Permit Fact Sheet

General Information

Permit Number	WI-0031780-09-0
Permittee Name and Address	VILLAGE OF FRIESLAND PO Box 208, 113 South Madison Street Friesland WI 53935-0208
Permitted Facility Name and Address	Friesland Wastewater Treatment Facility SEQ, NWQ, SEC 22, T13N, R12E, RANDOLPH TWP, FRIESLAND, WISCONSIN
Permit Term	April 01, 2025 to March 31, 2030
Discharge Location	1,600 feet North of Friesland Road, NE ¼ of the SW ¼ of Section 15, T13N, R12E, Town of Randolph
Receiving Water	Unnamed Tributary/Friesland Branch of the Grand River (Lower Grand River Watershed, UF11 – Upper Fox River Basin) in Columbia County
Stream Flow ($Q_{7,10}$)	0 cfs
Stream Classification	Warm Water Forage Fish Community, non-public water supply (Change from previous permit, see WQBEL Memo, dated February 12, 2025 & Stream Classification Memo, dated May 16, 2024)
Discharge Type	Existing, Intermittent
Annual Average Design Flow (MGD)	0.0267 MGD
Industrial or Commercial Contributors	None
Plant Classification	A4 - Ponds, Lagoons and Natural Systems; SS - Sanitary Sewage Collection System
Approved Pretreatment Program?	N/A

Facility Description

The Friesland Wastewater Treatment Facility is a stabilization pond system. The facility consists of three lagoons operated in series, with a primary lagoon followed by two secondary holding lagoons. The collection system flows by gravity to the influent lift station immediately upstream of the treatment plant where influent is pumped directly to lagoon 1 (no headworks). Effluent leaves lagoon 3 through an outlet control manhole, to the control building and final effluent meter and sampling location and is gravity fed to the outfall. The discharge location is approximately 0.5 miles north of the facility. Effluent pipe is underground until it reaches a 5-ft concrete flume and enters the receiving water.

The facility discharges intermittently, and rarely during the summer months. Effluent is held when treatment is less effective due to seasonal fluctuations or weather-related issues. The storage capacity of the lagoons enables Friesland WWTF to cease discharge when effluent results approach limits and resume when treatment and effluent quality improves. Lagoon 1 lined with clay and has an approximate capacity of 5.8 million gallons. Lagoons 2 and 3 each have an approximate capacity of 2.9 million gallons. All three lagoons were built in 1978, Lagoons 2 and 3 were relined in 1989 with PVC. Sludge is stored in the lagoons. Sludge has not been removed from the lagoons.

The facility has historically received limits based on a limited aquatic life (LAL) classification at the outfall to an internally drained wetland. Based on a site visit documented in the memo dated May 16, 2024, it was determined that a fish and aquatic life use of Warm Water Forage Fish (WWFF) Community should apply to the area where the outfall is located, and connectivity with downstream system is present. This results in multiple changes to limits reflected in this permit: BOD_5, DO, Ammonia, and the Upper Fox and Wolf River Basin TMDL.

Substantial Compliance Determination

Enforcement During Last Permit: An NON was issued May 03, 2024 for chloride schedule noncompliance. The facility has completed all previously required actions as part of the enforcement process. A chloride source reduction schedule has been repeated in this permit.

After a desk top review of all discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on April 16, 2024, this facility has been found to be in substantial compliance with their current permit.

Sample Point Descriptions

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)**
701	0.015 MGD (Average 2023)	Influent: Representative grab samples shall be collected in the pit at the influent lift station. An in-line continuous magnetic flow meter is in the same location.
001	0.022 MGD (Average January 2020 – May 2024)	Effluent: 24-hour flow proportional composite samples and grab samples shall be collected from the effluent manhole prior to discharge to the Friesland Branch. Flow is monitored continuously with an ultrasonic flow meter and v-notch weir at the final manhole.
003	N/A Did not land apply	Representative composite grab lagoon sludge samples shall be taken from each lagoon and then combined for one sample. Department approval is required prior to removal of any sludge from any of the lagoons. Additional sampling and requirements apply prior to land application of sludge.

Permit Requirements

1 Influent – Monitoring Requirements

1.1 Sample Point Number: 701- INFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total		mg/L	2/Week	Grab	
Suspended Solids, Total		mg/L	2/Week	Grab	

1.1.1 Changes from Previous Permit:

Influent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit.

BOD5 and Total Suspended Solids (TSS): The sample frequency for these parameters have been updated to align with effluent monitoring.

1.1.2 Explanation of Limits and Monitoring Requirements

Monitoring of influent flow, BOD5 and total suspended solids is required by s. NR 210.04(2), Wis. Adm. Code, to assess wastewater strengths and volumes and to demonstrate the percent removal requirements in s. NR 210.05, Wis. Adm. Code, and in the Standard Requirements section of the permit.

2 Surface Water - Monitoring and Limitations

2.1 Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Weekly Avg	30 mg/L	2/Week	24-Hr Flow Prop Comp	This is an interim limit. Final limits effective January 01, 2029. See compliance schedule.
BOD5, Total	Weekly Avg	5.0 mg/L	2/Week	24-Hr Flow Prop Comp	Final limit effective May - October starting in 2029.
BOD5, Total	Weekly Avg	10 mg/L	2/Week	24-Hr Flow Prop Comp	Final limit effective November - April starting in 2029.
BOD5, Total	Monthly Avg	20 mg/L	2/Week	24-Hr Flow Prop Comp	This is an interim limit effective until January 01, 2029. Once the final weekly average limits are effective a monthly average limit is no longer required.
BOD5, Total	Daily Max	7.0 lbs/day	2/Week	Calculated	
Suspended Solids, Total	Monthly Avg	60 mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of TSS and report on the last day of the month on the DMR. See TMDL Calculations section.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Suspended Solids, Total	Annual Total	1,114 lbs/yr	Monthly	Calculated	Limit effective upon permit reissuance. Calculate the sum of total monthly mass of TSS discharged for the calendar year and report on the last day of the month on the DMR. See TMDL Calculations section.
pH Field	Daily Max	9.0 su	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	
Dissolved Oxygen	Daily Min	4.0 mg/L	5/Week	Grab	This is an interim limit. Final limit effective January 01, 2029. See compliance schedule.
Dissolved Oxygen	Daily Min	7.0 mg/L	5/Week	Grab	Final limit effective January 01, 2029.
Nitrogen, Ammonia Variable Limit		mg/L	2/Week	See Table	Look up the variable ammonia limit from the 'Variable Ammonia Limitation' table and report the variable limit in the Ammonia Variable Limit column on the eDMR.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	2/Week	24-Hr Flow Prop Comp	Report the daily maximum Ammonia result in the Nitrogen, Ammonia (NH3-N) Total column of the eDMR. See Ammonia Limitation Section.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	5.3 mg/L	2/Week	24-Hr Flow Prop Comp	April - May
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	3.7 mg/L	2/Week	24-Hr Flow Prop Comp	June - September
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	9.4 mg/L	2/Week	24-Hr Flow Prop Comp	October - March
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	2.1 mg/L	2/Week	24-Hr Flow Prop Comp	April - May
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	1.5 mg/L	2/Week	24-Hr Flow Prop Comp	June - September
Nitrogen, Ammonia	Monthly Avg	3.7 mg/L	2/Week	24-Hr Flow	October - March

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
(NH3-N) Total				Prop Comp	
Phosphorus, Total	Monthly Avg	5.6 mg/L	2/Week	24-Hr Flow Prop Comp	This is an interim limit. Final TMDL-based mass limit goes into effect per the phosphorus compliance schedule. See Phosphorus TMDL section.
Phosphorus, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of phosphorus and report on the last day of the month on the DMR. See TMDL Calculations section.
Phosphorus, Total		lbs/yr	Monthly	Calculated	Calculate the sum of total monthly mass of phosphorus discharged for the calendar year and report on the last day of the month on the DMR. See TMDL Calculations section. Final limit 14 lbs/yr effective per the phosphorus compliance schedule.
Chloride	Weekly Avg	400 mg/L	4/Month	24-Hr Flow Prop Comp	See Chloride 4/Month Sample Frequency section.
Chloride	Weekly Avg	140 lbs/day	4/Month	Calculated	See Chloride 4/Month Sample Frequency section.
Copper, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	Monitoring monthly in 2028.
Arsenic, Total Recoverable		ug/L	Once	24-Hr Flow Prop Comp	Monitoring once in 2028. See Arsenic Monitoring section.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Annual in rotating quarters. See Nitrogen Series Monitoring section. Total

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.

2.1.1 Changes from Previous Permit

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit.

The order of parameters in the monitoring table have changed, pH and dissolved oxygen are listed before ammonia.

BOD, TSS, pH, DO, Ammonia, and Phosphorus: The sample frequency for these parameters have been updated.

BOD, TSS, Ammonia, Phosphorus, Chloride, and Total Nitrogen Series: The sample type for these parameters has changed to 24-hour flow proportional composite. The facility installed this type of sampler in January 2025.

BOD: The weekly average limits have been updated. The monthly average limit is an interim limit effective until January 01, 2029.

TSS: Mass based TSS limit of 1,114 lbs/yr has been added to the permit to comply with requirements of the Upper Fox Wolf River TMDL. Effluent concentration (mg/L) shall be monitored and reported 2 times per week upon permit reissuance and will be used to calculate amounts reported for mass-based limits. An additional reporting requirement for lbs/month will be used to calculate the facility's sum of total monthly discharge, which can be compared directly to the facility's designated WLA.

DO: The daily minimum limit has been updated with a schedule for compliance.

Ammonia: The weekly average and monthly average limitations and limit effective timeframes have been updated. The Variable Limitations Table has been updated.

Phosphorus: An interim limit of 5.6 mg/L goes into effect upon reissuance and will remain in effect unless a more stringent limit is required at a future permit issuance by ss. NR 217.13 and NR 217.16(2), Wis. Adm. Code, or the limit is relaxed following procedures outlined in ch. NR 207, Wis. Adm. Code. Discharge effluent concentration (mg/L) shall be reported 2 times per week upon permit reissuance and will be used to calculate amounts reported for mass-based parameters. An additional reporting requirement for lbs/month will be used to calculate the facility's sum of total monthly discharge, which can be compared directly to the facility's designated WLA. Final TMDL WLA-based effluent limits of 14 lbs/yr as an annual total will go into effect in accordance with compliance schedule Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus.

Chloride: The monitoring year has been updated to 2028.

Arsenic: A single monitoring event in 2028 has been included in the permit.

2.1.2 Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo for the Friesland Wastewater Treatment Facility, dated February 12, 2025, prepared by Sarah Luck, and used for this reissuance.

BOD and DO: These conventional pollutant limits were reevaluated for the protections of the Warm Water Forage Fish community of the Friesland Branch. The BOD monthly average limit is no longer required once the final limits are effective. The expression of limits requirement does not apply due to the non-continuous nature of the discharge.

TSS: The TSS concentration limit is a variance limit according to s. NR 210.07(2), Wis. Adm. Code. If chemical treatment is added to remove phosphorus in the future, a variance limit would no longer apply and different TSS limits would be effective.

Ammonia: Current acute and chronic ammonia toxicity criteria for the protection of aquatic life are included in Tables 2C and 4B of ch. NR 105, Wis. Adm. Code. Subchapter IV of ch. NR 106, Wis. Adm. Code establishes the procedure for calculating water quality-based effluent limitations (WQBELs) for ammonia for the protection of the WWFF receiving water.

Upper Fox Wolf River Total Maximum Daily Load (TMDL): The permitted facility is located within the Upper Fox Wolf River Basin Total Maximum Daily Load (UFWRB TMDL), which was approved by EPA February 27, 2020. The TMDL establishes Waste Load Allocations (WLAs) for point source dischargers and determines the maximum amounts of phosphorus and total suspended solids that can be discharged and still protect water quality. The final effluent limits and monitoring expressed in the permit were derived from and comply with the applicable water quality criterion and are consistent with the assumptions and requirements of the EPA-approved WLAs in the TMDL, which are 14 lbs/yr for phosphorus and 1,114 lbs/yr for TSS for the permitted facility.

Arsenic: The once monitoring event in 2028 is included to meet the data requirements of s. NR 200.065, Table 1, Wis. Adm. Code for the permit application. An approved analytical method should be used for arsenic such that the limit of detection is less than or equal to 2.7 µg/l to better determine the need for arsenic limits at the next permit reissuance.

Total Nitrogen Monitoring (NO2+NO3, TKN and Total N): The department has included effluent monitoring for Total Nitrogen through the authority under s. 283.55(1)(e), Wis. Stats., which allows the department to require the permittee to submit information necessary to identify the type and quantity of any pollutants discharged from the point source, and through s. NR 200.065(1)(h), Wis. Adm. Code, which allows for this monitoring to be collected during the permit term. More information on the justification to include total nitrogen monitoring in wastewater permits can be found in the "Guidance for Total Nitrogen Monitoring in Wastewater Permits" dated October 1, 2019.

Monitoring Frequencies: The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. The sample frequencies for BOD, TSS, pH, DO, ammonia, and phosphorus were increased to align Friesland with other facilities of similar size to ensure fairness and in consideration of department guidance on sampling frequencies.

Requirements in administrative code (NR 108, 205, 210, and 214 Wis. Adm. Code) and Sections 283.55 Wis. Stats., were considered, where applicable, when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. The department has determined at this time that the aforementioned changes in monitoring frequency are warranted based on the size and type of the facility.

Disinfection: Disinfection has not historically been required for Friesland WWTF due to the assumed limited aquatic life classification of the receiving water. However, since the receiving water was evaluated for applicable limits, the detention time disinfection exemption was evaluated for the applicability of E. coli limits. The department found that the detention time is effectively providing disinfection where additional disinfection treatment is not expected to be needed at this time.

