

Permit Fact Sheet

General Information

Permit Number	WI-0023639-11-0
Permittee Name and Address	VILLAGE OF CLEAR LAKE P O Box 181, CLEAR LAKE, WI 54005-0048
Permitted Facility Name and Address	Village of Clear Lake 366 South Avenue East, Clear Lake, Wisconsin
Permit Term	October 01, 2026 to September 30, 2031
Discharge Location	The outfall is located on the west bank of an unnamed tributary to the Willow River, 100ft east of the treatment facility. The pipe is located approximately 150 ft south of the bridge located on South Ave E/25 th Ave (NW ¼ SW ¼ Section 20; T32N-R15W)
Receiving Water	Unnamed Tributary to the Willow River Within the Upper Willow River Watershed in the St. Croix River Drainage Basin in Polk County
Stream Flow (Q _{7,10})	Unnamed Tributary 0 cfs
Stream Classification	Unnamed Tributary is a Limited Forage Fish (LFF) community and Willow River is a Warm Water Sport Fishery (WWSF) community. Both are non-public water supply and within the ceded territory.
Wild Rice Impacts <i>(no specific wild rice standards exist at this time)</i>	No impacts identified at this location. The conclusion of no impact is based on no wild rice waters inventoried near the outfall. (Evaluation completed March 2017)
Discharge Type	Existing continuous discharger
Annual Average Design Flow (MGD)	0.327 MGD
Industrial or Commercial Contributors	Advanced Food Products
Plant Classification	A2 - Attached 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 Village of Clear Lake owns and operates a domestic wastewater treatment system. The plant designed to treat 327,000 gallons per day currently treats an average of 276,000 gallons per day (June 2020- June 2025 data).

The facility consists of automated bar screening and grit removal, primary clarifier, first stage Moving Bed Biological Reactor (MBBR), intermediate clarifier, second stage MBBR and final clarifier with chemical phosphorus removal using ferric chloride and tertiary treatment for final phosphorus removal. More specifically, the treatment process utilizes tanks containing thousands of biofilm carriers. The carriers are small polyethylene disks that are kept in motion with aerators or mixing fans. Microorganisms found in the wastewater attach and grow on the surface of the discs, consuming and metabolizing organic matter. Solids and organic matter that sloughs off the disks are allowed to settle in the clarifiers. Effluent is discharged to an unnamed tributary to the Willow River.

Settled solids (sludge) removed from the clarifiers are treated by bacteria and organisms through aerobic digestion, reducing harmful pathogens to safe levels. Sludge is land spread on Department approved agricultural sites. Land application of waste is done in accordance with permit conditions and applicable codes. All land application sites shall be approved prior to their use.

Substantial Compliance Determination

Enforcement During Last Permit:

- Twenty-two (22) monthly average chloride limit violations.
- Nine (9) weekly average variable chloride limit violations.
- Thirty-three (33) weekly average chloride limit violations.
- Three (3) 6-month average phosphorus limit violations.
- One (1) monthly average phosphorus limit violations.
- In addition, one (1) ammonia sample was reported to be over the weekly average limit. However, this weekly average is calculated with one sample and there may have been a lab error associated with that result.

Clear Lake was served a Notice of Noncompliance (NON) for phosphorus and chloride effluent violations on February 13, 2025. Per the NON, the facility was required to meet the limits as soon as possible, but no later than October 31, 2025, for phosphorus and April 30, 2025, for chloride. Effluent phosphorus concentrations have been below the 6-month average limit since May 2025, and the situation continues to be monitored. Chloride concentrations continue to exceed the limit every month beyond the compliance deadline listed in the NON.

To address the chloride violations, the Village worked with a contributing industry to arrange hauling of their chlorides. This was originally scheduled to begin June 15, 2026, but was delayed to July 24, 2026. With this initial step towards addressing chloride concentrations, the facility has been determined to be back in substantial compliance. Additional chloride reduction methods must be invested further per the schedule included in the permit.

After a review of all Discharge Monitoring Reports, Land Application Reports, CMARs, a site visit on 07/01/2025, and a desktop review on 07/24/2026, it has been determined that The Village of Clear Lake is now in substantial compliance with their current WPDES permit. Significant chloride loadings to the facility have been causing ongoing chloride limit exceedances. The facility is responsible for regulating discharges into the treatment system and prohibiting wastes that could pass through the system and cause or significantly contribute to effluent violations.

Compliance determination made by Edwin Bruntvedt, WDNR Compliance Specialist on July 24, 2026.

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	INFLUENT An average of 0.276 MGD (June 2020- June 2025 data)	Representative samples shall be collected after the bar screen and prior to flow monitoring and grit removal.
001	EFFLUENT Flow is not a required parameter. Influent and effluent are expected to be equal.	Representative samples shall be collected at the head end of the former chlorine contact tank.
002	SLUDGE 38 tons per year (information provided in the application)	Samples shall be collected at a location and in a manner that will yield representative results of the sludge being tested. The samples shall be collected at a time appropriate for the specific test being used.

Permit Requirements

1 Influent – Monitoring Requirements

1.1 Sample Point Number: 701- INFLUENT TO PLANT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total		mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	3/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. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

- The flow rate sample frequency was changed from “Continuous” to “Daily” to reflect currently acceptable practices at the facility.

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
BOD5, Total	Daily Max	30 mg/L	3/Week	24-Hr Flow Prop Comp	
BOD5, Total	Monthly Avg	15 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Daily Max	30 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	20 mg/L	3/Week	24-Hr Flow Prop Comp	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
pH Field	Daily Min	6.0 su	5/Week	Grab	
pH Field	Daily Max	9.0 su	5/Week	Grab	
Dissolved Oxygen	Daily Min	4.0 mg/L	5/Week	Grab	
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	12 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective March through April.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	7.2 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective May through September.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	11 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective October through November.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	13 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective December through February.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	7.2 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective March through April.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	2.9 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective May through September.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	6.7 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective October through November.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	8.0 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective December through February.
Phosphorus, Total	Monthly Avg	0.225 mg/L	Weekly	24-Hr Flow Prop Comp	
Phosphorus, Total	6-Month Avg	0.075 mg/L	Weekly	24-Hr Flow Prop Comp	
Phosphorus, Total	Monthly Avg	4.95 lbs/day	Weekly	Calculated	See the Total Maximum Daily Load (TMDL) Limitations permit section for more information.
Phosphorus, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of phosphorus and report on the last day of the month on the DMR. See the Total Maximum Daily Load (TMDL) Limitations permit section.
Phosphorus, Total		lbs/yr	Monthly	Calculated	Calculate the 12-month rolling sum of total monthly mass of phosphorus discharged and report on

