Permit Fact Sheet

General Information

Permit Number:	WI-0028207-08-0	
Permittee Name:	Town of Holland Sanitary District No. 1	
Address:	573 Holland Road	
City/State/Zip:	Kaukauna WI 54130	
Discharge Location:	SW ¼ of NE ¼, Sec 35, T21N, R19E, Town of Holland, Brown County	
Receiving Water:	Unnamed tributary to Plum Creek	
StreamFlow ($Q_{7,10}$):	0 cfs	
Stream Classification:	Limited aquatic life biological use classification	
Discharge Type:	Existing, continuous	
Design Flow(s)	Daily Maximum	0.54 MGD
	Weekly Maximum	0.50 MGD
	Monthly Maximum	0.42 MGD
	Annual Average	0.39 MGD
Significant Industrial Loading?	Yes, Arla Foods discharges wastewater from cheese production	
Operator at Proper Grade?	The Holland SD#1 WWTF is rated as an Advanced facility in subclasses A1 – Suspended Growth Processes, A4 – Ponds/Lagoons, B – Solids Separation, C – Biological Solids/Sludge Processing, P – Phosphorus Removal, and SS – Collection System Bruce Genskow is the current Operator-in-Charge of the facility, Certification #33233. He has advanced certification in A1, A2, A4, B, C, D, and P, and OIT certification in A3. Lucas Franck (#38876) staffs the plant 5 days a week and has Basic certification for A1, A4, B, C, P, and SS. He also has OIT certification for N.	
Approved Pretreatment Program?	N/A	

Facility Description

The Town of Holland Sanitary District No. 1 (Holland SD 1) owns and operates an advanced secondary wastewater treatment facility for treating domestic wastewaters from the unincorporated community of Holland in southwest Brown County, along with process wastewater from Arla Foods Production LLC, a dairy foods processing facility. An upgrade in 2022 has separated Arla Food's process wastewater from the Town of Holland Sanitary District No. 1's wastewater and is treating the two liquid streams separately.

The municipal treatment train includes its own lift station followed by preliminary treatment with fine-screening, biological treatment with an activated sludge system consisting of an aerobic selector basin followed by aeration basins and a single clarifier and phosphorus removal by chemical precipitation using Ferric Sulfate. This effluent is discharged to a tributary to Plum Creek via Outfall 003.

The Arla treatment train includes its own lift station followed by an aerated equalization tank, two selector tanks, aeration basin, and secondary clarifier. The effluent from the clarifier is sent to the Plant Effluent Pump Station and monitored at Sample Point 103 prior to being combined with the effluent from the District's compact plant and discharged via Outfall 003.

Alternatively, the combined effluent can be pumped to a pair of polishing lagoons for further treatment before discharge via Outfall 001 to a tributary to Plum Creek downstream from Outfall 003. Flow measurements at Outfall 001 are taken with a manual flow meter and composite samples at that sample point are prepared from manually collected grab samples.

Sludge treatment includes aerobic digestion, screw press, and storage, with agricultural land application of liquid or cake sludge. A belt press can also be used if needed.

Substantial Compliance Determination

Enforcement During Last Permit:

The department issued three Notices of Violation dated December 15, 2016, January 30, 2018, and October 9, 2020, to the Town of Holland Sanitary District No. 1 (Holland) for alleged violations of its Wisconsin Pollutant Discharge Elimination System Permit Numbers WI-0028207-06-0 and WI-0028207-07-0 (Permit).

The alleged violations included exceedances of BOD5, TSS, Phosphorus, Chloride and Ammonia. Holland has completed Section 4.1 of its Permit by constructing an upgrade of the treatment facilities. BOD5, TSS, Phosphorus, Chloride and Ammonia have met Permit requirements since the end of construction in the fall of 2022. The notice of violation was closed out in an August 13, 2023, letter.

After a desk top review of all discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on November 10, 2022, the Holland SD 1 Wastewater Treatment Facility has been found to be in substantial compliance with their current permit except for their toxicity testing. There have been eight Whole Effluent Toxicity (WET) test failures at the facility since 2019. To bring the facility back into compliance, a WET Limit Compliance Schedule is being included in the permit reissuance to identify and remove the source of toxicity.

Compliance determination entered by Laura Gerold P.E., Senior Wastewater Engineer on November 7, 2023.

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, WasteType/sample Contents and Treatment Description (as applicable)**
701	0.208 MGD October 2018-September 2023	INFLUENT - 24-hr flow proportional samples and flow rate collected from lift station #1 (dairy industry) wetwell.
702	0.061 MGD October 2021-September 2023	INFLUENT - 24-hr flow proportional samples and flow rate collected from the NEW lift station #2 (municipality) wetwell.
001	0.0145 MGD October 2018-September 2023	EFFLUENT- LAGOONS- Representative samples shall be collected from the effluent side of the former chlorine contact chamber, prior to discharge via the cascade aerator. Grab samples

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, WasteType/sample Contents and Treatment Description (as applicable)**
		are collected for pH and DO analysis. Composite samples, for other parameters, are prepared from manually collected grab samples.
002	Back-up discharge point. Discharge not expected during permit term.	SEWAGE SLUDGE: Aerobically digested, gravity thickened liquid sludge samples shall be collected from the INDUSTRIAL aerobic digester. Limits applicable only for years when liquid sludge is land applied.
003	0.249 MGD October 2018-September 2023	EFFLUENT- COMBINED ARLA AND DISTRICT MECHANICAL PLANTS- 24-hour flow proportional samples and flow rate collected from the effluent wet well located after the Holland Sanitary District and mechanical plant Arla Clarifiers and prior to the discharge to surface water. Grab samples are collected for pH and DO analysis.
004	1260 cubic yards land applied in 2023	SEWAGE SLUDGE: Aerobically digested, thickened cake sludge samples shall be collected from the storage building.
103	Flow not reported at this sample point	ARLA PLANT - 24-hour time proportional and grab samples are collected from the manhole after the Arla Clarifier prior to combination with discharge from District Mechanical Plant.
005	Flow not reported at this sample point.	Sample point for determining compliance with the TMDL-based limits for Total Suspended Solids and Total Phosphorus, calculated as a combined discharge from the mechanical plant and lagoons. Loadings are calculated as the sum of the mass discharged at sample points 001 and 003.
006	New Sample Point	SEWAGE SLUDGE: Aerobically digested, gravity thickened liquid sludge samples shall be collected from the MUNICIPAL aerobic digester. Limits applicable only for years when liquid sludge is land applied.

1 Influent – Monitoring Requirements

1.1 Sample Point Number: 701- Influent - Lift Station #1 and 702- Influent - Lift Station #2

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	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Suspended Solids, Total		mg/L	3/Week	24-Hr Flow Prop Comp	

1.1.1 Changes from Previous Permit:

No changes made from previous permit.

1.1.2 Explanation of Limits and Monitoring Requirements

Influent monitoring is needed to assess loading to the facility and treatment performance. Requirements for flow, BOD, and TSS are established in accordance with ch. NR 210.04(2), Wis. Adm. Code. Sample Point 702 was added as a new influent lift station #2 was constructed in 2021. All domestic wastewater was routed to lift station #2 and a new sampler and flow meter were added at this lift station at that time. Only industrial wastewater from Arla is now routed to the previous lift station #1, Sample Point 701.

2 Inplant - Monitoring and Limitations

2.1 Sample Point Number: 103- Effluent - Arla Plant

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
BOD5, Total		mg/L	3/Week	24-Hr Comp	
Suspended Solids, Total		mg/L	3/Week	24-Hr Comp	
pH Field		su	5/Week	Grab	
Dissolved Oxygen		mg/L	5/Week	Grab	
Chloride		mg/L	4/Month	24-Hr Comp	Sampling done on 4 consecutive days one week per month. See chloride monitoring section in permit.
Phosphorus, Total		mg/L	3/Week	24-Hr Comp	
Nitrogen, Ammonia (NH3-N) Total		mg/L	3/Week	24-Hr Comp	

2.1.1 Changes from Previous Permit:

No changes made from previous permit.

2.1.2 Explanation of Limits and Monitoring Requirements

As part of the 2021/22 construction project, the treatment plant was split into two separate treatment trains. One treatment train treats the industrial wastewater from Arla, and the other treatment train treats the domestic wastewater from the town of Holland. As part of this construction project, a new sampler was added to sample the effluent industrial treatment train. This sampler is time proportional and is not associated with a flow meter.

3 Surface Water - Monitoring and Limitations

3.1 Sample Point Number: 001- Effluent-Lagoons

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Total Daily	See Section 3.2.1.1.
BOD5, Total	Weekly Avg	30 mg/L	3/Week	8-Hr Comp	See Section 6.4.6 for percent removal requirement.
BOD5, Total	Monthly Avg	20 mg/L	3/Week	8-Hr Comp	See Section 6.4.6 for percent removal requirement.
Suspended Solids, Total	Weekly Avg	30 mg/L	3/Week	8-Hr Comp	See Section 6.4.6 for percent removal requirement.
Suspended Solids, Total	Monthly Avg	20 mg/L	3/Week	8-Hr Comp	See Section 6.4.6 for percent removal requirement.
Suspended Solids, Total		lbs/day	3/Week	Calculated	See Section 3.2.3.1.
pH Field	Daily Min	6.0 su	5/Week	Grab	See Section 3.2.1.3.
pH Field	Daily Max	9.0 su	5/Week	Grab	See Section 3.2.1.3.
Dissolved Oxygen	Daily Min	4.0 mg/L	5/Week	Grab	
Chloride	Daily Max	940 mg/L	4/Month	8-Hr Comp	Alternative Effluent Limit. Sampling shall be done on four consecutive days one week per month. See Chloride Variance permit section and the Schedules section for applicable chloride target value.
Chloride	Weekly Avg	690 mg/L	4/Month	8-Hr Comp	Alternative Effluent Limit. Sampling shall be done on four consecutive days one week per month. See

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					Chloride Variance permit section and the Schedules section for applicable chloride target value.
Chloride		lbs/day	4/Month	Calculated	Sampling shall be done on four consecutive days one week per month. See Chloride Variance permit section and in the Schedules section for applicable chloride target value.
Phosphorus, Total	Monthly Avg	1.0 mg/L	3/Week	8-Hr Comp	TBEL.
Phosphorus, Total		lbs/day	3/Week	Calculated	See Section 3.2.3.1.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	3/Week	8-Hr Comp	See Section 3.2.1.4.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	7.7 mg/L	3/Week	8-Hr Comp	Applies October- March.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	5.7 mg/L	3/Week	8-Hr Comp	Applies April- May.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	4.1 mg/L	3/Week	8-Hr Comp	Applies June- September.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	3.1 mg/L	3/Week	8-Hr Comp	Applies October- March.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	2.3 mg/L	3/Week	8-Hr Comp	Applies April- May.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	1.7 mg/L	3/Week	8-Hr Comp	Applies June- September.
Nitrogen, Ammonia Variable Limit		mg/L	3/Week	8-Hr Comp	
Nitrogen, Total Kjeldahl		mg/L	Per Occurrence	24-Hr Flow Prop Comp	See Nitrogen Series Monitoring permit section.
Nitrogen, Nitrite + Nitrate Total		mg/L	Per Occurrence	24-Hr Flow Prop Comp	See Nitrogen Series Monitoring permit section.
Nitrogen, Total		mg/L	Per Occurrence	Calculated	See Nitrogen Series Monitoring permit section. Total Nitrogen shall be calculated as the sum of reported values for Total

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.
PFOS		ng/L	1/ 2 Months	Grab	See PFOS/PFOA Sampling and Reporting Requirements section below.
PFOA		ng/L	1/ 2 Months	Grab	See PFOS/PFOA Sampling and Reporting Requirements section below.
Acute WET		TUa	Per Occurrence	8-Hr Comp	See Section 3.2.1.8 in the permit for WET testing requirements and schedule.
Chronic WET	Monthly Avg	1.0 TUc	Per Occurrence	8-Hr Comp	Monitoring and limit to go into effect after completion of TRE. See Section 3.2.1.8 in the permit for WET testing requirements and schedule 5.2.

3.1.1 Changes from Previous Permit

Chloride- Mass in lbs/day will be calculated for days concentration data is reported. A daily max concentration limit of 940 mg/L has been approved for this permit term under a variance to the WQBEL limit.

Total Nitrogen Monitoring (NO2+NO3, TKN and Total N)- Monitoring is required once each year discharge occurs.

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

WET- Monitoring for acute and chronic WET tests has been set to "Per Occurrence". Monitoring and limit of 1.0 TUc set to go into effect after the completion of TRE per schedule 5.2.

3.1.2 Explanation of Limits and Monitoring Requirements

Refer to the WQBEL memo for the detailed calculations, prepared by the Water Quality Bureau dated March 14, 2024, used for this reissuance.

BOD_5, Total Suspended Solids (TSS), pH and Dissolved Oxygen- Categorical limits for BOD_5, TSS, pH and Dissolved Oxygen are outlined in s. NR 210.04, Wis. Adm. Code, and are carried over from the previous permit term. These limits are not subject to change at this time because the receiving water characteristics have not changed.

Chloride- Acute (757 mg/L) and chronic (395 mg/L) chloride toxicity criteria for the protection of aquatic life are included in Tables 1 and 5 of ch. NR 105. Subchapter IV of ch. NR 106 establishes the procedure for calculating WQBELs for chloride. An analysis of chloride effluent data from Holland SD 1's current permit term is included in the September 25, 2023, WQBEL memo. Because the 1-day P_{99} and the 4-day P_{99} for Outfalls 001 and 003 exceed the calculated daily maximum and weekly average WQBELs for chloride, effluent limits are needed in accordance with s. NR

106.05(4)(a) and (b), Wis. Adm. Code. However, since chloride is not substantially reduced by standard wastewater treatment processes, and the installation and operation of alternative chloride removal processes may cause substantial and widespread adverse social and economic impacts in the area where the discharger is located, ch. NR 106, Subchapter VII, provides for a variance from chloride limitations if a permittee submits an application requesting such a variance and the US EPA grants the variance, which is considered a variance from state water quality standards.

