

Permit Fact Sheet

General Information

Permit Number	WI-0032760-10-0
Permittee Name	Lakeside Foods Inc
Permitted Facility Name and Address	Lakeside Foods Inc - Random Lake 709 Allen St, Random Lake, WI 53075
Permit Term	July 01, 2025 to June 30, 2030
Discharge Location	Outfall 001: Latitude: 43° 33' 28.40"N Longitude: 87° 58' 13.84"W Outfall 002: 26 acres. Northern ~13 acre parcel located at SW ¼, SW ¼, Sec. 27, T13N, R21E. Southern ~13 acre parcel located at NW ¼, NW ¼, Sec. 34, T13N, R21E. Outfall 004: 116 acres located at NE ¼, NE ¼, Sec. 26, T13N, R21E and E ½, NW ¼, Sec. 26, T13N, R21E and W ½, NE ¼, Sec. 26, T13N, R21E. Landspreading is on Department approved sites.
Receiving Water	Silver Creek and the Groundwater in North Branch Milwaukee River of Milwaukee River in Sheboygan county.
Stream Flow (Q _{7,10})	0.3 cfs
Stream Classification	Limited forage fishery, warm water sport fish, non-public water supply. Note: Coldwater and public water supply criteria apply for bioaccumulating compounds of concern, because the discharge is within the Great Lakes basin.
Discharge Type	Existing, seasonal

Facility Description

Lakeside Foods Inc. – Random Lake (hereafter Lakeside) is a vegetable processing plant, which processes frozen peas, potatoes, beets, carrots, and corn. Plant operation typically occurs May through November. Wastewater is generated from vegetable washing, freezer defrost water, clean up, and condensate from blanching, chillers, and condensers. Generated wastewater is screened through a rotary drum to remove coarse and fine solids. The solids are dewatered and used as animal feed or landspread on approved sites. The wastewater is spray irrigated on one of two separate fields using a traveling gun/hose reel system. Traveling gun spray irrigation systems are connected to on-site hydrants which are connected to underground laterals extending back to Lakeside’s plant. Sanitary wastes are discharged to the Village of Random Lake WWTP. Water softener back wash is discharged to the Village of Random Lake WWTP. In 2016, the facility installed a reverse osmosis unit to condition well water used for blanching vegetables and feeding the boiler. RO retentate is sent to a stormwater sewer which mixes with WWTP effluent from the Village of Random Lake before discharging to Silver Creek.

Substantial Compliance Determination

Enforcement During Last Permit: An NON was issued in September 2024 for spray irrigation on a saturated field. The issue was caused by a failed pump and employee error. The situation was identified and resolved quickly. After a review of DMRs, compliance reports, 52 and 55 forms, and an onsite inspection on June 29, 2024, this facility has been found to be in substantial compliance with their current permit.

Compliance determination made by Curtis Nickles on January 24, 2025.

Sample Point Descriptions

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
101	New.	INPLANT: Vegetable processing wastewater, boiler blow down, and cooling tower blow down generated at the Lakeside Foods Inc. plant in Random Lake, WI. Representative samples are collected from the pumping station before discharging to irrigation sprayfields via Outfall 002 and/or Outfall 004.
001	2.25 MG/year [2018-2022] ¹	OUTFALL: Reverse osmosis reject generated during softening/conditioning of well water. Flow rate is gathered via a continuous inline meter from RO unit. Representative samples shall be collected before mixing with Random Lake WWTP effluent from the 2" RO discharge pipe that dumps into the 6" storm sewer pipe that projects above 4' from floor by door to microlab. Outfall is located about 1740 feet West-Northwest of the plant and discharges to Silver Creek via ~1,500 ft storm sewer.
002	1.3 MG/year average [2019-2024] ²	OUTFALL: Vegetable processing wastewater, boiler blow down, and cooling tower blow down generated at the Lakeside Foods Inc. plant in Random Lake, WI. 26 wetted acre West spray irrigation system. Northern ~13 acre parcel located at SW ¼, SW ¼, Sec. 27, T13N, R21E. Southern ~13 acre parcel located at NW ¼, NW ¼, Sec. 34, T13N, R21E. Flow rate is gathered via continuous flow meters from each traveling gun irrigation cart. Representative samples are collected from the pumping station.
003	300,000 gallons/year [2018-2022] ¹ 149,300 gallons average [2019-2024] ²	LIQUID WASTEWATER (LEACHATE): Liquid leachate from sweet corn solids. Representative samples are collected from the storage containment vessel. Leachate is hauled to approved land application sites.
004	21.7 MG/year average [2019-2024] ²	OUTFALL: Vegetable processing wastewater, boiler blow down, and cooling tower blow down generated at the Lakeside Foods Inc. plant in Random Lake, WI. 116 wetted acre East spray irrigation system consisting of NE ¼, NE ¼, Sec. 26, T13N, R21E and E ½, NW ¼, Sec. 26, T13N, R21E and W ½, NE ¼, Sec. 26, T13N, R21E. Flow rate is gathered via continuous flow meters from each traveling gun irrigation cart. Representative samples are collected from the pumping station.
006	5,000 tons (dry weigh basis)/year [2018-2022] ¹	BY-PRODUCT SOLIDS: Vegetable by-product solids. Silage generated as a by-product of sweet corn production. The silage is hauled via sealed trucks to be used as daily animal feed. Representative samples are collected from the vehicle used to transport the waste to the approved land spreading site.

