Permit Fact Sheet

General Information

Permit Number:	WI-0020753-11-0
Permittee Name:	Village of Ontario
Address:	205 South Street PO Box 66
City/State/Zip:	Ontario, WI 54651
Discharge Location:	Northeast side of Brush Creek, 250 feet west of the Kickapoo River
Receiving Water:	Brush Creek in the Middle Kickapoo River Watershed in Vernon County
StreamFlow ($Q_{7,10}$):	21.0 cfs
Stream Classification:	Warm water sport fish community, non-public water supply
Discharge Type:	Existing, Continuous
Annual Average Design Flow	0.086 MGD
Industrial or Commercial Contributors	None
Plant Classification	Ontario is a basic plant in A2, B, C, D, and SS subclasses.
Approved Pretreatment Program?	N/A

Facility Description

The Village of Ontario operates a 0.086 MGD (annual average design flow) wastewater treatment plant and serves a population of approximately 554 residents and no significant industrial users. Treatment consists of primary settling, rotating biological contractors, and by seasonal disinfection achieved through chlorination and dechlorination before being discharged to Brush Creek. Solids and biosolids generated at the plant are aerobically digested prior to being landspread on approved sites. For this permit term Ontario has requested an individual phosphorus variance and will be following an optimization.

Substantial Compliance Determination

Enforcement During Last Permit: On August 3, 2021, the department issued a notice of noncompliance (NON) for Failure to Test Sewage Sludge for PCBs. On April 29, 2022, the department issued a NON to Ontario for a sludge high quality exceedance. On December 13, 2023 the department issued a NON for effluent phosphorus limit exceedances. The facility has completed all previously required actions as part of the enforcement process.

After a desk top review of all discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on June 16, 2023 by Julia Stephenson former DNR wastewater engineer and a desktop review by DNR wastewater engineer, Katie Jo Jerzak, PE on October 8, 2024, this facility has been found to be in substantial compliance with their current permit.

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)**
701	0.035 MGD (January 2019 – July 2024)	INFLUENT: 24-hour flow proportional composite sampler intake located prior to the primary clarifier in the blower building. Flow monitoring located before the v notch weir in the primary.
001	No effluent flow meter	EFFLUENT: 24-hour flow proportional composite sampler intake located at the secondary clarifier effluent pipe prior to chlorine contact in the blower building. Grab samples are collected after the chlorine contact pipe in the outfall pipe manhole.
002	0.834 metric tons (application)	SLUDGE: Class B, Liquid Sludge, Aerobically digested. Representative samples shall be collected from the aerobic digestor after it is well mixed and prior to land application.

1 Influent – Monitoring Requirements

Sample Point Number: 701- INFLUENT PRIOR TO CLARIFIER

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 monitoring requirements were re-evaluated for the proposed permit term and no changes were made from the previous permit.

Explanation of Limits and Monitoring Requirements

Monitoring of influent flow, BOD_5 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

Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
BOD5, Total	Weekly Avg	45 mg/L	3/Week	24-Hr Flow Prop Comp	
BOD5, Total	Monthly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	45 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	
pH Field	Daily Min	6.0 su	Daily	Grab	
pH Field	Daily Max	9.0 su	Daily	Grab	
Nitrogen, Ammonia (NH3-N) Total	Daily Max	28 mg/L	2/Week	24-Hr Flow Prop Comp	Year-round limit.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	28 mg/L	2/Week	24-Hr Flow Prop Comp	Year-round limit.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	28 mg/L	2/Week	24-Hr Flow Prop Comp	Year-round limit.
E. coli	Geometric Mean - Monthly	126 #/100 mL	Weekly	Grab	Limit effective May through September annually.
E. coli	% Exceedance	10 Percent	Monthly	Grab	Limit effective May through September annually. See the E. coli Percent Limit permit section. Enter the result in the DMR on the last day of the month.
Chlorine, Total Residual	Daily Max	38 ug/L	Daily	Grab	Limit effective May through September annually and when chlorinating.
Chlorine, Total Residual	Monthly Avg	38 ug/L	Daily	Grab	Limit effective May through September annually and when chlorinating.
Chlorine, Total Residual	Weekly Avg	38 ug/L	Daily	Grab	Limit effective May through September annually and when

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					chlorinating.
Phosphorus, Total	Monthly Avg	7.5 mg/L	3/Week	24-Hr Flow Prop Comp	This is an interim limit effective until December 31, 2026. See Phosphorus Variance permit sections.
Phosphorus, Total	Monthly Avg	2.5 mg/L	3/Week	24-Hr Flow Prop Comp	This is a phosphorus variance interim limit that goes into effect January 1, 2027. See Phosphorus Variance permit sections.
Phosphorus, Total		lbs/day	3/Week	Calculated	
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring permit section.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring permit section.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.

Changes from Previous Permit

Ammonia: The sample frequencies changed from monthly to 2/week; the daily max, weekly average, and monthly average limits changed from 34 mg/L to 28mg/L; and the limits are not year-round.

E. coli: Fecal coliform monitoring and limits have been replaced with Escherichia coli (E. coli) monitoring and limits.

Phosphorus: Monthly average limit changed from 8.0 mg/L to an interim limit of 7.5 mg/L and variance limit of 2.5 mg/L

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

Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached *Water Quality-Based Effluent Limitations for the Ontario Wastewater Treatment Facility WPDES Permit No. WI-0020753* dated September 3, 2024

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.

Expression of Limits: In accordance with the federal regulation 40 CFR 122.45(d) and s. NR 205.065, Wis. Adm. Code, limits in this permit are to be expressed as weekly average and monthly average limits whenever practicable.

BOD_5, Total Suspended Solids and pH: Categorical limits and WQBELs are included in the permit as outlined in ch. NR 210, Wis. Adm. Code. Tracking of BOD_5 and total suspended solids are required for percent removal requirements found in s. NR 210.05, Wis. Adm. Code and in the Standard Requirements section of the permit. Chapter NR 102, Wis. Adm. Code, 'Water Quality Standards for Surface Waters' also specifies requirements for pH for fish and aquatic life streams.

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. The new rule requires that WPDES permits for facilities with required disinfection include monitoring for E. coli while facilities are disinfecting during the recreation period and establish effluent limitations for E. coli established in s. NR 210.06 (2), Wis. Adm Code. The administrative code rule changes included the following actions: revised the bacteria water quality criteria from fecal coliform to E. coli to protect recreation in ch. NR 102, Wis. Adm. Code.; removed fecal coliform criteria for certain individual waters from ch. NR 104, Wis. Adm. Code.; revised permit requirements for publicly and privately owned sewage treatment works in ch. NR 210, Wis. Adm. Code.; and, updated approved analytical methods for bacteria in ch. NR 219, Wis. Adm. Code.

Phosphorus: Phosphorus requirements are based on NR 102 Water Quality Standards and NR 217 Effluent Standards and Limitations for Phosphorus. The final limits are 0.225mg/L as a monthly average, 0.075 mg/L as a six-month average and 0.075 lbs/day six-month average. These limits are beyond the capabilities of the Village's current treatment plant. The permittee has applied for an individual phosphorus variance in accordance with s. 283.15, Wis. Stats. Conditions for this variance include implementing the phosphorus optimization plan dated September 10, 2024, maintaining effluent concentrations below the interim limit of 2.5 mg/L as a monthly average starting January 1, 2027, continued optimization for control of phosphorus, and calculating, reporting and tracking phosphorus mass discharge. The phosphorus interim limit in the current permit is 7.5 mg/L monthly average. The variance limit is set at the 2.5 mg/L monthly average which becomes effective on January 1, 2027. Following the upgrade the permittee will report on continued reductions and optimizations.

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

- *October – December 2025*
- *July – September 2026*
- *April – June 2027*
- *January – March 2028*
- *October – December 2029*

3 Land Application - Monitoring and Limitations

Municipal Sludge Description						
Sample Point	**Sludge Class (A or B)**	**Sludge Type (Liquid or Cake)**	**Pathogen Reduction Method**	**Vector Attraction Method**	**Reuse Option**	**Amount Reused/Disposed (Dry Tons/Year)**
002	B	Liquid	Fecal Coliform	Incorporation	Landspread	0.834
Does sludge management demonstrate compliance? yes						
Is additional sludge storage required? no						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? no						
Is a priority pollutant scan required? no						

Sample Point Number: 002- Liquid 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	
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	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	
Nitrogen, Ammonium (NH4-N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Monitoring required in 2026. See the Sludge Analysis for PCBs permit section and the Standard Requirements section for Monitoring and Calculating PCB Concentrations in Sludge.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Monitoring required in 2026. See the Sludge Analysis for PCBs permit section and the Standard Requirements section for Monitoring and Calculating PCB Concentrations in Sludge.
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:

PFAS: Annual monitoring is included in the permit pursuant s. NR 204.06(2)(b)9, Wis. Adm. Code.

Explanation of Limits and Monitoring Requirements

Requirements for 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). Radium requirements are addressed in s. NR 204.07(3)(n).

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

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

Water Extractable Phosphorus: Water extractable phosphorus (WEP) is the coefficient for determining plant available phosphorus from measured total phosphorus. In Wisconsin, the Penn State Method is utilized and is expressed in percent. While a total P may be significant, the WEP may show that only a small percentage of the P is available to plants because of factors such as treatment processes and chemical addition that "tie-up" phosphorus limiting the amount of phosphorus that is plant available. As part of the Wisconsin's nutrient management plan (NMP) requirements, the accounting of all fertilizers must be included over the NMP cycle. The fertilizer value of the waste needs to be communicated to the farmer and accounted for in the NMP.

