signific/metadata/lakes_of_biological_significance_criteria_20150423.pdf
DNR Regional Environmental Assessment Ecologist Contact Info
http://www.dnr.state.mn.us/eco/ereview/erp_regioncontacts.html

Cc: Jaime Thibodeaux



October 4, 2018

Mr. Dan Binsfeld
Big Dog Development
29534 County Road 20
Paynesville, MN 56362

RE: Develop Lake Traverse RV Park
T126 R48 S31 SW
Windsor Twp., Traverse County
SHPO Number: 2018-3008

Dear Mr. Binsfeld:

Thank you for consulting with our office during the preparation of an Environmental Assessment Worksheet for the above referenced project.

Due to the nature and location of the proposed project, we recommend that a Phase I archaeological survey be completed. The survey must meet the requirements of the Secretary of the Interior's Standards for Identification and Evaluation, and should include an evaluation of National Register eligibility for any properties that are identified. For a list of consultants who have expressed an interest in undertaking such surveys, please visit the website preservationdirectory.mnhs.org, and select "Archaeologists" in the "Search by Specialties" box.

We will reconsider the need for survey if the project area can be documented as previously surveyed or disturbed. Any previous survey work must meet contemporary standards. **Note:** plowed areas and right-of-way are not automatically considered disturbed. Archaeological sites can remain intact beneath the plow zone and in undisturbed portions of the right-of-way.

Please note that this comment letter does not address the requirements of Section 106 of the National Historic Preservation Act of 1966 and 36 CFR § 800. If this project is considered for federal financial assistance, or requires a federal permit or license, then review and consultation with our office will need to be initiated by the lead federal agency. Be advised that comments and recommendations provided by our office for this state-level review may differ from findings and determinations made by the federal agency as part of review and consultation under Section 106.

If you have any questions regarding our review of this project, please contact our Environmental Review Program at (651) 201-3285.

Sincerely,

Sarah J. Beimers
Environmental Review Program Manager

APPENDIX E: WETLAND DELINEATION REPORT



Office (320) 589-9893
Cell (320) 349-0794
Email: jasonkirwin@gmail.com

July 30, 2018

Sara Gronfeld
Traverse County SWCD
304 4th Street North
Wheaton, MN 56296

RE: Wetland Delineation Report
Proposed RV Park (+/- 28.5 Acres) (Site)
31-126-48, Lake Traverse - Traverse County

Dear Ms. Gronfeld:

I. Executive Summary

Environmental Scientific (ES) was contracted by Dan Binsfeld to delineate and flag all wetland boundaries within the above referenced Site in Windsor Township (Figure 1). On July 24, 2018, Environmental Scientific examined the Site and identified two (2) wetlands that were delineated and flagged for surveying and planning purposes (Figure 2).

II. Wetland Determination/Delineation Methodology

The potential wetlands present within the above referenced Site were evaluated using the procedures described in the *MN Wetland Conservation Act*, the *Army Corps of Engineers (ACOE) Manual for Identifying and Delineating Wetlands, 1987 edition*, and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region*. This method utilizes the standard multi-parameter approach (vegetation, hydrology, and soils) for wetland identification as outlined in the Corps of Engineers Data Forms. In general, an area is considered a wetland if Hydrophytic Vegetation, Wetland Hydrology, and Hydric Soils are present.

All observations made during this delineation were documented on Wetland Determination Data Forms for the Midwest Region (Appendix A). Additional resources referenced for this delineation included: the USDA Custom Soil Resource Report (Appendix B), the U.S. Fish and Wildlife Service National Wetland Inventory (NWI) (Appendix C), the DNR Protected Waters

and Wetlands Map (Appendix D), and antecedent precipitation data from the Minnesota Climatology Working Group (Appendix E).

III. Site Research Results

The USDA Custom Soil Resource Report identified four (4) soil types within the Site boundary. The identified soil types were: 418 *Lamoure silty clay loam (0-2% slope)*, 437E *Langhei loam (12-40% slope)*, 450 *Rauville silty clay loam (0-2% slope)*, and 494B *Darnen loam (1-6% slope)*. The Natural Drainage Class for these soils include: *Well Drained* (437E & 494B), *Poorly Drained* (418), and *Very Poorly Drained* (450). The hydric rating for the identified soils is: 95% (450), 92% (418), 5% (494B), and 3% (437E). The complete Custom Soil Resource Report is included in Appendix B.

The delineated wetland was listed on the NWI Map as *Palustrine Forested Deciduous Seasonally Flooded Diked/Impounded* (PFO1Ch) (Appendix C). The identified wetlands were not found on the DNR Protected Waters List (Appendix D). The antecedent precipitation data for July 24th at the Site was considered *Dry* (score: 9), with the months of April and May being considered *Dry* and the month of June being considered *Normal* (Appendix E). This antecedent precipitation data was likely not representative of field conditions as it rained heavily the week prior to this delineation. In any event, the precipitation data was not considered a limitation for these findings and likely provided a snap-shot of spring-time hydrologic conditions in conjunction with a mid-summer vegetative state.

IV. Site Wetland Delineation Methods/Results

The Site has ample topography with reported slopes ranging between 0-40 percent. During the field examination of the entire Site, two (2) potential wetlands (W1 & W2) were identified. Wetland W1 covered the vast majority of the property closest to the Lake Traverse. Wetland W2 was a small wetland on the east side of the Site and consisted of a small stream running under Highway 27 and flowing west into the property where it eventually ended where all water soaked into the ground. Wetland W1 was considered *Type 6 Shrub Swamp* waterlogged to the surface for much of the growing season and dominated by shrubs including willows and dogwoods (Appendix F). Wetland W2 is considered a *Type 1 Seasonally Flooded Basin or Floodplain*, with vegetation varying by the season (Appendix F). Based on all field

observations, water levels in both wetlands appeared high for this time of year, or near a seasonal high. The source of wetland hydrology for Wetland W1 appeared to mainly be the apparent water table with a lesser contribution from seasonal run-off. The source of wetland hydrology for Wetland W2 appeared to solely be from seasonal the run-off channeled by the culvert under State Highway 27.

To confirm whether the suspected areas were indeed wetland, ES followed the ACOE procedure for identifying and delineating wetland boundaries by completing a Transect, consisting of multiple sampling points to evaluate the presence and/or absence of the required wetland parameters, and to identify the boundary between wetland and upland. For wetland W1, a Transect consisting of two (2) Sampling Points (T1) was completed across the suspected wetland boundary on the south side (Figure 2). The first Sampling Point (T1-1) was completed at elevation two (2) feet above the identified surface water elevation in Wetland W1. At T1-1, Hydrophytic Vegetation, Hydric Soils, and Wetland Hydrology were identified, confirming that the area was wetland. To define the boundary of this wetland, a second Sampling Point (T1-2) was completed at an elevation of two (2) feet higher than Sampling Point T1-1. At this Sampling Point, Hydrophytic Vegetation was identified, but Wetland Hydrology and Hydric Soils were not identified; thereby confirming that area was not considered wetland. The delineated wetland boundary was then defined between Sampling Points T1-1 and T1-2, and the entire wetland boundary for W1, as well as W2, were then flagged for subsequent surveying. Notable observations used to flag all wetland boundaries included surface elevation, depth to groundwater, hydric soils, and plant community observations consistent with those identified in the Transect (Appendix F). Detailed Wetland Data Forms for T1 were completed and outline all observations made during completion of the above referenced Transect (Appendix A). A Detailed Site Map with the approximate delineated wetland boundaries is included in the Report (Figure 2). The delineated wetlands are to be surveyed for future planning purposes (Appendix F).

V. Conclusion

A total of two (2) wetlands were identified, delineated, and flagged at the Site. Preliminary approval of the delineated boundary was granted by way of an on-site inspection by Sara Gronfeld (LGU) on July 24, 2018, with final approval pending review of this Wetland Delineation Report and/or acceptance of project plans.

This report outlines the professional observations and recommendations of Environmental Scientific. If you have any questions regarding this report, or would like additional information, please don't hesitate to contact me at (320) 589-9893.

Sincerely,



Morgan Kirwin
Environmental Technician

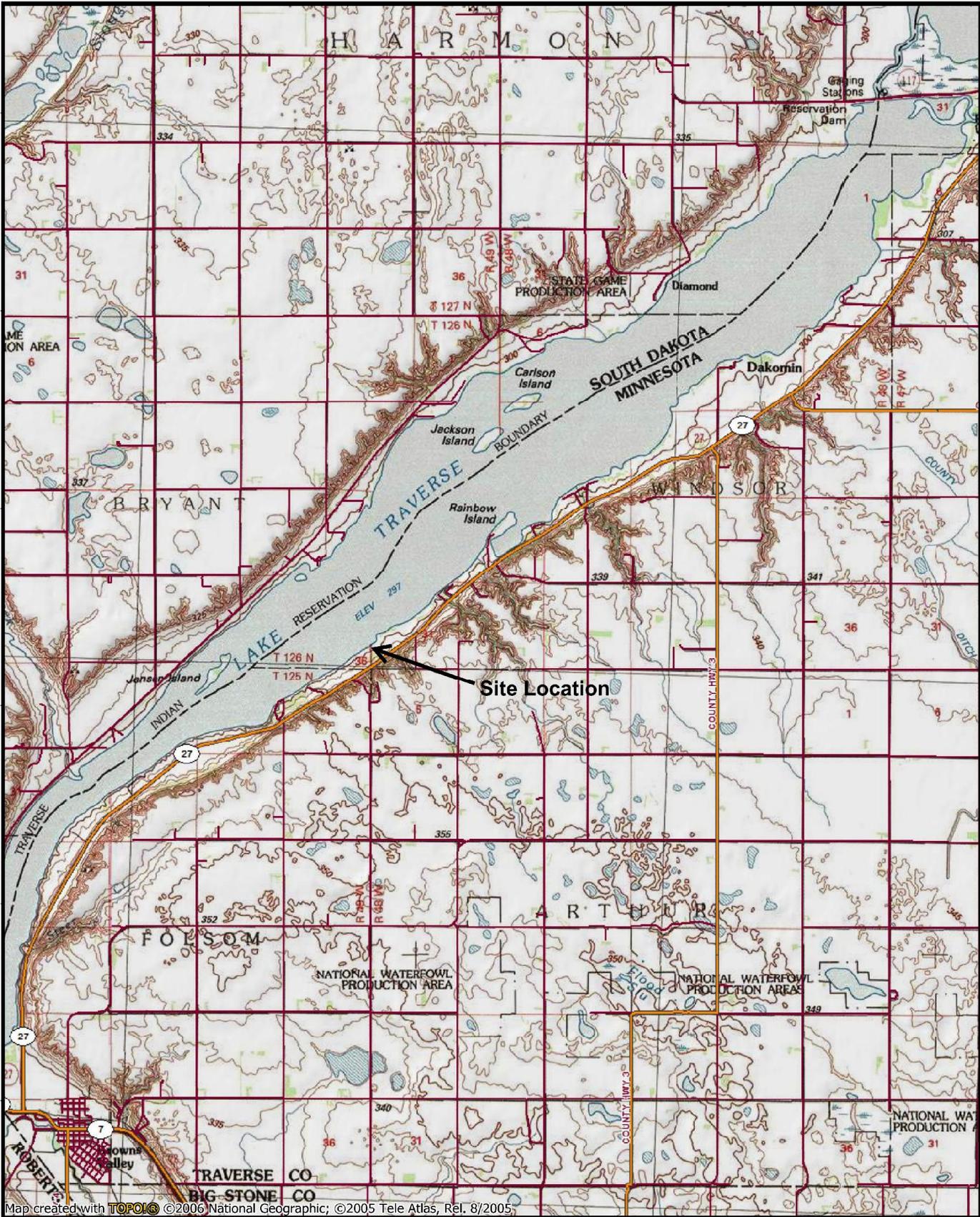


Jason Kirwin
President/Certified Wetland Delineator #1108

cc: Dan Binsfeld - Owner (e)
Ben O'Malley – Surveyor (e)

FIGURE 1

**Site Location Map
(USGS Topographic Map)**



Map created with **TOPOIC** ©2006 National Geographic; ©2005 Tele Atlas, Rel. 8/2005

**Figure 1: USGS Topographic Site Location Map
Traverse Lake RV Park
Traverse County, MN**

**ENVIRONMENTAL
SCIENTIFIC**

FIGURE 2

Detailed Site Map with Delineated Wetland Boundaries

PROPOSED R.V. PARK

Legend

- OK-BOUNDARY
- OK-GRAVEL-FIELD LINE
- OK-LOT-NEW

— Site Boundary
— Approximate Wetland Boundary
— Transect



Google Earth

© 2018 Google

800 ft



APPENDIX A

Wetland Data Forms

WETLAND DETERMINATION DATA FORM – Midwest Region

Project Site: **Traverse Lake RV Park** City/County: **Browns Valley/Traverse** Sampling Date: **7/24/18**
 Applicant/Owner: **Dan Binsfeld** State: **MN** Sampling Point: **T1-1**
 Investigator(s): **Jason Kirwin** Section, Township, Range: **31-126-48**
 Landform (hillslope, terrace, etc.): **Toe of Slope** Local relief (concave, convex, none): **Convex** Slope (%): **2%**
 Subregion (LRR): **Midwest** Lat: **45°40'35"N** Long: **96°45'36"W** Sampling Point Elevation: **102'** Datum: **100' (Water Level in Wetland)**
 Soil Map Unit Name: **418 – Lamoure Silty Clay Loam** NWI classification: **PFO1Ch**
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , Or Hydrology , significantly disturbed? No Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , Or Hydrology , naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampling Area within a Wetland?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Remarks:					

VEGETATION – Use scientific names of plants

<u>Tree Stratum</u> (Plot Size: 30')	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. Green Ash (<i>Fraxinus pennsylvanica</i>)	80%	Y	FACW	Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A) Total Number of Dominant Species Across All Strata: 4 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)
2.				
3.				
4.				
	80%	= Total Cover		Prevalence Index worksheet: NA Total % Cover of: Multiply by: OBL species x1 = FACW species x2 = FAC species x3 = FACU species x4 = UPL species x5 = Column Totals: (A) (B) Prevalence Index = B/A =
<u>Sapling/Shrub Stratum</u> (Plot Size: 15')				
1. European Buckthorn (<i>Rhamnus cathartica</i>)	70%	Y	FAC	
2. Fragrant Sumac (<i>Rhus aromatica</i>)	10%	N	UPL	
	80%	= Total Cover		
<u>Herb Stratum</u> (Plot Size 5':)				
1. Reed Canary Grass (<i>Phalaris arundinacea</i>)	70%	Y	FACW	Hydrophytic Vegetation Indicators: Prevalence Index is $\leq 3.0^1$ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present.
2. Common Milkweed (<i>Asclepias syriaca</i>)	5%	N	FACU	
3. Stinging Nettle (<i>Urtica dioica</i>)	5%	N	FACW	
	80%	= Total Cover		
<u>Woody Vine Stratum</u> (Plot Size 30':)				
1. Riverbank Grape (<i>Vitis vulpina</i>)	90%	Y	FACW	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2.				
	90%	= Total Cover		

Remarks: Completed point a little higher than normal. Thought water table would be higher. Very close to wetland edge.



SOIL

Sampling Point: **T1-1**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (Moist)	%	Type ¹	Loc ²		
0-14"	10YR 2/1						Clay Loam	
14-18"+	10YR 5/1						Clay Loam	

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:				Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/>	Histosol (A1)	<input type="checkbox"/>	Sandy Gleyed Matrix (S4)	<input type="checkbox"/>	Coast Prairie Redox (A16)
<input type="checkbox"/>	Histic Epipedon (A2)	<input type="checkbox"/>	Sandy Redox (S5)	<input type="checkbox"/>	Iron-Manganese Masses (F12)
<input type="checkbox"/>	Black Histic (A3)	<input type="checkbox"/>	Stripped Matrix (S6)	<input type="checkbox"/>	Other (Explain in Remarks)
<input type="checkbox"/>	Hydrogen Sulfide (A4)	<input type="checkbox"/>	Loamy Mucky Mineral (F1)		
<input type="checkbox"/>	Stratified Layers (A5)	<input type="checkbox"/>	Loamy Gleyed Matrix (F2)		
<input type="checkbox"/>	2 cm Muck (A10)	<input type="checkbox"/>	Depleted Matrix (F3)		
<input type="checkbox"/>	Depleted Below Dark Surface (A11)	<input type="checkbox"/>	Redox Dark Surface (F6)		
<input checked="" type="checkbox"/>	Thick Dark Surface (A12)	<input type="checkbox"/>	Depleted Dark Surface (F7)		
<input type="checkbox"/>	Sandy Mucky Mineral (S1)	<input type="checkbox"/>	Redox Depressions (F8)		
<input type="checkbox"/>	5 cm Mucky Peat or Peat (S3)				

³Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed of problematic.

Restrictive Layer (if present): Type: Depth (Inches):	Hydric Soils Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
--	--

Remarks:



HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
<input type="checkbox"/>	Surface Water (A1)	<input type="checkbox"/>	Water-Stained Leaves (B9)
<input type="checkbox"/>	High Water Table (A2)	<input type="checkbox"/>	Aquatic Fauna (B13)
<input checked="" type="checkbox"/>	Saturation (A3)	<input type="checkbox"/>	True Aquatic Plants (B14)
<input type="checkbox"/>	Water Marks (B1)	<input type="checkbox"/>	Hydrogen Sulfide Odor (C1)
<input type="checkbox"/>	Sediment Deposits (B2)	<input type="checkbox"/>	Oxidized Rhizospheres on Living Roots (C3)
<input type="checkbox"/>	Drift Deposits (B3)	<input type="checkbox"/>	Presence of Reduced Iron (C4)
<input type="checkbox"/>	Algal Mat or Crust (B4)	<input type="checkbox"/>	Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/>	Iron Deposits (B5)	<input type="checkbox"/>	Thin Muck Surface (C7)
<input type="checkbox"/>	Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/>	Gauge or Well Data (D9)
<input type="checkbox"/>	Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/>	Other (Explain in Remarks)
<input type="checkbox"/>		<input type="checkbox"/>	Surface Soil Cracks (B6)
		<input type="checkbox"/>	Drainage Patterns (B10)
		<input type="checkbox"/>	Dry-Season Water Table (C2)
		<input type="checkbox"/>	Crayfish Burrows (C8)
		<input type="checkbox"/>	Saturation Visible on Aerial Imagery (C9)
		<input type="checkbox"/>	Stunted or Stressed Plants (D1)
		<input type="checkbox"/>	Geomorphic Position (D2)
		<input checked="" type="checkbox"/>	FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present?	
Surface Water Present?	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>	Depth (inches):
Water Table Present?	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>	Depth (inches): 16"
Saturation Present? (includes capillary fringe)	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	Depth (inches): 12"
					Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: **After a 30 minute and 1.5 hour recharge period**

Remarks: **Rained 4 inches the Thursday before the delineation was completed. Therefore that conditions are probably considered wet for this time of year. The source of hydrology at this wetland appears to be from the apparent water table as any runoff from higher ground to the east does not reach Lake Traverse.**

WETLAND DETERMINATION DATA FORM – Midwest Region

Project Site: **Traverse Lake RV Park** City/County: **Browns Valley/Traverse** Sampling Date: **7/24/18**
 Applicant/Owner: **Dan Binsfeld** State: **MN** Sampling Point: **T1-2**
 Investigator(s): **Jason Kirwin** Section, Township, Range: **31-126-48**
 Landform (hillslope, terrace, etc.): **Shoulder of Slope** Local relief (concave, convex, none): **Convex** Slope (%): **3%**
 Subregion (LRR): **Midwest** Lat: **45°30'35"N** Long: **96°45'35"W** Sampling Point Elevation: **104'** Datum: **100' (Water Level in Wetland)**
 Soil Map Unit Name: **418 – Lamoure Silty Clay Loam** NWI classification: **None**
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , Or Hydrology , significantly disturbed? No Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , Or Hydrology , naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampling Area within a Wetland?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>		Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>		Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>

Remarks: It rained approximately 4 inches 5 days prior to this delineation, therefore it was wetter than your typical July delineation. This Sample Point was completed at an elevation approximately 2 feet higher than T1-1 on the edge of a slight topographic ridge which runs parallel to the lake edge. This ridge was utilized as a major factor in the flagging of the entire wetland boundary.

VEGETATION – Use scientific names of plants

<u>Tree Stratum</u> (Plot Size: 30')	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:																
1. Green Ash (<i>Fraxinus pennsylvanica</i>)	90%	Y	FACW	Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A) Total Number of Dominant Species Across All Strata: 3 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)																
2.																				
3.																				
4.																				
	90%	= Total Cover		Prevalence Index worksheet: NA <table style="width: 100%; border: none;"> <tr> <td style="text-align: right;"><u>Total % Cover of:</u></td> <td style="text-align: left;"><u>Multiply by:</u></td> </tr> <tr> <td>OBL species</td> <td>x1 =</td> </tr> <tr> <td>FACW species</td> <td>x2 =</td> </tr> <tr> <td>FAC species</td> <td>x3 =</td> </tr> <tr> <td>FACU species</td> <td>x4 =</td> </tr> <tr> <td>UPL species</td> <td>x5 =</td> </tr> <tr> <td>Column Totals:</td> <td>(A) (B)</td> </tr> <tr> <td colspan="2" style="text-align: center;">Prevalence Index = B/A =</td> </tr> </table>	<u>Total % Cover of:</u>	<u>Multiply by:</u>	OBL species	x1 =	FACW species	x2 =	FAC species	x3 =	FACU species	x4 =	UPL species	x5 =	Column Totals:	(A) (B)	Prevalence Index = B/A =	
<u>Total % Cover of:</u>	<u>Multiply by:</u>																			
OBL species	x1 =																			
FACW species	x2 =																			
FAC species	x3 =																			
FACU species	x4 =																			
UPL species	x5 =																			
Column Totals:	(A) (B)																			
Prevalence Index = B/A =																				
<u>Sapling/Shrub Stratum</u> (Plot Size: 15')																				
1. European Buckthorn (<i>Rhamnus cathartica</i>)	95%	Y	FAC																	
2.																				
3.																				
4.																				
	95%	= Total Cover																		
<u>Herb Stratum</u> (Plot Size 5':)																				
1. Smooth Brome (<i>Bromus inermis</i>)	80%	Y	FACU																	
2.																				
3.																				
	80%	= Total Cover																		
<u>Woody Vine Stratum</u> (Plot Size 30':)																				
1.																				
	= Total Cover																			

Remarks:



SOIL Sampling Point: T1-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (Moist)	%	Type ¹	Loc ²		
0-28"	10YR 2/1						Clay Loam	
28-36"+	10YR 5/3						Clay Loam	

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:				Indicators for Problematic Hydric Soils ³ :			
<input type="checkbox"/>	Histosol (A1)	<input type="checkbox"/>	Sandy Gleyed Matrix (S4)	<input type="checkbox"/>	Coast Prairie Redox (A16)	<input type="checkbox"/>	Iron-Manganese Masses (F12)
<input type="checkbox"/>	Histic Epipedon (A2)	<input type="checkbox"/>	Sandy Redox (S5)	<input type="checkbox"/>	Other (Explain in Remarks)		
<input type="checkbox"/>	Black Histic (A3)	<input type="checkbox"/>	Stripped Matrix (S6)				
<input type="checkbox"/>	Hydrogen Sulfide (A4)	<input type="checkbox"/>	Loamy Mucky Mineral (F1)				
<input type="checkbox"/>	Stratified Layers (A5)	<input type="checkbox"/>	Loamy Gleyed Matrix (F2)				
<input type="checkbox"/>	2 cm Muck (A10)	<input type="checkbox"/>	Depleted Matrix (F3)				
<input type="checkbox"/>	Depleted Below Dark Surface (A11)	<input type="checkbox"/>	Redox Dark Surface (F6)				
<input type="checkbox"/>	Thick Dark Surface (A12)	<input type="checkbox"/>	Depleted Dark Surface (F7)				
<input type="checkbox"/>	Sandy Mucky Mineral (S1)	<input type="checkbox"/>	Redox Depressions (F8)				
<input type="checkbox"/>	5 cm Mucky Peat or Peat (S3)						

³Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed of problematic.