¹: Data obtained from permit application

²: Data obtained from data in WDNR database

Permit Requirements

Sample Point Designation For Groundwater Monitoring Systems			
System	Sample Pt Number	Well Name	Comments
Outfall 002 - 26 Wetted Acre Sprayfield	807	MW-1	POINT OF STANDARDS: Downgradient water table observation well.
	808	MW-4	POINT OF STANDARDS: Downgradient water table observation well.
	809	MW-8	BACKGROUND: Background water table observation well
	810	MW-9	POINT OF STANDARDS: Downgradient water table observation well.
	818	MW-10	POINT OF STANDARDS: Downgradient water table observation well.
	819	MW-11	POINT OF STANDARDS: Downgradient water table observation well.
Outfall 004 - 116 Wetted Acre Sprayfield	805	MW-D2	POINT OF STANDARDS: Down/side gradient well.
	806	MW-E	POINT OF STANDARDS: Downgradient water table observation well.
	811	MW-AR	BACKGROUND: Background water table observation well
	812	MW-F	POINT OF STANDARDS: Downgradient water table observation well.
	813	MW-G	POINT OF STANDARDS: Downgradient water table observation well.
	815	MW-BR	POINT OF STANDARDS: Downgradient water table observation well. Replacement for MW-B.
	816	MW-HRR	POINT OF STANDARDS: Downgradient water table observation well. Replacement for MW-HR.
	817	MW-I	POINT OF STANDARDS: Downgradient water table observation well. Replacement for MW-C.

1 Inplant - Monitoring and Limitations

1.1 Sampling Point 101 - PROCESS WW PRIOR TO IRRIGATION

Monitoring Requirements and Limitations

Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
BOD ₅ , Total		mg/L	2/Month	Composite	
Chloride		mg/L	2/Month	Composite	
Nitrogen, Total Kjeldahl		mg/L	2/Month	Composite	
Nitrogen, Nitrite + Nitrate Total		mg/L	2/Month	Composite	
Nitrogen, Ammonia (NH ₃ -N) Total		mg/L	2/Month	Composite	
Nitrogen, Organic Total		mg/L	2/Month	Calculated	Organic nitrogen = total Kjeldahl nitrogen (mg/L) - ammonia nitrogen (mg/L)
Nitrogen, Total		mg/L	2/Month	Calculated	Total nitrogen = total Kjeldahl nitrogen (mg/L) + [NO ₂ + NO ₃] nitrogen (mg/L)

1.1.1 Changes from Previous Permit

This is a new inplant sample point to reduce reporting efforts for permittee. These parameters were being reported for both Outfall 002 and Outfall 004. However, since representative samples are collected from the same pumping station before discharging to the individual irrigation sprayfields, the reporting of the concentrations can be simplified into one inplant sample point. The following were not previously reported under individual Outfall 002 or Outfall 004 but have now been added:

Nitrogen, Ammonia (NH₃-N) Total: 2/month concentration monitoring added.

Nitrogen, Organic Total: 2/month concentration calculation added.

Nitrogen, Total: 2/month concentration calculation added.

Narrative Requirements:

- “Sampling Frequency” and “Composite Sample” narrative requirements were added for clarity.

1.1.2 Explanation of Limits and Monitoring Requirements

All requirements for land treatment of industrial wastewater are determined in accordance with ch. NR 214, Wis. Adm. Code. All categorical limits are based on ch. NR 214 Subchapter II (14)-Sprayfield Wis. Adm. Code.

BOD₅: Monitoring for BOD₅ is included to track changes in wastewater characteristics. Monitoring is also included to assess the organic load discharged to the treatment system.

Chloride: The concentration of any wastewater parameter that may impact groundwater quality shall be limited at the point of discharge to a value that will minimize the concentration of the substance in the groundwater to the extent technically and economically feasible and will prevent exceedance of the preventive action limit (PAL) in the groundwater. This is especially important for parameters, such as dissolved chloride, that do not receive significant treatment in the system (s. NR 214.14(4)(b), Wis. Adm. Code).

Nitrogen- Nutrients, such as nitrogen, are essential for plant and animal growth and nourishment, but overabundance in groundwater can cause several adverse health and ecological effects. Nitrogen can be found in many varied forms in the soil due to the nitrogen cycle.

Total Kjeldahl Nitrogen (TKN): Sampling is required to determine the organic components of the total nitrogen discharged per s. NR 214.14(3)(c), Wis. Adm. Code.

Nitrite + Nitrate: Sampling is required by s. NR 214.14(3)(c), Wis. Adm. Code. This is because Nitrite+Nitrate sampling is required to determine the remaining component of the total nitrogen discharged to spray irrigation. Total Nitrogen can be determined for compliance with total nitrogen loading limits by adding the sample results of TKN and Nitrite+Nitrate.

Total Nitrogen: Per s. NR 214.14(3)(c), Wis. Adm. Code, the total nitrogen applied to the land treatment system shall be determined. Total nitrogen = total Kjeldahl nitrogen (mg/L) + (Nitrite+Nitrate) nitrogen (mg/L).

Total Ammonia: Sampling is required to determine organic nitrogen discharged per s. NR 214.14(3)(c), Wis. Adm. Code.

Total Organic: Per s. NR 214.14(3)(c), Wis. Adm. Code, the organic nitrogen becoming available to plants shall be determined.

2 Surface Water - Monitoring and Limitations

2.1 Sample Point Number: 001- RO Retentate

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Daily Max	30 mg/L	Monthly	Composite	
BOD5, Total	Monthly Avg	15 mg/L	Monthly	Composite	
Suspended Solids, Total	Daily Max	12 mg/L	Monthly	Composite	
Suspended Solids, Total	Monthly Avg	12 mg/L	Monthly	Composite	
Dissolved Oxygen	Daily Min	4.0 mg/L	5/Week	Grab	
Nitrogen, Ammonia (NH3-N) Total		mg/L	Monthly	Composite	
Additive - Chem Treat RL9906	Weekly Avg	14 mg/L	3/Week	Calculated	
Phosphorus, Total	Monthly Avg	0.5 mg/L	Monthly	Composite	
Phosphorus, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of phosphorus and report on