4 Schedules

4.1 Phosphorus Variance and WWTP Upgrade/Optimization

As a condition of the variance to the water quality-based effluent limitation (WQBEL) for phosphorus approved in accordance with s. 283.15, Wis. Stats., the permittee shall perform the following actions.

Required Action	Due Date
Construction Upgrade Progress Report: The permittee shall submit a progress report on construction upgrades. The progress report shall include a description of the phase of construction, a current copy of the project schedule, and any proposed construction plan amendments or change orders that would require plan review under s. 281.41, Wis. Stats.	05/01/2025
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades.	12/31/2025
Achieve Compliance: The permittee shall achieve compliance with the phosphorus variance interim limit listed in the Surface Water section of this permit.	12/31/2026
Annual Optimization Report #1: Sumit a progress report on phosphorus reduction and optimization of the facility. Optimization includes adjustments to chemical addition rates and other items identified in the Optimization Plan.	09/30/2027
Annual Optimization Report #2: Submit a progress report on phosphorus reductions and optimization of the facility.	09/30/2028
Report on Reductions & Optimizing Control of Phosphorus: Submit a final report documenting the success in reducing phosphorus concentrations in the effluent, as well as the anticipated future reduction in phosphorus sources and phosphorus effluent concentrations. The report shall include an analysis of trends in weekly average, monthly average and annual total effluent phosphorus concentrations based on phosphorus sampling during the current permit term. Any influent phosphorus samples that the Village has taken during the permit term should be analyzed and	09/30/2029

included in this report.. The permittee shall also re-evaluate all available compliance options for meeting the final phosphorus WQBELs. If the report concludes Adaptive Management will be implemented, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 and an Adaptive Management Plan. If the report concludes water quality trading will be used, the submittal shall include a Water Quality Trading Plan. Additionally, if the permittee intends to seek to re-apply for a phosphorus variance per s. 283.15, Wis. Stats for the reissued permit, a detailed Pollutant Minimization Plan (PMP) outlining the pollutant minimization activities proposed for the upcoming permit term must be submitted along with the final report.	
Annual Optimization Reports After Permit Expiration: In the event that this permit is not reissued by the date the permit expires, the permittee shall continue to submit annual phosphorus optimization reports for the previous year following the due date of Annual Optimization Progress Reports listed above. Annual phosphorus optimization reports shall include information as defined above.	

Explanation of Schedules

This Schedule requires the permittee to implement chemical-feed phosphorus removal and meet the variance limit of 2.5 mg/L monthly average. Annual reports update the department on the progress made on phosphorus reductions and optimization efforts.

Special Reporting Requirements

NA

Other Comments:

NA

Attachments:

Water Quality-Based Effluent Limitations for the Ontario Wastewater Treatment Facility WPDES Permit No. WI-0020753 dated September 3, 2024

Ontario Optimization Plan dated September 10, 2024

EPA Data Sheet

Expiration Date:

March 31, 2030

Justification Of Any Waivers From Permit Application Requirements

No waivers were requested or granted.

Prepared By: Victoria ZieglerWastewater Specialist **Date:** September 26, 2024

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: September 3, 2024

TO: Victoria Ziegler – SER/Waukesha

FROM: Benjamin Hartenbower – WCR/Eau Claire

SUBJECT: Water Quality-Based Effluent Limitations for the Ontario Wastewater Treatment Facility WPDES Permit No. WI-0020753

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 Ontario Wastewater Treatment Facility in Vernon County. This municipal wastewater treatment facility (WWTF) discharges to Brush Creek, located in the Middle Kickapoo River Watershed in the Lower Wisconsin River Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
BOD_5			45 mg/L	30 mg/L		1
TSS			45 mg/L	30 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Ammonia Nitrogen	28 mg/L		**28 mg/L**	**28 mg/L**		2
E.Coli				126 #/100 mL geometric mean		3
Chlorine	38 µg/L		**38 µg/L**	**38 µg/L**		2
Phosphorus Interim Final WQBEL				 7.5 mg/L 0.225 mg/L	 0.075 mg/L	4
TKN, Nitrate+Nitrite, and Total Nitrogen						5

Footnotes:

1. No changes from the current permit.
2. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
3. Bacteria limits apply during the disinfection season of May - September. Additional limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
4. Under the phosphorus variance, the interim limit of 7.5 mg/L should be effective upon permit reissuance. The final WQBELs remain at 0.225 mg/L as a monthly average and 0.075 mg/L as a six-month average.
5. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen monitoring is recommended for all minor municipal permittees. Total Nitrogen is the sum of nitrate (NO_3), nitrite (NO_2), and total kjeldahl nitrogen (TKN) (all expressed as N).

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Benjamin Hartenbower at (715) 225-4705 or Benjamin.Hartenbower@wisconsin.gov or Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (2) – Narrative & Map

PREPARED BY: _____ Date: 09/03/2024

Benjamin Hartenbower, PE,
Water Resources Engineer

E-cc:

Katie Jo Jerzak, Wastewater Engineer – WCR/Eau Claire
Geisa Thielen, Regional Wastewater Supervisor – WCR/Eau Claire
Diane Figiel, Water Resources Engineer – WY/3
Kim Kuber, Water Quality Biologist – SCR/Dodgeville
Nate Willis, Wastewater Engineer – WY/3

Attachment #1

Water Quality-Based Effluent Limitations for the Ontario Wastewater Treatment Facility WPDES Permit No. WI-0020753

Prepared by: Benjamin P. Hartenbower

PART 1 – BACKGROUND INFORMATION

Facility Description:
The Ontario Wastewater Treatment Facility includes a primary clarifier, rotating biological contact (RBC), secondary treatment, chlorination, and dechlorination. The final effluent is discharged to Brush Creek.

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

Existing Permit Limitations
The current permit, which expired on December 31, 2023, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
BOD_5			45 mg/L	30 mg/L		1
TSS			45 mg/L	30 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Ammonia Nitrogen	34 mg/L		**34 mg/L**	**34 mg/L**		2
Fecal Coliform May - September			**656 #/100 mL** **geometric mean**	400 #/100 mL geometric mean		2
Chlorine	38 µg/L		**38 µg/L**	**38 µg/L**		2
Phosphorus Interim Final WQBEL				8.0 mg/L 0.225 mg/L	0.075 mg/L	

Footnotes:

1. 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.
2. Additional limits to comply with the expression of limits requirements are included in bold.

Receiving Water Information

- Name: Brush Creek
- Waterbody Identification Code (WBIC): 1198300
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: USGS for Station 05407470, in the Kickapoo River, 0.1 mile upstream of the treatment plant in Ontario.

  $7\text{-}Q_{10}$ = 21.0 cfs (cubic feet per second)
  $7\text{-}Q_{2}$ = 28.0 cfs

  Harmonic Mean Flow = 49.8 cfs using a drainage area of 117.0 mi^2.
  The Harmonic Mean has been estimated based on average flow and the $7\text{-}Q_{10}$ using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).
- Hardness = 266 mg/L as $CaCO_3$. This value represents the geometric mean of 60 samples collected in the Middle Kickapoo River from 08/07/1991 to 07/07/1992.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%
- Source of background concentration data: Chloride data is from the Middle Kickapoo River watershed. Metals data from Kickapoo River at Oil City is used for this evaluation because there is no data available for Brush Creek and the Middle Kickapoo River watershed is within the same ecological landscape so ambient water quality characteristics are expected to be similar. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: None
- Impaired water status: Less than 100 ft downstream of the discharge location in Brush Creek, the Kickapoo River is listed as impaired for Total Phosphorus from miles 19.1 to 25.5 and from miles 61.0 to 119.4.

Effluent Information:

- Design Flow Rates(s):
  Annual Average = 0.086 MGD (Million Gallons per Day)
  For reference, the actual average flow from January 2019 to July 2024 was 0.035 MGD.
- Hardness = 228 mg/L as $CaCO_3$. This value represents the geometric mean of 4 effluent samples collected from 01/25/2023 to 02/15/2023.
- Acute dilution factor used in accordance with s. NR 106.06 (3) (c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water Source: Domestic wastewater with water supply from wells.
- Additives: sodium hypochlorite (chlorination) and sodium bisulfite (dechlorination).
- Effluent characterization: This facility is categorized as a minor municipality, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus Chloride and Hardness. The permit-required monitoring for Ammonia Nitrogen, Chlorine, and Phosphorus from January 2019 to July 2024 is used in this evaluation.

Chemical Specific Effluent Data at Outfall 001

Sample Date	Copper µg/L	Sample Date	Chloride mg/L
01/25/2023	7.46	01/25/2023	104
01/29/2023	7.83	02/01/2023	100
02/01/2023	7.16	02/08/2023	125
02/05/2023	7.72	02/15/2023	76.1
02/08/2023	7.25		
02/13/2023	6.16		
02/15/2023	6.95		
02/19/2023	5.28		
02/22/2023	5.6		
02/26/2023	4.33		
03/01/2023	4.02		
1-day P_{99}	10.14	mean	101
4-day P_{99}	8.08		

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

Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled "MEAN EFFL. CONC.".

The following table presents the average concentrations and loadings at Outfall 001 from January 1900 to July 2024 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6):

Parameter Averages with Limits

	Average Measurement
BOD_5	15.8 mg/L*
TSS	5.2 mg/L*
pH	7.28 s.u.
Ammonia Nitrogen	16.84 mg/L
Fecal Coliform	726#/100 mL
Chlorine	<100 µg/L
Phosphorus	4.76 mg/L

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

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

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

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

Acute Limits based on 1-Q_{10}

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

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

Where:

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

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

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

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

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

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q_{10} method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is not the case for the Ontario Wastewater Treatment Facility and the limits are set based on two times the acute toxicity criteria.