PFOS and PFOA: NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. Pursuant to s. NR 106.98(3)(b), Wis. Adm. Code, the department evaluated the need for PFOS and PFOA monitoring taking into consideration the presence of potential PFOS or PFOA industrial wastes, remediation sites and other potential sources of PFOS or PFOA. Based on information available at the time the permit was drafted, the

department has determined the permittee does not need to sample for PFOS or PFOA as part of this permit reissuance. The department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

3 Land Application - Monitoring and Limitations

Municipal Sludge Description						
Sample Point	**Sludge Class (A or B)**	**Sludge Type (Liquid or Cake)**	**Pathogen Reduction Method**	**Vector Attraction Method**	**Reuse Option**	**Amount Reused/Disposed (Dry Tons/Year)**
003	B	Liquid	Fecal Coliform	Injection	Land Application	N/A Lagoon System
Does sludge management demonstrate compliance? **Yes**						
Is additional sludge storage required? **No**						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? **No**						
Is a priority pollutant scan required? **No. Design flow is less than 5 MGD.** Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.						

3.1 Sample Point Number: 003- LAGOON SLUDGE

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	Once	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Once	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Once	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Once	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Once	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Once	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Once	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Once	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Once	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Once	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Once	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Once	Composite	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Nickel Dry Wt	Ceiling	420 mg/kg	Once	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Once	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Once	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Once	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Once	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Once	Composite	
Nitrogen, Total Kjeldahl		Percent	Once	Composite	Once when land application occurs
Nitrogen, Ammonium (NH4-N) Total		Percent	Once	Composite	Once when land application occurs
Phosphorus, Total		Percent	Once	Composite	Once when land application occurs
Phosphorus, Water Extractable		% of Tot P	Once	Composite	Once when land application occurs
Potassium, Total Recoverable		Percent	Once	Composite	Once when land application occurs
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	
PFOA + PFOS		ug/kg	Once	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.
PFAS Dry Wt			Once	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

3.1.1 Changes from Previous Permit:

Sludge limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit.

List 2 Nutrients: Monitoring has been added should land application occur and for planning purposes.

PFAS: Monitoring is required once pursuant to s. NR 204.06(2)(b)9, Wis. Adm. Code.

3.1.2 Explanation of Limits and Monitoring Requirements

Requirements for disposal, including land application of municipal sludge, are determined in accordance with ch. NR 204, Wis. Adm. Code. Ceiling and high-quality limits for metals in sludge are specified in s. NR 204.07(5), Wis Adm Code. Requirements for pathogens are specified in s. NR 204.07(6) and in s. NR 204.07 (7), Wis. Adm. Code for vector attraction requirements. Limitations for PCBs are addressed in s. NR 204.07(3)(k), Wis. Adm. Code.

List 2 Nutrients: Monitoring for list 2 (nutrients) is highly recommended at the same time as the monitoring of List 1 (metals) in year 2 of the permit (2026). Results will assist in the determination of the acres needed for land application of sludge should it be necessary. The number of acres needed is also required for the Land Application Management Plan Schedule (see schedules for more information). List 2 nutrient sampling is required when land application occurs.

PFAS: The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA is currently developing a risk assessment to determine future land application rates and expects to release this risk assessment by the end of 2024. In the interim, the department has developed the "Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS."

Collecting sludge data on PFAS concentrations from a wide range of wastewater treatment facilities will help protect public health from exposure to elevated levels of PFAS and determine the department's implementation of EPA's recommendations. To quantitate this risk, PFAS sampling has been included in this WPDES permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9, Wis. Adm. Code.

4 Schedules

4.1 Biological Oxygen Demand Effluent Limits & Facility Modifications

The compliance schedule requires the permittee to achieve compliance by the specified date.

Required Action	Due Date
Report on Effluent Discharges: The permittee shall prepare and submit to the department for approval a report on effluent discharge. The report shall include an evaluation of collected effluent data and the facility's ability to comply with final biological oxygen demand (BOD) limitations. The report shall conclude whether current treatment, operational improvements, or a facility upgrade will result in compliance with the final BOD limitations. FACILITY PLAN - If the Report on Effluent Discharge concludes that current treatment or operational improvement does not result in compliance with the final BOD limitations and a facility upgrade is required, the permittee shall initiate development of a facility plan for meeting final BOD limitations and comply with the remaining required actions in this schedule of compliance.	04/30/2026
Submit Facility Plan: The permittee shall submit a Facility Plan per s. NR 110.09, Wis. Adm. Code for complying with BOD limitations. The permittee may submit an abbreviated facility plan if the Department determines that the modifications are minor.	08/30/2026
Final Plans and Specifications: The permittee shall submit final construction plans to the Department for approval pursuant to ch. NR 108, Wis. Adm. Code, specifying treatment plant upgrades that must be constructed to achieve compliance with final BOD limitations, and a schedule for completing construction of the upgrades by the complete construction date specified below.	07/31/2027
Treatment Plant Upgrade to Meet Limitations: The permittee shall initiate bidding, procurement, and/or construction of the project. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41. Stats., prior to initiating activities defined as construction under ch. NR 108, Wis. Adm. Code. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications.	12/31/2027

Construction Upgrade Progress Report: The permittee shall submit a progress report on construction upgrades.	06/30/2028
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades.	11/30/2028
Achieve Compliance: The permittee shall achieve compliance with final BOD limitations.	12/31/2028

4.1.1 Explanation of Compliance Schedule

Biological oxygen demand (BOD_5) pollutant limits were evaluated for the protection of the WWFF community of Friesland Branch, the updated stream classification, which resulted in a change to the permit limits. A review of effluent data over the permit term provides that the proposed limits are not currently achievable, therefore a compliance schedule has been included in the permit.

4.2 Dissolved Oxygen Effluent Limits & Facility Modifications

The compliance schedule requires the permittee to achieve compliance by the specified date.

Required Action	Due Date
Report on Effluent Discharge: The permittee shall prepare and submit to the department for approval a report on effluent discharge. The report shall include an evaluation of collected effluent data and the facility's ability to comply with final dissolved oxygen (DO) limitations. The report shall conclude whether current treatment, operational improvements, or a facility upgrade will result in compliance with the final DO limitations. FACILITY PLAN - If the Report on Effluent Discharge concludes that current treatment or operational improvement does not result in compliance with the final DO limitations and a facility upgrade is required, the permittee shall initiate development of a facility plan for meeting final DO limitations and comply with the remaining required actions in this schedule of compliance.	04/30/2026
Submit Facility Plan: The permittee shall submit a Facility Plan per s. NR 110.09, Wis. Adm. Code for complying with DO surface water limitations. The permittee may submit an abbreviated facility plan if the Department determines that the modifications are minor.	08/30/2026
Final Plans and Specifications: The permittee shall submit final construction plans to the Department for approval pursuant to ch. NR 108, Wis. Adm. Code, specifying treatment plant upgrades that must be constructed to achieve compliance with final DO limitations, and a schedule for completing construction of the upgrades by the complete construction date specified below.	07/31/2027
Treatment Plant Upgrade to Meet Limitations: The permittee shall initiate bidding, procurement, and/or construction of the project. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41. Stats., prior to initiating activities defined as construction under ch. NR 108, Wis. Adm. Code. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications.	12/31/2027
Construction Upgrade Progress Report: The permittee shall submit a progress report on construction upgrades.	06/30/2028
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades.	11/30/2028

Achieve Compliance: The permittee shall achieve compliance with final DO limitations.	12/31/2028

4.2.1 Explanation of Compliance Schedule

Dissolved oxygen (DO) pollutant limit was evaluated for the protection of the WWFF community of Friesland Branch, the updated stream classification, which resulted in a change to the permit limit. A review of effluent data over the permit term provides that the proposed limit is not currently achievable, therefore a compliance schedule has been included in the permit.

4.3 Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus

The permittee shall comply with the WQBELs for Phosphorus as specified. No later than 14 days following each compliance date, the permittee shall notify the Department in writing of its compliance or noncompliance. If a submittal is required, a timely submittal fulfills the notification requirement.

Required Action	Due Date
Preliminary Compliance Alternatives Plan: The permittee shall submit a preliminary compliance alternatives plan to the Department. If the plan concludes upgrading of the permittee's wastewater treatment facility is necessary to achieve final phosphorus WQBELs, the submittal shall include a preliminary engineering design report. If the plan concludes Adaptive Management will be used, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 without the Adaptive Management Plan. If water quality trading will be undertaken, the plan must state that trading will be pursued.	04/30/2026
Final Compliance Alternatives Plan: The permittee shall submit a final compliance alternatives plan to the Department. If the plan concludes upgrading of the permittee's wastewater treatment is necessary to meet final phosphorus WQBELs, the submittal shall include a final engineering design report addressing the treatment plant upgrades, and a facility plan if required pursuant to ch. NR 110, Wis. Adm. Code. If the plan concludes Adaptive Management will be implemented, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 and an engineering report addressing any treatment system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code. If the plan concludes water quality trading will be used, the submittal shall identify potential trading partners. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	08/30/2026
Final Plans and Specifications: Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.) Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section	07/31/2027

of this permit.	
Treatment Plant Upgrade to Meet WQBELs: The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41. Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2027
Construction Upgrade Progress Report: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	06/30/2028
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	11/30/2028
Compliance Status Report: The permittee shall submit a status report to the Department summarizing any ongoing optimizations, source reduction measures, or pursuit of alternative approaches to phosphorus WQBEL compliance in preparation for the final phosphorus WQBELS coming into effect.	07/01/2029
Compliance Status Report: The permittee shall submit a status report to the Department summarizing any ongoing optimizations, source reduction measures, or pursuit of alternative approaches to phosphorus WQBEL compliance in preparation for the final phosphorus WQBELS coming into effect.	07/01/2030
Compliance Status Report: The permittee shall submit a status report to the Department summarizing any ongoing optimizations, source reduction measures, or pursuit of alternative approaches to phosphorus WQBEL compliance in preparation for the final phosphorus WQBELS coming into effect.	07/31/2031
Achieve Compliance: The permittee shall achieve compliance with final phosphorus WQBELs. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	07/31/2032

4.3.1 Explanation of Compliance Schedule

Subsection NR 217.17, Wis Adm. Code, allows the department to provide a schedule of compliance for water quality-based phosphorus limits where the permittee cannot immediately achieve compliance. This compliance schedule requires the permittee to comply with the final water quality-based phosphorus limit within 7 years. The duration of this compliance schedule will be re-evaluated upon permit reissuance to determine if the compliance schedule length is still necessary and appropriate. As part of the compliance schedule the permittee is required to submit a Preliminary and Final Compliance Alternatives Plan to select a preferred compliance option for meeting final phosphorus WQBELs.

Assuming that facility upgrades will be made to comply with the final phosphorus WQBELs, subsequent steps of the phosphorus compliance schedule are to: submit final plans and specifications for construction, initiate construction, submit construction progress reports, and, finally, complete construction and comply with final phosphorus WQBELs. If an alternative compliance option is selected such as water quality trading or adaptive management, the compliance schedule will be amended to reflect these compliance options through either permit reissuance or permit modification.

It is probable that, in order to consistently comply with the mass limits, Friesland will need to evaluate and implement any number of the following approaches:

- Plant optimization;
- Phosphorus source reduction;

- Pilot testing of new or additional treatment processes;
- Additional treatment processes;
- Multiple treatment processes;
- Obtaining financing for construction; or
- Potential for adaptive management and/or pollutant trading with upstream contributors, and implementation of such trades.

The Department believes that the compliance schedule suggested in the permit (7 years) provides the appropriate length of time for the permittee to evaluate these options, implement the chosen option, and meet the final phosphorus limits (WQBELs)

4.4 Chloride Source Reduction Measures

The permittee shall comply with the WQBELs for Chloride and perform the following actions.

Required Action	Due Date
Annual Chloride Progress Report: Submit an annual progress report summarizing the chloride source reduction measures implemented during the previous year and the success in maintaining effluent quality at or below the current concentrations. The report shall include an analysis of trends in weekly, monthly, and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data covering the previous year. The report shall include an analysis of how effluent chloride varies with time and with significant loadings of chloride.	01/31/2026
Annual Chloride Progress Report: Submit an annual progress report summarizing the chloride source reduction measures implemented during the previous year and the success in maintaining effluent quality at or below the current concentrations. The report shall include an analysis of trends in weekly, monthly, and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data covering the previous year. The report shall include an analysis of how effluent chloride varies with time and with significant loadings of chloride.	01/31/2027
Annual Chloride Progress Report: Submit an annual progress report summarizing the chloride source reduction measures implemented during the previous year and the success in maintaining effluent quality at or below the current concentrations. The report shall include an analysis of trends in weekly, monthly, and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data covering the previous year. The report shall include an analysis of how effluent chloride varies with time and with significant loadings of chloride.	01/31/2028
Annual Chloride Progress Report: Submit an annual progress report summarizing the chloride source reduction measures implemented during the previous year and the success in maintaining effluent quality at or below the current concentrations. The report shall include an analysis of trends in weekly, monthly, and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data covering the previous year. The report shall include an analysis of how effluent chloride varies with time and with significant loadings of chloride.	01/31/2029
Annual Chloride Progress Report: Submit an annual progress report summarizing the chloride source reduction measures implemented during the previous year and the success in maintaining effluent quality at or below the current concentrations. The report shall include an analysis of trends in weekly, monthly, and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data covering the previous year. The report shall include an analysis of how effluent chloride varies with time and with significant loadings of chloride.	01/31/2030
Annual Chloride Progress Report Required After Permit Expiration: In the event that this permit is not reissued on time for an April 01, 2030 reissuance date, the permittee shall continue to	

submit annual chloride progress reports by January 31 each year covering the previous year.	

4.4.1 Explanation of Schedule

The schedule requires annal reports which shall indicate which source reduction measures have been implemented during the calendar year, and an analysis of chloride concentration and mass discharge data based on chloride sampling and flow data.