Restrictive Layer (if present): Type: Depth (Inches):	Hydric Soils Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
--	--

Remarks:



HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
<input type="checkbox"/>	Surface Water (A1)	<input type="checkbox"/>	Water-Stained Leaves (B9)
<input type="checkbox"/>	High Water Table (A2)	<input type="checkbox"/>	Aquatic Fauna (B13)
<input type="checkbox"/>	Saturation (A3)	<input type="checkbox"/>	True Aquatic Plants (B14)
<input type="checkbox"/>	Water Marks (B1)	<input type="checkbox"/>	Hydrogen Sulfide Odor (C1)
<input type="checkbox"/>	Sediment Deposits (B2)	<input type="checkbox"/>	Oxidized Rhizospheres on Living Roots (C3)
<input type="checkbox"/>	Drift Deposits (B3)	<input type="checkbox"/>	Presence of Reduced Iron (C4)
<input type="checkbox"/>	Algal Mat or Crust (B4)	<input type="checkbox"/>	Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/>	Iron Deposits (B5)	<input type="checkbox"/>	Thin Muck Surface (C7)
<input type="checkbox"/>	Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/>	Gauge or Well Data (D9)
<input type="checkbox"/>	Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/>	Other (Explain in Remarks)

Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): 33" Saturation Present? (includes capillary fringe) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches):	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: **WT checked after 30 minutes (>36") and 1.5 hour recharge period (33").**

Remarks:



APPENDIX B

Custom Soil Resource Report



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Traverse County, Minnesota**



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

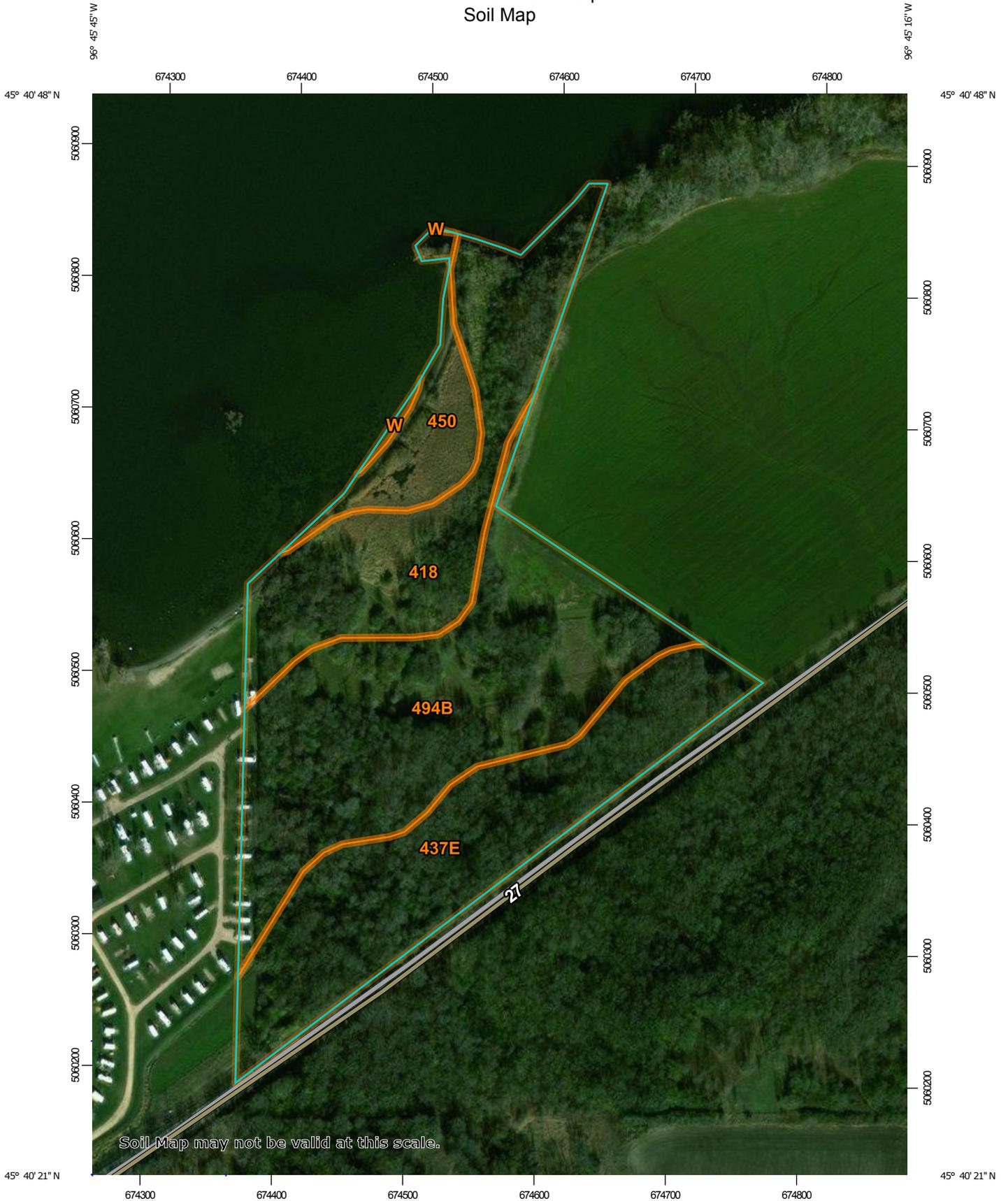
Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Scale: 1:4,000 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Traverse County, Minnesota
 Survey Area Data: Version 12, Oct 4, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 22, 2013—Nov 14, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
418	Lamoure silty clay loam, 0 to 2 percent slopes, occasionally flooded	7.2	24.5%
437E	Langhei loam, 12 to 40 percent slopes	8.5	28.7%
450	Rauville silty clay loam, 0 to 2 percent slopes, frequently flooded	2.2	7.4%
494B	Darnen loam, 1 to 6 percent slopes	11.5	39.2%
W	Water	0.1	0.3%
Totals for Area of Interest		29.5	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

Custom Soil Resource Report

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Traverse County, Minnesota

418—Lamoure silty clay loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2w0mn
Elevation: 920 to 2,130 feet
Mean annual precipitation: 22 to 31 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Lamoure, occasionally flooded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lamoure, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

Ap - 0 to 8 inches: silty clay loam
A - 8 to 36 inches: silty clay loam
BCg - 36 to 52 inches: silty clay loam
Cg - 52 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: About 0 to 8 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 3.0
Available water storage in profile: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: Linear Meadow (R102AY002SD)
Forage suitability group: Subirrigated (G102AY700SD)
Hydric soil rating: Yes

Minor Components

La prairie, occasionally flooded

Percent of map unit: 8 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy Overflow (R102AY020SD)
Hydric soil rating: No

Colvin, occasionally flooded

Percent of map unit: 7 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Limy Subirrigated (R102AY006SD)
Hydric soil rating: Yes

Rauville, frequently flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Linear Meadow (R102AY002SD)
Hydric soil rating: Yes

437E—Langhei loam, 12 to 40 percent slopes

Map Unit Setting

National map unit symbol: 2w0m1
Elevation: 920 to 2,130 feet
Mean annual precipitation: 22 to 31 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Langhei and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Langhei

Setting

Landform: Moraines
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope

Custom Soil Resource Report

Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Fine-loamy till

Typical profile

Ap - 0 to 6 inches: loam
Bk - 6 to 15 inches: loam
C1 - 15 to 60 inches: loam
C2 - 60 to 79 inches: loam

Properties and qualities

Slope: 12 to 40 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: Thin Loamy (R102AY012SD)
Forage suitability group: Not suited (G102AY000SD)
Hydric soil rating: No

Minor Components

Barnes, moderately eroded

Percent of map unit: 10 percent
Landform: Moraines
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Linear
Ecological site: Loamy (R102AY010SD)
Hydric soil rating: No

Darnen

Percent of map unit: 5 percent
Landform: Moraines
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: Loamy (R102AY010SD)
Hydric soil rating: No

Lakepark

Percent of map unit: 3 percent

Custom Soil Resource Report

Landform: Moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Linear Meadow (R102AY002SD)
Hydric soil rating: Yes

Fordville

Percent of map unit: 2 percent
Landform: Moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Loamy (R102AY010SD)
Hydric soil rating: No

450—Rauville silty clay loam, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2w0ms
Elevation: 920 to 2,130 feet
Mean annual precipitation: 22 to 31 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Rauville, frequently flooded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rauville, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy alluvium over sandy and gravelly alluvium

Typical profile

A - 0 to 27 inches: silty clay loam
Cg1 - 27 to 61 inches: silty clay loam
2Cg2 - 61 to 79 inches: gravelly sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 2.00 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: Frequent

Frequency of ponding: Frequent

Calcium carbonate, maximum in profile: 40 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0
mmhos/cm)

Sodium adsorption ratio, maximum in profile: 3.0

Available water storage in profile: High (about 11.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: C/D

Ecological site: Shallow Marsh (R102AY001SD)

Forage suitability group: Not suited (G102AY000SD)

Hydric soil rating: Yes

Minor Components

Lamoure, occasionally flooded

Percent of map unit: 8 percent

Landform: Flood plains

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Linear Meadow (R102AY002SD)

Hydric soil rating: Yes

Marysland, frequently flooded

Percent of map unit: 7 percent

Landform: Flood plains

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Linear

Ecological site: Linear Meadow (R102AY002SD)

Hydric soil rating: Yes

La prairie

Percent of map unit: 5 percent

Landform: Flood plains

Landform position (three-dimensional): Rise

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: Loamy Overflow (R102AY020SD)

Hydric soil rating: No

494B—Darnen loam, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2w8fk
Elevation: 920 to 2,130 feet
Mean annual precipitation: 22 to 31 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 120 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Darnen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Darnen

Setting

Landform: Moraines
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-loamy colluvium

Typical profile

Ap - 0 to 8 inches: loam
A - 8 to 24 inches: loam
AB - 24 to 29 inches: loam
Bw1 - 29 to 34 inches: loam
Bw2 - 34 to 79 inches: loam

Properties and qualities

Slope: 1 to 6 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 47 to 59 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e

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Hydrologic Soil Group: B
Ecological site: Loamy Overflow (R102AY020SD)
Forage suitability group: Loam (G102AY100SD)
Hydric soil rating: No

Minor Components

Lakepark

Percent of map unit: 5 percent
Landform: Moraines
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Linear Meadow (R102AY002SD)
Hydric soil rating: Yes

Barnes

Percent of map unit: 5 percent
Landform: Moraines
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Linear
Ecological site: Loamy (R102AY010SD)
Hydric soil rating: No

Svea

Percent of map unit: 3 percent
Landform: Moraines
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Loamy (R102AY010SD)
Hydric soil rating: No

Buse, moderately eroded

Percent of map unit: 2 percent
Landform: Moraines
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Thin Loamy (R102AY012SD)
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Rating by Map Unit (Traverse RV Park)

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

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Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

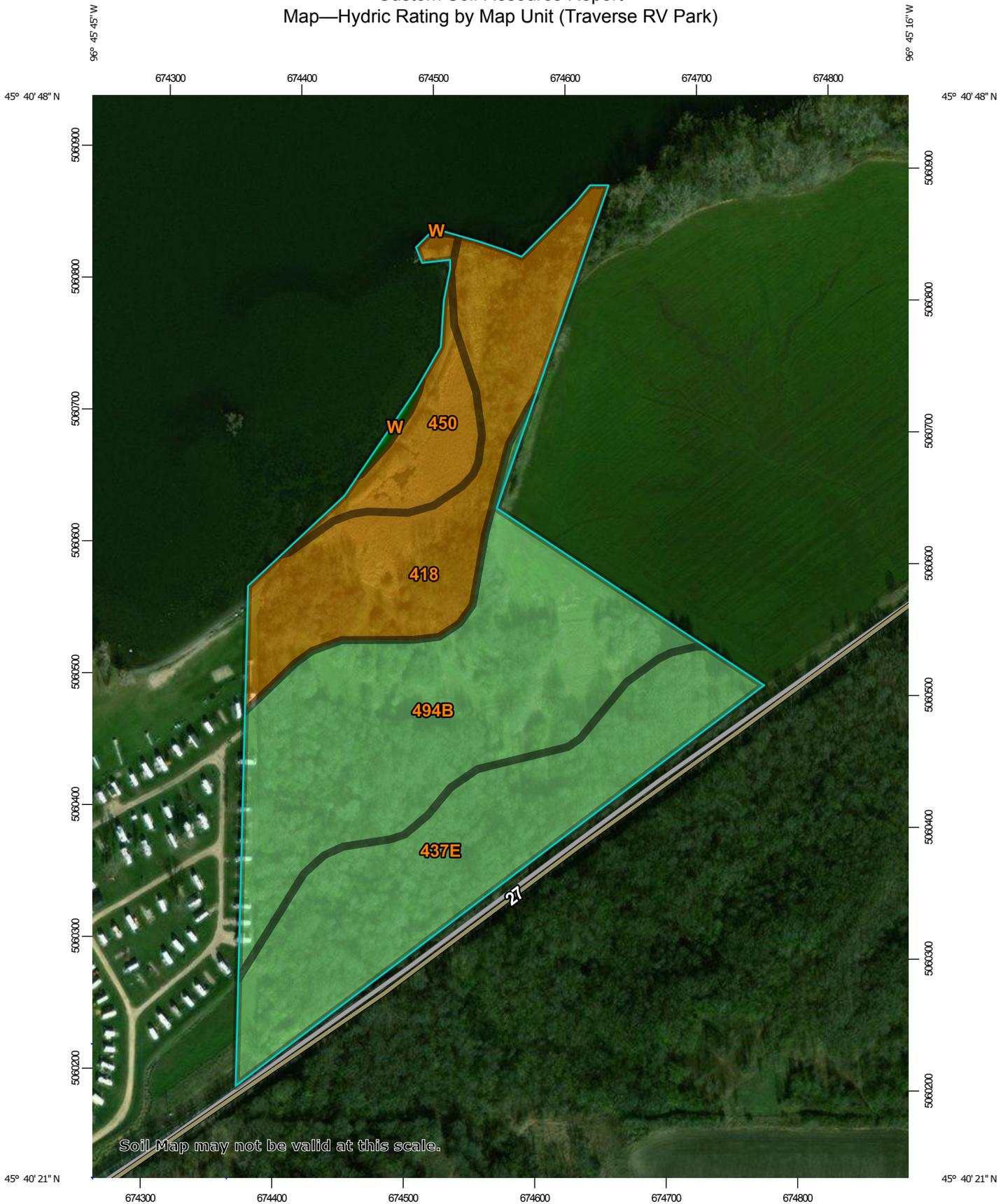
Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

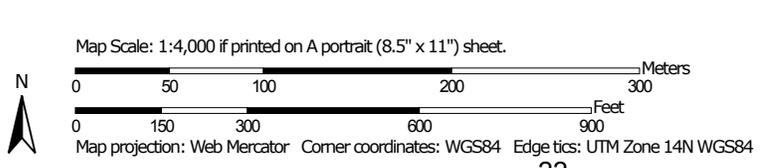
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Map—Hydric Rating by Map Unit (Traverse RV Park)



Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

-  Hydric (100%)
-  Hydric (66 to 99%)
-  Hydric (33 to 65%)
-  Hydric (1 to 32%)
-  Not Hydric (0%)
-  Not rated or not available

Soil Rating Lines

-  Hydric (100%)
-  Hydric (66 to 99%)
-  Hydric (33 to 65%)
-  Hydric (1 to 32%)
-  Not Hydric (0%)
-  Not rated or not available

Soil Rating Points

-  Hydric (100%)
-  Hydric (66 to 99%)
-  Hydric (33 to 65%)
-  Hydric (1 to 32%)
-  Not Hydric (0%)
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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Please rely on the bar scale on each map sheet for map measurements.

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 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

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Soil Survey Area: Traverse County, Minnesota
 Survey Area Data: Version 12, Oct 4, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 22, 2013—Nov 14, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydric Rating by Map Unit (Traverse RV Park)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
418	Lamoure silty clay loam, 0 to 2 percent slopes, occasionally flooded	92	7.2	24.5%
437E	Langhei loam, 12 to 40 percent slopes	3	8.5	28.7%
450	Rauville silty clay loam, 0 to 2 percent slopes, frequently flooded	95	2.2	7.4%
494B	Darnen loam, 1 to 6 percent slopes	5	11.5	39.2%
W	Water	0	0.1	0.3%
Totals for Area of Interest			29.5	100.0%

Rating Options—Hydric Rating by Map Unit (Traverse RV Park)

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

References

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United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX C

National Wetlands Inventory Map



U.S. Fish and Wildlife Service
National Wetlands Inventory

Traverse RV Park



U.S. Fish and Wildlife Service
wetlands_team

July 9, 2018

Wetlands

- | | | |
|--|---|--|
|  Estuarine and Marine Deepwater |  Freshwater Emergent Wetland |  Lake |
|  Estuarine and Marine Wetland |  Freshwater Forested/Shrub Wetland |  Other |
| |  Freshwater Pond |  Riverine |

This map is for informational purposes only. The U.S. Fish and Wildlife Service is not responsible for any errors or omissions in the base data shown. This map should not be used in any legal proceeding. Wetlands Map

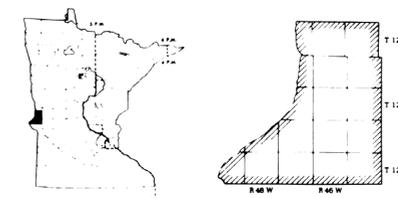
APPENDIX D

DNR Protected Waters Map

PROTECTED WATERS AND WETLANDS

TRAVERSE COUNTY MINNESOTA

SHEET 1 of 1



LEGEND

- Protected Waters:**
- Basins are identified with a number and the letter "P".
 - Watercourses are identified with a heavy, dark line.
 - Public ditches are identified with a dashed line.

- Protected Wetlands:**
- Identified with a number and the letter "W".

This map is intended for use with a separate descriptive list. The boundaries of the protected water bodies shown on this map are plotted as accurately as possible, consistent with the map scale, but are still approximate. A protected water body boundary coincides with the ordinary high water mark of the water body as defined in Minnesota Statutes, Section 105.37 and is determined through DNR field inspection or survey.

Protected waters and wetlands are subject to Minnesota Statutes, Section 105.42, which requires that a permit be obtained before making any alteration in the course, current or cross-section of these waters. Contact the DNR office in your area for further information.

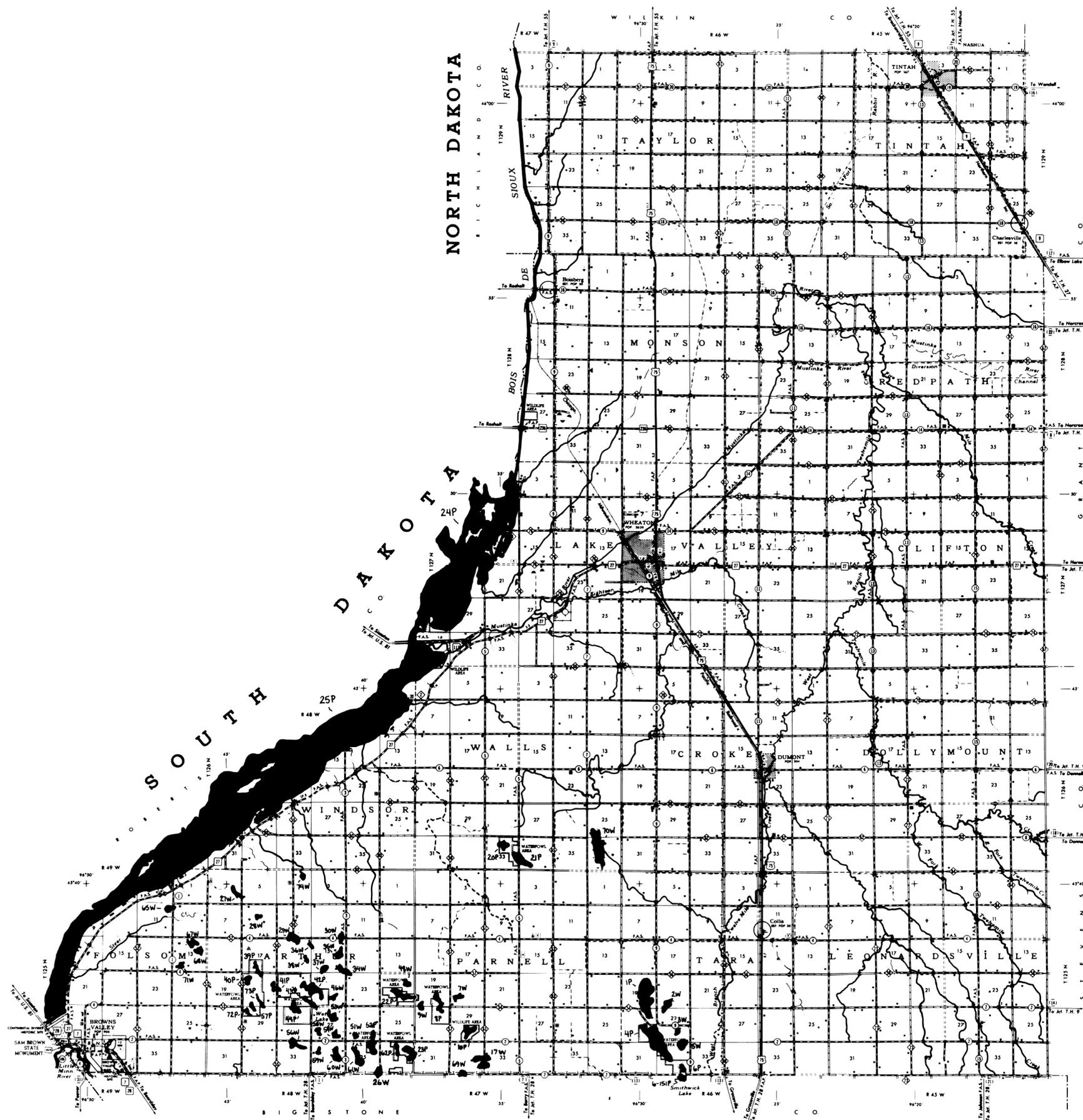
Trespass

The designation and mapping of protected waters or wetlands **does not** entitle anyone to cross private land in order to gain access to the water. Please respect the property of others.

Water Bank

Wetland owners may be eligible for compensation for preservation of protected wetlands. Contact the DNR office in your area for further information.

SCALE: 1/2" = 1 MILE



APPENDIX E

Precipitation Data

Minnesota State Climatology Office

State Climatology Office - DNR Division of Ecological and Water Resources

University of Minnesota

home | current conditions | journal | past data | summaries | agriculture | other sites | about us 

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:

county: **Traverse** township number: **126N**
 township name: **Windsor (east)** range number: **48W**
 nearest community: **Dakomin** section number: **31**

Aerial photograph or site visit date:

Tuesday, July 24, 2018

Score using 1981-2010 normal period

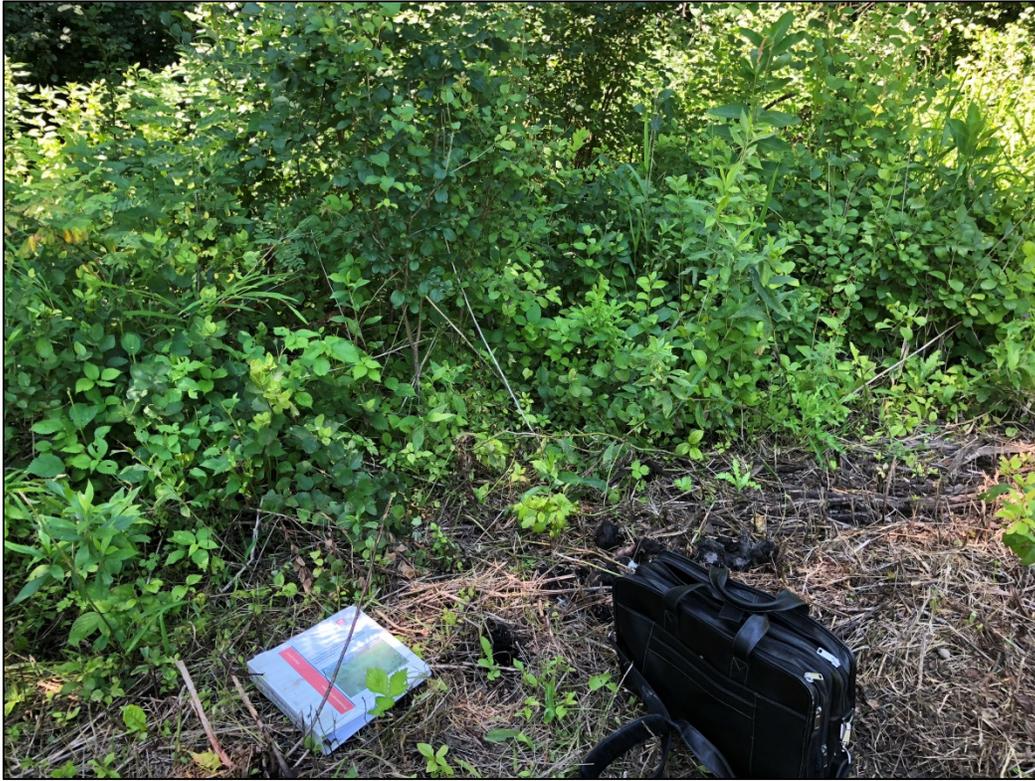
values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: June 2018	second prior month: May 2018	third prior month: April 2018
estimated precipitation total for this location:	3.26R	1.73R	0.63R
there is a 30% chance this location will have less than:	2.36	1.81	1.30
there is a 30% chance this location will have more than:	4.49	3.11	2.70
type of month: dry normal wet	normal	dry	dry
monthly score	3 * 2 = 6	2 * 1 = 2	1 * 1 = 1
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	9 (Dry)		

Other Resources:

- [retrieve daily precipitation data](#)
- [view radar-based precipitation estimates](#)
- [view weekly precipitation maps](#)
- [Evaluating Antecedent Precipitation Conditions](#) (BWSR)

APPENDIX F

Site Photographs



Photograph 1: Sample Point T1-1



Photograph 2: Hydric Soils at T1-1



Photograph 3: Typical Vegetation at T1-1



Photograph 4: Sample Point T1-2



Photograph 5: Soils at Sample Point T1-2



Photograph 6: Typical Vegetation at Sample Point T1-2



Photograph 7: Flagged Wetland Boundary in Mowed Area facing North



Photograph 8: Flagged Wetland Boundary in Wooded Area along Game Trail



Photograph 9: Flagged Wetland Boundary in Wooded Area facing North



Photograph 10: Flagged Stream Boundary Entering Site beneath Hwy 27 facing East



Photograph 11: Flagged Stream Boundary facing South



Photograph 12: Flagged Wetland where Stream Ends facing East

APPENDIX F: WETLAND DELINEATION APPROVAL

Minnesota Wetland Conservation Act Notice of Decision

Local Government Unit (LGU) Traverse County	Address 304 4th Street North Wheaton, MN 56296
---	---

1. PROJECT INFORMATION

Applicant Name Dan Binsfeld	Project Name RV Park Expansion	Date of Application 8/3/2018	Application Number 2018-01
---------------------------------------	--	--	--------------------------------------

Attach site locator map.