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 = 17 cfs, (1-Q_{10} (estimated as 80% of 7-Q_{10})), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD. mg/L	ATC	MEAN BACK-GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Chlorine		19.03		38.06	7.61	<100		<100
Arsenic		340		680	136	<0.77		
Cadmium	228	26.5	0.025	53.1	10.6	<0.084		
Chromium (+3)	228	3541	0.836	7083	1417	<0.7		
Copper	228	33.8	1.1	67.5			10.1	7.8
Lead	228	237	0.950	474	95	<1.08		
Nickel	228	942		1884	377	<0.9		
Zinc	228	247	2.9	495	99	<26		
Chloride		757	5.4	1514			157	125

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

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 5.3 cfs (¼ of the 7-Q_{10}), as specified in s. NR 106.06(4)(c), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	MAX. EFFL. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Chlorine		7.28		294.51	58.90	<100	
Arsenic		152		6157	1231	<0.77	
Cadmium	175	3.8	0.0253	153.6	30.7	<0.084	
Chromium (+3)	266	295	0.836	11889	2378	<0.7	
Copper	266	23.9	1.093	925.2			8.1
Lead	266	72	0.9501	2882	576	<1.08	
Nickel	266	120		4837	967	<0.9	
Zinc	266	284	2.935	11355	2271	<26	
Chloride		395	5.35	15769			127

* 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.

Attachment #1

Monthly Average Limits based on Human Threshold Criteria (HTC)
RECEIVING WATER FLOW = 12 cfs (¼ of the Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK-GRD.	MAX. EFFL. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P_{99}
Cadmium	370.0	0.025	34963.3	6992.7	<0.084	
Chromium (+3)	3818000	0.836	360807426	72161485	<0.7	
Lead	140	0.950	13141	2628	<1.08	
Nickel	43000		4063573	812715	<0.9	

Monthly Average Limits based on Human Cancer Criteria (HCC)
RECEIVING WATER FLOW = 12 cfs (¼ of the Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MEAN BACK-GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P_{99}
Arsenic	13.3		1256.9	251.4	<0.77	

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, limits are required for Chlorine.

Total Residual Chlorine – Because chlorine is added as a disinfectant, effluent limitations are recommended to assure proper operation of the de-chlorination system. Section NR 210.06(2)(b), Wis. Adm. Code, states, "When chlorine is used for disinfection, the daily maximum total residual chlorine concentration of the discharge may not exceed 0.10 mg/L." Because the WQBELs are more restrictive, they are recommended instead. Specifically, a **daily maximum limit of 38 µg/L** (38.06, rounded to two significant figures) is required. Due to revisions to s. NR 106.07(2), Wis. Adm. Code, mass limitations are no longer required. Weekly average limitations are not needed based on reasonable potential as the daily maximum limitations will provide adequate protection of the resource; however, additional limits are discussed in the expression of limits section of this memo.

PFOS and PFOA
The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98, Wis. Adm. Code. PFOS and PFOA were not detected in the water supply. Based on the annual design flow and lack of nondomestic contributions, it is unlikely that the effluent will contain PFOS or PFOA. **Therefore, monitoring is not recommended.** If information becomes available that indicates PFOS or PFOA may be present in the effluent, the monitoring requirements may change.

Mercury – The permit application did not require monitoring for mercury because the Ontario Wastewater Treatment Facility is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3., Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5). 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 2019 to 2023 was 2.28 mg/kg, with a maximum reported concentration of 4.26 mg/kg. **Therefore, no mercury monitoring is recommended at Outfall 001.**

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN

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

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.
- Section NR 106.07(3), Wis. Adm. Code requires weekly and monthly average limits for municipal treatment plants.
- The maximum expected effluent pH has changed

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

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

Where:

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

The effluent pH data was examined as part of this evaluation. A total of 2039 sample results were reported from January 2019 to July 2024. The maximum reported value was 7.70 s.u. (Standard pH Units). The effluent pH was 7.70 s.u. or less 99% of the time. The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 7.71 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 7.70 s.u. Therefore, a value of 7.71 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 7.71 s.u. into the equation above yields an ATC = 14.20 mg/L.

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

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

Daily Maximum Ammonia Nitrogen Determination

	Ammonia Nitrogen Limit mg/L
2×ATC	28.39
1-Q_{10}	1798

The 2×ATC method yields the most stringent limits for the Ontario Wastewater Treatment Facility.

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 – WWSF

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

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)
The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, since those limits relate to the assimilative capacity of the receiving water.

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

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

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

Where:

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

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q_{10} (4-Q3, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q_5 (estimated as 85% of the 7-Q_2 if the 30-Q_5 is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 ºC, 25% of the flow is used if the Temperature < 11 ºC, and 50% of the flow is used if the Temperature ≥ 11 ºC but < 16 ºC.

Section NR 106.32 (3), Wis. Adm. Code, provides a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 ºC, during the winter and spring months. Based on a review of the DNR Fisheries database, burbot, an early spawning species, are not believed to be present in Brush Creek. So “ELS Absent” criteria apply from October through March, and “ELS Present” criteria will apply from April through September for a WWSF classification.

The “default” basin assumed values are used for temperature and background ammonia concentrations, because minimum ambient data is available. The values for pH are based on data collected from Brush Creek. These values are shown in the table below, with the resulting criteria and effluent limitations.

Weekly and Monthly Ammonia Nitrogen Limits – WWSF

		April & May	June-September	October-March
Effluent Flow	Qe (MGD)	0.086	0.086	0.086
Background Information	7-Q_{10} (cfs)	21	21	21
	7-Q_2 (cfs)	28	28	28
	Ammonia (mg/L)	0.07	0.07	0.14
	Temperature (°C)	14.4	20.6	10.0
	pH (s.u.)	8.33	8.27	8.28
	% of Flow used	50	100	25
	Reference Weekly Flow (cfs)	11	21	5.3
	Reference Monthly Flow (cfs)	12	24	6.0
Criteria mg/L	4-day Chronic			
	Early Life Stages Present	3.64	2.70	3.96
	Early Life Stages Absent	3.65	2.70	5.29
	30-day Chronic			
	Early Life Stages Present	1.45	1.08	1.58
	Early Life Stages Absent	1.46	1.08	2.12
Effluent Limitations mg/L	Weekly Average			
	Early Life Stages Present	285	418	
	Early Life Stages Absent			209
	Monthly Average			
	Early Life Stages Present	125	182	
	Early Life Stages Absent			91

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from January 2019 to April 2024, with those results being compared to the calculated limits to determine the need to include ammonia limits in the Ontario Wastewater Treatment Facility permit for the respective month ranges.

Ammonia Nitrogen Effluent Data

	Ammonia Nitrogen mg/L
1-day P_{99}	48.79
4-day P_{99}	30.43
30-day P_{99}	21.15
Mean	16.84
Std	9.26
Sample size	37
Range	3.03 - 36.7

Based on this comparison, daily limits are required year-round.

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

Final Ammonia Nitrogen Limits

Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
28	**28**	**28**

Additional limits to meet the requirements in s. NR 106.07, Wis. Adm Code, are addressed in the expression of limits section of this memo.

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.

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.

E. coli monitoring is recommended at the same frequency that fecal coliform monitoring is required in the current permit. Because the Ontario Wastewater Treatment Facility permit requires weekly monitoring, the 410 counts/100 mL limit will effectively function as a daily maximum limit unless the facility performs additional monitoring. Any additional monitoring beyond what is required by the permit must also be reported on the DMR as required in the standard requirements section of the permit.

These limits are required during May through September. No changes are recommended to the required disinfection season.

Effluent Data
The Ontario Wastewater Treatment Facility has monitored effluent *E. coli* from August 2022 to July 2023 and a total of 22 results are available. A geometric mean of 126 counts/100 mL was never exceeded, with a maximum monthly geometric mean of 33 counts/100 mL. Effluent data exceeded 410 counts/100 mL one time (which is 5% of the total sample results). The maximum reported value was 9678 counts/100 mL. Based on this effluent data it appears that the facility can meet new *E. coli* limits and a compliance schedule is not needed in the reissued permit.

PART 5 – PHOSPHORUS

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

Because the Ontario Wastewater Treatment Facility does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. The data demonstrates that the annual monthly average phosphorus loading is less than 150 lbs/month, which is the threshold for municipalities in accordance to s. NR 217.04(1)(a)1, Wis. Adm. Code, and therefore a technology-based limit is not required.

Annual Average Mass Total Phosphorus Loading

Month	Monthly Avg. mg/L	Total Flow MG/month	Total Phosphorus lb./mo.
Aug 2023	8.10	0.40	27.22
Sep 2023	8.83	0.64	47.07
Oct 2023	8.72	0.54	39.25
Nov 2023	8.91	0.48	35.88
Dec 2023	7.01	0.47	27.40
Jan 2024	7.63	0.77	48.85
Feb 2024	1.74	0.55	8.00
Mar 2024	3.33	0.60	16.58
Apr 2024	3.76	0.94	29.35
May 2024	3.53	3.17	93.32
Jun 2024	4.46	1.88	69.89
Jul 2024	4.67	5.41	210.69
		Average =	**54.46**

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

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

Water Quality-Based Effluent Limits (WQBEL)
Revisions to administrative rules regulating phosphorus took effect on December 1, 2010. These rule revisions include additions to s. NR 102.06, Wis. Adm. Code, which establish phosphorus standards for surface waters. Subchapter III of NR 217, Wis. Adm. Code, establishes procedures for determining WQBELs for phosphorus, based on the applicable standards in ch. NR 102, Wis. Adm. Code.