Holland SD 1 has submitted an application requesting a chloride variance and as a condition of this variance the permittee has committed to maintaining effluent chloride concentrations at or below the interim chloride limits of 940 mg/L (expressed as a daily maximum) and 690 mg/L (expressed as a weekly average) and implementing the Town of Holland's Planned Source Reduction Measures, dated March 01, 2024 (attached to this fact sheet). The Chloride Target Value Compliance Schedule details the additional details required with a target value of 620 mg/L.

Phosphorus- Chapter NR 217 of the Wis. Adm. Code addresses point source dischargers of phosphorus to surface waters. The code limits municipal dischargers of more than 150 pounds of phosphorus per month, to a 1.0 mg/L total phosphorus effluent limit unless an alternative limit is approved. This facility exceeds the 150 pounds/month threshold and is currently subject to the 1.0 mg/L technology based effluent limit (TBEL) for total phosphorus. That limit remains in effect in this permit.

This discharge is also subject to the Lower Fox River TMDL, approved by the Environmental Protection Agency (EPA) in May 2012. Phosphorus data collected at Sample Point 001 will be used to determine compliance with TMDL-based limits at Sample Point 005. See the discussion on TMDL Derived Limits for Sample Point 005, below, for more details about the inclusion of a TMDL-derived phosphorus WQBEL in this permit.

Ammonia- 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 III of ch. NR 106 establishes the procedure for calculating WQBELs for ammonia. Effluent limits are necessary in accordance with the reasonable potential analysis, as presented in the WQBEL memo. The daily maximum limit is applied as a variable limit that is a function of effluent pH.

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.

PFOS and PFOA – NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. At the first reissuance of a WPDES permit after August 1, 2022, the new rule requires WPDES permits for major municipal dischargers with an average flow rate greater than 1 MGD but less than 5 MGD, at a minimum sample effluent once every two-months for PFOS and PFOA pursuant s. NR 106.98(2)(b), Wis. Adm. Code.

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

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

Whole Effluent Toxicity- Whole effluent toxicity (WET) testing requirements and limits (if applicable) are determined in accordance with ss. NR 106.08 and NR 106.09 Wis. Adm. Code, as revised August 2016. (See the current version of the Whole Effluent Toxicity Program Guidance Document and checklist and WET information, guidance and test methods at http://dnr.wi.gov/topic/wastewater/wet.html)

Acute tests are required anytime discharge occurs for a day or more, but no more than once per year. When discharge occurs for one to two days, acute tests may be conducted with one sample. When discharge occurs for three days or more, acute tests shall be conducted with a minimum of two samples.

Chronic tests are required anytime discharge occurs for three or more days after the completion of Schedule 5.2, but no more than once per quarter. When discharge occurs for more than three days, but less than six days, chronic tests may be conducted with two samples. When discharge occurs for six days or more, chronic tests shall be conducted with a minimum of three samples.

3.2 Sample Point Number: 003- Effluent-Mechanical Plant

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	See permit Section 3.2.2.1
BOD5, Total	Weekly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	See permit Section 6.4.6 for percent removal requirement.
BOD5, Total	Monthly Avg	20 mg/L	3/Week	24-Hr Flow Prop Comp	See permit Section 6.4.6 for percent removal requirement.
Suspended Solids, Total	Weekly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	See permit Section 6.4.6 for percent removal requirement.
Suspended Solids, Total	Monthly Avg	20 mg/L	3/Week	24-Hr Flow Prop Comp	See permit Section 6.4.6 for percent removal requirement.
Suspended Solids, Total		lbs/day	3/Week	Calculated	See permit Section 3.2.3.1.
pH Field	Daily Min	6.0 su	5/Week	Grab	See permit Section 3.2.2.4.
pH Field	Daily Max	9.0 su	5/Week	Grab	See permit Section 3.2.2.4.
Dissolved Oxygen	Daily Min	4.0 mg/L	5/Week	Grab	
Chloride	Daily Max	940 mg/L	4/Month	24-Hr Flow Prop Comp	Alternative Effluent Limit. Sampling shall be done on four consecutive days one week per month. See Chloride Variance permit section and the Schedules section for applicable chloride target value.
Chloride	Weekly Avg	690 mg/L	4/Month	24-Hr Flow Prop Comp	Alternative Effluent Limit. Sampling shall be done on four consecutive days one week per month. See Chloride Variance permit

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					section and the Schedules section for applicable chloride target value.
Chloride		lbs/day	4/Month	Calculated	Sampling shall be done on four consecutive days one week per month. See Chloride Variance section below and in the Schedules section for applicable chloride target value.
Phosphorus, Total	Monthly Avg	1.0 mg/L	3/Week	24-Hr Flow Prop Comp	TBEL.
Phosphorus, Total		lbs/day	3/Week	Calculated	See permit Section 3.2.3.1.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	3/Week	24-Hr Flow Prop Comp	See permit Section 3.2.2.4.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	7.7 mg/L	3/Week	24-Hr Flow Prop Comp	Applies October- March.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	5.7 mg/L	3/Week	24-Hr Flow Prop Comp	Applies April- May.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	4.1 mg/L	3/Week	24-Hr Flow Prop Comp	Applies June- September.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	3.1 mg/L	3/Week	24-Hr Flow Prop Comp	Applies October- March.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	2.3 mg/L	3/Week	24-Hr Flow Prop Comp	Applies April- May.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	1.7 mg/L	3/Week	24-Hr Flow Prop Comp	Applies June- September.
Nitrogen, Ammonia Variable Limit		mg/L	3/Week	24-Hr Flow Prop Comp	
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	Annual in rotating quarters. See Nitrogen Series Monitoring permit section. Total Nitrogen shall be

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.
PFOS		ng/L	1/ 2 Months	Grab	See PFOS/PFOA Sampling and Reporting Requirements permit section.
PFOA		ng/L	1/ 2 Months	Grab	See PFOS/PFOA Sampling and Reporting Requirements permit section.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See permit Section 3.2.1.8 for WET testing requirements and schedule.
Chronic WET	Monthly Avg	1.0 TUc	Quarterly	24-Hr Flow Prop Comp	Monitoring and limit to go into effect after completion of TRE. See permit Section 3.2.1.8 for WET testing requirements and schedule 5.2.

3.2.1 Changes from Previous Permit

Chloride- Mass in lbs/day will be calculated for days concentration data is reported.

Total Nitrogen Monitoring (NO2+NO3, TKN and Total N)- Annual monitoring in rotating quarters has been added to the permit.

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

Chronic WET- Monitoring increased from once to quarterly. Monitoring and limit of 1.0 TUc set to go into effect after the completion of TRE per schedule 5.2.

3.2.2 Explanation of Limits and Monitoring Requirements

Refer to the WQBEL memo for the detailed calculations, prepared by the Water Quality Bureau dated March 14, 2024, used for this reissuance.

BOD_5, Total Suspended Solids (TSS), pH and Dissolved Oxygen- Categorical limits for BOD_5, TSS, pH and Dissolved Oxygen are outlined in s. NR 210.04, Wis. Adm. Code, and are carried over from the previous permit term. These limits are not subject to change at this time because the receiving water characteristics have not changed.

Chloride- See the discussion on Chloride for Sample Point 001, above, for more details about the inclusion of an interim chloride limit in this permit.

Phosphorus- Chapter NR 217 of the Wis. Adm. Code addresses point source dischargers of phosphorus to surface waters. The code limits municipal dischargers of more than 150 pounds of phosphorus per month, to a 1.0 mg/L total phosphorus effluent limit unless an alternative limit is approved. This facility exceeds the 150 pounds/month threshold and is currently subject to the 1.0 mg/L technology based effluent limit (TBEL) for total phosphorus. That limit remains in effect in this permit.

This discharge is also subject to the Lower Fox River TMDL, approved by the Environmental Protection Agency (EPA) in May 2012. Phosphorus data collected at Sample Point 001 will be used to determine compliance with TMDL-based limits at Sample Point 005. See the discussion on TMDL Derived Limits for Sample Point 005, below, for more details about the inclusion of a TMDL-derived phosphorus WQBEL in this permit.

Ammonia- 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 III of ch. NR 106 establishes the procedure for calculating WQBELs for ammonia. Effluent limits are necessary in accordance with the reasonable potential analysis, as presented in the WQBEL memo. The daily maximum limit is applied as a variable limit that is a function of effluent pH.

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 1- December 31, 2024; April 1-June 30, 2025; January 1-March 31, 2026; July 1- September 30, 2027; and October 1- December 31, 2028.

PFOS and PFOA – NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. At the first reissuance of a WPDES permit after August 1, 2022, the new rule requires WPDES permits for major municipal dischargers with an average flow rate greater than 1 MGD but less than 5 MGD, at a minimum sample effluent once every two-months for PFOS and PFOA pursuant s. NR 106.98(2)(b), Wis. Adm. Code.

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

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

Whole Effluent Toxicity- Whole effluent toxicity (WET) testing requirements and limits (if applicable) are determined in accordance with ss. NR 106.08 and NR 106.09 Wis. Adm. Code, as revised August 2016. (See the current version of the Whole Effluent Toxicity Program Guidance Document and checklist and WET information, guidance and test methods at http://dnr.wi.gov/topic/wastewater/wet.html)

Acute tests are required during the following quarters: October 1- December 31, 2024; April 1-June 30, 2025; January 1-March 31, 2026; July 1- September 30, 2027; and October 1- December 31, 2028.

Chronic tests are required quarterly after the completion of Schedule 5.2.

3.3 Sample Point Number: 005- Calculated Combined Effluent

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Suspended Solids, Total	Monthly Avg	174 lbs/day	3/Week	Calculated	See permit Section 3.2.3.1.
Suspended Solids, Total	Weekly Avg	308 lbs/day	3/Week	Calculated	See permit Section 3.2.3.1.
Phosphorus, Total	Monthly Avg	3.3 lbs/day	3/Week	Calculated	See permit Section 3.2.3.1.

3.3.1 Changes from Previous Permit

No changes made from previous permit.

3.3.2 Explanation of Limits and Monitoring Requirements

Sample Point 005 is included in the permit for reporting the combined mass discharge of Total Suspended Solids (TSS) and Total Phosphorus (TP) from the Lagoons (Sample Point 001) and the Mechanical Plant (Sample Point 003), to determine compliance with the TMDL-derived limits for TSS and TP.

TMDL (Total Maximum Daily Load) Derived Limits for Total Phosphorus and Total Suspended Solids- Chapter NR 217 was revised on December 1, 2010, with the addition of Subchapter III, which includes WQBELs for phosphorus, based upon criteria contained in Chapter NR 102. Details may be found at: http://dnr.wi.gov/topic/surfacewater/phosphorus.html .

The Lower Fox River TMDL was developed to determine the maximum amounts of phosphorus and sediment that can be discharged to protect and improve water quality. The Lower Fox River TMDL was approved by the Environmental Protection Agency (EPA) in May 2012. The entire report can be found at: http://dnr.wi.gov/topic/TMDLs/documents/lowerfox/LowerFoxRiverTMDLReport2012.pdf .

The final effluent limits, expressed as mass limits, were derived from, and comply with, the applicable water quality criterion and are consistent with the assumptions and requirements of the EPA-approved Waste Load Allocation (WLA) for the Lower Fox Basin. The permit includes limitations and requirements necessary to implement the recommendations of the TMDL.

Limits for the permit were determined based upon the revised rules and the provisions of the TMDL, in accordance with Department guidance, "TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs, Edition No. 3," which can be found at: http://dnr.wi.gov/topic/tmdls/ptsourcetmdl.html . See the May 31 2014 planning limits letter and March 22, 2017 WQBEL memo for additional information on the derivation of the TMDL-based WQBELs.

For the reasons explained in the April 30, 2012 paper entitled 'Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin', WDNR has determined that it is impracticable to express the phosphorus WQBELs for the permittee as daily maximum or weekly average values. The final TMDL mass limits for phosphorus is expressed as a monthly average; the TMDL-based WQBEL is 3.3 lbs/day as a monthly average, based on s. NR 217.14(2).

There is no applicable impracticability determination for Total Suspended Solids (TSS) limitations. Therefore, the TSS TMDL-based WQBELs are set equal to 308 lbs/day, expressed as a weekly average limit, and 174 lbs/day, expressed as a monthly average limit. There are no changes to the categorical (concentration) limits for TSS.

At the annual average design flow rate (0.39 MGD), the phosphorus TMDL-based WQBEL of 3.3 lbs/day is equivalent to a concentration of 1.01 mg/L, and the TSS TMDL-based WQBELs of 308 lbs/day as a weekly average and 174 lbs/day as a monthly average are equivalent to concentrations of 94 mg/L and 53 mg/L, respectively.

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)**
004	B	Cake	Fecal Coliform Reduction	Incorporation	Land application	75 tons/yr
006	B	Liquid	Fecal Coliform Reduction	Injection	Land application Haul to another facility	75 tons/yr
Does sludge management demonstrate compliance? **Yes**						
Is additional sludge storage required? **No**						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? **Yes**, the municipal water system includes a treatment process for radium reduction. Sludge monitoring for Radium-226 is required. If yes, special monitoring and recycling conditions will be included in the permit to track any potential problems in landapplying sludge from this facility						
Is a priority pollutant scan required? **No**, design flow is < 5 MGD. Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.						

