

Groundwater and Well Water Quality Monitoring Plan 2018-2021

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Purpose

Within this water quality monitoring plan, a comprehensive approach is described to prioritize efforts towards groundwater and well water in Le Sueur County. The objectives of this plan are as follows:

1. Target groundwater that receives complaints due to excess nutrients in order to document areas of concern within Le Sueur County.
2. Provide resources and education to landowners to test their wells for pollutants, such as nitrate and arsenic.

Collection of samples will be tested with uncertified lab results.

Need for Plan

Locally we are unable to achieve these outcomes due to the present-day funds and efforts that are available. Le Sueur County continues to have inadequate resources to sample groundwater and well water that could potentially pose a health risk if not monitored as well as create great concern to many individuals.

Occasions where on a wide scale groundwater is monitored is during the WRAPS process. Keep in mind these watersheds are reviewed once every 10 years. WRAPS reports were completed for the Cannon River Watershed in 2016 and the Middle Minnesota River Watershed in 2017. The Lower Minnesota River Watershed is currently under the WRAPS process. Complaints about excess nutrient effects take place on a yearly and even seasonally basis. Multiple grievances are reported each year, and sometimes it can be within the same area. Once where the problems are occurring is determined, then the implementation process can begin for best management practices that would help improve the quality of the groundwater.

Landowners often want to test their well waters to determine whether it is safe to drink. Unfortunately, Le Sueur County and SWCD have to inform the landowner there is no funding assistance, and they would need to call the Minnesota Department of Health for support. By having the resources to generate results of what pollutants reside in their well water, the exposure to harmful pollutants can be prevented. At the same time, the landowner is aware that they need to fix their well water issue.

Relation to SWCD Capacity Funds

This plan can be classified as increasing SWCD capacity within the Technology/Capital Equipment and Operations Sectors.

Monitoring Station Location

Monitoring will take place throughout Le Sueur County. Target areas for monitoring will be identified as concerns and/or issues that are caused by non-point pollution sources. The sampling stations will be categorized as groundwater. Separate maps will be created to show where sample collections were taken for each different pollutant or nutrient.

Monitoring Station Structure

Monitoring will occur on an as needed basis. The total amount of monitoring stations that will be represented is based off of reports of well water and excess nutrient issues provided to Le Sueur County and SWCD.