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					the last day of the month on the DMR.
Phosphorus, Total		lbs/yr	Monthly	Calculated	Calculate the sum of total monthly mass of phosphorus discharged for the calendar year and report on the last day of the month on the DMR.
Temperature Maximum	Daily Max	81 deg F	3/Week	Multiple Grab	Effective every January, February and December
Temperature Maximum	Daily Max	82 deg F	3/Week	Multiple Grab	Effective every March and November
Temperature Maximum	Daily Max	84 deg F	3/Week	Multiple Grab	Effective every April
Temperature Maximum	Daily Max	87 deg F	3/Week	Multiple Grab	Effective every May
Temperature Maximum	Daily Max	88 deg F	3/Week	Multiple Grab	Effective every June and August
Temperature Maximum	Daily Max	89 deg F	3/Week	Multiple Grab	Effective every July
Temperature Maximum	Daily Max	86 deg F	3/Week	Multiple Grab	Effective every September
Temperature Maximum	Daily Max	85 deg F	3/Week	Multiple Grab	Effective every October
Temperature Maximum	Weekly Avg	53 deg F	3/Week	Multiple Grab	Effective every January, November and December
Temperature Maximum	Weekly Avg	54 deg F	3/Week	Multiple Grab	Effective every February
Temperature Maximum	Weekly Avg	56 deg F	3/Week	Multiple Grab	Effective every March
Temperature Maximum	Weekly Avg	59 deg F	3/Week	Multiple Grab	Effective every April
Temperature Maximum	Weekly Avg	69 deg F	3/Week	Multiple Grab	Effective every May
Temperature Maximum	Weekly Avg	80 deg F	3/Week	Multiple Grab	Effective every June
Temperature Maximum	Weekly Avg	85 deg F	3/Week	Multiple Grab	Effective every July and August

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Temperature Maximum	Weekly Avg	77 deg F	3/Week	Multiple Grab	Effective every September
Temperature Maximum	Weekly Avg	65 deg F	3/Week	Multiple Grab	Effective every October
pH Field	Daily Max	9.0 su	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	

2.1.1 Changes from Previous Permit

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

Flow rate: Frequency for flow has been corrected to “continuous” to clarify how flow rate is measured.

BOD5, Total: New parameter added with daily maximum of 30 mg/L and monthly average of 15 mg/L limits.

Suspended Solids, Total: Daily maximum of 12 mg/L and monthly average of 12 mg/L limits added.

Dissolved Oxygen: New parameter added with a daily minimum of 4 mg/L limit.

Nitrogen, Ammonia (NH3-N) Total: Monthly monitoring added.

Additive – Chem Treat RL9906: New parameter added with a weekly average of 14 mg/L calculated limit.

Phosphorus, Total: Monthly average of 0.5 mg/L limit added. Annual total of 6.5 lbs/yr limits added per compliance schedule. Monthly monitoring of lbs/month also added to assist in the tracking of monthly mass inputs for the annual calculation at the end of the year.

pH Field: Sample frequency changed from monthly to 5/week. This change will better assess the variability and is consistent with the minimum suggested frequency in the Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021).

Narrative Requirements:

- “Composite Sample” subsection added to provide information of what this type of sample entails.
- “Additive Chem Treat RL9906 Concentration Calculation” added to establish how this parameter shall be calculated.
- “Total Maximum Daily Load (TMDL) Limitations,” “TMDL Limitations for Total Phosphorus,” “Phosphorus Water Quality-Based Effluent Limitation(s)” “Alternative Approaches to Phosphorus WQBEL Compliance,” and “Submittal of Permit Application for Next Reissuance and Adaptive Management or Pollutant Trading Plan or Variance Application” narrative requirements added to provide insight on new phosphorus TMDL limits, how to calculate them, when they become effective, and alternate approaches to meet them.
- “Effluent Temperature Monitoring” language updated to provide more flexibility
- “Additives” subsection added to provide information of dosage records and procedures to change additives during permit term.

2.1.2 Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated May 28, 2024.

Monitoring Frequencies: The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term.

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

3 Land Treatment – Monitoring and Limitations

3.1 Sample Point Number: 002- 26-ACRE SPRAY IRRG SYSTEM

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		gpd	Daily	Total Daily	
Hydraulic Application Rate	Monthly Avg	0 gal/ac/day	Monthly	Calculated	Effective December-March
Hydraulic Application Rate	Monthly Avg	7,000 gal/ac/day	Monthly	Calculated	Effective April-November
Nitrogen, Max Applied On Any Zone	Annual Total	300 lbs/ac/yr	Annual	Calculated	
Chloride, Max Applied to Any Zone		lbs/ac/yr	Annual	Calculated	
Soil - Nitrogen, Available		mg/kg	Annual	Grab	
Soil - Phosphorus, Available		mg/kg	Annual	Grab	
Soil - Potassium, Available		mg/kg	Annual	Grab	
Soil - pH Lab		su	Annual	Grab	
Other Sources of Nitrogen		lbs/ac/yr	Annual	Measure	

3.1.1 Changes from Previous Permit:

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

Flow Rate: Limits of 182,000 gpd “Monthly Avg - LT” during April – November and 0 gpd “Monthly Avg - LT” during December – March have been deleted as it is unnecessary and contradictory to the other established limits. The restrictions for discharge are already established in the “Maximum Applied Volume” and in the “Hydraulic Application Rate.”

Nitrogen, Max Applied On Any Zone: Limit of 0 lbs/ac/yr annual total which was effective December – March has been deleted. This is because it is not necessary and could cause confusion since the annual total limit is established to be 300 lbs/ac/yr. Since irrigation is already limited to the months of April-November, there is no need to add the period restriction to the annual limit for Nitrogen too. Additionally, sample type was corrected from “total annual” to “calculated” to be more accurate.

Chloride Max Applied on Any Zone: Monitoring of annual lbs/ac/yr of chloride added.

Soil - Nitrogen, Available: Annual monitoring added.

Soil - Phosphorus, Available: Annual monitoring added.

Soil - Potassium, Available: Annual monitoring added.

Soil - pH Lab: Annual monitoring added.

Other Sources of Nitrogen: Annual monitoring added.