Type of Decision:

<input checked="" type="checkbox"/> Wetland Boundary or Type Sequencing	<input type="checkbox"/> No-Loss	<input type="checkbox"/> Exemption	<input type="checkbox"/>
<input type="checkbox"/> Replacement Plan	<input type="checkbox"/> Banking Plan		

Technical Evaluation Panel Findings and Recommendation (if any):

<input checked="" type="checkbox"/> Approve	<input type="checkbox"/> Approve with conditions	<input type="checkbox"/> Deny
Summary (or attach):		

2. LOCAL GOVERNMENT UNIT DECISION

Date of Decision: September 5, 2018		
<input checked="" type="checkbox"/> Approved Denied	<input type="checkbox"/> Approved with conditions (include below)	<input type="checkbox"/>

LGU Findings and Conclusions (attach additional sheets as necessary):

For Replacement Plans using credits from the State Wetland Bank:

Bank Account #	Bank Service Area	County	Credits Approved for Withdrawal (sq. ft. or nearest .01 acre)
----------------	-------------------	--------	---

Replacement Plan Approval Conditions. In addition to any conditions specified by the LGU, the approval of a Wetland Replacement Plan is conditional upon the following:

- Financial Assurance:** For project-specific replacement that is not in-advance, a financial assurance specified by the LGU must be submitted to the LGU in accordance with MN Rule 8420.0522, Subp. 9 (List amount and type in LGU Findings).
- Deed Recording:** For project-specific replacement, evidence must be provided to the LGU that the BWSR “Declaration of Restrictions and Covenants” and “Consent to Replacement Wetland” forms have been filed with the county recorder’s office in which the replacement wetland is located.
- Credit Withdrawal:** For replacement consisting of wetland bank credits, confirmation that BWSR has withdrawn the credits from the state wetland bank as specified in the approved replacement plan.

Wetlands may not be impacted until all applicable conditions have been met!

LGU Authorized Signature:

Signing and mailing of this completed form to the appropriate recipients in accordance with 8420.0255, Subp. 5 provides notice that a decision was made by the LGU under the Wetland Conservation Act as specified above. If additional details on the decision exist, they have been provided to the landowner and are available from the LGU upon request.

Name Sara Gronfeld	Title Traverse County Wetland Conservation Act Administrator	
Signature <i>Sara Gronfeld</i>	Date 10/5/2018	Phone Number and E-mail 320-563-8218 sara.gronfeld@mn.nacdnet.net

THIS DECISION ONLY APPLIES TO THE MINNESOTA WETLAND CONSERVATION ACT. Additional approvals or permits from local, state, and federal agencies may be required. Check with all appropriate authorities before commencing work in or near wetlands.

Applicants proceed at their own risk if work authorized by this decision is started before the time period for appeal (30 days) has expired. If this decision is reversed or revised under appeal, the applicant may be responsible for restoring or replacing all wetland impacts.

This decision is valid for three years from the date of decision unless a longer period is advised by the TEP and specified in this notice of decision.

3. APPEAL OF THIS DECISION

Pursuant to MN Rule 8420.0905, any appeal of this decision can only be commenced by mailing a petition for appeal, including applicable fee, within thirty (30) calendar days of the date of the mailing of this Notice to the following as indicated:

Check one:

<input checked="" type="checkbox"/> Appeal of an LGU staff decision. Send petition and \$ <u>n/a</u> fee (if applicable) to: Traverse County Coordinator, Lisa Siegel	<input type="checkbox"/> Appeal of LGU governing body decision. Send petition and \$500 filing fee to: Executive Director Minnesota Board of Water and Soil Resources 520 Lafayette Road North St. Paul, MN 55155
---	---

Applicants proceed at their own risk if work authorized by this decision is started before the time period for appeal (30 days) has expired. If this decision is reversed or revised under appeal, the applicant may be responsible for restoring or replacing all wetland impacts.

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Check one:

<input checked="" type="checkbox"/> Appeal of an LGU staff decision. Send petition and \$n/a fee (if applicable) to: Traverse County Coordinator, Lisa Siegel	<input type="checkbox"/> Appeal of LGU governing body decision. Send petition and \$500 filing fee to: Executive Director Minnesota Board of Water and Soil Resources 520 Lafayette Road North St. Paul, MN 55155
--	---

4. LIST OF ADDRESSEES

<input checked="" type="checkbox"/> SWCD TEP member: Sara Gronfeld <input checked="" type="checkbox"/> BWSR TEP member: Lynda Ponting <input checked="" type="checkbox"/> LGU TEP member (if different than LGU Contact): David Salberg <input checked="" type="checkbox"/> DNR TEP member: Julie Aadland <input type="checkbox"/> DNR Regional Office (if different than DNR TEP member) <input checked="" type="checkbox"/> WD or WMO (if applicable): Jamie Beyer, Bois de Sioux Watershed District Administrator <input checked="" type="checkbox"/> Applicant and Landowner (if different) <input checked="" type="checkbox"/> Members of the public who requested notice: Bruce Freske, USFWS <input checked="" type="checkbox"/> Corps of Engineers Project Manager <input type="checkbox"/> BWSR Wetland Bank Coordinator (wetland bank plan decisions only)
--

5. MAILING INFORMATION

➤ For a list of BWSR TEP representatives: www.bwsr.state.mn.us/aboutbwsr/workareas/WCA_areas.pdf

➤ For a list of DNR TEP representatives: www.bwsr.state.mn.us/wetlands/wca/DNR_TEP_contacts.pdf

➤ Department of Natural Resources Regional Offices:

NW Region: Reg. Env. Assess. Ecol. Div. Ecol. Resources 2115 Birchmont Beach Rd. NE Bemidji, MN 56601	NE Region: Reg. Env. Assess. Ecol. Div. Ecol. Resources 1201 E. Hwy. 2 Grand Rapids, MN 55744	Central Region: Reg. Env. Assess. Ecol. Div. Ecol. Resources 1200 Warner Road St. Paul, MN 55106	Southern Region: Reg. Env. Assess. Ecol. Div. Ecol. Resources 261 Hwy. 15 South New Ulm, MN 56073
---	---	--	--

For a map of DNR Administrative Regions, see: http://files.dnr.state.mn.us/aboutdnr/dnr_regions.pdf

➤ For a list of Corps of Project Managers: www.mvp.usace.army.mil/regulatory/default.asp?pageid=687 or send to:

US Army Corps of Engineers
 St. Paul District, ATTN: OP-R
 180 Fifth St. East, Suite 700
 St. Paul, MN 55101-1678

Specification & Documents

Collection Sewer Treatment System Report

Big Dog Development

Owner:

Dan Binsfield
29534 County Road 20
Paynesville, MN 56362

Legal Description:

NA
Sec 31 Twp 126 R 48
NA
Traverse County
Windsor

Design Overview:

This design is for a new septic system at Big Dog Development, Travers County, MN.

Flow Calculation:

This is a seasonal use park that is closed in the winter. Average use from Memorial Day to Labor Day is 88 seasonal rentals that are mostly used on weekends. We can expect occasional high weekend flows with substantially lower weekday volume. After contacting other like campgrounds with full trailer hookups, general usage is typically less than 25 gallons per site per day. U of M design guidelines call for 100 gpd for full hookups. We will be using a design flow of 40 gpd for full hookup sites, plus infiltration inflow for collection system. **Design flow is thus 4202 gallons per day (GPD).** Pump tank capacity into the mound is 4500 gallons. It will allow for a 3670 gallon reserve capacity for days that may exceed 3600 gpd.

Existing Condition:

None

New System Components:

Collection: 4300' +/- 4" SDR-35 gasketed sewer pipe, 400' +/- 2" SCH40 pipe

Tanking: 2 - 2500 gallon septic tanks, 9 - 2250 gallon septic tanks, 1 - 1500 gallon lift tank, and 2 - 2250 lift tanks

Treatment Area: 3 - 10'X100' rock bed mounds split into 3 zones

Pump Tank: 2 - 2250 gallon tanks with 4122 gallon reserve capacity, 3 - 58 gallon per minute pumps with 48.1 total feet head, alternating pumps with time dose

Site Evaluator:



Date: 5/22/2014

Advanced Designer, Inspector and Service Provider - Lic 2820

Elwood Septic Professionals, LLC

15987 - 150th Street, Villard MN 56385

Septic System Management Plan

Property Owner: Dan Binsfield **Phone:** 320-293-5769 **Date:** 7/3/2018

Mailing Address: 29534 County Road 20 **City:** Paynesville **Zip:** 56362

Site Address: 5386 Hwy 27 **City:** Browns Valley **Zip:** 56219

This management plan will identify the operation and maintenance activities necessary to ensure long-term performance of your septic system. Some of these activities must be performed by you, the homeowner. Other tasks must be performed by a licensed septic service provider.

System Designer: check every 12 months
Local Government: check every _____ months
State Requirement: check every 36 months

My system needs to be checked
every _____ months

Owner Management Tasks (performed monthly unless otherwise stated)

- *Leaks - Check (look,listen) for leaks in toilets and dripping faucets. Repair leaks promptly
- *Surfacing sewage - Regularly check for wet or spongy soil around your soil treatment area
- *Alarms - Alarm signals when there is a problem: contact Service Provider any time an alarm signals
- *Event counter or water meter - Monitor your average daily flows, keep a weekly record
- * Pump all tanks annually

Professional Management Tasks (annually)

- *Event counter or elapsed meter - Collect weekly reading for system assessment
- *Calibrate all pumps and reset timers if needed
- *Check and clean the in-tank effluent filter
- *Check the sludge/scum layer levels in all septic tanks
- *Visually inspect manhole covers, inspection caps and cleanout caps - replace if needed
- *Check inlet and outlet baffles in all tanks
- *Clean drainfield laterals
- *Check the drainfield effluent levels in the rock layer
- *Check the pump and alarm system functions
- *Check wiring for corrosion and function
- *Check waste strength at lift tank (*BOD, TSS, FOG must maintain domestic waste strength*)
- *Check dissolved oxygen and effluent temperature in tank
- *Provide owner with list of results and any action to be taken

" I understand it is my responsibility to properly operate and maintain the sewage treatment system on this property, utilizing the Management Plan. If requirements in this Management Plan are not met, I will promptly notify the permitting authority and take necessary corrective actions. If I have a new system, I agree to adequately protect the reserve area for future use as a soil treatment system."

Property Owner Signature: _____ Date: _____

Designer Signature:  Date: 8/27/2014

Permitting Authority Signature: _____ Date: _____

Elwood Septic Professionals, LLC

15897 - 150th St, Villard MN 56385

Property Owner: Dan Binsfield **Phone:** 320-293-5769 **Date:** 7/3/2018
Mailing Address: 29534 County Road 20 **City:** Paynesville **State:** MN **Zip:** 56362
Site Address: 5386 Hwy 27 **City:** Browns Valley **State:** MN **Zip:** 56219
Legal Desc: NA **Sec-Twp-Rge:** 31 / 126 / 48
Parcel No: NA **Co:** Traverse **Twp:** Windsor

System Condition: New Construction **System Type:** Commercial - Type1 **Dwelling Type:** New Construction
Shoreland: Yes **Lake Name:** Traverse **Classification:** NA **Set:** NA

Type of Establishment served by On-Site System:

Design Requirements for Commercial Septic System

Septic Tank Sizing Requirements

Total Units	Type of Units	Maximum Gallons per day per unit	Total Gallons
RV'S	88	75	6600
			0
			0
			0
(Sum of Gallons: (Gravity *3 (Pressure X 4.0)		Minimum required septic tank capacity	19,800 Gallons

Lift Station Sizing Requirements

Total Units	Type of Units	Maximum Gallons per day per unit	Total Gallons
RV'S	88	40	3520
			0
			0
		Minimum required lift satiation capacity	3,520 Gallons

Drain Field Sizing Requirements

Total Units	Type of Units	Maximum Gallons per day per unit	Total Gallons
RV'S	88	40	3520
I&I	4" pipe	4300	652
I&I	2" pipe	400	30
			0
Total estimated flow in gallons per day			4,202 GPD

Min. Tank Size: 19,800 gallons

Treatment Area Flow: 3,600 GPD

Min Lift Satiation: 4,500 gallons

Total Est. Flow: 4,202 gpd.

Effluent Filter: No

System Flows:

- 4500 gallons of lift tank capacity and time dose to be used to reduce system flow to treatment area to 3600 gallons per day.

Site Summary Data:

Landscape Position: Back / Side

Texture at Depth: Loam

Slope: 6.0 %

Permeability: 20.00 mpi.

Restricting Layer: 12 inches

Soil Loading Rate: 0.45

Standing Water: No inches

Contour Loading Rate: 12

Bedrock: No inches

Treatment Area: 3501 sq. ft.



1. SYSTEM SIZING:

Project ID: Dan Binsfield

v 06.12.13

- A. Design Flow: Flow to each zone : GPD
- B. Soil Loading Rate: GPD/ft²
- C. Depth to Limiting Condition: ft
- D. Percent Land Slope: %
- E. Design Media Loading Rate: GPD/ft²
- F. Mound Absorption Ratio:

Measured Perc Rate	← OR →	Texture - derived mound absorption ratio	→	Contour Loading Rate:
≤ 60mpi		1.0, 1.3, 2.0, 2.4, 2.6	→	≤12
61-120 mpi	← OR →	5.0	→	≤12
≥ 120 mpi*		>5.0*	→	≤6*

Percolation Rate (MPI)	Treatment Level C		Treatment Level A, A-2, B,	
	Absorption Area Loading Rate (gpd/ft ²)	Mound Absorption Ratio	Absorption Area Loading Rate (gpd/ft ²)	Mound Absorption Ratio
<0.1	-	1	-	1
0.1 to 5	1.2	1	1.6	1
0.1 to 5 (fine sand and loamy fine sand)	0.6	2	1	1.6
6 to 15	0.78	1.5	1	1.6
16 to 30	0.6	2	0.78	2
31 to 45	0.5	2.4	0.78	2
46 to 60	0.45	2.6	0.6	2.6
61 to 120	-	5	0.3	5.3
>120	-	-	-	-

*Systems with these values are not Type I systems. Contour Loading Rate (linear loading rate) is a recommended value.

2. DISPERSAL MEDIA SIZING

- A. Calculate Dispersal Bed Area: Design Flow ÷ Design Media Loading Rate = ft²
 GPD ÷ GPD/ft² = ft²
 If a larger dispersal media area is desired, enter size: ft²
- B. Enter Dispersal Bed Width: ft *Cannot exceed 10 feet*
- C. Calculate Contour Loading Rate: Bed Width X Design Media Loading Rate
 ft² X GPD/ft² = gal/ft *Cannot exceed Table 1*
- D. Calculate Minimum Dispersal Bed Length: Dispersal Bed Area ÷ Bed Width = Bed Length
 ft² ÷ ft = ft

3. ABSORPTION AREA SIZING

- A. Calculate Absorption Width: Bed Width X Mound Absorption Ratio = Absorption Width
 ft X = ft
- B. For slopes >1%, the Absorption Width is measured downhill from the upslope edge of the Bed.
 Calculate Downslope Absorption Width: Absorption Width - Bed Width
 ft - ft = ft

4. DISTRIBUTION MEDIA: ROCK

- A. Media Volume: Media Depth X Length X Width
 ft X ft X ft = ft³ ÷ 27 = yd³

5. DISTRIBUTION MEDIA: REGISTERED TREATMENT PRODUCTS: CHAMBERS AND EZFLOW

A. Enter Dispersal Media:

B. Enter the Component Length:

 ft

Enter the Component Width:

 ft

C. Number of Components per Row = Bed Length divided by Component Length (Round up)

$$\text{[] ft} \div \text{[] ft} = \text{[] components/row}$$

D. Actual Bed Length = Number of Components/row X Component Length:

$$\text{[] components} \times \text{[] ft} = \text{[] ft}$$

E. Number of Rows = Bed Width divided by Component Width (Round up)

$$\text{[] ft} \div \text{[] ft} = \text{[] rows} \text{ *Adjust width so this is an whole number.*}$$

F. Total Number of Components = Number of Components per Row X Number of Rows

$$\text{[]} \times \text{[]} = \text{[] components}$$

6. MOUND SIZING

A. Calculate Minimum Clean Sand Lift: 3 feet minus Depth to Limiting Condition = Clean Sand Lift

$$3.0 \text{ ft} - \text{[1.0] ft} = \text{[2.0] ft} \quad \text{Design Sand Lift (optional): [] ft}$$

B. Calculate Upslope Height: Clean Sand Lift + media depth + cover (1 ft.) = Upslope Height

$$\text{[2.0] ft} + \text{[1.0] ft} + \text{[1.0] ft} = \text{[4.0] ft}$$

C. Select Upslope Berm Multiplier (based on land slope):

 2.31

Land Slope %	0	1	2	3	4	5	6	7	8	9	10	11	12
Upslope Berm Ratio 3:1	3.00	2.91	2.83	2.75	2.68	2.61	2.54	2.48	2.42	2.36	2.31	2.26	2.21
Upslope Berm Ratio 4:1	4.00	3.85	3.70	3.57	3.45	3.33	3.23	3.12	3.03	2.94	2.86	2.78	2.70

D. Calculate Upslope Berm Width: Multiplier X Upslope Mound Height = Upslope Berm Width

$$\text{[2.31]} \times \text{[4.0] ft} = \text{[9.2] ft}$$

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

$$\text{[10.0] ft} \times \text{[6.0] \%} \div 100 = \text{[0.60] ft}$$

F. Calculate Downslope Mound Height: Upslope Height + Drop in Elevation = Downslope Height

$$\text{[4.0] ft} + \text{[0.60] ft} = \text{[4.6] ft}$$

G. Select Downslope Berm Multiplier (based on land slope):

 6.67

Land Slope %	0	1	2	3	4	5	6	7	8	9	10	11	12
Downslope Berm Ratio 3:1	3.00	3.09	3.19	3.30	3.41	3.53	3.66	3.80	3.95	4.11	4.29	4.48	4.69
Downslope Berm Ratio 4:1	4.00	4.17	4.35	4.54	4.76	5.00	5.26	5.56	5.88	6.25	6.67	7.14	7.69

H. Calculate Downslope Berm Width: Multiplier X Downslope Height = Downslope Berm Width

$$\text{[6.67]} \times \text{[4.6] ft} = \text{[30.7] ft}$$

I. Calculate Minimum Berm to Cover Absorption Area: Downslope Absorption Width + 4 feet

$$\text{[16.0] ft} + \text{[4] ft} = \text{[20.0] ft}$$

J. Design Downslope Berm = greater of 4H and 4I:

 30.7 ft

K. Select Endslope Berm Multiplier:

 3.00

(usually 3.0 or 4.0)

L. Calculate Endslope Berm X Downslope Mound Height = Endslope Berm Width

$$\text{[3.00] ft} \times \text{[4.6] ft} = \text{[13.8] ft}$$

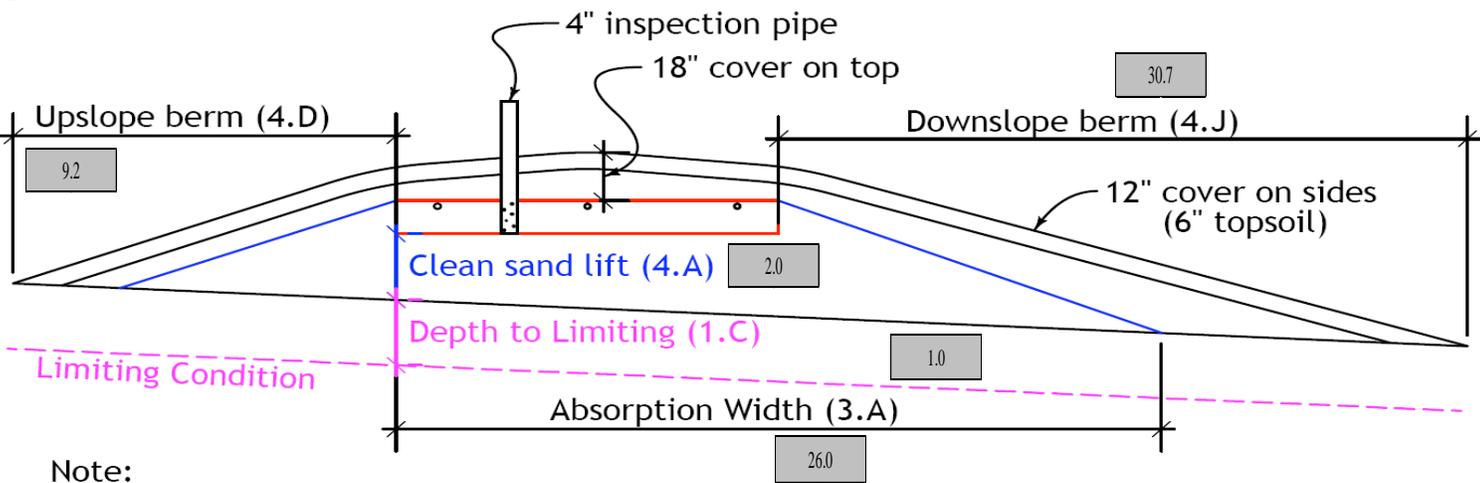
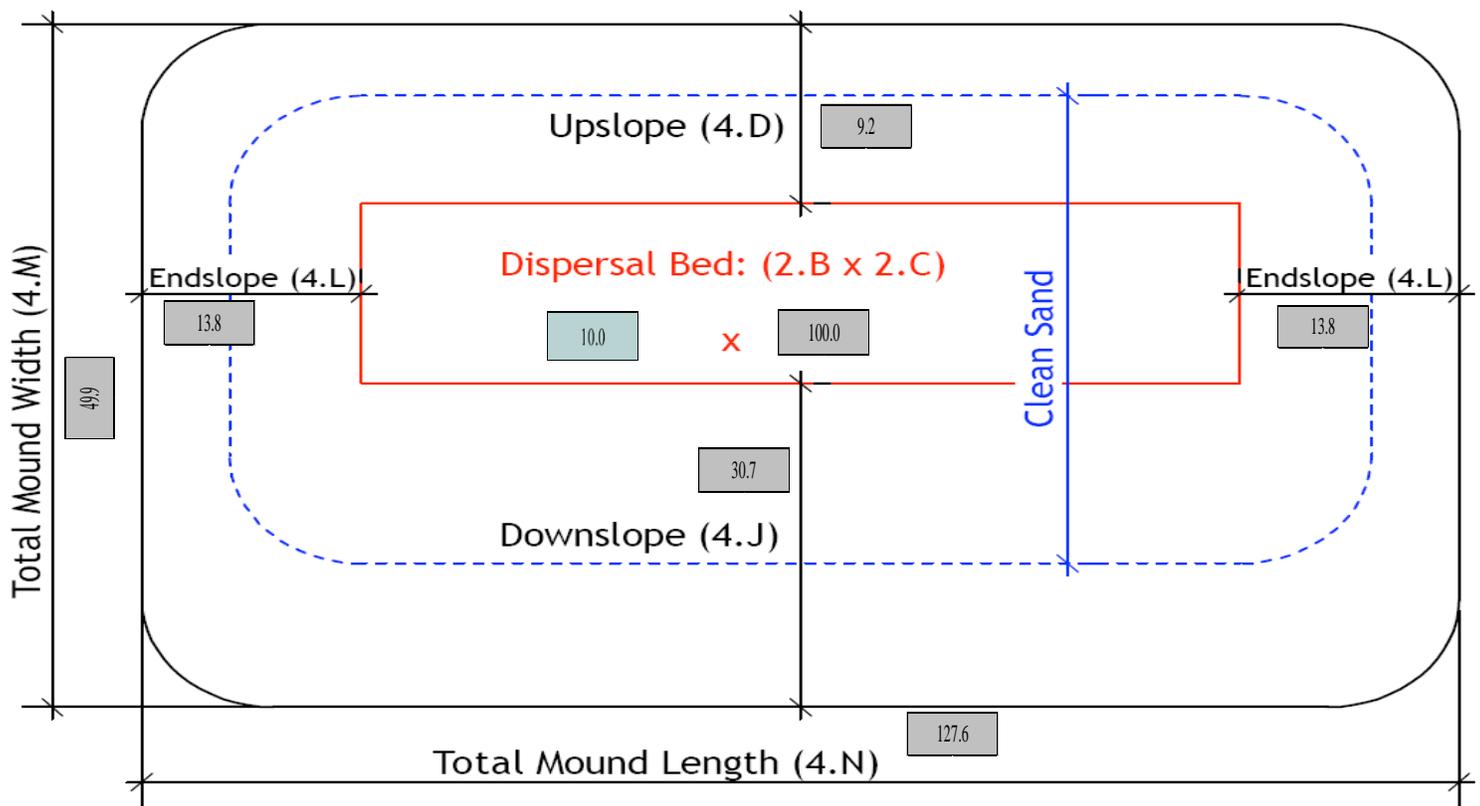
M. Calculate Mound Width: Upslope Berm Width + Bed Width + Downslope Berm Width

$$\text{[9.2] ft} + \text{[10.0] ft} + \text{[30.7] ft} = \text{[49.9] ft}$$

N. Calculate Mound Length: Endslope Berm Width + Bed Length + Endslope Berm Width

$$\text{[13.8] ft} + \text{[100.0] ft} + \text{[13.8] ft} = \text{[127.6] ft}$$

7. MOUND DIMENSIONS



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*.