4.1 Sample Point Number: 002- Industrial Liquid Sludge

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	Monthly	Grab	
Nitrogen, Total Kjeldahl		Percent	Monthly	Grab	
Chloride		Percent	Monthly	Grab	
pH Field		su	Annual	Grab	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Nitrogen, Ammonium (NH_4-N) Total		Percent	Annual	Grab	
Phosphorus, Total		Percent	Annual	Grab	
Phosphorus, Water Extractable		% of Tot P	Annual	Grab	
Potassium, Total Recoverable		Percent	Annual	Grab	
PFOA + PFOS		µg/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.

4.1.1 Changes from Previous Permit:

Aerobic digestion was separated for municipal and industrial treatment trains in 2022. Sample Point 002 now monitors industrial liquid sludge. Sample Point 006 has been added to monitor municipal liquid sludge. Monitoring for metals and radium is no longer required at Sample Point 002. Monitoring for chloride and pH has been added to comply with requirements for industrial discharges outlined in ch. NR 214, Wis. Adm. Code.

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

4.1.2 Explanation of Limits and Monitoring Requirements

Requirements for land application of industrial sludge are determined in accordance with ch. NR 214 Wis. Adm. Code.

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.

4.2 Sample Point Number: 004- Cake 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	
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	
Radium 226 Dry Wt		pCi/g	Annual	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Once in 2025. See Sludge Analysis for PCBs section in permit.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Once in 2025. See Sludge Analysis for PCBs Section in permit.
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.

4.2.1 Changes from Previous Permit:

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

4.2.2 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).

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.

4.3 Sample Point Number: 006- Municipal 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	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Cadmium Dry Wt	High Quality	39 mg/kg	Annual	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Annual	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Annual	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Annual	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Annual	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Annual	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Annual	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	
Nitrogen, Ammonium (NH_4-N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	Composite	
Radium 226 Dry Wt		pCi/g	Annual	Composite	
PFOA + PFOS		µg/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.

4.3.1 Changes from Previous Permit:

Aerobic digestion was separated for municipal and industrial treatment trains in 2022. Sample Point 002 now monitors industrial liquid sludge. Sample Point 006 has been added to monitor municipal liquid sludge.

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

4.3.2 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).

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.

5 Schedules

5.1 Chloride Source Reduction Measures (Target Value)

As a condition of the variance to the water quality based effluent limitation(s) for chloride granted in accordance with s. NR 106.83(2), Wis. Adm. Code, the permittee shall perform the following actions.

Required Action	Due Date
Annual Chloride Progress Report: Submit an annual chloride progress report related to the source reduction activities for the previous year. The annual chloride progress report shall: Indicate which chloride source reduction measures or activities in the Source Reduction Plan have been implemented and state which, if any, source reduction measures from the Source Reduction Plan were not pursued and why. Include an assessment of whether each implemented source reduction measure appears to be effective or ineffective at reducing pollutant discharge concentrations and identify actions planned for the upcoming year; Include an analysis of trends in weekly, monthly and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data; and Include an analysis of how effluent chloride varies with time and with significant loadings of chloride. Note that the interim limitation listed in the Surface Water section of this permit remains enforceable until new enforceable limits are established in the next permit issuance. The first annual chloride progress report is to be submitted by the Date Due.	01/31/2025
Annual Chloride Progress Report #2: Submit the chloride progress report, related to the source reduction activities for the previous year, as defined above.	01/31/2026
Annual Chloride Progress Report #3: Submit the chloride progress report, related to the source reduction activities for the previous year, as defined above.	01/31/2027

Annual Chloride Progress Report #4: Submit the chloride progress report, related to the source reduction activities for the previous year, as defined above.	01/31/2028
Final Chloride Report: Submit the final chloride report documenting the success in meeting the chloride target value of 620 mg/L, as well as the anticipated future reduction in chloride sources and chloride effluent concentrations. The report shall: Summarize chloride source reduction measures that have been implemented during the current permit term and state which, if any, source reduction measures from the Source Reduction Plan were not pursued and why; Include an assessment of which source reduction measures appear to have been effective or ineffective. Evaluate any needed changes to the pollutant reduction strategy accordingly; Include an analysis of trends in weekly, monthly and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data during the current permit term; and Include an analysis of how influent and effluent chloride varies with time and with significant loadings of chloride as identified in the source reduction plan. If the permittee intends to reapply for a chloride variance, for the reissued permit, proposed target limits and a detailed source reduction measures plan, outlining the source reduction activities proposed for the upcoming permit term, shall also be included per ss. NR 106.90 (5) and NR 106.83 (4), Wis. Adm. Code. An updated source reduction measures plan shall: Include an explanation of why or how each source reduction measure will result in reduced discharge of the target pollutant; and Evaluate any available information on pollutant sources, timing, and concentration to update the mass balance assumptions and expected sources of the pollutant, and Identify any information needs that would help to better determine pollutant sources and make plans to collect that information. Note that the target value is the benchmark for evaluating the effectiveness of the chloride source reduction measures but is not an enforceable limitation under the terms of this permit.	10/01/2028
Annual Chloride Reports After Permit Expiration: In the event that this permit is not reissued by the date the permit expires the permittee shall continue to submit annual chloride reports for the previous year following the due date of Annual Chloride Progress Reports listed above. Annual Chloride Progress Reports shall include the information as defined above.	January 31, each year

5.1.1 Explanation of Schedules

This schedule is a condition of receiving a variance from the chronic water quality-based chloride limits of 760 mg/L expressed as a daily maximum and 400 mg/L expressed as a weekly average. Since a schedule is being granted, an interim weekly average limit of 690 mg/L is required. The schedule requires that annual reports shall indicate which source reduction measures the permittee has implemented during each calendar year, and an analysis of chloride concentration and mass discharge data based on chloride sampling and flow data. The annual reports shall document progress made towards meeting the chloride target value of 620 mg/L by the end of the permit term.

5.2 Whole Effluent Toxicity Limit

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

Required Action	Due Date
Source Identification: Make a reasonable attempt to identify the source(s) of chronic toxicity, including the completion of monthly screening of the effluent for chronic toxicity and performing toxicity identification evaluation (TIE) steps when samples are toxic. Complete a review of all chemical additives including those added at the WWTP and used in the production facilities of all industrial contributors. This review shall include compiling a list of all chemicals used, their SDS, and aquatic toxicity data for each product as described in s. NR 105.05(4)(a), Wis. Adm. Code. Information from this review shall be compared to toxicity test and TIE results to determine their potential for causing effluent toxicity. The permittee shall submit a report to the Department presenting the results of all toxicity screening, TIE results, chemical review, and any other relevant information by the due date.	09/30/2024
Submit TRE Plan: Submit a TRE Plan describing actions to be taken to reduce or eliminate the toxicity identified in step one and the dates by which those actions will be implemented. Chloride concentrations shall be measured in all toxicities samples collected during the TRE.	10/30/2024
Complete Actions: Complete all actions identified in the TRE plan and achieve compliance with the chronic WET limitation.	03/31/2025

5.2.1 Explanation of Schedules

There have been eight Whole Effluent Toxicity (WET) test failures at the facility since 2019. To bring the facility back into compliance, a Chronic WET Limit Compliance Schedule is being included to identify and remove the source of toxicity.

5.3 PFOS/PFOA Minimization Plan Determination of Need

Required Action	Due Date
Report on Effluent Discharge: Submit a report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations. This analysis should also include a comparison to the applicable narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code. This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.	3/31/2025
Report on Effluent Discharge and Evaluation of Need: Submit a final report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations of data collected over the last 24 months. The report shall also provide a comparison on the likelihood of the facility needing to develop a PFOS/PFOA minimization plan. This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results. The permittee shall also submit a request to the department to evaluate the need for a PFOS/PFOA minimization plan. If the department determines a PFOS/PFOA minimization plan is needed based on a reasonable potential evaluation, the permittee will be required to develop a minimization plan for department approval no later than 90 days after written notification was sent from the department. The department will modify or revoke and reissue the permit to include PFOS/PFOA minimization plan reporting requirements along with a schedule of compliance	3/31/2026

to meet WQBELs. Effluent monitoring of PFOS and PFOA shall continue as specified in the permit until the modified permit is issued. If, however, the department determines there is no reasonable potential for the facility to discharge PFOS or PFOA above the narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code, no further action is required and effluent monitoring of PFOS and PFOA shall continue as specified in the permit.	

5.3.1 Explanation of Schedule

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

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

6 Attachments:

Water Quality-Based Effluent Limitations for Holland Sanitary District 1 Wastewater Treatment Facility, WPDES Permit No. WI-0028207-08, September 25, 2023; Nicole Krueger, Wastewater Resources Engineer

Holland Final Chloride Report Pollutant Minimization Plan and Planned Source Reduction Measures, March 01, 2024; Holland Sanitary District Wastewater Treatment Facility

Facility Specific Chloride Variance Data Sheet, March 20, 2024; Amanda Perdzock, Wastewater Specialist

7 Expiration Date:

June 30, 2029

8 Justification Of Any Waivers From Permit Application Requirements

No waiver from permit application requirements granted.

Prepared By: Amanda Perdzock, Wastewater Specialist **Date:** March 26, 2024

Notice of reissuance was published in the Green Bay Press-Gazette, PO Box 23430, Green Bay, WI 54305-3430.

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: 09/25/2023 – updated 03/14/2024 for chloride variance limit

TO: Amanda Perdzock – WY/3

FROM: Nicole Krueger – SER Nicole Krueger

SUBJECT: Water Quality-Based Effluent Limitations for Holland Sanitary District 1 Wastewater Treatment Facility
WPDES Permit No. WI-0028207-08

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 Town of Holland Sanitary District 1 Wastewater Treatment Facility in Brown County. This municipal wastewater treatment facility (WWTF) discharges to an unnamed tributary to Plum Creek, located in the Plum and Kankapot Creeks Watershed in the Lower Fox River Basin. This discharge is included in the Lower Fox River Basin TMDL as approved by EPA in March 2012. The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

Outfall 001 and Outfall 003 – Effluent Lagoons and Combined Arla and District Mechanical Plants

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1,2
BOD_5			30 mg/L	20 mg/L	1
TSS			30 mg/L	20 mg/L	1
pH	9.0 s.u.	6.0 s.u.			1
Dissolved Oxygen		4.0 mg/L			1
Chloride	760 mg/L		400 mg/L		3
Phosphorus TBEL				1.0 mg/L	
Ammonia Nitrogen Oct – March April – May June – Sept	 Variable Variable Variable		 7.7 mg/L 5.7 mg/L 4.1 mg/L	 3.1 mg/L 2.3 mg/L 1.7 mg/L	1,4
PFOS and PFOA					5
TKN, Nitrate+Nitrite, and Total Nitrogen					6
Acute WET					7,8
Chronic WET					7,8

Outfall 005 – Calculated Combined Effluent

Parameter	Weekly Average	Monthly Average	Footnotes
TSS TMDL	308 lbs/day	174 lbs/day	1, 9

Parameter	Weekly Average	Monthly Average	Footnotes
Phosphorus TMDL		3.3 lbs/day	1, 9

Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. These are the WQBELs for chloride. Alternative effluent limitations of 940 mg/L as a daily maximum and 690 mg/L as a weekly average may be included in the permit in place of this limit if the chloride variance application that was submitted is approved by EPA. If the variance is not approved, a wet weather mass limit would also be required.
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_3-N Limit mg/L**	**Effluent pH s.u.**	**NH_3-N Limit mg/L**	**Effluent pH s.u.**	**NH_3-N Limit mg/L**
$6.0 < pH \leq 6.1$	54	$7.0 < pH \leq 7.1$	33	$8.0 < pH \leq 8.1$	7.0
$6.1 < pH \leq 6.2$	53	$7.1 < pH \leq 7.2$	30	$8.1 < pH \leq 8.2$	5.7
$6.2 < pH \leq 6.3$	52	$7.2 < pH \leq 7.3$	26	$8.2 < pH \leq 8.3$	4.7
$6.3 < pH \leq 6.4$	50	$7.3 < pH \leq 7.4$	23	$8.3 < pH \leq 8.4$	3.9
$6.4 < pH \leq 6.5$	49	$7.4 < pH \leq 7.5$	20	$8.4 < pH \leq 8.5$	3.2
$6.5 < pH \leq 6.6$	47	$7.5 < pH \leq 7.6$	17	$8.5 < pH \leq 8.6$	2.7
$6.6 < pH \leq 6.7$	45	$7.6 < pH \leq 7.7$	14	$8.6 < pH \leq 8.7$	2.2
$6.7 < pH \leq 6.8$	42	$7.7 < pH \leq 7.8$	12	$8.7 < pH \leq 8.8$	1.8
$6.8 < pH \leq 6.9$	39	$7.8 < pH \leq 7.9$	10	$8.8 < pH \leq 8.9$	1.6
$6.9 < pH \leq 7.0$	36	$7.9 < pH \leq 8.0$	8.4	$8.9 < pH \leq 9.0$	1.3

5. Monitoring is required in accordance with s. NR 106.98(2), Wis. Adm. Code once every two months.
6. 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).
7. Acute WET testing is recommended 1x yearly and chronic testing is recommended quarterly after a TRE is completed. The Instream Waste Concentration (IWC) to assess chronic test results is 99%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 75%, 50%, 25% & 12.5% and the dilution water used in WET tests conducted on Outfall 001 or 003 shall be a grab sample collected from the receiving water.
8. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).
9. The TSS and phosphorus mass limits are based on the Total Maximum Daily Load (TMDL) for the Lower Fox River Basin to address phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA in March 2012.

