

# Permit Fact Sheet

## General Information

Permit Number:	WI-0020303-10-0	
Permittee Name:	VILLAGE OF HUSTISFORD	
Address:	P O Box 345 210 South Lake Street	
City/State/Zip:	Hustisford WI 53034	
Discharge Location:	SE ¼ of SW ¼, Section 15, T10N, R16E Lat: 43.33084° N / Lon: 88.58912° W	
Receiving Water:	Rock River (Sinissippi Lake Watershed, UR08 – Upper Rock River Basin) in Dodge County	
StreamFlow (Q <sub>7,10</sub> ):	5.0 cfs	
Stream Classification:	Warm Water Sport Fish (WWSF)	
Discharge Type:	Existing, Continuous	
Design Flow(s)	Annual Average	0.236 MGD
Significant Industrial Loading?	None	
Operator at Proper Grade?	Yes, facility is Basic with subclasses A4, P, L & SS. Subclass SS will be required by the end of the permit term.	
Approved Pretreatment Program?	N/A	

## Facility Description

The Village of Hustisford operates a wastewater treatment facility for the Village of Hustisford, the Hubbard-Hustisford Sanitary District No. 1 and the Hubbard Sanitary District No. 2 serving a total population of approximately 2,400 residents with no significant industrial contributors. The treatment plant consists of three aerated ponds where treatment occurs before being discharged to the Rock River daily on a year-round basis. Lagoon 1 is 10 feet deep and holds roughly 3.18 million gallons. Lagoon 2 is approximately 9 feet deep and holds roughly 2.18 million gallons. Lagoon 3 is about 6 feet deep and holds around 5.82 million gallons. The design flow of the facility is 0.236 MGD with an average of 0.176 MGD discharged daily. Phosphorus treatment is performed by chemical removal. Solids that settle are stored in the lagoons and periodically removed and land applied on DNR approved sites. Solids were last removed from the lagoons in 2010.

## Substantial Compliance Determination

After a desk top review of all discharge monitoring reports, CMARs, land app reports, compliance schedule items, and a site visit on December 19, 2022, this facility has been found to be in substantial compliance with their current permit.

**Compliance determination entered by Amy Garbe and Jordan Main, Wastewater Engineers on January 24, 2023 and January 1, 2024.**

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, WasteType/sample Contents and Treatment Description (as applicable)
701	0.185 MGD (Average January 2018 – December 2023)	Influent: 24-hour flow proportional composite samples to be collected from the manhole after the influent flow metering structure. Composite samples to represent the comingled discharges by the Village of Hustisford, Hubbard-Hustisford Sanitary District No. 1, and the Hubbard Sanitary District No. 2. Flow rate measured by separate flow meters for the Village of Hustisford, Hubbard-Hustisford Sanitary District No. 1, and the Hubard Sanitary District No. 2 to be totalized and the sum of the three (3) meters reported as the influent flow rate.
001	0.192 MGD (Average July 2018- June 2023)	Effluent: Representative effluent samples shall be collected after the effluent weir, prior to discharge to the Rock River. All samples are grab samples. Flow monitoring occurs at the V-notch weir in the concrete structure at the southeast corner of pond #3.
002	No solids were land applied during the previous permit term.	Liquid, Class B. Representative composite grab lagoon sludge samples shall be taken from each lagoon and then combined for one sample. If a lagoon is scheduled for desludging, a composite grab sample of just that lagoon sludge may be needed prior to land spreading. Sludge Management: The permittee shall submit a Desludging Management Plan to the Department for review and approval 60 days prior to sludge removal. The permittee shall contact the Department prior to recycling/disposing of any sludge.

Sample Point Designation For Groundwater Monitoring Systems			
System	Sample Pt Number	Well Name	Comments
Groundwater Monitoring	801	MW-1	Non-Point of Standards, Background Well
	802	MW-2	Non-Point of Standards, Downgradient
	803	MW-3	Non-Point of Standards, Downgradient

## 1 Influent – Monitoring Requirements

### Sample Point Number: 701- INFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
BOD <sub>5</sub> , Total		mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	2/Week	24-Hr Flow Prop Comp	

### Changes from Previous Permit:

**BOD<sub>5</sub> and Total Suspended Solids:** The sample frequency has increased to 2/week to align with effluent discharge monitoring.

### Explanation of Limits and Monitoring Requirements

**BOD<sub>5</sub> and Total Suspended Solids:** Tracking of BOD<sub>5</sub>, and Suspended Solids are required for percent removal requirements found in s. NR 210.05, Wis. Adm. Code and in the standard requirement 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
Flow Rate		MGD	Daily	Continuous	
BOD <sub>5</sub> , Total	Weekly Avg	45 mg/L	2/Week	Grab	
BOD <sub>5</sub> , Total	Monthly Avg	30 mg/L	2/Week	Grab	
Suspended Solids, Total	Monthly Avg	60 mg/L	2/Week	Grab	
Suspended Solids, Total	Monthly Avg	116 lbs/day	2/Week	Calculated	Limit effective January, March, May, July, August, October, December each year.
Suspended Solids, Total	Monthly Avg	128 lbs/day	2/Week	Calculated	Limit effective February each year.
Suspended Solids, Total	Monthly Avg	120 lbs/day	2/Week	Calculated	Limit effective April, June, September, November each year.
Suspended Solids, Total	Weekly Avg	173 lbs/day	2/Week	Calculated	Limit effective January, March, May, July, August, October, December each year.
Suspended Solids,	Weekly Avg	190 lbs/day	2/Week	Calculated	Limit effective February

<b>Monitoring Requirements and Limitations</b>					
<b>Parameter</b>	<b>Limit Type</b>	<b>Limit and Units</b>	<b>Sample Frequency</b>	<b>Sample Type</b>	<b>Notes</b>
Total					each year.
Suspended Solids, Total	Weekly Avg	179 lbs/day	2/Week	Calculated	Limit effective April, June, September, November each year.
pH Field	Daily Max	9.0 su	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	
Nitrogen, Ammonia Variable Limit		mg/L	2/Week	See Table	Using the daily pH result look up the applicable ammonia limit in the pH Dependent Daily Max Ammonia Table in the permit & report the variable limit on the daily record (DMR).
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	2/Week	Grab	Enter the daily ammonia result on the daily record (DMR) and compare the Nitrogen, Ammonia Variable Limit to determine compliance. See table in section 'Nitrogen, Ammonia (NH3-N) Total, Daily Max - Variable'
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	110 mg/L	2/Week	Grab	Limit effective November - June each year.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	90 mg/L	2/Week	Grab	Limit effective July each year.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	51 mg/L	2/Week	Grab	Limit effective August each year.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	32 mg/L	2/Week	Grab	Limit effective September each year.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	47 mg/L	2/Week	Grab	Limit effective October each year.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	110 mg/L	2/Week	Grab	Limit effective November - June each year.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	90 mg/L	2/Week	Grab	Limit effective July each year.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	51 mg/L	2/Week	Grab	Limit effective August each year.

<b>Monitoring Requirements and Limitations</b>					
<b>Parameter</b>	<b>Limit Type</b>	<b>Limit and Units</b>	<b>Sample Frequency</b>	<b>Sample Type</b>	<b>Notes</b>
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	32 mg/L	2/Week	Grab	Limit effective September each year.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	47 mg/L	2/Week	Grab	Limit effective October each year.
E. coli		#/100 ml	Weekly	Grab	Monitoring only May through September annually until the final limit goes into effect per the Effluent Limitations for E. coli Schedule.
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Limit effective May through September annually per the Effluent Limitations for E. coli Schedule.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Limit effective May through September annually per the Effluent Limitations for E. coli Schedule. See the 'E. coli Percent Limit' section. Enter the result in the DMR on the last day of the month.
Phosphorus, Total	Monthly Avg	1.0 mg/L	3/Week	Grab	
Phosphorus, Total	Monthly Avg	3.72 lbs/day	3/Week	Calculated	Limit effective January each year.
Phosphorus, Total	Monthly Avg	4.93 lbs/day	3/Week	Calculated	Limit effective February each year.
Phosphorus, Total	Monthly Avg	3.85 lbs/day	3/Week	Calculated	Limit effective March each year.
Phosphorus, Total	Monthly Avg	3.06 lbs/day	3/Week	Calculated	Limit effective April each year.
Phosphorus, Total	Monthly Avg	2.67 lbs/day	3/Week	Calculated	Limit effective May and September each year.
Phosphorus, Total	Monthly Avg	2.36 lbs/day	3/Week	Calculated	Limit effective June each year.
Phosphorus, Total	Monthly Avg	2.39 lbs/day	3/Week	Calculated	Limit effective July each year.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Phosphorus, Total	Monthly Avg	2.41 lbs/day	3/Week	Calculated	Limit effective August each year.
Phosphorus, Total	Monthly Avg	2.59 lbs/day	3/Week	Calculated	Limit effective October each year.
Phosphorus, Total	Monthly Avg	2.68 lbs/day	3/Week	Calculated	Limit effective November each year.
Phosphorus, Total	Monthly Avg	3.15 lbs/day	3/Week	Calculated	Limit effective December each year.
Chloride		mg/L	Quarterly	Grab	Monitoring only.
Nitrogen, Nitrite + Nitrate (as N) Dissolved		mg/L	Quarterly	Grab	Monitoring only.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	Grab	Annual in rotating quarters. See 'Nitrogen Series Monitoring' section.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	Grab	Annual in rotating quarters. See 'Nitrogen Series Monitoring' section.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Annual in rotating quarters. See 'Nitrogen Series Monitoring' section. Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.

