Permit Fact Sheet

General Information

Permit Number	WI-0023981-09-0
Permittee Name and Address	CITY OF FENNIMORE 860 Lincoln Avenue, Fennimore, WI 53809
Permitted Facility Name and Address	Fennimore Wastewater Treatment Facility US Hwy 61 South & McGhan Road
Permit Term	October 01, 2025 to September 30, 2030
Discharge Location	West of Hwy 61, across from treatment plant. NE ¼ of SE ¼, Section 30, T6N, R2W
Receiving Water	Gregory Branch (Upper Grant River Watershed, GP06 – Grant-Platte River Basin) in Grant County
Stream Flow ($Q_{7,10}$)	0.01 cfs
Stream Classification	Limited Forage Fish, Non-public water supply
Discharge Type	Existing, Continuous
Annual Average Design Flow (MGD)	0.394 MGD
Industrial or Commercial Contributors	Immuno Dynamics & Carr Valley Cheese
Plant Classification	A1 - Suspended Growth Processes; B - Solids Separation; C - Biological Solids/Sludges; P - Total Phosphorus; SS - Sanitary Sewage Collection System
Approved Pretreatment Program?	N/A

Facility Description

The City of Fennimore operates an extended aeration activated sludge wastewater treatment facility that includes a mechanical step screen, grit removal, equalization tank, equalization storage pond, selector basins, aeration basins, final clarification, biological phosphorus removal, and chemical phosphorus removal. The facility treats a combination of domestic, commercial, and industrial wastewater, and accepts septage, holding tank, and RV wastes. Solids treatment includes an aerobic digester, sludge storage tank, decant tanks, and gravity thickener. Process solids are stored on-site prior to land application on department approved sites.

Substantial Compliance Determination

Enforcement During Last Permit: Notices of noncompliance were issued throughout the permit term for frequent effluent limit violations, missed samples, late reporting, overflows, and incomplete reporting. The facility has completed all previously required actions as part of the enforcement process.

After a desk top review of all discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on September 23, 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	0.20 MGD (January 2019 – January 2025 Average)	Influent: 24-hr flow proportional composite sampler intake located in the control building basement, downstream of the Parshall flume. The Parshall flume is equipped with an ultrasonic flow meter. Samples at this location include influent from the collection system as well as plant recycle flows from the sludge storage tank.
001	Not required to report	Effluent: 24-hr flow proportional composite samples and grab samples shall be collected after final clarification at the pipe tap inside the control building.
002	23 Dry US Tons (2019 – 2023 Average)	Aerobically digested, Liquid, Class B. Representative sludge samples shall be collected from the sampling port on the aerobic digester recirculation system.

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	5/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	5/Week	24-Hr Flow Prop Comp	

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.

Flow: The sample frequency has changed from “Continuous” to “Daily” for eDMR reporting purposes.

BOD and Total Suspended Solids (TSS): The sample frequency for these parameters has increased to align with effluent monitoring.

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	Monitoring effective April 01, 2030. See Effluent Flow Meter Installation schedule.
BOD5, Total	Daily Max	30 mg/L	5/Week	24-Hr Flow Prop Comp	
BOD5, Total	Monthly Avg	15 mg/L	5/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Daily Max	30 mg/L	5/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	20 mg/L	5/Week	24-Hr Flow Prop Comp	
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	
Nitrogen, Ammonia (NH3-N) Total	Daily Max	11 mg/L	5/Week	24-Hr Flow Prop Comp	Year-round
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	6.1 mg/L	5/Week	24-Hr Flow Prop Comp	April
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	3.4 mg/L	5/Week	24-Hr Flow Prop Comp	May - September
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	7.0 mg/L	5/Week	24-Hr Flow Prop Comp	October - March
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	2.7 mg/L	5/Week	24-Hr Flow Prop Comp	April
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	1.5 mg/L	5/Week	24-Hr Flow Prop Comp	May - September
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	3.1 mg/L	5/Week	24-Hr Flow Prop Comp	October - March
E. coli	Geometric	126 #/100 ml	Weekly	Grab	Monitoring and limit

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
	Mean - Monthly				effective May through September annually per the Effluent Limitations for E. coli Schedule.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Monitoring and limit effective May through September annually per the Effluent Limitations for E. coli Schedule. See the E. coli Percent Limit section. Enter the result in the DMR on the last day of the month.
Phosphorus, Total	Monthly Avg	0.8 mg/L	5/Week	24-Hr Flow Prop Comp	This is an interim MDV limit effective through September 30, 2027. See the MDV/Phosphorus sections and phosphorus schedules.
Phosphorus, Total	Monthly Avg	0.6 mg/L	5/Week	24-Hr Flow Prop Comp	This is an interim MDV limit effective on October 01, 2027. See the MDV/Phosphorus sections and phosphorus schedules.
Phosphorus, Total		lbs/month	Monthly	Calculated	Report the total monthly phosphorus discharged in lbs/month on the last day of the month on the DMR. See Standard Requirements for 'Appropriate Formulas' to calculate the Total Monthly Discharge in lbs/month.
Phosphorus, Total		lbs/yr	Annual	Calculated	Report the sum of the total monthly discharges (for the months that the MDV is in effect) for the calendar year on the Annual report form.
Chloride		mg/L	4/Month	24-Hr Flow Prop Comp	Monitoring only. Sampling shall be done on four consecutive days one week per month. See Chloride - Implement Source Reduction Measures section

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					and Schedule.
Temperature Maximum		deg F	Daily	Continuous	Monitoring year-round. See permit sections and Temperature Limits Compliance and Dissipative Cooling Evaluation schedule.
PFOS		ng/L	1/ 2 Months	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.
PFOA		ng/L	1/ 2 Months	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.
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 Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See Whole Effluent Toxicity (WET) Testing section.
Chronic WET		TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	See Whole Effluent Toxicity (WET) Testing section.

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.

Flow: Monitoring of effluent flow has been added to the permit with schedule for compliance.

BOD, TSS, pH, DO, Ammonia, and Phosphorus: The sample frequency for these parameters has changed from "3/Week" to "5/Week".

Ammonia: The weekly average and monthly average limits for the months of October – April have changed.

Disinfection & E. coli: At the end of the compliance schedule, disinfection requirements and E. coli limits of 126 #/100 ml as a monthly geometric mean that may not be exceeded and 410 #/100 ml as a daily maximum that may not be exceeded more than 10 percent of the time in any calendar month will apply. Monitoring is not required until the limit becomes effective at the end of the compliance schedule.

Phosphorus MDV: The permittee has applied for a multi-discharger variance (MDV) for phosphorus for this permit term and the application has been approved by the Department. An MDV interim limit of 0.6 mg/L has been added that goes into effect per a compliance schedule. The permittee is now required to report the total amount of phosphorus discharged in lbs/month and lbs/year. By March 1 of each year the permittee shall make a payment(s) to participating county(s) of $66.62 per pound of phosphorus discharged during the previous year in excess of the target value of 0.2 mg/L.

Chloride: The permittee was previously approved for a variance. The department has determined the permittee is no longer eligible for the variance. The variance interim limit has been removed from the permit. The requirement to report chloride in lbs/day has also been removed. Monitoring shall continue throughout the permit term, as well as the requirement to continue implementing chloride source reduction measures.

Temperature: The permit includes weekly average temperature limits for the months of October, November, and December, which go into effect in accordance with a compliance schedule. The sample frequency has changed from "3/Week" to "Daily".

PFOS and PFOA: Monitoring once every two months is included in the permit in accordance with s. NR 106.98(2)(c), Wis. Adm. Code.

Total Nitrogen Monitoring (TKN, N02+N03 and Total N): Annual monitoring is required in specific quarters as outlined in the permit.

Acute and Chronic WET: Three acute WET tests and annual chronic WET tests are required in specific quarters as outlined in the permit.

Zinc: Monitoring has been removed.

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 Fennimore Wastewater Treatment Facility dated June 6, 2025, prepared by Zainah Masri, and used for this reissuance.

Disinfection & E. coli: Revisions to bacteria surface water quality criteria to protect recreational uses and accompanying E. coli WPDES permit implementation procedures became effective May 1, 2020.

Section NR 102.04(5)(a), Wis. Adm. Code, states that all surface waters shall be suitable for recreational use and meet the E. coli criteria established to protect this use. Section NR 102.04(5)(b), Wis. Adm. Code, states that exceptions to the disinfection requirement can be made if the department determines, in accordance with the procedures specified in s. NR 210.06(3), Wis. Adm. Code, that disinfection is not required to meet water quality criteria. As part of the reissuance process, the requirements for disinfection were reviewed under s. NR 210.06(3), Wis. Adm. Code.

It was determined that the permittee is required to disinfect, during the following months, May – September. See WQBEL for further explanation.

Chlorine: If Fennimore Wastewater Treatment Facility decides to upgrade to use chlorination for disinfection, effluent limitations would be recommended to ensure proper operation of the dechlorination system and would become effective May 1, 2030 with the E. coli limitations. Section NR 210.06(2)(b), Wis. Adm. Code, states, "When chlorine is used for disinfection, the daily maximum total residual chlorine concentration of the discharge may not exceed 0.10 mg/L." Because the WQBELs are more restrictive, they are recommended instead. Specifically, a daily maximum limit of 19

µg/L would be required if Fennimore Wastewater Treatment Facility decides to use chlorination for disinfection. Due to revisions to s. NR 106.07(2), Wis. Adm. Code, mass limitations are no longer required. The calculated weekly average effluent limitation of 7.3 µg/L would also be included in the permit because it is more restrictive than the daily maximum limit.

Sections NR 106.07(3) and NR 205.067(7), Wis. Adm. Code, require WPDES permits to contain weekly average and monthly average limitations for municipal dischargers whenever practicable and necessary to protect water quality. Therefore, in addition to the daily maximum and weekly average limits discussed above, a monthly average limit of 7.3 µg/L, set equal to the weekly average limit, would also be required to meet expression of limits requirements.

Phosphorus: Phosphorus rules became effective December 1, 2010 per NR 217, Wis. Adm. Code, that required the permittee to comply with water quality based effluent limits (WQBELs) for total phosphorous. The final phosphorus WQBELs are 0.225 mg/L as a monthly average and 0.075 mg/L and 0.25 lbs/day expressed as a six-month average and were to become effective as scheduled unless a variance was granted. For this permit term, the permittee has applied for the Multi-Discharger Variance (MDV) for phosphorus as provided for in s. 283.16, Wis. Stats., and approved by USEPA on February 6, 2017 for a 10-year duration. The permittee qualifies for the MDV because it is an existing source and a major facility upgrade is needed to comply with the applicable phosphorus WQBELs, thereby creating a financial burden. The effective interim effluent limit for total phosphorus is 0.8 mg/L as an average monthly limit. The limit was derived using DMR data from January 2019 to January 2025. The interim effluent limit for total phosphorus is 0.6 mg/L as an average monthly limit and goes into effect October 1, 2027, in accordance with the compliance schedule.