4.5 Land Application Management Plan

A management plan is required for the land application system.

Required Action	Due Date
Land Application Management Plan Submittal: If the permittee proposes to land apply sludge, a management plan shall be submitted and approved by the Department. The management plan shall be consistent with the requirements of this permit, and s. NR 204.07, Wis. Adm. Code. At minimum, the plan shall describe how the application rate has been calculated as well as how the sludge will be land applied and incorporated. Record keeping and tracking of site loadings shall also be described. Requests for land application sire approvals shall also be included. The plan is due sixty (60) days prior to land applying.	

4.5.1 Explanation of Schedule

If the permittee wishes to land apply sludge from the lagoons during the permit term, they must submit a plan detailing how the sludge land application will comply with relevant code and permit requirements. The plan must be submitted at least 60 days prior to the sludge being applied.

4.6 Desludging Management Plan

Required Action	Due Date
Desludging Management Plan Submittal: The permittee shall submit a management plan for approval if removal of the sludge will occur during this permit term. At minimum, the plan shall address how the sludge will be sampled, removed, transported, and disposed of. No desludging may occur unless approval by the Department is obtained. Daily logs shall be kept that record where the sludge has been disposed. The plan is due sixty (60) days prior to desludging.	

4.6.1 Explanation of Schedule

If the lagoons are to be de-sludged during this permit term, a management plan needs to be submitted 60 days prior to desludging. At minimum, the plan should address how the sludge will be sampled, removed, transported, and disposed of. An outline is available to assist in plan development.

Attachments

Water Quality Based Effluent Limits, dated February 12, 2025

Stream Classification Memo, dated May 16, 2024

Justification Of Any Waivers From Permit Application Requirements

No waivers requested or granted as part of this permit reissuance.

Prepared By: BetsyJo Howe, Wastewater Specialist **Date:** 02/12/2025

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: February 12, 2025

TO: BetsyJo Howe – SCR/Fitchburg

FROM: Sarah Luck – SCR/Fitchburg

SUBJECT: Water Quality-Based Effluent Limitations for the Friesland Wastewater Treatment Facility WPDES Permit No. WI-0031780-09-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Friesland Wastewater Treatment Facility in Columbia County. This municipal wastewater treatment facility (WWTF) discharges to Friesland Branch, located in the Lower Grand River Watershed (UF11) of the Upper Fox River Basin. This discharge is included in the Upper Fox and Wolf River Basin TMDL as approved by EPA in February 2020. The evaluation of the permit recommendations is discussed in more detail in the attached report.

Based on our review, the following recommendations are made on a chemical-specific basis at Outfall 001:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Annual Total	Footnotes
Flow Rate						1
BOD_5 Interim Final May – October November – April	 7.0 lbs/day 7.0 lbs/day		 30 mg/L 5.0 mg/L 10 mg/L	 20 mg/L		2
TSS Concentration limit TMDL mass limit			-	60 mg/L	 1,114 lbs/year	3,4
pH	9.0 s.u.	6.0 s.u.				5
Dissolved Oxygen Interim Final		 4.0 mg/L 7.0 mg/L				2
Ammonia Nitrogen April – May June – September October – March	 Variable Variable Variable		 5.3 mg/L 3.7 mg/L 9.4 mg/L	 2.1 mg/L 1.5 mg/L 3.7 mg/L		6
Chloride Concentration limit Mass limit			 400 mg/L 140 lbs/day			7
Phosphorus Interim Final TMDL				 5.6 mg/L	 14 lbs/year	4,8
Copper, Total Recoverable						9

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Annual Total	Footnotes
TKN, Nitrate+Nitrite, and Total Nitrogen						5,10

Footnotes:

1. Monitoring only.
2. A compliance schedule may be included in the reissued permit to meet the BOD_5 and DO concentration limits. The current concentration limits may be included as interim limits. The BOD_5 mass limit is required to continue and needs no compliance schedule.
3. The TSS concentration limit is a variance limit according to s. NR 210.07(2), Wis. Adm. Code, where aerated lagoons and stabilization ponds are the principal treatment processes. If chemical is added to remove phosphorus in the future, this limit will likely change to 10 mg/L as a weekly average. No compliance schedule is needed to meet the new mass limit.
4. The TSS and phosphorus mass limits are based on the Total Maximum Daily Load (TMDL) for the Upper Fox and Wolf River Basin to address phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA in February 2020. Since Friesland Wastewater Treatment Facility is a non-continuous discharger, the wasteload allocations are expressed as an annual total.
5. No changes from the current permit.
6. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round. The table has been updated to account for the change in classification of the receiving water.

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
$6.0 \leq pH \leq 6.1$	54	$7.0 < pH \leq 7.1$	33	$8.0 < pH \leq 8.1$	6.9
$6.1 < pH \leq 6.2$	53	$7.1 < pH \leq 7.2$	30	$8.1 < pH \leq 8.2$	5.7
$6.2 < pH \leq 6.3$	52	$7.2 < pH \leq 7.3$	26	$8.2 < pH \leq 8.3$	4.7
$6.3 < pH \leq 6.4$	51	$7.3 < pH \leq 7.4$	23	$8.3 < pH \leq 8.4$	3.9
$6.4 < pH \leq 6.5$	49	$7.4 < pH \leq 7.5$	20	$8.4 < pH \leq 8.5$	3.2
$6.5 < pH \leq 6.6$	47	$7.5 < pH \leq 7.6$	17	$8.5 < pH \leq 8.6$	2.7
$6.6 < pH \leq 6.7$	45	$7.6 < pH \leq 7.7$	14	$8.6 < pH \leq 8.7$	2.2
$6.7 < pH \leq 6.8$	42	$7.7 < pH \leq 7.8$	12	$8.7 < pH \leq 8.8$	1.8
$6.8 < pH \leq 6.9$	39	$7.8 < pH \leq 7.9$	10	$8.8 < pH \leq 8.9$	1.6
$6.9 < pH \leq 7.0$	36	$7.9 < pH \leq 8.0$	8.4	$8.9 < pH \leq 9.0$	1.3

7. In addition to the calculated limits, the facility should continue to implement their source reduction plan and source reduction measures.
8. The interim concentration limit for the phosphorus compliance schedule is set equal to the 4-day P_{99} of the effluent phosphorus concentration data from January 2020 through May 2024.
9. Monitoring at a frequency to ensure that 11 samples are available at the next permit issuance.
10. As recommended in the Department's October 1, 2019 *Guidance for Total Nitrogen Monitoring in Wastewater Permits*, annual total nitrogen monitoring is recommended for all minor municipal permittees. Total Nitrogen is the sum of nitrate (NO_3), nitrite (NO_2), and total Kjeldahl nitrogen (TKN) (all expressed as N).

No WET testing is required because information related to the discharge indicates low risk for toxicity.

Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code, are not required due to the non-continuous nature of the discharge.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Sarah Luck (Sarah.Luck@wisconsin.gov) or Diane Figiel (Diane.Figiel@wisconsin.gov).

Attachments (2) – Narrative and Site Map

PREPARED BY: Sarah Luck Date: February 12, 2025

Sarah Luck
Water Resources Engineer

E-cc: Jordan Main, Wastewater Engineer – SCR/Fitchburg
Diane Figiel, Water Resources Engineer – WY/3
Nate Willis, Wastewater Engineer – WY/3

Attachment #1

Water Quality-Based Effluent Limitations for
Friesland Wastewater Treatment Facility

WPDES Permit No. WI-0031780-09-0

PART 1 – BACKGROUND INFORMATION

Facility Description

The Friesland Wastewater Treatment Facility is a stabilization pond system. The facility consists of three lagoons operated in series, with a primary lagoon followed by two secondary holding lagoons.

The facility discharges intermittently, and rarely during the summer months. Effluent is held when treatment is less effective due to seasonal fluctuations or weather-related issues. The storage capacity of the lagoons enables Friesland WWTF to cease discharge when effluent results approach limits and resume when treatment and effluent quality improves.

Lagoon 1 is lined with clay and has an approximate capacity of 5.8 million gallons. Lagoons 2 and 3 each have an approximate capacity of 2.9 million gallons. All three lagoons were built in 1978, Lagoons 2 and 3 were relined in 1989 with PVC.

Attachment #2 is a map of the area showing the approximate location of Outfall 001.

Existing Permit Limitations

The current permit, expiring on December 31, 2024, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD_5	7.0 lbs/day		30 mg/L	20 mg/L		2
TSS				60 mg/L		3
pH	9.0 s.u.	6.0 s.u.				-
Dissolved oxygen		4.0 mg/L				2
Ammonia Nitrogen						4
April	Variable		11 mg/L	4.5 mg/L		
May	Variable		6.8 mg/L	2.7 mg/L		
June – August	Variable		4.6 mg/L	1.8 mg/L		
September	Variable		6.8 mg/L	2.7 mg/L		
October	Variable		11 mg/L	4.5 mg/L		
November – March	Variable		17 mg/L	6.7 mg/L		
Chloride			400 mg/L 244 lbs/day			5
Phosphorus						1

Attachment #1

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Copper, Total Recoverable						1
TKN, Nitrate+Nitrite, and Total Nitrogen						1

Footnotes:

1. Monitoring only.
2. These limits are based on a previous determination of Limited Aquatic Life (LAL) of the immediate receiving water as described in s. NR 104.02(3)(b), Wis. Adm. Code.
3. The TSS limit is a variance limit according to s. NR 210.07(2), Wis. Adm. Code, where aerated lagoons and stabilization ponds are the principal treatment processes.
4. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values was included in the permit in place of a single limit. These limits apply year-round.

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
$6.0 \leq pH \leq 6.1$	83	$7.0 < pH \leq 7.1$	51	$8.0 < pH \leq 8.1$	11
$6.1 < pH \leq 6.2$	82	$7.1 < pH \leq 7.2$	46	$8.1 < pH \leq 8.2$	8.8
$6.2 < pH \leq 6.3$	80	$7.2 < pH \leq 7.3$	40	$8.2 < pH \leq 8.3$	7.3
$6.3 < pH \leq 6.4$	78	$7.3 < pH \leq 7.4$	35	$8.3 < pH \leq 8.4$	6.0
$6.4 < pH \leq 6.5$	75	$7.4 < pH \leq 7.5$	31	$8.4 < pH \leq 8.5$	5.0
$6.5 < pH \leq 6.6$	72	$7.5 < pH \leq 7.6$	26	$8.5 < pH \leq 8.6$	4.1
$6.6 < pH \leq 6.7$	69	$7.6 < pH \leq 7.7$	22	$8.6 < pH \leq 8.7$	3.4
$6.7 < pH \leq 6.8$	65	$7.7 < pH \leq 7.8$	19	$8.7 < pH \leq 8.8$	2.8
$6.8 < pH \leq 6.9$	60	$7.8 < pH \leq 7.9$	16	$8.8 < pH \leq 8.9$	2.4
$6.9 < pH \leq 7.0$	56	$7.9 < pH \leq 8.0$	13	$8.9 < pH \leq 9.0$	2.0

5. A compliance schedule is in the current permit to meet the final WQBEL by December 31, 2024. The previous WQBEL recommended a mass limit of 244 lbs/day based on the daily max flow rate, but the final permit recommended mass limit of 144 lbs/day.

Receiving Water Information

- Name: Unnamed Tributary/Friesland Branch
- Waterbody Identification Code (WBIC): 3000276
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Forage Fish (WWFF) community, non-public water supply. Note: Cold Water and Public Water Supply criteria would be used for bioaccumulating compounds of concern since the discharge is within the Great Lakes basin, but since there are no bioaccumulating compounds of concern (e.g., mercury) being evaluated, this does not apply.
  The facility has historically received limited aquatic life (LAL) limits at the outfall despite Friesland Branch not being explicitly designated in ch. NR 104, Wis. Adm. Code. The Department conducted a site visit on 9/21/2023 to determine whether the facility's previous permit limits (based on LAL for one mile and then an internally drained wetland) were appropriate or whether Friesland Branch is likely to support fish and should have a full aquatic life classification. Based on the site visit and discussion with Department staff, documented in the memo dated 5/16/2024, it was determined that a fish and aquatic life use of WWFF should apply to the area where the outfall is located. It was also

confirmed that there is a channel that flows through the wetland due to natural spring flows, resulting in connectivity with the downstream system. Therefore, characterization of the wetland being internally drained is no longer accurate, and downstream impacts should be considered.

- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q_{10} and 7-Q_2 values were estimated by Department staff during a site visit on 10/29/2013.
  7-Q_{10} = 0 cfs (cubic feet per second)
  7-Q_2 = 0 cfs
  Harmonic Mean Flow = 0 cfs
  NOTE: During the site visit on 9/21/2023, Department staff noted that there was likely groundwater influx occurring to Friesland Branch approximately 40 yards east of the outfall. At this time, the Department does not have a way to quantify what, if any, impact the groundwater flow may have on the 7-Q_{10} and 7-Q_2 flows, so the flows remain at 0 cfs.
- Hardness = 237 mg/L as $CaCO_3$. Effluent hardness is used in place of receiving water because there is no receiving water flow upstream of the discharge.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: Not applicable when the receiving water low flows are zero.
- Source of background concentration data: Background concentrations are not included because they don't impact the calculated WQBEL when the receiving water low flows are equal to zero.
- Multiple dischargers: None.
- Impaired water status: Friesland Branch is not listed as impaired at the point of discharge. However, the Grand River, approximately 10 miles downstream of the outfall, is listed as impaired for phosphorus. Both Friesland Branch and the Grand River are included in the Upper Fox and Wolf River Basin TMDL to address impairment.