Narrative Requirements:

- “Nitrogen Loading Limitations” subsection deleted because language no longer applies. This change is an effort to phase out conditional language pertaining to Nitrogen as standard practice. Any nitrogen load greater than the baseline threshold of 300 lbs/ac/yr for spray irrigation likely exceeds crop nutrient uptake + demonstrable nitrogen losses and needs an exemption under s. NR 214.06, Wis. Adm. Code, to be permitted. See the “Establishing Nitrogen Limitations in WPDES Permits at Industrial Land Treatment Facilities” 2023 guidance for more information.
- “Nitrogen Loading Contingent on Groundwater Results” subsection deleted because language no longer applies. This change is an effort to phase out conditional language pertaining to Nitrogen as standard practice. Any nitrogen load greater than the baseline threshold of 300 lbs/ac/yr for spray irrigation likely exceeds crop nutrient uptake + demonstrable nitrogen losses and needs an exemption under s. NR 214.06, Wis. Adm. Code, to be permitted. See the “Establishing Nitrogen Limitations in WPDES Permits at Industrial Land Treatment Facilities” 2023 guidance for more information.
- “Composite Sample” subsection added to provide information of what this type of sample entails.
- “Monthly Avg Flow – LT Calculation” replaced with “Monthly Average Hydraulic Application Rate” to provide clarity on how to calculate the hydraulic application rate.
- “Maximum Applied Chloride/Nitrogen on Any Zone” added to this subsection to provide clarity on how to calculate the mass applied to each zone.
- “Spray Irrigation Site(s) - Soil Analysis” language updated for clarity.

3.1.2 Explanation of Limits and Monitoring Requirements

All requirements for land treatment of industrial wastewater are determined in accordance with ch. NR 214, Wis. Adm. Code. All categorical limits are based on ch. NR 214 Subchapter II (14)-Sprayfield Wis. Adm. Code. More information on the limitations can be found in the fact sheet attachment Appendix B – Groundwater Evaluation.

Flow Rate: Flow is required by s. NR 214.14(4)(a), Wis. Adm. Code.

Hydraulic Application Rate: The hydraulic application rate is set based on hydrogeologic conditions, soil texture, permeability, cation exchange capacity, topography, cover crop and wastewater characteristics. The average hydraulic application rate may not exceed 10,000 gallons per acre per day per s. NR 214.14(3)(d), Wis. Adm. Code. The Land

Treatment Evaluation Report will include the appropriate hydraulic application rate limits. Hydraulic application = (# gallons applied per month / # acres applied) / # days per month.

Nitrogen Max Applied on Any Zone: The annual nitrogen application rate shall be limited to the nitrogen needs of the cover crop plus demonstrable denitrification occurring in the treatment system. To assist the permittee in correct calculations, refer to the “Maximum applied Nitrogen/Chloride on any zone.”

Chloride Max Applied on Any Zone: Similar to Nitrogen Max Applied on Any Zone, reporting the annual maximum chloride with the units lbs/ac/yr will be included in the permit to better evaluate this parameter. To assist the permittee in correct calculations, use the “Maximum applied Nitrogen/Chloride on any zone.”

Soil testing (available nitrogen, available phosphorus, available potassium and pH) **and other sources of nitrogen** (i.e., fertilizer or manure): Annual soil monitoring of the sprayfield(s) is required by NR 214.14(5)(c), Wis. Adm. Code and was previously submitted through the Annual Report. These parameters have been moved to the monitoring table. This eliminates the additional report allowing all data to be entered into eDMRs. Only one set of samples is required, but if the facility completes multiple soil tests or the department asks for additional samples for the fields/zones used under the outfall sample point there is a feature within the eDMRs that allows additional data to be recorded. It is asked that the additional sample points’ field/zone(s) are identified in the form’s general comments section.

3.2 Sample Point Number: 004- 116-ACRE SPRAY IRRG SYSTEM

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		gpd	Daily	Total Daily	
Hydraulic Application Rate	Monthly Avg	7,000 gal/ac/day	Monthly	Calculated	Effective April-November
Hydraulic Application Rate	Monthly Avg	0 gal/ac/day	Monthly	Calculated	Effective December-March
Nitrogen, Max Applied On Any Zone	Annual Total	300 lbs/ac/yr	Annual	Calculated	
Chloride, Max Applied to Any Zone		lbs/ac/yr	Annual	Calculated	
Soil - Nitrogen, Available		mg/kg	Annual	Grab	
Soil - Phosphorus, Available		mg/kg	Annual	Grab	
Soil - Potassium, Available		mg/kg	Annual	Grab	
Soil - pH Lab		su	Annual	Grab	
Other Sources of Nitrogen		lbs/ac/yr	Annual	Measure	

3.2.1 Changes from Previous Permit:

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

Flow Rate: Limits of 812,000 gpd “Monthly Avg - LT” during April – November and 0 gpd “Monthly Avg - LT” during December – March have been deleted as it is unnecessary and contradictory to the other established limits. The restrictions for discharge are already established in the “Maximum Applied Volume” and in the “Hydraulic Application Rate.”

Nitrogen, Max Applied On Any Zone: Limit of 0 lbs/ac/yr annual total which was effective December – March has been deleted. This is because it is unnecessary and could cause confusion since the annual total limit is established to be 300 lbs/ac/yr. Since irrigation is already limited to the months of April-November, there is no need to add the period restriction to the annual limit for Nitrogen too. Additionally, sample type was corrected from “total annual” to “calculated” to be more accurate.

Chloride Max Applied on Any Zone: Monitoring of annual lbs/ac/yr of chloride added.

Soil - Nitrogen, Available: Annual monitoring added.

Soil - Phosphorus, Available: Annual monitoring added.

Soil - Potassium, Available: Annual monitoring added.

Soil - pH Lab: Annual monitoring added.