Conditions of the MDV require the permittee to optimize phosphorus removal throughout the proposed permit term, comply with interim limits and make annual payments to participating county(s) by March 1 of each year based on the pounds of phosphorus discharged during the previous year in excess of the specified target value. A reopener clause is included in the permit to address the current MDV's expiration date, as a permit action may be required to update or remove variance provisions if the MDV is altered or unavailable after February 6, 2027.

The "price per pound" value is $50.00 adjusted for CPI annually during the first quarter as defined by s. 283.16(8)(a)2, Wis. Stats and takes effect for reissued permits with effective dates starting April 1. This may differ from the "price per pound" that is public noticed; however, the "price per pound" is set upon reissuance and is applicable for the entire permit term. The participating county(s) uses these payments to implement non-point source phosphorus control strategies at the watershed level.

PFOS and PFOA: NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. At the first reissuance of a WPDES permit after August 1, 2022, the new rule requires WPDES permits for municipal dischargers with an average flow rate less than 1 MGD, to be evaluated on a case-by-case basis to determine if monitoring is required pursuant to s. NR 106.98(2)(c), 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 proposed permit was drafted, it was identified that the POTW has an indirect discharger(s) that may be a potential source of PFOS/PFOA.

Therefore, monitoring once every two months is included. A sample frequency of 1/2 months means one sample is taken during any two-month period. Examples of 1/2 month sample would be every other month (Jan, March, May, etc.) or back-to-back months with a break in between (February & March, May & June, Aug & Sept, etc.). DMR Short Forms will be generated for the following time periods: January-February, March-April, May-June, July-August, September-October, and November-December. At a minimum one sample result will be present on each form.

The initial determination of the need for sampling shall be conducted for up to two years in order to determine if the permitted discharge has the reasonable potential to cause or contribute to an exceedance of the PFOS or PFOA standards under s. NR 102.04(8)(d)1, Wis. Adm. Code.

Total Nitrogen Monitoring: 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 from 3/Week to 5/Week per department guidance, specifically to align Fennimore with facilities of similar size and to better capture effluent variability from industrial contributions.

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 compliance history and the size and type of the facility.

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)**
002	B	Liquid	Fecal Coliform	Injection/ Aerobic SOUR test	Land Application	23 (2019-2023 Average)
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.** If yes, special monitoring and recycling conditions will be included in the permit to track any potential problems in landapplying sludge from this facility						
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: 002- SLUDGE

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	Annual	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Annual	Composite	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Cadmium Dry Wt	Ceiling	85 mg/kg	Annual	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Annual	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Annual	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Annual	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Annual	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Annual	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Annual	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Annual	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	
Nitrogen, Ammonium (NH4-N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Once in 2026.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Once in 2026.
PFOA + PFOS		ug/kg	Annual	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.
PFAS Dry Wt			Annual	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					Permit Sections for more information.

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.

PCBs: Monitoring is required once in 2026.

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

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). Requirements for pathogens are specified in s. NR 204.07(6) and in s. NR 204.07 (7) for vector attraction requirements. Limitations for PCBs are addressed in s. NR 204.07(3)(k).

PFAS: The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA has developed a draft risk assessment to determine future land application rates and released this risk assessment in January 2025. The department is evaluating this new information. Until a decision is made, the "Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS" may be followed.

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 Effluent Flow Meter Installation

Required Action	Due Date
Submit Plans and Specifications: Submit flow meter installation plans and specifications per ch. NR 108, Wis. Adm. Code requirements. The flow meter type shall be compliant with s. NR 218, Wis. Adm. Code.	03/31/2028
Complete Installation: Complete installation of an effluent flow meter that is compliant with s. NR 218, Wis. Adm. Code.	03/31/2030

Explanation of Schedule

This compliance schedule requires the permittee to install an effluent flow meter so that accurate flow data can be collected.

4.2 Disinfection and Effluent Limitations for E. coli

The permittee shall install disinfection treatment and comply with surface water limitations for E. coli 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
Progress Report: The permittee shall submit a progress report on development and submittal of a facility plan for upgrades to meet disinfection requirements and E. coli limits.	06/30/2026
Submit Facility Plan: The permittee shall submit a Facility Plan per s. NR 110.09, Wis. Adm. Code for meeting disinfection requirements and complying with E. coli surface water limitations. The permittee may submit an abbreviated facility plan if the Department determines that the modifications are minor.	04/30/2027
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 meet disinfection requirements per s. NR 210.06(1), Wis. Adm Code, achieve compliance with final E. coli limitations, and a schedule for completing construction of the upgrades by the complete construction date specified below.	03/31/2028
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.	09/30/2028
Construction Upgrade Progress Report: The permittee shall submit a progress report on construction upgrades.	09/30/2029
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades.	03/31/2030
Achieve Compliance: The permittee shall achieve compliance with final E. coli limitations.	04/30/2030

Explanation of Schedule

A compliance schedule is included in the permit to provide time for the permittee to submit plans and specs and install disinfection treatment for meeting effluent E. coli water quality-based effluent limits and disinfection requirements pursuant s. NR 210.06, Wis. Adm. Code. If Fennimore Wastewater Treatment Facility decides to upgrade to use chlorination for disinfection, effluent limitations would be recommended to ensure proper operation of the dechlorination system and would become effective May 1, 2030 with the E. coli limitations. Section NR 210.06(2)(b), Wis. Adm. Code, states, “When chlorine is used for disinfection, the daily maximum total residual chlorine concentration of the discharge may not exceed 0.10 mg/L.” Because the WQBELs are more restrictive, they are recommended instead. Specifically, a daily maximum limit of 19 µg/L would be required if Fennimore Wastewater Treatment Facility decides to use chlorination for disinfection. Due to revisions to s. NR 106.07(2), Wis. Adm. Code, mass limitations are no longer required. The calculated weekly average effluent limitation of 7.3 µg/L would also be included in the permit because it is more restrictive than the daily maximum limit.

Sections NR 106.07(3) and NR 205.067(7), Wis. Adm. Code, require WPDES permits to contain weekly average and monthly average limitations for municipal dischargers whenever practicable and necessary to protect water quality. Therefore, in addition to the daily maximum and weekly average limits discussed above, a monthly average limit of 7.3 µg/L, set equal to the weekly average limit, would also be required to meet expression of limits requirements.

4.3 Phosphorus Schedule - Continued Optimization

The permittee is required to optimize performance to control phosphorus discharges per the following schedule.

Required Action	Due Date

Optimization: The permittee shall continue to implement the optimization plan as previously approved to optimize performance to control phosphorus discharges. Submit a progress report on optimizing removal of phosphorus by the Due Date.	01/31/2026
Progress Report #2: Submit a progress report on optimizing removal of phosphorus.	01/31/2027
Progress Report #3: Submit a progress report on optimizing removal of phosphorus.	01/31/2028
Progress Report #4: Submit a progress report on optimizing removal of phosphorus.	01/31/2029
Progress Report #5: Submit a progress report on optimizing removal of phosphorus.	01/31/2030

Explanation of Schedule

Per s. 283.16(6)(a), Wis. Stats. the Department may include a requirement that the permittee optimize the performance of a point source in controlling phosphorus discharges, which may be necessary to achieve compliance with multi-discharger variance interim limits. This compliance schedule requires the permittee to continue to implement the optimization plan that was approved during the previous permit term.

4.4 Phosphorus Multi-Discharger Variance Interim Limit (0.6 mg/L)

This compliance schedule requires the permittee to achieve compliance with the specified MDV interim effluent limit in accordance with s. 283.16(6), Wis. Stats., by the due date.

Required Action	Due Date
Report on Effluent Discharges: Submit a report on effluent discharges of phosphorus with conclusions regarding compliance.	03/31/2026
Action Plan: Submit an action plan for complying with the specified interim effluent limit. If construction is required, include plans and specifications with the submittal.	09/30/2026
Initiate Actions: Initiate actions identified in the plan.	03/31/2027
Complete Actions: Complete actions identified in the plan and achieve compliance with the specified interim effluent limit.	09/30/2027

Explanation of Schedule

Subsection 283.16(6), Wis. Stats., establishes required interim phosphorus effluent limits that must be met for multi-discharger variance (MDV) eligibility. The schedule above provides the permittee with two years to comply with that limit.

4.5 Phosphorus Payment per Pound to County

The permittee is required to make annual payments for phosphorus reductions to the participating county or counties in accordance with s. 283.16(8), Wis. Stats, and the following schedule. The price per pound will be set at the time of permit reissuance and will apply for the duration of the permit.

Required Action	Due Date
Annual Verification of Phosphorus Payment to County: The permittee shall make a total payment to the participating county or counties approved by the Department by March 1 of each calendar year. The amount due is equal to the following: [(lbs of phosphorus discharged minus the permittee's target value) times ($66.62 per pound)] or $640,000, whichever is less. See the payment calculation steps in the Surface Water section.	03/01/2026

The permittee shall submit Form 3200-151 to the Department by March 1 of each calendar year indicating total amount remitted to the participating counties to verify that the correct payment was made. The first payment verification form is due by the specified Due Date. Note: The applicable Target Value is 0.2 mg/L as defined by s. 283.16(1)(h), Wis. Stats. The "per pound" value is $50.00 adjusted for CPI.	
Annual Verification of Payment #2: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.	03/01/2027
Annual Verification of Payment #3: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.	03/01/2028
Annual Verification of Payment #4: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.	03/01/2029
Annual Verification of Payment #5: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.	03/01/2030
Continued Coverage: If the permittee intends to seek a renewed variance, an application for the MDV (Multi Discharger Variance) shall be submitted as part of the application for permit reissuance in accordance with s. 283.16(4)(b), Wis. Stats.	
Annual Verification of Payment After Permit Expiration: In the event that this permit is not reissued prior to the expiration date, the permittee shall continue to submit Form 3200-151 to the Department indicating total amount remitted to the participating counties by March 1 each year.	

Explanation of Schedule

Subsection 283.16(6)(b), Wis. Stats., requires permittees that have received approval for the multi-discharger variance (MDV) to implement a watershed project that is designed to reduce non-point sources of phosphorus within the HUC 8 watershed in which the permittee is located. The permittee has selected the “Payment to Counties” watershed option described in s. 283.16(8), Wis. Stats. Under this option the permittee shall make annual payment(s) to participating county(s) that are calculated based on the amount of phosphorus actually discharged during a calendar year in pounds per year less the amount of phosphorus that would have been discharged had the permittee discharged phosphorus at a target value concentration of 0.2 mg/L. The pounds of phosphorus discharged in excess of the target value is multiplied by a per pound phosphorus charge that will equal $66.62 per pound. This schedule requires the permittee to submit Form 3200-151 to the Department indicating the total amount remitted to the participating county(s).