Effluent Information

- Flow rates:
  Design annual average = 0.0267 MGD (Million Gallons per Day)
  Peak daily = 0.073 MGD
  Peak weekly = 0.041 MGD
  Peak monthly = 0.035 MGD
  The peak design flows are from Department records from 2000.
  For reference, the actual average flow from January 2020 through May 2024 was 0.022 MGD (excluding zero flow days).
- Hardness = 237 mg/L as $CaCO_3$. This value represents the geometric mean of four samples collected in April and May 2023 which were reported on the permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water source: Domestic and commercial wastewater with water supply from the village.
- Additives: None.
- Effluent characterization: This facility is categorized as a minor municipality, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus ammonia, chloride, hardness, and phosphorus.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled "MEAN EFFL. CONC.". Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Attachment #1

Copper Effluent Data

Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)
2/28/2023	<5.2	6/20/2023	<5.2	2/12/2024	7.4
3/7/2023	<5.2	11/7/2023	<5.2	3/15/2024	<5.2
3/28/2023	<5.2	12/5/2023	6.0	4/2/2024	<5.2
4/24/2023	5.4	1/8/2024	<5.2		
Mean = 1.7 µg/L					

"<" means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected results.

Chloride Effluent Data

	Chloride (mg/L)	Chloride (lbs/day)
1-day P_{99}	620	113.17
4-day P_{99}	442	80.63
30-day P_{99}	348	63.53
Mean	301	55.02
Std	103	18.89
Sample size	140	140
Range	160 - 590	20.733 - 105.3

The following table presents the average concentrations and loadings at Outfall 001 from January 2020 through May 2024 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameter Averages with Limits

	Average Measurement	Average Mass Discharged
BOD_5	5.5 mg/L*	1.1 lbs/day
TSS	5.8 mg/L*	
pH field	7.34 s.u.	
Phosphorus	2.8 mg/L	0.51 lbs/day
Ammonia Nitrogen	1.3 mg/L*	
Dissolved Oxygen	5.80 mg/L	
Chloride	301 mg/L	55.02 lbs/day

*Results below the level of detection (LOD) were included as zeroes in calculation of average.

PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN

Permit limits for toxic substances are required whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P_{99}) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Acute Limits based on 1-Q_{10}

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q_{10} receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

$$\text{Limitation} = \frac{(WQC)\,(Qs + (1-f)\,Qe) - (Qs - f\,Qe)\,(Cs)}{Qe}$$

Where:

WQC =Acute toxicity criterion or secondary acute value according to ch. NR 105, Wis. Adm. Code.

Qs = average minimum 1-day flow which occurs once in 10 years (1-day Q_{10}) if the 1-day Q_{10} flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q_{10}).

Qe = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.

f = Fraction of the effluent flow that is withdrawn from the receiving water, and

Cs = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e), Wis. Adm. Code.

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q_{10} method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations.

The following tables list the calculated WQBELs for this discharge along with the results of effluent sampling. All concentrations are expressed in terms of micrograms per Liter (µg/L), except for hardness and chloride (mg/L).

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	REF. HARD. mg/L	ATC	MAX. EFFL. LIMIT*	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Arsenic		340	339.8	68.0	<7.7		
Cadmium	237	27.7	27.7	5.5	<0.41		
Chromium	237	3654	3653.8	731	<1.1		
Copper	237	35.0	35.0	7.0	1.7		
Lead	237	246	246.0	49.2	<1.4		
Nickel	237	973	973.2	195	<1.5		
Zinc	237	256	255.9	51.2	35.5		
Chloride (mg/L)		757	757.0			620	590

* Per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016 consideration of ambient concentrations and 1-Q_{10} flow rates yields a more restrictive limit than the 2 × ATC method of limit calculation.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	REF. HARD.* mg/L	CTC	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Arsenic		152.2	152	30.4	<7.7	
Cadmium	175	3.82	3.82	0.8	<0.41	
Chromium	237	267.71	268	53.5	<1.1	
Copper	237	21.65	21.7	4.33	1.7	
Lead	237	64.43	64.4	12.9	<1.4	
Nickel	237	108.26	108	21.7	<1.5	
Zinc	237	255.9	256	51.2	35.5	
Chloride (mg/L)		395	395			**442**

* The indicated hardness may differ from the receiving water hardness because the receiving water hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the chronic criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

Monthly Average Limits based on Wildlife Criteria (WC)

The effluent characterization did not include any effluent sampling results for substances for which Wildlife Criteria exist.

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	HTC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	370	74.0	<0.41
Chromium (+3)	3818000	3818000	763600	<1.1
Lead	140	140	28.0	<1.4
Nickel	43000	43000	8600	<1.5

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3	13.3	2.66	<7.7

In addition to evaluating the need for limits for each individual substance for which HCC exist, s. NR 106.06(8), Wis. Adm. Code, requires the evaluation of the cumulative cancer risk. Because no effluent limits are needed based on HCC, determination of the cumulative cancer risk is not needed per s. NR 106.06(8), Wis. Adm. Code.

Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, **effluent limitations are required for chloride.**

Arsenic – A single sample was submitted for arsenic: <7.7 µg/L (04/23/2024) using the EPA 200.7 analytical method. The limit of detection of this analytical method is significantly higher than 1/5th of the calculated limit based on HCC and is not necessarily determinate if the nondetect sample is actually lower than 2.7 µg/L. **A different approved analytical method is recommended for future samples for arsenic such that the limit of detection is less than or equal to 2.7 µg/L to better determine the need for arsenic limits at the next permit reissuance.**

Chloride – Considering available effluent data from the current permit term (January 2020 through May 2024), the 1-day P_{99} chloride concentration is 620 mg/L, and the 4-day P_{99} of effluent data is 442 mg/L. Since the 4-day P_{99} exceeds the calculated weekly average WQBEL of 395 mg/L, **a weekly average limit of 400 mg/L** (rounded) **is required** in accordance with s. NR 106.05(4)(b), Wis. Adm. Code.

In addition to the concentration limit, a mass effluent limit is also required in accordance with s. NR 106.05(4)(b), Wis. Adm. Code. The chronic mass limitation of **140 lbs/day** (rounded) **as a weekly average** is based on the concentration limit and the peak weekly design flow rate of 0.041 MGD (395 mg/L × 0.041 MGD × 8.34). The peak weekly design flow rate is used in place of the annual average design flow rate in order to allow operational flexibility due to the non-continuous nature of the discharge in accordance with s. 106.06(4)(d)3, Wis. Adm. Code. Since there is no dilution available in the receiving water, the calculated concentration limits are the same no matter which effluent flow rate is used.

An alternative wet weather mass limit (to comply with s. NR 106.07(9), Wis. Adm. Code) and a monthly average concentration limit (to comply with s. NR 106.07(4), Wis. Adm. Code) are not required due to the non-continuous nature of the discharge.

In addition to the numeric limitations, **continuation of the source reduction measures should remain** in order to maintain the current levels of treatment so as not to increase the concentration, level, or loading of chloride to Friesland Branch.

Mercury – The permit application did not require monitoring for mercury because Friesland Wastewater Treatment Facility is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3, Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, "there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5), Wis. Adm. Code." A single sludge sample was collected 06/12/2024. The sample result, 0.14 mg/kg, was within expected analytical ranges and well below the 17 mg/kg level. Therefore, **no mercury monitoring is recommended at Outfall 001.**

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Based on the type of discharge, the effluent flow rate, and lack of indirect dischargers, **PFOS and PFOA monitoring is not recommended.** The Department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BOD_5 AND DISSOLVED OXYGEN

Water Quality-Based BOD_5 Concentration Limits

The BOD_5 limits in the current permit are variance limits as described in s. NR 104.02(4)(c), Wis. Adm.

Code. These limits are no longer applicable because the receiving water is no longer considered LAL community. Therefore, conventional pollutant limits will be reevaluated for the protection of the WWFF community of Friesland Branch.

In establishing biological oxygen demand (BOD_5) limitations, the primary intent is to prevent a lowering of dissolved oxygen (DO) levels in the receiving water below water quality standards as specified in ss. NR 102.04(4)(a) and (b), Wis. Adm. Code. The 26-lb method is the most frequently used approach for calculating BOD_5 limits when resources are not available to develop a detailed water quality model. This simplified model was developed in the 1970s by the Wisconsin Committee on Water Pollution on the Fox, Wisconsin, Oconto, and Flambeau Rivers. Further studies throughout the 1970s proved this model to be relatively accurate. The model has since then been used by the Department on many occasions when resources are not available to perform a site-specific model. The "26" value stems from the following equation:

$$\frac{26\ {}^{\text{lbs}}/_{\text{day}}}{{}^{\text{ft}^3}/_{\text{sec}}} * \frac{1\,\text{day}}{86{,}400\,\text{sec}} * \frac{454{,}000\,\text{mg}}{\text{lbs}} * \frac{1\,\text{ft}^3}{28.32\,\text{L}} = 4.8 = 2.4 * 2\ {}^{\text{mg}}/_{\text{L}}$$

The 4.8 mg/L has been calculated by taking 2.4 mg/L which is the number one receives when converting 26 lbs of BOD/day/cfs into mg/L, multiplied by 2.0 which is the change in the DO level. A typical background DO level for Wisconsin waters is 7 mg/L, so a 2 mg/L decrease is allowed to meet the 5 mg/L standard for warm water streams. The above relationship is temperature dependent, and an appropriate temperature correction factor is applied. The 26-lb method is based on a typical 24°C summer value for warm water streams. Adjustments for temperature are made using the following equation:

$$k_t = k_{24}\left(0.967^{(T-24)}\right)$$

Where k_{24} = 26 lbs of BOD/day/cfs

$$Limitation(mg/L) = 2.4\left(DO_{stream} - DO_{std}\right)\left(\frac{\left({}_7Q_{10} + Q_{eff}\right)}{Q_{eff}}\right)\left(0.967^{(T-24)}\right)$$

Where:

Q_{eff} = effluent design flow = 0.0267 MGD
DO_{stream} = background dissolved oxygen = 7 mg/L
DO_{std} = dissolved oxygen criteria from s. NR 102.04(4) = 5.0 mg/L
$7\text{-}Q_{10}$ = 0 cfs
T = Receiving water temperature from s. NR 102.25

Since there is no dilution available in the receiving water, the calculated limits would be the lowest that the Department typically gives to facilities. **The recommended effluent limitations are 5.0 mg/L as a weekly average from May through October and 10 mg/L as a weekly average from November through April** (rounded to two significant digits). Given that these limitations are the lowest that the Department would typically give to a facility, these limitations shall be considered as those needed to prevent significant lowering of water quality. **As there is no dilution available under low flow conditions, a dissolved oxygen limit of 7.0 mg/L as a daily minimum is also recommended.**

The Department normally does not give BOD_5 mass limits when the stream is effluent dominated. However, since the current permit contains a daily maximum **BOD_5 mass limit of 7.0 lbs/day, this limit**

is required to continue during the reissued permit term unless the applicable antibacksliding requirements in subch. II of NR 207, Wis. Adm. Code, are met.

Expression of Limits

Additional limits to meet the requirements in s. NR 106.07, Wis. Adm Code, are not required due to the non-continuous nature of the discharge.

Effluent Data

Data from January 2020 through May 2024 for BOD_5 and DO are summarized in the table below.

BOD_5 and DO Effluent Data

	Summer BOD_5 (mg/L)	Winter BOD_5 (mg/L)	DO (mg/L)
1-day P_{99}	7.8	23	8.35
4-day P_{99}	5.9	14	6.99
30-day P_{99}	3.8	8.5	6.22
Mean*	2.8	6.2	5.80
Std	1.4	4.6	0.95
Sample size	16 (4 ND)	54 (4 ND)	143
Range	<2 - 6.1	<2 - 27	4.32 - 9.46

*"<" means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected (ND) result.

Based on the effluent data for BOD_5 and DO, it does not appear that the facility can meet the limits based on WWFF. Therefore, **a compliance schedule to meet the BOD_5 and DO limits is recommended in the reissued permit. The current limits based on the LAL classification may be included in the reissued permit as interim limits.**

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. The current permit has daily maximum, weekly average, and monthly average limits. These limits are re-evaluated at this time due to the following changes:

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.
- The maximum expected effluent pH has changed.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

Daily maximum limitations are based on acute toxicity criteria in ch. NR 105, Wis. Adm. Code, which are a function of the effluent pH and the receiving water classification. The acute toxicity criterion (ATC) for ammonia is calculated using the following equation:

$$ATC \text{ in mg/L} = [A \div (1 + 10^{(7.204 - pH)})] + [B \div (1 + 10^{(pH - 7.204)})]$$

Where:

A = 0.411 and B = 58.4 for a Warm Water Forage Fishery, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 143 sample results were reported from January 2020 through May 2024. The maximum reported value was 8.89 s.u. (Standard pH Units). The effluent pH was 8.88 s.u. or less 99% of the time. The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.58 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.51 s.u. Therefore, a value of 8.89 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 8.89 s.u. into the equation above yields an ATC = 1.58 mg/L.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method
In accordance with s. NR 106.32(2), Wis. Adm. Code, daily maximum ammonia limitations are calculated using the 1-Q_{10} receiving water low flow if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q_{10} (estimated as 80 % of 7-Q_{10}) and the 2×ATC approach are shown below.

Daily Maximum Ammonia Nitrogen Determination

	Ammonia Nitrogen Limit mg/L
2×ATC	3.2
1-Q_{10}	1.6

The 1-Q_{10} method yields the most stringent limits for Friesland Wastewater Treatment Facility.