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

Attachments (3) – Narrative, Map, and 2018 Ammonia Calculations

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Attachment #1

Water Quality-Based Effluent Limitations for
Holland Sanitary District No. 1

WPDES Permit No. WI-0028207-08

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

The Holland Sanitary District 1 Wastewater Treatment Facility ("Holland") owns and operates an advanced secondary wastewater treatment facility for treating domestic wastewaters from the unincorporated community of Holland in southwest Brown County, along with process wastewater from Arla Foods Production LLC, a dairy foods processing facility. An upgrade in 2022 has separated Arla Food's process wastewater from the Town of Holland Sanitary District #1's wastewater and is treating the two liquid streams separately.

The municipal treatment train includes its own lift station followed by preliminary treatment with fine-screening, biological treatment with an activated sludge system consisting of an aerobic selector basin followed by aeration basins and a single clarifier and phosphorus removal by chemical precipitation using ferric sulfate. This effluent is discharged to a tributary to Plum Creek via Outfall 003.

The Arla treatment train includes its own lift station followed by an aerated equalization tank, two selector tanks, aeration basin, and secondary clarifier. The effluent from the clarifier will be sent to the Plant Effluent Pump Station to combine with the effluent from the district's compact plant.

Alternatively, the mixed wastewater can be pumped to a pair of polishing lagoons for further treatment before discharge via Outfall 001 to a tributary to Plum Creek. Outfall 001 was used very infrequently during the current permit term and is expected to be used less in the future.

Disinfection of the effluent is not required at this time. It should be noted that recreational use surveys and other information may be re-evaluated in the future to ensure the conditions of s. NR 210.06(3), Wis. Adm. Code, are being met. This re-evaluation could result in requiring disinfection of the effluent at that time.

Attachment #2 is a map of the area showing the approximate location of Outfalls 001 and 003.

Existing Permit Limitations

The current permit, expiring on 12/31/2023, includes the following effluent limitations and monitoring requirements.

Outfall 001 – Effluent Lagoons and Outfall 003 – Combined Arla and District Mechanical Plants

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD_5			30 mg/L	20 mg/L		2,3
TSS			30 mg/L	20 mg/L		2,3

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Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
pH	9.0 s.u.	6.0 s.u.				2
Dissolved Oxygen		4.0 mg/L				2,3
Chloride	990 mg/L		690 mg/L			4
Phosphorus				1.0 mg/L		
Ammonia Nitrogen Oct – March April – May June – Sept	 Variable Variable Variable		 7.7 mg/L 5.7 mg/L 4.1 mg/L	 3.1 mg/L 2.3 mg/L 1.7 mg/L		5
Acute WET						6
Chronic WET						6

Footnotes:

1. Monitoring only.
2. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
3. These limits are based on the Limited Aquatic Life (LAL) community of the immediate receiving water as described in s. NR 104.02(3)(b), Wis. Adm. Code.
4. These chloride limits are interim variance limits.
5. Ammonia daily maximum limits:

Effluent pH s.u.	**NH_3-N Limit mg/L**	**Effluent pH s.u.**	**NH_3-N Limit mg/L**	**Effluent pH s.u.**	**NH_3-N Limit mg/L**
$6.0 < pH \leq 6.1$	54	$7.0 < pH \leq 7.1$	33	$8.0 < pH \leq 8.1$	7.0
$6.1 < pH \leq 6.2$	53	$7.1 < pH \leq 7.2$	30	$8.1 < pH \leq 8.2$	5.7
$6.2 < pH \leq 6.3$	52	$7.2 < pH \leq 7.3$	26	$8.2 < pH \leq 8.3$	4.7
$6.3 < pH \leq 6.4$	50	$7.3 < pH \leq 7.4$	23	$8.3 < pH \leq 8.4$	3.9
$6.4 < pH \leq 6.5$	49	$7.4 < pH \leq 7.5$	20	$8.4 < pH \leq 8.5$	3.2
$6.5 < pH \leq 6.6$	47	$7.5 < pH \leq 7.6$	17	$8.5 < pH \leq 8.6$	2.7
$6.6 < pH \leq 6.7$	45	$7.6 < pH \leq 7.7$	14	$8.6 < pH \leq 8.7$	2.2
$6.7 < pH \leq 6.8$	42	$7.7 < pH \leq 7.8$	12	$8.7 < pH \leq 8.8$	1.8
$6.8 < pH \leq 6.9$	39	$7.8 < pH \leq 7.9$	10	$8.8 < pH \leq 8.9$	1.6
$6.9 < pH \leq 7.0$	36	$7.9 < pH \leq 8.0$	8.4	$8.9 < pH \leq 9.0$	1.3

6. Acute and chronic WET tests are required once during the permit term for Outfall 001. Acute WET tests are required every other year and chronic WET tests are required 1x/annually for Outfall 003. The IWC for chronic WET was 97%.

Outfall 005 – Calculated Combined Effluent

Parameter	Weekly Average	Monthly Average	Footnotes
TSS	308 lbs/day	174 lbs/day	1
Phosphorus		3.3 lbs/day	1

Footnotes:

1. The TSS and phosphorus mass limits are based on the Total Maximum Daily Load (TMDL) for the Lower Fox River Basin to address phosphorus water quality impairments within the TMDL area.

Receiving Water Information

- Name: Unnamed tributary to Plum Creek
- Waterbody Identification Code (WBIC): 125500
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: The immediate receiving water is classified as a limited aquatic life (LAL) community as listed in Table 5 in s. NR NR 104.07(2), Wis. Adm. Code. Plum Creek is a Warm Water Sport Fish (WWSF) community and a non-public water supply. Note: Cold Water and Public Water Supply criteria are used for bioaccumulating compounds of concern, because the discharge is within the Great Lakes basin.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q_{10} and 7-Q_2 values are estimates from USGS where Outfalls 001 and 003 are located and downstream where the classification changes to WWSF:
  Unnamed tributary (LAL)
  7-Q_{10} = 0 cfs (cubic feet per second)
  7-Q_2 = 0 cfs
  Plum Creek (WWSF approximately 1.5 miles downstream of Outfalls 001 and 003):
  7-Q_{10} = 0.02 cfs
  7-Q_2 = 0.05 cfs
- Hardness = 425 mg/L as $CaCO_3$. This value represents the geometric mean of data from chronic WET testing from 10/01/2019 – 02/18/2020.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: Not applicable where the receiving water low flows are zero.
- Source of background concentration data: Background concentrations are not included because they do not impact the calculated WQBEL when the receiving water low flows are equal to zero.
- Multiple dischargers: None.
- Impaired water status: The Plum Creek approximately 1.5 miles downstream of Holland is 303(d) listed as impaired for total phosphorus and TSS.

Effluent Information

- Design flow rate(s):
  Annual average = 0.39 MGD (Million Gallons per Day)
  Outfall 001 actual average flow from 01/01/2019 – 07/31/2023 excluding days of zero flow was 0.44 MGD.
  Outfall 003 actual average flow from 01/01/2019 – 07/31/2023 excluding days of zero flow was 0.26 MGD.
- Hardness = 611 mg/L as $CaCO_3$. This value represents the geometric mean of data from the permit application from 04/16/2023 – 05/07/2023.
- 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: Ferric sulfate 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. This data is representative of both outfalls.

- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled "MEAN EFFL. CONC.". Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Effluent Copper Data

Sample Date	Copper µg/L	Sample Date	Copper µg/L	Sample Date	Copper µg/L
04/16/2023	2.31	04/30/2023	2.31	05/14/2023	0.92
04/19/2023	<0.718	05/03/2023	1.03	05/17/2023	0.84
04/23/2023	<0.718	05/07/2023	1.40	05/21/2023	1.18
04/26/2023	<0.718	05/10/2023	1.0		
Average = 1.0 µg/L					

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

Effluent Chloride Data

	Chloride mg/L **Outfall 001**	Chloride mg/L **Outfall 003**	Chloride mg/L **Both Outfalls**
1-day P_{99}	740	1034	1016
4-day P_{99}	590	761	749
30-day P_{99}	507	616	606
Mean	463	542	534
Std	98.6	164	161
Sample size	26	235	259
Range	295 – 588	238 – 1541	238 – 1541

The following table presents the average concentrations and loadings at Outfalls 001, 003, and 005 from 01/01/2019 – 07/31/2023 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 001	Average Measurement 003	Average Mass Discharged 005
BOD_5	5.1 mg/L*	6.7 mg/L*	
TSS	7.7 mg/L*	8.5 mg/L*	6.73 lbs/day
pH field	8.12 s.u.	7.24 s.u.	
Phosphorus	0.65 mg/L	0.45 mg/L	0.52 lbs/day
Ammonia Nitrogen	1.23 mg/L*	0.77 mg/L*	
Chloride	463 mg/L	542 mg/L	
Dissolved Oxygen	11.2 mg/L	6.69 mg/L	

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

Attachment #1

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

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

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

Acute Limits based on 1-Q_{10}

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

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

Where:

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

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

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

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

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

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

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	REF. HARD.* mg/L	ATC	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Arsenic		340	340	68.0	1.88		

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SUBSTANCE	REF. HARD.* mg/L	ATC	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Cadmium	457	164.9	165	33.0	<0.19		
Chromium	301	4446	4446	889	<1.1		
Copper	495	70.2	70.2	14.0	1.0		
Lead	356	365	365	72.9	<4.3		
Nickel	268	1080	1080	216	<1.2		
Zinc	333	345	345	68.9	16		
Chloride (mg/L)		757	757			**1016**	**1541**

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

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

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	REF. HARD.* mg/L	CTC	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Arsenic		152	152	30.4	1.88	
Cadmium	175	3.82	3.82	0.76	<0.19	
Chromium	301	326	326	65.2	<1.1	
Copper	425	35.7	35.7	7.14	1.0	
Lead	356	95.5	95.5	19.1	<4.3	
Nickel	268	169	169	33.8	<1.2	
Zinc	333	345	345	68.9	16	
Chloride (mg/L)		395	395			**749**

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

Monthly Average Limits based on Wildlife Criteria (WC)

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

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	HTC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	880	880	176	<0.19
Chromium (+3)	8400000	8400000	1680000	<1.1
Lead	2240	2240	448	<4.3
Nickel	110000	110000	22000	<1.2

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Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	40	40	8.0	1.88

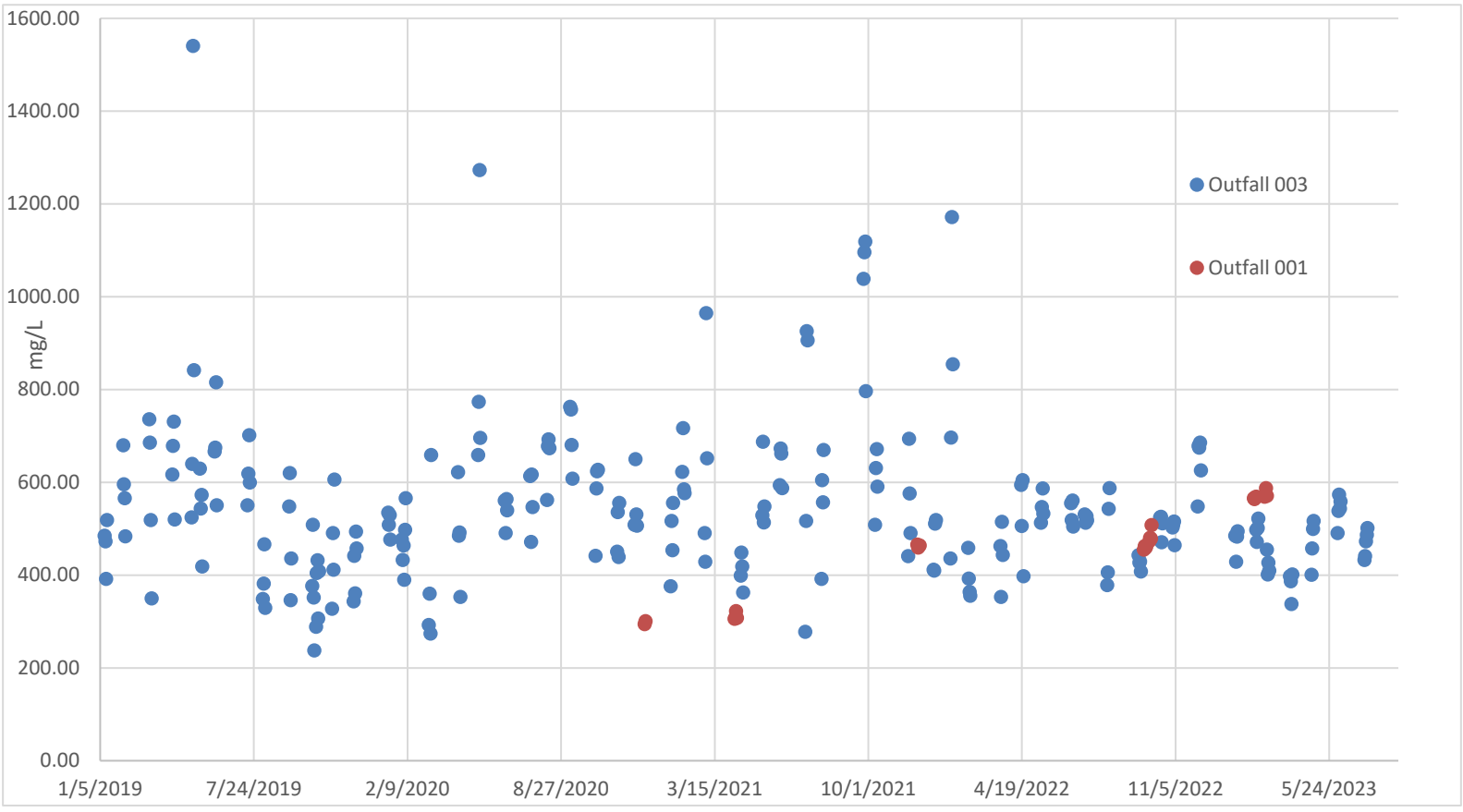
In addition to evaluating the need for limits for each individual substance for which HCC exist, s. NR 106.06(8), Wis. Adm. Code, requires the evaluation of the cumulative cancer risk. Because no effluent limits are needed based on HCC, determination of the cumulative cancer risk is not needed per s.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

Conclusions and Recommendations

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

Chloride – Considering available effluent data from the current permit term (01/01/2019 – 07/31/2023), the 1-day P_{99} concentration was 1016 mg/L and the 4-day P_{99} concentration was 749 mg/L for the combined data collected from both outfalls. A graph of the chloride data is below:

Effluent Chloride Data



Because the 1-day P_{99} and the 4-day P_{99} for Outfalls 001 and 003 exceed the calculated daily maximum and weekly average WQBELs, effluent limits are needed in accordance with s. NR 106.05(4)(a) and (b), Wis. Adm. Code.