### Changes from Previous Permit

**Flow:** The sample type has been changed from “total daily” to “continuous” for eDMR reporting purposes.

**pH:** The sample frequency for this parameter has been increased to 5/week.

**E.coli:** Fecal coliform monitoring and limits have been replaced with Escherichia coli (E. coli) monitoring and limits. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

**Phosphorus, Total:** The sample frequency for this parameter has been increased to 3/week.

**Nitrogen, Nitrite + Nitrate (as N) Dissolved:** Monthly monitoring throughout the permit term was added to the proposed permit.

**Total Nitrogen Monitoring (TKN, N02+N03 and Total N):** Annual monitoring in rotating quarters throughout the permit term was added to the proposed permit.

## Explanation of Limits and Monitoring Requirements

Please refer to the Water Quality Based Effluent Limitations memo for the Hustisford Wastewater Treatment Facility prepared by Sarah Luck dated September 8, 2023, and used for this reissuance.

**BOD<sub>5</sub> and pH:** No changes are recommended in the categorical permit limitations for BOD<sub>5</sub> and pH. Because the 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. Where the receiving water is classified as fish and aquatic life (Warm Water Sport Fish in this case) as defined in s. NR 102.04(3)(b), Wis. Adm. Code the categorical limits for BOD<sub>5</sub> and pH are those limits enumerated in s. NR 210.05(1)(a) and s. NR 210.05(1)(c), Wis Adm. Code.

**Suspended Solids, Total:** The TSS limit is a variance limit according to s. NR 210.07(2), Wis. Adm. Code. Weekly average and monthly average mass limits for total suspended solids were required to comply with the Rock River TMDL and were derived consistent with the assumptions and requirements of the EPA-approved WLA for the Rock River. There are no changes proposed in current concentration limits. These limits are in addition to the concentration limit for suspended solids of 60 mg/L as a monthly average. The approved total suspended solids TMDL limits for this permittee are included in the following table, expressed as weekly average and monthly average effluent limits, and were already effective during the previous permit term:

Month	Monthly Ave TSS Effluent Limit (lbs/day)	Weekly Ave TSS Effluent Limit (lbs/day)
Jan	116	173
Feb	128	190
March	116	173
April	120	179
May	116	173
June	120	179
July	116	173
Aug	116	173
Sept	120	179
Oct	116	173
Nov	120	179
Dec	116	173

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

**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.

E. coli monitoring is required at the permit effective date. At the end of the compliance schedule, E. coli limits of 126 #/100 ml as a monthly geometric mean that may not be exceeded and 410 #/100 ml as a daily maximum that may not be exceeded more than 10 percent of the time in any calendar month will apply.

**Phosphorus, Total:** Phosphorus requirements are based on the Phosphorus Rules that became effective 12/1/2010 as detailed in NR 102 Water Quality Standards and NR 217 Effluent Standards and Limitations for Phosphorus. Chapter NR 217 of the Wis. Adm. Code addresses point source dischargers of phosphorus to surface waters. The monthly average phosphorus limit is a technology-based effluent limit. Sample frequency has been increased due to compliance concerns and the need for the 1.0 mg/L TBEL.

Waste load allocations specified in TMDLs are expressed as WQBELs (water quality based effluent limits). The waste load allocated-derived WQBELs are consistent with the assumptions and requirements of the approved Rock River TMDL. The approved total phosphorus TMDL limits for this permittee are included in the following table, expressed as monthly average effluent limits, and were already effective during the previous permit term:

Month	Monthly Ave Total P Effluent Limit (lbs/day)
Jan	3.72
Feb	4.93
March	3.85
April	3.06
May	2.67
June	2.36
July	2.39
Aug	2.41
Sept	2.67
Oct	2.59
Nov	2.68
Dec	3.15

**Chloride:** Acute and chronic chloride toxicity criteria for the protection of aquatic life are included in Tables 1 and 5 of ch. NR 105, Wis. Adm. Code. Subchapter VII of ch. NR 106, Wis. Adm. Code establishes the procedure for calculating water quality based effluent limitations (WQBELs) for chloride. Quarterly monitoring during the permit term is included to aid in characterization of the lagoon chemical composition and provide supporting data for the Groundwater Evaluation at permit reissuance. For more information, refer to the Groundwater Evaluation for Hustisford WWTF, WPDES Permit memo, dated January 17, 2024.

**Nitrogen, Nitrite + Nitrate (as N) Dissolved:** This parameter has been included in the permit at a quarterly monitoring frequency to aid in characterization of the lagoon chemical composition and provide supporting data for the Groundwater Evaluation at permit reissuance. For more information, refer to the Groundwater Evaluation for Hustisford WWTF, WPDES Permit memo, dated January 17, 2024.

**Total Nitrogen Monitoring (NO<sub>2</sub>+NO<sub>3</sub>, 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.

**PFAS:** Based on information available at the time the proposed permit was drafted, the department has determined the permittee does not need to sample for PFOS or PFOA in their effluent as part of this permit reissuance. The department



may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

**Monitoring Frequency:** 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 fairness and consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term.

The Department has been revisiting the sampling frequencies at every facility to evaluate whether current frequencies are appropriate or if an increase is warranted. The frequencies for pH and phosphorus were increased to align Hustisford with other facilities of similar size to ensure fairness and in consideration of department guidance of sample frequencies.

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

### 3 Groundwater – Monitoring and Limitations

#### 3.1 Groundwater Monitoring System for Lagoons

**Location of Monitoring system:** SE 1/4 of SW 1/4, Section 15, T10N, R16E

**Wells to be Monitored:** MW-1, MW-2, MW-3

**Well Used To Calculate PALs:** MW-1

**Point of Standards Application Well(s):** None

Parameter	Units	Preventative Action Limit	Enforcement Standard	Frequency
Depth To Groundwater	feet	N/A	N/A	2/Year
Groundwater Elevation	feet MSL	N/A	N/A	2/Year
Nitrogen, Nitrite + Nitrate (as N) Dissolved	mg/L	2.0	10	2/Year
Nitrogen, Ammonia Dissolved	mg/L	0.97	9.7	2/Year
Nitrogen, Organic Dissolved	mg/L	N/A	N/A	2/Year
Nitrogen, Total Kjeldahl Dissolved	mg/L	N/A	N/A	2/Year
Chloride Dissolved	mg/L	125	250	2/Year
Conductivity	umhos/cm	N/A	N/A	2/Year

#### Changes from Previous Permit:

Preventative Action Limits and Enforcement Standards are included for Nitrite + Nitrate Nitrogen, Ammonia Nitrogen, and Chloride.

Electrical Conductivity has been added to the list of monitoring parameters for groundwater.

The frequency for monitoring of these parameters has changed to 2/year.

## Explanation of Limits and Monitoring Requirements

Refer to the Groundwater Evaluation for Hustisford WWTF, WPDES Permit memo, dated January 17, 2024 prepared by Zach Watson, Hydrogeologist.

### 4 Land Application - Monitoring and Limitations

Municipal Sludge Description						
Sample Point	Sludge Class (A or B)	Sludge Type (Liquid or Cake)	Pathogen Reduction Method	Vector Attraction Method	Reuse Option	Amount Reused/Disposed (Dry Tons/Year)
002	B	Liquid	Fecal Coliform	Injection	Land Application	N/A Lagoon
Does sludge management demonstrate compliance? <b>Yes</b>						
Is additional sludge storage required? <b>No</b>						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? <b>Yes</b> 7/13/2023, 4.66 pCi/L 2/16/2023, 2.14 pCi/L  Special monitoring and recycling conditions will be included in the permit to track any potential problems in landapplying sludge from this facility.						
Is a priority pollutant scan required? <b>No, design flow is less than 5 MGD.</b>						

### Sample Point Number: 002- LAGOON SLUDGE

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Radium 226 Dry Wt		pCi/g	Once	Composite	January 1, 2026 – December 31, 2026
Arsenic Dry Wt	Ceiling	75 mg/kg	Once	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Once	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Once	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Once	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Once	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Once	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Once	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Once	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Once	Composite	

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

### Changes from Previous Permit:

**Radiumm-226:** The sample year has been updated.

**PCB:** Monitoring for PCBs in the year 2026 has been added to the proposed permit.

**PFAS:** Annual sludge 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”.

**PCB:** PCBs are not expected to be present due to the lack of any industrial or commercial discharges. Pursuant to s. NR 204.06(2)(c), Wis Adm. Code, PCB monitoring may be included with a monitoring frequency of ‘once’ every other permit term.