Section NR 102.06(3)(a), Wis. Adm. Code, specifically names river segments for which a phosphorus criterion of 0.100 mg/L applies. For other stream segments that are not specified in s. NR 102.06(3)(a), Wis. Adm. Code, s. NR 102.06(3)(b), Wis. Adm. Code, specifies a phosphorus criterion of 0.075 mg/L. The phosphorus criterion of 0.075 mg/L applies for Brush Creek.

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

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

Where:

WQC = 0.075 mg/L for Brush Creek.
Qs = 100% of the 7-Q_2 of 28 cfs
Cs = background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code
Qe = effluent flow rate = 0.086 MGD = 0.133 cfs
f = the fraction of effluent withdrawn from the receiving water = 0

Section NR 217.13(2)(d), Wis. Adm. Code, specifies that the background phosphorus concentration used in the limit calculation formula shall be calculated using the procedures specified in s. NR 102.07(1)(b) to (c), Wis. Adm. Code. The median shall be calculated with at least one year of data using samples collected once per month during the period of May through October. All representative data from the most recent 5 years shall be used, but data from the most recent 10 years may be used if representative of current conditions.

The following data were considered in estimating the background phosphorus concentration:

SWIMS ID	633064
Station Name	Monitoring station at Kickapoo River - Sth 33
Waterbody	Kickapoo River
Sample Count	6
First Sample	10/15/2008
Last Sample	09/16/2009
Mean	0.146 mg/L
Median	0.115 mg/L

Substituting a background concentration above criteria into the limit calculation equation above would result in a calculated limit that is less than the applicable criterion of 0.075 mg/L. However, s. NR 217.13(7), Wis. Adm. Code, specifies that "if the water quality-based effluent limitation calculated pursuant to the procedures in this section is less than the phosphorus criterion specified in s. NR 102.06, Wis. Adm. Code, for the water body, the effluent limit shall be set equal to the criterion."

The impaired water listing of the Kickapoo River also points towards the notion that effluent phosphorus limits equal to the water quality criterion are needed to prevent the discharge from contributing to further impairment of the receiving water. The Guidance for Implementing Wisconsin's Phosphorus Water Quality Standards for Point Source Discharges (2020) suggests setting effluent limits equal to the criterion in the absence of an EPA approved total maximum daily load for discharges of phosphorus to phosphorus impaired waters.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from January 2019 to July 2024.

Phosphorus Effluent Data

	Phosphorus mg/L
1-day P_{99}	11.20
4-day P_{99}	7.55
30-day P_{99}	5.67
Mean	4.76
Std	2.00
Sample size	862
Range	0.441 - 12.7

Reasonable Potential Determination

Since the 30-day P_{99} of reported effluent total phosphorus data is greater than the calculated WQBEL, the discharge has reasonable potential to cause or contribute to an exceedance of the water quality criterion. Therefore, a WQBEL is required.

In accordance with s. NR 217.15(2), Wis. Adm. Code, there is reasonable potential for the discharge to cause or contribute to an exceedance of the water quality criteria. The data suggest that a compliance schedule will be necessary for the facility to meet the given phosphorus limits.

Limit Expression

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

Mass Limits
Because the discharge is to a surface water that is to or upstream of a phosphorus impaired water, a mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code. This final mass limit shall be 0.075 mg/L × 8.34 × 0.086 MGD = 0.054 lbs/day expressed as a six-month average.

Variance Request
The facility has applied for an individual variance under s. 283.15, Wis. Stats. Eligibility for the variance is not included as part of this review. An interim limit, calculated using the 4-day P_{99}, represents the Level Currently Achievable at the Ontario Wastewater Treatment Facility. If a variance is granted and approved by US Environmental Protection Agency**, an interim limit of 7.5 mg/L may be included in the permit.**

PART 6 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

Due to the amount of upstream flow available for dilution in the limit calculation (Qs:Qe >20:1), the lowest calculated limitation is 120° F (s. NR 106.55(6)(a), Wis. Adm. Code). For biological treatment systems of domestic waste, there is no reasonable potential for the discharge to exceed this limit. **Therefore, no temperature limits or monitoring are recommended.**

PART 7 – WHOLE EFFLUENT TOXICITY (WET)

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

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

PART 8 – EXPRESSION OF LIMITS

Revisions to chs. NR 106 and 205, Wis. Adm. Code, align Wisconsin's WQBELs with 40 CFR 122.45(d), which requires WPDES permits contain the following concentration limits, whenever practicable and necessary to protect water quality:

- Weekly average and monthly average limitations for continuous discharges subject to ch. NR 210.
- Daily maximum and monthly average limitations for all other discharges.

The Ontario Wastewater Treatment Facility is a municipal treatment facility and is therefore subject to weekly average and monthly average limitations whenever limitations are determined to be necessary.

This evaluation provides additional limitations necessary to comply with the expression of limits in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code. Pollutants already compliant with these rules or that have an approved impracticability demonstration, are excluded from this evaluation including water-quality based effluent limitations for phosphorus, temperature, pH, and *E. coli* among other parameters. Mass limitations are not subject to the limit expression requirements if concentrations limits are given.

Method for Calculation

The methods for calculating limitations for continuous discharges subject to ch. NR 210 to conform to 40 CFR 122.45(d) are specified in s. NR 106.07(3), Wis. Adm. Code, and are as follows:

1. Whenever a daily maximum limitation is determined necessary to protect water quality, a weekly and monthly average limitation shall also be included in the permit and set equal to the daily maximum limit unless a more restrictive limit is already determined necessary to protect water quality.
2. 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.
3. Whenever a monthly average limitation is determined necessary to protect water quality, a weekly average limit shall be calculated using the following procedure and included in the permit unless a more restrictive limit is already determined necessary to protect water quality:

   Weekly Average Limitation = (Monthly Average Limitation × MF)

   Where:

   MF= Multiplication factor as defined in Table 1

   CV= coefficient of variation (CV) as calculated in s. NR 106.07(5m), Wis. Adm. Code.

   n= the number of samples per month required in the permit

s. NR 106.07(3) (e) 4, Table 1, Wis. Adm. Code — Multiplication Factor (for CV = 0.6)

CV	n=1	n=2	n=3	n=4	n=8	n=12	n=16	n=20	n=24	n=30
0.6	1.00	1.31	1.51	1.64	1.95	2.12	2.23	2.30	2.36	2.43

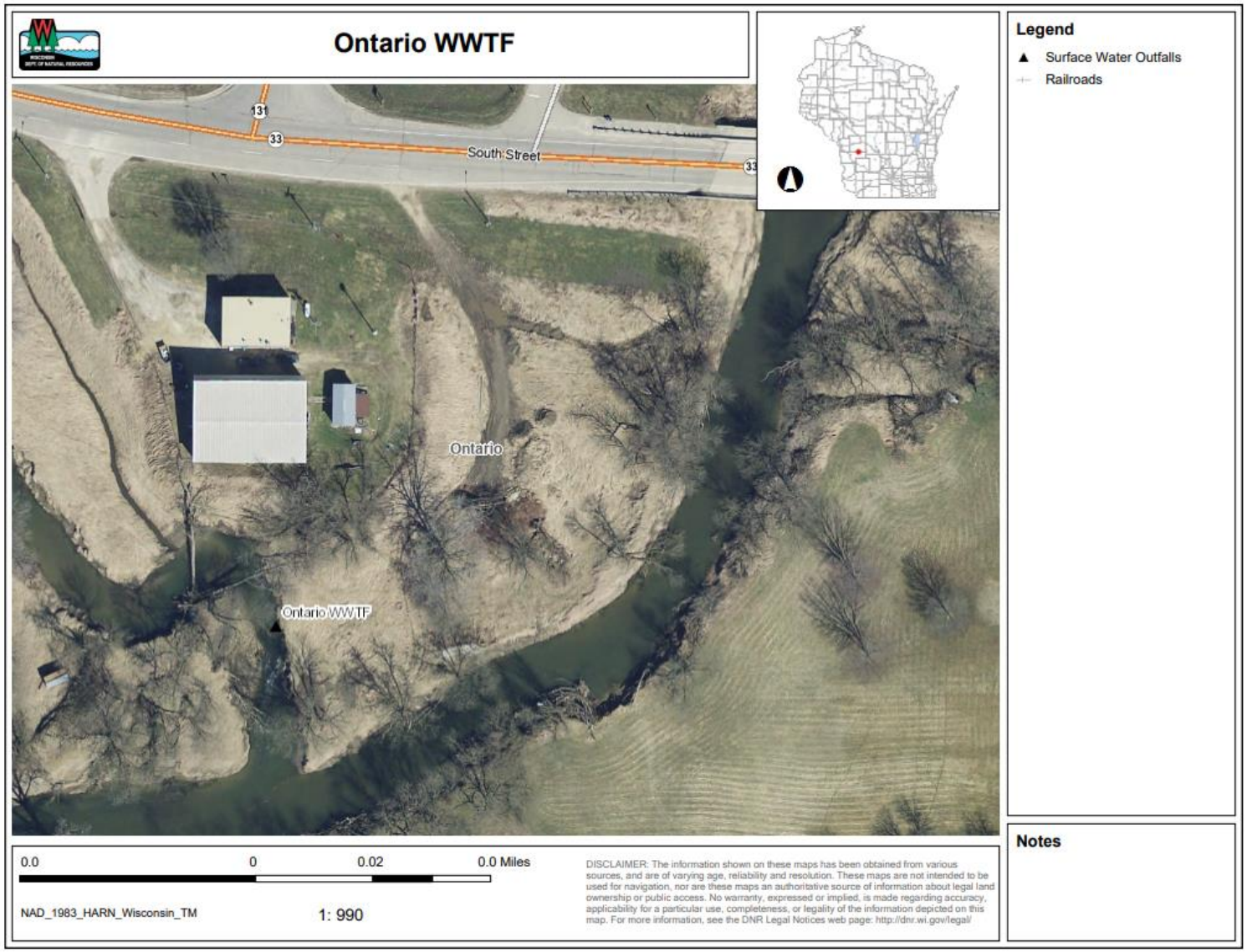
Note: This methodology is based on the *Technical Support Document for Water Quality-based Toxics Control* (March 1991). PB91-127415.