Comments:

Pressure Distribution and Pump Spec. Sheet

Select number of perforated laterals: 3

Select perforation spacing: 3.0 ft

Lateral Lengths: 98 ft

Select perforation size: 3/16 inch

Perforations per lateral: 33

Total number of perforations: 99

Calculate the square footage per perforation: 12.12 ft²/perf

Determine required flow rate gpm.: 58 gpm

Design Flow: 4,202 gpd.

Flow pre zone:	<u>1200</u> gpd.	2" Optional Laterals
Lift Station:	<u>4500</u> gal	
Lateral Diameter:	<u>1.50</u> Inch	
Manifold Connection:	<u>End</u> Center/End	
Vol. Distribution Pipe:	<u>2.34</u> gal.	
Minimum Dose Vol.	<u>12.36</u> gal.	49.98 gal.
Maximum Pumpout Vol	<u>300</u> gal.	199.9 gal.
		300 gal.

Dosing Chamber

Total square feet: NA sq.

Gallons per inch: 99.20 gal per in.

39. Total tank volume: 4762 gal.

Gallons to cover pump(2 - 3 inch): 893 gal.

Doses per day (4 to 5): 6

Gallons per dose: 200.00 gal.

Drainback liquid volume of pipe: 0.17 gal./ft.

Drainback quantity: 34.0 gal.

Total pump out volume: 234.0 gal.

Float separation distance: 2.4 in.

Distance to set Pump Off: 9 In.

Volume for alarm (typically 2 to 3in.): 51 In.

Time Dose Settings				
Time On:	<u>234.0</u>	/	<u>58</u>	= 4.0 Min. On
Time Off:	<u>1440 min.</u>	/	<u>6</u>	= 236.0 Min. Off

Selected Pump Capacity: 58 gpm

Alarm Depth: 46 In.

Determine Total Dynamic Head (TDH)

Elevation difference between pump and discharge point: 21.52 ft.

Total pipe length: 200 ft.

Diameter of Pipe: 2

Special head requirement: 5 ft.

Friction loss in supply pipe: 2 in.

Friction loss in per 100 ft: 8.63

25 percent to pipe length for friction loss. 250 ft.

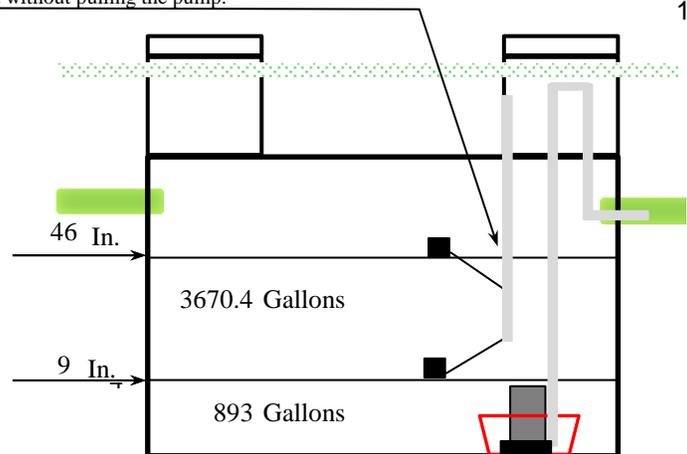
Total friction loss: 21.6

Total Head: 48.1 Feet

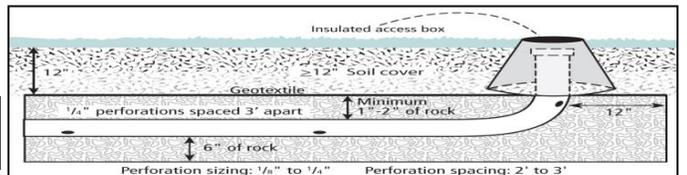
1. A pump must be selected to deliver at least 58 gpm with at least 48.1 feet of total head (2D).

Float Tree: (recommended)

- Install floats separately from pump on a float tree. The float tree is a 1.5 or 2" pipe secured to riser. This will allow the replacement of a float without pulling the pump.



Special Head Requirements	
Gravity Distribution	0ft
Pressure Distribution	5ft



Employed By: Elwood Septic Professionals, LLC

Address: 15897-150th St., Villard, MN 56385

Designer Name: Scott Elwood

Office Phone: 320-554-7389

Cell: 320-815-8297

Signature: *Scott Elwood*

License: L2820

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

Pressure Distribution and Pump Spec. Sheet

Select number of perforated laterals: NA

Select perforation spacing: NA ft

Lateral Lengths: NA ft

Select perforation size: NA inch

Perforations per lateral: NA

Total number of perforations: NA

Calculate the square footage per perforation: NA ft²/perf

Determine required flow rate gpm.: 10 gpm

Design Flow:

Estimated Flow 600 gpd.

Lift Station: 757 gal

Lateral Diameter: 1.50 Inch

Manifold Connection: End Center/End

Vol. Distribution Pipe: NA gal.

Minimum Dose Vol. NA gal.

Maximum Pumpout Vol 150 gal.

2" Optional Laterals
2.00 Inch
NA gal.
NA gal.
150 gal.

Dosing Chamber

Total square feet: NA sq.

Gallons per inch: 15.8 gal per in.

3) Total tank volume: 757 gal.

Gallons to cover pump(2 - 3 inch) 284 gal.

Doses per day (4 to 5) 10

Gallons per dose: 60.00 gal.

Drainback liquid volume of pipe: 0.17 gal./ft.

Drainback quantity: 5.1 gal.

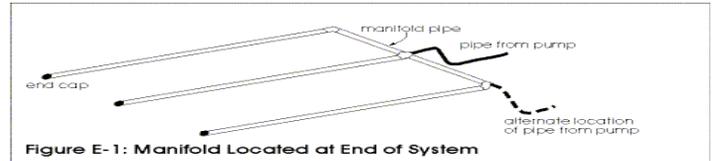
Total pump out volume: 65.1 gal.

Float separation distance: 4.1 in.

Distance to set Pump Off: 18 In.

Volume for alarm (typically 2 to 3in.) 25 In.

2 - Upper Level Pumps



Selected Pump Capacity:

10 gpm

Alarm Depth: 25 In.

Determine Total Dynamic Head (TDH)

Elevation difference between pump and discharge point 6.00 ft.

Pump On: 22 In. 47.4 Gallons

Total pipe length: 30 ft.

Pump Off: 18 In. 65.1 Gallons

Diameter of Pipe: 2

Special head requirement: 0 ft.

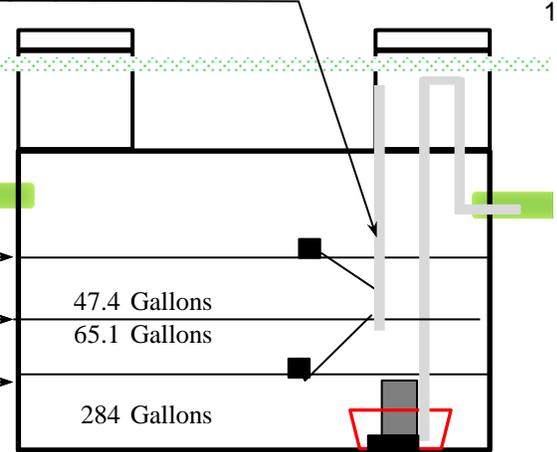
Friction loss in supply pipe: 2 in.

Friction loss in per 100 ft: 0.31

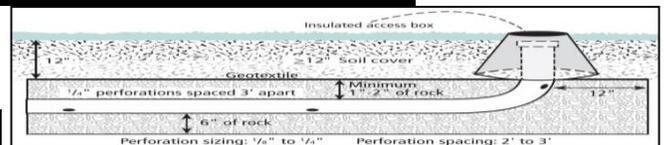
25 percent to pipe length for friction loss: 38 ft.

Total friction loss: 0.1

Total Head: 6.1 Feet



Special Head Requirements	
Gravity Distribution	0ft
Pressure Distribution	5ft



I. A pump must be selected to deliver at least 10 gpm with at least 6.1 feet of total head (2D).

Employed By: Elwood Septic Professionals, LLC

Address: 15897-150th St., Villard, MN 56385

Signature Name: Scott Elwood

Office Phone: 320-554-7389

Cell: 320-815-8297

Signature: *Scott Elwood*

License: L2820

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

Pressure Distribution and Pump Spec. Sheet

Select number of perforated laterals: NA

Select perforation spacing: NA ft

Lateral Lengths: NA ft

Select perforation size: NA inch

Perforations per lateral: NA

Total number of perforations: NA

Calculate the square footage per perforation.: NA ft²/perf

Determine required flow rate gpm.: 10 gpm

Design Flow:

Estimated Flow 600 gpd.

Lift Station: 757 gal

Lateral Diameter: 1.50 Inch

Manifold Connection: End Center/End

Vol. Distribution Pipe: NA gal.

Minimum Dose Vol. NA gal.

Maximum Pumpout Vol 150 gal.

2" Optional Laterals
2.00 Inch
NA gal.
NA gal.
150 gal.

Dosing Chamber

Total square feet: NA sq.

Gallons per inch: 15.8 gal per in.

3) Total tank volume: 757 gal.

Gallons to cover pump(2 - 3 inch) 284 gal.

Doses per day (4 to 5) 10

Gallons per dose: 60.00 gal.

Drainback liquid volume of pipe: 0.17 gal./ft.

Drainback quantity: 68.0 gal.

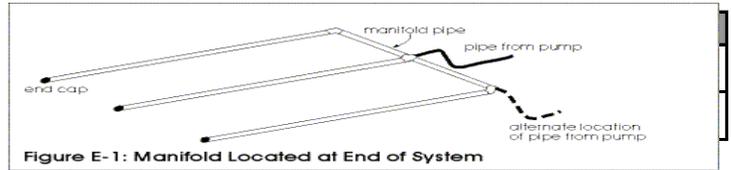
Total pump out volume: 128.0 gal.

Float separation distance: 8.1 in.

Distance to set Pump Off: 18 In.

Volume for alarm (typically 2 to 3in.) 29 In.

West Pump



Float Tree: (recommended)

- Install floats separately from pump on a float tree. The float tree is a 1.5 or 2" pipe secured to riser. This will allow the replacement of a float without pulling the pump.

Selected Pump Capacity:

10 gpm

Alarm Depth: 29 In.

Determine Total Dynamic Head (TDH)

Elevation difference between pump and discharge point 12.00 ft.

Pump On: 26 In. 47.4 Gallons

Pump Off: 18 In. 128.0 Gallons

Total pipe length: 400 ft.

284 Gallons

Diameter of Pipe: 2

Special head requirement: 0 ft.

Friction loss in supply pipe: 2 in.

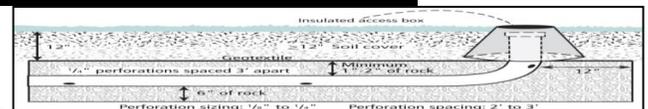
Friction loss in per 100 ft: 0.31

25 percent to pipe length for friction loss: 500 ft.

Total friction loss 1.6

Total Head: 13.6 Feet

Special Head Requirements	
Gravity Distribution	0ft
Pressure Distribution	5ft



1. A pump must be selected to deliver at least 10 gpm with at least 13.6 feet of total head (2D).

Employed By: Elwood Septic Professionals, LLC

Address: 15897-150th St., Villard, MN 56385

Signature Name: Scott Elwood

Office Phone: 320-554-7389

Cell: 320-815-8297

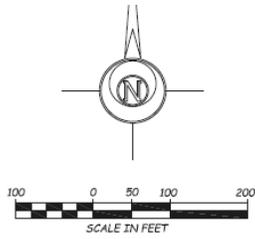
Signature: *Scott Elwood*

License: L2820

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

LEGEND

- PE 1.5" Water
- 4" SCH40 Sewer
- △ Water Hydrant with backflow preventers
- Sewer Cleanouts
- ▭ Sewer Tanks
- System Flow



- Legend
- INDICATES IRON MONUMENT PLACED
 - INDICATES IRON MONUMENT FOUND
 - INDICATES TRAVERSE COUNTY P.L.S.S. MONUMENT
 - ⊕ INDICATES ARMY CORP OF ENGINEERS EASEMENT BOUNDARY POST

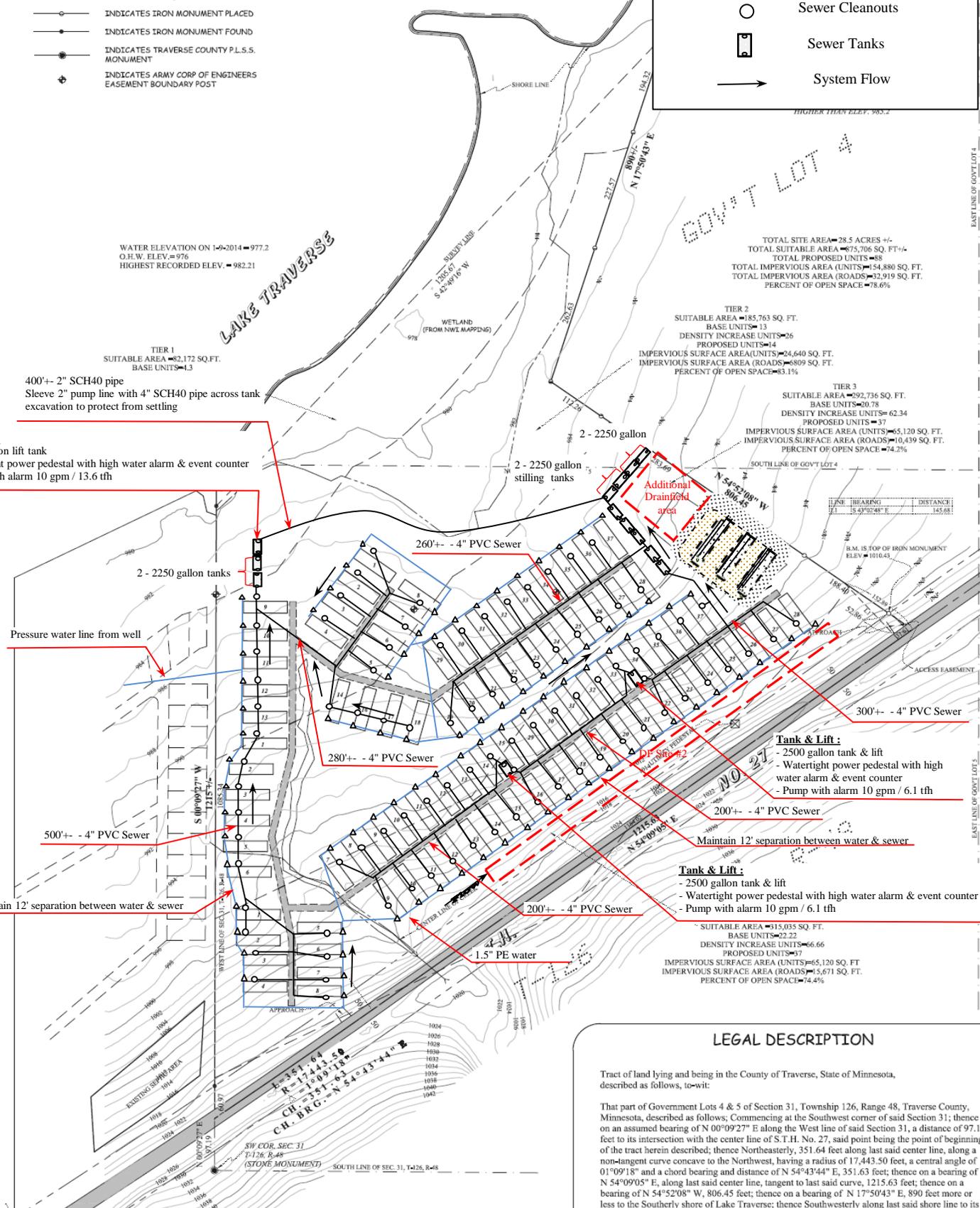
NOTE: THIS SURVEY IS INTENDED ONLY FOR THE BENEFIT OF THE PARTY TO WHOM IT WAS PREPARED FOR AND SHOULD NOT BE RELIED UPON BY ANY OTHER PARTY OR FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN CONSENT OF THE SURVEYOR. THE SURVEYOR ASSUMES NO LIABILITY FOR ANY DAMAGE, UNAUTHORIZED REPRODUCTION OF THIS DOCUMENT IS PROHIBITED.

370 CHAPEL, HT. CHLD. SPRING / PH. 320-685-95-99 FAX 320-685-3090

LAND SURVEYORS, INC.

1004 2nd ST. SE WILLMAR, MN 56201 PH. 320-235-4012 FAX 320-685-3096

REVISIONS: 2 04/11/18 01/12/18 02/12/18 03/12/18 04/12/18 05/12/18 06/12/18 07/12/18 08/12/18 09/12/18 10/12/18 11/12/18 12/12/18



WATER ELEVATION ON 1-9-2014 = 977.2
O.H.W. ELEV. = 976
HIGHEST RECORDED ELEV. = 982.21

TIER 1 SUITABLE AREA = 82,172 SQ. FT. BASE UNITS = 4.3

400'± - 2" SCH40 pipe
Sleeve 2" pump line with 4" SCH40 pipe across tank excavation to protect from settling

TOTAL SITE AREA = 28.5 ACRES ±
TOTAL SUITABLE AREA = 875,706 SQ. FT. ±
TOTAL PROPOSED UNITS = 88
TOTAL IMPERVIOUS SURFACE AREA (UNITS) = 54,880 SQ. FT.
TOTAL IMPERVIOUS SURFACE AREA (ROADS) = 53,919 SQ. FT.
PERCENT OF OPEN SPACE = 78.6%

TIER 2 SUITABLE AREA = 185,763 SQ. FT. BASE UNITS = 13 DENSITY INCREASE UNITS = 26 PROPOSED UNITS = 4 IMPERVIOUS SURFACE AREA (UNITS) = 24,640 SQ. FT. IMPERVIOUS SURFACE AREA (ROADS) = 6809 SQ. FT. PERCENT OF OPEN SPACE = 83.1%

TIER 3 SUITABLE AREA = 292,736 SQ. FT. BASE UNITS = 20.78 DENSITY INCREASE UNITS = 62.34 PROPOSED UNITS = 37 IMPERVIOUS SURFACE AREA (UNITS) = 65,120 SQ. FT. IMPERVIOUS SURFACE AREA (ROADS) = 10,439 SQ. FT. PERCENT OF OPEN SPACE = 74.2%

Lift Tanks:

- 1500 gallon lift tank
- Watertight power pedestal with high water alarm & event counter
- Pump with alarm 10 gpm / 13.6 th

2 - 2250 gallon tanks

Pressure water line from well

Tank & Lift:

- 2500 gallon tank & lift
- Watertight power pedestal with high water alarm & event counter
- Pump with alarm 10 gpm / 6.1 th

Tank & Lift:

- 2500 gallon tank & lift
- Watertight power pedestal with high water alarm & event counter
- Pump with alarm 10 gpm / 6.1 th

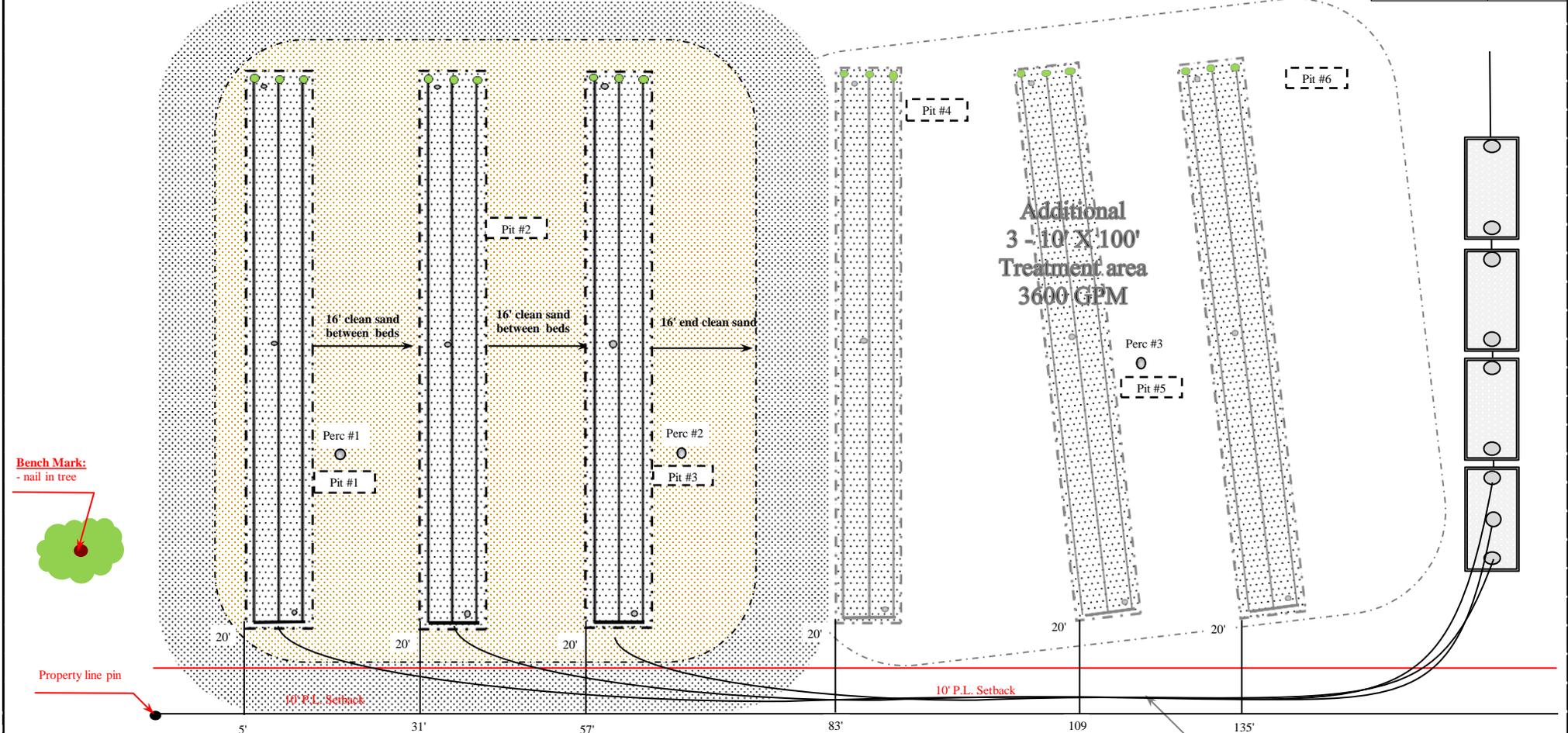
Maintain 12' separation between water & sewer

SUITABLE AREA = 315,035 SQ. FT. BASE UNITS = 22.22 DENSITY INCREASE UNITS = 66.66 PROPOSED UNITS = 47 IMPERVIOUS SURFACE AREA (UNITS) = 65,120 SQ. FT. IMPERVIOUS SURFACE AREA (ROADS) = 5,671 SQ. FT. PERCENT OF OPEN SPACE = 74.4%

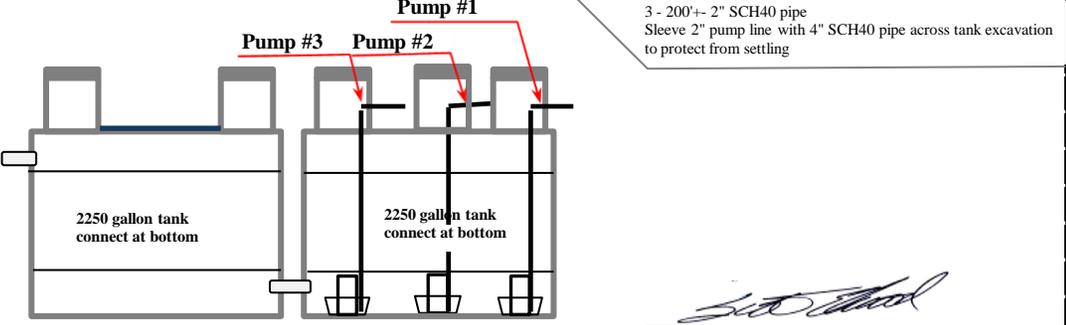
LEGAL DESCRIPTION

Tract of land lying and being in the County of Traverse, State of Minnesota, described as follows, to-wit:

That part of Government Lots 4 & 5 of Section 31, Township 126, Range 48, Traverse County, Minnesota, described as follows; Commencing at the Southwest corner of said Section 31; thence on an assumed bearing of N 00°09'27" E along the West line of said Section 31, a distance of 97.19 feet to its intersection with the center line of S.T.H. No. 27, said point being the point of beginning of the tract herein described; thence Northeasterly, 351.64 feet along last said center line, along a non-tangent curve concave to the Northwest, having a radius of 17,443.50 feet, a central angle of 01°09'18" and a chord bearing and distance of N 54°43'44" E, 351.63 feet; thence on a bearing of N 54°09'05" E, along last said center line, tangent to last said curve, 1215.63 feet; thence on a bearing of N 54°52'08" W, 806.45 feet; thence on a bearing of N 17°50'43" E, 890 feet more or less to the Southerly shore of Lake Traverse; thence Southwesterly along last said shore line to its intersection with the West line of said Section 31; thence on a bearing of S 00°09'27" W along last said line, 1215 feet more or less to the point of beginning.