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					the last day of the month on the DMR. See the Total Maximum Daily Load (TMDL) Limitations permit section.
Chloride	Weekly Avg	400 mg/L	4/Month	24-Hr Flow Prop Comp	
Chloride	Monthly Avg	400 mg/L	4/Month	24-Hr Flow Prop Comp	
Chloride	Weekly Avg – Variable	lbs/day	4/Month	Calculated	Enter the chloride result on the eDMR and compare it to the Chloride Variable Limit column to determine compliance.
Chloride, Variable Limit		lbs/day	4/Month	See Table	Look up the applicable chloride limit using the permit table in the Alternative Wet Weather Mass Limit section and report the variable limit on the eDMR.
E. coli	Geometric Mean – Monthly	126 #/100 ml	Weekly	Grab	Monitoring and limit 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 as well. Enter the result in the DMR on the last day of the month.
Copper, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	Monthly monitoring is required in the 2027 calendar year.
Copper, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	Quarterly monitoring is required 2028 through the end of the permit term.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Hardness, Total as CaCO ₃		mg/L	Quarterly	24-Hr Flow Prop Comp	Monitoring should coincide with copper sampling.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Nitrogen Series Monitoring permit section for testing schedule.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Nitrogen Series Monitoring permit section for testing schedule.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Total Nitrogen = Total Nitrogen Kjeldahl (mg/L) + Nitrite + Nitrate Nitrogen (mg/L). See the Nitrogen Series Monitoring permit section for testing schedule.
Temperature Maximum	Weekly Avg	63 deg F	3/Week	Multiple Grab	Monitoring is required October through March; the limit for October becomes effective at the end of the Temperature Limits Compliance and Dissipative Cooling Evaluation schedule.
Temperature Maximum	Weekly Avg	54 deg F	3/Week	Multiple Grab	Monitoring is required October through March; the limit for November through February becomes effective at the end of the Temperature Limits Compliance and Dissipative Cooling Evaluation schedule.
Temperature Maximum	Weekly Avg	57 deg F	3/Week	Multiple Grab	Monitoring is required October through March; the limit for March becomes effective at the end of the Temperature Limits Compliance and Dissipative Cooling Evaluation schedule.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	Three tests are required during the permit term. See the Whole Effluent Toxicity (WET) Testing

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					permit section for the schedule.
Chronic WET		TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	Two tests each year are required during the permit term. See the Whole Effluent Toxicity (WET) Testing permit section for the schedule.

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. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

- The monitoring frequency for **pH** monitoring has been increased from 3 times a week to 5 times a week and **Ammonia** from weekly to 3 times a week. The frequency change was implemented to meet standard monitoring frequencies post upgrade which is based on the size and type of the facility.
- During the last permit term there was a clerical error on the **Ammonia** weekly average limit for May through September. The limit was recorded as 7.7 mg/L but should have been 7.2 mg/L. This has been corrected.
- **E. coli** monitoring and limits will begin May 1, 2031, at the end of the Disinfection and Effluent Limitations for E. coli schedule
- **Copper** monitoring will occur monthly during 2027 and quarterly thereafter. A Pollutant Minimization Program schedule has been included with a goal of meeting a daily maximum of 33 ug/L and 21 ug/L as a weekly and monthly average.
- **Thermal** monitoring is required October to March with limits beginning October 1, 2030, at the end of the Temperature Limits and Dissipative Cooling Evaluation schedule.
- Three **Acute WET** tests over the permit term and two **Chronic WET** tests each year of the permit term are required.

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 dated September 15, 2025.

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.

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.

PFOS and PFOA –NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. Pursuant to s. NR 106.98(3)(b), Wis. Adm. Code, the department evaluated the need for PFOS and PFOA monitoring taking into consideration the presence of potential PFOS or PFOA industrial wastes, remediation sites and other potential sources of PFOS or PFOA. Based on information available at the time the proposed permit was drafted, the department has determined the permittee does not need to sample for PFOS or PFOA as part of this permit reissuance. The department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

3 Land Application - Monitoring and Limitations

Municipal Sludge Description						
Sample Point	Sludge Class (A or B)	Sludge Type (Liquid or Cake)	Pathogen Reduction Method	Vector Attraction Method	Reuse Option	Amount Reused/Disposed (Dry Tons/Year)
002	B	Liquid	Aerobic Digestion & Fecal Coliform	VSR & Incorporation	Land Application	38 tons/year
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? Yes, the most recent samples from 2020 were below levels of detection.						
Is a priority pollutant scan required? No						

3.1 Sample Point Number: 002- Aerobically Digested 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	
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	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
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 (NH ₄ -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	See the Sludge Analysis for PCBs permit section.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	See the Sludge Analysis for PCBs permit section.
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 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. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

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 of 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” should 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 Disinfection and Effluent Limitations for E. coli

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.	10/31/2027
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.	04/30/2028
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.	03/31/2029
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.	09/30/2029
Construction Upgrade Progress Report: The permittee shall submit a progress report on construction upgrades.	09/30/2030

Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades.	03/31/2031
Achieve Compliance: The permittee shall achieve compliance with final E. coli limitations.	04/30/2031

Explanation of Schedule

E. coli- A compliance schedule is included in the permit to provide time for the permittee to investigate options for meeting new effluent E. coli water quality-based effluent limits while coming into compliance with the limits as soon as reasonably possible.

4.2 Temperature Limits and Dissipative Cooling Evaluation

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

Required Action	Due Date
Report on Effluent Discharges: Submit a report on effluent temperature with conclusions regarding compliance. Informational Note: Refer to the Surface Water subsections regarding 'Determination of Need for Effluent Limits' and 'Dissipative Cooling Demonstration - Weekly Average Limits' concerning requests for a Department determination on the need for limits and follow-up procedures for demonstration of dissipative cooling per NR 106.59, as well as re-evaluation of the limits pursuant to NR 106 Subchapters V & VI or NR 102.26, Wis. Adm. Code.	09/30/2027
Action Plan: Submit an action plan for complying with all effluent temperature limits that remain following the Department's review for necessity.	09/30/2028
Construction Plans: Submit construction plans (if construction is required for complying with effluent temperature limits) and include plans and specifications with the submittal.	03/31/2029
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

Temperature Limits Compliance and Dissipative Cooling Evaluation - A schedule is included to provide time for the permittee to investigate options for meeting the limit while coming into compliance with the limit as soon as reasonably possible.

4.3 Copper Pollutant Minimization Program

Required Action	Due Date
Plan Development: The permittee shall develop and submit to the Department a plan for a cost-effective pollutant minimization program (PMP) which has as its goal the reduction of Copper for the purpose of maintaining the effluent at or below the water quality based effluent limitation. The pollutant minimization program shall include investigation of treatment technologies and efficiencies, process changes, wastewater reuse or other pollution prevention techniques that are appropriate for that facility, taking account of the permittee's overall treatment strategies, facilities plans and operational circumstances. Past documented pollution prevention or treatment efforts may be used to satisfy all or part of this PMP requirement.	09/30/2027
NOTE: The Department will notify the permittee of acceptance of or comments on the proposed	

PMP. If the Department has not notified the permittee within 90 days of the Department's receipt of the PMP, the permittee may assume the PMP has been accepted.	
Implementation: The permittee shall implement the pollutant minimization program as submitted or as amended by agreement of the permittee and the Department.	03/31/2028
Annual Status Report: The permittee shall submit to the Department, an annual status report on the progress of the pollutant minimization program. Submittal of the first annual status report is required by the Date Due.	09/30/2028
Annual Status Report: The permittee shall submit to the Department, an annual status report on the progress of the pollutant minimization program. Submittal of the annual status report is required by the Date Due.	09/30/2029
Annual Status Report: The permittee shall submit to the Department an annual status report on the progress of the PMP. Submittal of the annual status report is required by the Date Due.	09/30/2030
Final Report: Submit a final report documenting the success in reducing copper concentrations in the effluent as well as the anticipated future reduction in copper sources and copper effluent concentrations. The report shall summarize copper source reduction measures that have been implemented during the current permit term and state which, if any, source reduction measures from the approved plan were not pursued and why. Include an analysis of daily maximum, weekly average and monthly average effluent copper concentrations and mass discharge of copper based on sampling and flow data covering the current permit term. Include a proposed variance limit and source reduction measures for negotiations with the department if the permittee intends to seek a copper variance per s. 283.15, Wis. Stats.	09/30/2031
Annual Copper Progress Reports After Permit Expiration: In the event that this permit is not reissued on time, the permittee shall continue to submit annual copper reports each year covering source reduction measures implemented and copper concentration and mass discharge trends.	