Summary of Additional Limitations:
In conclusion, the following additional limitations are required to comply with ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code.

Expression of Limits Summary

Parameter	Daily Maximum	Weekly Average	Monthly Average	Multiplication Factor (CV)	Assumed Monitoring Frequency (n)
Chlorine	38 µg/L	**38 µg/L**	**38 µg/L**		
Ammonia Nitrogen	28 mg/L	**28 mg/L**	**28 mg/L**		

Attachment #2



VILLAGE OF ONTARIO
PHOSPHORUS OPTIMIZATION PLAN

Facility Name: Village of Ontario

WPDES Permit #: WI-0020753-10-0

PART 1 – BACKGROUND INFORMATION

(A) Briefly describe wastewater treatment facility processes and operations and the means of treating phosphorus, including any chemicals used. Attach a flow schematic which shows the point(s) of chemical addition for TP control. Include both liquid and solids treatment trains.

Liquid Process Description & Optimization

Raw wastewater from the Village of Ontario flows by gravity sewer collection system to the wastewater treatment plant (WWTP). The WWTP is a mechanical treatment plant designed to treat 0.086 MGD (86,000 GPD) and 105 lbs. BOD per day. The WWTP was originally constructed in the 1940s. A major improvement to the WWTP occurred in 1980-82 with the construction of the Rotating Biological Contactor (RBC).

Raw wastewater enters the WWTP by gravity and flows through a bar screen to the primary clarifier. Following primary clarification, the wastewater is pumped to the RBC. Effluent from the RBC flows by gravity to the final clarifier. Following the final clarifier, the wastewater flows to a chlorine contact tank for disinfection. After disinfection, the water is de-chlorinated and discharged to Brush Creek. Waste solids generated in the wastewater treatment process are digested in the aerobic digester, transported off site as liquid waste and land applied.

The primary clarifier and pump station are located in the same concrete building that was part of the original construction in the 1940s. The concrete structure is in good serviceable condition. The mechanical equipment including pumps, air blowers and chain/scraper sludge removal equipment have been maintained in good working condition. The overflow rate at design capacity is 430 gpd/sq. ft. as compared to DNR standard of 1,000 gpd/sq. ft. The primary clarifier has a depth of 6’-5”; less than the DNR standard of 10 feet.

From the primary clarifier, wastewater is pumped to the RBC for biological treatment. The RBC was constructed in 1982 and rehabilitated in 2012. The RBC is in good working condition.

Flow enters the final clarifier following the RBC. The final clarifier is a concrete tank constructed as part of the expansion in 1982. The final clarifier is in good serviceable condition. The overflow rate at design capacity is 600 gpd/sq. ft. as compared to DNR standard of 1,200 gpd/sq. ft. The final clarifier has a depth of 12 feet, which meets the DNR standard of 10 feet.

The existing WWTP is not capable of significant biological phosphorus reduction to achieve the stringent effluent phosphorus limit. The existing WWTP does not have any chemical feed equipment or chemical storage facilities. The existing WWTP is not capable of significant phosphorus removal to achieve the stringent effluent phosphorus limit. The Village has conducted a few separate chemical treatment pilot tests to target an effluent phosphorus level of 1.0 mg/L, however the pilot tests did not produce consistent and reliable results.

Solids Handling Description

The existing WWTP has an anaerobic digester tank which collects settled solids from the primary and final clarifiers. The tank is an underground concrete tank and is in good serviceable condition. The aeration tank is 18’ x 10’ with an overall depth of 14 feet. The digester tank volume is 2,520 cu. ft. The digester was constructed in 1980 as part of the plant upgrades and replaced the old anaerobic digester

which is now used as a sludge storage tank. Aeration is provided by two (2) 7 CFM blowers located in the Blower Building/Pump House.

The sludge storage tank which was previously the anaerobic digester is a concrete underground structure and is 15.5' x 15.5' and 15 feet deep with a storage volume of approximately 3,500 cu. ft. Liquid sludge is removed offsite once per year.

(B) Baseline Year

Influent and Effluent Phosphorus Data 2019-2023

Influent and effluent phosphorus data from 2019 – 2024 is shown in tables A.1 thru A.6. Data for 2024 is not complete. The Village is not required to sample for influent phosphorus; however, the Village has been sampling influent phosphorus in 2024 to determine influent total phosphorus levels.

Table A.1 – 2019 Influent and Effluent Phosphorus

Date	Influent Flow (MGD)	Influent Monthly Average		Effluent Monthly Average	
		TP (mg/L)	TP (lbs/day)	TP (mg/L)	TP (lbs/day)
Jan-19	0.023	-	-	3.85	0.84
Feb-19	0.023	-	-	4.08	0.71
Mar-19	0.065	-	-	4.44	1.47
Apr-19	0.032	-	-	2.56	0.64
May-19	0.056	-	-	2.92	1.07
Jun-19	0.026	-	-	3.80	0.80
Jul-19	0.042	-	-	4.81	1.31
Aug-19	0.018	-	-	6.91	0.98
Sep-19	0.084	-	-	5.71	2.29
Oct-19	0.067	-	-	3.23	3.84
Nov-19	0.021	-	-	4.79	0.69
Dec-19	0.033	-	-	3.55	1.58
Average	**0.041**	**-**	**-**	**4.22**	**1.35**

Table A.2 – 2020 Influent and Effluent Phosphorus

Date	Influent Flow (MGD)	Influent Monthly Average		Effluent Monthly Average	
		TP (mg/L)	TP (lbs/day)	TP (mg/L)	TP (lbs/day)
Jan-20	0.019	-	-	4.26	0.65
Feb-20	0.018	-	-	4.76	0.69
Mar-20	0.051	-	-	2.90	0.85
Apr-20	0.031	-	-	4.28	1.16
May-20	0.022	-	-	4.59	0.76
Jun-20	0.077	-	-	3.63	1.60
Jul-20	0.026	-	-	5.36	1.04
Aug-20	0.031	-	-	5.59	1.38
Sep-20	0.044	-	-	4.83	1.05
Oct-20	0.021	-	-	5.82	0.87
Nov-20	0.026	-	-	4.19	0.73
Dec-20	0.019	-	-	5.12	0.80
Average	**0.032**	**-**	**-**	**4.61**	**0.96**

Table A.3 – 2021 Influent and Effluent Phosphorus

Date	Influent Flow (MGD)	Influent Monthly Average		Effluent Monthly Average	
		TP (mg/L)	TP (lbs/day)	TP (mg/L)	TP (lbs/day)
Jan-21	0.021	-	-	5.20	0.79
Feb-21	0.022	-	-	5.30	0.93
Mar-21	0.029	-	-	3.44	0.82
Apr-21	0.023	-	-	4.03	0.64
May-21	0.031	-	-	3.64	0.81
Jun-21	0.025	-	-	5.33	0.83
Jul-21	0.048	-	-	6.68	4.53
Aug-21	0.101	-	-	4.01	1.31
Sep-21	0.024	-	-	6.06	1.15
Oct-21	0.019	-	-	6.53	0.95
Nov-21	0.019	-	-	5.60	0.87
Dec-21	0.019	-	-	4.90	0.85
Average	**0.032**	-	-	**5.06**	**1.21**

Table A.4 – 2022 Influent and Effluent Phosphorus

Date	Influent Flow (MGD)	Influent Monthly Average		Effluent Monthly Average	
		TP (mg/L)	TP (lbs/day)	TP (mg/L)	TP (lbs/day)
Jan-22	0.020	-	-	5.15	0.91
Feb-22	0.020	-	-	5.00	0.83
Mar-22	0.029	-	-	4.45	0.99
Apr-22	0.032	-	-	4.05	0.84
May-22	0.033	-	-	3.66	0.82
Jun-22	0.772	-	-	4.14	1.62
Jul-22	0.021	-	-	5.95	1.02
Aug-22	0.024	-	-	5.34	0.91
Sep-22	0.021	-	-	5.71	0.89
Oct-22	0.020	-	-	5.77	0.89
Nov-22	0.039	-	-	4.24	0.74
Dec-22	0.027	-	-	4.31	1.07
Average	**0.088**	-	-	**4.81**	**0.96**