Minimum Setback Requirements		Ground Elev.		Est. Depth	Cut
Tank:	1,500 gal.	88.20	Outlet	100.00	NA
Lift:	500 gal.	88.20	Tank	100.00	4.00
Tank:	> 10 ft.	88.20	Lift Tank	86.00	0.00
Treatment:	3501 sq. ft.	98.10	BC (SE)	100.10	2.00
Treatment area:	>20 ft.	97.50	BC (NE)	99.40	1.90
Property Line:	> 10' ft.	96.75	BC (SW)	98.75	2.00
Well:	> 50' ft.	95.90	BC (NW)	98.75	2.85
Neighboring well:	>100' ft.	97.50	B1 94.80 B3	0.00	Perk #1
Lakes:	Traverse ft.	95.55	B2 91.80 B4	0.00	Perk #2
Depth to restriction:	12 in.	98.75	Proposed elevation of the bottom of drain field		
Depth of System:	Mound	NA	Ordinary High Water Level		



Certified Statement:
 The proposed sewage treatment system has been designed in accordance with MN Rules Ch. 7080 and local codes. The soil treatment area must be protected from disturbance and compaction before and after construction. Non-sewage waste (drain tile, water softener discharge, etc.) shall not be discharged into this system. No warrant is made that this system will continue to function indefinitely. System must be properly maintained. For instruction on proper septic system operation & maintenance, go to <http://septic.umn.edu>, the University of Minnesota Extension Agency, or local regulating agency.

Signature
 Elwood Septic Professionals, LLC MPCA License #2820
Elwood Septic Professionals, LLC
 Project Name: Dan Binsfield
 Address: 5386 Hwy 27

Partial Material List > 1 % Mound

Partial Material List Only

Septic Tank Requirements:

Septic Tank: 19,800 gallons
 Lift Tank: 4500 gallons
 Manhole Riser: 180+- Est. ft.
 4" SCH40 Pipe: 4300 Est. ft.

Effluent Filter: NA

Effluent Filter Alarm: NA

Manhole Riser Options (PVC / Concrete)

Insulate Tank: NA R10

Total Tank Needs: As listed gallons

Construction Notes:

1. 9 - 2250 gallon straight tanks
2. 2 - 2500 gallon compartment septic tank and lifts
3. 1 - 1500 gallon lift tank
4. 2 - 2250 gallon custom lift tanks connected at the bottom

Lift Tank Requirements:

Minimum Lift Tank Size: 4500

Minimum Pump Size: <u>58.4</u> gallons per minute	Minimum Pump Size: <u>48.1</u>	Total Feet Head
---	--------------------------------	-----------------

Time Dose Control Panel: Yes

Demand Pump Off: 9 inches from floor

Alarm Float: Yes

Demand Pump On: 0 inches from floor

Alarm Float: 46 inches from floor

Control Panel: minimums

Run up to 5 pumps
 Time dose control & alternate between each pump
 Elapsed time meters & event counter for each pump

Construction Notes:

(3) - 58.4 gpm / with 48.1 tfh pumps
 2" SCH40 supply line: 1000'
 2" Perforated Laterals: 882'
 300'+- of drainfield fabric
 (1) - 10 gpm / 13.6 tfh pump and (2) - 10gpm w/ 6.1 tfh pumps

Pressure Distribution:

2" SCH40 Supply Line: 400 ft.

2" Perforated Laterals: 882 ft.

Manifold Connection: End

Perforation Size: 3/16 in.

Laterals: 3 each bed

Total perforations per lateral : 33

Lateral Length: 98 ft. each bed

Clean out box assemblies: 9

Treatment Area Requirements: (> 1% mound)

Rock Bed Size: (3) 10'X100' ft.

Washed Rock: 160 yd³ 224 Ton 9" under pipe

Clean Sand Lift: 2.0 ft.

Clean Sand: 1500 yd³ 2100 Ton

Absorption Area: 26 ft.

Loamy Cover: 500 yd³ 700 Ton 6" Min. Cover

Upslope: 9.2 ft.

Topsoil Cover: 500 yd³ 700 Ton 6" Min. Cover

Downslope: 20.0 ft.

Sideslopes: 13.8 ft.

Total Mound Width: 120.0 ft.

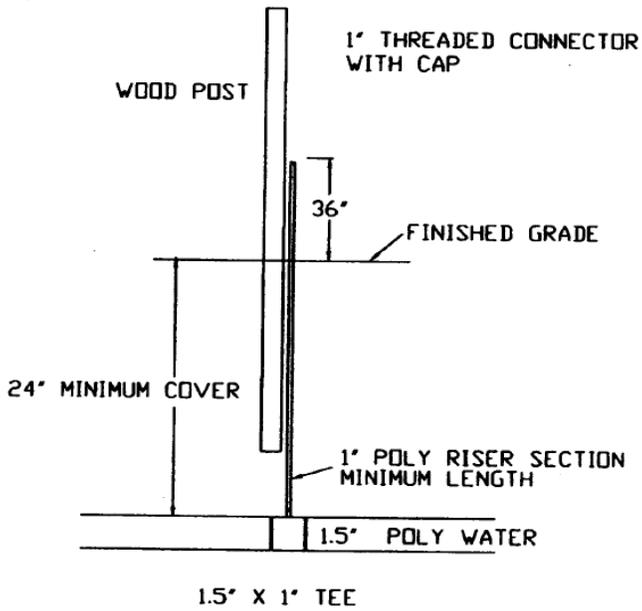
Total Mound Length: 127.6 ft.

Upslope Height: 4 ft.

Construction Notes:

20% has been added to all materials. Estimated totals only each site may need additional materials.

INSTALL BLOW-OFF ASSEMBLY
NEXT TO SHUT-OFF VALVE



WINTER BLOW-OFF ASSEMBLY

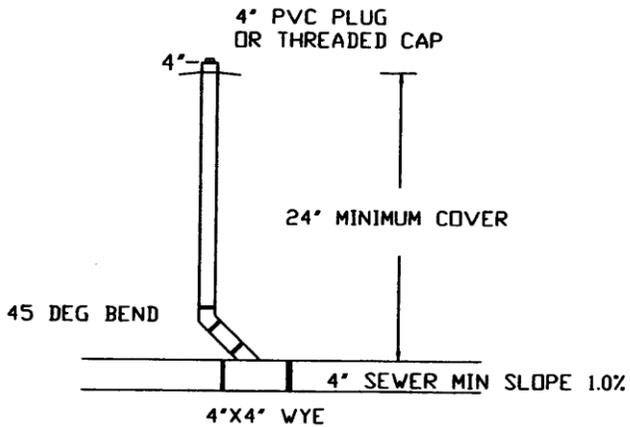
MATERIALS SPECIFICATION:
HDPE WATERLINE SHALL MEET ASTM D-2239, ASTM D-3350 & AWWA C901
160 PSI PIPE WITH SS CLAMP CONNECTIONS

THE NEW WATERLINE SECTION TO BE INSTALLED SHALL
BE PRESSURE TESTED PRIOR TO BEING PLACED INTO SERVICE
MN CITY ENGINEERS ASSOCIATION SPECIFICATION

MATERIAL SPECIFICATION:
SANITARY SEWER LINES SHALL MEET ASTM D 3034, SDR 35
GASKETED JOINTS SHALL MEET ASTM D 3212

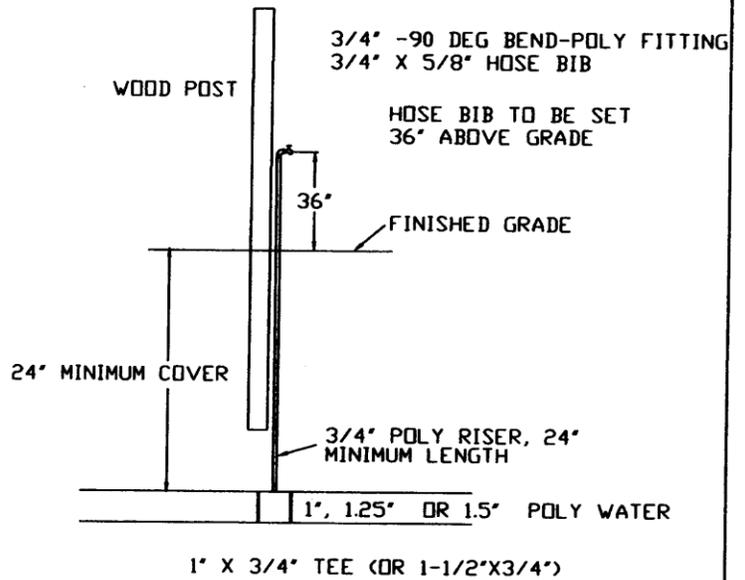
CONSTRUCTION NOTE:
WHERE A WATERLINE CROSSES A SEWERLINE
INSTALL THE WATERLINE A MINIMUM OF 12" ABOVE
THE TOP OF THE SEWERLINE. WHEN THIS IS NOT FEASIBLE
THE SEWERLINE SHALL BE CONSTRUCTED OF ONE OF THE
MATERIALS LISTED IN MN RULES 4715.1710, SUBP 2E.
THE WATERLINE SHALL NOT CONTAIN ANY JOINTS OR
CONNECTIONS WITHIN 10' OF THE CROSSING.

TOP OF CAP TO BE SET 4" ABOVE FINISHED GRADE
FINISHED GRADE TO DIRECT RUNOFF AWAY FROM CAP



TYPICAL SEWER SERVICE

INSTALL 4"X4" WOOD POST
FOR WATER RISER SUPPORT

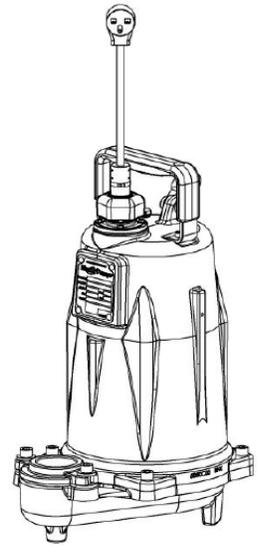


TYPICAL WATER SERVICE

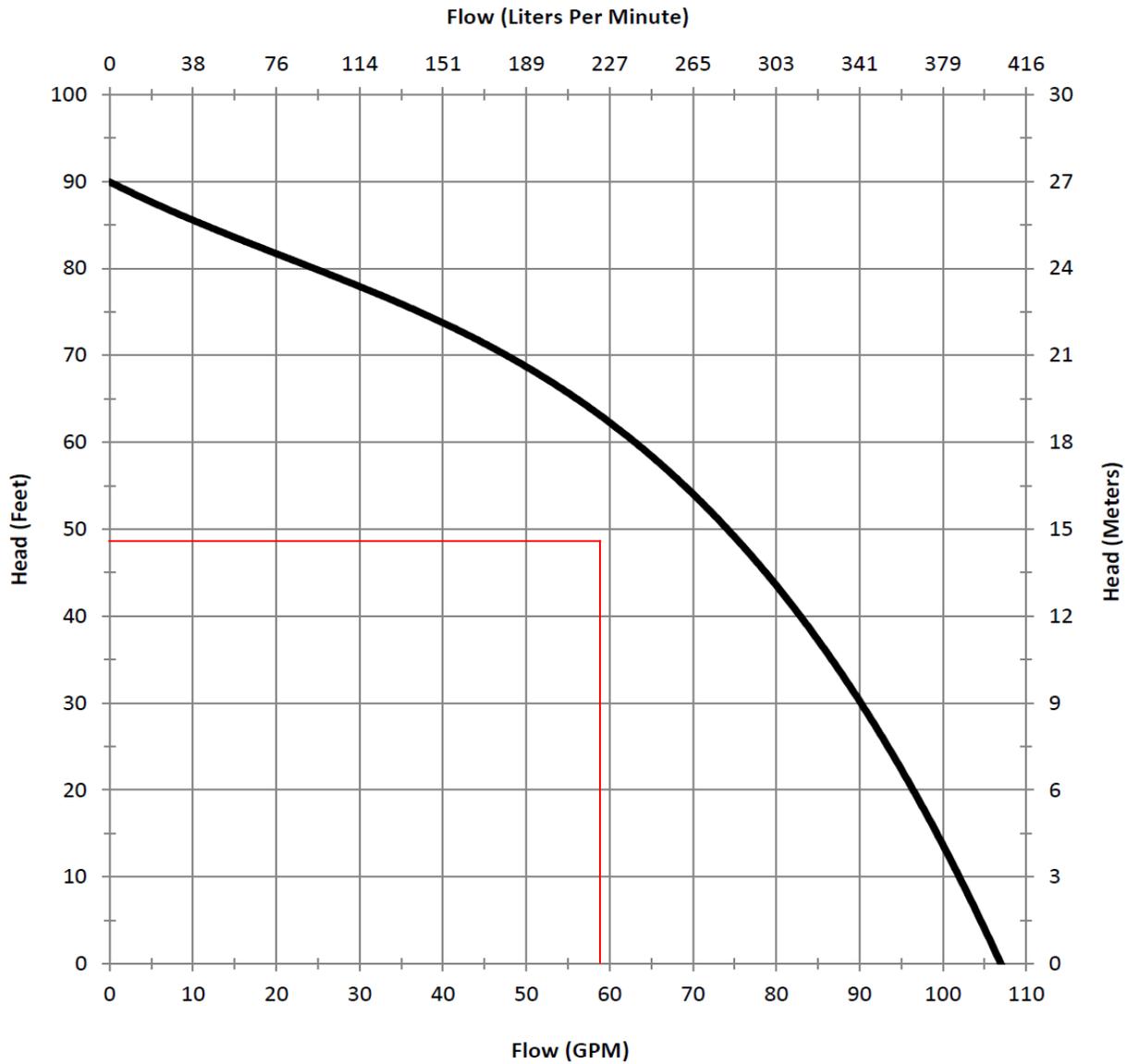


Pump Specifications

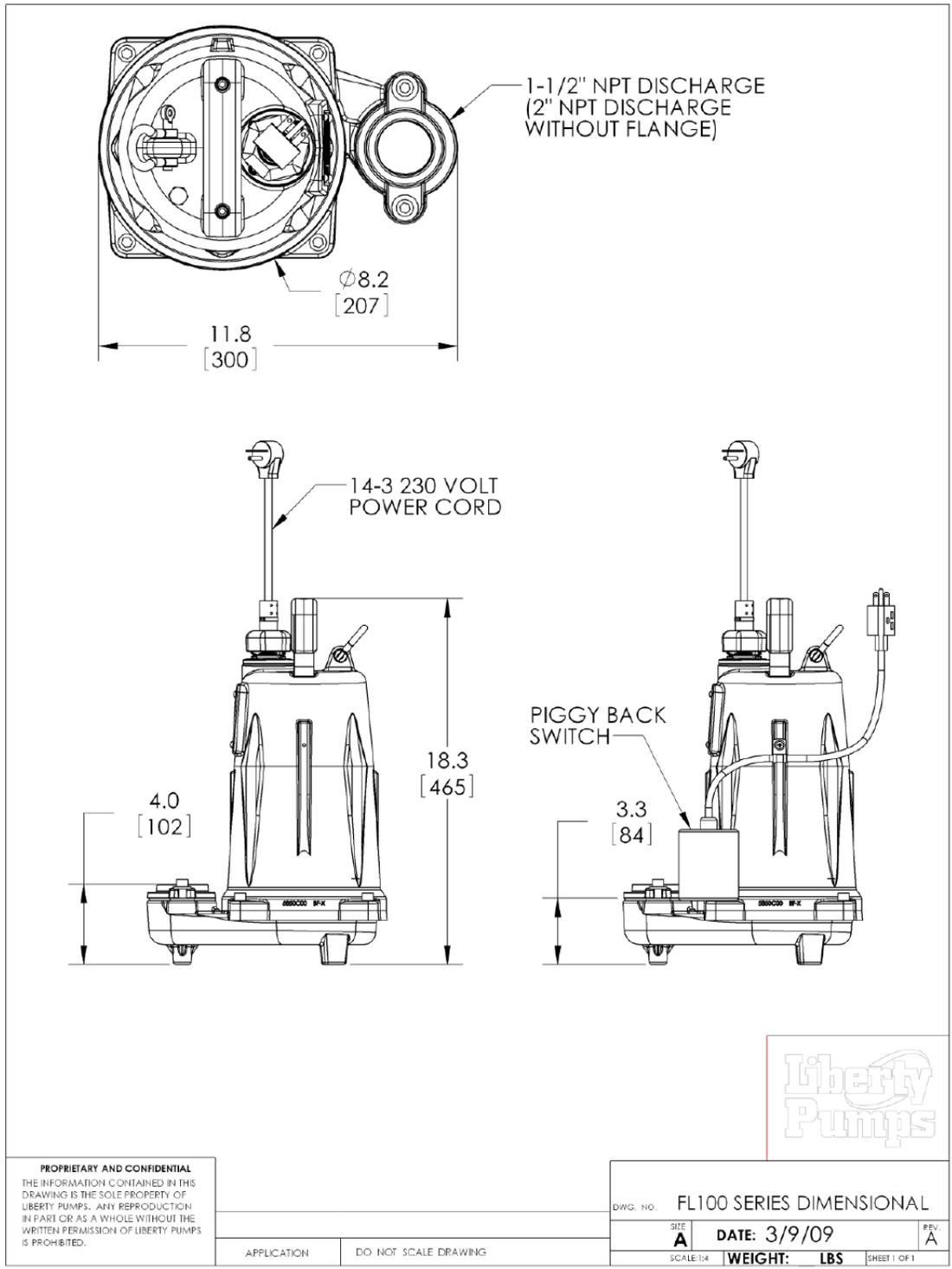
FL100 Series Submersible Effluent Pump

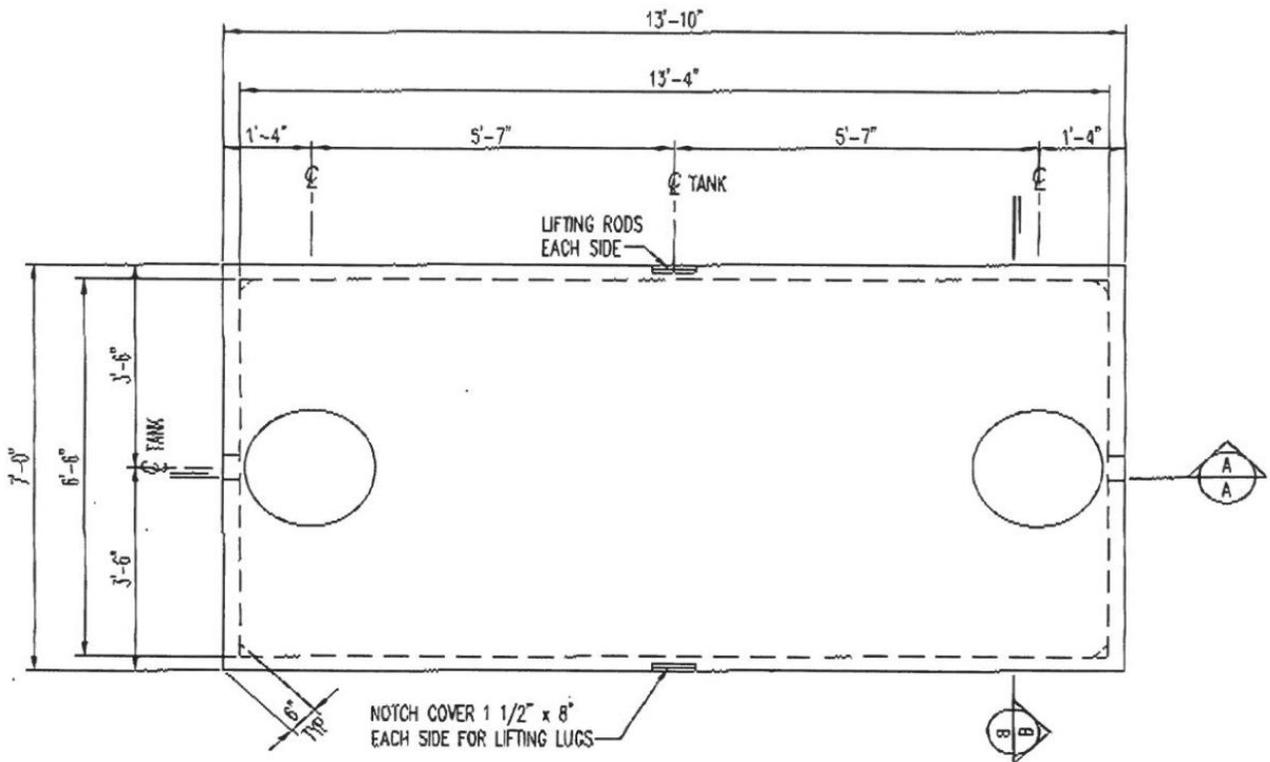


Or Equivalent

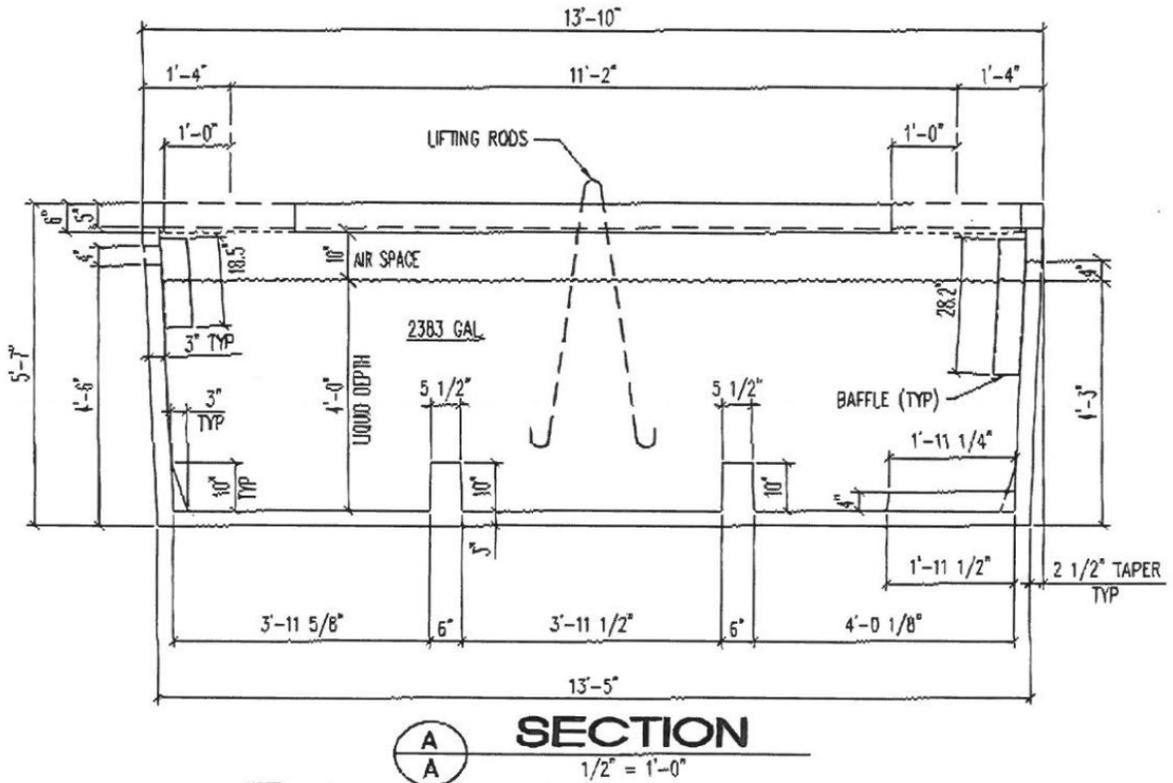


FL100-Series Dimensional Data





2250 GALLON 1 COMP. TANK
 1/2" = 1'-0"

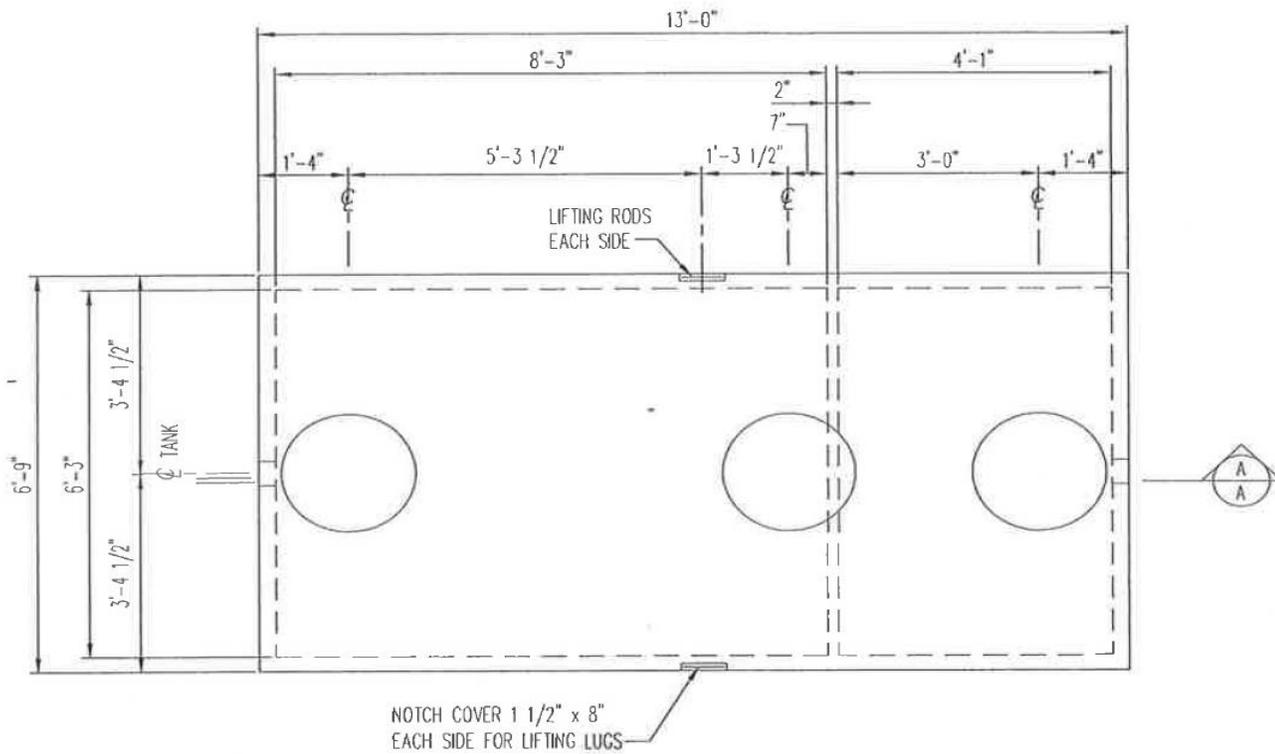


NOTE:
 1. PROVIDE MINIMUM 1" CLEAR BETWEEN TOP OF BAFFLE AND UNDERSIDE OF LID.