**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.

## 5 Schedules

### 5.1 Effluent Limitations for E. coli

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

Required Action	Due Date
<b>Status Update:</b> The permittee shall submit information within the discharge monitoring report (DMR) comment section documenting the steps taken in preparation for properly monitoring and testing for E. coli including, but not limited to, selected test method and location of sampling.	05/21/2024
<p><b>Operational Evaluation Report:</b> The permittee shall prepare and submit an Operational Evaluation Report to the Department for review and approval. The report shall include an evaluation of collected effluent data and proposed operational improvements that will optimize efficacy of disinfection at the treatment plant during the period prior to complying with final E. coli limitations and, to the extent possible, enable compliance with the final E. coli limitations. The report shall include a plan and schedule for implementation of the operational improvements. These improvements shall occur as soon as possible, but not later than <b>April 30, 2025</b>. The report shall state whether the operational improvements are expected to result in compliance with the final E. coli limitations.</p> <p>The permittee shall implement the operational improvements in accordance with the approved plan and schedule specified in the Operational Evaluation Report and in no case later than <b>April 30, 2025</b>.</p> <p>If the Operational Evaluation Report concludes that the operational improvements are expected to result in compliance with the final E. coli limitations, the permittee shall comply with the final E. coli limitations by <b>April 30, 2025</b> and the permittee is not required to comply with subsequent milestones identified below in this compliance schedule (‘Submit Facility Plan’, ‘Final Plans and Specifications’, ‘Treatment Plant Upgrade to Meet Limitations’, ‘Construction Upgrade Progress Report’, ‘Complete</p>	11/30/2024

Construction', 'Achieve Compliance').  FACILITY PLAN - If the Operational Evaluation Report concludes that operational improvements alone are not expected to result in compliance with the final E. coli limitations, the permittee shall initiate development of a facility plan for meeting final E. coli limitations and comply with the remaining required actions in this schedule of compliance.  If the Department disagrees with the conclusion of the report and determines that the permittee can achieve final E. coli limitations using the existing treatment system with only operational improvements, the Department may reopen and modify the permit to include an implementation schedule for achieving the final E. coli limitations sooner than <b>April 30, 2028</b> .	
<b>Submit Facility Plan:</b> If the Operational Evaluation Report concluded that the permittee cannot achieve final E. coli limitations with operational improvements alone, the permittee shall submit a Facility Plan per s. NR 110.09, Wis. Adm. Code. The permittee may submit an abbreviated facility plan if the Department determines that the modifications are minor.	04/30/2025
<b>Final Plans and Specifications:</b> The permittee shall submit final construction plans to the Department for approval pursuant to ch. NR 108, Wis. Adm. Code, specifying treatment plant upgrades that must be constructed to achieve compliance with final E. coli limitations and a schedule for completing construction of the upgrades by the complete construction date specified below.	03/31/2026
<b>Treatment Plant Upgrade to Meet Limitations:</b> The permittee shall initiate bidding, procurement, and/or construction of the project. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats., prior to initiating activities defined as construction under ch. NR 108, Wis. Adm. Code. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications.	09/30/2026
<b>Construction Upgrade Progress Report:</b> The permittee shall submit a progress report on construction upgrades.	09/30/2027
<b>Complete Construction:</b> The permittee shall complete construction of wastewater treatment system upgrades.	03/31/2028
<b>Achieve Compliance:</b> The permittee shall achieve compliance with final E. coli limitations.	04/30/2028

### 5.1.1 Explanation of Schedule

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

### 5.2 Land Application Management Plan

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

### 5.2.1 Explanation of Schedule

If the permittee wishes to land apply sludge from the lagoons during the permit term, they must submit a plan detailing how the sludge will be handled and where it will be applied for the Department to approve. The plan must be submitted at least 60 days prior to the sludge being applied.

### 5.3 Desludging Management Plan

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

#### 5.3.1 Explanation of Schedule

If desludging of the lagoons is proposed, a plan needs to be developed that clearly explains how the sludge will be removed, what contingencies are in place, and the type of equipment will be used. Since earthen lined lagoons are in place, proper procedures need to be taken to not injure the liners. If the lagoons are to be de-sludged during this permit term, a management plan needs to be submitted 60 days prior to desludging. At minimum, this plan should address how the sludge will be sampled, removed, transported, and disposed of. An outline is available to assist in plan development.

### 5.4 Groundwater Monitoring Well - Abandonment Evaluation

Required Action	Due Date
<b>Submit Abandonment Evaluation:</b> The permittee shall submit a well abandonment evaluation to the department by the Due Date. The evaluation shall 1) investigate the cost to abandon monitoring wells MW-1, MW-2, and MW-3; 2) investigate the cost of ongoing monitoring requirements at these wells; and 3) determine if it is cost effective for the facility to abandon monitoring wells MW-1, MW-2, and MW-3 or continue ongoing monitoring requirements.	03/31/2029

#### 5.4.1 Explanation of Schedule

A schedule is included in the permit to provide time for the permittee to determine the cost-effective option between groundwater monitoring well abandonment and ongoing groundwater monitoring of wells MW #1, MW #2, and MW #3. Pursuant to s. NR 141.25(1)(b), Wis. Adm. Code, any permanent groundwater monitoring well no longer being used to gather information on geologic or groundwater properties shall be abandoned within 60 days after its use has been discontinued.

### Special Reporting Requirements

None.

### Other Comments:

None.

## **Attachments:**

Water Quality Based Effluent Limits dated September 8, 2023

NR 140 Groundwater Evaluation Report dated January 17, 2024

## **Expiration Date:**

March 31, 2029

## **Justification Of Any Waivers From Permit Application Requirements**

No waivers were requested or given from permit application requirements.

**Prepared By:** BetsyJo Howe Wastewater Specialist

**Date:** 1/22/2024

Updated (based on fact check comments): Editorial changes for clarity. Influent sample description updated. 2/9/2024

Updated (based on public notice comments):

# CORRESPONDENCE/MEMORANDUM

DATE: September 8, 2023

TO: Jennifer Jerich – SCR/Horicon

FROM: Sarah Luck – SCR/Fitchburg

SUBJECT: Water Quality-Based Effluent Limitations for the Hustisford Wastewater Treatment Facility  
WPDES Permit No. WI-0020303-10-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Hustisford Wastewater Treatment Facility in Dodge County. This municipal wastewater treatment facility (WWTF) discharges to the Rock River, located in the Sinissippi Lake Watershed (UR08) in the Upper Rock River Basin. This discharge is included in the Rock River TMDL as approved by EPA. The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD <sub>5</sub>			45 mg/L	30 mg/L		2
TSS				60 mg/L		2,3,4
pH	9.0 s.u.	6.0 s.u.				2
Ammonia Nitrogen						5
July	Variable		<b>90 mg/L</b>	<b>90 mg/L</b>		
August	Variable		<b>51 mg/L</b>	<b>51 mg/L</b>		
September	Variable		<b>32 mg/L</b>	<b>32 mg/L</b>		
October	Variable		<b>47 mg/L</b>	<b>47 mg/L</b>		
November – June	Variable		<b>110 mg/L</b>	<b>110 mg/L</b>		
Bacteria						6
<i>E. coli</i>				126 #/100 mL geometric mean		
Phosphorus						4,7
TBEL				1.0 mg/L		
Chloride						8
TKN, Nitrate+Nitrite, and Total Nitrogen						9

Footnotes:

1. Monitoring only.
2. No changes from the current permit.
3. The TSS limit is a variance limit according to s. NR 210.07(2), Wis. Adm. Code, where aerated lagoons and stabilization ponds are the principal treatment processes.
4. Additional phosphorus and TSS mass limitations are required in accordance with the wasteload allocations specified in the Rock River TMDL.



Month	Monthly Ave TSS Effluent Limit (lbs/day)	Weekly Ave TSS Effluent Limit (lbs/day)	Monthly Ave Total P Effluent Limit (lbs/day)
Jan	116	173	3.72
Feb	128	190	4.93
March	116	173	3.85
April	120	179	3.06
May	116	173	2.67
June	120	179	2.36
July	116	173	2.39
Aug	116	173	2.41
Sept	120	179	2.67
Oct	116	173	2.59
Nov	120	179	2.68
Dec	116	173	3.15

5. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round. 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.

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

6. Bacteria limits apply during the disinfection season of May through September. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
7. The monthly average phosphorus limit is a technology-based effluent limit (TBEL).
8. Monitoring in the fourth year of the permit term at a frequency to ensure that a minimum of 11 samples are available at the next permit issuance.
9. As recommended in the Department's October 1, 2019 *Guidance for Total Nitrogen Monitoring in Wastewater Permits*, annual total nitrogen monitoring is recommended for all minor municipal permittees. Total Nitrogen is the sum of nitrate (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), and total kjeldahl nitrogen (TKN) (all expressed as N).

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

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

Attachments (4) – Narrative, Site Map, Ammonia Nitrogen Calculations, and Thermal Table

PREPARED BY: *Sarah Luck* Date: September 8, 2023  
Sarah Luck  
Water Resources Engineer

E-cc: Jordan Main, Wastewater Engineer – SCR/Fitchburg  
Tom Bauman, Regional Wastewater Supervisor – SCR/Fitchburg  
Diane Figiel, Water Resources Engineer – WY/3

**Water Quality-Based Effluent Limitations for  
Hustisford Wastewater Treatment Facility**

**WPDES Permit No. WI-0020303-10**

**PART 1 – BACKGROUND INFORMATION**

**Facility Description**

The Village of Hustisford operates a wastewater treatment facility for the Village as well as the Hubbard-Hustisford Sanitary District No. 1 and the Hubbard Sanitary District No. 2. The total population served is approximately 2,400 residents with no significant industrial contributors. The treatment plant consists of three aerated ponds where treatment occurs before being discharged to the Rock River daily on a year-round basis. Lagoons 1 and 2 are approximately 10 feet deep and hold roughly 1.8 million gallons. Lagoon 3 is about 6 feet deep and holds around 0.6 million gallons. Chemical phosphorus treatment was active as of March 2020. Sludge that is produced is stored in the lagoons and periodically removed to be land applied on DNR approved sites; sludge was last removed from the lagoons in 2010.

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

**Existing Permit Limitations**

The current permit, which expired on June 30, 2023, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD <sub>5</sub>			45 mg/L	30 mg/L		2,3
TSS				60 mg/L		2
pH	9.0 s.u.	6.0 s.u.				2
Ammonia Nitrogen						4,5
July	Variable		<b>90 mg/L</b>	<b>90 mg/L</b>		
August	Variable		<b>51 mg/L</b>	<b>51 mg/L</b>		
September	Variable		<b>32 mg/L</b>	<b>32 mg/L</b>		
October	Variable		<b>47 mg/L</b>	<b>47 mg/L</b>		
November – June	Variable		<b>110 mg/L</b>	<b>110 mg/L</b>		
Fecal Coliform						1
May – September						1
Chloride						1
Phosphorus						3,6
Interim				1.71 mg/L		
Final				0.225 mg/L	0.075 mg/L	

Footnotes:

1. Monitoring only.

Attachment #1

2. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
3. Additional phosphorus and TSS mass limitations are required in accordance with the wasteload allocations specified in the Rock River TMDL.