4.6 Chloride Source Reduction Measures

Required Action	Due Date
Annual Chloride Report: Submit an annual chloride report related to the source reduction activities for the previous year. The annual chloride report shall: Indicate which chloride source reduction measures or activities have been implemented and an assessment of whether each implemented source reduction measure appears to be effective or ineffective at reducing pollutant discharge concentrations and maintaining effluent quality at or below the current concentrations; Identify actions planned for the upcoming year; and Include an analysis of trends in quarterly and annual average chloride concentrations based on chloride sampling and flow data.	01/31/2026

The first annual chloride report is to be submitted by the Date Due.	
Annual Chloride Report #2: Submit the chloride report, related to the source reduction activities for the previous year, as defined above.	01/31/2027
Annual Chloride Report #3: Submit the chloride report, related to the source reduction activities for the previous year, as defined above.	01/31/2028
Annual Chloride Report #4: Submit the chloride report, related to the source reduction activities for the previous year, as defined above.	01/31/2029
Final Chloride Report: Submit the final chloride report documenting the source reduction activities for the current permit term and the success in maintaining chloride effluent concentrations. The report shall: Summarize chloride source reduction measures that have been implemented during the current permit term and include an assessment of which source reduction measures appear to have been effective or ineffective; Include an analysis of trends in quarterly and annual average chloride concentrations based on chloride sampling and flow data during the current permit term; and Evaluate any needed changes to the pollutant reduction strategy accordingly.	01/31/2030
Annual Chloride Reports After Permit Expiration: In the event that this permit is not reissued by the date the permit expires the permittee shall continue to submit annual chloride reports for the previous year following the due date of Annual Chloride Reports listed above. Annual Chloride Reports shall include the information as defined above.	

Explanation of Schedule

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

4.7 Temperature Limits Compliance and Dissipative Cooling Evaluation

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

Required Action	Due Date
Preliminary Compliance Report: Submit a preliminary compliance report indicating alternatives to achieve the final temperature limits. Informational Note: Refer to the Surface Water subsection titled 'Dissipative Cooling Demonstration - POTW Weekly Average Limits' regarding requests for Department consideration of dissipative cooling per NR 106.59, Wis. Adm. Code, as well as re-evaluation of the limits pursuant to NR 106 Subchapters V & VI or NR 102.26, Wis. Adm. Code.	09/30/2026
Action Plan: Submit an action plan for complying with all applicable effluent temperature limits.	09/30/2027
Construction Plans: Submit construction plans (if construction is required for complying with effluent temperature limits) and include plans and specifications with the submittal.	09/30/2028
Initiate Actions: Initiate actions identified in the plan.	09/30/2029
Complete Actions: Complete actions necessary to achieve compliance with effluent temperature limits.	09/30/2030

Explanation of Schedule

The monitoring data collected at Fennimore indicates a reasonable potential for exceedance of the calculated weekly average temperature limits during the months of October, November, and December. However, municipal facilities can take advantage of dissipative cooling (DC). Dissipative cooling, by definition in s. NR 106.59, Wis. Adm. Code, is the cooling effect associated with heat loss to the ambient water, the atmosphere and the surrounding environment. The primary objective of establishing temperature limitations is to ensure there is no point in the receiving water where elevated effluent temperature will result in lethality or otherwise significantly impair the existence of a balanced fish and aquatic life community. Dissipative cooling can be used to drop weekly average temperature limits from the WPDES permit, pursuant to ss. NR 106.59(4) and (6), Wis. Adm. Code. This schedule provides time for Fennimore to submit a DC application and/or complete actions required to meet temperature effluent limitations. The DC study should be completed during one of the months that have triggered a temperature limit.

4.8 PFOS/PFOA Minimization Plan Determination of Need

Required Action	Due Date
Report on Effluent Discharge: Submit a report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations. This analysis should also include a comparison to the applicable narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code. This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.	09/30/2026
Report on Effluent Discharge and Evaluation of Need: Submit a final report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations of data collected over the last 24 months. The report shall also provide a comparison on the likelihood of the facility needing to develop a PFOS/PFOA minimization plan. This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results. The permittee shall also submit a request to the department to evaluate the need for a PFOS/PFOA minimization plan. If the Department determines a PFOS/PFOA minimization plan is needed based on a reasonable potential evaluation, the permittee will be required to develop a minimization plan for Department approval no later than 90 days after written notification was sent from the Department. The Department will modify or revoke and reissue the permit to include PFOS/PFOA minimization plan reporting requirements along with a schedule of compliance to meet WQBELs. Effluent monitoring of PFOS and PFOA shall continue as specified in the permit until the modified permit is issued. If, however, the Department determines there is no reasonable potential for the facility to discharge PFOS or PFOA above the narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code, no further action is required and effluent monitoring of PFOS and PFOA shall continue as specified in the permit.	09/30/2027

Explanation of Schedule

As stated above, ch. NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. Section NR 106.98, Wis. Adm. Code, specifies steps to generate data in order to determine the need for reducing PFOS and PFOA in the discharge. Data generated per the effluent monitoring requirements will be used to determine the need for developing a PFOS/PFOA minimization plan. As part of the schedule, the permittee is required to submit two annual Reports on Effluent Discharge.

If the Department determines that a minimization plan is needed, the permit will be modified or revoked/reissued to include additional requirements.

4.9 Land Application Management Plan

A management plan is required for the land application system.

Required Action	Due Date
Land Application Management Plan Submittal: Submit a management plan to optimize the land application system performance and demonstrate compliance with ch. NR 204, Wis. Adm. Code, by the Due Date. This management plan shall 1) specify information on pretreatment processes (if any); 2) identify land application sites; 3) describe site limitations; 4) address vegetative cover management and removal; 5) specify availability of storage; 6) describe the type of transporting and spreading vehicle(s); 7) specify monitoring procedures; 8) track site loading; 9) address contingency plans for adverse weather and odor/nuisance abatement; and 10) include any other pertinent information. Once approved, all landspreading activities shall be conducted in accordance with the plan. Any changes to the plan must be approved by the Department prior to implementing the changes.	09/30/2026

Explanation of Schedule

An up-to-date Land Application Management Plan is required that documents how the permittee will manage the land application of biosolids consistent with ch. NR 204, Wis. Adm. Code.

Attachments

Water Quality Based Effluent Limits, dated June 6, 2025

MDV Conditional Approval Letter, dated November 11, 2024

MDV Evaluation Checklist, dated November 11, 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:** 8/14/2025

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: June 6, 2025

TO: BetsyJo Howe – SCR/Fitchburg

FROM: Zainah Masri – WY/3

SUBJECT: Water Quality-Based Effluent Limitations for the Fennimore Wastewater Treatment Facility WPDES Permit No. WI-0023981-09-0

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 Fennimore Wastewater Treatment Facility in Grant County. This municipal wastewater treatment facility (WWTF) discharges to the Gregory Branch located in the Upper Grant River Watershed in the Grant/Platte Basin. 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	Six-Month Average	Footnotes
Flow Rate						1
BOD_5	30 mg/L			15 mg/L		2,3
TSS	30 mg/L			20 mg/L		2,3
pH	9.0 s.u.	6.0 s.u.				2
Dissolved Oxygen		4.0 mg/L				2
Ammonia Nitrogen April May – September October– March	 11 mg/L 11 mg/L 11 mg/L		 6.1 mg/L 3.4 mg/L 7.0 mg/L	 2.7 mg/L 1.5 mg/L 3.1 mg/L		-
Bacteria						
Final Limit *E. coli*				126 #/100 mL geometric mean		4
Chloride						5
PFOS and PFOA						6
Phosphorus						
LCA Interim				0.8 mg/L		
HAC Interim				0.6 mg/L		
Final				0.225 mg/L	0.075 mg/L 0.25 lbs/day	7
TKN, Nitrate+Nitrite, and Total Nitrogen						8
Temperature October November December			 61 °F 49 °F 49 °F			9
Acute WET						10,13
Chronic WET						11,12,13

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Footnotes:

1. Monitoring only.
2. No changes from the current permit.
3. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold. Weekly average limits for BOD and TSS are not needed because the limits listed in the table above are specifically listed in administrative code and are exempt from expression of limits requirements.
4. Bacteria limits apply during the disinfection season of May through September. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
5. Quarterly monitoring and PMP efforts are recommended to continue during the reissued permit term to maintain effluent quality at or below current levels.
6. PFOS and PFOA monitoring is recommended at a once every two months frequency.
7. With the permit application, Fennimore Wastewater Treatment Facility has re-applied for the phosphorus multi-discharger variance (MDV). Conditions of the phosphorus MDV require the facility to comply with an interim phosphorus limit in lieu of meeting the final WQBEL. The recommended interim limit during the 2nd permit under MDV approval, pursuant to s. 283.16 (6) (a), Wis. Stats., is 0.6 mg/L as a monthly average. A compliance schedule may be appropriate to meet this interim limit but compliance with 0.6 mg/L shall be no later than the end of the reissued permit. The previous interim limit of 0.8 mg/L should not be exceeded during the compliance schedule.
8. 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. Nitrogen is the sum of nitrate (NO_3), nitrite (NO_2), and total kjeldahl nitrogen (TKN) (all expressed as N).
9. Based on this analysis**,** weekly average temperature maximum limits are necessary for the months of October, November and December. The Fennimore Wastewater Treatment Facility has requested an application for dissipative cooling, A compliance schedule may be included in the permit and if the facility successfully completes a DC study, then temperature limits can be dropped from the permit, while monitoring would remain per the requirements of s. NR 106.59(7), Wis. Adm. Code recommended in the reissued permit. Please note that the DC study should be completed during one of the months that have triggered a temperature limit.
10. After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above three acute WET tests throughout the permit term are recommended in the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing should continue after the permit expiration date (until the permit is reissued).
11. After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above one chronic WET test per year throughout the permit term is recommended in the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing should continue after the permit expiration date (until the permit is reissued).
12. The Instream Waste Concentration (IWC) to assess chronic test results is 72%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 75%, 50%, 25% & 12.5% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from Gregory Branch.
13. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Zainah Masri at Zainah.Masri@wisconsin.gov or Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (4) – Narrative, Map, Thermal Table and Email Confirming Effluent Flow Rate Change

PREPARED BY: Zainah Masri, Water Resources Engineer Zainah Masri

APPROVED BY: Diane Figiel Date: 06/06/2025
Diane Figiel, PE,
Water Resources Engineer

E-cc: Caitlin O'Connell, Wastewater Engineer – SCR/Fitchburg
Lisa Creegan, Regional Wastewater Supervisor – SCR/Fitchburg
Diane Figiel, Water Resources Engineer – WY/3
Kari Fleming, NR Program Manager – WY/3
Nate Willis, Wastewater Engineer – WY/3

Attachment #1

Water Quality-Based Effluent Limitations for
Fennimore Wastewater Treatment Facility

WPDES Permit No. WI- 0023981-09-0

Prepared by: Zainah Masri – WY/3

PART 1 – BACKGROUND INFORMATION

Facility Description

The City of Fennimore Wastewater Treatment Facility operates an activated sludge wastewater treatment facility that includes a mechanical step screen, grit removal, equalization tank, equalization storage pond, selector basins, aeration basins, final clarification, biological phosphorus removal, and supplemental chemical phosphorus removal. Treated effluent is sampled prior to discharge to the Gregory Branch. Process solids are gravity thickened, aerobically digested, and stored on site prior to seasonal land application.