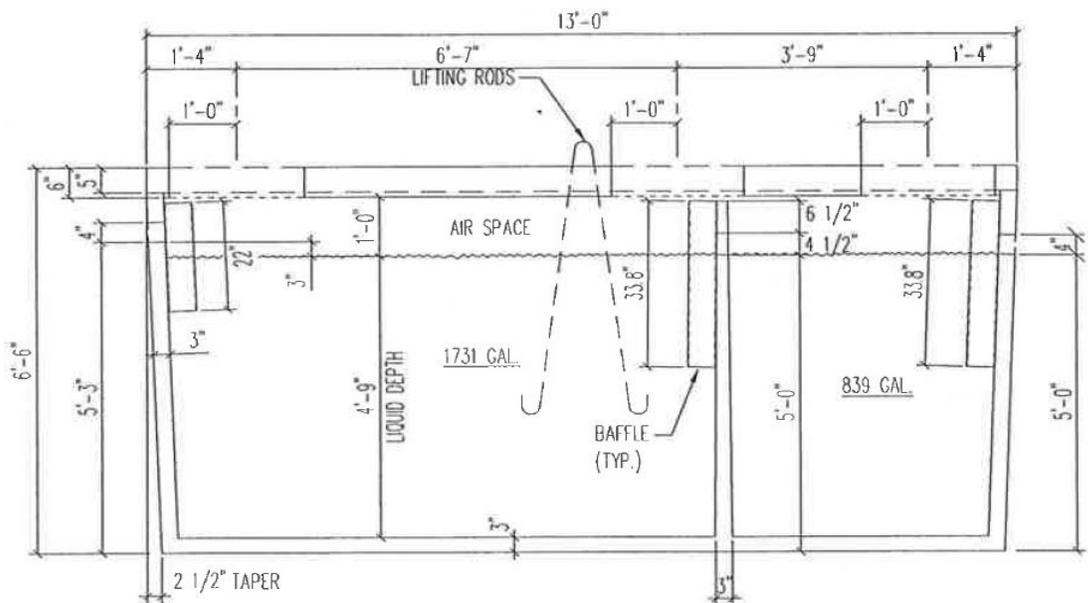
2250 GALLON 1 COMP.
 SEPTIC TANK
 (2250)

Brown Wilbert

WEIGHT= 19,000#
 MAX. SOIL COVER= 8'-0"
 TOTAL LIQUID VOLUME= 2383 GAL.



2500 GALLON 2 COMP. TANK
 1/2" = 1'-0"



SECTION
 1/2" = 1'-0"

NOTE:
 1. PROVIDE MINIMUM 1" CLEAR BETWEEN TOP OF BAFFLE AND UNDERSIDE OF LID.

2500 GALLON 2 COMP. SEPTIC TANK
 (2500 2C)



WEIGHT=19,500#
 MAX. SOIL COVER=6'-0"
 TOTAL LIQUID VOLUME= 2570 GAL

SSTS Soils Log

Percent of slope:	6.00
Disturbed Soils	None
Flooding, run on potential:	None

Date:	07/03/18
Parcel ID#	494B, Darnen
Property Owner:	Dan Binsfield
Soil Survey Information:	NA
Soil Parent Material:	Till
Landscape Position:	Back / Side
Vegetation Type:	Wooded

Soil Observation # 3

Depth In inches	Munsell Soil Color Name	Matrix Color	Mottle Color	% Rock Frags	Soil Texture	Soil Structure	Soil Grade	Soil Consistency	
0 - 18	Black	10YR2/1		<35%	Loam	Blocky	Moderate	Friable	
18 - 24	Very Dark Gray	10YR3/1		<35%	Clay Loam	Blocky	Weak	Friable	
24 - 26	Dark Gray	10YR5/1	10YR5/1	<35%	Clay Loam	Massive	Strong	Firm	
12+	Dark Gray		10YR5/1		Restricting				
Ground Elevation:		94.80				Depth to Restriction layer:	12 "	93.80	

Soil Observation # 4

Depth In inches	Munsell Soil Color Name	Matrix Color	Mottle Color	% Rock Frags	Soil Texture	Soil Structure	Soil Grade	Soil Consistency	
0 - 18	Black	10YR2/1		<35%	Loam	Blocky	Moderate	Friable	
18 - 20	Very Dark Gray	10YR3/1		<35%	Clay Loam	Blocky	Weak	Friable	
20 - 24	Dark Gray	10YR5/1	10YR5/1	<35%	Clay Loam	Massive	Strong	Firm	
12+	Dark Gray		10YR5/1		Restricting				
Ground Elevation:		91.80				Depth to Restriction layer:	12 "	90.80	

Designer's Signature: Scott Elwood



License Number 2820

SSTS Soils Log

Percent of slope:	6.00
Disturbed Soils	None
Flooding, run on potential:	None

Date:	07/03/18
Parcel ID#	494B, Darnen
Property Owner:	Dan Binsfield
Soil Survey Information:	NA
Soil Parent Material:	Till
Landscape Position:	Back / Side
Vegetation Type:	Wooded

Soil Observation # 5

Depth In inches	Munsell Soil Color Name	Matrix Color	Mottle Color	% Rock Frags	Soil Texture	Soil Structure	Soil Grade	Soil Consistency	
0 - 18	Black	10YR2/1		<35%	Loam	Blocky	Moderate	Friable	
18 - 24	Very Dark Gray	10YR3/1		<35%	Clay Loam	Massive	Moderate	Friable	
24 - 36	Dark Gray	10YR5/1	10YR5/1	<35%	Clay Loam	Massive	Strong	Firm	
12+	Dark Gray		10YR5/1		Restricting				
Ground Elevation:		90.45				Depth to Restriction layer:	12 "	89.45	

Soil Observation # 6

Depth In inches	Munsell Soil Color Name	Matrix Color	Mottle Color	% Rock Frags	Soil Texture	Soil Structure	Soil Grade	Soil Consistency	
0 - 18	Black	10YR2/1		<35%	Loam	Blocky	Moderate	Friable	
18 - 22	Very Dark Gray	10YR3/1		<35%	Clay Loam	Blocky	Weak	Friable	
22 - 32	Dark Gray	10YR5/1	10YR5/1	<35%	Clay Loam	Massive	Strong	Firm	
12+	Dark Gray		10YR5/1		Restricting				
Ground Elevation:		87.00				Depth to Restriction layer:	12 "	86.00	

Designer's Signature: _____

Scott Elwood



License Number _____

2820

OSTP Percolation Data Sheet



1. Contact Information

Property Owner/Client: Dan Binsfield
Address: 31 / 126 / 48

2. General Percolation Information

Diameter: 8 in Date prepared and/or soaked: 11/15/18
Method of scratching sidewall: Board with nails
Is pre-soak required? No * Not required in sandy soils
Soak* start time: 11:00 AM Soak* end time: 3:00 PM 4:00 hrs of soak
Method to maintain 12 in of water during soak: Water tank with Richy Water

3. Percolation Test Data

Test hole: #1 Location: In treatment area
Date reading taken: 11/16/18 Elevation: 97.50
Starting time: 13:00 Depth**: 36 inches

Soil texture description:

Depth (in)	Soil Texture
0 - 28	Loam
28 - 36	Clay Loam

** 12 inches for mounds & at-grades, depth of absorption area for trenches & beds

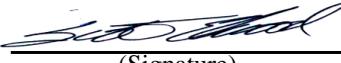
Reading	Start Time	End Time	Start Reading (in)	End Reading (in)	Perc rate (mpi)	% Difference Last 3 Rates	Pass
1	0	30	8.00	2.00	5	NA	NA
2	0	30	8.00	3.88	7.28	NA	NA
3	0	30	8.00	4.00	7.50	33.3	No
4	0	30	8.00	4.13	7.75	6.1	Yes
5							
6							
0							

Chosen Percolation Rate for Test Hole #1 7.5 mpi

Additional percolation test data may be included on attached pages
Design Percolation Rate (maximum of all tests) =

20.00 mpi

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

Scott Elwood (Designer)  (Signature) 2820 (License #) 11/15/18 (Date)

Additional Percolation Data



Test hole: #2

Location:

Starting time: 1:30 PM

Depth**: 28 inches

Soil texture description:

Depth (in)	Soil Texture
0 - 20	Loam
28 - 28	Clay Loam

** 12 in. for mounds & at-grades,
depth of absorption area for trenches
and beds

Reading	Start Time	End Time	Start Reading (in)	End Reading (in)	Perc rate (mpi)	% Difference Last 3 Rates	Pass
1	0	30	8.00	3.50	3.75	NA	NA
2	0	30	8.00	4.00	7.50	NA	NA
3	0	30	8.00	5.44	11.72	68.0	No
4	0	30	8.00	5.50	12.00	37.5	No
5	0	30	8.00	5.63	12.66	7.4	Yes
6							

Chosen Percolation Rate for Test Hole #2 12.7 mpi

Test hole: #3

Location:

Date reading taken: 11/16/18

Elevation:

Starting time: 1:45 PM

Depth**: 32 inches

Soil texture description:

Depth (in)	Soil Texture
0 - 20	Loam
28 - 28	Clay Loam

** 12 in. for mounds & at-grades,
depth of absorption area for trenches
and beds

Reading	Start Time	End Time	Start Reading (in)	End Reading (in)	Perc rate (mpi)	% Difference Last 3 Rates	Pass
1	0	30	8.00	5.63	12.6582278	NA	NA
2	0	30	8.00	6.25	17.14	NA	NA
3	0	30	8.00	6.50	20.00	36.7	No
4	0	30	8.00	6.44	19.23	14.3	No
5	0	30	8.00	6.50	20.00	3.8	Yes
6							

Chosen Percolation Rate for Test Hole #3 20.0 mpi



Minnesota Pollution
Control Agency

OSTP Final Permitting Flow Worksheet

UNIVERSITY
OF MINNESOTA



v 06.12.13

1. Flow from Dwellings	Flow from Dwellings	0	gpd	From either existing and new development worksheet
2. Flow from Other Establishments	Permitting Flow from Other Establishments	3520	gpd	From either Measured or Estimated OE worksheet
3. Flow from Collection System	a) Total Length of Collection Pipe:	400	feet	Design flow must include 200 gallons of infiltration and inflow per inch of collection pipe diameter per mile per day with a minimum pipe diameter of two inches. Flow values can be further increased if the system employs treatment devices that will infiltrate precipitation.
	b) Diameter of Pipe (Minimum of 2 in):	2.00	inches	
	c) Flow from I&I in Collection System:	30	gpd	
4. Final Permitting Flow		3550	gpd	Sum of 1, 2 and 3c.



OSTP Final Permitting Flow Worksheet



1. Flow from Dwellings	Flow from Dwellings	0	gpd	From either existing and new development worksheet
2. Flow from Other Establishments	Permitting Flow from Other Establishments	3520	gpd	From either Measured or Estimated-OE worksheet
3. Flow from Collection System	a) Total Length of Collection Pipe:	4300	feet	Design flow must include 200 gallons of infiltration and inflow per inch of collection pipe diameter per mile per day with a minimum pipe diameter of two inches. Flow values can be further increased if the system employs treatment devices that will infiltrate precipitation.
	b) Diameter of Pipe (Minimum of 2 in):	4.00	inches	
	c) Flow from I&I in Collection System:	652	gpd	
4. Final Permitting Flow		4172	gpd	Sum of 1, 2 and 3c.

Traverse County, Minnesota

494B—Darnen loam, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2w8fk
Elevation: 920 to 2,130 feet
Mean annual precipitation: 22 to 31 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 120 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Darnen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Darnen

Setting

Landform: Moraines
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-loamy colluvium

Typical profile

Ap - 0 to 8 inches: loam
A - 8 to 24 inches: loam
AB - 24 to 29 inches: loam
Bw1 - 29 to 34 inches: loam
Bw2 - 34 to 79 inches: loam

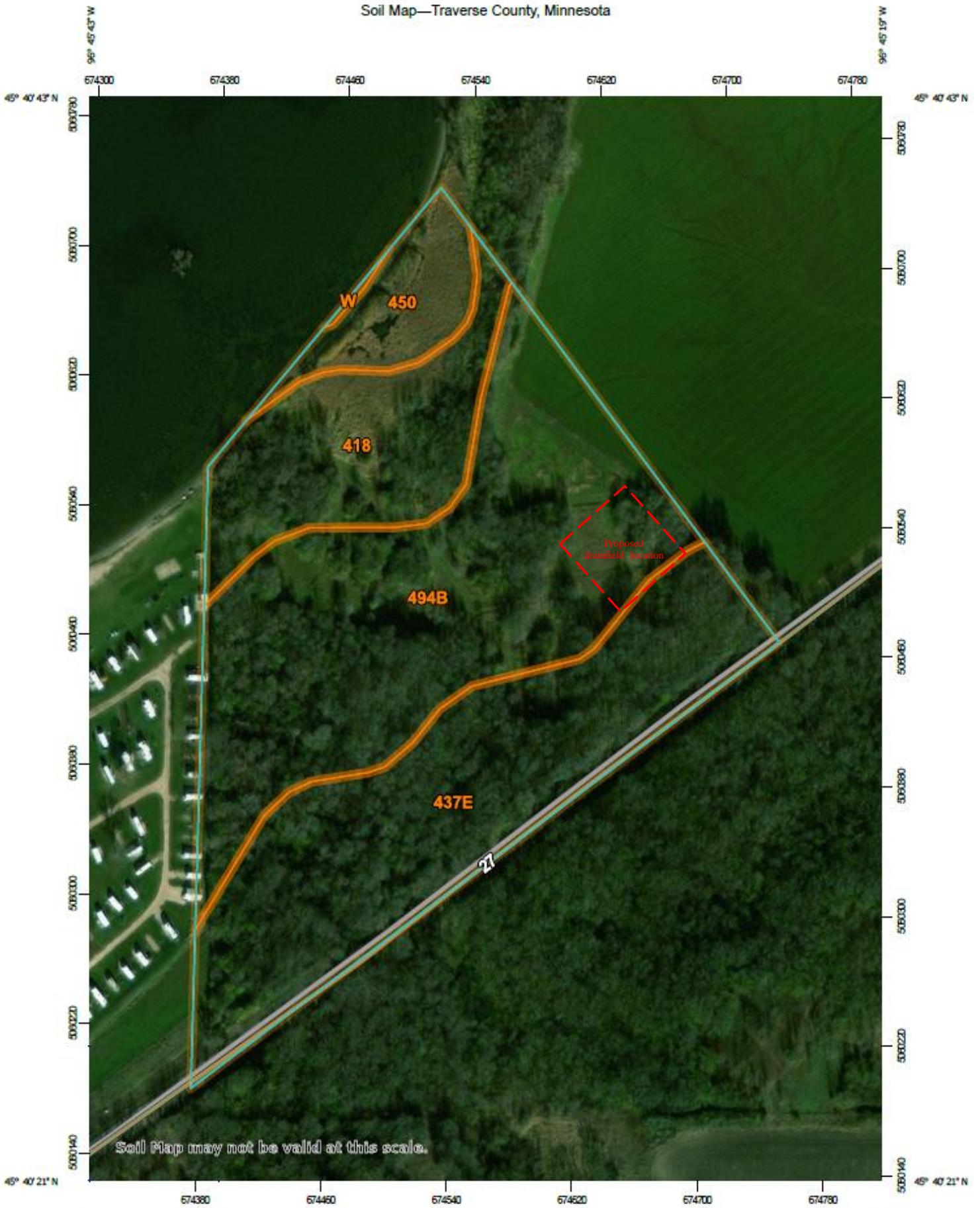
Properties and qualities

Slope: 1 to 6 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 47 to 59 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Soil Map—Traverse County, Minnesota



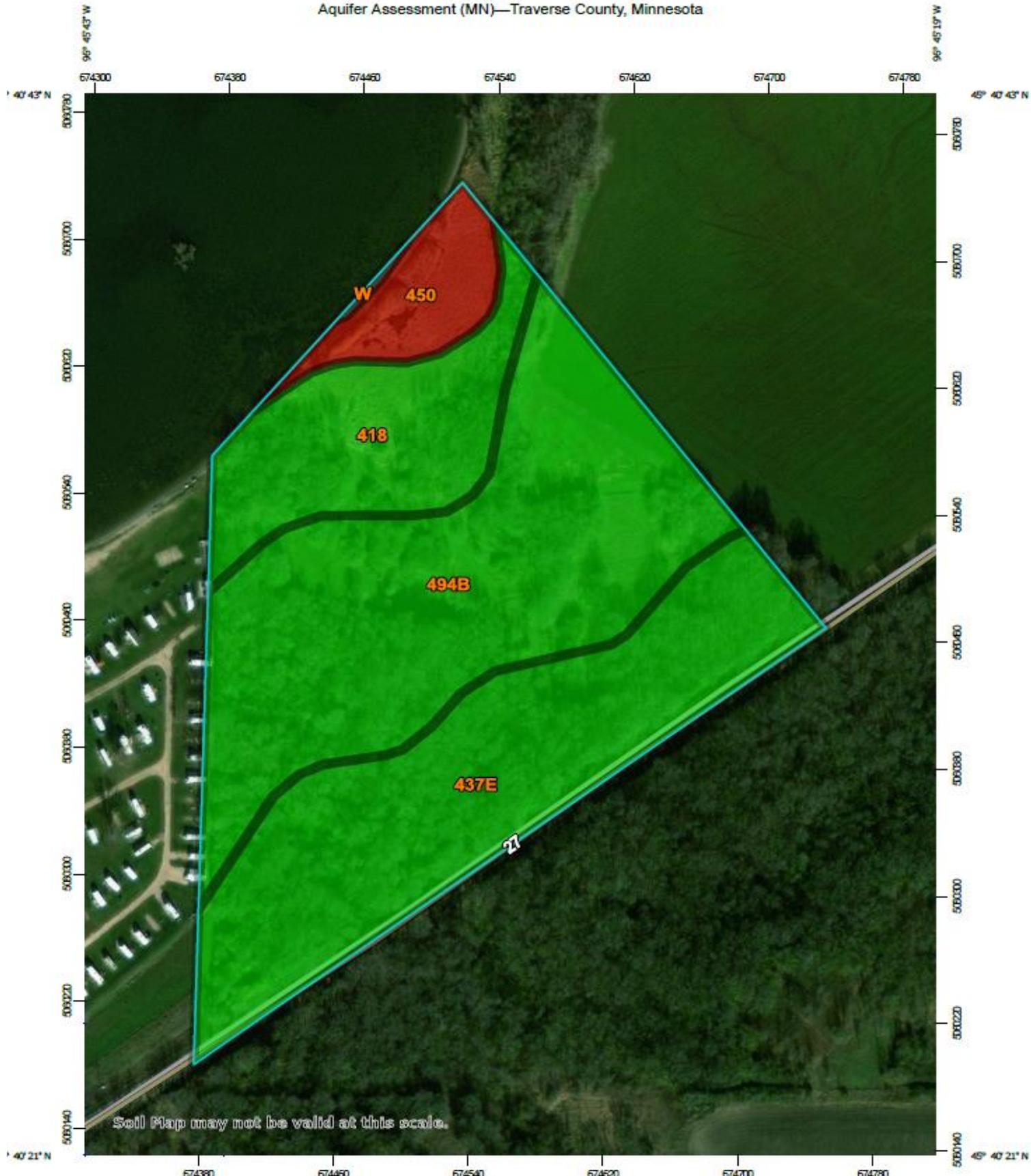
Map Scale: 1:3,250 if printed on A portrait (8.5" x 11") sheet.



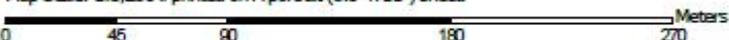
Map projection: Web Mercator Corner coordinates: WGS84 Edge ticks: UTM Zone 14N WGS84



Aquifer Assessment (MN)—Traverse County, Minnesota



Map Scale: 1:3,250 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

Certification of Buried Sewer Construction and Testing

This form must be completed and submitted to the Minnesota Department of Health (MDH) for installation of a buried sewer located 20 to 50 feet from a water-supply well, or the installation of a water-supply well located 20 to 50 feet from a buried sewer. **NOTE:** A 50-foot minimum separation must be maintained between a water-supply well and a buried collector or municipal sewer, an unapproved sewer, or a buried sewer serving a facility handling infectious or pathological waste.

Owner of Property Where Sewer is Located (please print)

Dan Binsfield

Street Address, City, ZIP for Property Where Sewer is Located

5386 Hwy 27 Browns Valley 56362

County Name Traverse	Township No. Windsor	Range No. 31 / 126 / 48	Section No. 31	Fraction
--------------------------------	--------------------------------	-----------------------------------	--------------------------	----------

Date of Testing (mm/dd/yyyy)	Person(s) Present to Witness Testing
------------------------------	--------------------------------------

Well Information

Provide Minnesota Well and Boring Number(s) _____ or, if unavailable provide the following information for each well located within 50 feet of the buried sewer.

Well No./Description	Well Depth	Well Diameter	Year of Construction	Well Contractor Company Name	Well Address (if different from above)

Variance Information

Was a variance issued by the MDT for this sewer or well installation? Yes No

If yes, please provide the variance tracking number: TN _____.

Sewer Materials

- | | | |
|---|---|--|
| <input type="checkbox"/> ABS (ASTM D2661) | <input type="checkbox"/> ABS (ASTM D2751) | <input type="checkbox"/> ABS (ASTM F628) |
| <input type="checkbox"/> PVC (ASTM D2665) | <input type="checkbox"/> PVC (ASTM D3430) | <input type="checkbox"/> PVC (ASTM F789) |
| <input type="checkbox"/> PVC (ASTM D2665) | <input type="checkbox"/> Cast Iron _____ | |

Test Methods (check one)

- Air Test (5 psi constant pressure for 15 minutes).
- Manometer Test (1-inch water column).
- Hydrostatic Test (for Plastic pipe only)

The portion of the buried sewer tested is described as follows (please specify each segment of sewer pipe which was tested)

Please draw a diagram of the sewer system on back and note the locations of any wells and the portions of the sewer system that were pressure tested.

Buried Sewer Testing Diagram

Please draw a site diagram of the sewer system and all buried sewer pipes, including those buried beneath buildings (serving floor drain[s], bathroom[s], laundry room, etc.). Please note the portions of the buried sewer pipes that were pressure tested, the location of the well(s), and major landmarks on the property.

I, (name) _____, certify that the buried sewer(s) described above is/are constructed of the indicated, approved sewer material meeting the requirements of the Minnesota Plumbing Code, Minnesota Rules, part 4715.0530, and has/have been successfully tested in accordance with Minnesota Rules, part 4715.2820, by the indicated method.

In accordance with Minnesota Statutes, section 144.992, persons submitting false information to the Minnesota Department of Health are subject to administrative penalties of up to \$10,000.

Name		Title	
Firm			
Street Address			
City		State	ZIP Code
License/Certification Number	Signature		Date

APPENDIX H: SSTS DESIGN APPROVAL



Woodland Engineering, St Paul, MN 55109

Sara Gronfeld
Traverse Soil & Water
304 4th Street North
Wheaton, MN 56296

Re: Septic system at Big Dog Development, Traverse County, MN.

I have reviewed the Design and Site Evaluation for the Septic System for Big Dog Development [NA Sec 31 Twp 126 R 48 NA] Traverse County. This is a System with a design flow of system 4,202 gallons per day [LISTS as defined in MN Chapter 7080]

The System:

Collection: 4,300' +/- 4" SDR-35 gasketed sewer pipe, 400' +/- 2" SCH40 pipe

Tanking: 2 - 2,500 gallon septic tanks, 9 - 2,250 gallon septic tanks, 1 - 1,500 gallon lift tank, and 2 - 2,250 lift tanks

Soil Treatment Area: 3 - 10'X100' rock bed mounds split into 3 zones

Pump Tank: 2 - 2,250 gallon tanks with 4,122 gallon reserve capacity,

3 - 58 gallon per minute pumps with 48.1 total feet head, alternating pumps with time dose

The plans for the Septic System are complete meeting the requirements for Chapter 7080 for a System design. The Soils were verified on October 23, 2019 with the limiting condition being identified at 12" for the two sites and the Mound Systems requiring 24" of clean sand that will be verified on construction.

If there are, any questions please feel to contact me at 612-251-4513.