Explanation of Schedule

Copper Pollutant Minimization Plan- At this time the village can't meet copper Water Quality Based Effluent Limits of a daily maximum of 33 ug/L and weekly and monthly average limits of 21 ug/L. A schedule has been included to provide time for the permittee to investigate and reduce the sources of the metal and take steps to meet limitations.

4.4 Chloride Source Reduction Management Program

Required Action	Due Date
Plan Development: The permittee shall develop and submit to the Department a plan for source reduction measures (SRM) which has as its goal the reduction of chloride for the purpose of maintaining the effluent at or below the water quality-based effluent limitation. The plan shall include investigation of source reduction measures and activities or other pollution prevention techniques that are appropriate for the permittee. The measures and activities shall include but are not limited to: sampling within the collection system, updates to the Village's Sewer Use Ordinance to include limit/ surcharge and enforcement abilities, and educational outreach material. NOTE: The Department will notify the permittee of acceptance of or comments on the proposed SRM. If the Department has not notified the permittee within 90 days of the Department's receipt of	10/31/2026

the SRM, the permittee may assume the SRM has been accepted.	
Implementation: The permittee shall implement the SRM as submitted or as amended by agreement of the permittee and the Department.	12/31/2026
Semi-Annual Status Report: The permittee shall submit to the Department a status report on the progress of the SRM each June 30th and December 31st. Indicate which chloride source reduction measures or activities in the Source Reduction Plan have been implemented and state which, if any, source reduction measures from the Source Reduction Plan were not pursued and why. Include an assessment of whether each implemented source reduction measure appears to be effective or ineffective at reducing pollutant discharge concentrations and identify actions planned for the upcoming year. Include an analysis of trends in weekly, monthly and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data. Include an analysis of how effluent chloride varies with time and with significant loadings of chloride. Submittal of the first status report is required by the Date Due.	03/31/2027
Semi-Annual Status Report: The permittee shall submit to the Department a status report on the progress of the SRM. Submittal of the status report is required by the Date Due.	12/31/2027
Semi-Annual Status Report: The permittee shall submit to the Department a status report on the progress of the SRM. Submittal of the status report is required by the Date Due.	03/31/2028
Semi-Annual Status Report: The permittee shall submit to the Department a status report on the progress of the SRM. Submittal of the status report is required by the Date Due.	12/31/2028
Semi-Annual Status Report: The permittee shall submit to the Department a status report on the progress of the SRM. Submittal of the status report is required by the Date Due.	03/31/2029
Semi-Annual Status Report: The permittee shall submit to the Department a status report on the progress of the SRM. Submittal of the status report is required by the Date Due.	12/31/2029
Semi-Annual Status Report: The permittee shall submit to the Department a status report on the progress of the SRM. Submittal of the status report is required by the Date Due.	03/31/2030
Semi-Annual Status Report: The permittee shall submit to the Department a status report on the progress of the SRM. Submittal of the status report is required by the Date Due.	12/31/2030
Semi-Annual Status Report: The permittee shall submit to the Department a status report on the progress of the SRM. Submittal of the status report is required by the Date Due.	03/31/2031
Final Report: Submit a final report documenting the success in reducing chloride concentrations in the effluent as well as the anticipated future reduction in chloride sources and chloride effluent concentrations. The report shall summarize chloride source reduction measures that have been implemented during the current permit term and state which, if any, source reduction measures from the approved plan were not pursued and why. Include an assessment of which source reduction measures appear to have been effective or ineffective. Evaluate any needed changes to the pollutant reduction strategy accordingly; Include an analysis of trends in weekly, monthly and annual average chloride concentrations and total	12/30/2031

mass discharge of chloride based on chloride sampling and flow data during the current permit term. Include an analysis of how effluent chloride varies with time and with significant loadings of chloride.	
Semi-Annual Chloride Progress Reports After Permit Expiration: In the event that this permit is not reissued on time, the permittee shall continue to submit semi-annual chloride reports each June 30th and December 31st covering source reduction measures implemented and chloride concentration and mass discharge trends.	

Explanation of Schedule

Chloride Source Reduction Management Program - Over the previous permit term the village exceeded their chloride Water Quality Based Effluent Limits. A potential solution has been found, but it doesn't work toward reducing other possible sources of chloride. A schedule has been included to provide a timeline to investigate all sources of chloride and work toward their reduction so that limits can be met consistently.