Month	Monthly Ave TSS Effluent Limit (lbs/day)	Weekly Ave TSS Effluent Limit (lbs/day)	Monthly Ave Total P Effluent Limit (lbs/day)
Jan	116	173	3.72
Feb	128	190	4.93
March	116	173	3.85
April	120	179	3.06
May	116	173	2.67
June	120	179	2.36
July	116	173	2.39
Aug	116	173	2.41
Sept	120	179	2.67
Oct	116	173	2.59
Nov	120	179	2.68
Dec	116	173	3.15

4. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round.

Effluent pH s.u.	NH <sub>3</sub> -N Limit mg/L	Effluent pH s.u.	NH <sub>3</sub> -N Limit mg/L	Effluent pH s.u.	NH <sub>3</sub> -N Limit mg/L
6.0 < pH ≤ 6.1	110	7.0 < pH ≤ 7.1	72	8.0 < pH ≤ 8.1	17
6.1 < pH ≤ 6.2	108	7.1 < pH ≤ 7.2	66	8.1 < pH ≤ 8.2	14
6.2 < pH ≤ 6.3	106	7.2 < pH ≤ 7.3	59	8.2 < pH ≤ 8.3	11
6.3 < pH ≤ 6.4	104	7.3 < pH ≤ 7.4	52	8.3 < pH ≤ 8.4	9.4
6.4 < pH ≤ 6.5	101	7.4 < pH ≤ 7.5	46	8.4 < pH ≤ 8.5	7.8
6.5 < pH ≤ 6.6	98	7.5 < pH ≤ 7.6	40	8.5 < pH ≤ 8.6	6.4
6.6 < pH ≤ 6.7	94	7.6 < pH ≤ 7.7	34	8.6 < pH ≤ 8.7	5.3
6.7 < pH ≤ 6.8	89	7.7 < pH ≤ 7.8	29	8.7 < pH ≤ 8.8	4.4
6.8 < pH ≤ 6.9	84	7.8 < pH ≤ 7.9	24	8.8 < pH ≤ 8.9	3.7
6.9 < pH ≤ 7.0	78	7.9 < pH ≤ 8.0	20	8.9 < pH ≤ 9.0	3.1

5. 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.
6. A compliance schedule is in the current permit to meet the final WQBEL by June 30, 2020.

**Receiving Water Information**

- Name: Rock River
- Waterbody Identification Code (WBIC): 788800
- Classification: Warmwater sport fish community, non-public water supply.
- Low Flow: The following 7-Q<sub>10</sub> and 7-Q<sub>2</sub> values are based on flow information 1000 feet downstream of the dam at Hustisford for Station #05424090, UR4, obtained by USGS.  
7-Q<sub>10</sub> = 5.0 cubic feet per second (cfs)

7-Q<sub>2</sub> = 24.5 cfs

Harmonic Mean Flow = 52.84 cfs

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7-Q <sub>10</sub> (cfs)	21	26.1	56.9	149	58.3	23.9	12.8	6.6	6.1	8.2	20.5	19.5
7-Q <sub>2</sub> (cfs)	81.7	92	230	414	185	89.1	52.1	42.6	37.9	48.2	92.6	87.1

- Hardness = 327 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of data (n=6) from 2018-2023 WET tests conducted by Watertown WWTF. Although Watertown WWTF is located downstream of Hustisford WWTF, only two data points were available upstream, in Dodge County, and were outdated. The hardness values from Watertown WWTF are consistent with previous hardness values used in limit calculations.
- % of low flow used to calculate limits: 25%
- Source of background concentration data: Metals data from the Rock River upstream of Davy Creek near Ashippun (SWIMS Station 143301) are used for this evaluation. 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: The Ashippun Sanitary District Wastewater Treatment Facility discharges to the Rock River 16 miles downstream from Hustisford’s Outfall. Combined impacts are not considered in this evaluation because the mixing zones do not overlap.
- Impaired water status: The Rock River in Dodge County (River Miles 269.66-293.25) is impaired for total phosphorus and sediment.

**Effluent Information**

- Flow rate:  
 Design annual average = 0.236 MGD (Million Gallons per Day)  
 For reference, the actual average flow from July 2018 through June 2023 was 0.192 MGD.
- Hardness = 389 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of data (n=4) from July and August 2022 reported on the permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water source: Domestic wastewater with water supply from wells.
- Additives: Ferric chloride (for phosphorus removal).
- Effluent characterization: This facility is categorized as a minor municipality, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus ammonia, chloride, hardness, and phosphorus.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled “MEAN EFFL. CONC.”. Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Attachment #1  
**Copper Effluent Data**

Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)
7/20/2022	16	8/8/2022	20	8/28/2022	8.1
7/24/2022	20	8/13/2022	8.9	9/2/2022	4.7
7/29/2022	16	8/18/2022	6.9	9/7/2022	3.8
8/3/2022	16	8/23/2022	14		
1-day P <sub>99</sub> = 32 µg/L					
4-day P <sub>99</sub> = 21 µg/L					

**Chloride Effluent Data**

Sample Date	Chloride (mg/L)	Sample Date	Chloride (mg/L)	Sample Date	Chloride (mg/L)
1/7/2021	400	5/5/2021	430	9/1/2021	450
2/4/2021	420	6/2/2021	430	10/6/2021	450
3/3/2021	440	7/6/2021	480	11/3/2021	470
4/6/2021	410	8/5/2021	470	12/1/2021	470
1-day P <sub>99</sub> = 507 mg/L					
4-day P <sub>99</sub> = 474 mg/L					

The following table presents the average concentrations and loadings at Outfall 001 from July 2018 through June 2023 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

**Parameter Averages with Limits**

	Average Measurement	Average Mass Discharged
BOD <sub>5</sub>	12 mg/L	
TSS	17 mg/L	31 lbs/day
pH field	7.7. s.u.	
Ammonia Nitrogen	11 mg/L	
Phosphorus	0.80 mg/L	1.31 lbs/day

**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 99<sup>th</sup> percentile (or P<sub>99</sub>) 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<sub>10</sub>**

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<sub>10</sub> receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

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

Where:

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

Q<sub>s</sub> = average minimum 1-day flow which occurs once in 10 years (1-day Q<sub>10</sub>)  
if the 1-day Q<sub>10</sub> flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q<sub>10</sub>).

Q<sub>e</sub> = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.

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

C<sub>s</sub> = 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<sub>10</sub> 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 Hustisford 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 = 4.0 cfs, (1-Q<sub>10</sub> (estimated as 80% of 7-Q<sub>10</sub>)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	ATC	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P <sub>99</sub>	1-day MAX. CONC.
Arsenic		340	679.6	135.9	1.2		
Cadmium	389	49.0	98.0	19.6	<0.19		
Chromium	301	4446	8891.7	1778	1.4		
Copper	389	55.9	111.9			32	20
Lead	356	365	729.3	145.9	<4.3		
Nickel	268	1080	2160.6	432	4.1		
Zinc	333	345	689.4	137.9	25		
Chloride (mg/L)		757	1514			507	480

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

\*\* The 2 × ATC method of limit calculation yields a more restrictive limit than consideration of ambient concentrations and 1-Q<sub>10</sub> 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 = 1.25 cfs (¼ of the 7-Q<sub>10</sub>), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P <sub>99</sub>
Arsenic		152.2		673	134.6	1.2	
Cadmium	175	3.82	0.07	16.67	3.3	<0.19	
Chromium	301	325.75	2.1	1434	286.7	1.4	
Copper	327	30.68	2.1	119			21
Lead	327	95.51		389.3	77.9	<4.3	
Nickel	268	120.18	2	523	104.6	4.1	
Zinc	327	344.68	1	1498	299.5	25	
Chloride (mg/L)		395		1747			474

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

**Monthly Average Limits based on Wildlife Criteria (WC)**

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

**Monthly Average Limits based on Human Threshold Criteria (HTC)**

RECEIVING WATER FLOW = 13.2 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	0.07	13743	2748.5	<0.19
Chromium (+3)	3818000	2.1	141834741	28366948	1.4
Lead	140		5201	1040.2	<4.3
Nickel	43000	2	1597318	319464	4.1

**Monthly Average Limits based on Human Cancer Criteria (HCC)**

RECEIVING WATER FLOW = 13.2 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3	494.1	98.82	1.2

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, **no effluent limitations are required.**



Chloride – Considering available effluent data from the current permit term (July 2018 through June 2023), the 1-day P<sub>99</sub> chloride concentration is 507 mg/L, and the 4-day P<sub>99</sub> of effluent data is 474 mg/L. These effluent concentrations are below the calculated WQBELs for chloride; therefore, **no effluent limits are needed. Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance** to meet the data requirements of s. NR 106.85, Wis. Adm. Code.