Other Sources of Nitrogen: Annual monitoring added

Narrative Requirements:

- “Nitrogen Loading Limitations” subsection deleted because language no longer applies. This change is an effort to phase out conditional language pertaining to Nitrogen as standard practice. Any nitrogen load greater than the baseline threshold of 300 lbs/ac/yr for spray irrigation likely exceeds crop nutrient uptake + demonstrable nitrogen losses and needs an exemption under s. NR 214.06, Wis. Adm. Code, to be permitted. See the “Establishing Nitrogen Limitations in WPDES Permits at Industrial Land Treatment Facilities” 2023 guidance for more information.
- “Nitrogen Loading Contingent on Groundwater Results” subsection deleted because language no longer applies. This change is an effort to phase out conditional language pertaining to Nitrogen as standard practice. Any nitrogen load greater than the baseline threshold of 300 lbs/ac/yr for spray irrigation likely exceeds crop nutrient uptake + demonstrable nitrogen losses and needs an exemption under s. NR 214.06, Wis. Adm. Code, to be permitted. See the “Establishing Nitrogen Limitations in WPDES Permits at Industrial Land Treatment Facilities” 2023 guidance for more information.
- “Composite Sample” subsection added to provide information of what this type of sample entails.
- “Monthly Avg Flow – LT Calculation” replaced with “Monthly Average Hydraulic Application Rate” to provide clarity on how to calculate the hydraulic application rate.
- “Maximum Applied Chloride/Nitrogen on Any Zone” added to this subsection to provide clarity on how to calculate the mass applied to each zone.
- “Spray Irrigation Site(s) - Soil Analysis” language updated for clarity.

3.2.2 Explanation of Limits and Monitoring Requirements

All requirements for land treatment of industrial wastewater are determined in accordance with ch. NR 214, Wis. Adm. Code. All categorical limits are based on ch. NR 214 Subchapter II (14)-Sprayfield Wis. Adm. Code. More information on the limitations can be found in the fact sheet attachment Appendix B – Groundwater Evaluation.

Flow Rate: Flow is required by s. NR 214.14(4)(a), Wis. Adm. Code.

Hydraulic Application Rate: The hydraulic application rate is set based on hydrogeologic conditions, soil texture, permeability, cation exchange capacity, topography, cover crop and wastewater characteristics. The average hydraulic application rate may not exceed 10,000 gallons per acre per day per s. NR 214.14(3)(d), Wis. Adm. Code. The Land Treatment Evaluation Report will include the appropriate hydraulic application rate limits. Hydraulic application = (# gallons applied per month / # acres applied) / # days per month.

Nitrogen Max Applied on Any Zone: The annual nitrogen application rate shall be limited to the nitrogen needs of the cover crop plus demonstrable denitrification occurring in the treatment system. To assist the permittee in correct calculations, refer to the “Maximum applied Nitrogen/Chloride on any zone.”

Chloride Max Applied on Any Zone: Similar to Nitrogen Max Applied on Any Zone, reporting the annual maximum chloride with the units lbs/ac/yr will be included in the permit to better evaluate this parameter. To assist the permittee in correct calculations, use the “Maximum applied Nitrogen/Chloride on any zone.”

Soil testing (available nitrogen, available phosphorus, available potassium and pH) **and other sources of nitrogen** (i.e., fertilizer or manure): Annual soil monitoring of the sprayfield(s) is required by NR 214.14(5)(c), Wis. Adm. Code and was previously submitted through the Annual Report. These parameters have been moved to the monitoring table. This eliminates the additional report allowing all data to be entered into eDMRs. Only one set of samples is required, but if the facility completes multiple soil tests or the department asks for additional samples for the fields/zones used under the outfall sample point there is a feature within the eDMRs that allows additional data to be recorded. It is asked that the additional sample points’ field/zone(s) are identified in the form’s general comments section.

4 Groundwater – Monitoring and Limitations

4.1 Groundwater Monitoring System for Outfall 002 - 26 Wetted Acre Sprayfield

Location of Monitoring system: NW ¼, NW ¼. Sec. 34, T13N, R21E (lower) and SW ¼, SW ¼, Sec. 27, T13N, R21E (Upper)

Groundwater Monitoring Well(s) to be Sampled: MW-1 (807), MW-4 (808), MW-8 (809), MW-9 (810), MW-10 (818), MW-11 (819)

Groundwater Monitoring Well(s) Used to Evaluate Background Groundwater Quality: MW-8 (809)

Groundwater Monitoring Well(s) Used for Point of Standards Application: MW-1(807), MW-4 (808), MW-9 (810), MW-10 (818), MW-11 (819)

Parameter	Units	Preventive Action Limit	Enforcement Standard	Frequency
Depth To Groundwater	feet	N/A	N/A	Quarterly
Groundwater Elevation	feet MSL	N/A	N/A	Quarterly
Nitrogen, Nitrite + Nitrate (as N) Dissolved	mg/L	8.5	10	Quarterly
Chloride Dissolved	mg/L	125	250	Quarterly
pH Field	su	8.5	N/A	Quarterly
Nitrogen, Ammonia Dissolved	mg/L	0.97	9.7	Quarterly

Nitrogen, Organic Dissolved	mg/L	2.5	N/A	Quarterly
COD, Filtered	mg/L	41	N/A	Quarterly

4.1.1 Changes from Previous Permit:

Groundwater limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below and fact sheet attachment Appendix B: Groundwater Evaluation for more information.

Nitrogen, Nitrite + Nitrate (as N) Dissolved: Preventive action limit changed from 4.6 mg/L to 8.5 mg/L.

pH Field: Preventive action limit changed from 8.3 su to 8.5 su.

Nitrogen, Ammonia Dissolved: Preventive action limit changed from 1.2 mg/L to 0.97 mg/L.

Nitrogen, Organic Dissolved: Preventive action limit changed from 2.4 mg/L to 2.5 mg/L

COD, Filtered: Preventive action limit changed from 38 mg/L to 41 mg/L.

Narrative Requirements:

- “Alternative Concentration Limit” requirement name has changed to “Exemptions and Alternative Concentration Limit” with the limits updated.
- “pH Preventive Action Limits” requirement name has changed to “Preventive Action Limits for pH” and limits have been updated.

4.1.2 Explanation of Limits and Monitoring Requirements

Groundwater limits and requirements are determined in accordance with ch. NR 140, Wis. Adm. Code. Indicator parameter Preventive Action Limit (PAL) values are established per s. NR 140.20, Wis. Adm. Code. Alternative Concentration Limits as allowed under s. NR 140.28, Wis. Adm. Code, are established on a case-by-case basis.