The current permit has variable daily maximum effluent limits based on effluent pH. However, **presented below is an updated table of daily maximum limitations corresponding to various effluent pH values based on the updated stream classification of warm water forage fish (WWFF).**

Daily Maximum Ammonia Nitrogen Limits –WWFF where 1-Q_{10} = 0 cfs

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	54	7.0 < pH ≤ 7.1	33	8.0 < pH ≤ 8.1	6.9
6.1 < pH ≤ 6.2	53	7.1 < pH ≤ 7.2	30	8.1 < pH ≤ 8.2	5.7
6.2 < pH ≤ 6.3	52	7.2 < pH ≤ 7.3	26	8.2 < pH ≤ 8.3	4.7
6.3 < pH ≤ 6.4	51	7.3 < pH ≤ 7.4	23	8.3 < pH ≤ 8.4	3.9
6.4 < pH ≤ 6.5	49	7.4 < pH ≤ 7.5	20	8.4 < pH ≤ 8.5	3.2
6.5 < pH ≤ 6.6	47	7.5 < pH ≤ 7.6	17	8.5 < pH ≤ 8.6	2.7
6.6 < pH ≤ 6.7	45	7.6 < pH ≤ 7.7	14	8.6 < pH ≤ 8.7	2.2
6.7 < pH ≤ 6.8	42	7.7 < pH ≤ 7.8	12	8.7 < pH ≤ 8.8	1.8
6.8 < pH ≤ 6.9	39	7.8 < pH ≤ 7.9	10	8.8 < pH ≤ 8.9	1.6
6.9 < pH ≤ 7.0	36	7.9 < pH ≤ 8.0	8.4	8.9 < pH ≤ 9.0	1.3

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)

The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia since those limits relate to the assimilative capacity and classification of the receiving water.

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria in ch. NR 105, Wis. Adm. Code.

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a Warm Water Forage Fish Community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{[0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})]\} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,
E = 0.854,
C = the minimum of 2.85 or $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or
$C = 1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Absent), and
T = the temperature (ºC) of the receiving water – (Early Life Stages Present), or
T = the maximum of the actual temperature (ºC) and 7 - (Early Life Stages Absent)

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. Since there is zero flow in the receiving water, the calculated limits equal the respective criteria.

Section NR 106.32 (3), Wis. Adm. Code, provides a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 ºC, during the winter and spring months. Burbot, an early spawning species, are not believed to be present in Friesland Branch. So "ELS Absent" criteria apply from October through March, and "ELS Present" criteria will apply from April through September for a warmwater forage fish classification.

Although there is zero background flow at the point of discharge at low flow conditions, "default" ambient pH values are uses to calculate criteria rather than effluent pH because in harder waters, such as those found in southern Wisconsin, instream pH tends to approach default values. In addition, "default" basin assumed values are used for temperature and background ammonia concentrations. These values are shown in the table below, with the resulting criteria and effluent limitations.

Weekly and Monthly Ammonia Nitrogen Limits – WWFF

		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
Effluent Flow	Qe (MGD)			
Background Information	7-Q_{10} (cfs)	0	0	0
	7-Q_2 (cfs)	0	0	0
	Ammonia (mg/L)	0.02	0.03	0.05
	Temperature (°C)	14	21	10
	pH (s.u.)	8.09	8.08	7.9
	Reference Weekly Flow (cfs)	0	0	0

Attachment #1

		Spring	Summer	Winter
		April & May	**June – Sept.**	**Oct. - March**
	Reference Monthly Flow (cfs)	0	0	0
Criteria mg/L	4-day Chronic			
	Early Life Stages Present	**5.32**	**3.66**	6.99
	Early Life Stages Absent	5.35	3.66	**9.36**
	30-day Chronic			
	Early Life Stages Present	**2.13**	**1.46**	2.80
	Early Life Stages Absent	2.14	1.46	**3.74**
Effluent Limitations mg/L	Weekly Average			
	Early Life Stages Present	**5.3**	**3.7**	
	Early Life Stages Absent			**9.4**
	Monthly Average			
	Early Life Stages Present	**2.1**	**1.5**	
	Early Life Stages Absent			**3.7**

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from January 2020 through May 2024.

Effluent Ammonia Data

Ammonia Nitrogen mg/L	April – May	June – September	October – March
1-day P_{99}	-	-	12
4-day P_{99}	-	-	6.7
30-day P_{99}	-	-	3.4
Mean*	0.16	0.21	2.0
Std	1.6	-	2.8
Sample size	41 (38 ND)	12 (11 ND)	90 (36 ND)
Range	<0.2 - 3.7	<0.2 - 0.21	<0.2 - 10

*"<" means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected (ND) result.

Reasonable Potential

Comparing the effluent data to the calculated limits, **a daily maximum limit is required October through March.** However, since the permit currently has daily, weekly, and monthly limits year-round, **the limits must be retained regardless of reasonable potential**, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:

> (b) If a permittee is subject to an ammonia limitation in an existing permit, the limitation shall be included in any reissued permit. Ammonia limitations shall be included in the permit if the permitted facility will be providing treatment for ammonia discharges.

Conclusions and Recommendations

In summary, after rounding to two significant figures, the following ammonia nitrogen limitations are recommended. No mass limitations are recommended in accordance with s. NR 106.32(5), Wis. Adm Code.

Final Ammonia Nitrogen Limits

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
April & May	Variable	5.3	2.1
June – September	Variable	3.7	1.5
October – March	Variable	9.4	3.7

PART 5 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

On May 1, 2020, revisions to chs. NR 102 and NR 210, Wis. Adm. Codes, became effective which replace fecal coliform limits with new *Escherichia coli* (*E. coli*) limits for protection of recreational uses. Section NR 210.06(2)(a)1, Wis. Adm. Code, includes two limits which must be included in permits for facilities which are required to disinfect:

1. The geometric mean of *E. coli* bacteria in effluent samples collected in any calendar month may not exceed 126 counts/100 mL.
2. No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 counts/100 mL.

Disinfection has not historically been required for Friesland Wastewater Treatment Facility due to the assumed limited aquatic life classification of the receiving water. However, since receiving water is being evaluated for applicable limits, the detention time disinfection exemption will be evaluated for the applicability of *E. coli* limits in the reissued permit.

It is recognized Friesland Wastewater Treatment Facility potentially has a detention time of at least 180 days, in which the resulting discharged effluent is thought to not pose a risk to human and animal heath, as described in s. NR 210.06(3)(h), Wis. Adm. Code. The maximum 180-day rolling average flow rate for the facility is 0.0248 MGD (January 2020 – May 2024). The volumetric capacity of the lagoons is approximately 37.4 ac-ft (which converts to 12.2 MG), calculated based on dimensions provided by the facility (the 2023 CMAR stating the total pond area is 7.2 ac and the 1988 schematic showing a depth of 5.2 ft). Therefore, the estimated shortest detention time for the facility is approximately 490 days (12.2 MG / 0.0248 MGD) and is significantly longer than the 180-day minimum. This detention time is essentially providing disinfection where additional disinfection treatment is not expected to be needed. **Therefore, bacteria limits or monitoring are not recommended during the reissued permit term.**

PART 6 – PHOSPHORUS

Technology-Based Effluent Limit

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of total phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit.

Since Friesland Wastewater Treatment Facility does not currently have an existing technology-based

limit, the need for this limit in the reissued permit is evaluated. The data demonstrates that the annual monthly average phosphorus loading is less than 150 lbs/month, which is the threshold for municipalities in accordance with s. NR 217.04(1)(a)1, Wis. Adm. Code, and therefore **no technology-based limit is required.**

Annual Average Mass Total Phosphorus Loading

Month	Average Phosphorus Concentration (mg/L)	Total Effluent Flow (Million Gallons)	Calculated Mass (lbs/month)
February 2023	4.7	0.681	26.4
March 2023	3.7	0.642	19.8
April 2023	2.1	0.731	12.8
May 2023	3.0	0.698	17.2
June 2023	0.5	0.396	1.8
November 2023	3.1	0.565	14.6
December 2023	2.8	0.755	17.6
January 2024	3.9	0.588	19.1
February 2024	4.7	0.403	15.6
March 2024	2.1	0.433	7.4
April 2024	2.9	0.435	10.3
May 2024	2.1	0.507	8.9
Average			**14.3**

Total P (lbs/month) = Monthly average (mg/L) × total flow (MG/month) × 8.34 (lbs/gallon)
Where total flow is the sum of the actual (not design) flow (in MGD) for that month

In addition, the need for a WQBEL for phosphorus must be considered.

TMDL Limits

Total phosphorus (TP) effluent limits in pounds per day (lbs/day) are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs* (April 2020) and are based on the annual phosphorus wasteload allocation (WLA) given in pounds per year (lbs/year). These WLA, found in Appendix H of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Upper Fox and Wolf River Basins* (UFW TMDL) report dated February 2020, are expressed as maximum annual loads (lbs/year). **The annual TP WLA is 14 lbs/year.**

For non-continuous discharges, methods for converting WLAs into permit limits should be determined on a case-by-case basis. For example, some discharges do not occur continuously and often vary from year to year, depending on weather conditions or production processes. In these cases, it may be appropriate to express limits by season or as an annual total amount. In many cases, giving shorter term limitations (e.g., daily, monthly) might have the effect of unduly limiting operational flexibility and, since TMDLs are required to be protective of critical conditions, a seasonal or annual limit would be consistent with the TMDL and protective of water quality. In the case of Friesland Wastewater Treatment Facility, it is recommended the TMDL limit is expressed as an annual total.

The UFW TMDL establishes TP wasteload allocations to reduce the loading in the entire watershed including WLAs to meet water quality standards for tributaries to the Upper Fox and Wolf River. Therefore, WLA-based WQBELs are protective of immediate receiving waters and total phosphorus WQBELs derived according to s. NR 217.13, Wis. Adm. Code are not required.

Effluent Data
The following table summarizes effluent total phosphorus monitoring data from January 2020 through May 2024.

Total Phosphorus Effluent Data

	Phosphorus mg/L	Phosphorus lbs/day
1-day P_{99}	9.5	1.87
4-day P_{99}	5.6	1.08
30-day P_{99}	3.7	0.69
Mean	2.8	0.51
Std	1.8	0.37
Sample size	70	68
Range	0.4 - 9.1	0.05 - 1.83

Annual Total Phosphorus Effluent Mass Data

	lbs/yr
2020	103
2021	131
2022	97
2023	110

- Annual Discharge: sum of total monthly discharges for the calendar year.
- Total Monthly Discharge: monthly average concentration (mg/L) x total flow for the month (MG/month) x 8.34.

Interim Limit
An interim limit is required per s. NR 217.17, Wis. Adm. Code, when a compliance schedule is needed in the permit to meet the WQBEL. The interim limit should reflect a concentration that the facility is able to meet without investing in additional "temporary" treatment, but also should prevent backsliding from current conditions. Therefore, **it is recommended that the interim limit be set equal to 5.6 mg/L for permit reissuance along with requirements for optimization of phosphorus removal.** This value reflects the 4-day P_{99} concentration of 5.6 mg/L from the past four years. This value is recommended instead of the 30-day P_{99} concentration of 3.7 mg/L due to the small dataset and to allow operational flexibility when the facility begins to initiate phosphorus treatment optimization activities which often consist of trial and error.

Conclusions
In summary, the following limits are recommended by this evaluation:

- **Monthly average interim total phosphorus concentration limit of 5.6 mg/L**, based on the 4-day P_{99} of concentration data from the past four years, is recommended for the compliance schedule.
- **Annual total mass limit of 14 lbs/year** since Friesland Wastewater Treatment Facility is a non-continuous discharger.

PART 7 – TOTAL SUSPENDED SOLIDS (TSS)

Concentration Limit

Friesland Wastewater Treatment Facility currently has a TSS concentration limit of 60 mg/L as a monthly average that is a variance limit given in accordance with s. NR 210.07(2), Wis. Adm. Code, where aerated lagoons and stabilization ponds are the principal treatment processes. **This limit is recommended to continue.** It should be noted, however, that if Friesland begins adding chemical to remove phosphorus, the variance limit of 60 mg/L would no longer be applicable and the concentration limit would likely be set equal to 10 mg/L as a weekly average. TSS concentration limits are usually set equal to BOD_5 limits, however the Department typically does not require TSS limits lower than 10 mg/L.

Mass Limits

Total Suspended Solids (TSS) effluent limits in pounds per day (lbs/day) are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs* (April 2020). The TSS wasteload allocations (WLA) can be found in Appendix I of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Upper Fox and Wolf Basins* (UFW TMDL) report dated February 2020 and are expressed as maximum annual loads (lbs/year). **The annual TSS WLA for Friesland Wastewater Treatment Facility is 1,114 lbs/year.**

For non-continuous discharges, methods for converting WLAs into permit limits should be determined on a case-by-case basis. For example, some discharges do not occur continuously and often vary from year to year, depending on weather conditions or production processes. In these cases, it may be appropriate to express limits by season or as an annual total amount. In many cases, giving shorter term limitations (e.g., daily, monthly) might have the effect of unduly limiting operational flexibility and, since TMDLs are required to be protective of critical conditions, a seasonal or annual limit would be consistent with the TMDL and protective of water quality. In the case of Friesland Wastewater Treatment Facility, it is recommended the TMDL limit is expressed as an annual total.

Effluent Data

The following table summarizes effluent total suspended solids monitoring data from January 2020 through May 2024. TSS mass data was not reported, so the mass was calculated based on the TSS concentration and flow rate for that day.

Total Suspended Solids Effluent Data

	TSS mg/L	TSS lbs/day
1-day P_{99}	28.9	6.0
4-day P_{99}	16.8	3.4
30-day P_{99}	9.0	1.8
Mean*	5.8	1.1
Std	6.3	1.3
Sample size	70 (19 ND)	70
Range	<2 - 31	0 - 5.8

*"<" means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected (ND) result.

Attachment #1

Annual Total Suspended Solids Effluent Mass Data

	lbs/yr
2020	304
2021	399
2022	196
2023	280

- Annual Discharge: sum of total monthly discharges for the calendar year.
- Total Monthly Discharge: monthly average concentration (mg/L) x total flow for the month (MG/month) x 8.34.