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

Existing Permit Limitations

The current permit, which expired on September 30, 2024, and includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
BOD_5	30 mg/L			15 mg/L		1
TSS	30 mg/L			20 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		4.0 mg/L				1
Ammonia Nitrogen April May – September October – March	 11 mg/L 11 mg/L 11 mg/L		 8.0 mg/L 3.4 mg/L **11 mg/L**	 3.3 mg/L 1.5 mg/L 5.4 mg/L		2
Chloride Interim Limit Final Limit			 510 mg/L 400 mg/L 2,070 lbs/day	 **400 mg/L**		3
Phosphorus Interim MDV Interim Final				 1.0 mg/L 0.8 mg/L 0.225 mg/L	 0.075 mg/L 0.39 lbs/day	4
Temperature						5
Chronic WET						7
Acute WET						8

Footnotes:

1. These limits are based on the Limited Forage Fish (LFF) community of the immediate receiving water as described in s. NR 104.02(3)(a), Wis. Adm. Code.
2. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
3. A compliance schedule for Chloride is in the current permit to meet the Chloride target value of 400 mg/L by December 31, 2023.
4. A compliance schedule for a Phosphorus MDV of 0.8 mg/L is in the current permit to meet the MDV interim limit effective January 2023.
5. Temperature monitoring only in 2022. The previous limit memo stated that "If the facility wishes to use a dissipative cooling study for the relaxation of thermal effluent limits at the time of the next permit reissuance , a new study must be conducted and submitted."
6. Zinc monitoring only in 2023
7. Chronic tests shall be conducted annually in rotating quarters in order to collect seasonal information about the discharge. Tests are required during the following quarters. October 1, 2019 – December 31, 2019; July 1, 2020 – September 30, 2020; October 1, 2021 – December 31, 2021; January 1, 2022 – March 31, 2022; April 1, 2023 – June 30, 2023. Testing shall continue after permit expiration (until permit is reissued) in accordance with the WET requirements specified for the last full calendar year of this permit.
8. Acute tests shall be conducted twice during the permit term in rotating quarters in order to collect seasonal information about the discharge. July 1, 2020 – September 30, 2020; January 1, 2022 – March 31, 2022

Receiving Water Information

- Name: Gregory Branch
- Waterbody Identification Code (WBIC): 964400
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Limited Forage Fish (LFF) community from Outfall 001 to State Highway 61, non-public water supply. Approximately 1.2 miles downstream of State Highway 61, the Gregory Branch becomes a cold water (CW) community in SWDV which has recently changed from a warm water sport fish community (WWSF).
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q_{10} and 7-Q_2 values are from USGS for Station SE ¼ , SW ¼ , SEC.19, T6N-R2W, where Outfall 001 is located.

  7-Q_{10} = 0.01 cfs (cubic feet per second)
  7-Q_2 = 0.03 cfs
  90-Q_{10} = 0.07 cfs
  Harmonic Mean Flow = 0.07 cfs

  The Harmonic Mean has been estimated based on average flow and the 7-Q_{10} using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).

  Low flows 1.2 miles downstream at the point of classification change:

  7-Q_{10} = 0.24 cfs
  7-Q_2 = 0.72 cfs

  The 7-Q_2 was not determined at this site, but at Fennimore the 7-Q_2 = 0.03 cfs and the 7-Q_{10} = 0.01 cfs which equals a ratio of 3:1.
- Hardness = 323 mg/L as $CaCO_3$. This value represents the geometric mean of data from WET tests conducted between 12/10/2019 and 08/20/2024.

- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%
- Source of background concentration data: Metals data from Borah Creek is used for this evaluation because there is no data available for the Gregory Branch. Borah Creek is within the same ecological landscape so ambient water quality characteristics are expected to be similar. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: Stitzer Sanitary District WWTF discharges approximately 2.5 miles downstream from the Fennimore WWTF, however the mixing zones do not overlap. Therefore, the other discharger does not impact this evaluation.
- Impaired water status: Approximately 5.5 miles downstream, the Rogers Branch (stream miles 0.00 – 8.00) is listed as impaired for total phosphorus and TSS.

Effluent Information

- Design flow rate(s):
  Annual average = 0.394 MGD (Million Gallons per Day)
  For reference, the actual average flow from January 2019 to January 2025 was 0.20 MGD.
  Please note that in the previous WQBEL dated June 29, 2018, the annual average design flow was incorrectly listed as 0.62 MGD, which is the peak weekly flow.
- Hardness = 347 mg/L as $CaCO_3$. This value represents the geometric mean of data from 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).
- Wastewater source: Domestic wastewater with two industrial contributors Immuno-Dynamics, a dairy producer, and Carr Valley Cheese, where packaging occurs.
- Water supply: Domestic wells from the city of Fennimore.
- Additives: Aluminum Sulfate (Alum) for Phosphorus Removal.
- 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.

Effluent Copper Data

Sample Date	Copper µg/L	Sample Date	Copper µg/L	Sample Date	Copper µg/L
11/30/2023	6.6	12/22/2023	8.4	01/12/2024	8.1
12/05/2023	9.0	12/26/203	8.3	01/16/2024	11
12/08/2023	8.4	01/05/2024	7.7	01/19/2024	8.3
12/12/2023	8.1	01/09/2024	8.0		
1-day P_{99} = 11 µg/L					
4-day P_{99} = 10 µg/L					

Attachment #1

Effluent Chloride Data

	Chloride mg/L
1-day P_{99}	463
4-day P_{99}	374
30-day P_{99}	324
Mean	298
Std	59.3
Sample size	404
Range	122 - 529

Effluent Zinc Data

	Zinc µg/L
1-day P_{99}	114
4-day P_{99}	80
30-day P_{99}	62
Mean	53
Std	20
Sample size	32
Range	20 - 100

The following table presents the average concentrations and loadings at Outfall 001 from January 2019 to January 2025 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	14 mg/L*	-
TSS	11 mg/L*	-
Dissolved Oxygen	8.0 mg/L	-
pH field	7.2 s.u.	-
Phosphorus	0.53 mg/L	-
Ammonia Nitrogen	2.2 mg/L*	-
Chloride	298 mg/L	487 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. This is the case for Fennimore Wastewater Treatment Facility.

The following tables list the calculated WQBELs for this discharge along with the results of effluent sampling for all the detected substances. 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 = 0.01 cfs, (1-Q_{10} (estimated as 80% of 7-Q_{10})), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

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	344	69	<1.1		
Cadmium	347	43	44	9.0	<0.19		
Chromium	301	4446	4504	901	<1.1		
Copper	347	50.2	51			11	11
Lead	347	356	360	72	<4.3		
Nickel	268	1080	1095	219	3.5		
Zinc	333	345	349			114	100

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.
Chloride (mg/L)		757	767			463	529

* The indicated hardness may differ from the effluent hardness because the effluent hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the acute criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.
* * 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 = 0.0025 cfs (¼ of the 7-Q_{10}), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Arsenic		152		153	31	<1.1	
Cadmium	175	3.8		3.8	0.8	<0.19	
Chromium	301	326		327	66	<1.1	
Copper	323	28		28			10
Lead	323	87	0.50	87	18	<4.3	
Nickel	268	120		121	24	3.5	
Zinc	323	336		337			80
Chloride (mg/L)		395		397			374

* 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 = 0.0175 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370		382	77	<0.19
Chromium (+3)	3,818,000		3,945,007	789,001	<1.1
Lead	140	0.50	145	29	18
Nickel	43,000		44,430	8,886	24

Monthly Average Limits based on Human Cancer Criteria (HCC)
RECEIVING WATER FLOW = 0.0175 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13	14	2.8	<1.1

Conclusions and Recommendations
Based on a comparison of the effluent data and calculated effluent limitations, **effluent limitations are not required, but monitoring for chloride, PFOS and PFOA and copper are recommended.**

Copper – Considering available effluent data from November 2023 to January 2024, the 1-day P_{99} concentration is 11 µg/L, with a maximum concentration of 11 µg/L. The maximum effluent concentration and the 1-day P_{99} of the effluent data did not exceed the calculated daily maximum limit, therefore **concentration and mass limits are not required.**

Chloride – Considering available effluent data from the January 2019 to January 2025, the 1-day P_{99} chloride concentration is 463 mg/L, and the 4-day P_{99} of effluent data is 374 mg/L.
These levels are below the calculated chloride WQBELs; **therefore, limits are not recommended during the reissued permit term. Quarterly monitoring and PMP efforts are recommended to continue during the reissued permit term to maintain effluent quality at or below current levels.**

The current permit has the interim limit of 500 mg/L as a weekly effluent limit and is an alternative chloride effluent limit based on the variance granted by EPA as described in s. NR 106.145(4), Wis. Adm. Code. **This limit is recommended to be removed during the reissued permit term because reasonable potential for chloride WQBELs is not demonstrated.** This limit removal meets the antidegradation/antibacksliding requirements of ch. NR 207, Wis. Adm. Code, because chloride PMP efforts are recommended to continue in the reissued permit."

Mercury – The permit application did not require monitoring for mercury because the Fennimore 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 review of the past five years of sludge characteristics data reveals that all the sample results are within expected analytical ranges and well below the 17 mg/kg level. The average concentration in the sludge from April 2019 to August 2024 was 1.6 mg/kg, with a maximum reported concentration of 8.0 mg/kg. **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 non-domestic contributions to the collection system **PFOS and PFOA monitoring is recommended at a once every two months frequency.**

PART 3 – 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.

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 Limited 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 1158 sample results were reported from January 2019 to January 2025. The maximum reported value was 8.0 s.u. (Standard pH Units). The effluent pH was 7.8 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 7.7 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 7.7 s.u. Therefore, a value of 7.7 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 7.7 s.u. into the equation above yields an ATC = 14 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	29
1-Q_{10}	14

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

This limit is greater than the current daily maximum limit of 11 mg/L. If Fennimore Wastewater Treatment Facility would like to request an increase to the existing permit limits, an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter by parameter basis and includes consideration of operations, maintenance and temporary upsets. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current limits must be continued in the reissued permit. The Department would be unable to increase the limit due to the lack of need as shown via the antidegradation rule (ch. NR 207, Wis. Adm. Code) because the highest reported concentration was 29.62 mg/L during the previous permit term.

Presented below is a table of daily maximum limitations corresponding to various effluent pH values. Use of this table is not necessarily recommended in the permit, but it is presented herein for informational purposes.