Mercury – The permit application did not require monitoring for mercury because Hustisford Wastewater Treatment Facility is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3, Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, “there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5), Wis. Adm. Code.” A review of the past five years of sludge characteristics data reveals that the single sample collected was well below the 17 mg/kg level. The concentration in the sludge from July 2018 through June 2023 was 3.1 mg/kg on 7/30/2020. Therefore, **no mercury monitoring is recommended at Outfall 001.**

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

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

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

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

#### **Daily Maximum Limits based on Acute Toxicity Criteria (ATC)**

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

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

Where:

A = 0.411 and B = 58.4 for 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 491 sample results were reported from July 2018 through June 2023. The maximum reported value was 8.4 s.u. (Standard pH Units). The effluent pH was 8.3 s.u. or less 99% of the time. The 1-day P<sub>99</sub>, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.3 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.3 s.u.

Attachment #1

Therefore, a value of 8.3 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 8.3 s.u. into the equation above yields an ATC = 4.71 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 the 1-Q<sub>10</sub> 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<sub>10</sub> (estimated as 80 % of 7-Q<sub>10</sub>) and the 2×ATC approach are shown below.

**Daily Maximum Ammonia Nitrogen Determination**

	Ammonia Nitrogen Limit mg/L
2×ATC	9.4
1-Q <sub>10</sub>	56

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

The current permit has variable daily maximum effluent limits based on effluent pH. Presented below is a table of daily maximum limitations corresponding to various effluent pH values.

**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 weekly and monthly average ammonia nitrogen limits calculation from the previous memo do not change because there have been no changes in the effluent and receiving water flow rates. The calculations from the previous WQBEL memo are shown in Attachment #3.

**Effluent Data**

The following table evaluates the statistics based upon ammonia data reported from July 2018 through June 2023, with those results being compared to the calculated limits to determine the need to include

Attachment #1

ammonia limits in the Hustisford Wastewater Treatment Facility permit for the respective month ranges. That need is determined by calculating 99<sup>th</sup> upper percentile (or P<sub>99</sub>) values for ammonia during each of the month ranges and comparing the daily maximum values to the daily maximum limit.

**Ammonia Nitrogen Effluent Data**

	Ammonia Nitrogen mg/L
1-day P <sub>99</sub>	46
4-day P <sub>99</sub>	26
30-day P <sub>99</sub>	15
Mean	11
Std	9.3
Sample size	475
Range	0.1 - 37

Based on this comparison, there is no reasonable potential for the discharge to exceed any of the calculated ammonia nitrogen limits. However, **since the permit currently has daily, weekly, and monthly limits year-round, limits must be retained regardless of reasonable potential**, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:

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

**Conclusions and Recommendations**

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

**Final Ammonia Nitrogen Limits**

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
July	Variable	<b>90 mg/L</b>	<b>90 mg/L</b>
August	Variable	<b>51 mg/L</b>	<b>51 mg/L</b>
September	Variable	<b>32 mg/L</b>	<b>32 mg/L</b>
October	Variable	<b>47 mg/L</b>	<b>47 mg/L</b>
November – June	Variable	<b>110 mg/L</b>	<b>110 mg/L</b>

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

**PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA**

Section NR 102.04 (5)(a), Wis. Adm. Code, specifies that all surface waters shall be suitable for supporting recreational use. Hustisford was not historically required to disinfect the effluent.

On May 1, 2020, revisions to chs. NR 102 and NR 210, Wis. Adm. Codes, became effective which replace fecal coliform limits with new *Escherichia coli* (*E. coli*) limits for protection of recreational uses.

Section NR 210.06(2)(a)1, Wis. Adm. Code, includes two limits which must be included in permits for facilities which are required to disinfect:

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

*E. coli* monitoring is recommended at the same frequency that fecal coliform monitoring is required in the current permit. Since Hustisford's permit requires two times per week 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 current recreational period and the required disinfection season.

### **Effluent Data**

Hustisford Wastewater Treatment Facility has monitored effluent *E. coli* from July 2022 through June 2023, and a total of 20 results are available. A geometric mean of 126 counts/100 mL was exceeded in one out of the last five months, with a maximum monthly geometric mean of 206 counts/100 mL. Effluent data has exceeded 410 counts/100 mL two times (which is 10% of the total sample results). The maximum reported value was 1,046 counts/100 mL. Based on this effluent data, it appears that the facility cannot meet new *E. coli* limits and **a compliance schedule is 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 effluent limit (AEL).

Hustisford Wastewater Treatment Facility previously had an AEL of 1.71 mg/L as a monthly average. However, since chemical addition is now utilized for phosphorus removal, the AEL is no longer applicable. The technology based effluent limit (TBEL) of 1.0 mg/L **is effective upon reissuance.**

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

### **Water Quality-Based Effluent Limits**

Section NR 217.16, Wis. Adm. Code, states that the Department may include a TMDL-derived water quality based effluent limit (WQBEL) for phosphorus in addition to, or in lieu of, a s. NR 217.13, Wis. Adm. Code, WQBEL in a WPDES permit. The Rock River TMDL was developed to protect the water quality of impaired waters within the watershed, and the discharge from Hustisford Wastewater Treatment Facility is to the Rock River in Dodge County. Since the Rock River was listed as impaired prior to TMDL development, the TMDL-based phosphorus limits were included in the permit at the last reissuance rather than the s. NR 217.13, Wis. Adm. Code WQBEL. Hustisford Wastewater Treatment Facility was unable to meet these limits, and a compliance schedule and an interim limit of 4.4 mg/L were required in the permit.

Attachment #1

The Rock River remains impaired for phosphorus meaning the Rock River TMDL limits remain applicable. The following limits from the current permit are recommended to be retained for phosphorus:

**Total Phosphorus TMDL Mass Limits**

Month	Monthly Ave (lbs/day)	Month	Monthly Ave (lbs/day)
Jan	3.72	July	2.39
Feb	4.93	Aug	2.41
March	3.85	Sept	2.67
April	3.06	Oct	2.59
May	2.67	Nov	2.68
June	2.36	Dec	3.15

**Effluent Data**

The following table summarizes effluent total phosphorus monitoring data from July 2018 through June 2023.

**Total Phosphorus Effluent Data**

	October 2018 through June 2023		July 2020 through June 2023 <small>(data since final phosphorus limits went into effect)</small>	
	Phosphorus mg/L	Phosphorus lbs/day	Phosphorus mg/L	Phosphorus lbs/day
1-day P <sub>99</sub>	1.8	5.0	1.8	3.5
4-day P <sub>99</sub>	1.2	2.9	1.2	2.1
30-day P <sub>99</sub>	0.94	1.8	0.92	1.4
Mean*	0.80	1.3	0.78	1.1
Std	0.30	0.99	0.31	0.68
Sample size	473	473	283	283
Range	0.16 - 1.7	0.13 - 9.41	0.16 - 1.6	0.13 - 5.3

**PART 6 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL**

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

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from July 2018 through June 2023.

Hustisford last monitored effluent temperature from January to December 2017 (except during June), shown in the table below. Since there have been no changes to the treatment process, this data is still considered to be representative.

**Monthly Temperature Effluent Data & Limits**

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN	37	37	-	120
FEB	41	41	-	120
MAR	44	45	-	120
APR	59	61	-	120
MAY	41	44	-	120
JUN	-	-	-	120
JUL	82	82	-	120
AUG	76	82	105	101
SEP	76	76	90	104
OCT	66	67	80	120
NOV	41	44	-	120
DEC	36	40	-	120

**Reasonable Potential**

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

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

Based on the available effluent data, **no effluent limits or monitoring are recommended for temperature**. The complete thermal table used for the limit calculation can be found in Attachment #4.

**PART 7 – WHOLE EFFLUENT TOXICITY (WET)**

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET

limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document* (2022).

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC<sub>50</sub> (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC<sub>25</sub> (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of 23% shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

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

Where:

- Q<sub>e</sub> = annual average flow = 0.236 MGD = 0.365 cfs
- f = fraction of the Q<sub>e</sub> withdrawn from the receiving water = 0
- Q<sub>s</sub> = ¼ of the 7-Q<sub>10</sub> = 5.0 cfs ÷ 4 = 1.25 cfs

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

**WET Data History**

Date Test Initiated	Acute Results LC <sub>50</sub> %			
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?
07/15/2015	>100	>100	Pass	Yes

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

According to s. NR 106.08(6)(d), Wis. Adm. Code, TU<sub>a</sub> and TU<sub>c</sub> effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC<sub>50</sub>, IC<sub>25</sub> or IC<sub>50</sub> ≥ 100%).

Attachment #1

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

The WET checklist was developed to help DNR staff make recommendations regarding WET limits, monitoring, and other related permit conditions. The checklist indicates whether acute and chronic WET limits are needed, based on requirements specified in s. NR 106.08, Wis. Adm. Code. The checklist steps the user through a series of questions, assesses points based on the potential for effluent toxicity, and suggests monitoring frequencies based on points accumulated during the checklist analysis. As toxicity potential increases, more points accumulate, and more monitoring is recommended to ensure that toxicity is not occurring. A summary of the WET checklist analysis completed for this permittee is shown in the table below. Staff recommendations based on best professional judgment are provided below the summary table. For guidance related to reasonable potential and the WET checklist, see Chapter 1.3 of the WET Guidance Document: <https://dnr.wisconsin.gov/topic/Wastewater/WET.html>.