Friesland can currently meet the TSS mass limit. Therefore, **the TMDL mass limit is recommended to be effective immediately upon permit reissuance.**

PART 8 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in chs. NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. Daily maximum and weekly average temperature criteria are available for the 12 different months of the year depending on the receiving water classification.

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from January 2020 through May 2024.

Calculated Temperature Limits

Month	Calculated Effluent Limit	
	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	49	76
FEB	50	76
MAR	52	77
APR	55	79
MAY	65	82
JUN	76	84
JUL	81	85
AUG	81	84
SEP	73	82
OCT	61	80

Attachment #1

Month	Calculated Effluent Limit	
	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
NOV	49	77
DEC	49	76

Since this facility provides hydraulic detention times in excess of one year, elevated effluent temperatures are unlikely and discharge temperatures are expected to be similar to ambient conditions. The facility last monitored temperature from March 2011 to May 2012, and the highest maximum recorded temperature was 79.3°F. Given the extended detention time and lack of industrial contributors to the system, **no thermal limits or monitoring are recommended.**

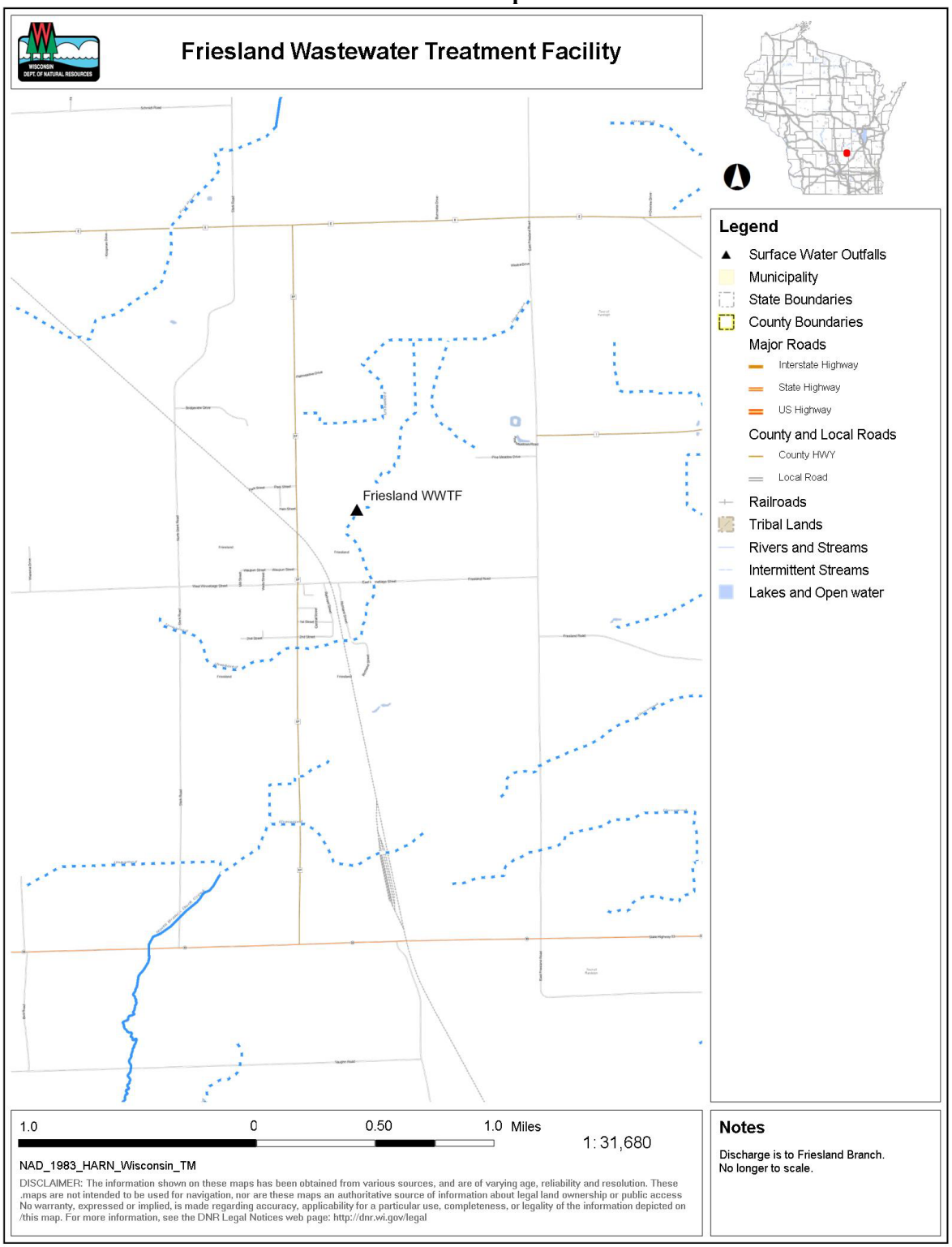
PART 9 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document* (2022).

Guidance in Chapter 1.11 (WET Testing of Minor Municipal Discharges) of the *WET Program Guidance Document* was consulted. This is a minor municipal discharge (< 1.0 MGD) comprised solely of domestic and commercial wastewater with no history of WET failures and no toxic compounds detected at levels of concern. **No WET testing is recommended at this time because of the low risk in effluent toxicity**.

Attachment #1

Site Map



CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: 5-16-2024 FILE REF: NA

TO: Sarah Luck, Limit Calculator; Jordan Main, Compliance Engineer

FROM: Dave Bolha, Stream Biologist; Kristi Minahan, Water Quality Standards; Diane Figiel, Limit Calculator Coordinator

SUBJECT: Friesland Wastewater Treatment Facility, Friesland Branch (WBIC 3000276) Columbia County

Overview of issue

In preparation for reissuance of the Friesland Wastewater Treatment Facility permit, staff were requested to do a site visit to determine the appropriate stream classifications for the receiving waters. Friesland is a noncontinuous discharger, with a permitted daily maximum flow of 0.0267 MGD (0.04 cfs). They have a continuous flow-through system from spring to early winter and fill and draw during late winter and early spring months. At the time of the site visit on 9/21/2023, Friesland Wastewater Treatment Facility was not discharging, and observations indicated discharge had not occurred for some time (Photo 1). According to the Friesland operator, its last discharge before the visit was in June 2023.

Segment 1 of Friesland Branch is usually dry and does not have a fish and aquatic life community (Map 2 blue line, Photo 1). Segment 2 is from the point where the outfall joins Friesland Br. (Map 2 green line), which has groundwater influx ~40 yards east of the outfall (N43.5932, W-89.06133, Photo 2) and flows northeast for ~1.4 miles through a wetland to East Friesland Road (Photo 3). The entirety of Segment 2 was not walked due to limited access. However, observations of Friesland Branch downstream of the outfall 0.2 miles (Photo 2), recent aerial photos, and the condition of Friesland Branch at East Friesland Road (Photo 3) indicate that there is a continuous stream channel.

The facility's previous permit limits were based on LAL for 1 mile, and then it was considered to be an internally drained wetland so it was not considered to reach downstream waters and phosphorus limits were not included for downstream impacts (however, now that the Fox-Wolf Total Maximum Daily Load (TMDL) is in effect, they will have TMDL phosphorus limits if it is not an internally drained wetland). These segments are not in ch. NR 104 as Limited Aquatic Life or Limited Forage Fish (LAL/LFF).

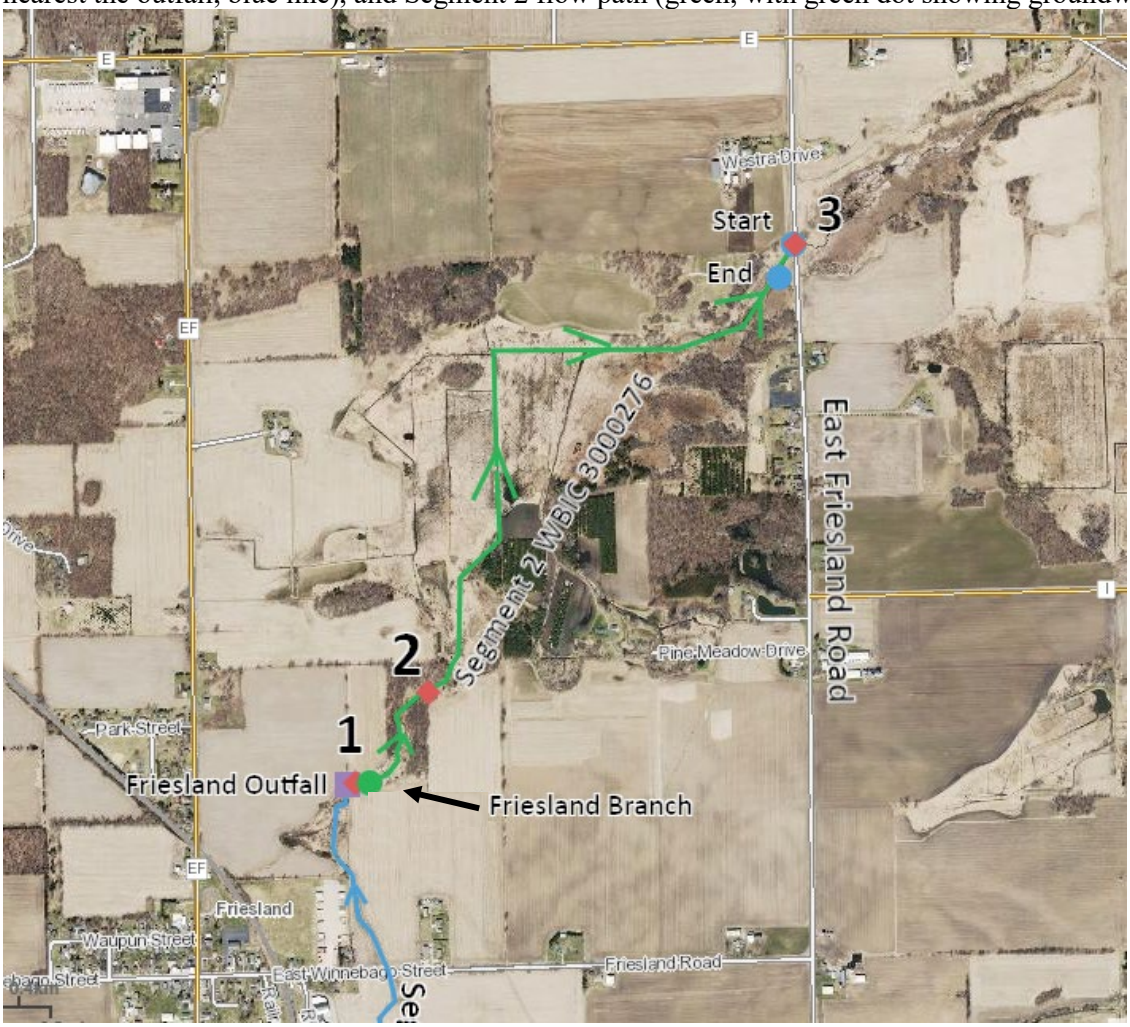
Summary of recommendations

- **Segment 1 (most upstream): Friesland Br. (WBIC 3000276) upstream of the outfall to its headwater**
  - *Codified designated use:* Not in NR 104 as LAL or LFF.
  - *Classification used for previous permit issuance:* LAL
  - *Previous stream class recommendations:* In 2003, it was recommended to be listed as LAL from the outfall to the Columbia/Green Lake county line. In 2013, Dan Heim also recommended LAL for this segment, however no fish survey was done.
  - *Modeled Natural Community:* Cool-warm headwater
  - *New recommended Natural Community and Designated Use:* Macroinvertebrate NC and LAL DU.
- **Segment 2: Friesland Branch from outfall downstream to East Friesland Road (about 1.4 miles)**
  - *Codified designated use:* Not in NR 104 as LAL or LFF.
  - *Classification used for previous permit issuance:* LAL-Wetland about 0.2 miles downstream of outfall
  - *Previous stream class recommendations:* In 2003, it was recommended to be listed as LAL from the outfall to the Columbia/Green Lake county line. In 2013, Dan Heim recommended LAL-Wetland for this wetland segment; however, no fish survey was done.
  - *Modeled Natural Community:* Cool-warm headwater
  - *New recommended NC & DU:* Verified as Cool-warm headwater NC and Warmwater Forage Fish DU
  - *Qualitative Habitat for Segment 2 was Fair (58)*

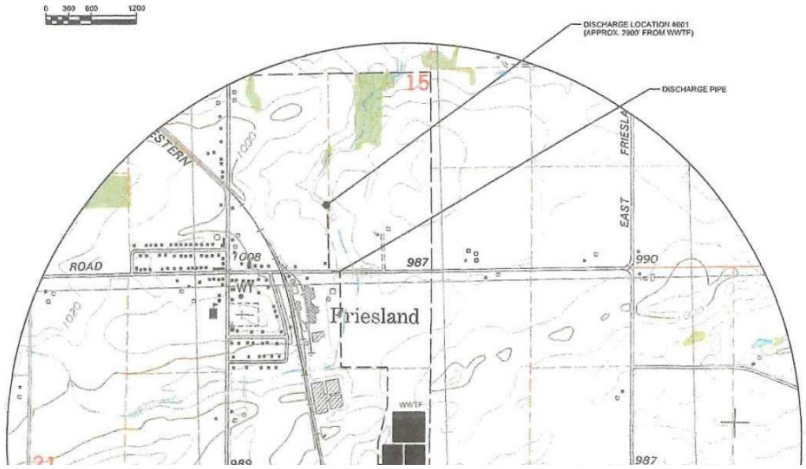
Site overview maps

Map 1. Effluent flows from Lagoon 3 (bottom left lagoon) through an underground pipe (yellow dashed line) to the outfall farther north on Friesland Branch. An old manhole (orange dot) is at the point where the effluent leaves the property.