Daily Maximum Ammonia Nitrogen Limits –LFF

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
$6.0 \leq pH \leq 6.1$	108	$7.0 < pH \leq 7.1$	66	$8.0 < pH \leq 8.1$	14
$6.1 < pH \leq 6.2$	106	$7.1 < pH \leq 7.2$	59	$8.1 < pH \leq 8.2$	11
$6.2 < pH \leq 6.3$	104	$7.2 < pH \leq 7.3$	52	$8.2 < pH \leq 8.3$	9.4
$6.3 < pH \leq 6.4$	101	$7.3 < pH \leq 7.4$	46	$8.3 < pH \leq 8.4$	7.8
$6.4 < pH \leq 6.5$	98	$7.4 < pH \leq 7.5$	40	$8.4 < pH \leq 8.5$	6.4
$6.5 < pH \leq 6.6$	94	$7.5 < pH \leq 7.6$	34	$8.5 < pH \leq 8.6$	5.3
$6.6 < pH \leq 6.7$	89	$7.6 < pH \leq 7.7$	29	$8.6 < pH \leq 8.7$	4.4
$6.7 < pH \leq 6.8$	84	$7.7 < pH \leq 7.8$	24	$8.7 < pH \leq 8.8$	3.7
$6.8 < pH \leq 6.9$	78	$7.8 < pH \leq 7.9$	20	$8.8 < pH \leq 8.9$	3.1
$6.9 < pH \leq 7.0$	72	$7.9 < pH \leq 8.0$	17	$8.9 < pH \leq 9.0$	2.6

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)
Ammonia limits were last calculated in the WQBEL memo dated March 19, 2010. At that time, about 1.2 miles downstream was classified as a WWSF community. Currently, though, Gregory Branch is classified as a cold water community 1.2 miles downstream, which warrants a re-calculation of the downstream impact. Default ambient stream temperature data are contained in Table 2 of ch. NR 102, Wis. Adm. Code. Seasonal mean pH values are available for the Gregory Branch in Grant County. The ambient values are used in conjunction with the effluent and stream low flows to re-calculate limits using the procedure in s. NR 106.32, Wis. Adm. Code.

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 Limited 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 = 1.0,
C = the minimum of 3.09 or $3.73 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or
C = $3.73 \times 10^{(0.028 \times (25 - T))}$ – (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. The 4-day criteria are used in a mass-balance equation with the 7-Q_{10} (4-Q_3, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q_5 (estimated as 85% of the 7-Q_2 if the 30-Q_5 is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 ºC, 25% of the flow is used if the Temperature < 11 ºC, and 50% of the flow is used if the Temperature ≥ 11 ºC but < 16 ºC.

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 the Gregory Branch based on conversations with local fisheries biologists.

The "default" basin assumed values are used for Temperature, pH and background ammonia concentrations, because minimum ambient data is available. These values are shown in the table below, with the resulting criteria and effluent limitations.

Weekly and Monthly Ammonia Nitrogen Limits – LFF

		Summer	Winter	Spring
		May - September	October – March	April
Effluent Flow	Qe (MGD)	0.394	0.394	0.394
Background Information	7-Q_{10} (cfs)	0.01	0.01	0.01
	7-Q_2 (cfs)	0.03	0.03	0.03
	Ammonia (mg/L)	0.06	0.03	0.03
	Temperature (°C)	19	7	15
	Maximum Temperature (°C)	21	13	15
	pH (s.u.)	8.21	7.97	7.97
	% of Flow used	100	25	50
	Reference Weekly Flow (cfs)	0.01	0.0025	0.005
	Reference Monthly Flow (cfs)	0.0255	0.006375	0.01275
Criteria mg/L	4-day Chronic			
	Early Life Stages Present	5.60		8.06
	Early Life Stages Absent		21.10	
	30-day Chronic			
	Early Life Stages Present	2.24		3.22
	Early Life Stages Absent		8.44	
Effluent	Weekly Average			

		Summer	Winter	Spring
		May - September	October – March	April
Limitations mg/L	Early Life Stages Present	5.60		8.06
	Early Life Stages Absent		21.10	
	Monthly Average			
	Early Life Stages Present	2.24		3.22
	Early Life Stages Absent		8.44	

Downstream Impacts

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified for a Cold-Water 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 $1.45 \times 10^{(0.028 \times (25 - T))}$,

T = the temperature (ºC) of the receiving water

Weekly and Monthly Ammonia Nitrogen Limits – CW

		Summer	Winter	Spring
		May – September	October– March	April
Effluent Flow	Qe (MGD)	0.394	0.394	0.394
Background Information	7-Q_{10} (cfs)	0.24	0.24	0.24
	7-Q_2 (cfs)	0.72	0.72	0.72
	Ammonia (mg/L)	0.06	0.48	0.11
	Temperature (°C)	16	4	8
	Maximum Temperature (°C)	18	11	8
	pH (s.u.)	8.09	7.98	8.09
	% of Flow used	100	25	50
	Reference Weekly Flow (cfs)	0.01	0.0025	0.005
	Reference Monthly Flow (cfs)	0	0	0
Criteria mg/L	4-day Chronic	4.25	6.26	5.32
	30-day Chronic	1.70	2.50	2.13
Effluent Limits mg/L	Weekly Average	5.90	6.83	5.84
	Monthly Average	3.35	3.01	2.64

Ammonia Decay

The Department must establish limits to protect downstream uses, according to s. NR 106.32(1)(b), Wis. Adm. Code. Ammonia decay may be considered when determining limits at the outfall to protect the downstream classification, according to s. NR 106.32(4)(c), Wis. Adm. Code. Where the calculated limits are more restrictive based on downstream uses, ammonia decay can be considered to determine if these more restrictive limits are needed or if the ammonia will decay before it reaches the point of the classification change.

Ammonia decay rates are dependent on temperature with in-stream nitrification essentially non-existent in the winter. In-stream decay is expected so a first order decay model should be used. Based on the available literature, a decay rate of 0.25 day^{-1} at 20°C has been suggested as a default rate. A temperature correction factor of $\theta = 1.08$ is ($k_{.t} = k_{20}\,\theta^{(T-20)}$). The ammonia nitrogen decay equation is provided below.

$$N_{Limit} = \left(\frac{N_{down}}{EXP(-k_t T)} \right)$$

Where: N_{Limit} = Ammonia limit needed to protect downstream use (mg/L)
N_{down} = Ammonia limit calculated based on downstream classification and flow (mg/L)
$-k_t$ = Ammonia decay rate at background stream temperature (day^{-1})
T = Travel time from outfall to downstream use (day)

The velocity of receiving water is assumed to be 5 miles per day and the distance from the point of discharge to the classification change is approximately 1.2 miles for a travel time of 0.24 days. This equation shows that at the location where the classification change, 95% of the ammonia is remaining during April. After decay, the limits are increased as shown in the following table.

Ammonia Nitrogen Decay Limits Comparison

	LFF		Cold Water		After decay		Current Limits	
Months Applicable	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L
May – September	5.6	2.2	5.9	3.35	6.2	3.5	***3.4***	***1.5***
October –March	21	8.4	6.83	3.01	***7.0***	***3.1***	11	5.4
April	8.1	3.3	5.84	2.64	***6.1***	***2.7***	8.0	3.3

Ammonia Nitrogen Effluent Data

	Ammonia Nitrogen mg/L
1-day P_{99}	23.5
4-day P_{99}	13.9
30-day P_{99}	5.79
Mean*	2.21
Std	6.69
Sample size	1312
Range	0.03 - 32.07

*Values lower than the level of detection were substituted with a zero

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Ammonia Nitrogen Effluent Data

Ammonia Nitrogen mg/L	May- September	October - March	April
1-day P_{99}	4.0	36.5	37.2
4-day P_{99}	2.7	20.4	20.1
30-day P_{99}	1.11	9.21	10.45
Mean*	0.36	4.67	6.48
Std	1.17	8.20	7.74
Sample size	391	483	78
Range	0.03 - 9.1	0.03 - 32.07	0.05 - 24.51

*Values lower than the level of detection were substituted with a zero

The permit currently has daily maximum limits year-round as well as, weekly average and monthly average limits. Where there are existing ammonia nitrogen limits in the permit, 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. Please note that the weekly and monthly CW community ammonia nitrogen limits for the months of April and October – March are more stringent than that of the current limits for those months. Those that are more stringent will be used to protect the downstream community. 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
May – September	11 mg/L	3.4 mg/L	1.5 mg/L
October – March	11 mg/L	7.0 mg/L	3.1 mg/L
April	11 mg/L	6.1 mg/L	2.7 mg/L

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

Section NR 102.04(5), Wis. Adm. Code, states that all surface waters shall be suitable for supporting recreational use and shall meet *E. coli* criteria during the recreation season. Section NR 102.04(5)(b), Wis. Adm. Code, allows the Department to make exceptions when it determines, in accordance with s. NR 210.06(3), Wis. Adm. Code, that wastewater disinfection is not required to meet E. coli limits and protect the recreational use. Section NR 210.06(3), Wis. Adm. Code, tasks the Department with determining the need for disinfection using a site-specific analysis based on potential risk to human or animal health. It sets out the factors that must be considered in determining the necessity to disinfect municipal wastewater or to change the length of the disinfection season.

Fennimore Wastewater Treatment Facility had previously been exempted from disinfection based on the limited aquatic life or limited forage fish community classification of the receiving water. Section NR 210.06(3)(g), Wis. Adm. Code, states that disinfection decisions may be made based on the hydrologic classifications listed in s. NR 104.02(1), Wis. Adm. Code (**not** on the water quality classifications - i.e., limited forage fish, limited aquatic life - that are defined in s. NR 104.02(3), Wis. Adm. Code). The hydrologic classification for Gregory Branch is listed in ch. NR 104, Wis. Adm. Code, as continuous. Continuous streams have a higher likelihood of providing opportunities for full contact recreational activities. Therefore, disinfection should not be exempted based solely on this hydrological classification.

The Department has considered the information required by s. NR 210.06(3), Wis. Adm. Code, and has determined that the discharge cannot meet bacteria limits without disinfection. 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.

These limits are required during May through September. The permit will include a compliance schedule to meet these limits.

PART 5 – 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.

Because Fennimore Wastewater Treatment Facility currently has an limit of 0.8 mg/L, this limit should be included in the reissued permit. This limit remains applicable unless a more stringent WQBEL is given.

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

Water Quality-Based Effluent Limits (WQBEL)
Revisions to administrative rules regulating phosphorus took effect on December 1, 2010. These rule revisions include additions to s. NR 102.06, Wis. Adm. Code, which establish phosphorus standards for surface waters. Subchapter III of NR 217, Wis. Adm. Code, establishes procedures for determining WQBELs for phosphorus, based on the applicable standards in ch. NR 102, Wis. Adm. Code. Section NR 102.06(3)(a), Wis. Adm. Code, specifically names river segments for which a phosphorus criterion of 0.100 mg/L applies. For other stream segments that are not specified in s. NR 102.06(3)(a), Wis. Adm. Code, s. NR 102.06(3)(b), Wis. Adm. Code, specifies a phosphorus criterion of 0.075 mg/L. The phosphorus criterion of 0.075 mg/L applies for Gregory Branch.