Table A.5 – 2023 Influent and Effluent Phosphorus

Date	Influent Flow (MGD)	Influent Monthly Average		Effluent Monthly Average	
		TP (mg/L)	TP (lbs/day)	TP (mg/L)	TP (lbs/day)
Jan-23	0.029	-	-	3.68	1.04
Feb-23	0.033	-	-	4.05	1.43
Mar-23	0.044	-	-	2.62	0.88
Apr-23	0.065	-	-	1.91	0.84
May-23	0.031	-	-	3.31	0.91
Jun-23	0.026	-	-	4.33	0.91
Jul-23	0.027	-	-	4.05	0.93
Aug-23	0.013	-	-	8.10	0.92
Sep-23	0.021	-	-	8.83	2.24
Oct-23	0.017	-	-	8.72	1.20
Nov-23	0.016	-	-	8.91	1.09
Dec-23	0.015	-	-	7.18	0.83

Average	**0.028**	**-**	**-**	**5.47**	**1.10**

Table A.6 – 2024 Influent and Effluent Phosphorus

Date	Influent Flow (MGD)	Influent Monthly Average		Effluent Monthly Average	
		TP (mg/L)	TP (lbs/day)	TP (mg/L)	TP (lbs/day)
Jan-24	0.020	8.2	1.2	7.7	1.13
Feb-24	0.019	7.7	1.1	1.7	0.31
Mar-24	0.020	7.3	1.3	3.3	0.63
Apr-24	0.031	10.4	2.5	3.8	0.94
May-24	0.102	5.4	5.5	4.1	5.45
Jun-24	-	-	-	-	-
Jul-24	-	-	-	-	-
Aug-24	-	-	-	-	-
Sep-24	-	-	-	-	-
Oct-24	-	-	-	-	-
Nov-24	-	-	-	-	-
Dec-24	-	-	-	-	-
Average	**0.038**	**-**	**7.21**	**4.10**	**1.69**

From 2019 to 2024, the annual average phosphorus effluent concentration was 4.71 mg/L and 1.21 lbs/day.

(C) Possible Contributors: For municipalities, list all possible industries, other commercial buildings and hauled in wastes that could be introducing phosphorus into the collection system.

Wastewater discharged to the WWTP is primarily residential. There are two bars and a church that discharge to the system. There is only one discharger to the WWTP and that is Clark County Health Care Center. The facility staff has reviewed the chemical usage for cleaning, disinfectants, and other day to day operations of the facility. Several chemicals have been identified to contain phosphorus. The Health Care Center is in the process of implementing changes to eliminate phosphate based chemical usage.

Table B.1 – Potential Phosphorus Sources

Potential Source	Process Description	High Phosphorus Discharge?
Rivers End Bar	Tavern/Restaurant	No
Wildcat Mountain Bar & Grill	Tavern/Restaurant	No
Grace Community Church	Church	No

Water supply: What are the phosphorus levels within your water supply? Does the water utility add phosphorus for corrosion control or iron and manganese sequestration?

The Village operates its own municipal water supply system through the use of two (2) production wells. A centralized water treatment facility currently uses sodium hypochlorite for disinfection. No polyphosphates are added for sequestering iron and manganese.

END OF PAGE

PART 2 – PHOSPHORUS OPTIMIZATION ACTION PLANS

OPTIMIZATION ACTION PLAN "A" – IDENTIFY SOURCES OF INFILTRATION AND INFLOW

Optimization Action

Identify and repair leaking sanitary sewer lines that allow infiltration and inflow (I/I) to enter the system. I/I directly impacts flow to the WWTP and allows for greater phosphorus loads to discharge from the WWTP during peak rain events.

Optimization Action Plan

Meet with Village staff to review phosphorus contributors and review annual sewer investigation work.

Anticipated Time Frame for Optimization Action Plan

Item to Complete	Date - Start	Date Complete
Meet with Village Staff	7/1/2025	6/30/2030

Overall Optimization Action Plan Time Frame

Conduct meetings with Village staff annually, 7/1/2025 – 6/30/2030.

Overall Completion Date: 6/30/2030

OPTIMIZATION ACTION PLAN "B" – REDUCE EFFLUENT TOTAL PHOSPHORUS CONCENTRATIONS & LOADINGS

Optimization Action

Implement and optimize permanent chemical feed system at WWTP.

Optimization Action Plan

Design and construct a chemical feed system and chemical storage for phosphorus reduction. Optimize the system to consistently meet the limit and maintain 180 days of sludge storage.

Anticipated Time Frame for Optimization Action Plan

Item to Complete	Date Start	Date Complete
Submit plans and specifications to DNR	9/30/2024	12/30/2024
Bid Construction of Chemical Feed & Storage System	1/6/2025	2/10/2025
Construct Chemical Feed & Storage Project	3/1/2025	12/31/2025
Optimize Chemical Feed System	1/1/2026	12/31/2026

Overall Optimization Action Plan Time Frame

Submit plans and specifications for DNR approval by 9/30/2024 along with Clean Water Fund application. Depending on DNR review timeframe, receive approval by 12/30/2024. Upon receiving DNR approval, advertise project for bids in January 2025. Open bids February 2025. Begin construction of chemical feed and storage system in March 2025. Complete construction by December 2025. Optimize chemical feed system from January to December 2026 to consistently meet permit limits and maintain 180 days of sludge storage.

Overall Completion Date: 12/31/2026

OPTIMIZATION PLAN "C" – INVESTIGATE WATER QUALITY TRADING

Optimization Action

Continue discussions with Vernon County & begin discussions with Monroe County Land Conservation Departments to identify Water Quality Trading (WQT) in the HUC 12 watershed and adjacent watersheds and implement WQT projects. The goal for the discussions is to confirm the counties' willingness and ability to assist with WQT projects, including identifying projects with the potential of reducing phosphorus in the watershed, collecting field data and phosphorus samples, discussing with landowners, permitting, design, and providing construction oversite.

Briefly describe optimization action plan

Identify WQT projects, trading partners, gather field data including phosphorus sampling, complete modeling analysis for WQT projects, and determine project costs/funding opportunities. Draft WQT report and submit to DNR for approval. Obtain permit and construct projects.

WQT involves the WWTP compensating or cooperating with another party, preferably within the same HUC 12 basin, to have them reduce phosphorus to streams and other water bodies for an equivalent water quality benefit. WQT can be more practical for a small community as in-stream monitoring is not required to prove the benefit.

The goal for the Village of Ontario is to perform WQT to develop credits needed to get from a 1.0 mg/L effluent concentration to the stringent effluent phosphorus concentration of 0.075 mg/L.

From 2019-2024, the total annual average discharge from the Village of Boaz WWTP was approximately 16.4 million gallons (MG). At an average effluent phosphorus concentration of approximately 1.0 mg/L, the phosphorus mass loading is approximately 137 lbs. P/year. At the final 0.075 mg/L limit at the same flow, the discharge is 10.3 lbs. P/year. Ontario will need to work with the County Land Conservation to find approximately 379 lbs of phosphorus credits at an assumed ratio of 3:1. This assumes the WWTP will be equipped with a chemical feed system capable of reducing effluent TP to 1.0 mg/L consistently.

The Village will work with both Vernon and Monroe County Land Conservation Departments to identify projects in the HUC 12 watershed. Monroe County was contacted in 2024 and is optimistic about finding projects. The County has mentioned there are numerous streambank stabilization opportunities in the Brush Creek watershed in Monroe County where most of the Village's HUC 12 is located. Vernon County was contacted in 2023 to begin identifying projects along Brush Creek in Vernon County. Vernon County agreed to begin looking, however there was no update on the progress of locating projects since the initial discussions. Several attempts to contact Vernon County were made with no response. The Village will continue contacting Vernon County; however, it appears that more opportunities are available in Monroe County. If suitable projects can't be identified by county LCDs, the Village can register with the WQT Clearinghouse to find projects.

Anticipated Time Frame for Optimization Action Plan:

Main Item to Complete	Date Start	Date Complete
Identify WQT projects and trading partners	7/1/2025	6/30/2027
Investigate WQT funding opportunities	7/1/2025	6/30/2027
Collect field data and sampling	7/1/2027	6/30/2028
Conduct modeling analysis for WQT projects	7/1/2027	6/30/2028
Draft WQT Report	7/1/2028	6/30/2029
Construct WQT Projects	7/1/2029	6/30/2030

Overall Optimization Action Plan Time Frame: Discuss with Vernon & Monroe County to identify potential WQT projects and coordinate with landowners. Identify projects, coordinate with landowners, gather field data/modeling, draft WQT report, obtain permits, and construct projects by 6/30/2030.

Overall Completion Date: Complete by 6/30/2030.

PART 3 – OPTIMIZATION APPROVAL

Facility Name: Village of Ontario **WPDES Permit #:** WI-0020753-10-0

Name and Contact Information of Person Preparing Report:

Name: Carson Hackett, P.E. **E-mail Address:** chackett@davyinc.com

Telephone #: 608-782-3130

OPTIMIZATION ACTION PLANS

Please provide a summary of the proposed action items and projected completion dates. The completion dates should be developed to enable the incorporation of the action items into the Preliminary Facilities Plan that is required in the WPDES Permit Phosphorus Compliance Schedule.

ACTION ITEM	PROPOSED DATE OF COMPLETION
A. Identify Sources of Infiltration and Inflow	6/30/2030
B. Reduce Effluent Total Phosphorus	12/31/2026
C. Investigate Water Quality Trading	6/30/2030

For DNR use only

☐ Complete

☐ Not Complete

☐ Requesting more information?

Comments:

Submitted for Approval by:
(signed)

Date of Submittal: **10/25/2024**

Authorized Permit Representative
(printed)

Carson Hackett

Approved by:
(signed)

Date of Approval:

DNR Wastewater Engineer or Designee
(printed)

Facility Specific Phosphorus Variance Data Sheet

Directions: Please complete this form electronically. Record information in the space provided. Select checkboxes by double clicking on them. Do not delete or alter any fields. For citations, include page number and section if applicable. Please ensure that all data requested are included and as complete as possible. Attach additional sheets if needed.