Subchapter VII of ch. NR 106, Wis. Adm. Code, provides for a variance from water quality standards for this substance, and Holland has requested such a variance. That variance may be granted subject to the following conditions:

1) The permit shall include an "Interim" limitation intended to prevent an increase in the discharge of Chloride;
2) The permit shall specify "Source Reduction Measures" to be implemented during the permit term, with periodic progress reports; and
3) The permit shall include a "Target Limit" or "Target Value" to gage the effectiveness of the Source Reduction Measures, and progress toward the WQBELs.

Interim Limit for Chloride

Section NR 106.82(9), Wis. Adm. Code, defines a "Weekly average interim limitation" as either the 4-day P_{99} concentration or 105% of the highest weekly average concentration of the representative data.

There were two outliers in the chloride data on 05/06/2019 (1541 mg/L) and 05/13/2020 (1273 mg/L) that were caused by spills at Arla Foods. This data is not representative of normal conditions and should be excluded from the evaluation for the recommendation of an interim limit. The following table shows a statistical breakdown of effluent chloride data, excluding the two outliers:

Effluent Chloride Data – Outfalls 001 and 003

	Chloride mg/L
1-day P_{99}	941
4-day P_{99}	713
30-day P_{99}	590
Mean	528
Std	141
Sample size	257
Range	238 – 1172

A daily maximum of 940 mg/L interim chloride limit is recommended for permit reissuance, based on the 1-day P_{99}. A weekly average of 690 mg/L interim chloride limit is recommended, which is equal to the current weekly average interim limit. This is the 4-day P_{99} from the previous permit term because the current 4-day P_{99} is higher and the Department does not find it appropriate to increase the interim concentration limit in the reissued permit, because it would be counterproductive to meeting the final WQBEL.

Chloride Monitoring Recommendations

Four samples per month (on consecutive days) are recommended. This allows for averaging of the results to compare with the interim limit and allows the use of the average in determining future interim limits, and degree of success with chloride reduction measures.

In the absence of a variance, Holland would be subject to the WQBEL of 760 mg/L as a daily average, 400 mg/L as a weekly average, a daily maximum mass limit of 2,400 lbs/day (757 mg/L × 0.39 MGD ×

8.34), and a weekly average mass limit of 1,300 lbs/day (395 mg/L × 0.39 MGD × 8.34); and an alternative wet weather mass limit.

Mercury – The permit application did not require monitoring for mercury because Holland is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3, Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, "there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5), Wis. Adm. Code." A review of the past five years of sludge characteristics data reveals that all the sample results are within expected analytical ranges and well below the 17 mg/kg level. The average concentration in the sludge from 06/25/2019 – 03/08/2021 was nondetect. Therefore, no mercury monitoring is recommended at Outfalls 001 or 003.

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 indirect dischargers contributing to the collection system, **PFOS and PFOA monitoring is recommended at a once every two months frequency.**

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

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

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.
- 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:

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

Where:

A = 0.633 and B = 90.0 for Limited Aquatic Life, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 51 sample results were reported from 12/15/2020 – 03/07/2023 for Outfall 001 and 1255 results from 01/02/2019 – 07/28/2023 for Outfall 003.

The maximum reported value was 8.87 s.u. (Standard pH Units). The effluent pH was 7.92 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 7.83 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 7.81 s.u. Therefore, a value of 7.92 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 7.92 s.u. into the equation above yields an ATC = 15 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	30
1-Q_{10}	15

The 1-Q_{10} method yields the most stringent limits for Holland.

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.

Variable Ammonia Limits (LAL)

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

The current daily maximum variable limits are more stringent than the ones calculated because they were based on the WWSF classification downstream. If Holland would like to request an increase to the existing permit limits an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter-by-parameter basis and includes consideration of operations, maintenance and temporary upsets. **Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current limits must be continued in the reissued permit.**

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.

The current weekly and monthly average ammonia limits are shown below:

Current Ammonia Limits

	Weekly Average mg/L	Monthly Average mg/L
October – March	7.7	3.1
April – May	5.7	2.3
June – September	4.1	1.7

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from 01/01/2019 – 07/25/2023, with those results being compared to the calculated limits to determine the need to include ammonia limits in Holland's permit for the respective month ranges. That need is determined by calculating 99th upper percentile (or P_{99}) values for ammonia during each of the month ranges and comparing the daily maximum values to the daily maximum limit.

Ammonia Nitrogen Effluent Data – Outfalls 001 and 003

Ammonia Nitrogen mg/L	April - May	June - September	October - March
1-day P_{99}	15.6	8.14	4.10
4-day P_{99}	9.69	4.99	2.33
30-day P_{99}	4.04	2.08	1.01
Mean*	1.49	0.81	0.47
Std	4.20	2.13	0.99
Sample size	124	212	320
Range	<0.038 – 33.4	<0.038 – 12.6	<0.038 – 6.54

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

Based on this comparison, weekly average and monthly average limits are required April – September.

The permit currently has daily maximum, weekly average, and monthly average limits year-round. **Where there are existing ammonia nitrogen limits in the permit, the limits must be retained regardless of reasonable potential, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:**

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

Conclusions and Recommendations

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

Final Ammonia Nitrogen Limits

Attachment #1

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
October – March	Variable	7.7	3.1
April – May	Variable	5.7	2.3
June – September	Variable	4.1	1.7

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 Holland currently has a limit of 1.0 mg/L for Outfall 001 and 003, this limit should be included in the reissued permit.

Water Quality Based Limit
Revisions to the administrative rules for phosphorus discharges took effect on December 1, 2010. These rule revisions include additions to ch. NR 102 (s. NR 102.05), which establish phosphorus standards for surface waters. Revisions to ch. NR 217 (s. NR 217, Subchapter III) establish procedures for determining water quality based effluent limits for phosphorus, based on the applicable standards in ch. NR 102.

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 WQBEL in a WPDES permit. The LFR TMDL establishes TP wasteload allocations (WLAs) to reduce the loading in the entire watershed including WLAs to meet water quality standards for tributaries to the Lower Fox River. Therefore, implementing the TMDL provide WQBELs to protect immediate receiving waters and a s. NR 217.13 WQBEL is not needed.

Lower Fox Total Maximum Daily Load
Total phosphorus (TP) effluent limits in lbs/day are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs (*April 2020) and are based on the annual phosphorus (WLA) given in pounds per year. The WLA found in the *Total Maximum Daily Loads and Watershed Management Plan for Total Phosphorus and Total Phosphorus and Total Suspended Solids in the Lower Fox River Basin and Lower Green Bay (LFR TMDL)* report dated March 2012 are expressed as maximum annual loads (lbs/year). The TP WLA for Holland is 809 lbs/year.

For the reasons explained in the April 30, 2012 paper entitled *Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin*, WDNR has determined that the phosphorus WQBELs set equal to WLAs would not be consistent with the assumptions and requirements of the TMDL. Therefore, limits given to facilities included in the Lower Fox River TMDL are given monthly average mass limits and, if the equivalent effluent concentration is less than or equal to 0.3 mg/L, six-month average mass limits. The following equation shows the calculation of equivalent effluent concentration:

TP Equivalent Effluent Concentration = WLA ÷ (365 days/yr * Flow Rate * Conversion Factor)

= 809 lbs/yr ÷ (365 days/yr * 0.39 MGD * 8.34)
= 0.68 mg/L

Since this value is greater than 0.3 mg/L, the WLA should be expressed as a monthly average mass limit for total phosphorus and no six-month average limit is required.

TP Monthly Average Permit Limit = 809 ÷ 365 days/yr * 1.47
= (809 lbs/yr ÷ 365 days/yr) * 2.07
= 4.6 lbs/day

The multiplier used in the six-month average calculation was determined according to the implementation guidance. A coefficient of variation was calculated, based on phosphorus mass monitoring data, to be 1.2. This is the standard deviation divided by the mean of mass data. This value, along with monitoring frequency, is used to select the multiplier.

The current permit has a monthly average mass-based TMDL limit of 3.3 lbs/day which is recommended to continue rather than the calculated limit of 4.6 lbs/day for antidegradation purposes. The requirements of s. NR 207.04(1)(a), Wis. Adm. Code, do not appear to be met because Holland can currently meet the TMDL limit.

A monthly average mass effluent limit of 3.3 lbs/day is recommended for this discharge. The limit are equivalent to a concentration of 1.0 mg/L at the facility design flow of 0.39 MGD. This mass limit applies to Outfall 005, which is the combination of Outfall 001 and 003.

Effluent Data
The following table summarizes effluent total phosphorus monitoring data from 01/01/2019 – 07/31/2023.

Total Phosphorus Effluent Data

	Phosphorus mg/L Outfall 001	**Phosphorus mg/L Outfall 003**	**Phosphorus lbs/day Outfall 005**
1-day P_{99}	1.4	2.1	3.0
4-day P_{99}	1.0	1.2	1.6
30-day P_{99}	0.75	0.66	0.83
Mean	0.65	0.45	0.52
Std	0.24	0.42	0.62
Sample size	26	652	653
Range	0.243 – 1.34	0.081 – 3.87	0 – 4.15

The mass-based phosphorus TMDL limit is currently effective for Outfall 005 and is recommended to continue in the reissued permit without a compliance schedule because Holland has demonstrated they can currently meet it.

PART 6 – TOTAL SUSPENDED SOLIDS

Lower Fox River Basin TMDL Limits
Total suspended solids (TSS) effluent limits in lbs/day are calculated as recommended in the *TMDL*

*Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs (*April 2020) and are based on the annual phosphorus wasteload allocation (WLA) given in pounds per year. The WLA found in the *Total Maximum Daily Loads and Watershed Management Plan for Total Phosphorus and Total Phosphorus and Total Suspended Solids in the Lower Fox River Basin and Lower Green Bay (LFR TMDL)* report dated March 2012 are expressed as maximum annual loads (lbs/year). The TSS WLA for Holland is 27,786 lbs/year.

Revisions to chs. NR 106 and 205, Wis. Adm. Code align Wisconsin water quality-based effluent limits with 40 CFR 122.45(d), which requires WPDES permits to 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.

Holland is a municipal treatment facility and is therefore subject to weekly average and monthly average TSS limits derived from TSS annual WLAs.

TSS Monthly Average Permit Limit = WLA ÷ 365 days/yr * monthly multiplier
= (27,786 lbs/yr ÷ 365 days/yr) * 3.02
= 230 lbs/day

TSS Weekly Average Permit Limit = WLA ÷ 365 days/yr * weekly multiplier
= (27,786 lbs/yr ÷ 365 days/yr) * 5.57
= 424 lbs/day

The multiplier used in the weekly average and monthly average calculation was determined according to implementation guidance. A coefficient of variation was calculated, based on TSS mass monitoring data, to be 2.0. This is the standard deviation divided by the mean of mass data. This value, along with monitoring frequency, is used to select the multiplier.

The current permit has a weekly average and monthly average mass-based TMDL limits of 308 lbs/day and 174 lbs/day which are recommended to continue rather than the calculated limits for antidegradation purposes. The requirements of s. NR 207.04(1)(a), Wis. Adm. Code, do not appear to be met because Holland can currently meet the current TMDL limits.

The current TMDL-based monthly and weekly average mass limitations should be included in the permit along with the currently imposed TSS concentration limits – a monthly average of 20 mg/L and a weekly average of 30 mg/L for Outfalls 001 and 003.

Effluent Data
The following table summarizes effluent total suspended solids monitoring data from 01/01/2019 – 07/31/2023.

Total Suspended Solids Effluent Data

	TSS lbs/day Outfall 005	TSS mg/L Outfall 001	TSS mg/L Outfall 003
1-day P_{99}	57	25	42

4-day P_{99}	32	16	23
30-day P_{99}	14	10	13
Mean	6.7	7.7	8.5
Std	13	4.9	8.7
Sample Size	649	26	644
Range	0 – 129	0 – 18	0 – 82

The TSS limits are currently effective for Outfall 005 and are recommended to continue in the reissued permit without a compliance schedule.

PART 7 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in Chapters NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. The daily maximum effluent temperature limitation shall be 86 °F for discharges to surface waters classified as Limited Aquatic Life according to s. NR 104.02(3)(b)1, Wis. Adm. Code, except for those classified as wastewater effluent channels and wetlands regulated under ch. NR 103 and described in s. NR 106.55(2), Wis. Adm. Code, which has a daily maximum effluent temperature limitation of 120 °F. The 86° F limit applies because the hydrologic classification is not listed as wetland in ch. NR 104, Wis. Adm. Code.