The conservation of mass equation is described in s. NR 217.13(2)(a), Wis. Adm. Code, for phosphorus WQBELs and includes variables of water quality criterion (WQC), receiving water flow rate (Qs), effluent flow rate (Qe), and upstream phosphorus concentrations (Cs) provided below.

$$\text{Limitation} = [(WQC)(Qs+(1-f)\ Qe) - (Qs-f\ Qe)\ (Cs)]/Qe$$

Where:

WQC = 0.075 mg/L for Gregory Branch.
Qs = 100% of the 7-Q_2 of 0.03 cfs
Cs = background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code
Qe = effluent flow rate = 0.394 MGD = 0.959 cfs
f = the fraction of effluent withdrawn from the receiving water = 0

Section NR 217.13(2)(d), Wis. Adm. Code, specifies that the background phosphorus concentration used in the limit calculation formula shall be calculated as a median using the procedures specified in s. NR 102.07(1)(b) to (c), Wis. Code. All representative data from the most recent 5 years shall be used, but data from the most recent 10 years may be used if representative of current conditions.

A previous evaluation resulted in a WQBEL of 0.075 mg/L using a background concentration of 0.185 mg/L. Section NR 217.13(2)(d), Wis. Adm. Code, states that the determination of upstream concentrations shall be evaluated at each permit reissuance. The previous limit memo used data from SWIMS Station 22349 Roger Branch of the Rock River. Additional phosphorus sampling has not occurred at this station since the previous permit reissuance. Given the receiving water low flow, the limit does not change with background concentrations below criteria.

Limit Expression

According to s. NR 217.14(2), Wis. Adm. Code, because the calculated WQBEL is less than or equal to 0.3 mg/L, the effluent limit of 0.075 mg/L may be expressed as a six-month average. If a concentration limitation expressed as a six-month average is included in the permit, a monthly average concentration limitation of 0.225 mg/L, equal to three times the WQBEL calculated under s. NR 217.13, Wis. Adm. Code shall also be included in the permit. The six-month average should be averaged during the months of May – October and November – April.

Mass Limits

A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because the discharge is to a surface water that is to or upstream of impaired total phosphorus. **This final mass limit shall be 0.075 mg/L × 8.34 × 0.394 MGD = 0.25 lbs/day expressed as a six-month average.**

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from January 2019 to January 2025.

Total Phosphorus Effluent Data

	Phosphorus mg/L from January 2023 to January 2025	Phosphorus mg/L from January 2019
1-day P_{99}	1.6	3.3
4-day P_{99}	0.9	1.8
30-day P_{99}	0.54	0.90
Mean	0.39	0.53
Std	0.32	0.71
Sample size	328	955
Range	0.03 - 4.2	0.03 - 14.28

Reasonable Potential Determination
The Fennimore Wastewater Treatment Facility discharge has reasonable potential to cause or contribute to an exceedance of the water quality criterion because the 30-day P_{99} of reported effluent total phosphorus data is greater than the calculated WQBEL**.** Therefore, **a WQBEL is required.**

Multi-Discharge Variance Interim Limit
With the permit application, Fennimore Wastewater Treatment Facility has re-applied for the phosphorus multi-discharger variance (MDV). Conditions of the phosphorus MDV require the facility to comply with an interim phosphorus limit in lieu of meeting the final WQBEL. The recommended interim limit during the 2nd permit under MDV approval, pursuant to s. 283.16 (6) (a), Wis. Stats., **is 0.6 mg/L as a monthly average. A compliance schedule may be appropriate to meet this interim limit but compliance with 0.6 mg/L shall be no later than the end of the reissued permit. The previous interim limit of 0.8 mg/L should not be exceeded during the compliance schedule.**

PART 6 – 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 2019 to January 2025. Effluent flow rates are not currently being measured at the Fennimore Wastewater Treatment Facility, so influent flow rates were used instead.

The table below summarizes the maximum temperatures reported during monitoring from April 2022 to December 2022.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	-	-	49	76
FEB	-	-	50	76
MAR	-	-	52	77
APR	50	51	55	79
MAY	57	60	65	82

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Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JUN	64	66	76	84
JUL	68	68	81	85
AUG	67	69	81	84
SEP	68	69	73	82
OCT	**65**	65	**61**	80
NOV	**59**	61	**49**	77
DEC	**52**	54	**49**	76

Reasonable Potential
Permit limits for temperature are recommended based on the procedures in s. NR 106.56, Wis. Adm. Code.

- An acute limit for temperature is recommended for each month in which the representative daily maximum effluent temperature for that month exceeds the acute WQBEL. The representative daily maximum effluent temperature is the greater of the following:
  (a) The highest recorded representative daily maximum effluent temperature
  (b) The projected 99th percentile of all representative daily maximum effluent temperatures
- A sub−lethal limitation for temperature is recommended for each month in which the representative weekly average effluent temperature for that month exceeds the weekly average WQBEL. The representative weekly average effluent temperature is the greater of the following:
  (a) The highest weekly average effluent temperature for the month.
  (b) The projected 99th percentile of all representative weekly average effluent temperatures for the month

Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. The months in which limitations are recommended are shown in bold. Based on this analysis**, weekly average temperature maximum limits are necessary for the months of October, November and December at 61 °F during the month of October, and 49 °F for the months of November and December.**

The following general options are available for a facility to explore potential relief from the temperature limits:

- Effluent monitoring data: Verification or additional effluent monitoring (flow and/or temperature) may be appropriate if there were questions on the representativeness of the current effluent data.
- Monthly low receiving water flows: Contract with USGS to generate monthly low flow estimates for the receiving water to be used in place of the annual low flow.
- Mixing zone studies: A demonstration of rapid and complete mixing may allow for the use of a mixing zone other than the default 25%.

- Dissipative cooling demonstration: Effluent limitations based on sub-lethal criteria may be adjusted based on the potential for heat dissipation from municipal treatment plants as described in s. NR 106.59(4), Wis. Adm. Code.
- Collection of site-specific ambient temperature: default background temperatures for streams in Wisconsin, so actual data from the direct receiving water may provide for relaxed thermal limits but only if the site-specific temperatures are lower than the small stream defaults used in the above tables
- A variance to the water quality standard: This is typically considered to be the least preferable and most complex option as it requires the evaluation of the other alternatives.

These options are explained in additional detail in the August 15, 2013 Department *Guidance for Implementation of Wisconsin's Thermal Water Quality Standards*
https://dnr.wisconsin.gov/topic/Wastewater/Thermal.html

Based on this analysis**,** weekly average temperature maximum limits are necessary for the months of October, November and December. The Fennimore Wastewater Treatment Facility has requested an application for dissipative cooling, A compliance schedule may be included in the permit and if the facility successfully completes a DC study, then temperature limits can be dropped from the permit, while monitoring would remain per the requirements of s. NR 106.59(7), Wis. Adm. Code recommended in the reissued permit. Please note that the DC study should be completed during one of the months that have triggered a temperature limit.

Future WPDES Permit Reissuance
Dissipative cooling requests must be re-evaluated every permit reissuance. The permittee is responsible for submitting an updated DC request prior to permit reissuance. Such a request must either include:
a) A statement by the permittee that there have been no substantial changes in operation of, or thermal loadings to, the treatment facility and the receiving water; or
b) New information demonstrating DC to supplement the information used in the previous DC determination. If significant changes in operation or thermal loads have occurred, additional DC data must be submitted to the Department.

PART 7 – 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).*

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC_{50} (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.

- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC_{25} (Inhibition Concentration) greater

than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of 72% shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

$$IWC\ (as\ \%) = Q_e \div \{(1 - f)\ Q_e + Q_s\} \times 100$$

Where:

Q_e = annual average flow =0.394 MGD = 0.61 cfs
f = fraction of the Q_e withdrawn from the receiving water = 0
Q_s = 100% of the 7-Q_{10} = 0.24 cfs (flow at first downstream non-variance waterbody)

- The IWC has decreased from the previous permit term due to a mistake in the previous WQBEL listing the weekly peak design flow of 0.62 MGD as the annual design flow rate. This mistake has been rectified and the correct design flow rate is 0.394 MGD resulting in a change of the IWC.

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.

- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations.

WET Data History

Date Test Initiated	Acute Results LC_{50} %				Chronic Results IC_{25} %					Footnotes or Comments
	C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Algae (IC_{50})	Pass or Fail?	Use in RP?	
09/09/1996	>100	90	Pass	No	-	-	-	-	-	1
10/07/1997	>100	>100	Pass	No	>100	-	-	No	No	1
09/29/1998	>100	>100	Pass	No	>100	>100	-	Yes	No	1
07/13/2000	>100	>100	Pass	No	>100	>100	-	Yes	No	1
05/10/2001	-	-	-	-	>100	>100	-	Pass	No	1
01/13/2004	-	-	-	-	>100	>100	-	Pass	No	1
12/08/2005	>100	>100	Pass	No	>100	>100	-	Pass	No	1
04/13/2006	>100	>100	Pass	Yes	>100	>100	-	Pass	No	2
08/16/2007	-	-	-	-	>100	>100	-	Pass	No	2
09/09/2014	>100	>100	Pass	Yes	>100	>100	-	Pass	No	2

10/13/2015	>100	>100	Pass	Yes	>100	>100	-	Pass	No	2
08/02/2016	>100	>100	Pass	Yes	>100	>100	-	Pass	No	2
12/10/2019	-	-	-	-	>100	>100	-	Pass	No	2
09/29/2020	>100	>100	Pass	Yes	>100	>100	-	Pass	No	2
03/15/2022	-	-	-	-	3.6	4	-	Fail	No	2
05/10/2022	>100	>100	Pass	Yes	>100	>100	-	Pass	No	2
06/07/2022	-	-	-	-	>100	1	-	Pass	No	2
01/24/2023	-	-	-	-	>100	37.5	-	Fail	No	2
03/28/2023	-	-	-	-	>100	82	-	Pass	No	2
04/11/2023	-	-	-	-	>100	48.2	-	Fail	No	2
05/16/2023	-	-	-	-	>100	>100	-	Pass	No	2
10/24/2023	-	-	-	-	>100	>100	-	Pass	Yes	-
11/28/2023	-	-	-	-	>100	>100	-	Pass	Yes	-
12/12/2023	-	-	-	-	>100	>100	-	Pass	Yes	-
01/23/2024	-	-	-	-	>100	>100	-	Pass	Yes	-
05/14/2024	-	-	-	-	>100	>100	-	Pass	Yes	-
02/20/2024	-	-	-	-	>100	>100	-	Pass	Yes	-
03/19/2024	-	-	-	-	>100	>100	-	Pass	Yes	-
08/20/2024	-	-	-	-	>100	>100	-	Pass	Yes	-

Footnotes:

1. *Data Not Representative.* Significant changes were made to WET test methods in 2004 and these changes were assumed to be fully implemented by certified labs by no later than June 2005. It may be appropriate to exclude data collected before July 1, 2005, unless 1) it shows repeated toxicity that was never resolved or 2) older data is all that is available, and no significant changes have occurred which obviously make it unrepresentative. Ammonia limits were added to the permit in 2005 based on updated water quality criteria.
2. *Data Not Representative.* Significant changes were made to the facility and a TRE was completed, therefore and data prior to October 2023 is no longer representative.

- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. **WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.**

  According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa and TUc effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC_{50}, IC_{25} or $IC_{50} \geq 100\%$).

  Acute Reasonable Potential = 0 < 1.0, reasonable potential is not shown, and a limit is not required.
  Chronic Reasonable Potential = 0 < 1.0, reasonable potential is not shown, and a limit is not required.

The WET checklist was developed to help DNR staff make recommendations regarding WET limits, monitoring, and other related permit conditions. The checklist indicates whether acute and chronic WET limits are needed, based on requirements specified in s. NR 106.08, Wis. Adm. Code. The checklist steps the user through a series of questions, assesses points based on the potential for effluent toxicity, and suggests monitoring frequencies based on points accumulated during the checklist analysis. As toxicity potential increases, more points accumulate, and more monitoring is recommended to ensure that toxicity is

not occurring. A summary of the WET checklist analysis completed for this permittee is shown in the table below. Staff recommendations based on best professional judgment are provided below the summary table. For guidance related to reasonable potential and the WET checklist, see Chapter 1.3 of the WET Guidance Document: https://dnr.wisconsin.gov/topic/Wastewater/WET.html.

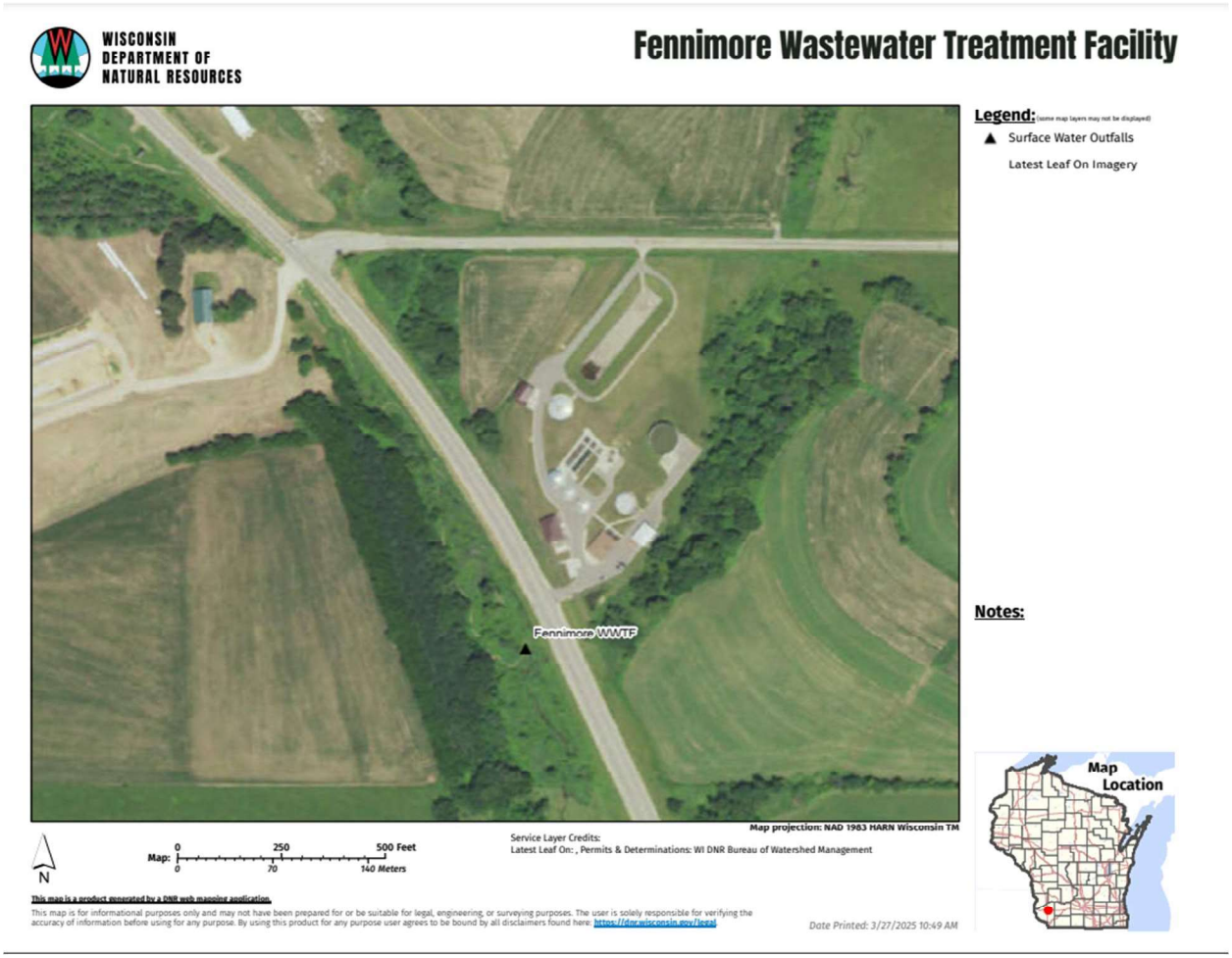
WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not Applicable. **0 Points**	IWC = 72 %. **15 Points**
Historical Data	2 tests used to calculate RP. No tests failed. **0 Points**	16 tests used to calculate RP. 3 tests failed. **0 Points**
Effluent Variability	Variability, with more frequent violations or upsets, but have consistent WWTF operations. **9 Points**	Same as Acute. **9 Points**
Receiving Water Classification	WWSF or < 4 mi to non-variance **5 Points**	Same as Acute. **5 Points**
Chemical-Specific Data	Reasonable potential for limits for Ammonia Nitrogen based on ATC; Copper, Nickel, Zinc, and Chloride detected. **8 Points**	Reasonable potential for limits for Ammonia Nitrogen based on CTC; Copper, Nickel, Zinc, and Chloride detected. **8 Points**
Additives	No Biocides and 1 Water Quality Conditioner added. Permittee has proper P chemical SOPs in place **1 Point**	All additives used more than once per 4 days. **1 Point**
Discharge Category	2 Industrial Contributors. **6 Points**	Same as Acute. **6 Points**
Wastewater Treatment	Secondary or Better **0 Points**	Same as Acute. **0 Points**
Downstream Impacts	No impacts known. **0 Points**	Same as Acute. **0 Points**
Total Checklist Points:	**29 Points**	**44 Points**
Recommended Monitoring Frequency (from Checklist):	3 tests during permit term	Annual testing during the permit term
Limit Required?	No	No

	Acute	Chronic
TRE Recommended? (from Checklist)	No	No

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above **three acute WET tests during the permit term are recommended and one chronic WET test per year is recommended throughout the permit term** the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing should continue after the permit expiration date (until the permit is reissued).

Site Map:


WISCONSIN
DEPARTMENT OF
NATURAL RESOURCES
Fennimore Wastewater Treatment Facility
Legend:
Surface Water Outfalls
Latest Leaf On Imagery
Fennimore WWTF
Notes:
Map projection: NAD 1983 HARN Wisconsin TM
Map: 0 250 500 Feet
0 70 140 Meters
N
Service Layer Credits:
Latest Leaf On: , Permits & Determinations: WI DNR Bureau of Watershed Management
This map is a product generated by a DNR web mapping application.
This map is for informational purposes only and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. The user is solely responsible for verifying the accuracy of information before using for any purpose. By using this product for any purpose user agrees to be bound by all disclaimers found here: https://dnr.wisconsin.gov/legal
Date Printed: 3/27/2025 10:49 AM
Map Location

Thermal Table:

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

Facility:	Fennimore WWTF		**7-Q_{10}:**	0.01 cfs		**Temp Dates** / **Flow Dates**
Outfall(s):	001		**Dilution:**	25%	**Start:**	04/01/22 / 01/01/19
Date Prepared:			**f:**	0	**End:**	12/31/22 / 06/23/24
Design Flow (Qe):	0.394	MGD	**Stream type:**	Small warm water sport or forage fish com		
Storm Sewer Dist.	0	ft	**Qs:Qe ratio:**	0.0 :1		
			Calculation Needed?	YES		

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit		**Adjusted Thermal Limits**	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Qesl)	Daily Maximum Flow Rate (Qea)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation	**Weekly Average**	**Daily Maximum**
	(°F)	(°F)	(°F)	(cfs)	(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)	(°F)	(°F)
JAN	33	49	76	0.01	0.204	0.269	0			49	76	49.1	76.3
FEB	34	50	76	0.01	0.223	0.452	0			50	76	50.1	76.2
MAR	38	52	77	0.01	0.239	0.261	0			52	77	52.1	77.2
APR	48	55	79	0.01	0.214	0.247	0	50	51	55	79	55.1	79.2
MAY	58	65	82	0.01	0.307	0.390	0	57	60	65	82	65.0	82.1
JUN	66	76	84	0.01	0.319	0.495	0	64	66	76	84	76.1	84.1
JUL	69	81	85	0.01	0.468	0.871	0	68	68	81	85	81.0	85.0
AUG	67	81	84	0.01	0.284	0.456	0	67	69	81	84	81.1	84.1
SEP	60	73	82	0.01	0.356	0.556	0	68	69	73	82	73.1	82.1
OCT	50	61	80	0.01	0.189	0.277	0	65	65	61	80	61.1	80.2
NOV	40	49	77	0.01	0.269	0.417	0	59	61	49	77	49.1	77.1
DEC	35	49	76	0.01	0.225	0.302	0	52	54	49	76	49.1	76.2

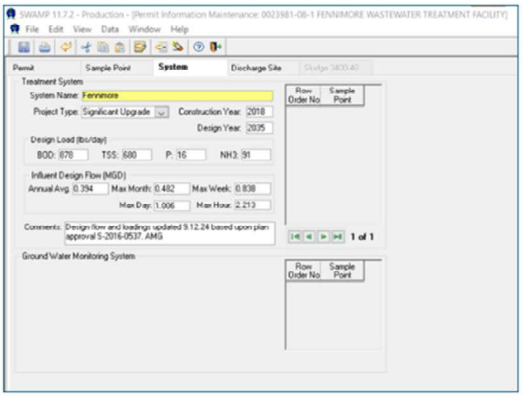
Email confirming effluent flow rate change:

O Oconnell, Caitlin L - DNR
To: Masri, Zainah M - DNR
Cc: Figiel, Diane - DNR

Reply Reply all Forward
Tue 6/3/2025 3:34 PM

Hi Zainah,

The influent design flow and design loading information can be found in the 'Permit Information' section of SWAMP. Screen capture provided:



The actual files are stored in the plan review database or one of the other temporary plan review storage folders. In this case, I believe they are in the plan review database. If I had to guess, we may have generated the permit application before SWAMP was updated with the new design flows, and the permittee copied over what was reported from the previous permit application. Fennimore went through a significant enough upgrade that their design flows changed; however, it might be helpful to speak with the municipal plan review staff, as they can better answer your questions because they review and approve these. I have not communicated with Fennimore on how the design flow changes would affect their limits. Because Fennimore has been and is planning to continue to use the MDV, the phosphorus mass WQBEL has not become effective yet. This is something they will have to address, along with the phosphorus concentration WQBELs, post MDV.