Attachments

Water Flow Schematic updated August 2025

Water Quality Based Effluent Limits memo dated September 15, 2025

Justification Of Any Waivers From Permit Application Requirements

No waivers requested or granted as part of this permit reissuance

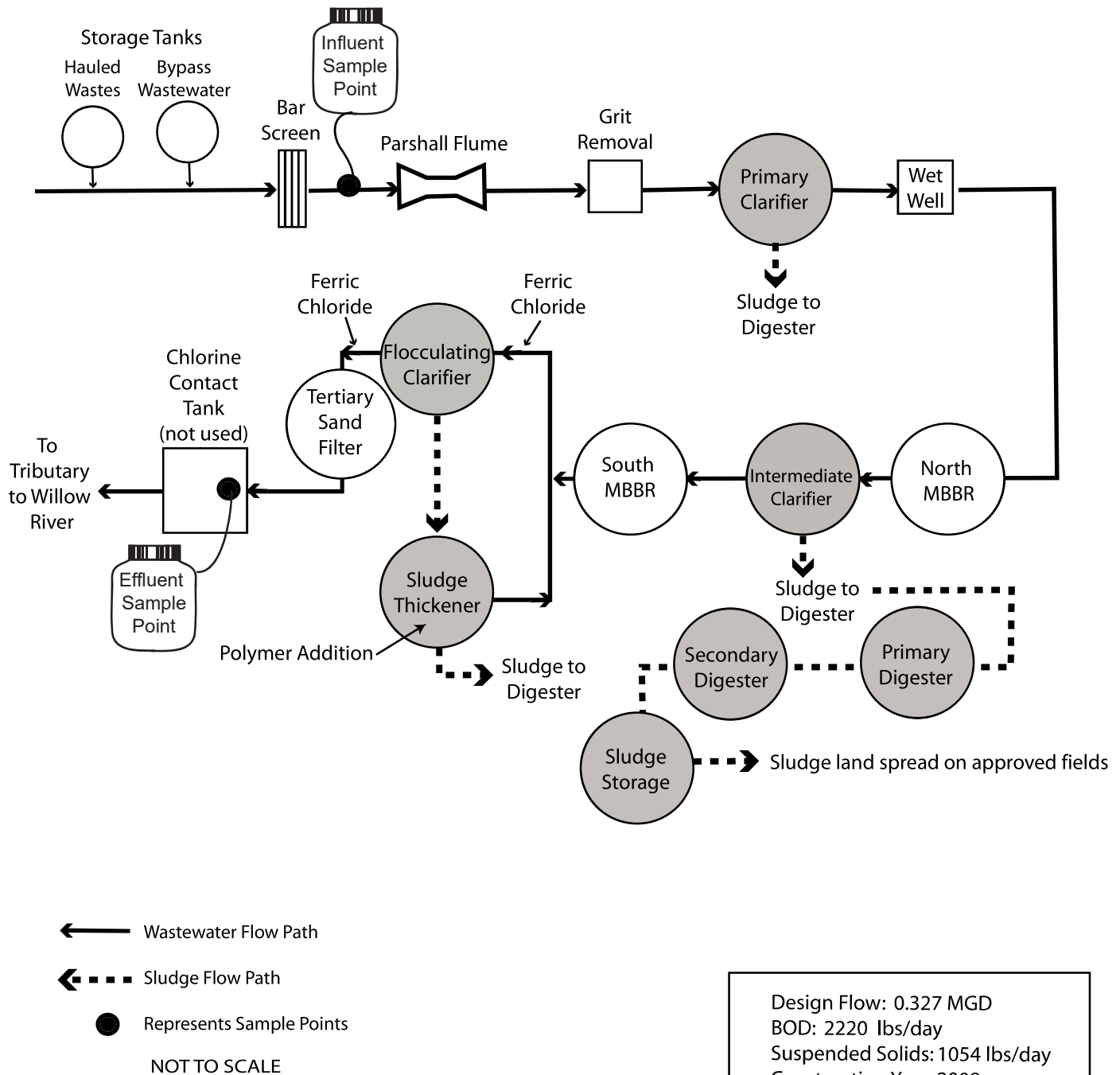
Prepared By: Sheri A. Snowbank

Wastewater Specialist

Date: July 16, 2026

VILLAGE OF CLEAR LAKE Wastewater Treatment Facility

The Clear Lake wastewater treatment facility consists of Moving Bed Biofilm Reactors (MBBR), clarifiers, chemical phosphorus removal and sand filters. Effluent is discharged to an unnamed tributary to the Willow River. Sludge is treated in anaerobic digesters and land spread as a soil conditioner on approved cropland. The diagram represents the treatment units and sampling locations.



CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: September 15, 2025

TO: Sheri Snowbank – NOR/Spooner Service Center

FROM: Michael Polkinghorn – NOR/Rhineland Service Center

Michael Polkinghorn

SUBJECT: Water Quality-Based Effluent Limitations for the Village of Clear Lake
WPDES Permit No. WI-0023639-11-0

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 Village of Clear Lake in Polk County. This municipal wastewater treatment facility (WWTF) discharges to an unnamed tributary to the Willow River, located in the Upper Willow River Watershed in the St. Croix River Basin. This discharge is included in the Lake St. Croix Basin (LSCB) Total Maximum Daily Load (TMDL) as approved by EPA on 08/08/2012. 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		1, 2
TSS	30 mg/L			20 mg/L		1, 2
pH	9.0 s.u.	6.0 s.u.				1, 2
Dissolved Oxygen		4.0 mg/L				1, 2
Ammonia Nitrogen March – April May – September October – November December – February			12 mg/L 7.2 mg/L 11 mg/L 13 mg/L	7.2 mg/L 2.9 mg/L 6.7 mg/L 8.0 mg/L		1, 3
Phosphorus				4.95 lbs/day 0.225 mg/L	0.075 mg/L	1, 4
Chloride Dry weather Wet weather			400 mg/L 1,100 lbs/day 1,400 lbs/day	400 mg/L		1, 3, 5
<i>E. coli</i> May – September				126 #/100 mL geometric mean		6
Copper (Total Recoverable)		33 µg/L	21 µg/L	21 µg/L		3, 7
Hardness (Total as CaCO ₃)						1, 8
TKN, Nitrate+Nitrite, and Total Nitrogen						1, 9
Temperature October November – February March			63 °F 54 °F 57 °F			10
Acute WET						11

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Chronic WET						12

Footnotes:

1. No changes from the current permit.
2. 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.
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.
4. The mass-based phosphorus WQBEL is based on the Lake St. Croix Basin (LSCB) Total Maximum Daily Load (TMDL) to address phosphorus impairments within the TMDL area.
5. The wet weather mass limit applies when the dry weather mass limit is exceeded and the facility demonstrates to the Department the exceedance occurred during a wet weather event.
6. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL. The permit will include a compliance schedule to meet these limits.
7. In the absence of a copper variance, mass limits would also be required.
8. Hardness monitoring is recommended because of the relationship between hardness and daily maximum limits based on acute toxicity criteria.
9. 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. Sections 283.37(5) and 283.55(1)(e), Wis. Stats, and ss. NR 200.065(1)(g) and NR 200.065(1)(h), Wis. Adm. Codes, provide the authority to request this monitoring during the permit term. Total nitrogen is the sum of nitrate (NO₃), nitrite (NO₂), and total Kjeldahl nitrogen (TKN) (all expressed as N).
10. Options for potential relief from temperature limits are explained in 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>
11. Three acute whole effluent toxicity (WET) tests are recommended during the reissued permit term. 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.
12. Twice/yr chronic WET testing is recommended during the reissued permit term. The Instream Waste Concentration (IWC) to assess chronic test results is 100%. 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%. The primary control water used in chronic WET tests conducted on Outfall 001 shall be a grab sample collected from the UT upstream of the confluence of Outfall 001. If flow is not present in the UT, the grab sample shall be taken from the Willow River upstream of the confluence of the UT. Chronic testing should continue after the permit expiration date (until the permit is reissued).
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.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Michael Polkinghorn at (715) 360-3379 or Michael.Polkinghorn@wisconsin.gov and Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (4) – Narrative, discharge area map, weekly/monthly average ammonia nitrogen WQBELs, & thermal table.

PREPARED BY: Michael A. Polkinghorn – Water Resources Engineer

E-cc: Michelle BalkLudwig, Regional Wastewater Supervisor – NOR/Spooner Service Center
Diane Figiel, Water Resources Engineer – WY/3
Nate Willis, Wastewater Engineer – WY/3

Water Quality-Based Effluent Limitations for Village of Clear Lake

WPDES Permit No. WI-0023639-11-0

Prepared by: Michael A. Polkinghorn

PART 1 – BACKGROUND INFORMATION

Facility Description

The Village of Clear Lake owns and operates a domestic wastewater treatment system. Treatment consists of bar screen, grit removal, primary clarification, moving bed biological reactor (MBBR), secondary clarification (gravity sludge thickener) with polymer addition, secondary MBBR, tertiary clarification, and a sand filter. Ferric chloride is used before the final clarifier for chemical phosphorus treatment. Effluent is discharged on a continuous basis to the west bank of an unnamed tributary (UT) to the Willow River, approx. 150 ft south of the South Ave. East/25th Ave. bridge.

Attachment #2 is a discharge area map of Outfall 001.