For more information, please refer to the fact sheet attachment Appendix B: Groundwater Evaluation

4.2 Groundwater Monitoring System for Outfall 004 - 116 Wetted Acre Sprayfield

Location of Monitoring system: NW ¼, SE ¼, Sec. 26, T13N, R21E

Groundwater Monitoring Well(s) to be Sampled: MW-D2 (805), MW-E (806), MW-AR (811), MW-F (812), MW-G (813), MW-BR (815), MW-HRR (816), MW-I (817)

Groundwater Monitoring Well(s) Used to Evaluate Background Groundwater Quality: MW-AR (811)

Groundwater Monitoring Well(s) Used for Point of Standards Application: MW-I (817), MW-HRR (816), MW-BR (815), MW-G (813), MW-F (812), MW-E (806), MW-D2 (805)

Parameter	Units	Preventive Action Limit	Enforcement Standard	Frequency
Depth To Groundwater	feet	N/A	N/A	Quarterly
Groundwater Elevation	feet MSL	N/A	N/A	Quarterly
Nitrogen, Nitrite + Nitrate (as N) Dissolved	mg/L	2.2	10	Quarterly

Chloride Dissolved	mg/L	125	250	Quarterly
pH Field	su	8.4	N/A	Quarterly
Nitrogen, Ammonia Dissolved	mg/L	0.97	9.7	Quarterly
Nitrogen, Organic Dissolved	mg/L	2.3	N/A	Quarterly
COD, Filtered	mg/L	41	N/A	Quarterly

4.2.1 Changes from Previous Permit:

Groundwater limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below and fact sheet attachment Appendix B: Groundwater Evaluation for more information.

Nitrogen, Nitrite + Nitrate (as N) Dissolved: Preventive action limit changed from 4.5 mg/L to 2.2 mg/L.

Chloride Dissolved: Preventive action limit changed from 274 mg/L to 125 mg/L and the enforcement standard changed from 274 mg/L to 250 mg/L.

pH Field: Preventive action limit remained the same but changed from **** to 8.4 su on the table.

Nitrogen, Ammonia Dissolved: Preventive action limit changed from 1.2 mg/L to 0.97 mg/L.

Nitrogen, Organic Dissolved: Preventive action limit changed from 2.3 mg/L to 2.3 mg/L.

COD, Filtered: Preventive action limit changed from 43 mg/L to 41 mg/L.

Narrative Requirements:

- “Alternative Concentration Limit” requirement name has changed to “Exemptions and Alternative Concentration Limit” with the limits updated.
- “pH Preventive Action Limits” requirement name has changed to “Preventive Action Limits for pH” and limits have been updated.

4.2.2 Explanation of Limits and Monitoring Requirements

Groundwater limits and requirements are determined in accordance with ch. NR 140, Wis. Adm. Code. Indicator parameter Preventive Action Limit (PAL) values are established per s. NR 140.20, Wis. Adm. Code. Alternative Concentration Limits as allowed under s. NR 140.28, Wis. Adm. Code, are established on a case-by-case basis.

For more information, please refer to the fact sheet attachment Appendix B: Groundwater Evaluation

5 Land Application - Liquids/By-Product Solids (industrial only)

5.1 Sample Point Number: 003- Vegetable Leachate

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Nitrogen, Total Kjeldahl		mg/L	Annual	Grab	
Chloride		mg/L	Annual	Grab	
Phosphorus, Total		mg/L	Annual	Grab	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Phosphorus, Water Extractable		% of Tot P	Annual	Grab	
Potassium, Total Recoverable		mg/L	Annual	Grab	

5.1.1 Changes from Previous Permit:

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

Potassium, Total Recoverable: Annual mg/L monitoring was added.

5.1.2 Explanation of Limits and Monitoring Requirements

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

Potassium, Total Recoverable: Potassium monitoring is proposed to ensure that the nutrient content of the waste being land applied is adequately tracked to ensure crop needs are met.

5.2 Sample Point Number: 006- Vegetable By-Products

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Annual	Grab Comp	
Nitrogen, Total Kjeldahl		Percent	Annual	Grab Comp	
Chloride		Percent	Annual	Grab Comp	
Phosphorus, Total		Percent	Annual	Grab Comp	
Phosphorus, Water Extractable		% of Tot P	Annual	Grab Comp	
Potassium, Total Recoverable		Percent	Annual	Grab Comp	

5.2.1 Changes from Previous Permit:

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

Potassium, Total Recoverable: Annual percent monitoring was added.

5.2.2 Explanation of Limits and Monitoring Requirements

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

Potassium, Total Recoverable: Potassium monitoring is proposed to ensure that the nutrient content of the waste being land applied is adequately tracked to ensure crop needs are met.

6 Schedules

6.1 Land Treatment Management Plan

A management plan is required for the land treatment system.

Required Action	Due Date
Land Treatment Management Plan: Submit an update to the management plan to optimize the land treatment system performance and demonstrate compliance with Wisconsin Administrative Code NR 214.	12/01/2025

6.1.1 Explanation of Schedule

Land Treatment Management Plan (industrial): An up-to-date Land Treatment Management plan is a standard requirement in reissued industrial permits per ch. NR 214, Wis. Adm. Code.

6.2 Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus

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

Required Action	Due Date
Operational Evaluation Report: The permittee shall prepare and submit to the Department for approval an operational evaluation report. The report shall include an evaluation of collected effluent data, possible source reduction measures, operational improvements or other minor facility modifications that will optimize reductions in phosphorus discharges from the treatment plant during the period prior to complying with final phosphorus WQBELs and, where possible, enable compliance with final phosphorus WQBELs by July 1, 2028. The report shall provide a plan and schedule for implementation of the measures, improvements, and modifications as soon as possible, but not later than July 1, 2028 and state whether the measures, improvements, and modifications will enable compliance with final phosphorus WQBELs. Regardless of whether they are expected to result in compliance, the permittee shall implement the measures, improvements, and modifications in accordance with the plan and schedule specified in the operational evaluation report. If the operational evaluation report concludes that the facility can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the permittee shall comply with the final phosphorus WQBEL by July 1, 2028 and is not required to comply with the milestones identified below for years 3 through 9 of this compliance schedule ('Preliminary Compliance Alternatives Plan', 'Final Compliance Alternatives Plan', 'Final Plans and Specifications', 'Treatment Plant Upgrade to Meet WQBELs', 'Complete Construction', 'Achieve Compliance'). STUDY OF FEASIBLE ALTERNATIVES - If the Operational Evaluation Report concludes that the permittee cannot achieve final phosphorus WQBELs with source reduction measures, operational improvements and other minor facility modifications, the permittee shall initiate a study of feasible	07/01/2026