Map 2. Map from the Surface Water Data Viewer showing outfall location, numbered photo locations (with red diamonds), fish survey start and end locations (shown with blue dots), Segment 1 flow path (at the end nearest the outfall, blue line), and Segment 2 flow path (green, with green dot showing groundwater influx).



Map 3. Location of Friesland lagoons and discharge point. Map provided by the facility as a part of permit application materials.



Site observations and habitat survey results

- **Segment 1 (most upstream): Segment 1 (most upstream): Friesland Br. (WBIC 3000276) upstream of the outfall to its headwater**
    - Segment 1 was dry during the Sept. 2023 visit, but had some water in April 2024. At the WWTF Outfall, there was a concrete trough with bottom and sides (Photo 1), which joins Friesland Br. No discharge was flowing out of the trough.

Photo 1: Friesland WWTF Outfall

- **Segment 2: Friesland Branch from outfall downstream to East Friesland Road (about 1.4 miles)**
    - Groundwater influx to Friesland Branch was found approximately 40 yards East of outfall where bed and bank were observed.
    - Rainfall in 2023 was below average.
    - Friesland Branch stream channel followed downstream ~0.2 miles to edge of access (Photo 2).
    - Water clarity clear and temperature cool indicating groundwater influx.

Photo 2: Friesland Branch ~0.2 miles downstream from Outfall where groundwater is providing streamflow.

Photo 3: Friesland Branch at East Friesland Road

Fish survey results

One fish survey was conducted at East Friesland Road in Friesland Branch to characterize Segment 2. No past fish surveys had been conducted at this location.

- SWIMS Station 10058655
- Survey station length: 100 meters
- Survey started at East Friesland Road (downstream end of survey)
- Total fish captured: 182
- Species captured: 10
- Natural Community Verified as Cool-warm headwater (see attached spreadsheet)
- The Small Stream Fish IBI score was 35, between Fair and Poor.
- Qualitative Habitat scored as Fair (58)

Figure 1. Species captured during the Sept. 21, 2023 fish survey, and Small Stream Fish IBI score of 35.

Species	Count
BROOK STICKLEBACK	50
CREEK CHUB	11
WHITE SUCKER	6
CENTRAL MUDMINNOW	3
NORTHERN REDBELLY DACE	37
PEARL DACE	38
FATHEAD MINNOW	21
GREEN SUNFISH	2
CENTRAL STONEROLLER	1
JOHNNY DARTER	13

Discussion and Designated Use Recommendations

Friesland WWTF is a non-continuous discharger in the northeast portion of Columbia County. The receiving water for their effluent was assessed in 2013; however, the classification needed to be verified in preparation for their permit reissuance. Water Resources was asked to revisit the receiving water classification. The receiving water, Friesland Branch, is mapped as an intermittent stream that originates on the west side of Friesland. The effluent from the facility flows through an underground pipe to the point of the outfall where it flows through a short concrete trough and enters Friesland Branch, which then flows generally northeast toward Green Lake County.

During Dave Bolha's visit on Sept. 21, 2023, which was a below-average precipitation summer, Friesland Branch was dry upstream of the Friesland WWTF Outfall (segment 1). At the point of the outfall the effluent flows from the pipe into a 5 foot concrete trough and then into Friesland Branch. The Friesland WWTF operator present during the classification indicated that they had not discharged since June 2023 so the trough was dry at the date of the visit. At a later site visit by Jordan Main on April 16, 2024, there was flow in Friesland Branch in Seg. 1 upstream of the outfall. Segment 1 will not have a fish community and, at best, limited macroinvertebrates during most of the year. The Natural Community of Segment 1 would be Macroinvertebrate, and LAL designated use.

In Segment 2 of Friesland Branch, ~40 yards to the east of the Outfall (point 1 on Map 1), groundwater flow was evident, which formed the streamflow even during the dry period of the 2023 visit. Flow and a stream

channel was followed to the northeast ~0.2 miles along a small but defined stream corridor through the reed canary grass. Friesland Branch then flows through a wetland complex through a series of ditched channels. East Friesland Road crosses the Friesland Branch roughly 1.4 miles after it originates. A fish survey upstream of East Friesland Road was conducted on September 21st, 2023, to assess the fish community representative of Segment 2. The fish community was relatively diverse with 10 species and 182 individuals captured in 100 meters, even in a very dry year. Therefore, although earlier recommendations had been to classify Segment 2 as LAL, that is not appropriate because LAL is meant to be applied to streams that do not support a fish community. Fish surveys were not conducted as part of the earlier recommendations. Based on the 2023 findings, the Natural Community was verified as Cool-warm Headwater with a recommended Designated Use of Warm Water Forage Fish.

In the previous permit issuances, the wetland was presumed to be internally drained and therefore downstream protection limits for phosphorus were not applied. However, Dave Bolha confirmed that there is a channel that flows through the wetland due to natural spring flows, resulting in connectivity with the downstream system. Therefore, downstream limits should be considered.

Are code changes and/or a Use Attainability Analysis needed?

Friesland Branch is not currently in the code as LAL or LFF. Based on the existing fish community documented with the 2023 survey, LAL or LFF are not appropriate for Segment 2, where a Warmwater Forage Fish designated use should be applied; no code change is needed for that segment (downstream of the outfall). Segment 1 could qualify as LAL (with no effluent flow, as is the current situation with the pipe entering at the end of Seg. 1), but may require a Use Attainability Analysis and code change to do so. Because a designation of LAL would not affect the facility's limits (because their immediate downstream water is Warmwater (Seg. 2)), it is unlikely to be a priority to codify this segment as LAL. If effluent were added to Seg 1, flows would increase such that a new classification determination would likely be needed to determine if LAL would still be appropriate.

Attachments

- NC Verification Report
- Habitat surveys

State of Wisconsin
Department of Natural Resources
PO Box 7921, Madison WI 53707-7921
dnr.wi.gov

Wadable Stream Fish Assessment

Form 3600-230 (R 7/15)

Modeled as CW Headwater Upstream of East Friesland Rd
Modeled as CC HW Downstream of East Friesland Rd

Instructions: **Bold** fields must be completed.

Station Summary

Stream Name	Waterbody ID Code	SWIMS Station ID	FH Database ID
Friesland Branch (Unnamed trib to Gaul Rd)	3000276	10058655	

Date (MMDDYYY)	Station Name
09/21/2023	US Friesland Rd

Latitude - Longitude Determination Method Used	Datum Used
GPS	WGS 84

Start Latitude	Start Longitude	End Latitude	End Longitude	County
N43.60582	W 89.04734	N43.60502	W89.04772	Columbia

Water Characteristics

Time (24-hr clock)	Air Temperature (C)	Water Temperature (C)	Conductivity (µs/cm)	Transparency (cm)
14:00		15.8	810	120

Dissolved Oxygen (mg/l)	Dissolved Oxygen % Saturation	pH
6.50	65.3	7.8

Flow (m³/sec)	Water Level (check one - measure distance if Above or Below Normal):	Water Clarity:
	⊗ Normal ○ Below: _____ (m) ○ Above: _____ (m)	⊗ Clear ○ Turbid ○ Stained

Channel and Basin Characteristics

Channel Condition: (check one) ⊗ Natural ⊗ > 20-year-old Channelization ○ 10- to 20-year-old Channelization ○ < 10-year-old Channelization ○ Concrete Channel

Mean Stream Width (m)	Percent Channelization	Sinuosity	Gradient (m/km)	Stream Order	Basin Area (km²)
2m	100				

Sampling Description

Sampling Type (check one): ⊗ CPE ○ Depletion ○ Mark-Recapture ○ Other - Specify: _____

Station Length (m)	Start Time (24-hr clock)	Finish Time (24-hr clock)
100 m	14:10	15:14 (Only 29 min)

Type of Pass (check one): ⊗ Upstream Only ○ Upstream, then Downstream ○ Other - Specify:

Gear Description

Gear (indicate number of each type used): 1 Backpack Shockers _____ Stream Shockers _____ Mini-Boom Shockers **Number of Anodes per Unit** 1

Current Type:	Volts	Amps	Rate	Duty
○ AC ○ DC ⊗ DCP	130	3.2	60	13

# of Dippers	Dip Net Mesh Size (inches) and Type (bar, Ace, Delta, etc.)
1	0.125

Person(s) Who Collected Data (Full Names)
D. Bolha, Chris Kolasinski

Comments / Notes (continue on the back of this sheet if necessary)

Unnamed Creek originates w/flow on 9/21/23 @ N 43.59320 W-89.06133
~40 yds East of Friesland Outfall

-Start fish survey at bridge

Catch Summary

Stream Name	Waterbody ID Code	SWIMS Station ID	Date (YYYY MM DD)

Pass Number	Time (24-hr clock) Start	Time (24-hr clock) End	Time (24-hr clock) Start	Time (24-hr clock) End	Total Time (min.)	Pass Direction
	14:10	14:25	15:10	15:14	29	⊗ Up ○ Down

Species	Number Caught	Weight (g) Tare	Weight (g) Gross	Weight (g) Total	Number w/ DELT	Number of Mortalities	Number of Vouchers	Number Marked	Number Recaptured	Lab Check # ID
Brook Stickleback (50)	++++ ++++ ++++ ++++	++++ ++++	++++ ++++	+++						
Creek Chub (11)	++++ ++++ I									
White Sucker (6)	++++ I									
Central Mudminnow (3)	III									
Northern Redbelly Dace (13)	++++ ++++ +++									
Pearl Dace (38)	++++ ++++ ++++ ++++ ++++	++++ ++++ III								
Fathead minnow (21)	++++ ++++ ++++ ++++	I								
Northern Redbelly dace (2)	II									
Green Sunfish (2)	II									
Central Stoneroller (1)	I									
(37) Northern Redbelly Dace 4 (20)	++++ ++++ ++++ ++++									
Johnny darter (13)	++++ ++++ III									

Comments / Notes

6 Fish ID'd by John Lyons 9/26/23

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Wadable Stream Qualitative Fish Habitat Rating for Streams < 10 m wide

Form 3600-532A (R 6/07)

Instructions: **Bold** fields must be completed. Record all measurements in metric units.

Station Summary

Stream Name	**Waterbody ID Code**	**SWIMS Station ID**	FH Database ID
Friesland Branch (UnTrib to Grand River)	30002276	10058655	

Date (MMDDYYYY)	**Station Name**
09/21/2023	US Friesland Rd

Latitude - Longitude Determination Method Used	**Datum Used**
GPS	WGS84

Start Latitude	**Start Longitude**	End Latitude	End Longitude	**County**
N43.60582	W89.04734	N43.60502	W89.04772	Columbia

Water Characteristics

Time (24-hr clock)	Air Temperature (C)	Water Temperature (C)	Conductivity (µs/cm)	Transparency (cm)
14:00		15.8	810	120

Dissolved Oxygen (mg/l)	Dissolved Oxygen % Saturation	pH
6.5	65.3	7.8

Flow (m³/sec)

Water Level (check one - measure distance if Above or Below Normal): ☒ Normal ☐ Below: _____ (m) ☐ Above: _____ (m)

Water Clarity: ☒ Clear ☐ Turbid ☐ Stained

Channel and Basin Characteristics

Mean Stream Width (m)	**Station Length (m)**
2	100

Channel Condition: (check one) ☐ Natural ☒ > 20-year-old Channelization ☐ 10- to 20-year-old Channelization ☐ < 10-year-old Channelization ☐ Concrete Channel

Percent Channelization	Sinuosity	Gradient (m/km)	Stream Order	Basin Area (km²)
100				

Comments / Notes

Wadable Stream Qualitative Fish Habitat Rating for Streams < 10 m wide

Form 3600-532A (R 6/07)

Rating Item	Excellent	Good	Fair	Poor	Score
Riparian Buffer Width (m) Width of contiguous undisturbed land uses; meadow, shrubs, woodland, wetland, exposed rock	Riparian zone well protected; buffer wide (> 10.0 m) 15	Riparian zone protected, but buffer width moderate (5.0 - 10.0 m) 10	Riparian zone moderately disturbed, buffer narrow (1.0 - 4.9 m) 5	Most of the riparian zone disturbed, buffer very narrow or absent (< 1.0 m) 0	15
Bank Erosion Width of bare soil on bank, along transects	No significant bank erosion; < 0.20 m of bank is bare soil 15	Limited erosion; 0.20 - 0.50 m of bank is bare soil 10	Moderate erosion; 0.51 - 1.0 m of bank is bare soil 5	Extensive erosion; > 1.0 m of bank is bare soil 0	15
Pool Area % of stream length in pools	Pools common; wide, deep, slow velocity habitat, balanced by other habitats; 40 to 60% of station 10	Pools present; not frequent or over-abundant; 30 to 39% or 61 to 70% of station 7	Pools present, but either rare or overly dominant, few other habitats present; 10 to 29% or 71 to 90% of station 3	Pools either absent or dominant, not balanced by other habitats; < 10% or > 90% of station 0	3
Width:Depth Ratio Average stream width divided by average thalweg depth in runs and pools	Streams very deep and narrow; width/depth ≤ 7 15	Stream relatively deep and narrow; width/depth 8-15 10	Stream moderately deep and narrow; width/depth 16-25 5	Stream relatively wide and shallow; width/depth > 25 0	5
Riffle:Riffle or Bend:Bend Ratio Average distance between riffles or bends divided by average stream width	Diverse habitats; meandering stream with deep bends and riffles common; ratio < 10 15	Diverse habitats; bends and riffles present, but not abundant; ratio 10 to 14 10	Habitat diversity low; occasional riffles or bends, ratio 15 to 25 5	Habitat monotonous; riffles or bends rare; generally continuous run habitat; ratio > 25 0	5
Fine Sediments % of the substrate that is < 2 mm (sand, silt, or clay)	Fines rare or absent, < 10% of the stream bed 15	Fines present but limited, generally in stream margins or pools; 10 to 20% of stream bed 10	Fines common in mid-channel areas, present in riffles and extensive in pools; 21 to 60% 5	Fines extensive in all habitats; > 60% of stream bed covered 0	0
Cover for Fish % of the stream area with cover	Cover/shelter for fish abundant; > 15% of stream 15	Cover common, but not extensive; 10 - 15% of stream 10	Occasional cover, limited to one or two areas; 5 - 9% of stream 5	Cover rare or absent; limited to < 5% of stream 0	0
				Total Score	53

Natural Community Verification -Data Entry Spreadsheet **Form V2. 9-15-2014**

Only enter data into the cells shaded in yellow or orange. The rest will autofill/autocalculate.