Existing Permit Limitations

The current permit, which expired on 03/31/2025, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD ₅	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, 3
Dissolved Oxygen		4.0 mg/L				2, 3
Ammonia Nitrogen						
March – April			12 mg/L	7.2 mg/L		4
May – September			7.2 mg/L	2.9 mg/L		
October – November			11 mg/L	6.7 mg/L		
December – February			13 mg/L	8.0 mg/L		
Phosphorus						
Interim				1.0 mg/L		5
Final				4.95 lbs/day 0.225 mg/L	0.075 mg/L	
Chloride						
Dry weather			400 mg/L	400 mg/L		4, 6
Wet weather			1,100 lbs/day 1,400 lbs/day			
Hardness (Total as CaCO ₃)						1

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Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Copper (Total Recoverable)						1
Temperature						1
TKN, Nitrate+Nitrite, and Total Nitrogen						1
Acute WET						7
Chronic WET						7

Footnotes:

1. Monitoring only.
2. **These limitations are not being evaluated as part of this review.** Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
3. 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.
4. 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.
5. The concentration-based phosphorus WQBELs become effective in the current permit on 10/01/2023. The mass-based phosphorus WQBEL is based on the Lake St. Croix Basin (LSCB) Total Maximum Daily Load (TMDL) to address phosphorus impairments within the TMDL area.
6. The chloride limits became effective in the current permit on 10/01/2023. The wet weather mass limit applies when the dry weather mass limit is exceeded and the facility demonstrates to the Department the exceedance occurred during a wet weather event.
7. Two acute and chronic whole effluent toxicity (WET) tests were required during the current permit term. The IWC for chronic WET was 43%.

Receiving Water Information

- Name: UT to the Willow River
- Waterbody Identification Code (WBIC):
 - UT: 2613000
 - Willow River: 2606900
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code:
 - UT: Limited Forage Fish (LFF) community (LFF) as listed in table 7 row 7 of s. NR 104.09, Wis. Adm. Code.
 - Willow River: Warm Water Sport Fish (WWSF) community.
 - Both surface waterbodies are non-public water supplies and have recreational designated use.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code:
 - UT: The following 7-Q₁₀ and 7-Q₂ values are from USGS for Station NW¼, SW¼ of Section 20; T32N – R15W, where Outfall 001 is located.
7-Q₁₀ = 0 cubic feet per second (cfs)
7-Q₂ = 0 cfs
 - Willow River:
7-Q₁₀ = 0.67 cfs

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$7-Q_2 = 1.5$ cfs, estimated utilizing a $7-Q_2:7-Q_{10}$ ratio of 2.25. This ratio is determined by taking the respective low-flow values from the Willow Creek stream segment in the WPDES viewer before confluence with the UT.

- Hardness: Effluent hardness is used in place of receiving water because there is no receiving water flow upstream of the discharge.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: Not applicable where the receiving water low flows are zero.
- Source of background concentration data: Background concentrations are not included because they do not impact the calculated WQBEL when the receiving water low flows are equal to zero.
- Multiple dischargers: None.
- Impaired water status: There are no known impairments to the UT or Willow River. Approx. 13 mi downstream of Outfall 001, the North Fork Willow River is on the Clean Water Act Section 303(d) list for a total phosphorus impairment. Outfall 001 is included in the LSCB TMDL to address phosphorus impairments within the TMDL area.

Effluent Information

- Design flow rate(s):
Annual average = 0.327 million gallons per day (MGD)
Peak weekly = 0.417 MGD
For reference, the actual average flow from April 2020 – July 2025 was 0.275 MGD.
- Hardness = 225 mg/L as CaCO_3 . This value represents the geometric mean of data ($n = 11$, February 2023 – December 2023 from permit required monitoring.
- 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 one industrial contributor.
- Water supply: Two municipality wells.
- Additives: Ferric chloride for chemical phosphorus removal and polymer to improve settling.
- 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. The current permit required monitoring for hardness, copper, and temperature.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2, 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.

Copper Effluent Data

Sample Date	Copper ($\mu\text{g/L}$)
02/19/2023	24
03/08/2023	19
04/03/2023	15
05/03/2023	26
06/04/2023	11
07/10/2023	29
08/01/2023	16
09/04/2023	25
10/01/2023	26

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Sample Date	Copper (µg/L)
11/01/2023	22
12/04/2023	25
1-day P ₉₉	38
4-day P ₉₉	29

Chloride Effluent Data

Statistics	Conc. (mg/L)	Mass (lbs/day)
1-day P ₉₉	684	2,154
4-day P ₉₉	552	1,533
30-day P ₉₉	478	1,206
Mean*	439	1,044
Std	88	360
Sample size	251	246
Range	84 - 689	270 – 1,996

The following table presents the average concentrations and loadings at Outfall 001 from April 2020 – July 2025 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameters with Effluent Limits

	Average Measurement*	Average Mass Discharged
BOD ₅	2.5 mg/L	
TSS	4.3 mg/L	
pH field	7.1 s.u.	
Dissolved Oxygen	8.7 mg/L	
Ammonia Nitrogen	0.43 mg/L	
Phosphorus	0.23 mg/L	0.58 lbs/day
Chloride	439 mg/L	1,044 lbs/day

*Results below the limit 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 P₉₉) 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-Q₁₀

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-Q₁₀ 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.

$$\text{Limitation} = \frac{(\text{WQC}) (Q_s + (1-f) Q_e) - (Q_s - f Q_e) (C_s)}{Q_e}$$

Where:

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

Q_s = average minimum 1-day flow which occurs once in 10 years (1-day Q₁₀)

if the 1-day Q₁₀ flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q₁₀).

Q_e = 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

C_s = 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-Q₁₀ 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 Village of Clear Lake, and the limits are set based on the 1-Q₁₀ method.

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	REF. HARD. mg/L	ATC	MAX. EFFL. LIMIT*	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Arsenic		340	340	68	<0.231		
Cadmium	225	26.1	26.1	5.2	<0.268		
Chromium	225	3,503	3,503	701	0.812		
Copper	225	33.4	33.4			38	29
Lead	225	234	234	46.8	<0.385		
Nickel	225	932	932	186	11		
Zinc	225	245	245	48.9	17		
Chloride (mg/L)		757	757			684	689

* Per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016 consideration of ambient concentrations and 1-Q₁₀ flow rates yields a more restrictive limit than the 2 × ATC method of limit calculation.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	REF. HARD.* mg/L	CTC	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	Max 4-day Avg.	4-day P ₉₉
Arsenic		152	152	30.4	<0.231		
Cadmium	175	3.82	3.82	0.8	<0.268		
Chromium	225	257	257	51.3	0.812		
Copper	225	20.7	20.7				29
Lead	225	61.3	61.3	12.3	<0.385		
Nickel	225	104	104	20.7	11		
Zinc	225	245	245	48.9	17		
Chloride (mg/L)		395	395			643	552

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

Monthly Average Limits based on Wildlife Criteria (WC)

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

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	HTC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	370	74	<0.268
Chromium	3,818,000	3,818,000	763,600	0.812
Lead	140	140	28	<0.385
Nickel	43,000	43,000	8,600	11

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3	13.3	2.7	<0.231

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

Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, **effluent limitations are required for chloride and copper**. Limits and/or monitoring recommendations are made in the paragraphs below:

Copper – Considering available effluent data from the current permit term (February 2023 – December 2023), the 1-day and 4-day P₉₉ concentrations are 38 and 29 µg/L respectively. These effluent concentrations exceed the daily maximum and weekly average copper WQBELs; **therefore, the daily maximum limit of 33 µg/L and the weekly average limit of 21 µg/L are recommended during the reissued permit term.**

The monthly average limit of 21 µg/L is also required during the reissued permit term for the expression of limit requirements per s. NR 106.07(4), Wis. Adm. Code, as follows:
Whenever a weekly average limitation is determined necessary to protect water quality, a monthly average limitation shall also be included in the permit and set equal to the weekly average limit unless a more restrictive limit is already determined necessary to protect water quality.