**WET Checklist Summary**

	<b>Acute</b>	<b>Chronic</b>
<b>AMZ/IWC</b>	Not Applicable. <b>0 Points</b>	IWC = 23% <b>0 Points</b>
<b>Historical Data</b>	1 test used to calculate RP. No tests failed. No data from past five years. <b>5 Points</b>	No data available. <b>5 Points</b>
<b>Effluent Variability</b>	Little variability, few permit violations, no upsets, consistent WWTF operations. <b>0 Points</b>	Same as Acute. <b>0 Points</b>
<b>Receiving Water Classification</b>	WWSF <b>5 Points</b>	Same as Acute. <b>5 Points</b>
<b>Chemical-Specific Data</b>	No reasonable potential for limits based on ATC. Ammonia nitrogen limit carried over from the current permit. Arsenic, chromium, chloride, copper, nickel, and zinc detected. Additional Compounds of Concern: None. <b>3 Points</b>	No reasonable potential for limits based on CTC. Ammonia nitrogen limit carried over from the current permit. Arsenic, chromium, chloride, copper, nickel, and zinc detected. Additional Compounds of Concern: None. <b>3 Points</b>
<b>Additives</b>	No biocides and one water quality conditioner (Ferric Chloride) added. Permittee has proper SOP in place. <b>1 Point</b>	All additives used more than once per 4 days. <b>1 Point</b>
<b>Discharge Category</b>	No industrial contributors. <b>0 Points</b>	Same as Acute. <b>0 Points</b>
<b>Wastewater Treatment</b>	Secondary or better. <b>0 Points</b>	Same as Acute. <b>0 Points</b>
<b>Downstream Impacts</b>	No impacts known. <b>0 Points</b>	Same as Acute. <b>0 Points</b>
<b>Total Checklist Points:</b>	<b>14 Points</b>	<b>14 Points</b>
<b>Recommended Monitoring Frequency (from Checklist):</b>	None.	None.
<b>Limit Required?</b>	No	No

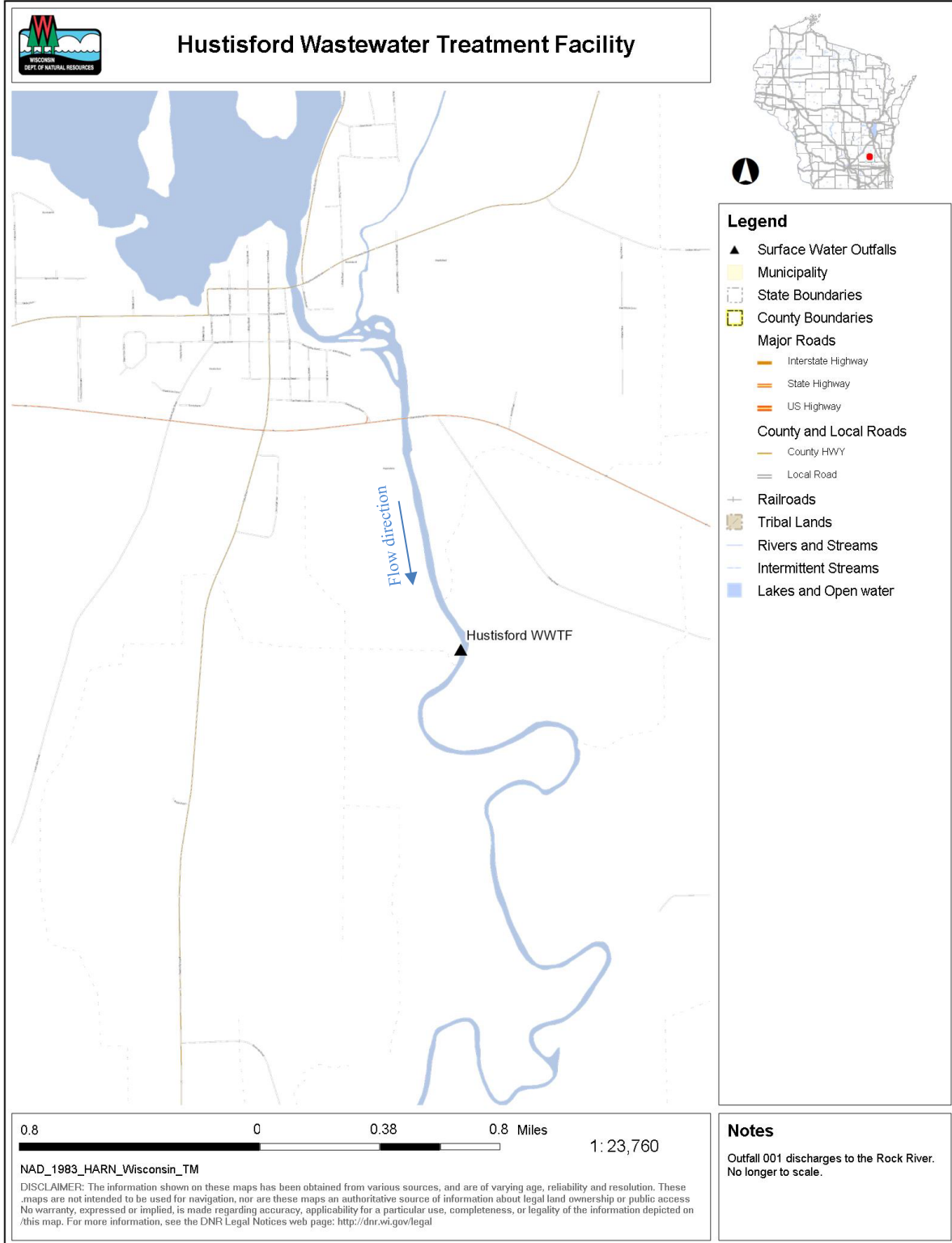


## Attachment #1

	<b>Acute</b>	<b>Chronic</b>
<b>TRE Recommended? (from Checklist)</b>	No	No

- **No WET testing is required** because information related to the discharge indicates the potential for effluent toxicity is believed to be low.

Attachment #2  
Site Map



## Ammonia Nitrogen Calculations from the WQBEL Memo Dated March 2, 2018

		Jan	Feb	Mar	Apr	May	Jun
<b>Background Information</b>	7-Q <sub>10</sub> (cfs)	21.8	26.1	56.9	149	58.3	23.9
	7-Q <sub>2</sub> (cfs)	81.7	92	230	414	185	89.1
	Ammonia (mg/L)	0.17	0.17	0.09	0.09	0.09	0.07
	Temperature (°C)	0.56	1.11	3.33	8.89	14.44	18.89
	pH (s.u.)	7.73	7.73	7.73	8.06	8.06	8.06
	% of Flow used	25	25	25	25	50	100
	Reference Weekly Flow (cfs)	5.5	6.5	14.2	37.3	29.2	23.9
	Reference Monthly Flow (cfs)	17.4	19.6	48.9	88.0	78.6	75.7
<b>Criteria mg/L</b>	4-day Chronic						
	Early Life Stages Present						4.20
	Early Life Stages Absent	14.04	14.04	14.04	8.01	5.60	
	30-day Chronic						
	Early Life Stages Present						1.68
	Early Life Stages Absent	5.62	5.62	5.62	3.20	2.24	
<b>Effluent Limitations mg/L</b>	Weekly Average						
	Early Life Stages Present						274.65
	Early Life Stages Absent	221.07	261.90	557.51	815.62	445.33	
	Monthly Average						
	Early Life Stages Present						335.78
Early Life Stages Absent	264.56	297.21	745.31	753.15	465.04		

		Jul	Aug	Sept	Oct	Nov	Dec
<b>Background Information</b>	7-Q <sub>10</sub> (cfs)	12.8	6.6	6.1	8.2	20.5	19.5
	7-Q <sub>2</sub> (cfs)	52.1	42.6	37.9	48.2	92.6	87.1
	Ammonia (mg/L)	0.07	0.07	0.07	0.1	0.1	0.1
	Temperature (°C)	20.56	19.44	15.56	10	4.44	1.67
	pH (s.u.)	8.31	8.31	8.31	8.09	8.09	8.09
	% of Flow used	100	100	50	25	25	25
	Reference Weekly Flow (cfs)	12.8	6.6	3.1	2.1	5.1	4.9
	Reference Monthly Flow (cfs)	44.3	36.2	16.1	10.2	19.7	18.5
<b>Criteria mg/L</b>	4-day Chronic						
	Early Life Stages Present	2.54	2.73	3.50			
	Early Life Stages Absent				7.12	8.64	8.64
	30-day Chronic						
	Early Life Stages Present	1.02	1.09	1.40			
	Early Life Stages Absent				2.85	3.46	3.46
<b>Effluent Limitations mg/L</b>	Weekly Average						
	Early Life Stages Present	89.07	50.78	32.19			
	Early Life Stages Absent				46.56	128.56	122.71
	Monthly Average						
	Early Life Stages Present	115.67	102.38	60.14			
Early Life Stages Absent				79.97	184.39	173.65	

### Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

<b>Facility:</b>	Hustisford WWTF	<b>7-Q<sub>10</sub>:</b>	5.0 cfs	<b>Temp Dates</b>	<b>Flow Dates</b>
<b>Outfall(s):</b>	001	<b>Dilution:</b>	25%	<b>Start:</b>	01/01/17 07/01/18
<b>Date Prepared:</b>	8/22/2023	<b>f:</b>	0	<b>End:</b>	12/01/17 06/30/23
<b>Design Flow (Qe):</b>	0.236 MGD	<b>Stream type:</b>	Small warm water sport or fora ▼		
<b>Storm Sewer Dist.</b>	0 ft	<b>Qs:Qe ratio:</b>	3.4 :1		
		<b>Calculation Needed?</b>	YES		