Reasonable Potential
Section NR 106.59(2)(b), Wis. Adm. Code, allows the use of temperature effluent data, on a case-by-case basis, from at least two other POTWs within a 100-mile radius that utilize similar wastewater treatment technology and have a similar ratio of domestic to industrial waste stream composition, or representative data of the POTW.

The maximum daily temperature from Hilbert WWTF, approximately 7 miles away, was 74° F over the previous ten years. The maximum daily temperature from Nichols WWTF, approximately 19 miles away, was 71° over the previous ten years. Based on the effluent data from May through September and the available effluent data from the two similar facilities, **no effluent limits are recommended for temperature. Monitoring for one year is recommended in the reissued permit.**

PART 8 – WHOLE EFFLUENT TOXICITY (WET)

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

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests

must produce a statistically valid LC_{50} (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.

- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC_{25} (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of **99%** shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

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

Where:

Q_e = annual average flow = 0.39 MGD = 0.603 cfs
f = fraction of the Q_e withdrawn from the receiving water = 0
Q_s = ¼ of the 7-Q_{10} = 0.02 cfs ÷ 4 = 0.005 cfs

*The previous IWC was calculated to be 97% because the evaluation used 100% dilution for the downstream water (Plum Creek) which is the first nonvariance water. This evaluation uses the default of 25% mixing because there is not information/data that demonstrates a higher mixing is appropriate.

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfalls 001 and 003 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.
- Shown below is a tabulation of all available WET data for Outfalls 001 and 003. 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	Outfall	Acute Results LC_{50} %				Chronic Results IC_{25} %			
		C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Pass or Fail?	Use in RP?
11/29/2005	001					>100	>100	Pass	Yes
09/13/2007	001					13.25	>100	Fail	Yes
04/01/2008	001					>100	>100	Pass	Yes
04/29/2008	001					>100	>100	Pass	Yes
06/18/2019	003					4.6	59.6	Fail	Yes
10/01/2019	003					54.2	>100	Fail	Yes

10/15/2019	003					29.6	89.5	Fail	Yes
02/04/2020	003					>100	>100	Pass	Yes
02/18/2020	003	>100	>100	Pass	Yes	98.9	>100	Pass	Yes
09/27/2022	003	>100	>100	Pass	Yes	72.5	>100	Fail	Yes
09/27/2022	001	>100	>100	Pass	Yes	98.1	>100	Pass	Yes
10/18/2022	003					76.9	>100	Fail	Yes
12/06/2022	003					>100	>100	Pass	Yes
05/02/2023	003					>100	>100	Pass	Yes
07/11/2023	003					>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.**

  Acute Reasonable Potential = [(TUa effluent) (B)(AMZ)]
  Chronic Reasonable Potential = [(TUc effluent) (B)(IWC)]

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

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

  Chronic Reasonable Potential = [(TU_c effluent) (B)(IWC)]

Chronic WET Limit Parameters

TUc (maximum) $100/IC_{25}$	**B** (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
100/4.6 = 21.7	1.9 Based on 8 detects	99%

[(TUc effluent) (B)(IWC)] = 40.9 > 1.0

Therefore, reasonable potential is shown for chronic WET limits using the procedures in s. NR 106.08(6) and representative data from 11/29/2005 – 07/11/2023.

Expression of WET limits
Chronic WET limit = [100/IWC] TU_c = 1.0 TU_c expressed as a monthly average

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

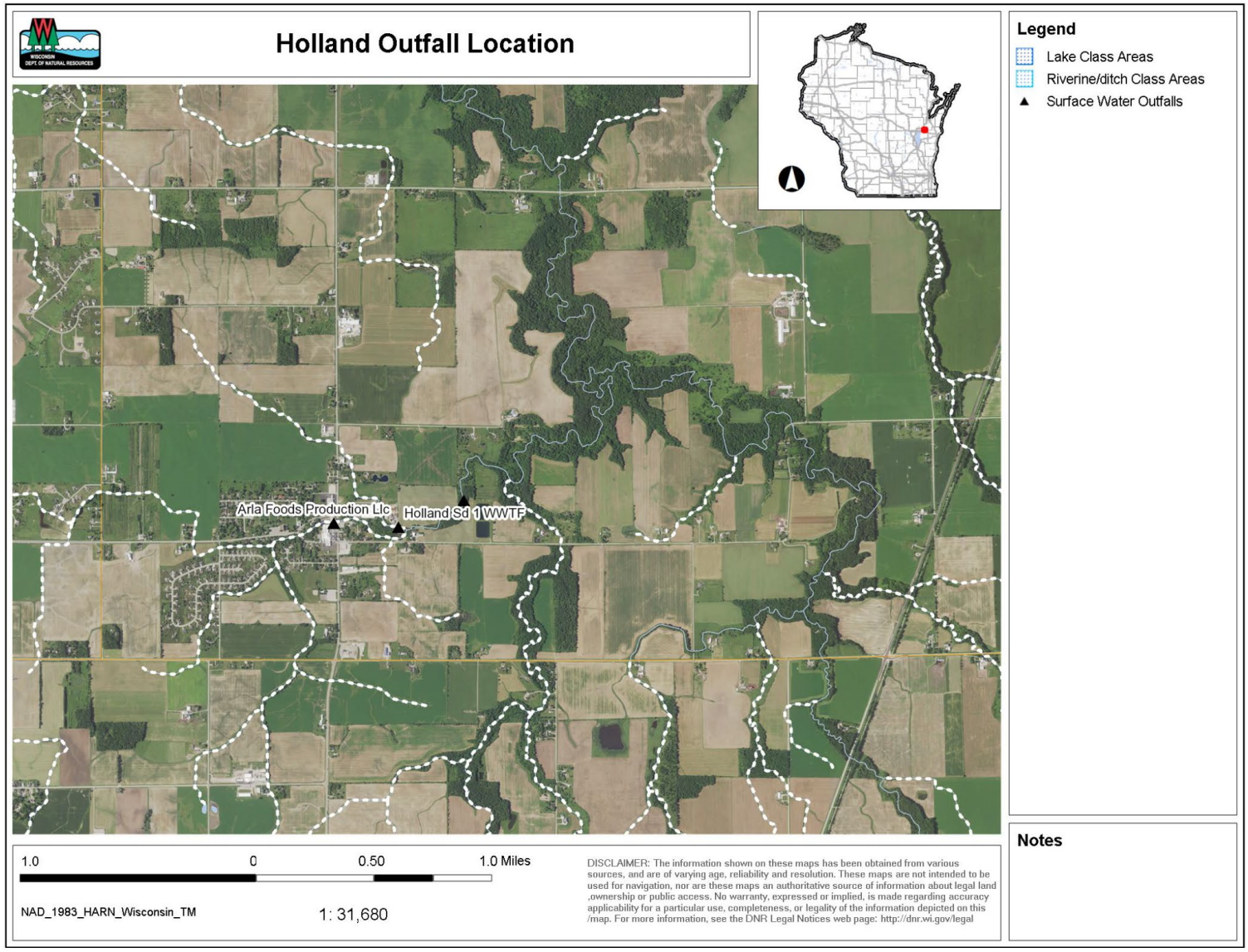
potential increases, more points accumulate, and more monitoring is recommended to ensure that toxicity is not occurring. A summary of the WET checklist analysis completed for this permittee is shown in the table below. Staff recommendations based on best professional judgment are provided below the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

WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not Applicable. **0 Points**	IWC = 99%. **15 Points**
Historical Data	3 tests used to calculate RP. No tests failed. **0 Points**	15 tests used to calculate RP. 6 tests failed. **0 Points**
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. **0 Points**	Same as Acute. **0 Points**
Receiving Water Classification	LAL and less than 4 miles to the WWSF classification **5 Points**	Same as Acute. **5 Points**
Chemical-Specific Data	Reasonable potential for limits for chloride based on ATC; Ammonia nitrogen limit carried over from the current permit. Arsenic, copper, zinc, and ammonia detected. Additional Compounds of Concern: None. **8 Points**	Reasonable potential for limits for chloride and ammonia based on CTC; Arsenic, copper, and zinc detected. Additional Compounds of Concern: None. **9 Points**
Additives	0 Biocides and 1 Water Quality Conditioner added. Permittee has proper P chemical SOPs in place: Yes. **1 Point**	All additives used more than once per 4 days. **1 Point**
Discharge Category	1 Industrial Contributor. **5 Points**	Same as Acute. **5 Points**
Wastewater Treatment	Secondary or better. **0 Points**	Same as Acute. **0 Points**
Downstream Impacts	No impacts known. **0 Points**	Same as Acute. **0 Points**
Total Checklist Points:	**19 Points**	**35 Points**
Recommended Monitoring Frequency (from Checklist):	2 tests during permit term	Quarterly
Limit Required?	No	Yes Limit = 1.0 TU_c

	Acute	Chronic
TRE Recommended? (from Checklist)	No	Yes

- Arla Foods contributes a significant amount of flow to Holland. This wastewater is likely to contain several additives which Holland has not fully investigated and are therefore not counted on the checklist above. Because these unaccounted-for additives may contribute to the toxicity in Holland's effluent, more frequent acute WET testing is recommended at a frequency of 1x yearly.
- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, 1x yearly acute and quarterly chronic WET tests are recommended in the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing should continue after the permit expiration date (until the permit is reissued).
- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. **The chronic WET limit shall be expressed as 1.0 TUc as a monthly average in the effluent limits table of the permit.**
- Toxicity has been measured in 8 out of 15 tests conducted on this effluent, as shown in the WET Data History table above. Due to this repeated toxicity, it is recommended that a schedule be included in the permit which allows time for a toxicity reduction evaluation (TRE) to be completed to find and fix the source of the toxicity and achieve compliance with the new WET limit. Holland is currently investigating sources of toxicity and how to remove it. Because it cannot be concluded that the facility has permanently removed the source of toxicity, more time to complete the TRE may be needed. The WET limit should become effective and monitoring recommended above should begin after the TRE schedule has been completed. Guidance related to TRE schedules is provided in Chapter 1.12 of the WET Guidance Document.
- A minimum of annual chronic monitoring is required because a chronic WET limit is required. Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.


Holland Outfall Location
Legend
Lake Class Areas
Riverine/ditch Class Areas
Surface Water Outfalls
Arla Foods Production Llc
Holland Sd 1 WWTF
Notes
1.0
0
0.50
1.0 Miles
NAD_1983_HARN_Wisconsin_TM
1: 31,680
DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ,ownership or public access. No warranty, expressed or implied, is made regarding accuracy applicability for a particular use, completeness, or legality of the information depicted on this /map. For more information, see the DNR Legal Notices web page: http://dnr.wi.gov/legal

Attachment #3

2018 Ammonia Calculations

Weekly Average & Monthly Average Limits based on Chronic Toxicity Criteria (CTC):
Ammonia limits were last calculated in a June 12, 2006 letter and summarized in the January 31, 2008 water quality based effluent limits memo. At that time, default stream pH and temperatures were used to calculate limits. At this time, though, more specific information is available for both parameters which warrant a re-calculation of weekly and monthly average limits. New default temperature data are available for relatively small warm water streams as part of the state's new thermal standards; the new default ambient stream temperatures are contained in Table 2 of ch. NR 102. Seasonal mean pH values are now available for the Lower Fox River Basin. The new ambient values are used in conjunction with the effluent and stream low flows to re-calculate limits using the procedure in s. NR 106.32, Wis. Adm. Code.

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria.

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as Limited Aquatic Life is calculated by the following equation.

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

Where:

pH = the pH (s.u.) of the receiving water,
E = 1.0,
$C = 8.09 \times 10^{(0.028 \times (25 - T))}$
T = the temperature of the receiving (°C)

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a Warm Water Sport Fish Community is calculated by the following equation.

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

Where:

pH = the pH (s.u.) of the receiving water,
E = 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 (°C) of the receiving water – (Early Life Stages Present), or
T = the maximum of the actual temperature (°C) and 7 - (Early Life Stages Absent)

The 4-day criterion is simply equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q_{10} (4-Q_3, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q_5 (estimated as 85% of the 7-Q_2 if the 30-Q_5 is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 °C, 25% of the flow is used if the Temperature < 11 °C, and 50% of the flow is used if the Temperature ≥ 11 °C but < 16 °C.

Since minimal ambient data is available, the "default" basin assumed values are used for Temperature, pH and background ammonia concentrations, Background ammonia concentrations at the point of discharge were based on effluent data from Arla Foods, the maximum value of four samples collected in 2012. This data is shown in the table below, with the resulting criteria and effluent limitations.

		Spring April & May	Summer June – Sept.	Winter Oct. - March
Effluent Flow	Qe (MGD)	0.39	0.39	0.39
Background Information	7-Q_{10} (cfs)	0	0	0
	7-Q_2 (cfs)	0	0	0
	Ammonia (mg/L)	0.33	0.33	0.33
	Temperature (°C)	14	21	10
	pH (s.u.)	8.09	8.08	8.06
	% of Flow used	50	100	25
	Reference Weekly Flow (cfs)	0	0	0
	Reference Monthly Flow (cfs)	0	0	0
Criteria mg/L	4-day Chronic	34.95	23.93	48.70
	30-day Chronic	13.98	9.57	19.48
Effluent Limits mg/L	Weekly Average	34.95	23.93	48.70
	Monthly Average	13.98	9.57	19.48

Ammonia Nitrogen Limits to Protect Plum Creek

The rules provide a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 °C, during the winter and spring months. Burbot, an early spawning species, are not believed to be present in the Plum Creek, based on conversations with local fisheries biologists. So "ELS Absent" criteria apply from October through March, and "ELS Present" criteria will apply from April through September for a warm water sport fish classification.