In the absence of a copper variance, mass limits would also be required. Hardness monitoring is recommended to continue during the reissued permit term because of the relationship between hardness and daily maximum limits based on acute toxicity criteria.

Chloride – Considering available effluent data from the current permit term (April 2020 – July 2025), the 4-day P₉₉ and maximum 4-day average concentrations are 552 and 643 mg/L respectively. These effluent concentrations exceed the weekly average chloride WQBEL; **therefore, the weekly average limit of 400 mg/L is recommended to continue during the reissued permit term.**

The chronic mass limitation of 1,100 lbs/day is required to continue during the reissued permit term and is based on the concentration limit and the design annual average flow rate of 0.327 MGD (395 mg/L × 0.327 MGD × 8.34) in accordance with s. NR 106.07(2)(c), Wis. Adm. Code. **An alternative wet weather mass limit of 1,400 lbs/day (395 mg/L × 0.417 MGD × 8.34) shall also continue during the reissued permit term** in accordance with s. NR 106.07(9), Wis. Adm. Code. The peak weekly design flow was used to calculate the wet weather mass limit. The wet weather mass limit applies when the dry weather mass limit is exceeded and the facility demonstrates to the Department the exceedance occurred during a wet weather event.

The monthly average limit of 400 mg/L is also required to be continued during the reissued permit term for the expression of limit requirements per s. NR 106.07(4), Wis. Adm. Code, as follows:

Whenever a weekly average limitation is determined necessary to protect water quality, a monthly average limitation shall also be included in the permit and set equal to the weekly average limit unless a more restrictive limit is already determined necessary to protect water quality.

Mass limitations are not subject to the limit expression requirements if concentration limits are given.

Chloride Limits Summary

	Weekly Average	Monthly Average
Chloride		
Concentration limit	400 mg/L	400 mg/L*
Mass limit	1,100 lbs/day	
Wet weather mass limit	1,400 lbs/day	

*Limit needed to meet the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code.

Mercury – The permit application did not require monitoring for mercury because the Village of Clear Lake 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 October 2020 – October 2024 was 0.2 mg/kg, with a maximum reported concentration of 0.6 mg/kg. **Therefore, mercury monitoring is not recommended during the reissued permit term.**

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Based on the type of discharge, the effluent flow rate, the types of indirect dischargers contributing to the collection system and known nondetectable levels of PFOS/PFOA in the source water, **PFOS and PFOA monitoring is not recommended during the reissued permit term.** The Department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR 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 weekly average and monthly average limits year round. These limits are re-evaluated at this time due to the following changes:

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

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

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

Where:

A = 0.411 and B = 58.4 for an LFF community, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. Effluent pH data prior to October 2023 is excluded from this evaluation as the pH sample magnitudes and variability are observed to be significantly higher than from October 2023 to present. This is likely due to the conversion of treatment technologies at the facility from trickling filters to MBBRs, which was completed through 2023.

A total of 670 sample results were reported from October 2023 – July 2025. The maximum reported value was 7.6 s.u. (Standard pH Units). The effluent pH was 7.3 s.u. or less 99% of the time. The 1-day P₉₉,

Attachment #1

calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 7.3 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 7.3 s.u. Therefore, a value of 7.3 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 7.3 s.u. into the equation above yields an ATC = 26 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-Q₁₀ 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-Q₁₀ (estimated as 80 % of 7-Q₁₀) and the 2×ATC approach are shown below.

Daily Maximum Ammonia Nitrogen Determination

Method	Ammonia Nitrogen Limit (mg/L)
2×ATC	53
1-Q ₁₀	26

The 1-Q₁₀ method yields the most stringent limits for the Village of Clear Lake.

The current permit has variable daily maximum effluent limits based on effluent pH. 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 Community

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

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

The weekly and monthly average ammonia nitrogen limits calculation from the previous limit evaluation do not change because there have been no changes in the effluent and receiving water flow rates. The calculations from the previous limit evaluation (January 2020) are shown in attachment #2.

Effluent Data

Similar to effluent pH data, effluent ammonia nitrogen data prior to December 2023 is excluded from this evaluation as the ammonia nitrogen sample magnitudes and variability are observed to be significantly higher than from December 2023 to present due to the treatment technology conversion. The following table evaluates the statistics based upon ammonia data reported from December 2023 – July 2025.

Ammonia Nitrogen Effluent Data	
Statistics	Conc. (mg/L)
1-day P ₉₉	1.4
4-day P ₉₉	0.75
30-day P ₉₉	0.31
Mean*	0.10
Std	0.53
Sample size	308
Range	<0.011 - 3.73

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

Reasonable Potential

The need to include ammonia limits in the Village of Clear Lake permit is determined by calculating 99th upper percentile (or P₉₉) values for ammonia and comparing those to the calculated limits. In this case effluent ammonia nitrogen samples are observed to be consistent year round during December 2023 – July 2025 so the effluent data is not split into seasonal timeframes. Based on this comparison, there is no reasonable potential for the discharge to exceed any of the calculated ammonia nitrogen limits. **However, since the permit currently has weekly and monthly average limits year-round, the limits must be retained regardless of reasonable potential**, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:

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

Conclusions and Recommendations

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

Final Ammonia Nitrogen Limits		
Month Range	Weekly Average (mg/L)	Monthly Average (mg/L)
March – April	12	7.2
May – September	7.2	2.9
October – November	11	6.7
December – February	13	8.0

Additional limits to meet the requirements in s. NR 106.07, Wis. Adm Code, are denoted in bold text.

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.

The Village of Clear Lake had previously been exempted from disinfection based on the LAL or LFF 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 the UT is listed in ch. NR 104, Wis. Adm. Code, as noncontinuous. Discharges to noncontinuous streams with $Q_{7,10}$ values < 0.1 cfs usually result in effluent-dominated situations. The risk of illness is related to the concentration of *E. coli* and therefore dilution is an important consideration when considering risk to human health. Since little to no dilution is present in these situations, 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. **Since the Village of Clear Lake has phosphorus limits in effect that are more stringent than 1.0 mg/L, the need for a TBEL will not be considered further.**

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.

The current permit has the effective phosphorus WQBELs of 0.225 mg/L as a monthly average and 0.075 mg/L as a 6-month average. Because the classification and flow of the UT have not changed, **these limits do not need to be evaluated at this time and are recommended to continue during the reissued permit term.**

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from October 2023 – July 2025 since the phosphorus WQBELs became effective in the permit on 10/01/2023.

Total Phosphorus Effluent Data

Statistics	Conc. (mg/L)	Mass (lbs/day)
1-day P ₉₉	0.41	1.2
4-day P ₉₉	0.23	0.67
30-day P ₉₉	0.14	0.39
Mean*	0.10	0.27
Std	0.084	0.25
Sample size	287	287
Range	0.01 - 0.87	0 - 1.92

TMDL Limits

Total phosphorus (TP) effluent limits in lbs/day are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs (April 2020)* and are based on the annual phosphorus wasteload allocation (WLA) given in kg/yr. This WLA is found in page 70 of the *Lake St. Croix Nutrient Total Maximum Daily Load Report (May 2012)* and is expressed as a maximum annual load (kg/yr). For the Village of Clear Lake, this WLA is 558 kg/year (1,228 lbs/yr) and 3.4 lbs/day.