Biologist:	Bolha
Today's Date:	02/16/2024
Sample Date:	09/21/2023
Station Number:	10058655
Fieldwork Description:	Fish Survey
Waterbody Name:	Friesland Branch Upstream East Friesland Road
Counties:	Columbia
AUs:	
WBIC:	3000276
HUC10 (req'd for weather data):	403020105 *Must enter all 10 digits*
Modeled Natural Community:	Cool-Warm Headwater *Click for picklist: This fi*

Fish Catch (enter each species and the number found)

Species (common name)	Number	Thermal Guild (C,T,W)	Stream Size (S,M,L)	Tolerance (IT,IM,T)
Brook Stickleback	50	T	S	T
Creek Chub	11	T	S	T
White Sucker	6	T	M	T
Central Mudminnow	3	T	S	T
Northern Redbelly Dace	37	T	S	IM
Pearl Dace	38	T	S	IM
Fathead Minnow	21	W	S	T
Green Sunfish	2	W	S	T
Central Stoneroller	1	W	S	IM
Johnny Darter	13	T	M	IM
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0

		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0
Total N=	**182**			

Natural Community Verification Recommendation **Form V2. 9-15-2014**

Only enter data into the cells shaded in yellow. The rest will autofill/autocalculate.

Biologist:	Bolha
Today's date:	02/16/2024
Sample Date:	09/21/2023
Fieldwork Description:	Fish Survey

Waterbody Name:	Friesland Branch Upstream East Friesland Road
Counties:	Columbia
AUs:	0
WBIC:	3000276
HUC10:	403020105

Modeled Natural Community: Cool-Warm Headwater

ENTER THE FOLLOWING AFTER THE ASSESSMENT BELOW HAS BEEN COMPLETED:

Model "Verified as correct", OR "Proposed change"?	Verified as correct
If a change is proposed, what is the new proposed NC?	

TO BE FILLED IN BY THE REVIEW TEAM, IF APPLICABLE:	
Reviewed by review team? If so, enter date reviewed:	
Decision:	
Status (proposed for rule change, etc):	

1. COMPARE OBSERVED VERSUS EXPECTED SPECIES GUILDS

The following tables will autocalculate based on data provided in the data-entry tab.

Total number of individuals observed in each Guild (this will autocalculate)

Thermal		Stream Size		Tolerance	
Coldwater	0	Small Stream	163	Intolerant	0
Transitional	158	Medium Stream	19	Intermediate	89
Warmwater	24	Large River	0	Tolerant	93

Observed & Expected Guild Percentages (these will autocalculate)

Thermal				
Guild	Observed	Expected Range		Within Range?
		Low End	High End	
Coldwater	0%	0%	25%	Y
Transitional	87%	25%	100%	Y
Warmwater	13%	0%	75%	Y

Stream Size				
Guild	Observed	Expected Range		Within Range?
		Low End	High End	
Small Stream	90%	50%	100%	Y
Medium Stream	10%	0%	50%	Y
Large River	0%	0%	10%	Y

Based on the "Within Range" assessments above (Y/N), is the modeled Natural Community verified as correct?
Yes, No, Uncertain, etc.; add notes if needed:

Yes

- *If the modeled NC is verified as correct, you may stop here and make your verification recommendation.*
  Or, if you feel the data may have been taken during an extreme weather year, continue on to step 3 to assess weather data.
- *If the model is not verified as correct, move on to step 2.*

2. TOLERANCE: ARE HUMAN-CAUSED IMPACTS EVIDENT?

IF the observed Natural Community does not fit the modeled NC based on Thermal and Size guilds, use the Tolerance ranges below to determine whether the difference in species is likely due to human-caused impacts.

*- IF **BOTH** Intolerant species and Tolerant species are OUTSIDE the expected range (i.e. "N"), it is likely that the difference in NC is human-caused, and the NC should not be changed.*

*- IF **ZERO OR ONE OF** (BUT NOT BOTH) Intolerant and Tolerant species are outside the expected range, then the difference in NC is likely not human-caused and a new NC may be propsed.*

Tolerance				
Guild	Observed	Expected Range		Within Range?
		Low End	High End	
Intolerant	0%	PRESENT	100%	N
Intermediate*	49%	0%	100%	Y
Tolerant	51%	0%	75%	Y

*The "Intermediate" value is not used in the determination, but is provided for informational purposes.

Based on the Tolerance "Within Range" assessments above (Y/N), is the difference between observed and expected NC likely due to human-caused impacts? If so, the modeled NC should not be changed.
Yes, No, Uncertain, etc.; add notes if needed:

3. WEATHER: WAS THE SAMPLE TAKEN DURING AN EXTREME WEATHER YEAR?

Weather data only need to be assessed if the biologist suspects the fish survey may have been conducted during an extreme weather year.

Temperature Index (average temperature (C) in 30 days prior to sample)	Temp Index sample	#DIV/0!
	Temp Index 10%	#N/A
	Temp Index 90%	#N/A
	Extreme Temp?	**#DIV/0!**

Precipitation Index (weighted average daily precipitation (mm) in 4 years prior to sample)	Avg precip 30 days	#DIV/0!
	Avg precip 31-90 days	#DIV/0!
	Avg precip 91-365 days	#DIV/0!
	Avg precip 366-1460 days	#DIV/0!
	Precip Index sample	#DIV/0!
	Precip Index 10%	#N/A
	Precip Index 90%	#N/A
	Extreme Precip?	**#DIV/0!**

Was it an extreme weather year? If so, in what way?

If not, use the information from steps 1 and 2 above to make your determination.
If it was an extreme weather year, is another year of surveying needed to supplement the data?
Or, can additional existing data from other years supplement this data?
Attach any additional justification used to make a decision on NC Verification (in a new tab), and describe below.

YOUR ASSESSMENT IS COMPLETE. AT THE TOP, ENTER WHETHER THE MODELED NC IS VERIFIED, OR A DIFFERENT NC IS PROPOSED.

CORRESPONDENCE/MEMORANDUM

DATE: 10/29/2013 FILE REF:

TO: file

FROM: Dan Heim, Horicon

SUBJECT: Friesland wastewater discharge evaluation

A January 5, 1977 water resources memo lists the stream that the Friesland wastewater plant discharges to as noncontinuous marginal surface water. An inspection of the stream was done on 10/29/2013 by DNR employees, Dan Heim, Laura Bub, Diane Figel and Doris Thiele to confirm that classification. The Friesland WWTP operator, Dan Katsma was also present. The inspection began at the discharge point of the WWTP which is approximately 2000 ft. from the WW lagoons. There is an enclosed pipe from the lagoons to the discharge location (see maps). There was no discharge at the time. The last discharge was at the end of September, according to the operator. He said he discharges about 100,000 gpd for about one week in the fall and spring.

There was no flow in the stream at the cement structure where the discharge point is located (see photos). We walked downstream approximately 600 ft. There was no flow in the stream for the first 200 ft. or so. There was a wetland seep at that point where flow began. Flow for the next 400 ft. or so was minimal with some channelized flow but also some dispersed throughout the wetland complex, which was approximately 100 ft. wide for the entire distance we walked. At about 300 ft. there was a tractor crossing through the wetland. No fish were observed as the channelized areas where only a few inches deep and a foot wide the entire length we walked.

After this inspection, we traveled downstream to the next road crossing which is approximately 1.4 miles. The stream and adjacent wetlands appeared very similar to what was observed upstream. The next named stream downstream of the discharge point is the Grand River which is approximately 10 miles.

Of concern is a 300 ft. portion of the stream upstream of the discharge location. There was ponded water on average of about 3 ft. deep and 50 ft. wide. The water appeared to be septic with an odor of domestic sewage. It appears that during discharge from the WWTP, wastewater may back up and fill this pool area. With no flow in the stream, this ponded wastewater just sits there and goes septic.

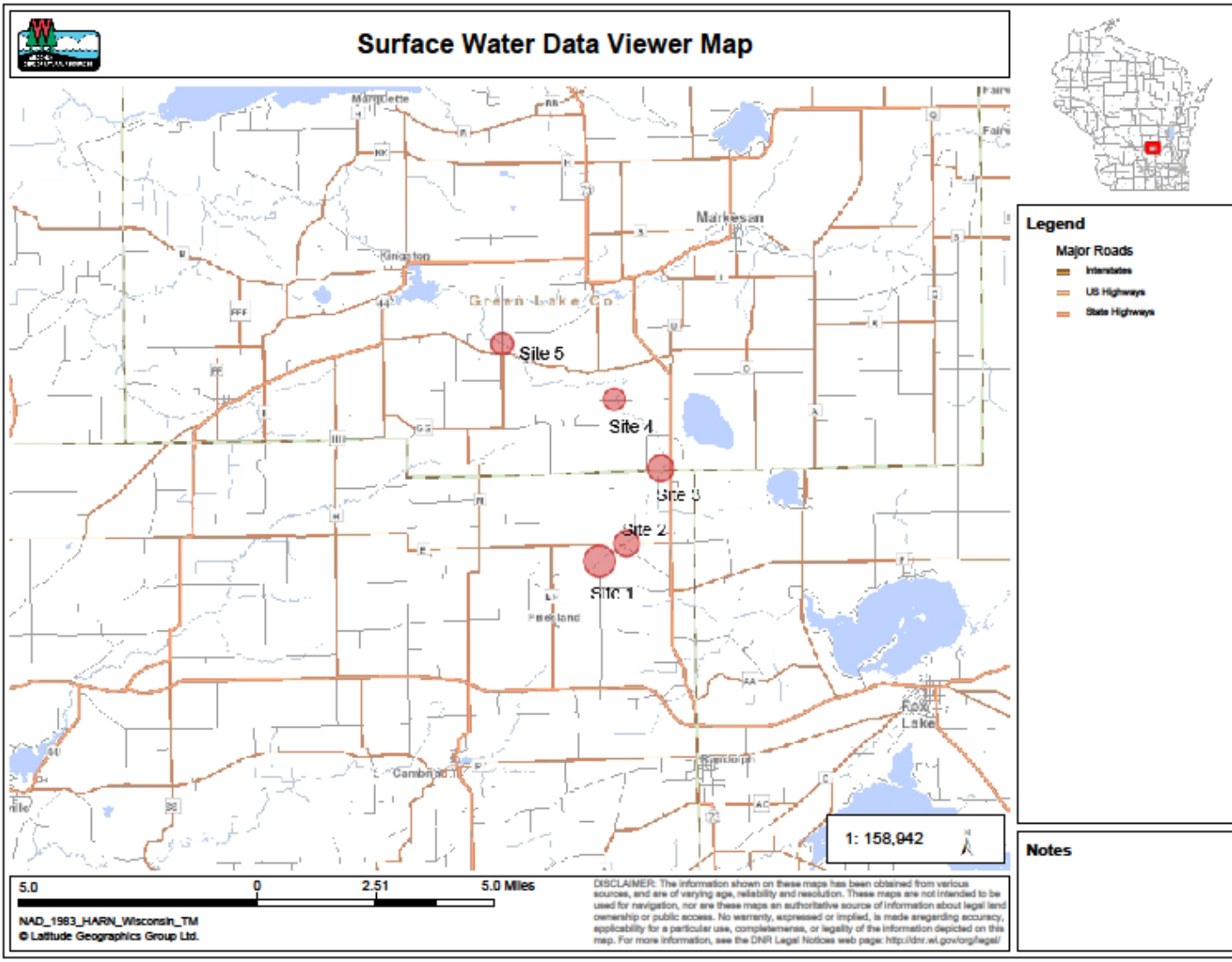
Given the conditions of the stream downstream of the WWTP, I would agree with the limited aquatic life classification. Although there is some channelization through the wetland there is also some stream dispersal. There appears to be a minimal impact on the stream from the WWTP discharge. I would however, recommend some discharge volume limits to protect the upstream portion and allow for the wetland to assimilate any pollutants in the effluent.

DOWNSTREAM CONDITIONS

On Friday No. 8th I investigated downstream conditions to try and evaluate how far downstream the limited aquatic life classification may apply. Attached is a map showing the downstream road crossings along with photos of the stream at those crossings. At site 1, at the East Friesland Rd. crossing, it appears that the LAL classification would be applicable. There was little channelized flow although a detailed survey would need to be done to show positively. At site 2 on the map, the Hwy E crossing, there was still limited flow and habitat was marginal but it is likely the classification would change not far downstream of this location. At site 3, the Hwy AW crossing, there was plenty of flow and habitat

available for a fishery to be present. This is likely due to the fact that the stream goes through a converted wetland that has been drained for farming. At sites 4 and 5 there would also be flow and habitat that could support a fishery but a detailed survey would need to be done.

Site 1 – approximately .75 miles downstream of discharge location (photos 1 &2)
Site 2 - approximately 1.5 miles downstream (photos 3,4 &5)
Site 3 – approximately 3.6 miles downstream (photos 6 & 7)
Site 4 – approximately 5.9 miles downstream (photos 8 & 9)
Site 5 – approximately 9.7 miles downstream (photos 10 & 11)
Enters the Grand River approximately 10. 8 miles downstream



Photos 1 & 2

Photos 3, 4 & 5

Photos 6 & 7

Photos 8 & 9

Photos 10 & 11