		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
Effluent Flow	Qe (MGD)	0.39	0.39	0.39
Background Information	7-Q_{10} (cfs)	0.02	0.02	0.02
	7-Q_2 (cfs)	0.05	0.05	0.05
	Ammonia (mg/L)	0.07	0.05	0.16
	Temperature (°C)	14	21	10
	pH (s.u.)	8.09	8.08	8.06
	% of Flow used	50	100	25
	Reference Weekly Flow (cfs)	0.01	0.02	0.005
	Reference Monthly Flow (cfs)	0.02125	0.0425	0.010625
Criteria mg/L	4-day Chronic			
	Early Life Stages Present	**5.32**	**3.66**	5.57
	Early Life Stages Absent	5.35	3.66	**7.45**
	30-day Chronic			
	Early Life Stages Present	**2.13**	**1.46**	2.23
	Early Life Stages Absent	2.14	1.46	**2.98**
Effluent Limitations mg/L	Weekly Average			
	Early Life Stages Present	**5.41**	**3.78**	5.61
	Early Life Stages Absent	5.44	3.78	**7.51**
	Monthly Average			
	Early Life Stages Present	**2.20**	**1.56**	2.26
	Early Life Stages Absent	2.21	1.56	**3.03**

Ammonia Decay: Because the calculated limits are more restrictive than the current limits ammonia decay is considered to determine limits at the outfall to protect the downstream classification. The more restrictive calculated limits should be used to protect at the point of discharge and downstream uses. Where the calculated limits are more restrictive based on downstream uses, ammonia decay can be considered to determine if these more restrictive limits are needed or if the ammonia will decay before it reaches the point of the classification change.

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

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

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

The velocity of receiving water is assumed to be 5 miles per day and the distance from the point of discharge to the classification change is approximately 2 miles for a travel time of 0.4 days. This equation shows that at the location where the classification change, 95% of the ammonia is remaining in April and

May; 91 % in June – September and 97% in October - March. After decay, the limits are increased as shown in the following table.

	LAL		WWSF		After decay			
Months Applicable	Weekly Average (mg/L)	Monthly Average (mg/L)	Weekly Average (mg/L)	Monthly Average (mg/L)	Weekly Average (mg/L)	Monthly Average (mg/L)	Weekly Average (mg/L)	Monthly Average (mg/L)
April & May	34.95	13.98	5.41	2.20	**5.70**	**2.32**	1.14	0.46
June - Sept	23.93	9.57	3.78	1.56	**4.14**	**1.71**	0.83	0.34
Oct - March	48.70	19.48	7.51	3.03	**7.73**	**3.12**	1.55	0.62

Holland Final Chloride Report
Pollutant Minimization Plan (PMP) and Planned Source Reduction Measures (SRMs)
March 1, 2024

SRM/PMP Activities		1st Year	2nd Year	3rd Year	4th Year	5th Year
1. Industrial Contributors (Arla Foods)						
	a. Continue to monitor Industrial Influent Chloride loadings.	x	x	x	x	x
	b. Create and maintain an inventory of known chloride industrial sources.	x	x	x	x	x
	c. Meet with Arla Foods to discuss potential Chloride Reduction Measures and opportunities for reducing municipal water use.	x				
	d. Request that Arla Foods research options to reduce or capture incidental discharges of brine wastewater to the WWTF.		x			
	e. Conduct annual progress meetings to track progress of Chloride Reduction Measures and water use reductions.		x	x	x	x
2. Sewer Use Ordinance						
	a. Analyze data to determine a new Chloride Limit for Industrial Users.	x				
	b. Add a Chloride Limit to the Sewer Use Ordinance for Industrial Users.		x			
	c. Adopt an ordinance that requires all new softeners to be demand-initiated or meet a high salt use efficiency.			x		
3. Well #2 Water Softeners						
	a. Hire a Water Softener Technician to review the operation of the current softeners. Ask Technician to review operational settings – including regeneration intervals and salt dosage. Inspect resin levels in the softeners.			x		
	b. Obtain samples of resin and have condition assessed by manufacturer.			x		
4. Point-of-Use Softeners						
	a. Consider the cost of a rebate program for discontinuing point-of-use softeners and report on the feasibility of the rebate program. Consider using fee revenues from the sewer ordinance to fund the residential softener replacement/removal program.				x	
	b. Send out the Point-of-Use Softener Questionnaire to a) collect an inventory of residental and commerical softeners, b) determine age and type of softeners, c) determine average pounds of salt used, and d) determine the last time (if any) the softeners were serviced.		x			
	c. Educate licensed installers and self-installers of softeners on providing optional hard water for outside faucets for residences.		x		x	

5. Educate Point-of-Use Customers						
	a. Educate homeowners on the impacts of chloride from residential softeners, discuss options available for increasing softener salt efficiency, discuss water conservation measures, and recommend softener tune ups or replacement with high salt efficiency softeners on a voluntary basis by sending out the "Water Softening and the Environment" brochue with 2nd quarter billings. Inform residents that municipal water is already softened to 7 grains and encourage discontinuing softening or limit softening to only the most pressing needs.	x	x	x	x	x
	b. Discuss how to properly apply de-icing salts on sidewalks and driveways by sending out the “Salting of Sidewalks and Driveways” pamphlet with 3rd or 4th quarter billings.	x	x	x	x	x
	c. Request voluntary support from local water softening businesses in the efforts described above.		x		x	
6. Municipal Road Maintenance Actions						
	a. Reduce inflow into the sanitary sewer collection system through CMOM implementation.	x	x	x	x	x
	b. Discuss winter road maintenance salting practices with the County. If feasible, implement a program of reduced road maintenance salting in collaboration with the County. Report on the results of the collaboration in annual reports.	x	x	x	x	x
7. Infrastructure Improvements						
	a. Research grant/loan opportunities for funding infrastructure improvement to address chloride issues and report on the results of those explorations in annual reports.	x	x	x	x	x

Facility Specific Chloride 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: Town of Holland Sanitary District No. 1

B. Facility Name: Holland SD 1 Wastewater Treatment Facility

C. Submitted by: Wisconsin Department of Natural Resources

D. State: Wisconsin **Substance:** Chloride **Date completed:** March 20, 2024

E. Permit #: WI0028207-08-0 **WQSTS #:** (EPA USE ONLY)

F. Duration of Variance **Start Date:** July 1, 2024 **End Date:** June 30, 2029

G. Date of Variance Application: August 22, 2023

H. Is this permit a:
☐ **First time submittal for variance**
☒ **Renewal of a previous submittal for variance** *(Complete Section IX)*

I. Description of proposed variance: The Town of Holland has applied for a variance from the chloride chronic toxicity water quality criterion and resulting calculated water quality-based effluent limits of 760 mg/L as a daily average, 400 mg/L as a weekly average, a daily maximum mass limit of 2,400 lbs/day, and a weekly average mass limit of 1,300 lbs/day. The proposed permit includes a daily max interim limit of 940 mg/L and a weekly average interim limit of 690 mg/L with requirements to implement source reduction measures along with an effluent target value of 620 mg/L.

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

Name	Email	Phone	Contribution
Amanda Perdzock	Amanda.Perdzock@Wisconsin.gov	608-982-7718	Permit Drafter
Laura Gerold	Laura.Gerold@Wisconsin.gov	920-366-6728	Compliance Engineer
Nicole Krueger	Nicole.Krueger@Wisconsin.gov	414-882-1019	Limits Calculator
Bryan Hartsook	Bryan.Hartsook@wisconsin.gov	414-607-2275	Interim Variance Coordinator

Section II: Criteria and Variance Information

A. Water Quality Standard from which variance is sought: Chloride

B. List other criteria likely to be affected by variance: No other criteria will be affected by this variance.

C. Source of Substance: A food processor that discharges wastewater to the WWTF, regeneration wastewater from municipal ion exchange softening, water softening regeneration wastewater from a restaurant and residential point-of-use water softeners, and groundwater that is the source water for the Holland Sanitary District No. 1 municipal water system. It is noted that the municipal ion-exchange softening system is operated to remove naturally present radium from the municipal water supply. That treatment system was installed in response to a consent order issued by the Department to the Holland Sanitary District No. 1 for exceedances of the radium drinking water standard.

D. Ambient Substance Concentration: Zero ☐ **Measured** ☐ **Estimated** ☒ **Default** ☐ **Unknown**

If measured or estimated, what was the basis? Include citation. Since the background stream flow is zero in the tributary to which the permittee discharges, the background concentration is not needed in order to calculate the water quality-based limit.

E. Average effluent discharge rate: 0.39 MGD (annual average design flow) **Maximum effluent discharge rate:** Outfall 001: 0.68 MGD Outfall 003: 1.34 MGD

F. Effluent Substance Concentration: 1-day P99 = 914 mg/L; 4-day P99 = 713 mg/L; 30-day P99 = 590 mg/L; Average all data = 528 mg/L ☒ **Measured** ☐ **Estimated** ☐ **Default** ☐ **Unknown**

(Data from Outfalls 001 and 003 combined)

If measured or estimated, what was the basis? Include Citation. Permit-required effluent monitoring for Outfalls 001 and 003 at a frequency of 4x/month.

H. 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**

I. 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 Chloride SRM plan. Thus, the HAC at commencement of this variance is 940 mg/L as a daily max and 690 mg/L as a weekly average, which reflects the greatest chloride reduction achievable with the current treatment processes, in conjunction with the implementation of the permittee's Chloride SRM plan. The current effluent condition is reflective of on-site optimization measures that have already occurred. This HAC determination is based on the economic feasibility of available compliance options for Holland SD 1 Wastewater Treatment Facility at 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. A subsequent HAC cannot be defined as less stringent than this HAC.

J. Variance Limit: 940 mg/L as a daily max and 690 mg/L as a weekly average

K. Level currently achievable (LCA): 710 mg/L 4-day P99

L. **What data were used to calculate the LCA, and how was the LCA derived?** The LCA represents the 4-day P99 from the current permit term from both outfalls (01/01/2019 – 07/31/2023). The permit required monitoring at a frequency of 4x/month.

M. Explain the basis used to determine the variance limit (which must be ≤ LCA). Include citation.
A daily maximum of 940 mg/L interim chloride limit is recommended for permit reissuance, based on the 1-day P99 calculated after excluding two outliers in the chloride data. A weekly average of 690 mg/L interim chloride limit is recommended, which is equal to the current weekly average interim limit. This is the 4-day P99 from the previous permit term because the current 4-day P99 is higher. The Department does not find it appropriate to increase the interim concentration limit in the reissued permit, because it would be counterproductive to meeting the final WQBEL. The limit was established in accordance with s. 283.15 (5), Wis. Stats. and ch. NR 106 Subchapter II, Wis. Adm. Code.

N. 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**

A feasibility study for replacement of the current ion exchange softeners with either Reverse Osmosis (RO) or Vertical Pressure Filtration (VPF) was conducted in 2023 by the district. The cost of the RO system was estimated to result in an average cost that would be about 4.87% of the MHI, while VPF was estimated to cost 4.37% of the MHI for the district.

Installing centralized lime softening on the current municipal water supply system was evaluated by the department using the Chloride Variance Economic Eligibility tool for lime softening. Debt services and O&M costs were set to $0.00 to demonstrate economic infeasibility of lime softening without need to collect updated information from facility. Prior to O&M and debt service costs being added to the screening tool, the costs of a central lime softening system is estimated to result in an average cost that would be about 7.24% of the MHI. 2019 survey results for the Town of Holland Sanitary District #1 identify that the average salt use per residential user is 285 lbs/year based on a 42% survey response rate. The survey additionally identifies only 35% of the customers soften their water. This results in an estimated total chloride loading from residential customers of 36 lbs/day. Average chloride loading from the municipal well no. 2 is 295 lbs/day while the loading from the major industrial contributor is 573 lbs/day. At 4% of the total chloride loading to the treatment plant, even eliminating residential water softener discharges altogether will not result in significant progress towards meeting the final effluent limit as compared to the 70% reduction needed overall (interim limit - final limit / final limit x 100).

The cost estimates for evaluated technologies are in the range in which the application of treatment would be expected to result in substantial and widespread economic and social impacts to the community. Thus, without a

variance, meeting the water quality standard of 400 mg/L would result in substantial and widespread economic and social impacts.

Section III: Location Information

A. Counties in which water quality is potentially impacted: Brown

B. Receiving waterbody at discharge point: Tributary to Plum Creek

C. Flows into which stream/river? Plum Creek **How many miles downstream?** 2.2 mi

D. Coordinates of discharge point (UTM or Lat/Long): Outfall 001: 44º 15' 04" N Lat, 88º 9' 30" W Long; Outfall 003: 44º 14' 59" N Lat, 88º 10' 00" W Long

E. 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 chronic criterion of the substance for aquatic life protection?
Approximately 13 miles for chronic criteria and 1.5 miles for acute criteria

F. Provide the equation used to calculate that distance *(Include definitions of all variables, identify the values used for the clarification, and include citation):*
(interim limit in mg/L x effluent design flow in cfs) + (background concentration mg/L x background stream flow in cfs)) / (effluent design flow in cfs + background stream flow in cfs) = ≤ 395 mg/L.

Variables used: interim limit of 690 mg/L, effluent design flow of 0.60 cfs, background concentrations of 190 mg/L for Plum Creek and 18.35 mg/L for the Fox River, and background stream flows of 0.02 cfs for Plum Creek and 930 cfs for the Fox River.