Section I: General Information

A. Name of Permittee: Village of Ontario

B. Facility Name: Ontario Wastewater Treatment Facility

C. Submitted by: Wisconsin Department of Natural Resources

D. State: Wisconsin **Substance:** Phosphorus **Date completed:** October 10, 2024

E. Permit #: WI-0020753-10-0 **WQSTS #:** (EPA USE ONLY)

F. Duration of Variance **Start Date:** April 1, 2025 **End Date:** March 31, 2030

G. Date of Variance Application: June 15, 2023

H. Is this permit a:
- ☐ **First time submittal for variance**
- ☒ **Renewal of a previous submittal for variance**

I. Description of proposed variance:

Brush Creek is listed as a warm water sport fish community, non-public water supply. The water quality criteria for phosphorus for creeks like Brush Creek is 0.075 mg/L and the phosphorus WQBEL calculation formula is cited in s. NR 217.13 (2)(a), Wis. Adm. Code. The calculated phosphorus WQBEL is 0.075 mg/L as a 6-month average and 0.225 mg/L as a monthly average. Given the small size of this facility, a technology-based phosphorus limitation was not warranted in previous WPDES permits. The Village of Ontario was issued a WPDES permit containing the phosphorus WQBEL on February 1, 2013. During this permit term, Ontario evaluated their compliance options and determined that water quality trading, adaptive management and facility upgrades are not economically viable compliance options.

The proposed permit includes requirements to implement on-site phosphorus optimization measures along with an interim limit of 7.5 mg/L, expressed as a monthly average. The variance interim limit is reduced to 2.5 mg/L beginning January 1, 2027 after the plant is upgraded with chemical addition capabilities.

J. List of all who assisted in the compilation of data for this form

Name	Email	Phone	Contribution
Victoria Ziegler	Victoria.ziegler@wisconsin.gov	414-391-8946	Permit Drafter
Katie Jo Jerzak	Katherine.Jerzak@wisconsin.gov	715-491-0207	Compliance Engineer
Ben Hartenbower	Benjamin.Hartenbower@wisconsin.gov	715-225-4705	Limits Calculator

Section II: Criteria and Variance Information

A. Water Quality Standard from which variance is sought: Phosphorus 0.075mg/L

B. List other criteria likely to be affected by variance: none

C. Source of Substance: The Village of Ontario discharges to Brush Creek in the Plum Run- Kickapoo River Watershed. According to the Pollutant Load Ratio Elimination Tool (PRESTO) model, 98% of the phosphorus in the 150 square miles watershed is attributed from nonpoint sources. The total annual average nonpoint phosphorus loading is 94,249 lbs/year. The Ontario WWTF average annual phosphorus load between 2010 and 2012 was 708 lbs/year.

Citation: PRESTO is a statewide GIS-based tool that compares the average annual phosphorus loads originating from point and nonpoint sources within a watershed. More information about this model is available at http://dnr.wi.gov/topic/surfacewater/presto.html.

D. Ambient Substance Concentration: 0.115 mg/L (Kickapoo River) ☒ **Measured** ☐ **Estimated** ☐ **Default** ☐ **Unknown**

E. If measured or estimated, what was the basis? Include citation.
There are no recent phosphorus data from Brush Creek, however the discharge is located approximately 100 ft upstream of the confluence of Brush Creek and the Kickapoo River. Monitoring data collected from October 2008 through September 2009 (n=6) on the Kickapoo River at State Hwy 33 in Ontario demonstrates is above the applicable water quality criterion of 0.075 mg/L

F. Average effluent discharge rate: 0.035 MGD **Maximum effluent discharge rate:** 1.204 (07/14/2024)
(January 2019 – July 2024)

G. Effluent Substance Concentration: Mean = 4.76 mg/L, 1-day P99 = 11.20 mg/L, 4-day P99 = 7.55 mg/L, 30-day P99 = 5.67 mg/L

☒ **Measured** ☐ **Estimated** ☐ **Default** ☐ **Unknown**

H. If measured or estimated, what was the basis? Include Citation. Effluent data reported during January 2019 – July 2024 (n = 862).

I. Type of HAC:

☐ **Type 1: HAC reflects waterbody/receiving water conditions**
☒ **Type 2: HAC reflects achievable effluent conditions**
☐ **Type 3: HAC reflects current effluent conditions**

J. Statement of HAC:
The Department has determined the highest attainable condition of the receiving water is achieved through the application of the variance limit in the permit, combined with a permit requirement that the permittee implement its Phosphorus Optimization Plan. Thus, the HAC during the permit term is 2.5 mg/L, which reflects the greatest phosphorus reduction achievable with the proposed chemical upgrade treatment process without needing a wide-scale facility upgrade. The current effluent condition is reflective of current on-site measures that have already occurred, and a proposed interim limit of 7.5 mg/L has been included in the proposed permit until the permittee can complete the chemical feed upgrades and meet the variance interim limit of 2.5 mg/L. This HAC determination is based on the economic feasibility of available compliance options for Ontario this time (see Economic Section below). The permittee may seek to renew this variance in the subsequent reissuance of this permit; the Department will reevaluate the HAC in its review of such a request.

K. Variance Limit : an interim limit of 7.5 mg/L with a compliance schedule to achieve a variance interim limit to 2.5 mg/L

L. Level currently achievable (LCA): 7.5 mg/L

M. What data were used to calculate the LCA, and how was the LCA derived? (*Immediate compliance with LCA is required.)* The LCA was based on best professional judgment after reviewing effluent data from January 2019 – July 2024. The 4-day P99 during that period was 7.55 mg/L.

N. Explain the basis used to determine the variance limit (which must be ≤ LCA). Include citation.
Per the 2024 Facility Plan (to install chemical treatment) and discussions with the consultant based on an early 2024 chemical feed trial, the facility is only able to treat to 2.5 mg/L and still maintain 180 days of sludge storage. The increased chemical sludge has decreased the effective sludge storage the facility has. The facility will receive a compliance schedule to allow them to install and optimize the chemical treatment and then the lower limit of 2.5 mg/L will take effect. The facility plans to pursue water quality trading efforts during the permit term to avoid an upgrade to their sludge storage system.

O. Select all factors applicable as the basis for the variance provided under 40 CFR 131.10(g). Summarize justification below:

☐ **1** ☐ **2** ☐ **3** ☐ **4** ☐ **5** ☒ **6**

The Village of Ontario plans to implement and optimize a permanent chemical feed system at the wastewater treatment facility to achieve a variance limit of 2.5 mg/L. An additional upgrade to meet the WQBEL of 0.075 mg/L with sand filtration would force user rates to exceed 2% MHI. Given the long-term effects of phosphorus pollution, an interim monthly average limit of 7.5 mg/L is recommended until Ontario completes the facility upgrade to meet the variance interim limit of 2.5 mg/L monthly average, January 1, 2027.

Citation: Village of Ontario Phosphorus Optimization Plan, September 10, 2024

Section III: Location Information

A. Counties in which water quality is potentially impacted: Vernon County

B. Receiving waterbody at discharge point: Brush Creek

C. Flows into which stream/river? Kickapoo River **How many miles downstream?** 0.01 miles

D. Coordinates of discharge point (UTM or Lat/Long): Lat: 43.72077 N Long: 90.58975 W

E. What are the designated uses associated with this waterbody?
Warm water sport fish, non-public water supply

F. Describe downstream waters:
As previously stated, approximately 98% of the total phosphorus load to Brush Creek is from non-point sources. For these reasons, this facility is not believed to significantly impact downstream waters.

G. What is the distance from the point of discharge to the point downstream where the concentration of the substance falls to less than or equal to the applicable criterion of the substance?
The Kickapoo River is above the phosphorus criterion from the outfall location downstream to where it enters the Wisconsin River. The phosphorus concentration in the Wisconsin River at this confluence is unknown but may possibly remain below the criterion since the furthest downstream monitoring point is in Muscoda (0.096 mg/L). The Mississippi River is phosphorus impaired where the Wisconsin River enters, downstream.

H. Provide the equation used to calculate that distance.
N/A

I. Identify all other variance permittees for the same substance which discharge to the same stream, river, or waterbody in a location where the effects of the combined variances would have an additive effect on the waterbody:
There are no other permittees that discharge to Brush Creek that have a phosphorus variance.

Please attach a map, photographs, or a simple schematic showing the location of the discharge point as well as all variances for the substance currently draining to this waterbody on a separate sheet.

J. Is the receiving waterbody on the CWA 303(d) list? If yes, please list the impairments below. ☐ Yes ☒ No ☐ Unknown
Brush Creek is not on the CWA 303(d) list, but the Kickapoo River (located 0.01 miles downstream) is listed for total phosphorus.