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs) (cfs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Qesl) (MGD)	Daily Maximum Flow Rate (Qea) (MGD)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)		(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	33	49	76	21.0	0.254	0.293	0	37	37	NA	120
FEB	34	50	76	26.1	0.336	0.599	0	41	41	NA	120
MAR	38	52	77	56.9	0.469	0.656	0	44	45	NA	120
APR	48	55	79	149.0	0.468	0.589	0	59	61	NA	120
MAY	58	65	82	58.3	0.420	0.535	0	41	44	NA	120
JUN	66	76	84	23.9	0.355	0.555	0			NA	120
JUL	69	81	85	12.8	0.270	0.380	0	82	82	NA	120
AUG	67	81	84	6.6	0.630	1.077	0	76	82	105	101
SEP	60	73	82	6.1	0.737	0.987	0	76	76	90	104
OCT	50	61	80	8.2	0.756	0.941	0	66	67	80	120
NOV	40	49	77	20.5	0.294	0.380	0	41	44	NA	120
DEC	35	49	76	19.5	0.314	0.361	0	36	40	NA	120

**CORRESPONDENCE/MEMORANDUM**

DATE: January 17, 2024 FILE REF: FIN 5824

TO: File

FROM: Zach Watson Hydrogeologist - SCR

SUBJECT: Groundwater Evaluation for Hustisford Wastewater Treatment Facility WI-0020303-09

**General Information and Treatment System Description**

Hustisford Wastewater Treatment Facility is located at 500 Industrial Ln., Hustisford, WI 53034. The total population served is approximately 2,400 residents with no significant industrial contributors. Influent wastewater is generated in the Village of Hustisford, Town of Hubbard, Hustisford Sanitary District No. 1 force main and Hubbard Sanitary District No. 2 force main. The design flow of the facility is 0.236 MGD with an average of 0.178 MGD discharged daily. Treatment consists of three aerated ponds before being discharged to the Rock River daily on a year-round basis. Lagoons 1, 2 and 3 hold approximately 3.2, 2.2, and 5.8 million gallons, respectively. Three groundwater monitoring wells surround the lagoons to monitor potential leakage related impacts to groundwater.

**Table 1 – Lagoon Groundwater Monitoring System**

Sample Point	Well Name	Current Permit and Proposed WI-0020303-09 and WI-0020303-10	
		Well Location	Well Designation
801	MW-1	Background	Non-Point of Standards
802	MW-2	Downgradient	Non-Point of Standards
803	MW-3	Downgradient	Non-Point of Standards

**Table 2 – Lagoon Monitoring Wells Groundwater Standards**

Parameter	Current Permit WI-0020303-09		Proposed Permit WI-0020303-10	
	PAL	ES	PAL	ES
Depth to Groundwater	N/A	N/A	N/A	N/A
Groundwater Elevation	N/A	N/A	N/A	N/A
Nitrite+Nitrate nitrogen	N/A	N/A	<b>*2 mg/l</b>	<b>*10 mg/l</b>
Ammonia	N/A	N/A	<b>*0.97 mg/l</b>	<b>*9.7 mg/l</b>
Organic Nitrogen	N/A	N/A	N/A	N/A
Total Kjeldahl Nitrogen	N/A	N/A	N/A	N/A
Chloride	N/A	N/A	<b>*125 mg/l</b>	<b>*250 mg/l</b>
Electrical conductivity	--	--	<b>N/A</b>	<b>N/A</b>

**\*Recommended changes for upcoming permit**

-- Not in 0020303-09 permit monitoring requirements

**Geology**

The bedrock underlying the lagoons is the Ordovician-aged undivided Sippipsee Group. The Sippipsee Group includes the Galena, Decorah and Platteville Formations (Bedrock Geology of Dodge County, Wisconsin 2021). These formations are comprised of dolostones. The overburden is mostly north-south oriented ground

moraine from Quaternary glaciations (Ground-water resources and geology of Dodge County). Depth to bedrock is expected to be 20 – 50 feet below ground surface (Depth-to-bedrock Map of Dodge County, Wisconsin 2021). Surface soils are the Keowns Silt Loam and Adrian Muck (NRCS Soil Map).

### **Hydrogeology**

The Hustisford Waster Treatment Facility lies at the southern edge of a water table plateau which is centered in Dodge County (Water-table map of Dodge County, Wisconsin 1977). At the edges of the plateau, groundwater flow direction becomes highly variable driven by ground moraine surface topography. Groundwater elevation at the site is mostly stable varying less than two feet during the permit term. Groundwater elevations at the site ranged from approximately 844 – 849 feet above mean sea level during the current permit term (**Figure 2**). Changes in groundwater elevation were most often consistent between monitoring wells (i.e., groundwater flow direction is stable). Groundwater flow is generally to the east towards the Rock River (**Figure 1**). Depth to water is approximately 4 – 12 feet below top of casing.

### **Lagoon Effluent Characterization**

Sampling and monitoring of the lagoons are not required within the WPDES permit. Therefore, the chemical composition of the lagoons is not clearly identified for use in this report. The effluent discharge to the Rock River is monitored for ammonia and chloride. The concentration of ammonia is seasonally variable and ranges up to 25 – 40 mg/l during the spring and to non-detect during the summer and fall. Most recently, chloride has been sampled in 2017 and 2021. The results for chloride are most often between 300 – 500 mg/l.

### **Background Groundwater Quality**

Background groundwater quality is defined by the results from samples collected at MW-1. The results for chloride are variable and ranged up to 370 mg/l (**Figure 3**). The results for nitrite+nitrate exhibited a slight increasing trend during the current permit term and were most often between 2 – 4 mg/l (**Figure 4**). The results for ammonia are non-detect.

### **Downgradient Groundwater Quality**

The results for chloride at MW-2 are similar in concentration and variability to MW-1 at concentrations typically falling between 100 – 250 mg/l. The results for chloride at MW-3 are significantly lower and stable at MW-3, typically at 5 – 15 mg/l. The results for nitrite+nitrate at MW-2 are non-detect. The results for nitrite+nitrate at MW-3 are elevated and variable ranging between 2 – 8 mg/l during the current permit term. The results for ammonia at MW-2 and MW-3 are non-detect.

### **Lagoon System Impact on Groundwater**

Review of the past five years of lagoon leakage rates indicate that the lagoons are not experiencing any significant losses to groundwater (**Figure 5**). The notice of final determination for the 0020303-09 permit stated that “Groundwater monitoring is required to continue to show that the lagoons are not negatively impacting groundwater. Quarterly monitoring shall be done in the 3<sup>rd</sup> and 4<sup>th</sup> year of the permit term, to provide data to evaluate for the next permit. The parameters included are the nitrogen series and chloride and are commonly found in municipal wastewater.”. Groundwater was monitored quarterly in 2021, 2022 and for two of four quarters in 2023. The results for nitrogen species and chloride do not clearly indicate that the lagoon is a source of these parameters. The elevated results for chloride at MW-1 and MW-2 vs. low concentrations at MW-3 could be related to MW-1 and MW-2’s closer proximity to State Road 60. The reason for the elevated results of nitrite+nitrate at MW-1 and MW-3 vs. the clearly unimpacted results at MW-2 is unknown. Neither downgradient monitoring well shows both elevated results for chloride and nitrite+nitrate, which would be expected if the lagoons were leaking and impacting groundwater. The background monitoring well is the only well of the three with elevated results for both chloride and nitrite+nitrate.

### Conclusions, Recommendations and Schedule Requirements

- While the results from the groundwater monitoring system appear to show that the lagoon is not negatively impacting local groundwater quality, groundwater monitoring should continue into the upcoming 00203030-10 permit term. Groundwater monitoring should occur throughout the permit on a semi-annual basis for parameters listed in **Table 2**.
- There were no groundwater standards applied to the groundwater monitoring system for inclusion in the current permit. Ch. NR 140, Wis. Adm. Code Groundwater Quality Standards should be applied for the monitored parameters at the groundwater monitoring wells during the 00203030-10 permit. Indicator Parameter PALs and ACLs are not provided in the upcoming permit term.
- Electrical conductivity has been added to the list of monitoring parameters for groundwater.
- Chloride and nitrite+nitrate should be monitored monthly in the discharge to the Rock River to aid in characterization of the lagoon chemical composition.

**Figure 1 – Water Table Flow Map March 17, 2022**





# Water Table Flow Map

## Hustisford Wastewater Treatment Facility

### March 17, 2022



#### Site Location

Hustisford Wastewater Treatment Facility  
500 Industrial Ln.  
Hustisford, WI 53034

#### Legend

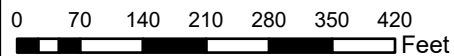
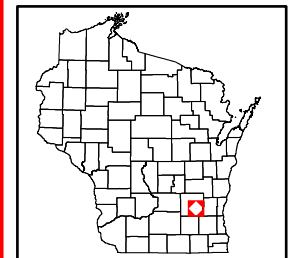
- Monitoring Wells
- Water Table Contour (0.25 FAMSLS 3/17/2022)
- ← Groundwater Flow Direction

#### Notes

Water table contours generated using elevation data collected on March 17, 2022. Water table elevations and contours are presented in feet above mean sea level.

Contour interpretation generated using kriging in ArcGIS Pro.

Created By: watsoz  
Date: 12/20/2023



1:2,560

**DISCLAIMER:** This map is a user generated static output from the Wisconsin Department of Natural Resources. The contents herein are for reference purposes only and may or may not be accurate, current, or otherwise reliable. No liability is assumed for the data delineated herein either expressed or implied by the Wisconsin DNR or its employees. All land application must meet NR 113, NR 204, and NR 214 Wis. Adm. Code.