The monthly average limit of 4.95 lbs/day was determined in the previous limit evaluation (May 2014). The monthly average multiplier of 1.47 was chosen as described in the Department TMDL Implementation guidance using a coefficient of variation (CV) of 0.6 and a 3x/wk effluent monitoring frequency. The TMDL-based phosphorus WQBEL(s) will be re-evaluated if the annual phosphorus WLA is not being met as described in the prior stated guidance. This is done by comparing each rolling sum of 12 consecutive months of total monthly mass phosphorus discharges over the current permit term directly against the annual WLA. In this case, the Village of Clear Lake has been 100% compliant in meeting the annual WLA of 1,228 lbs/yr, with the maximum rolling sum being 89 lbs/yr during the October 2023 – July 2025 timeframe when the phosphorus WQBELs were effective in the current permit term.

Therefore, the monthly average limit of 4.95 lbs/day will remain unchanged during the reissued permit term.

PART 7 – 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. Because the receiving water flow is zero, limit are set equal to thermal water quality criteria.

The table below summarizes the maximum temperatures reported during monitoring from January 2023 – December 2023.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN	59	61	54	78
FEB	57	60	54	79
MAR	58	60	57	80
APR	59	62	63	81
MAY	69	72	70	84
JUN	73	74	77	85
JUL	74	77	81	86
AUG	74	76	79	86
SEP	72	74	73	85
OCT	69	71	63	83
NOV	63	65	54	80
DEC	59	61	54	79

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:
 - 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 limits are recommended during October – March.**

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.
- 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.
- 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>

PART 8 – 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 LC₅₀ (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 IC₂₅ (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The

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IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of 100%, 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:

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

Where:

Q_e = annual average flow = 0.327 MGD = 0.506 cfs

f = fraction of the Q_e withdrawn from the receiving water = 0

Q_s = $\frac{1}{4}$ of the 7- Q_{10} = 0 cfs $\div$ 4 = 0 cfs

- The previous limit evaluation (January 2020) utilized an IWC of 43% based on the protection of the Willow River. The natural community of the UT is “Cool-Cold Headwater” using the Natural Communities layer of Surface Water Data Viewer. Because this implies the presence of a fish and aquatic life community beyond solely macroinvertebrates, the need of WET limits and testing should also account for the protection of the UT and not only the Willow River. Therefore, the IWC of 100% will be used in this evaluation.
- 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. In this case the previous limit evaluation (January 2020) excluded all WET testing data prior to June 2018 as the extensive upgrades to the facility was expected to change the representative effluent toxicity. Therefore, only WET data newer than June 2018 is shown in the table below:

WET Data History

Date Test Initiated	Acute Results LC ₅₀ %				Chronic Results IC ₂₅ %				Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	<i>C. dubia</i>	Fathead Minnow	Pass or Fail?	Use in RP?	
09/13/2023	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
05/28/2024	>100	>100	Pass	Yes	>100	>100	Pass	Yes	

- 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

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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.

$$\text{Acute Reasonable Potential} = [(TUa \text{ effluent}) (B)(AMZ)]$$

$$\text{Chronic Reasonable Potential} = [(TUC \text{ effluent}) (B)(IWC)]$$

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 = 100%. 15 Points
Historical Data	Two tests used for acute RP. All tests passed. 0 Points	Two tests used for RP. All tests passed. 0 Points
Effluent Variability	NONs sent for chloride and phosphorus limit exceedances. 10 Points	Same as acute. 10 Points
Receiving Water Classification	“Cool-Cold” Headwater natural community 5 Points	Same as acute. 5 Points
Chemical-Specific Data	Reasonable potential for copper limits based on ATC; ammonia nitrogen, chloride, chromium, nickel, and zinc detected. Additional Compounds of Concern: No. 8 Points	Reasonable potential for copper and chloride limits based on CTC; ammonia nitrogen limit carried over from the current permit. Chromium, nickel, and zinc detected. Additional Compounds of Concern: No. 9 Points
Additives	No biocides and 2 water quality conditioners added.	All additives used more than once per 4 days.

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	Acute	Chronic
	Permittee has proper P chemical SOPs in place Yes. 2 Points	2 Points
Discharge Category	One industrial contributor. 5 Points	Same as acute. 5 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:	30 Points	46 Points
Recommended Monitoring Frequency (from Checklist):	Three acute tests recommended.	Twice/yr chronic tests recommended.
Limit Required?	No.	No.
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, **3x acute and 2x/yr chronic WET tests are recommended in the reissued permit.** Sampling WET concurrently with any chemical-specific toxic substances is recommended. Testing should be done in rotating quarters, to collect seasonal information about this discharge. Chronic testing should continue after the permit expiration date (until the permit is reissued).

A map of the Clear Lake Village of area. The map shows a network of streets including 1st Street, 2nd Street, 3rd Street, 4th Street, 5th Street, 6th Street, 7th Street, 8th Street, 9th Street, 10th Street, 11th Street, 12th Street, 13th Street, 14th Street, 15th Street, 16th Street, 17th Street, 18th Street, 19th Street, 20th Street, 21st Street, 22nd Street, 23rd Street, 24th Street, 25th Street, 26th Street, 27th Street, 28th Street, 29th Street, 30th Street, 31st Street, 32nd Street, 33rd Street, 34th Street, 35th Street, 36th Street, 37th Street, 38th Street, 39th Street, 40th Street, 41st Street, 42nd Street, 43rd Street, 44th Street, 45th Street, 46th Street, 47th Street, 48th Street, 49th Street, 50th Street, 51st Street, 52nd Street, 53rd Street, 54th Street, 55th Street, 56th Street, 57th Street, 58th Street, 59th Street, 60th Street, 61st Street, 62nd Street, 63rd Street, 64th Street, 65th Street, 66th Street, 67th Street, 68th Street, 69th Street, 70th Street, 71st Street, 72nd Street, 73rd Street, 74th Street, 75th Street, 76th Street, 77th Street, 78th Street, 79th Street, 80th Street, 81st Street, 82nd Street, 83rd Street, 84th Street, 85th Street, 86th Street, 87th Street, 88th Street, 89th Street, 90th Street, 91st Street, 92nd Street, 93rd Street, 94th Street, 95th Street, 96th Street, 97th Street, 98th Street, 99th Street, 100th Street. The map also shows Clear Lake and the Clear Lake Village of. The map is oriented with North at the top.

▲ Surface Water Outfalls
— Rivers and Streams
--- Intermittent Streams
■ Open Water

WPDES viewer, WDNR

Service Layer Credits:
Basic Basemap (Cached):

 Δ

Map: 0 1,000 2,000 Feet
0 510 1,020 Meters

Map projection: NAD 1983 HARN Wisconsin TM

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Weekly & Monthly Average Ammonia Nitrogen WQBELs – January 2020 Limit Evaluation

The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, since those limits relate to the assimilative capacity of the receiving water. Weekly and monthly average limits based on chronic toxicity criteria for ammonia are also calculated to determine the weekly and monthly average limits to meet the requirements of s. NR 106.07(3).