Sincerely,

David Gustafson, C 1481
Woodland Engineering, L 1162

APPENDIX I: MN DOT LETTER



District 4 Property Management
1000 Highway 10 West
Detroit Lakes MN 56501

February 07, 2019

Mr. Ben Oleson, Traverse County Zoning Consultant
% Hometown Planning
324 Broadway Street Suite 101
Alexandria, MN 56308

**RE: C.S. 7802 (T.H. 27) MP 7.2-7.3 Left Side of roadway
Big Dog Land Development Conditional Use Permit Request for 88 Unit RV Site expansion.**

Dear Mr. Oleson:

Mark Kohler, Property Management Field Technician with The Minnesota Department of Transportation (MnDOT) District 4, Detroit Lakes, has been in contact with Dan Binsfeld regarding the Traverse County notice of the 88 unit RV Park Development request for a Conditional Use Permit on a parcel of land adjacent to State Trunk Highway 27. After further review MnDOT offers the following comments:

- 1) The proposed 88 unit RV site expansion will require a change of use permit from MnDOT. This is a requirement for any change in property use or change in traffic patterns. MnDOT will conduct a field review to ensure that a safe ingress/egress to the property can be constructed/reconstructed. This will be for the original entrance used to access the previous development, as well as additional access/es to the requested 88 unit expansion. If suitable sight distance can be established there will be no Right Turn Lane required.
- 2) MnDOT also reviews the preliminary plat for any changes to hydraulics (pre/post discharge) & any necessary utility connections within MnDOT Right of Way.
- 3) Mark Kohler has been in contact and will work with Dan Binsfeld to find suitable ingress/egress for the proposed expansion. Any current accesses to the property, not reconstructed for ingress/egress, shall be completely removed and the ditch graded to properly drain.
- 4) Dan Binsfeld will work with our Property Management office to obtain the proper permit/s. As the process moves forward we will keep your office informed, and copy you with any permits we issue.

Please call me at (218) 846-7950 or contact me by email if you have any questions or comments.

Sincerely,

A handwritten signature in black ink that reads 'Jim Utecht'.

Jim Utecht
Mn/DOT District 4
Property Management Supervisor

cc: Mary Safgren, MnDOT District 4 Transportation Planning Director; Jeremy Flatau, MnDOT District 4 Right of Way Supervisor; Dan Binsfeld, Developer; Mark Kohler, MnDOT District 4 Property Mgmt; file

APPENDIX J: NEARBY WELL RECORDS

Well Log 118562 (Behrens Well).pdf

Well Log 727133 (Reinart Well).pdf

Well Log 727144 (Benson Well).pdf

Well Log 727145 (Benson Well 2).pdf

Well Log 744975 (Young Well).pdf

Well Log 755979 (Pederson Well).pdf

Well Log 755981 (Well 1).pdf

Well Log 771415 (Reinart Well).pdf

Well Log 823607 (Theede Well).pdf

Well Log 823612 (Well 2).pdf

**MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes, Chapter 103I**

MINNESOTA UNIQUE WELL NO.

727133

WELL LOCATION

County Name Traverse

Township Name Windsor Township No. 126 Range No. 48-49 Section No. 31 Fraction NESE, NE

WELL DEPTH (completed) 61 ft. Date Work Completed 9-20-05

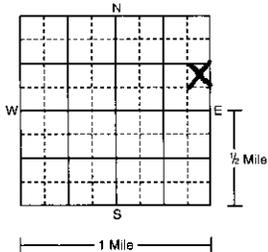
GPS LOCATION: Latitude _____ degrees _____ minutes _____ seconds _____
Longitude _____ degrees _____ minutes _____ seconds _____

DRILLING METHOD
 Cable Tool Driven Dug
 Auger Rotary Jetted

House Number, Street Name, City, and Zip Code of Well Location 54219 or Fire Number
5489 Hwy 27 Browns Valley MN

DRILLING FLUID Super Jet WELL HYDROFRACTURED? Yes No
FROM _____ ft. TO _____ ft.

Show exact location of well in section grid with "X". Sketch map of well location. Showing property lines, roads and buildings



USE
 Domestic Monitoring Heating/Cooling
 Noncommunity PWS Environ. Bore Hole Industry/Commercial
 Community PWS Irrigation Remedial
 Dewatering

CASING Drive Shoe? Yes No
 Steel Threaded Welded
 Plastic

CASING DIAMETER 4 in. to 56 ft. WEIGHT SDR 21 lbs./ft. 7 in. to 61 ft.
in. to _____ ft. lbs./ft. _____ in. to _____ ft.
in. to _____ ft. lbs./ft. _____ in. to _____ ft.

PROPERTY OWNER'S NAME/COMPANY NAME
Greg Reinart

SCREEN Johnson OPEN HOLE
Make Stainless FROM _____ ft. TO _____ ft.
Type 304 Diam. 3"

Property owner's mailing address if different than well location address indicated above.

Slot/Gauze 20 Length 5'
Set between 56 ft. and 61 ft. FITTINGS 4x3 K packer

STATIC WATER LEVEL
40 ft. below above land surface Date measured 9-20-05

WELL OWNER'S NAME/COMPANY NAME

PUMPING LEVEL (below land surface)
50 ft. after 2 hrs. pumping 5 g.p.m.

Well owner's mailing address if different than property owners address indicated above.

WELL HEAD COMPLETION
 Pitless adapter manufacturer Not Installed Model _____
 Casing Protection _____ 12 in. above grade
 At-grade (Environmental Wells and Boring ONLY)

GROUTING INFORMATION
Well grouted Yes No
Grout material Neat cement Bentonite Concrete High Solids Bentonite
from 0 to 50 ft. 4 yds. bags
from _____ to _____ ft. _____ yds. bags
from _____ to _____ ft. _____ yds. bags

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Top Soil	Bl	med	0	2
Clay	yell	med	2	18
Clay	Grey	hard	18	33
Sand	Grey	med	33	37
clay	Grey	hard	37	55
Sand	Grey/white	med	55	61

NEAREST KNOWN SOURCE OF CONTAMINATION
90 feet NW direction Septic type

Well disinfected upon completion Yes No

PUMP
 Not installed Date installed _____
Manufacturer's name _____
Model number _____ HP _____ Volts _____
Length of drop pipe _____ ft. Capacity _____ g.p.m.

Type: Submersible L.S. Turbine Reciprocating Jet _____

ABANDONED WELLS
Does property have any not in use and not sealed well(s) Yes No

VARIANCE
Was a variance granted from the MDH for this well? Yes No TN# _____

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

REMARKS. ELEVATION, SOURCE OF DATA, etc.



Reinart Bros Well Drilling 78-642
Licensee Business Name Lic. or Reg. No.
Joe Reinart 10-31-05
Authorized Representative Signature Date

Greg Reinart
Name of Driller

119058

WELL OR BORING LOCATION

County Name

Traverse

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD

Minnesota Statutes, Chapter 103/

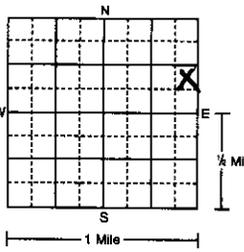
Minnesota Well and Boring Sealing No.
Minnesota Unique Well No. or W-series No.
(Leave blank if not known)

H 279467
727133

Township Name *Windsor* Township No. *126* Range No. *48-49* Section No. *31* Fraction (sm. -> lg.) *NE 1/4 SE 1/4 NE 1/4* Date Sealed *10-24-09* Date Well or Boring Constructed *9-20-05*

GPS LOCATION: Latitude _____ degrees _____ minutes _____ seconds Longitude _____ degrees _____ minutes _____ seconds Depth Before Sealing *61* ft. Original Depth *61* ft.

Numerical Street Address or Fire Number and City of Well or Boring Location *5489 Hwy 27 Browns Valley MN*
Show exact location of well or boring in section grid with "X." Sketch map of well or boring location, showing property lines, roads, and buildings.



AQUIFER(S) Single Aquifer Multiaquifer
WELL/BORING Water-Supply Well Monit. Well
 Env. Bore Hole Other _____
STATIC WATER LEVEL Measured Estimated Date Measured _____
40 ft. below above land surface

CASING TYPE(S)
 Steel Plastic Tile Other _____

WELLHEAD COMPLETION
Outside: Well House At Grade Pitless Adapter/Unit Well Pit Other _____
Inside: Basement Offset Burled Other _____

PROPERTY OWNER'S NAME/COMPANY NAME *Dreg Reinart*
Property owner's mailing address if different than well location address indicated above

CASING(S)
Diameter *4* in. from *0* to *56* ft. Set in oversize hole? Yes No Annular space initially grouted? Yes No Unknown
_____ in. from _____ to _____ ft. Yes No Yes No Unknown
_____ in. from _____ to _____ ft. Yes No Yes No Unknown

WELL OWNER'S NAME/COMPANY NAME
Well owner's mailing address if different than property owner's address indicated above

SCREEN/OPEN HOLE
Screen from *56* to *61* ft. Open Hole from _____ to _____ ft.

OBSTRUCTIONS
 Rods/Drop Pipe Check Valve(s) Debris Fill No Obstruction
Type of Obstructions (Describe) _____

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
<i>Top Soil</i>	<i>Bl</i>	<i>Med</i>	<i>0</i>	<i>2</i>
<i>Clay</i>	<i>Yell</i>	<i>mod</i>	<i>2</i>	<i>18</i>
<i>Clay</i>	<i>Grey</i>	<i>hard</i>	<i>18</i>	<i>33</i>
<i>Sand</i>	<i>Dry</i>	<i>mod</i>	<i>33</i>	<i>37</i>
<i>Clay</i>	<i>Dry</i>	<i>hard</i>	<i>37</i>	<i>55</i>
<i>Sand</i>	<i>Dry</i>	<i>Med</i>	<i>55</i>	<i>61</i>
<i>Clay</i>				

Obstructions removed? Yes No Describe _____
PUMP
Type _____
 Removed Not Present Other _____

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:
 No Annular Space Exists Annular Space Grouted with Tremie Pipe Casing Perforation/Removal
_____ in. from _____ to _____ ft. Perforated Removed
_____ in. from _____ to _____ ft. Perforated Removed
Type of Perforator _____
 Other _____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)
Grouting Material *Bentonite* from *0* to *61* ft. _____ yards *3* bags
_____ from _____ to _____ ft. _____ yards _____ bags
_____ from _____ to _____ ft. _____ yards _____ bags

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

OTHER WELLS AND BORINGS
Other unsealed and unused well or boring on property? Yes No How many? _____

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION
This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Reinart Bros Well Drilling Licensee Business Name *1826* License or Registration No.

Greg Reinart Certified Representative Signature *463* Certified Rep. No. *12-9-09* Date

MINN. DEPT OF HEALTH COPY H 279467

Dreg Reinart Name of Person Sealing Well or Boring

WELL OR BORING LOCATION
County Name
Traverse

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 103J

Minnesota Well and Boring Sealing No.
Minnesota Unique Well No. or W-series No.
(Leave blank if not known)

H 279467
727133

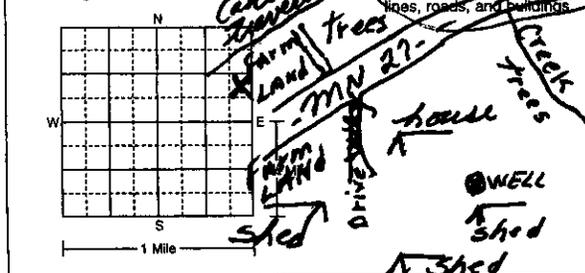
Township Name Windsor Township No. 126 Range No. 48-49 Section No. 31 Fraction (sm. → lg.) NE 1/4 SE 1/4 NE 1/4 Date Sealed 10-24-09 Date Well or Boring Constructed 9-20-05

GPS LOCATION: Latitude _____ degrees _____ minutes _____ seconds
Longitude _____ degrees _____ minutes _____ seconds

Depth Before Sealing 61 ft. Original Depth 61 ft.

Numerical Street Address or Fire Number and City of Well or Boring Location

5489 Hwy 27 Browns Valley MN
Show exact location of well or boring in section grid with "X."



AQUIFER(S)
 Single Aquifer Multiaquifer

WELL/BORING
 Water-Supply Well Monit. Well
 Env. Bore Hole Other _____

STATIC WATER LEVEL
 Measured Estimated Date Measured _____
40 ft. below above land surface

CASING TYPE(S)
 Steel Plastic Tile Other _____

WELLHEAD COMPLETION
Outside: Well House At Grade Pitless Adapter/Unit Well Pit Other _____
Inside: Basement Offset Well Pit Buried Other _____

PROPERTY OWNER'S NAME/COMPANY NAME
Dreg Reinart

Property owner's mailing address if different than well location address indicated above

CASING(S)
Diameter _____ in. from _____ to _____ ft. Set in oversize hole? Yes No Annular space initially grouted? Yes No Unknown
4 in. from 0 to 56 ft. Yes No Yes No Unknown

WELL OWNER'S NAME/COMPANY NAME

Well owner's mailing address if different than property owner's address indicated above

SCREEN/OPEN HOLE
Screen from 56 to 61 ft. Open Hole from _____ to _____ ft.

OBSTRUCTIONS
 Rods/Drop Pipe Check Valve(s) Debris Fill No Obstruction
Type of Obstructions (Describe) _____

GEOLOGICAL MATERIAL COLOR HARDNESS OR FORMATION FROM TO

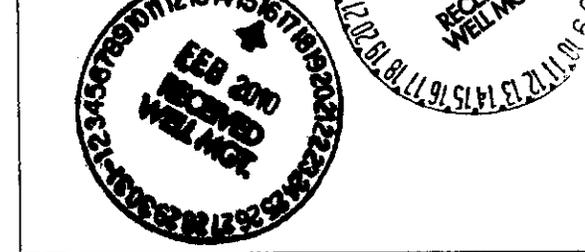
GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
Top Soil	Bl	Med	0	2
Clay	Yell	Med	2	18
Clay	Grey	hard	18	33
Sand	Grey	med	33	37
Clay	Grey	hard	37	55
Sand	Grey	Med	55	61
Clay				

PUMP
Type _____
 Removed Not Present Other _____

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:
 No Annular Space Exists Annular Space Grouted with Tremie Pipe Casing Perforation/Removal
_____ in. from _____ to _____ ft. Perforated Removed
_____ in. from _____ to _____ ft. Perforated Removed
Type of Perforator _____
 Other _____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)
Grouting Material Bentonite from 0 to 61 ft. _____ yards 3 bags
_____ from _____ to _____ ft. _____ yards _____ bags
_____ from _____ to _____ ft. _____ yards _____ bags

REMARKS, SOURCE OF DIFFICULTIES IN SEALING



OTHER WELLS AND BORINGS
Other unsealed and unused well or boring on property? Yes No How many? _____

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION
This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Reinart Bros Well Drilling Licensee Business Name 1826 License or Registration No.
Joe Reinart Certified Representative Signature 463 12-9-09 Certified Rep. No. Date

MINN. DEPT OF HEALTH COPY H 279467

Dreg Reinart Name of Person Sealing Well or Boring

727144

County Traverse
 Quad Peever NE
 Quad ID 167A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
 Minnesota Statutes Chapter 1031

Entry Date
 Update Date 04/22/2008
 Received Date 01/29/2007

Well Name BENSON,	Township 125	Range 49	Dir Section W 1	Subsection DDCCCB	Well Depth 65 ft.	Depth Completed 65 ft.	Date Well Completed 12/01/2006
Elevation 991 ft.	Elev. Method Calc from DEM (USGS 7.5 min or equiv.)				Drill Method Non-specified Rotary	Drill Fluid Qwik gel	
Address Well 5381 27 SH BROWNS VALLEY MN					Use domestic	Status Active	
Stratigraphy Information					Well Hydrofractured? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	From To	
Geological Material					Casing Type Single casing	Joint	
From To (ft.) Color Hardness					Drive Shoe? Yes <input type="checkbox"/> No <input type="checkbox"/>	Above/Below	
TOPSOIL 0 1 BLACK SOFT					Casing Diameter 4 in. To 53 ft. lbs./ft. Hole Diameter 7 in. To 65 ft.		
CLAY 1 8 YELLOW MEDIUM					Open Hole From ft. To ft.		
CLAY 8 10 GRAY MEDIUM					Screen? <input checked="" type="checkbox"/> Type plastic Make		
SHALE 10 53 DK. GRY HARD					Diameter Slot/Gauze Length Set		
LIMESTONE 53 65 BROWN HARD					4 in. 60 12 ft. 53 ft. 65 ft.		
					Static Water Level 2 ft. land surface Measure 12/01/2006		
					Pumping Level (below land surface) 40 ft. 4 hrs. Pumping at 2 g.p.m.		
					Wellhead Completion Pitless adapter manufacturer Model		
					<input type="checkbox"/> Casing Protection <input checked="" type="checkbox"/> 12 in. above grade		
					<input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY)		
					Grouting Information Well Grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Specified		
					Material Amount From To		
					neat cement Sacks ft. 50 ft.		
					Nearest Known Source of Contamination 250 feet Northwest Direction Body of water Type		
					Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
					Pump <input checked="" type="checkbox"/> Not Installed Date Installed		
					Manufacturer's name		
					Model Number HP Volt		
					Length of drop pipe ft Capacity g.p. Typ		
					Abandoned Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
					Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
					Miscellaneous First Bedrock Aquifer		
					Last Strat Depth to Bedrock ft		
					Located by Minnesota Department of Health		
					Locate Method GPS SA Off (averaged) (15 meters)		
					System UTM - NAD83, Zone 15, Meters X 206673 Y 5064667		
					Unique Number Verification Info/GPS from data Input Date 11/30/2007		
					Angled Drill Hole		
					Well Contractor Reinart Bros. Well Drilling, 1826 REINART, G. Licensee Business Lic. or Reg. No. Name of Driller		
Remarks							

WELL LOCATION

County Name **Traverse**

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL NO.

727145

Township Name **Folsom** Township No. **125** Range No. **49** Section No. **1** Fraction **NENENW**

WELL DEPTH (completed) **117** ft. Date Work Completed **12-1-06**

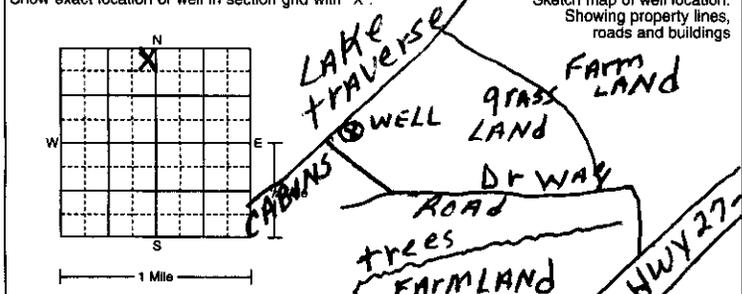
GPS LOCATION: Latitude _____ degrees _____ minutes _____ seconds _____
Longitude _____ degrees _____ minutes _____ seconds _____

DRILLING METHOD
 Cable Tool Driven Dug
 Auger Rotary Jetted

House Number, Street Name, City, and Zip Code of Well Location
5381 State Hwy 27 Browns Valley MN

DRILLING FLUID **Super Gel X** WELL HYDROFRACTURED? Yes No
FROM _____ ft. TO _____ ft.

Show exact location of well in section grid with "X".



USE
 Domestic Monitoring Heating/Cooling
 Noncommunity PWS Environ. Bore Hole Industry/Commercial
 Community PWS Irrigation Remedial
 Dewatering

PROPERTY OWNER'S NAME/COMPANY NAME
~~DAVID B. BENSON~~ **Leland BENSON**

CASING Drive Shoe? Yes No
 Steel Threaded Welded
 Plastic

Property owner's mailing address if different than well location address indicated above.

**5381 State Hwy 27
Browns Valley, MN.
56219**

CASING DIAMETER **4** in. to **93** ft. WEIGHT **50 lb** lbs./ft. **7** in. to **117** ft.
in. to _____ ft. _____ lbs./ft. _____ in. to _____ ft.
in. to _____ ft. _____ lbs./ft. _____ in. to _____ ft.

WELL OWNER'S NAME/COMPANY NAME
Dan Binsfeld

SCREEN OPEN HOLE
Make **PVC** FROM **4** ft. TO _____ ft.
Type _____ Diam. _____

Well owner's mailing address if different than property owners address indicated above.

**29534 Cty. Rd. 20
Paynesville, MN 56363**

Slot/Gauge **60** Length **24**
Set between **93** ft. and **117** ft. FITTINGS **4x4 slipcouple**

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
top soil	BL	soft	0	1
clay	Yell	Med	1	19
Shale	DARK GREY	HARD	19	93
Limestone FORMATION	Br	HARD	93	117

STATIC WATER LEVEL
2 ft. below above land surface Date measured _____

NEAREST KNOWN SOURCE OF CONTAMINATION
250' feet **NW** direction **LAKE** type

PUMPING LEVEL (below land surface)
90 ft. after **4** hrs. pumping **5** g.p.m.

WELL HEAD COMPLETION
 Pitless adapter manufacturer _____ Model _____
 Casing Protection 12 in. above grade
 At-grade (Environmental Wells and Boring ONLY)

GROUTING INFORMATION
Well grouted Yes No
Grout material Neat cement Bentonite Concrete High Solids Bentonite
from **0** to **90** ft. **4** yds. bags
from _____ to _____ ft. _____ yds. bags
from _____ to _____ ft. _____ yds. bags

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

ABANDONED WELLS
Does property have any not in use and not sealed well(s) Yes No

VARIANCE
Was a variance granted from the MDH for this well? Yes No TN# _____

PUMP
 Not installed Date installed _____
Manufacturer's name _____
Model number _____ HP _____ Volts _____
Length of drop pipe _____ ft. Capacity _____ g.p.m.
Type: Submersible L.S. Turbine Reciprocating Jet

REMARKS, ELEVATION, SOURCE OF DATA, etc.

Use a second sheet, if needed

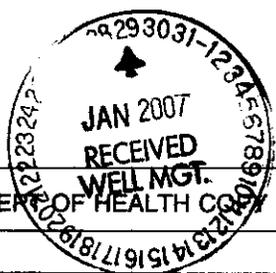
MINN. DEPT. OF HEALTH

Licensee Business Name **Remait Bros** Lic. or Reg. No. **1826 78642**

727145

Authorized Representative Signature **Joe Remait** Date **12-1-06**

Name of Driller **Joe Remait**



MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes, Chapter 103I

744975

WELL/BORING LOCATION
County Name Traverse

Township Name W Windsor Township No. 126 Range No. 48.49 Section No. 3 Fraction NENW 1/4

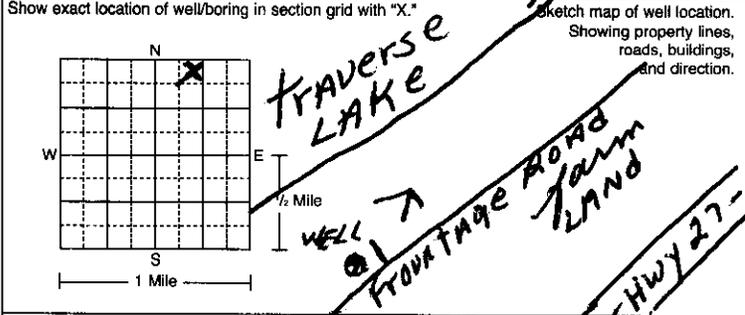
WELL/BORING DEPTH (completed) 414 ft. DATE WORK COMPLETED MAY 7-08

GPS LOCATION: Latitude _____ degrees _____ minutes _____ seconds _____ Longitude _____ degrees _____ minutes _____ seconds _____

DRILLING METHOD
 Cable Tool Driven Dug
 Auger Rotary Jetted

House Number, Street Name, City, and Zip Code of Well Location 5381 Brown Valley MN 56219 or Fire Number _____

DRILLING FLUID Supergel X WELL HYDROFRACTURED? Yes No
From _____ ft. To _____ ft.



USE Domestic Monitoring Heating/Cooling
 Noncommunity PWS Environ. Bore Hole Industry/Commercial
 Community PWS Irrigation Remedial
 Elevator Dewatering

PROPERTY OWNER'S NAME/COMPANY NAME Mike Young

CASING MATERIAL Drive Shoe? Yes No HOLE DIAM. 6 414
 Steel Threaded Welded
 Plastic

Property owner's mailing address if different than well location address indicated above.
609 Broadway Ave
Wheaton, MN 56296

CASING Diameter 2 in. to 374 ft. Weight 5240 lbs./ft. Specifications _____
_____ in. to _____ ft. _____ lbs./ft. _____
_____ in. to _____ ft. _____ lbs./ft. _____

WELL/BORING OWNER'S NAME/COMPANY NAME _____

SCREEN Make _____ OPEN HOLE From _____ ft. To _____ ft.
Type PVC Diam. 2
Slot/Gauze 60 Length 40

Well/boring owner's mailing address if different than property owner's address indicated above.

Set between 374 ft. and 414 ft. FITTINGS _____

STATIC WATER LEVEL 8 ft. Below Above land surface Date measured 6-7-08

PUMPING LEVEL (below land surface) 0 ft. after 24 hrs. pumping 1203 g.p.m.