River Mile	Pollutant	Impairment

Section IV: Pretreatment (complete this section only for POTWs with DNR-Approved Pretreatment Programs. See w:\Variances\Templates and Guidance\Pretreatment Programs.docx)

A. Are there any industrial users contributing phosphorus to the POTW? If so, please list.
No

B. Are all industrial users in compliance with local pretreatment limits for phosphorus? If not, please include a list of industrial users that are not complying with local limits and include any relevant correspondence between the POTW and the industry (NOVs, industrial SRM updates and timeframe, etc)
NA

C. When were local pretreatment limits for phosphorus last calculated?
NA

D. Please provide information on specific SRM activities that will be implemented during the permit term to reduce the industry's discharge of the variance pollutant to the POTW
NA

Section V: Public Notice

A. Has a public notice been given for this proposed variance? ☒ Yes ☐ No

B. If yes, was a public hearing held as well? ☒ Yes ☐ No ☐ N/A

C. What type of notice was given?
☒ Notice of variance included in notice for permit ☐ Separate notice of variance

D. Date of public notice: _____ **Date of hearing:** _____

E. Were comments received from the public in regards to this notice or hearing? *(If yes, please attach on a separate sheet)* ☐ Yes ☐ No

Section VI: Human Health

A. Is the receiving water designated as a Public Water Supply? ☐ Yes ☒ No

B. Applicable criteria affected by variance: NA

C. Identify any expected impacts that the variance may have upon human health, and include any citations: none

Section VII: Aquatic Life and Environmental Impact

A. Aquatic life use designation of receiving water: warm water sport fish (WWSF)

B. Applicable criteria affected by variance: 0.075 mg/L

C. Identify any environmental impacts to aquatic life expected to occur with this variance, and include any citations:
The Village of Ontario discharges to Brush Creek in the Plum Run- Kickapoo River Watershed. According to the Pollutant Load Ratio Elimination Tool (PRESTO) model, 98% of the phosphorus in the 150 square miles watershed is attributed from nonpoint sources. The total annual average nonpoint phosphorus loading is 94,249 lbs/year. The Ontario WWTF average annual phosphorus load between 2010 and 2012 was 708 lbs/year.

D. List any Endangered or Threatened species known or likely to occur within the affected area, and include any citations:

Northern Monkshood (Aconitum noveboracense): federally listed threatened

Citation: National Heritage Index (http://dnr.wi.gov/topic/nhi/)

Section VIII: Economic Impact and Feasibility

A. Describe the permittee's current pollutant control technologies (treatment processes):
Treatment consists of a primary clarifier, bar screen, rotating biological contractor (RBC), secondary clarifier, chlorination, and dechlorination. The permittee has no control technologies for phosphorus currently.

B. **What modifications would be necessary to comply with the current limits? List additional treatment processes and/or technologies available. Include any citations.**
Tertiary treatment would be needed to comply with the final limits, such as discfilters, ultrafiltration, or reactive sand filters. The facility would also need to upgrade their clarifiers and sludge storage capacity due to the increased chemical sludge loading. These options and costs are discussed in further detail in the 2024 Facility Plan.

Citation:

C. Identify any expected environmental impacts that would result from further treatment, and include any citations:

The plant would need to be expanded from its current footprint, resulting in more impervious surfaces and potential environmental issues. This is discussed in the 2024 Facility Plan.

D. Is it technically and economically feasible for this permittee to modify the treatment process to comply with the water quality-based limits? ☐ Yes ☒ No
The facility is financially strained and will not be able to upgrade the WWTP and stay below or at 2% of the MHI. Costs to install tertiary treatment would raise the user rates to 3.16% of the MHI.

E. If treatment is possible, is it possible to comply with the limits on the substance? ☐ Yes ☒ No

F. If yes, what prevents this from being done? Include any citations. N/A

G. List any alternatives to current practices that have been considered, and why they have been rejected as a course of action, including any citations:

The Facility is pursuing water quality trading as a compliance option. They were unable to find trades in the last permit term but have found some promising leads already in late 2024. The facility's optimization plan includes a timeline for finding, vetting, and designing water quality trades and anticipates using water quality trading for their next permit's compliance option.

Citation: Village of Ontario Phosphorus Optimization Plan, September 10, 2024

H. Describe the economic impacts of compliance: ***{applies only to municipalities; include other cost estimates for industries}***

Economic Factor		Source
MHI	$57,500	DNR Loan Website
Calculated preliminary screener	3.16%	2024 Facility Plan
Secondary score value	5 (Vernon County)	DNR's Phosphorus Multi-discharger Variance Guidance

Section IX: Multi-Discharger Variance Feasibility *(this assumes MDV approval)*

A. Does the facility meet the economic indicators to qualify for the MDV? ☒ **Yes** ☐ **No** ☐ **Unknown**

MDV secondary indicator score: **6**

B. Is it technically and economically feasible for this permittee to comply with a phosphorus WQBEL of 1 mg/L or lower? ☐ **Yes** ☒ **No** ☐ **Unknown**

C. Justification for considering an individual variance in lieu of the MDV:

To qualify for the MDV, a facility must meet an interim limit of 0.8 mg/L. In special cases, a limit of 1 mg/L will be considered. Ontario does not have the sludge storage capacity to treat down to 1.0 mg/L and maintain 180 days of storage. The additional chemical use to get to 1.0 mg/L would result in increased hardships to the facility, who is already on an economic variance for their previous permit term.

Citation:2024 Facility Plan

Section X: Compliance with Water Quality Standards

A. Describe all activities that have been, and are being, conducted to reduce the discharge of the substance into the receiving stream. This may include existing treatments and controls, consumer education, promising centralized or remote treatment technologies, planned research, etc. Include any citations.

See attached Optimization Plan. Plan includes chemical feed optimization to 2.5 mg/L once chemical feed is installed, I/I reduction, and pursuit of water quality trade projects. Facility was not treating for phosphorus at all during the previous permit cycle.

B. Describe all actions that the permit requires the permittee to complete during the variance period to ensure reasonable progress towards attainment of the water quality standard. Include any citations.

See attached Optimization Plan. Plan includes chemical feed optimization to 2.5 mg/L once chemical feed is installed, I/I reduction, and pursuit of water quality trade projects.

This permit contains a variance to the water quality-based effluent limit (WQBEL) for phosphorus granted in accordance with s. 283.15, Wis. Stats. As conditions of this variance the permittee shall (a) maintain effluent quality at or below the

interim effluent limitations specified in the table above per the schedule compliance date, (b) report on reductions and optimizing control of phosphorus, and (c) perform the actions listed in the schedule section of the permit.

Phosphorus Variance and WWTP Upgrade/Optimization -Construction Upgrade Progress Report	May 1, 2025
Phosphorus Variance and WWTP Upgrade/Optimization -Complete Construction	December 31, 2025
Phosphorus Variance and WWTP Upgrade/Optimization -Achieve Compliance	December 31, 2026
Phosphorus Variance and WWTP Upgrade/Optimization -Annual Optimization Report #1	September 30, 2027
Phosphorus Variance and WWTP Upgrade/Optimization -Annual Optimization Report #2	September 30, 2028
Phosphorus Variance and WWTP Upgrade/Optimization -Report on Reductions & Optimizing Control of Phosphorus	September 30, 2029
Phosphorus Variance and WWTP Upgrade/Optimization -Annual Optimization Reports After Permit Expiration	See Permit

Section XI: Compliance with Previous Permit *(Variance Reissuances Only)*

A. Date of previous submittal: October 17, 2018 **Date of EPA Approval:** December 7, 2018

B. Previous Permit #: WI-0020753-10 **Previous WQSTS #:** (EPA USE ONLY)

C. Effluent substance concentration: 1-day P_{99}: 11.20mg/L; 4-day P_{99}: 7.55 mg/L; 30-day P_{99}: 5.67 mg/L **Variance Limit:** 8.0 mg/L

D. Target Value(s): N/A **Achieved?** ☒ **Yes** ☐ **No** ☐ **Partial**

E. For renewals, list previous steps that were to be completed. Show whether these steps have been completed in compliance with the terms of the previous variance permit. Attach additional sheets if necessary.

Condition of Previous Variance	Compliance
1. Identify sources of phosphorus: Continue efforts to identify and repair/reduce the I/I sources throughout the Village according to CMOM program and annual audits.	☒ **Yes** ☐ **No**
2. Reduce effluent TP concentrations/loadings:	
a. Identify sources of phosphorous causing seasonal peaks in effluent concentration.	☐ **Yes** ☒ **No**
b. Budgeting for future capital expenditure to upgrade WWTP.	☒ **Yes** ☐ **No**
c. Chemical supply companies will be contacted to set up a pilot study on the secondary clarifier for phosphorus removal. It is anticipated Alum will be used.	☒ **Yes** ☐ **No**
d. Review results of the pilot study, propose plan to DNR based upon analysis.	☒ **Yes** ☐ **No**
e. Design and implement plan based upon pilot study results (assumes the pilot study was successful).	☒ **Yes** ☐ **No**

3. Watershed Reduction Program	
a. Evaluate Village owned land and stormwater needs for potential nonpoint source projects.	☒ **Yes** ☐ **No**
b. Work with the County Land Conservation Department to identify potential projects to be used to apply toward the PMP Watershed Program for future trades.	☒ **Yes** ☐ **No**
c. Upon identifying potential projects for credit trading, follow up with soil testing, calculations and a Water Quality Trading Report.	☐ **Yes** ☒ **No**
d. Work with DNR to secure approval of the Water Quality Trading projects.	☐ **Yes** ☒ **No**
e. Budgeting for future capital expenditure to implement watershed projects.	☐ **Yes** ☒ **No**
4. Public Education	
a. Distribute information to residents and businesses regarding the new regulations of phosphorus and potential sources/reductions.	☒ **Yes** ☐ **No**
b. Conduct a meeting with the Village Board and interested residents/businesses to help encourage input on sources/reductions of phosphorus.	☒ **Yes** ☐ **No**
c. Should any items require follow up from meeting in 4b., then address those items. At that time, the PMP may need to be updated to add action items.	☐ **Yes** ☒ **No**
Annual Reporting to DNR	☒ **Yes** ☐ **No**