Ammonia limits were last calculated in May 2014. At that time, default stream pH and temperatures were used to calculate limits. At this time, though, more specific information is available for both parameters which warrant a re-calculation of weekly and monthly average limits. New default temperature data are available for relatively small warm water streams as part of the state's new thermal standards; the new default ambient stream temperatures are contained in Table 2 of ch. NR 102. Seasonal mean pH values are now available for surface waters based on ambient hardness. The new 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. The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a Limited Forage Fish Community is calculated by the following equation.

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

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 (°C) of the receiving water – (Early Life Stages Present), or

T = the maximum of the actual temperature (°C) and 7 - (Early Life Stages Absent)

The 4-day criterion is simply equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q₁₀ (4-Q₃, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q₅ (estimated as 85% of the 7-Q₂ if the 30-Q₅ 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 °C, 25% of the flow is used if the Temperature < 11 °C, and 50% of the flow is used if the Temperature ≥ 11 °C but < 16 °C.

The rules provide 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 °C, during the winter and spring months. Burbot, an early spawning species, are not believed to be present in the Unnamed Tributary to the Willow River, based on conversations with local fisheries biologists. So “ELS Absent” criteria apply from October – April, and “ELS Present” criteria will apply from May – September for an LFF classification.

Since minimal ambient data is available, the “default” basin assumed values are used for Temperature, pH and background ammonia concentrations, shown in the table below, with the resulting criteria and effluent limitations. Background pH for the Unnamed Tributary is estimated using the effluent hardness since low flows are estimated to be zero.

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Unnamed Tributary		Spring	Summer	Fall	Winter
		March – April	May – Sept.	Oct. – Nov.	Dec. – Feb.
Effluent Flow	Qe (MGD)	0.327	0.327	0.327	0.327
Background Information	7-Q ₁₀ (cfs)	0	0	0	0
	7-Q ₂ (cfs)	0	0	0	0
	Ammonia (mg/L)	0.04	0.04	0.03	0.08
	Average Temperature (°C)	8	18	10	4
	Maximum Temperature (°C)	10	21	13	4
	pH (s.u.)	8.05	8.05	8.05	8.05
	% of Flow used	25	100	25	25
	Reference Weekly Flow (cfs)	0	0	0	0
	Reference Monthly Flow (cfs)	0	0	0	0
Criteria mg/L	4-day Chronic				
	Early Life Stages Present	-	7.18	-	-
	Early Life Stages Absent	22.8	-	19.1	27.7
	30-day Chronic				
	Early Life Stages Present	-	2.87	-	-
	Early Life Stages Absent	9.12	-	7.62	11.1
Effluent Limitations mg/L	Weekly Average				
	Early Life Stages Present	-	7.2	-	-
	Early Life Stages Absent	23	-	19	28
	Monthly Average				
	Early Life Stages Present	-	2.9	-	-
	Early Life Stages Absent	9.1	-	7.6	11

Ammonia Decay:

Because the calculated limits are more restrictive than the current limits ammonia decay is considered to determine limits at the outfall to protect the downstream classification. The more restrictive calculated limits should be used to protect at the point of discharge and downstream uses. 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. Willow Creek before confluence with the Unnamed Tributary is classified as a WWSF community. The assumed basin background information is provided in the table below, with the resulting criteria and effluent limitations.

Willow Creek		Spring	Summer	Fall	Winter
		March – April	May – Sept.	Oct. – Nov.	Dec. – Feb.
Effluent Flow	Qe (MGD)	0.327	0.327	0.327	0.327
Background Information	7-Q ₁₀ (cfs)	0.67	0.67	0.67	0.67
	7-Q ₂ (cfs)	1.5	1.5	1.5	1.5
	Ammonia (mg/L)	0.04	0.04	0.03	0.08
	Average Temperature (°C)	6	18	7	1
	Maximum Temperature (°C)	9	21	10	2
	pH (s.u.)	7.85	7.85	7.85	7.85
	% of Flow used	25	100	25	25
	Reference Weekly Flow (cfs)	0.17	0.67	0.17	0.17
	Reference Monthly Flow (cfs)	0.32	1.3	0.32	0.32
Criteria	4-day Chronic				

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mg/L	Early Life Stages Present	-	5.06	-	-
	Early Life Stages Absent	10.7	-	10.0	12.1
	30-day Chronic				
	Early Life Stages Present	-	2.02	-	-
	Early Life Stages Absent	4.30	-	4.00	4.85
Effluent Limitations mg/L	Weekly Average				
	Early Life Stages Present	-	12	-	-
	Early Life Stages Absent	14	-	13	16
	Monthly Average				
	Early Life Stages Present	-	7.1	-	-
	Early Life Stages Absent	7.0	-	6.5	7.9

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 will 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 ($k_t = k_{20} \theta^{(T-20)}$).

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

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 1.25 miles for a travel time of 0.5 days. This equation shows that at the location of the classification change, 95 – 98% of the ammonia is remaining. After decay, the limits are increased as shown in the following table.

Attachment #3

	LFF		WWSF		WWSF After decay		Most Restrictive 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
March – April	23	9.1	14	7.0	15	7.2	15	7.2
May – September	7.2	2.9	12	7.1	12	7.4	7.2	2.9
October – November	19	7.6	13	6.5	14	6.7	14	6.7
December – February	28	11	16	7.9	16	8.0	16	8.0

Temperature Limits for Receiving Waters with Unidirectional Flow

(calculation using default ambient temperature data)

Facility:	Village of Clear Lake	7-Q₁₀:	0 cfs	Temp Dates	01/01/23	Flow Dates	04/01/20
Outfall(s):	001	Dilution:	25%	Start:	01/01/23	End:	07/31/25
Date Prepared:	8/29/2025	f:	0				
Design Flow (Qe):	0.327 MGD	Stream type:	Limited forage fish community				
Storm Sewer Dist.	0 ft	Qs:Qe ratio:	0.0 :1				
			Calculation Needed?	YES			

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs) (cfs)	Representative Highest Effluent Flow Rate (Qe)			f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default) (°F)	Sub-Lethal WQC (°F)	Acute WQC (°F)		7-day Rolling Average (Qesl) (MGD)	Daily Maximum Flow Rate (Qea) (MGD)	(MGD)		Weekly Average (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	37	54	78	0	0.341	0.431	0	0	59	61	54	78
FEB	39	54	79	0	0.343	0.469	0	0	57	60	54	79
MAR	43	57	80	0	0.357	0.492	0	0	58	60	57	80
APR	50	63	81	0	0.520	0.689	0	0	59	62	63	81
MAY	59	70	84	0	0.393	0.818	0	0	69	72	70	84
JUN	64	77	85	0	0.440	0.623	0	0	73	74	77	85
JUL	69	81	86	0	0.371	0.483	0	0	74	77	81	86
AUG	68	79	86	0	0.341	0.522	0	0	74	76	79	86
SEP	63	73	85	0	0.383	0.513	0	0	72	74	73	85
OCT	55	63	83	0	0.398	0.469	0	0	69	71	63	83
NOV	46	54	80	0	0.398	0.461	0	0	63	65	54	80
DEC	40	54	79	0	0.363	0.441	0	0	59	61	54	79