WELL HEAD COMPLETION
 Pitless Adapter Manufacturer _____ Model _____
 Casing Protection _____ 12 in. above grade
 At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION
Well grouted? Yes No
Grout materials Neat cement Bentonite Concrete Other _____
From 0 To 350 ft. 15 Yds. Bags
From _____ To _____ ft. _____ Yds. Bags
From _____ To _____ ft. _____ Yds. Bags

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Topsoil	BL	soft	0	1
Clay-Rocky Shale	Br.	HARD	1	10
CLAY w/SAND layers	white		10	375
CLAY w/SAND layers	green		375	400
CLAY w/SAND layers			400	414

NEAREST KNOWN SOURCE OF CONTAMINATION 80 feet N direction Septic type
Well disinfected upon completion? Yes No

PUMP Not installed Date installed _____ Flows 1203 per min.
Manufacturer's name _____
Model Number _____ HP _____ Volts _____
Length of drop pipe _____ ft. Capacity _____ g.p.m.
Type: Submersible L.S. Turbine Reciprocating Jet

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? Yes No

VARIANCE
Was a variance granted from the MDH for this well? Yes No TN# _____

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

Remait Bros. 1826
Licensee Business Name Lic. or Reg. No. 463
Joe Remait
Authorized Representative Signature Date 6-1-08
Joe Remait
Name of Driller

MINN. DEPT OF HEALTH COPY 744975

HE-01205-09 (Rev. 9/05)

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD

Minnesota Statutes, Chapter 103I

Minnesota Well and Boring Sealing No.
Minnesota Unique Well No. or W-series No.
(Leave blank if not known)

H 279470

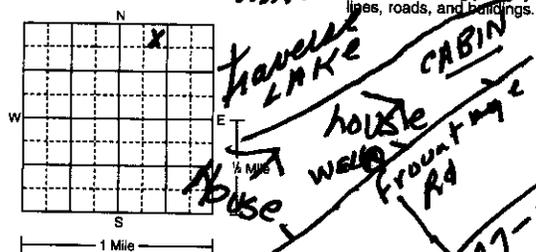
WELL OR BORING LOCATION
County Name Isaiah

Township Name WINDSOR Township No. 126 Range No. 49 Section No. 31 Fraction (sm. → lg.) NE 1/4 NE Date Sealed 1-19-10 Date Well or Boring Constructed MAY 7-08

GPS LOCATION: Latitude _____ degrees _____ minutes _____ seconds Longitude _____ degrees _____ minutes _____ seconds
Depth Before Sealing 414 ft. Original Depth 414 ft.

Numerical Street Address or Fire Number and City of Well or Boring Location
5381 BENSON DR. Browns Valley MN.

Show exact location of well or boring in section grid with "X."
Sketch map of well or boring location, showing property lines, roads, and buildings.



AQUIFER(S) Single Aquifer Multiaquifer
WELL/BORING Water-Supply Well Monit. Well
 Env. Bore Hole Other

STATIC WATER LEVEL
 Measured Estimated Date Measured 1-19-10
8 ft. below above land surface

CASING TYPE(S)
 Steel Plastic Tile Other

WELLHEAD COMPLETION
Outside: Well House At Grade Pitless Adapter/Unit Buried
Inside: Basement Offset Well Pit Buried Other

PROPERTY OWNER'S NAME/COMPANY NAME
MIKE YOUNG

CASING(S)
Diameter 2 in. from 0 to 374 ft. Set in oversize hole? Yes No
Annular space initially grouted? Yes No Unknown

WELL OWNER'S NAME/COMPANY NAME
Well owner's mailing address if different than property owner's address indicated above

SCREEN/OPEN HOLE
Screen from 374 to 414 ft. Open Hole from _____ to _____ ft.

OBSTRUCTIONS
 Rods/Drop Pipe Check Valve(s) Debris Fill Obstruction

Obstructions removed? Yes No Describe

PUMP
Type Flow 1203 per min.
 Removed Not Present Other

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:
 No Annular Space Exists Annular Space Grouted with Tremie Pipe Casing Perforation/Removal

_____ in. from _____ to _____ ft. Perforated Removed

_____ in. from _____ to _____ ft. Perforated Removed

Type of Perforator _____
 Other

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)

Grouting Material Cement from 0 to 414 yards 8 bags

_____ from _____ to _____ ft. _____ yards _____ bags

_____ from _____ to _____ ft. _____ yards _____ bags

OTHER WELLS AND BORINGS
Only unsealed and unused well or boring on property? Yes No How many? _____

SEALING OR REGISTERED CONTRACTOR CERTIFICATION
This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Remait Bros Licensee Business Name License or Registration No. 1826

Joe Remait Certified Representative Signature Certified Rep. No. 463 Date _____

Doug Remait Name of Person Sealing Well or Boring Date 1-19-10

MINN. DEPT. OF HEALTH COPY H 279470

WELL OR BORING LOCATION
County Name Townsend

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 103f

Minnesota Well and Boring Sealing No. H-279470
Minnesota Unique Well No. or W-series No. 744975

Township Name Windsor Township No. 126 Range No. 49 Section No. 31 Fraction (sm. → lg.) NE 1/4 NE 1/4 Date Sealed 1-19-10

Date Well or Boring Constructed May 7-08

GPS LOCATION: Latitude _____ degrees _____ minutes _____ seconds
Longitude _____ degrees _____ minutes _____ seconds

Depth Before Sealing 414 ft. Original Depth 414 ft.

Numerical Street Address or Fire Number and City of Well or Boring Location
5381 Benson Dr. Browns Valley MN.

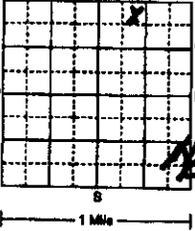
AQUIFER(S)
 Single Aquifer Multi-aquifer

STATIC WATER LEVEL
 Measured Estimated Date Measured 1-19-10

Show exact location of well or boring in section grid with "X".

Water-Supply Well Monit. Well
 Env. Bore Hole Other _____

8 ft. below above land surface



CASING TYPE(S)
 Steel Plastic Tile Other _____

WELLHEAD COMPLETION
Outside: Well House At Grade Pitless Adapter/Unit Buried Well Pit Other _____
Inside: Basement Offset Well Pit Buried Other _____

PROPERTY OWNER'S NAME/COMPANY NAME
Mike Young

CASING(S)
Diameter 2 in. from 0 to 374 ft. Set in oversize hole? Yes No Annular space initially grouted? Yes No Unknown

Well owner's mailing address if different than well location address indicated above

_____ in. from _____ to _____ ft. Yes No Yes No Unknown
_____ in. from _____ to _____ ft. Yes No Yes No Unknown

WELL OWNER'S NAME/COMPANY NAME

SCREEN/OPEN HOLE
Screen from 374 to 414 ft. Open Hole from _____ to _____ ft.

Well owner's mailing address if different than property owner's address indicated above

OBSTRUCTIONS
 Rods/Drop Pipe Check Valve(s) Debris Fil No Obstruction
Type of Obstructions (Describe) _____

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
Top soil	BL	soft	0	1
Clay Rocky	Br.	hard	1	10
Shale	Grey	Hard	10	375
Clay w/sand layer	White		375	400
Clay w/sand layer	grey		400	414

Obstructions removed? Yes No Describe _____

If not known, indicate estimated formation log from nearby well or boring.

PUMP
Type Flow 1203 per min.
 Removed Not Present Other _____

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
Top soil	BL	soft	0	1
Clay Rocky	Br.	hard	1	10
Shale	Grey	Hard	10	375
Clay w/sand layer	White		375	400
Clay w/sand layer	grey		400	414

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:
 No Annular Space Exists Annular Space Grouted with Tremie Pipe Casing Perforation/Removal
_____ in. from _____ to _____ ft. Perforated Removed
_____ in. from _____ to _____ ft. Perforated Removed
Type of Perforator _____
 Other _____

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
Top soil	BL	soft	0	1
Clay Rocky	Br.	hard	1	10
Shale	Grey	Hard	10	375
Clay w/sand layer	White		375	400
Clay w/sand layer	grey		400	414

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 80 lbs.)
Grouting Material Cement from 0 to 414 yards 8 bags
_____ from _____ to _____ ft. _____ yards _____ bags
_____ from _____ to _____ ft. _____ yards _____ bags

REMARKS, SPECIAL NOTES, OR COMMENTS CONCERNING SEALING
ADDITIONAL DATA ADDED TO THIS DOCUMENT
FEB 17 2010
Reinast Bros
DATA RECEIVED
From: _____ By: RS

OTHER WELLS AND BORINGS
Of unsealed and unused well or boring on property? Yes No How many? _____
LICENSED OR REGISTERED CONTRACTOR CERTIFICATION
The well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.
Reinast Bros Licensee Business Name 1826 License or Registration No.
Joe Reinast Certified Representative Signature 463 Certified Rep. No. Date
Joe Reinast Name of Person Sealing Well or Boring 1-19-10

MINN. DEPT OF HEALTH COPY H 279470

_____ 1-19-10

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes, Chapter 1031

755981

WELL OR BORING LOCATION
County Name Traverse

Township Name Windsor Township No. 126 Range No. 79 Section No. 31 Fraction NW 1/4 SW 1/4

WELL/BORING DEPTH (completed) 30 ft. DATE WORK COMPLETED 8-18-08

GPS LOCATION: Latitude _____ degrees _____ minutes _____ seconds _____
Longitude _____ degrees _____ minutes _____ seconds _____

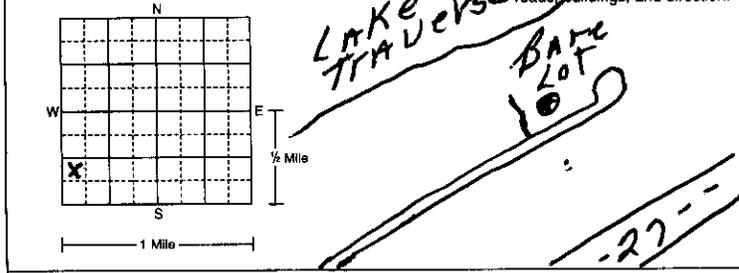
DRILLING METHOD
 Cable Tool Driven Dug
 Auger Rotary Jetted

House Number, Street Name, City, and Zip Code of Well Location Rt 1 Browns Valley, MN 56219 or Fire Number _____

DRILLING FLUID Super gel * WELL HYDROFRACTURED? Yes No
From _____ ft. To _____ ft.

Show exact location of well/boring in section grid with "X." Sketch map of well/boring location. Showing property lines, roads, buildings, and direction.

USE Domestic Monitoring Heating/Cooling
 Noncommunity PWS Environ. Bore Hole Industry/Commercial
 Community PWS Irrigation Remedial
 Elevator Dewatering _____



CASING MATERIAL Drive Shoe? Yes No
 Steel Threaded Welded
 Plastic _____

CASING Diameter 4 in. to 20 ft. Weight 2 lbs./ft. Specifications _____
HOLE DIAM. 7 in. to 30 ft.

PROPERTY OWNER'S NAME/COMPANY NAME DAN BINS FELD

SCREEN Make JOHNSON OPEN HOLE From _____ ft. To _____ ft.
Type 304 stainless Diam. _____
Slot/Gauze 20 Length _____
Set between 20 ft. and 30 ft. FITTINGS _____

Property owner's mailing address if different than well location address indicated above.
29534 Cty Rd 20
PAYNESVILLE MN 56362

STATIC WATER LEVEL Measured from Top
15 ft. Below Above land surface Date measured 8-18-08

WELL OWNER'S NAME/COMPANY NAME _____

PUMPING LEVEL (below land surface) 17 ft. after 4 hrs. pumping 15 g.p.m.

Well/boring owner's mailing address if different than property owner's address indicated above.

WELLHEAD COMPLETION Pitless/adaptor manufacturer monitor Model Bulldog
 Casing Protection 12 in. above grade
 At-grade (Environmental Well and Boring ONLY)

GEOLOGICAL MATERIALS COLOR HARDNESS OF MATERIAL FROM TO

GROUTING INFORMATION
Well grouted Yes No
Grout materials Neat cement Bentonite Concrete Other
From 0 To 20 ft. 1 1/2 Yds. Bags
From _____ To _____ ft. Yds. Bags
From _____ To _____ ft. Yds. Bags

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
top soil	BL		0	1
clay	Br.	Med	1	12
clay	Dark Br.	Med	12	17
SAND + gravel	Br.	Med	17	30

NEAREST KNOWN SOURCE OF CONTAMINATION 125 feet NW direction Septic type

Well disinfected upon completion? Yes No

PUMP Not installed Date installed 8-18-08

Manufacturer's name Schaeffer

Model Number _____ HP 1/2 Volts 230
Length of drop pipe 20 ft. Capacity 10 g.p.m.

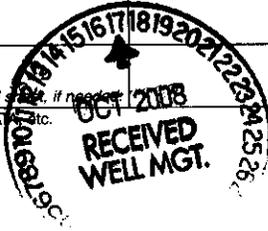
Type: Submersible L.S. Turbine Reciprocating Jet _____

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? Yes No

VARIANCE
Was a variance granted from the MDH for this well? Yes No TN# _____

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

REMARKS, ELEVATION, SOURCE OF DATA



Reinait Bros 1826
Licensee Business Name Lic. or Reg. No.

Joe Reinait 463
Certified Representative Signature Certified Rep. No. Date

Mary Reinait 10-13-08
Name of Driller

MINN. DEPT. OF HEALTH COPY 755981

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL AND BORING NO.

771415

WELL OR BORING LOCATION

County Name
Traverse

Township Name: *Windsor* Township No.: *126* Range No.: *48-49* Section No.: *31* Fraction: *NE SE NE*

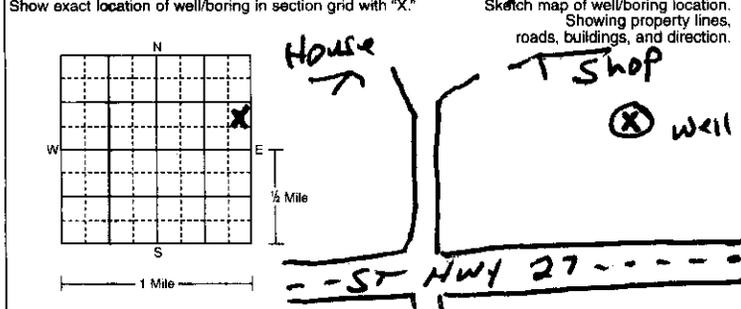
WELL/BORING DEPTH (completed): *61 ft* WORK COMPLETED: *11-26-10*

GPS LOCATION: Latitude _____ degrees _____ minutes _____ seconds _____
Longitude _____ degrees _____ minutes _____ seconds _____

DRILLING METHOD
 Cable Tool Driven Dug
 Auger Rotary Jetted

House Number, Street Name, City, and Zip Code of Well Location or Fire Number
5489 Hwy 27 Bump Valley MN 5489

DRILLING FLUID: *Super Gel* WELL HYDROFRACTURED? Yes No



USE
 Domestic Monitoring Heating/Cooling
 Noncommunity PWS Environ. Bore Hole Industry/Commercial
 Community PWS Irrigation Remedial
 Elevator Dewatering _____

CASING MATERIAL Drive Shoe? Yes No HOLE DIAM.
 Steel Threaded Welded
 Plastic _____

CASING Diameter: *4* in. to *55* ft. Weight: *2* lbs./ft. Specifications: *SDR 21* HOLE DIAM.: *7* in. to *61* ft.

PROPERTY OWNER'S NAME/COMPANY NAME
Greg Reinart

SCREEN: *4" PVC* OPEN HOLE From _____ ft. To _____ ft.

Property owner's mailing address if different than well location address indicated above.

Type: _____ Diam.: *4"* Length: *6 FT*
Slot/Gauge: *50* FITTINGS: *Slip Coupling*

STATIC WATER LEVEL Measured from: *Surface*
40 ft. Below Above land surface Date measured: *11-26-10*

WELL OWNER'S NAME/COMPANY NAME

PUMPING LEVEL (below land surface)
50 ft. after *2* hrs. pumping *10* g.p.m.

Well/boring owner's mailing address if different than property owner's address indicated above.

WELLHEAD COMPLETION
 Pitless/adaptor manufacturer: *Monitor* Model: *Bulldog*
 Casing Protection 12 in. above grade
 At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION
Well grouted Yes No
Grout materials Neat cement Bentonite Concrete Other
From *0* To *50* ft. *3* Yds. Bags
From _____ To _____ ft. _____ Yds. Bags
From _____ To _____ ft. _____ Yds. Bags

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Top Soil	Bl	med	0	1
clay	yellow	med	2	18
clay	Grey	hard	18	33
Sand	Grey	mixed	33	37
clay	Grey	hard	37	55
Sand	Grey	med	55	61

NEAREST KNOWN SOURCE OF CONTAMINATION
150 feet *NE* direction *Septic* type

Well disinfected upon completion? Yes No

PUMP
 Not installed Date installed: *11-26-10*

Manufacturer's name: *Schaeffers*

Model Number: *Legend* HP: *1/2* Volts: *230*
Length of drop pipe: *50* ft. Capacity: *10* g.p.m.

Type: Submersible L.S. Turbine Reciprocating Jet

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? Yes No

VARIANCE
Was a variance granted from the MDH for this well? Yes No TN#

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

REMARKS, ELEVATION, SOURCE OF DATA, etc.
Use a second sheet, if needed.



Licensee Business Name: *Reinart Bros Well Drilling 1826* Lic. or Reg. No. _____

Certified Representative Signature: *Greg Reinart* Certified Rep. No.: *463* Date: _____

Name of Driller: *Greg Reinart*

E

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING CONSTRUCTION RECORD
Minnesota Statutes, Chapter 103I

823607

WELL OR BORING LOCATION

County Name Traverse

Township Name Folsom Township No 125 Range No 49 Section No 1 Fraction NW/4NW/4E

WELL/BORING DEPTH (completed) 145 ft DATE WORK COMPLETED 10-1-17

GPS LOCATION — decimal degrees (to four decimal places)
Latitude _____ Longitude _____

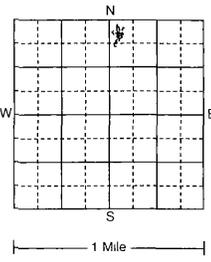
DRILLING METHOD
 Cable Tool Driven
 Auger Rotary
 Other

House Number, Street Name, City, and ZIP Code of Well Location Big Dog Development
No Address given

DRILLING FLUID Bentonite WELL HYDROFRACTURED? Yes No
From _____ ft To _____ ft

Show exact location of well/boring in section grid with "X" Sketch map of well/boring location Showing property lines, roads, buildings, and direction

USE Domestic Monitoring Heating/Cooling
 Noncommunity PWS Environ Bore Hole Industry/Commercial
 Community PWS Irrigation Remedial
 Elevator Dewatering _____



CASING MATERIAL Drive Shoe? Yes No
 Steel Threaded Welded
 Plastic

CASING Diameter 3 in To 129 ft Weight 1.4 lbs/ft Specifications sch 40 HOLE DIAM 6 in To 145 ft
in To _____ ft lbs/ft _____ in To _____ ft
in To _____ ft lbs/ft _____ in To _____ ft

PROPERTY OWNER'S NAME/COMPANY NAME Corey Theede

SCREEN Make _____ OPEN HOLE From _____ ft To _____ ft
Type PVC Diam 3

Property owner's mailing address if different than well location address indicated above
9290 Co. Rd. 81
Farmount, N.D. 58030

Slot/Gauge 45 Length 16
Set between 129 ft and 145 ft FITTINGS slipcoupl/cap

WELL OWNER'S NAME/COMPANY NAME

STATIC WATER LEVEL Measured from gr level
1 ft Below Above land surface Date measured 10-1-17

Well/boring owner's mailing address if different than property owner's address indicated above

PUMPING LEVEL (below land surface)
120 ft after 10 hrs pumping 2 g p m

WELLHEAD COMPLETION
 Pitless/adaptor manufacturer _____ Model _____
 Casing protection _____ 12 in above grade
 At-grade Well House Hand Pump

GROUT INFORMATION (specify bentonite, cement-sand, neat-cement, concrete, cuttings, or other)
Material Bentonite From 0 To 120 ft _____ Yds Bags
Material _____ From _____ To _____ ft _____ Yds Bags
Material _____ From _____ To _____ ft _____ Yds Bags

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
<u>Top soil</u>	<u>BL</u>	<u>med</u>	<u>0</u>	<u>1</u>
<u>SAND</u>	<u>Br</u>	<u>soft</u>	<u>1</u>	<u>4</u>
<u>SAND + GRAVEL</u>	<u>Br</u>	<u>soft</u>	<u>4</u>	<u>20</u>
<u>Shale</u>	<u>Grey</u>	<u>hard</u>	<u>20</u>	<u>129</u>
<u>limestone lenses</u>		<u>hard</u>	<u>129</u>	<u>145</u>
<u>Green horn</u>				

NEAREST KNOWN SOURCE OF CONTAMINATION
75 feet W direction Septic type
Well disinfected upon completion? Yes No

REMARKS, ELEVATION, SOURCE OF DATA, etc

PUMP Not installed Date installed 10-1-17
Manufacturer's name Grundfos
Model Number SQ 240 HP 3/4 Volts 220
Length of drop pipe 120 ft Capacity 2 g p m

Type Submersible L.S. Turbine Reciprocating Jet _____
ABANDONED WELLS
Does property have any not in use and not sealed well(s)? Yes No

VARIANCE
Was a variance granted from the MDH for this well? Yes No TN# _____

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725
The information contained in this report is true to the best of my knowledge



Remait Bros Well 1826
Licensee Business Name Lic or Reg No
Joe Remait 463
Certified Representative Signature Certified Rep No Date
Joe Remait 10-18-17
Name of Driller

MINN DEPT. OF HEALTH COPY 823607

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING CONSTRUCTION RECORD
 Minnesota Statutes, Chapter 1031

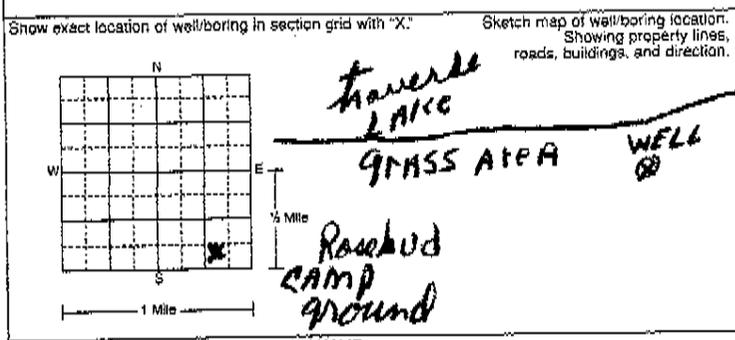
823612

WELL OR BORING LOCATION
 County Name Traverse
 Township Name WINDSOR
 Township No. 126
 Range No. 49
 Section No. 36
 Fraction SW 1/4 SE

WELL BORING DEPTH (completed) 45 ft. DATE WORK COMPLETED 6-22-18

GPS LOCATION — decimal degrees (to four decimal places).
 Latitude _____ Longitude _____
 House Number, Street Name, City, and ZIP Code of Well Location _____

DRILLING METHOD
 Cable Tool
 Auger
 Other
 Driven
 Rotary



DRILLING FLUID Bentonite WELL HYDROFRACTURED? Yes No
 From _____ ft. To _____ ft.
 USE
 Domestic
 Noncommunity PWS
 Community PWS
 Elevator
 Monitoring
 Environ. Bore Hole
 Irrigation
 Dewatering
 Heating/Cooling
 Industry/Commercial
 Remedial

PROPERTY OWNER'S NAME/COMPANY NAME
DAN BINSFELD
 Property owner's mailing address if different than well location address indicated above.
29534 - Cty. Rd. 20
PAYNEVILLE, MN. 56362

CASING MATERIAL Drive Shoe? Yes No
 Steel Threaded Welded
 Plastic
 CASING Diameter 4 in. To 35 ft. Weight 2 lbs./ft. Specifications SPT 21
 HOLE DIAM. 7 in. To 45 ft.

WELL OWNER'S NAME/COMPANY NAME
 Well/boring owner's mailing address if different than property owner's address indicated above.

SCREEN Johnson OPEN HOLE
 Make Johnson From _____ ft. To _____ ft.
 Type 304 SS Diam. 5
 Slot/Gauze 5'-15" 5' 20 Not Length 10
 Set between 55 ft. and 45 ft. FITTINGS 3x4 SS R-P
 STATIC WATER LEVEL Measured from 4' level
3 ft. Below Above land surface Date measured _____

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Top soil	BL	Med	0	1
clay	yell	med	1	6
clay	Grey	Med	6	14
clay dark Grey		Hard	14	30
course colorful sand		soft	30	45

PUMPING LEVEL (below land surface)
25 ft. after 5 hrs. pumping 50 g.p.m.
 WELLHEAD COMPLETION
 Pitless/adaptor manufacturer
 Casing protection
 At-grade Well House Hand Pump
 Model 12 in. above grade
 GROUT INFORMATION (specify bentonite, cement-sand, neat-cement, concrete, cuttings, or other)
 Material Cement From 0 To 25 ft. 3 Yds. Bags Bags
 Material Bentonite From 25 To 30 ft. 1 Yds. Bags Bags
 Material _____ From _____ To _____ ft. _____ Yds. Bags Bags
 Driven casing seal From _____ To _____ Bags

REMARKS, #ELEVATION, SOURCE OF DATA, etc.
 Sent to:
Den Olson
320-759-1560

NEAREST KNOWN SOURCE OF CONTAMINATION
66 feet SW direction 4" sewer line
 Well disinfected upon completion? Yes No
 PUMP
 Not installed Date installed _____
 Manufacturer's name _____
 Model Number _____ HP _____ Volts _____
 Length of drop pipe _____ ft. Capacity _____ g.p.m.
 Type: Submersible L.S. Turbine Reciprocating Jet _____
 ABANDONED WELLS
 Does property have any not in use and not sealed well(s)? Yes No
 VARIANCE
 Was a variance granted from the MDH for this well? Yes No TN# _____

WELL CONTRACTOR COPY? 823612

WELL CONTRACTOR CERTIFICATION
 This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.
Reinart Bros. 1826
 Licensee Business Name Lic. or Reg. No.
Joe Reinart 463
 Certified Representative Signature Certified Rep. No. Date
Joe Reinart 6-29-18
 Name of Driller