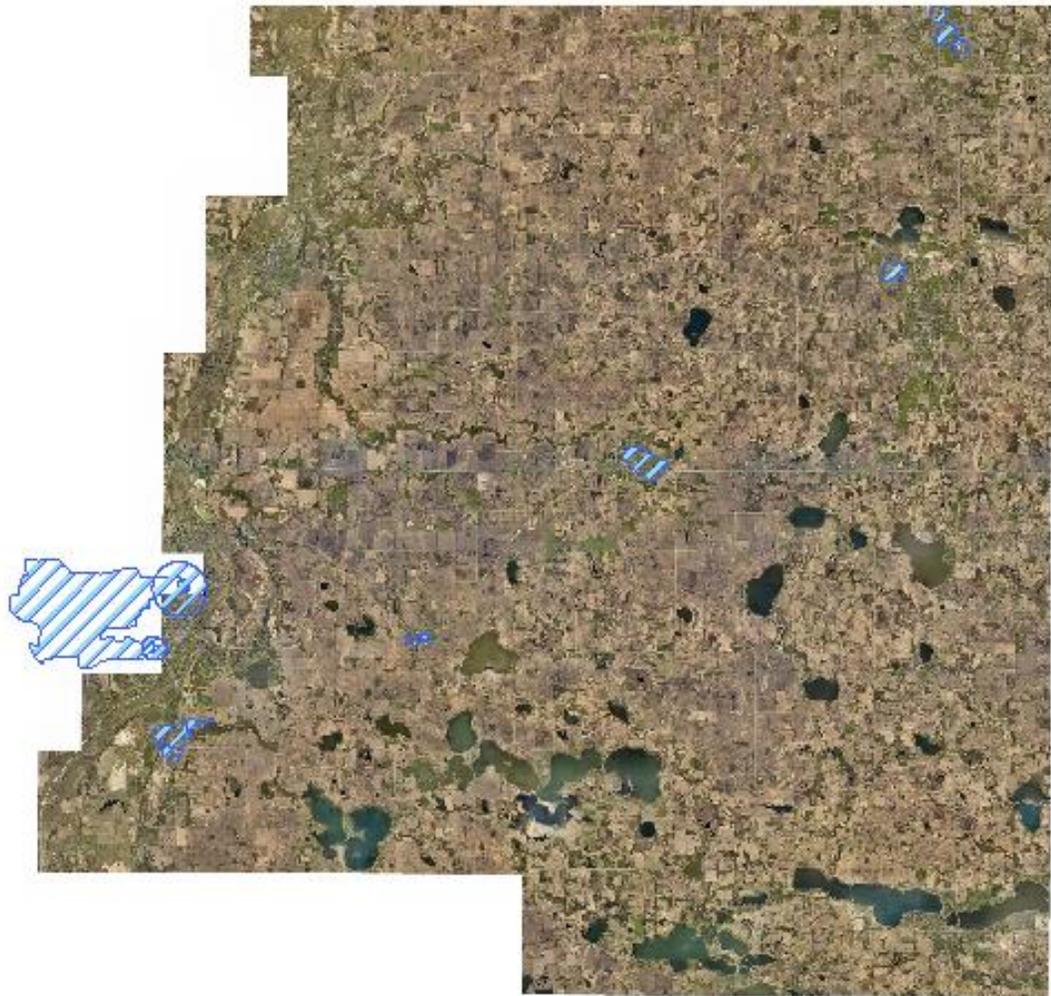
Le Sueur County



0 2 4 8 12 16 Miles

Figure 1. Le Sueur County aerial map.

Le Sueur County



0 2 4 8 12 16 Miles



Wellhead Protection Area

Figure 2. Le Sueur County aerial map of wellhead protection areas.

Sample Collection

Le Sueur County and SWCD will work together to collect samples and analyze in Le Sueur County's noncertified lab either using the DR3900 Benchtop spectrophotometer or DRB200 reactor. Collected samples will be tested for phosphorus and/or nitrate. These two pollutants are commonly found in groundwater and well water, thus that is why they are being tested for.

Staff members within Le Sueur County have about 4 ½ years' worth of knowledge and experience with water monitoring and the equipment that is used. Le Sueur County SWCD staff have basic knowledge of water monitoring, but have not necessarily worked directly or extensively with the spectrophotometer and reactor. Individuals who worked with the equipment previously will be training other staff on how to operate and use the equipment effectively.

Collection dates and times will vary based on when landowners inquire about getting their well water tested or when complaints are reported about effects from nutrient loading. The only season that will not be available for monitoring is winter which varies from year to year (depends on ice conditions).

Observations will be recorded. Factors such as date, time, air temperature, water temperature, wind, precipitation, and so forth will be documented.

Data Availability

Any water quality data that is collected will be available between Le Sueur County and SWCD. Data that is accessible to the public is determined by who owns the land. Any county, state, and federal lands where samples are taken along with water sampling educational events will be made public. Access to the data will be found on Le Sueur County's website. When gathering data from any private landowner(s), it will be up to their discretion whether or not the data can be made public or if they have specific limitations on what is shared. For instance, a landowner may choose to have the location listed, but not necessarily their name or any other personal information.

Equipment Ownership & Responsibility

Both Le Sueur County and Le Sueur SWCD will share the equipment that is purchased. It will be the responsibility of Le Sueur County to maintain and take care of the equipment; a contractual agreement will be completed between Le Sueur County and

SWCD. Thorough cleaning and replacement of parts are imperative to obtaining accurate data.

Budget

2018-2021 Le Sueur County/SWCD Monitoring Program: Total Costs

Equipment	Description	Qty	Unit Price	Total
DR3900 Benchtop Spectrophotometer	db aa DR3900 Spectrophotometer with RFID	1	\$4,431.00	\$4,431.00
Nitrate Reagent	Nitrate, TNT+LR (0.2-13.5mg/L)	2 (Pkg. of 25)	\$43.95	\$87.90
Nitrate Reagent	Nitrate, TNT + HR (5-35mg/L-N)	2 (Pkg. of 25)	\$43.95	\$87.90
Phosphorus Reagent	aa Phosphorus TNT+ LR (0.05-1.5mg/L PO4-P)	2 (Pkg. of 25)	\$55.15	\$110.30
Phosphorus Reagent	aa Phosphorus TNT+ HR (0.5-5mg/L PO4-p)	2 (Pkg. of 25)	\$55.19	\$110.38
Phosphorus Reagent	aa Phosphorus TNT+ UHR (2-20mg/L PO4-P)	2 (Pkg. of 25)	\$55.19	\$110.38
Phosphorus Reagent	Phos, TNT+, Ortho, (1.67-30mg/L PO4-P)	2 (Pkg. of 25)	\$37.49	\$74.98
Digital Reactor Block, 30 x 16mm	15 vials x 16mm x 15 vials x 16mm (dual block) 115 V ac, for TNT+ vials	1	\$1,399.00	\$1,399.00
Reactor Adapter, 16mm to 13mm	For TNT+ vials	2 (Pkg. of 25)	\$16.99	\$33.98
Sampler dipper 500mL (16oz)	6 foot length	1	\$61.45	\$61.45
Chest Waders		1	\$135	\$135

total cost includes estimation of taxes & shipping

Total Cost: \$7,500.00

County Support

Water monitoring projects to collect data and identify water quality in groundwater and wells is identified in Le Sueur County Local Water Management Plan 2016-2021. See table below.