Thanks,
Caitlin

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
101 S. Webster Street
Box 7921
Madison WI 53707-7921

Tony Evers, Governor

Telephone 608-266-2621
FAX 608-267-3579
TTY Access via relay - 711

WISCONSIN DEPT. OF NATURAL RESOURCES

11/11/2024

Ashley Edge
860 Lincoln Avenue
Fennimore, WI 53813

Subject: Conditional approval of a multi-discharger phosphorus variance
Receiving Stream: Gregory Branch Grant River in Grant County
Permittee: City of Fennimore, WPDES WI-0023981

Dear Ms. Edge:

In accordance with s. 283.16 of the Wisconsin Statutes, you have requested coverage under Wisconsin's multi-discharger phosphorus variance for the Fennimore Wastewater Treatment Facility in an application dated 3/20/2024. Wisconsin's multi-discharger phosphorus variance was approved by EPA on February 6, 2017. Coverage under the multi-discharger phosphorus variance may only be granted to an existing source that demonstrates a major facility upgrade is necessary to achieve phosphorus compliance and the upgrade will result in economic hardship as defined in the federally approved variance. The water quality criterion for which you are seeking a variance is contained in s. NR 102.06, Wis. Adm. Code.

After review of the application materials, the Department is tentatively approving coverage under the phosphorus multi discharger variance because the applicant has demonstrated that a major facility upgrade would be required to comply with the phosphorus water quality based effluent limitation, and the applicant meets the economic hardship eligibility criteria delineated in the federally approved variance. In addition, the permitted facility has agreed to comply with the interim limitations that will be included in the WPDES permit, and has agreed to reduce the amount of phosphorus entering surface waters by making payments to the counties pursuant to s. 283.16(6)(b)1., Wis. Stats.

Public comment on this decision will be solicited at the time of permit reissuance after which a final decision will be made. The Department appreciates your attention and interest in Wisconsin's multi-discharger phosphorus variance. Should you have further questions regarding this matter, please contact me at (608) 400 – 5596 or by email at matthew.claucherty@wisconsin.gov.

Sincerely,

Matt Claucherty, MDV Point Source Coordinator
Bureau of Water Quality

e-cc Jordan Fritche, City of Fennimore
Caitlin Oconnell, WDNR
Betsyjo Howe, WDNR
Tim Elkins, EPA Region 5
Micah Bennett, EPA Region 5

State of Wisconsin
Department of Natural Resources
Bureau of Water Quality
Permits Section - WQ/3

Multi-Discharger Variance Application Evaluation Checklist

Form 3200-145 (R 5/16)

Notice: This checklist is meant to be a tool to help Department of Natural Resources (DNR) staff review municipal and industrial multi-discharger variance (MDV) applications (Forms 3200-149 and 3200-150). Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31-19.39, Wis. Stats.).

Permittee Name

City of Fennimore

WPDES Permit Number	County
WI- 0 | 0 | 2 | 3 | 9 | 8 | 1	Grant

1. Did the point source apply for the MDV at the appropriate time?	(•) Yes ( ) No. *STOP- facility not eligible at this time.*	*See Questions 1-3.*
2. This operation is (check one):	( ) New or relocated outfall. *STOP- facility not eligible.* (•) Existing outfall	*See Questions 5-6.*
3. Is the point source is located in an MDV eligible area?	(•) Yes ( ) No. *STOP- facility not eligible.*	*Apply County information to Appendix H. Additional information provided in Q7 on municipal form & Q7-8 on industrial form.*
4. The secondary indicator score for the county (counties) the discharge is located is:	4	*See Appendices A-F. If the score is less than 2, stop; the facility is not eligible.* *See Q23 on municipal form & Q28 on industrial form.*
5. Is a major facility upgrade required to comply with phosphorus limits?	(•) Yes ( ) No. *STOP- facility not eligible.*	*See Q8 on municipal form/Q9 on industrial form.*
6. List the months where phosphorus limits cannot be achieved during the permit term:	☒ All ☒ Jan ☒ Apr ☒ Jul ☒ Oct ☒ Feb ☒ May ☒ Aug ☒ Nov ☒ Mar ☒ Jun ☒ Sep ☒ Dec	*Consider checking with limit calculator. If this does not match information in application, the application should be updated prior to approval.*

7. What is the current effluent level achievable?

Outfall Number(s)	Conc. (mg/L)	Method for calculation:	Does this concur with application?	
001	0.71	(•) 30-day P99 ( ) Other, specify:	( ) Yes (•) No, why not: Application used smaller data subset	*DNR staff should verify the effluent concentration value(s) provided. See Q11 on municipal form & Q12 on industrial form.*

8. What is the appropriate interim limitation(s) for the permit term?

0.6 mg/L as a monthly average, pursuant to s. 283.16(6)(a)2., Wis. Stats.
Target Value = 0.2 mg/L

Provide Rationale:

Total phosphorus effluent data from the past three years (10/1/2021 - 9/30/2024, n=473) yield a 30-day P99 value of 0.71 mg/L. Treatment often times achieves much better results than the P99 value, though short-duration issues with treatment have elevated some monthly averages above this level. Treatment has improved over the past year. A schedule is not likely needed to achieve 0.6 mg/L.

Note: See description in Section 2.02 of the MDV implementation guidance. Interim limitations should reflect the "highest attainable condition" for the permittee in question pursuant to s. 283.16(7), Wis. Stat.

Save

9. *For Industries Only*- Where does the phosphorus in the effluent come from? (check all that apply)	☐ Process ☐ Additive Usage ☐ Water supply *Can intake credits be given or can the facility use an alternative water supply?* ◯ Not feasible ◯ Possibly, but further analysis needed ◯ Not evaluated at this time	*See Q14-15 & 19 on industrial form. If the answer is "possibly" or "not evaluated", the schedule section of the MDV permit should contain a requirement to perform this analysis.*
10. Has this facility optimized?	◉ Yes ◯ In progress ◯ No	*See Q14 on municipal form & Q16 & 20 on industrial form. Facility must optimize and operate at an optimize treatment level (s. 283.16(6)(a), Wis. Stat.)If no will need compliance schedule.*
11. Has a facility plan/compliance alternative plan been completed for the facility?	◉ Yes ◯ In progress ◯ No	*See Q15 on municipal form & Q17 on industrial form.*
12. What is the projected cost for complying with phosphorus? Source:	$ 2,386,200.00 MDV Application / Past site-specific cost estimate	*Facility must submit site-specific compliance costs. If cost projections are used from EIA, the permittee must certify that these costs are reasonable for the facility in question. See "projected compliance costs" in Section 2.02 of the MDV Implementation Guidance for details.*

Comments on planning efforts:

A final compliance alternatives plan, dated October 2017, was completed for the Fennimore WWTF. This document evaluated options for compliance with low-level phosphorus limits. The present worth cost for disc filtration was listed at $2.37M. The EIA addendum analysis listed the capital costs for Fennimore at $4.1M which is greater than the site-specific costs. The provided site-specific costs are similar to other facility reported costs and are considered representative, or conservative considering cost increases that have occurred between 2017 and the present. Fennimore has optimized phosphorus treatment during the current permit term.

13. Are adaptive management and water quality trading viable?	◯ Yes ◉ Perhaps. Additional analysis required. ◯ No	*See Q18-21 on municipal form & Q22-25 on industrial form. If additional analyses required, the applicant may need to complete this analysis during the MDV permit term.*
14. Has the point source met the appropriate primary screener?	◉ Yes ◯ No. *STOP- facility not eligible.*	*See Q4 of this form in addition to the "eligibility" guidance in Section 2.01 of the MDV Implementation Guidance.*

Comments on economic demonstration:

Capital costs estimated at $2,386,200 result in annual payments (20 year CWFP loan, 2.2% interest) of $148,763.87. The residential portion (64%) is $95,208.87. This cost, divided amongst 979 user households results in a per-user rate increase of $97.25. Current sewer rates are $600 and future rates are projected to be $697.25. This value is 1.07% of Fennimore's $65,031 median household income. In Grant County with a secondary indicator score of 4, sewer rates at 1% of MHI meet the primary screener. The applicant meets the primary screener.

Save

15. What watershed option was selected?

- (•) County project option. *Complete Section 5.*
- ( ) Binding, written agreement with the DNR to construct a project or implement a watershed plan. *Complete Section 4.*
- ( ) Binding, written agreement with another person that is approved by the DNR to construct a project or implement a watershed plan. *Complete Section 4.*

Section 4. Watershed Plan Review

16. MDV Plan Number: *Note: This is for tracking purposes. Contact Statewide Phosphorus Implementation Coordinator for the plan number.*	_____
17. Did the point source complete Form 3200-148?	( ) Yes ( ) No
18. Is the project area in the same HUC 8 watershed as the point of discharge?	( ) Yes ( ) No. *STOP- Watershed plan must be updated.*
19. What is the annual offset required? *See Section 2.03 of the MDV implementation guidance. If this value is different from the offset target provided in form 3200-148, the watershed plan should be amended.*	_____
20. Does the plan ensure that the annual load is offset annually?	( ) Yes ( ) No. *STOP- Watershed plan must be updated.*

21. Are projects occurring on land owned/operated by a CAFO or within a permitted MS4 boundary?

- ( ) Yes. *Work with appropriate DNR staff to ensure projects are not working towards other permit compliance.*
- ( ) No.

22. Are other funding sources being used as part of the MDV watershed project?

- ( ) Yes. *Work with appropriate DNR staff to ensure that funding sources can be appropriately used in the plan area.*
- ( ) No.

23. Do you have any concerns about the watershed project? *Note: Coordinate with other DNR staff as appropriate.*	( ) Yes. *STOP- Watershed plan must be updated.* ( ) No.

Comments:

Section 5. Payment to the County(ies)

24. At this time, the appropriate per pound payment is: $ 64.75

See "Payment Calculator" document at \\central\water\WQWT_PROJECTS\WY_CW_Phosphorus\MDV.

Section 6. Determination

Based on the available information, the MDV application is:

- (•) Approved
- ( ) Request for more information
- ( ) Denied

Save

Additional Justification (if needed):

Certification		
Preparer Name	Title	
Matt Claucherty	Water Resources Management Specialist	
Signature of Preparer		Date
Matt Claucherty		11/11/2024

Save