alternatives for meeting final phosphorus WQBELs and comply with the remaining required actions of this schedule of compliance. If the Department disagrees with the conclusion of the report, and determines that the permittee can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the Department may reopen and modify the permit to include an implementation schedule for achieving the final phosphorus WQBELs sooner than July 1, 2034.	
Compliance Alternatives, Source Reduction, Improvements and Modifications Status: The permittee shall submit a 'Compliance Alternatives, Source Reduction, Operational Improvements and Minor Facility Modification' status report to the Department. The report shall provide an update on the permittee's: (1) progress implementing source reduction measures, operational improvements, and minor facility modifications to optimize reductions in phosphorus discharges and, to the extent that such measures, improvements, and modifications will not enable compliance with the WQBELs, (2) status evaluating feasible alternatives for meeting phosphorus WQBELs.	07/01/2027
Preliminary Compliance Alternatives Plan: The permittee shall submit a preliminary compliance alternatives plan to the Department. If the plan concludes upgrading of the permittee's wastewater treatment facility is necessary to achieve final phosphorus WQBELs, the submittal shall include a preliminary engineering design report. If the plan concludes Adaptive Management will be used, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 without the Adaptive Management Plan. If water quality trading will be undertaken, the plan must state that trading will be pursued.	07/01/2028
Final Compliance Alternatives Plan: The permittee shall submit a final compliance alternatives plan to the Department. If the plan concludes upgrading of the permittee's wastewater treatment is necessary to meet final phosphorus WQBELs, the submittal shall include a final engineering design report addressing the treatment plant upgrades, and a facility plan if required pursuant to ch. NR 110, Wis. Adm. Code. If the plan concludes Adaptive Management will be implemented, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 and an engineering report addressing any treatment system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code. If the plan concludes water quality trading will be used, the submittal shall identify potential trading partners. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	07/01/2029
Progress Report on Plans & Specifications: Submit progress report regarding the progress of preparing final plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	07/01/2030
Final Plans and Specifications: Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s.	07/01/2031

283.53(2), Stats.) Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	
Treatment Plant Upgrade to Meet WQBELs: The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	07/01/2032
Construction Upgrade Progress Report #1: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	01/31/2033
Construction Upgrade Progress Report #2: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	07/01/2033
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	01/01/2034
Achieve Compliance: The permittee shall achieve compliance with final phosphorus WQBELs. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	07/01/2034

6.2.1 Explanation of Schedule

The TMDL report addresses phosphorus water quality impairments within the Milwaukee River Basin and provides waste load allocations (WLAs) required to meet water quality standards. Effluent limitations based on these WLAs must be included in WPDES permits according to s. NR 217.16, Wis. Adm. Code. A compliance schedule is established to help the permittee meet the required limits. For more information, see the discussions of limits and monitoring requirements in the fact sheet attachment Appendix A.

6.3 Chloride Source Reduction Measures (SRMs) for Groundwater Discharges

Required Action	Due Date
Chloride Reduction Plan: The permittee shall complete and submit for Department review and approval a chloride reduction plan (CRP). The CRP is an initial step toward controlling chloride and ensuring compliance with chloride limits based on applicable groundwater standards. The CRP shall evaluate all applicable source reduction measures (SRMs) and establish appropriate implementation activities for the SRMs. The CRP shall include a schedule for implementing the selected SRMs.	02/28/2026
Annual Progress Report: Once the chloride reduction plan (CRP) is approved by the Department, the permittee shall submit an annual progress report, under the authority of s. NR 205.07(1)(h), Wis. Adm. Code. If a SRM implementation date of an approved CRP is not met, this may constitute a violation of the permit. Submittal of the first annual progress report is required by the Date Due.	02/28/2027
Second Annual Progress Report: Submit progress report in implementing the chloride reduction plan (CRP).	02/28/2028

Third Annual Progress Report: Submit progress report in implementing the chloride reduction plan (CRP).	02/28/2029
Fourth Annual Progress Report: Submit progress report in implementing the chloride reduction plan (CRP).	02/28/2030
Annual Status Reports After Expiration: In the event that this permit is not reissued on time, the permittee shall continue to submit annual status reports each year by February 28.	

6.3.1 Explanation of Schedule

Chloride Source Reduction Measures (SRMs) for Groundwater Discharges: The concentration of chloride in the discharge to the sprayfields is often well above the NR 140 Enforcement Standard. The permittee shall continue to work at reducing the concentration of chloride to prevent exceedance of the NR140 preventive action limit in groundwater.

6.4 Groundwater Monitoring Well - Installation

Required Action	Due Date
Plans and Specifications: Submit plans and specifications for installation of monitoring wells MW-10 (818) and MW-11 (819) to be installed.	02/28/2026
Installation: Complete well installation in accordance with ch NR 141, Wisconsin Administrative Code. (Note: Documentation of well construction must be submitted to the Department within 60 days of well installation.)	07/01/2026

6.4.1 Explanation of Schedule

The groundwater monitoring system for the 26-acre sprayfield does not adequately define groundwater flow paths through and downgradient of the treatment system. Therefore, two additional monitoring wells will be required to both portions of the 26-acre Sprayfield. Approval of the location and specifications of these monitoring wells will be required prior to installation of the monitoring wells.

Other Comments

No comments.

Attachments

Appendix A: Water Quality Based Effluent Limits [05/28/2024]

Appendix B: Groundwater Evaluation [05/08/2025]

Justification Of Any Waivers From Permit Application Requirements

No waivers requested or granted as part of this permit reissuance.