Table 1. Water Monitoring as a priority in Le Sueur County Local Water Management Plan 2016-2021.

Priority Concern	Goal	Objective	Action(s)
#1: Drinking Water Protection	#7: Protected groundwater quality and quantity.	#3: Gather information about groundwater quantities and interconnection to surface water by 2021.	#55: Continue to monitor existing Observation Wells through the DNR OBWELL Program. #58 Utilize data obtained through EPA Class V Injection Well Inventory to help educate and protect groundwater, especially within the groundwater management zones in wellhead protection areas.
#5: Drinking Water Protection	#7: Protected groundwater quality and quantity.	#16: Coordinate water-testing clinics for Co residents with wells that would include nitrate and arsenic by 2021.	#48: Locate funding for a water-testing clinic that includes nitrate and arsenic testing throughout the county. #49: Locate funding to purchase well water testing equipment for Co use. #50: If funding is not located to purchase equipment, locate equipment that can be utilized by the Co on an as-need basis. #51: Organize and implement the water testing clinics, provide information to residents on arsenic and nitrate at the clinics. #52: Provide on-demand well water testing in the Co. #53: Compile collected data and map utilizing GIS to highlight possible regional trends. #54: Provide outreach on arsenic following the testing clinic to disseminate information on arsenic in water supplies.

***Please note the number associated with a priority concern is not in correlation of the order of the priority in the water plan.**

Technical Specifications-DR3900 Laboratory VIS Spectrophotometer with RFID & DRB200:
Digital Reactor Block: 30x16mm, 115 Vac



**DR3900 Laboratory VIS Spectrophotometer with RFID*
Technology**

Product #: LPV440.99.00012
USD Price: \$4,431.00
Available

Expert water analysis made simple.

Simplicity throughout: The DR3900 spectrophotometer provides the simplest way to perform tests for water analysis. Used together with TNTplus™ test kits testing steps are reduced. The potential for human errors is minimized. The system of spectrophotometer and test kits supports the process optimization of waste water treatment plants and environmental testing.

*RFID currently available only in US, Canada, Puerto Rico, Australia, New Zealand, and Colombia. Customers in other countries should order LPV440.99.00002.

Simple Preparation

TNTplus vials use Doticaps - freeze-dried reagents integrated into sealed cap - that are easier to use than Powder Pillows or Liquid Reagents, without any risk of contamination.

The boxes and vials are color-coded for a fast and easy parameter and range recognition of exactly the test you need.

Step-by-step illustrated test methods are printed on the box as a quick reference and can also be called up in the instrument menu.

Fast execution

A 2D barcode on the TNTplus vial is automatically read by the Hach DR spectrophotometer to identify the appropriate method and take the measurement. The vial spins to take 10-fold absorbance readings that will be averaged for result determination to exclude scratches and fingerprints. Instrument calibration verification and high instrument stability all combine to eliminate the need to run reagent blanks.

Comprehensive Documentation

Measurement results are documented on the detailed level with timestamp, operator ID, absorbance reading, and calculated concentration. The 2D barcode delivers the lot number and expiry date, logged with every result.

For your accreditation the certificate of analysis can be called up just by wiping the reagent box towards the RFID* sensor.

*RFID technology currently available in US, Canada, Puerto Rico, Australia, New Zealand, and Colombia only.