At Plum Creek, 1.5 miles downstream of Outfall 001, the mixed concentration is calculated to be 674 mg/L which is greater than the chronic criteria of 395 mg/L but less than the acute criteria of 757 mg/L. At the Fox River, approximately 13 miles downstream, the mixed concentration is calculated to be 18.44 mg/L which is less than both the acute and chronic criteria.

G. What are the designated uses associated with the direct receiving waterbody, and the designated uses for any downstream waterbodies until the water quality standard is met?
The receiving water and downstream waters are designated for recreation, nonpublic water supply, and fish and aquatic life uses (limited forage fish classification for the receiving water and warmwater sport fish classification for Plum Creek).

H. 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:

Permit Number	Facility Name	Facility Location	Variance Limit [mg/L]
None			

I. 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

River Mile	Pollutant	Impairment
N/A		

***K.* Please list any contributors to the POTW in the following categories:**
May need to contact facility for this information

Food processors (cheese, vegetables, meat, pickles, soy sauce, etc.)	Arla Foods

Metal Plating/Metal Finishing	
Car Washes	
Municipal Maintenance Sheds (salt storage, truck washing, etc.)	
Laundromats	
Other presumed commercial or industrial chloride contributors to the POTW	

L. If the POTW does not have a DNR-approved pretreatment program, is a sewer use ordinance enacted to address the chloride contributions from the industrial and commercial users? If so, please describe.
The Holland Sanitary District's Sewer Use Ordinance does not specifically address – nor contain limits for – the discharge of chloride by industrial and commercial users. The Holland Sanitary District is currently collecting chloride influent information in order to update their sewer use ordinance with a chloride limit for industrial users.

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

The permittee does not administer a delegated pretreatment program.

A. Are there any industrial users contributing chloride to the POTW? If so, please list.
N/A

B. Are all industrial users in compliance with local pretreatment limits for chloride? 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)
N/A

C. When were local pretreatment limits for chloride last calculated?
N/A

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
N/A

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: April 9, 2024 **Date of hearing:** May 24, 2024

E. Were comments received from the public in regards to this notice or hearing? *(If yes, see notice of final determination)* ☐ **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: No human health criteria for chloride

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: Limited aquatic life for the immediate receiving water and warmwater sport fish for Plum Creek

B. Applicable criteria affected by variance: Acute criteria of 757 mg/L and chronic criteria of 395 mg/L

C. Identify any environmental impacts to aquatic life expected to occur with this variance, and include any citations:

Because there is no dilution available in the receiving water, the estimated instream concentration is equal to the proposed interim limit (690 mg/L). This concentration exceeds the applicable chronic criterion of 395 mg/L. The proposed interim limit exceeds the genus mean chronic values for *Ceriodaphnia* (417 mg/L), *Daphnia* (639 mg/L), and *Physa* (663 mg/L).

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

County	Species	Status
Brown	Blanchard's Cricket Frog	Endangered
Brown	Callused Vertigo Snail	Endangered
Brown	Caspian Tern	Endangered
Brown	Common Tern	Endangered
Brown	Forster's Tern	Endangered
Brown	Hairy-necked Tiger Beetle	Endangered
Brown	Peregrine Falcon	Endangered
Brown	Piping Plover	Endangered
Brown	Cherrystone Drop Snail	Threatened
Brown	Dwarf Lake Iris	Threatened
Brown	Great Egret	Threatened
Brown	Handsome Sedge	Threatened
Brown	Longear Sunfish	Threatened
Brown	Pale Green Orchid	Threatened
Brown	Red-shouldered Hawk	Threatened
Brown	Redfin Shiner	Threatened
Brown	Seaside Crowfoot (plant)	Threatened
Brown	Slippershell Mussel	Threatened
Brown	Snow Trillium	Threatened
Brown	Upland Sandpiper	Threatened
Brown	Wood Turtle	Threatened

Citation: U.S. Fish & Wildlife Service – Environmental Conservation Online System (http://www.fws.gov/endangered/) and National Heritage Index (http://dnr.wi.gov/topic/nhi/)

Section VIII: Economic Impact and Feasibility

A. Describe the permittee's current pollutant control technology in the treatment process:

An upgrade in 2022 has separated Arla Food's process wastewater from the Town of Holland Sanitary District No. 1's wastewater and is treating the two liquid streams separately.

The municipal treatment train includes its own lift station followed by preliminary treatment with fine-screening, biological treatment with an activated sludge system consisting of an aerobic selector basin followed by aeration basins and a single clarifier and phosphorus removal by chemical precipitation using Ferric Sulfate. This effluent is discharged to a tributary to Plum Creek via Outfall 003.

The Arla treatment train includes its own lift station followed by an aerated equalization tank, two selector tanks, aeration basin, and secondary clarifier. The effluent from the clarifier is sent to the Plant Effluent Pump Station and monitored at Sample Point 103 prior to being combined with the effluent from the District's compact plant and discharged via Outfall 003.

Alternatively, the combined effluent can be pumped to a pair of polishing lagoons for further treatment before discharge via Outfall 001 to a tributary to Plum Creek downstream from Outfall 003.

B. What modifications would be necessary to comply with the current limits? Include any citations.

Upgrades to the WWTF to install reverse osmosis (RO) would be needed to comply with the WQBEL of 400 mg/L. Recent influent sampling has shown that 65% of the chloride loading is from Arla, therefore the best treatment option to remove all of the chloride would be at the wastewater treatment plant.

An ion-exchange water softening system was installed to reduce the level of radium in the municipal water supply for the Holland Sanitary District No. 1. This system adds chloride water that is eventually treated at the wastewater treatment plant. A feasibility study for the replacement of the ion exchange softeners was conducted in 2023. The two systems evaluated were Reverse Osmosis (RO) and Vertical Pressure Filtration with hydrous manganese oxide (HMO) addition. Both were found to be economically infeasible.

Citation: Holland Sanitary District Chloride Source Reduction Plan, September 22, 2023

C. How long would it take to implement these changes?
It would not be economically feasible for the Holland Sanitary District to install reverse osmosis treatment at the WWTF or to change the drinking water treatment system. Affordability is the limiting factor, and it is unknown how long that will continue to be the case.

D. Estimate the capital cost *(Citation)***:** $438,750 (per 2023 Variance Application)

E. Estimate additional O & M cost *(Citation)***:** $142,350 (per 2023 Variance Application)

F. Estimate the impact of treatment on the effluent substance concentration, and include any citations:
Reverse osmosis wastewater treatment systems can be operated to achieve levels of chloride below the water quality standard of 400 mg/L. However, this technology is not economically feasible for the Holland Sanitary District No. 1 at this time.

G. Identify any expected environmental impacts that would result from further treatment, and include any citations:
End-of-pipe RO wastewater treatment technology for chloride produces concentrated brine that can be as much or more of an environmental liability than the untreated effluent. Since the concentrated brine cannot be further treated, the only recourse for the disposal of the brine is transfer to another community, which is often not feasible. Appropriate chloride source reduction activities are preferable environmentally to effluent end-of-pipe treatment in most cases since the end product of treatment (production of a concentrated brine) does not remove the load of chloride from the environment.

There would be some impacts based on disposal of brine from RO. These include air pollution impacts from trucking brine and increased chloride impacts at the point where brine is discharged.

H. Is it technically and economically feasible for this permittee to modify the treatment process to reduce the level of the substance in the discharge? ☐ **Yes** ☒ **No** ☐ **Unknown**
It is not economically feasible to install RO treatment at the plant or regional lime softening of the water supply.

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

J. If yes, what prevents this from being done? Include any citations.
It is not economically feasible for the permittee to install a RO treatment system at the wastewater treatment plant or to add centralized lime softening treatment at the public drinking water supply well.

K. List any alternatives to current practices that have been considered, and why they have been rejected as a course of action, including any citations:
Treatment alternatives have been rejected because they are not economically feasible.
Reverse Osmosis wastewater treatment would result in a cost burden of 4.87% of the MHI.
Lime softening of the regional water supply would also result in widespread economic impact at an estimated cost of over 7% of the MHI.

Section IX: 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.

Activities taken at Arla Foods:

- Improved procedures and training related to operation and maintenance of brine system. Made repairs to decrease leaks and spills, 2017- 2019
- Created optimization team to meet biweekly, to optimize the brine system, and investigate chloride increases in the effluent flow, 2018
- Annual spill awareness/reporting training for employees

Activities taken by Holland SD 1:

- Investigated condition of softeners used for drinking water supply in 2020 and 2021
- Evaluated feasibility of replacing municipal ion exchange softening with RO and Vertical Pressure Filtration with hydrous manganese oxide additional in 2023 and found both options to be infeasible due to costs of building new treatment buildings to accommodate technologies.
- Distributed water conservation brochures to sewer users in 2019
- Explored the use of waste brine for road de-icing with local municipalities, 2020
- Surveyed residential softener and other point of use softener use in service area, 2019
- Regularly communicates with Arla foods regarding spills and reduction of brine loss.

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.

As conditions of the variance the permittee shall (a) maintain effluent quality at or below the interim effluent limitations of 940 mg/L as a daily maximum and 690 mg/L as a weekly average, (b) implement the chloride source reduction measures specified below, (c) follow the approved Source Reduction Plan and (d) perform the actions listed in the compliance schedule. A five-year compliance schedule was specified to provide the permittee adequate time to complete the items outlined below.

1) Industrial Contributors (Arla Foods)
   a) Continue to monitor Industrial influent chloride loadings.
   b) Create and maintain an inventory of known chloride industrial sources.
   c) Meet with Arla Foods to discuss potential chloride reduction measures.
   d) Discuss opportunities for reducing municipal water use.
   e) Conduct annual progress meetings to track progress on water use.
2) Sewer Use Ordinance
   a) Add a chloride limit to the sewer use ordinance for industrial users.
   b) Adopt an ordinance that requires all new softeners to be demand-initiated or meet a high salt use efficiency.
3) Well #2 Water Softeners
   a) Hire a Water Softener Technician to review the operation of the current softeners. Ask Technician to review operational settings – including regeneration intervals and salt dosage. Inspect resin levels in the softeners.
   b) Obtain samples of resin and have condition assessed by manufacturer.
4) Point-of-Use Softeners
   a) Send out the Point-of-Use Softener Questionnaire to a) collect an inventory of residential and commercial softeners, b) determine age and type of softeners, c) determine average pounds of salt used, and d) determine the last time (if any) the softeners were serviced.
   b) Educate licensed installers and self-installers of softeners on providing optional hard water for outside faucets for residences.
5) Educate Point-of-Use Customers
   a) Educate homeowners on the impacts of chloride from residential softeners, discuss options available for increasing softener salt efficiency, discuss water conservation measures, and recommend softener tune ups or replacement with high salt efficiency softeners on a voluntary basis by sending out the "Water Softening and the Environment" brochure with 2nd quarter billings. Inform residents that municipal water is already softened to 7 grains and encourage discontinuing softening or limit softening to only the most pressing needs.

b) Discuss how to properly apply de-icing salts on sidewalks and driveways by sending out the "Salting of Sidewalks and Driveways" pamphlet with 3rd or 4th quarter billings.
c) Request voluntary support from the local water softening businesses in the efforts described above.

6) Municipal Road Maintenance Items
a) Reduce flow into the sanitary sewer collection system through CMOM implementation.
b) Discuss salting practices with the County. Explore feasibility of reducing salt use.

Citation: Holland Sanitary District Chloride Source Reduction Plan, September 22, 2023

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

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

B. Previous Permit #: WI0028207-07 **Previous WQSTS #:** (EPA USE ONLY)

C. Effluent substance concentration: 1-day P99 = 1016 mg/L; 4-day P99 = 749 mg/L; 30-day P99 = 606 mg/L; Average all data = 534 mg/L **Variance Limit:** 990 mg/L daily maximum; 690 mg/L weekly average

D. Target Value(s): 620 mg/L **Achieved?** ☐ **Yes** ☐ **No** ☒ **Partial**
The daily max and weekly average interim limits were exceeded 7 times each (7 weeks) over the past permit term

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
Optimize the operation of the municipal ion-exchange softeners.	☒ **Yes** ☐ **No**
Evaluate the feasibility of replacing the municipal ion-exchange softening system with another technology for radionuclide removal from the municipal water supply.	☒ **Yes** ☐ **No**
Encourage water conservation measures.	☒ **Yes** ☐ **No**
Evaluate the feasibility of hauling the softener wastewater to a different WWTF for disposal.	☒ **Yes** ☐ **No**
If the projected radioactivity level of re-used brine is determined to not exceed a level of concern, then evaluate the economic feasibility for re-use of the brine wastewater from the municipal softeners, and develop plans to implement re-use options identified to be economically feasible.	☒ **Yes** ☐ **No**
Educate point-of-use softener owners of the availability of municipally softened water and the impact of chloride on water quality; provide information about increasing softener efficiency and reducing the use of softened water.	☒ **Yes** ☐ **No**
Develop an inventory of point- of-use water softeners in use in the Sanitary District, and collect information about the type of regeneration control unit and when each was last tuned-up.	☒ **Yes** ☐ **No**
Work with industrial and commercial contributors to prevent increases in the amount of chloride discharged, and seek reductions from those sources.	☒ **Yes** ☐ **No**

Add a chloride limit for industrial sources to the Sewer Use Ordinance.	☐ **Yes** ☒ **No** Multiple bottlenecks prevented the town from meeting this goal. Design and construction delays during the previous permit term prevented the facility from gathering enough data to determine proper limits. Multiple board changes occurred during the variance term, including the death of two board members. The facility has finished construction of the new treatment train and is now monitoring chloride loads coming from Arla Foods. Using this data, the town plans to establish limits to be incorporated into the Sewer User Ordinance by the second year of the variance term.