Figure 2 – Monitoring Wells – Groundwater Elevation

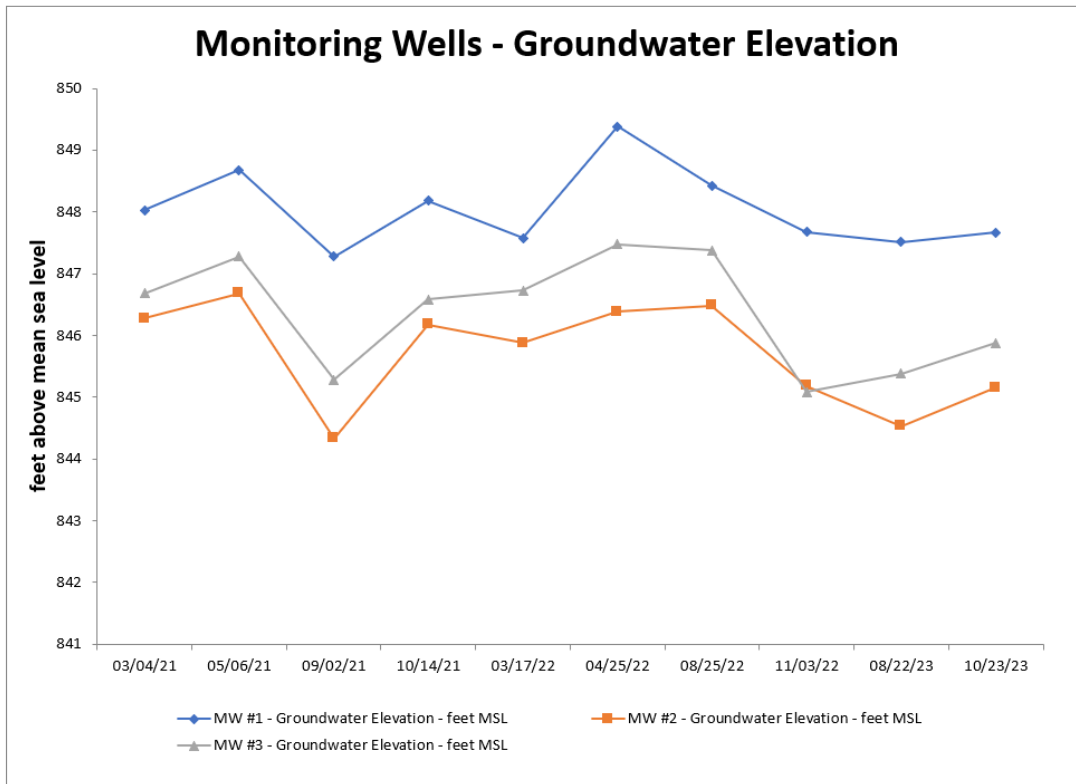


Figure 3 – Monitoring Wells – Nitrite+nitrate

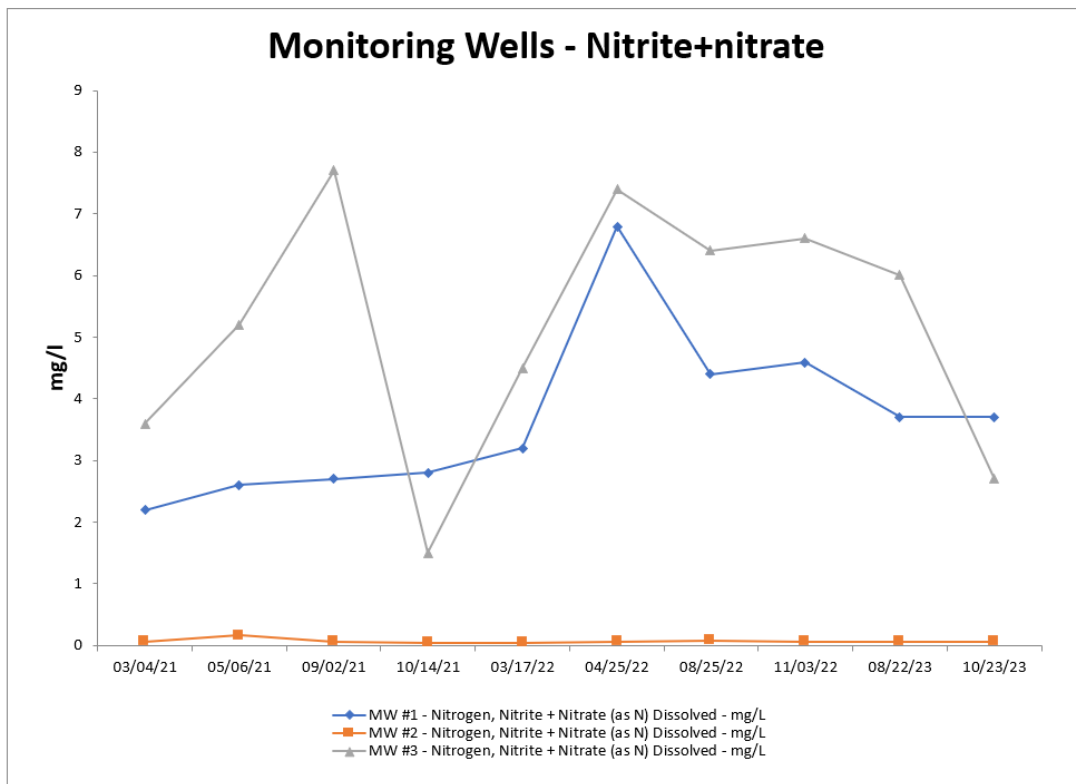
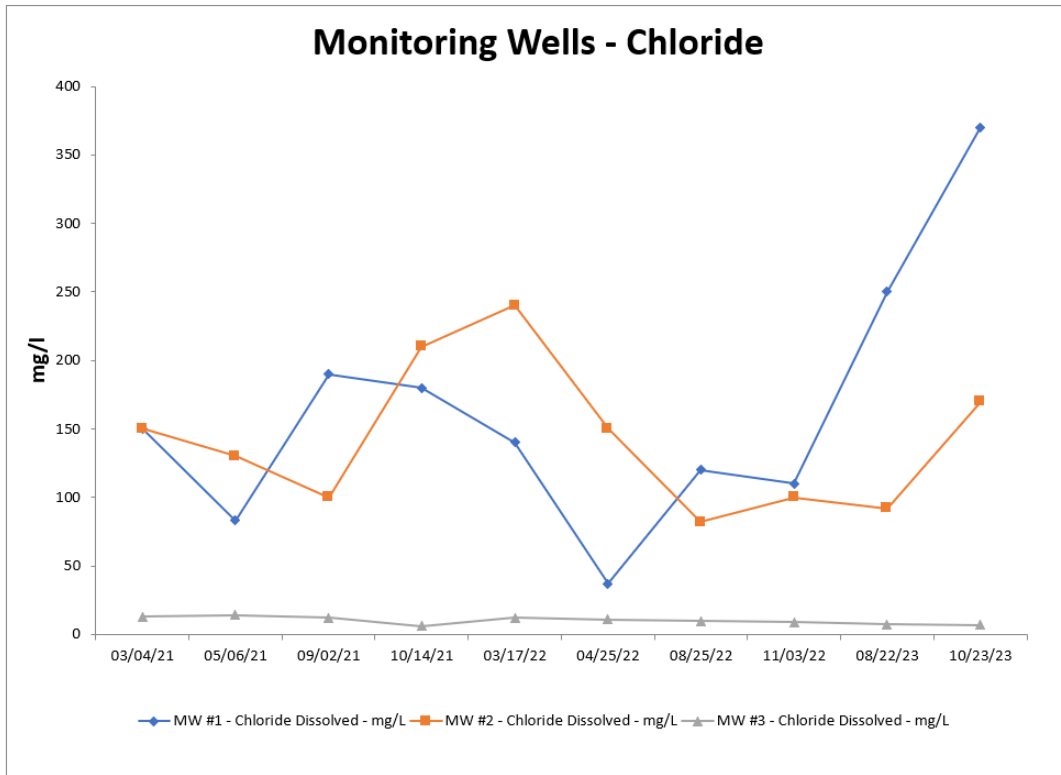


Figure 4 – Monitoring Wells – Chloride



**Figure 5 – Lagoon Leakage Determination Form**

### POND/LAGOON LEAKAGE DETERMINATION FORM

Permit Number: WI-0020303-08-0  
 Permittee Name: VILLAGE OF HUSTISFORD  
 Facility Name and Address: Hustisford Wastewater Treatment Facility, 500 INDUSTRIAL LANE,  
 HUSTISFORD, WISCONSIN  
 POND/LAGOON LINING MATERIAL: Bentonite and Clay with a total of about 5.8 acres  
 CONSTRUCTION YEAR:: 1977

#### ADEQUACY OF FLOW MONITORING/METERING EQUIPMENT

<input checked="" type="checkbox"/> Adequate	
Inadequate (Describe briefly)	

#### CMAR DATA SUMMARY

Summary of Part 6, CMAR data for this facility since the last permit reissuance or for the last 5 years.

Year	Effluent/Influent Ratio	Leakage Rate (gpad)
2022	0.992	239
2021	1.002	-236
2020	1.034	-1058
2019	0.976	984
2018	1.029	-1019

#### FORMAL LEAKAGE STUDY

<input checked="" type="checkbox"/> No leakage Study	
<input type="checkbox"/> Leakage Study Completed (Provide information below)	
Date of Study	
Leakage Rate (gpad)	
Other. Summarize Study Briefly	Based on reported leakage data, lagoons appear to meet 1000 gpad in <span style="color: red;">NR 110.24(4)(b)</span>

#### LEAKAGE DETERMINATION

<input checked="" type="checkbox"/> In Compliance	
Noncompliance	

**Comments/Recommendations on Permit Reissuance:** No changes. Reviewed by Basin Engineer -  
 Signature and Date: J. Main 1/17/24