Specifications

Beam Height:	10 mm
Data Logger:	2000 measured values (Result, Date, Time, Sample ID, User ID)
Dimensions (H x W x D):	151 mm x 350 mm x 255 mm
Display:	7" TFT
Display Resolution:	WVGA (800 pix x 480 pix)
Display Size:	7 inch (17.8 cm)
Display Type:	Colored touch-screen
Enclosure Rating:	IP30
Includes:	Adapter "A" for 1" round + Accuvac/1 cm rectangular cuvettes, manual in m 5 languages (GB, D, F, I, E), power supply 100 - 240V, 47 - 63Hz.
Interfaces:	USB type A (2) USB type B Ethernet RFID module
Light Source:	Gas-filled Tungsten (visible)
Manual Languages:	English

	French (CDN) Spanish (SA) Portuguese (BR) Chinese Japanese Korean
Max. operating humidity:	80 %
Max. Storage Humidity:	80 %
Operating Conditions:	10 °C - 40 °C
Operating Mode:	Transmittance (%), Absorbance and Concentration, Scanning
Optical System:	Reference beam, spectral
Photometric Accuracy:	5 mAbs @ 0.0 - 0.5 Abs
Photometric Accuracy 2:	1 % at 0.50 - 2.0 Abs
Photometric Linearity:	< 0.5 % - 2 Abs
Photometric Linearity 2:	≤ 0.01 % at >2 Abs with neutral glass at 546 nm
Photometric Measuring Range:	± 3.0 Abs (wavelength range 340 - 900 nm)
Power Requirements:	With external power supply
Power Requirements (Hz):	50/60 Hz
Power Requirements (Voltage):	110 - 240 V AC
Power Supply:	Desk Power Supply
Preprogrammed Methods:	> 240
Sample Cell Compatibility:	Rectangular: 10, 20, 30, 50 mm, 1 inch; round: 13 mm, 16 mm, 1 inch
Scanning Speed:	> 8 nm/S (in steps of 1 nm)
Specific Technology:	RFID for easy method update, sample ID and Certificate of Analysis
Spectral Bandwidth:	5 nm ± 1 nm
Storage Conditions:	-30 °C to 60 °C
Stray Light:	< 0.1 % T at 340 nm with NaNO ₂
User Interface Languages:	Bulgarian, Chinese, Croatian, Czech, Danish, Dutch, English, Finnish, French, German, Greek, Hungarian, Italian, Japanese, Korean, Polish, Portuguese - Brazil, Portuguese, Russian, Serbian, Slovakian, Slovenian, Spanish, Swedish, Turkish
User Programs:	100
Warranty:	12 months
Wavelength Accuracy:	± 1.5 nm (wavelength range 340 - 900 nm)
Wavelength Calibration:	Automatic
Wavelength Range:	320 - 1100 nm
Wavelength Reproducibility:	± 0.1 nm
Wavelength Resolution:	1 nm
Wavelength Selection:	Automatic, based on method selection
Weight:	4.2 kg

What's in the box?

Includes: Adapter A for 1 in. round and 1 cm square cells, matched pair of 1 in. square glass sample cells, light shield, dust cover, printed basic user manual and benchtop power supply with 115 and 230V power cords.

Product details pdf footer



DRB200: Digital Reactor Block; 30 x 16 mm vial wells, 115 Vac

Product #: LTV082.53.44001
USD Price: \$1,399.00
Available

The simple solution for standard and special digestions.

15 vials x 16 mm x 15 vials x 16 mm (dual block) 115 Vac

Easy-to-use and fast

The Hach DRB 200 Dry Thermostat Reactor provides unique one-key operation. Programs for Hach procedures with digestion are preprogrammed into the instrument. And it's fast—the block heats from 20 to 150°C in less than 10 minutes.

Safe to operate

The fully insulated heater block of the DRB 200 reactor means there can be no skin contact with the heater block. Temperature safeguards are provided to prevent overheating. The lids are transparent and lock do deter premature checking of the progress of the reaction. And the reactor will emit an audible signal and automatically shutdown at the end of the run.

Versatile

Use the DRB 200 reactor for digestions for metals analysis, digestions for nutrients analysis, or culture biological samples. Control temperatures in the reactor from 37 to 165°C in 1°C increments. In addition to preprogrammed digestion methods, use the reactor to program and store up to three custom methods.

Accommodates Most Test Vials

The DRB 200 reactor can heat solutions in round vials of two different sizes. Small, 16-mm diameter vial wells are suitable for Hach COD, UniCell™, TOC, and Test 'N Tube vials. Larger, 20-mm diameter vial wells are intended for sample preparation reaction vessels using the Metals Prep Set.

Select the Dual Block Model for Simultaneous Digestions

Two heat blocks in the DRB200 Dual Block Models reactor give the operator independent control of two temperatures and durations. Use this option to run two programs at the same time. A Single Block DRB Reactor cannot be upgraded to a Dual Block Model at a later time.

Specifications

Number of cuvettes:	15 vials x 16 mm x 15 vials x 16 mm (dual block)
Power Requirements (Voltage):	115 V AC
Warranty:	1 year

What's in the box?

Includes: digital block reactor, power cord and operating manual