Prepared By: Laura Rodriguez Alvarez

Wastewater Engineer

Date: May 16, 2025

CORRESPONDENCE/MEMORANDUM

DATE: 05/28/2024

TO: Laura Rodriguez Alvarez – WY/3

FROM: Nicole Krueger – SER *Nicole Krueger*SUBJECT: Water Quality-Based Effluent Limitations for Lakeside Foods Inc. – Random Lake
WPDES Permit No. WI-0032760-10

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 Lakeside Foods Inc. – Random Lake in Sheboygan County. This industrial facility discharges to Silver Creek, located in the North Branch Milwaukee River Watershed in the Milwaukee River Basin. This discharge is located in the Milwaukee River but were not given individual wasteload allocations in the TMDL approved by EPA in March 2018. The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Annual Maximum	Footnotes
Flow Rate						1,2
BOD ₅	30 mg/L			15 mg/L		
TSS	12 mg/L			12 mg/L		3
Dissolved Oxygen		4.0 mg/L				
Phosphorus Interim TMDL				0.5 mg/L	6.5 lbs/year	3,4
Temperature						5
pH	9.0 s.u.	6.0 s.u.				1
Ammonia Nitrogen						2
ChemTreat RL9906			14 mg/L			

Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. The TSS concentration limits and phosphorus mass limit are based on the Total Maximum Daily Load (TMDL) for the Milwaukee River Basin to address phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA in March 2018.
4. The interim phosphorus limit shall be effective during a compliance schedule and remain effective after the TMDL limit becomes effective.
5. The following thermal limits are recommended to continue in the reissued permit.

Month	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	53	81
FEB	54	81
MAR	56	82

Month	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
APR	59	84
MAY	69	87
JUN	80	88
JUL	85	89
AUG	85	88
SEP	77	86
OCT	65	85
NOV	53	82
DEC	53	81

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

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, & Thermal Table

PREPARED BY: Nicole Krueger, Water Resources Engineer – SER

E-cc: Curt Nickels, Wastewater Engineer – SER
 Jason Knutson, Wastewater Section Chief – WY/3
 Diane Figiel, Water Resources Engineer – WY/3
 Kari Fleming, Environmental Toxicologist – WY/3
 Michael Polkinghorn, Water Resources Engineer – NOR/Rhineland Service Center
 Nate Willis, Wastewater Engineer – WY/3

Attachment #1
**Water Quality-Based Effluent Limitations for
Lakeside Foods Inc. Random Lake**

WPDES Permit No. WI-0032760-10

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

Lakeside Foods Inc. – Random Lake (“Lakeside Foods”) is a vegetable processing plant, which processes peas, potatoes, beets, carrots, and corn. Plant operation typically occurs May – November. Wastewater is generated from vegetable washing, blanching, and clean ups. Generated wastewater is screened through a rotary drum to remove coarse and fine solids. The solids are dewatered and used as animal feed or landspread on approved sites. The wastewater is spray irrigated on one of two separate fields using a traveling gun/hose reel system. Traveling gun spray irrigation systems are connected to on-site hydrants which are connected to underground laterals extending back to Lakeside Foods’ plant. A reverse osmosis (RO) unit was installed in 2016 to condition well water used for blanching vegetables and feeding the boiler. RO retentate is sent to a stormwater sewer which mixes with wastewater effluent from the Village of Random Lake before discharging to Silver Creek.

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

Existing Permit Limitations

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
TSS						1
Phosphorus						1
Temperature						
January	81 deg F		53 deg F			
February	81 deg F		54 deg F			
March	82 deg F		56 deg F			
April	84 deg F		59 deg F			
May	87 deg F		69 deg F			
June	88 deg F		80 deg F			
July	89 deg F		85 deg F			
August	88 deg F		85 deg F			
September	86 deg F		77 deg F			
October	86 deg F		65 deg F			
November	82 deg F		53 deg F			
December	81 deg F		53 deg F			
pH	9.0 s.u.	6.0 s.u.				2

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.

Receiving Water Information

- Name: Silver Creek
- Waterbody Identification Code (WBIC): 29900
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Silver Creek is currently classified as a limited forage fishery, non-public water supply from the discharge downstream to the first crossing of Creek Road, about 1 ½ miles downstream of the discharge. The Village of Random Lake is listed in ch NR. 104, Wis. Adm. Code which discharges to the same storm sewer. From the first crossing of Creek Road, Silver Creek is classified as a warm water sport fishery. 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-Q₁₀ and 7-Q₂ values are from USGS for Station 04086319 at Highway 144. The flows were updated from USGS on 05/20/2022. The downstream low flows are estimated from USGS for downstream protection purposes.

LFF Classification at Outfall 001

7-Q₁₀ = 0.30 cfs (cubic feet per second)

7-Q₂ = 0.60 cfs

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7-Q ₁₀ (cfs)	0.53	0.55	0.84	1.7	0.79	0.53	0.40	0.39	0.34	0.43	0.66	0.61
7-Q ₂ (cfs)	1.3	1.4	2.6	3.5	2.1	1.5	0.92	0.82	0.83	1.0	1.4	1.4

Warmwater sport fish classification 1.5 miles downstream of Outfall 001 at Creek Road

7-Q₁₀ = 0.44

7-Q₂ = 1.23

- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%.
- Hardness = 245 mg/L as CaCO₃. This value represents the geometric mean of data from Random Lake's WET testing from 04/22/2008 to 11/28/2017.
- Source of background concentration data: Metals data from DNR Water Quality Rules Implementation Plan, January 1998; Milwaukee River at Batavia. The Milwaukee River is used in this evaluation because it is within the same ecological landscape so ambient water quality characteristics are expected to be similar. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: The Village of Random Lake effluent discharges to the same storm sewer as Lakeside Foods before discharge to Silver Creek. The combined discharge was considered for the

calculation of thermal limits but was not considered for other pollutants due to the low concentration levels.

- Impaired water status: The direct receiving water is 303(d) listed as impaired for total phosphorus.

Effluent Information

- Design flow rate(s):
Maximum annual average = 0.042 MGD (Million Gallons per Day)
For reference, the actual average flow from 01/01/2019 – 02/29/2024 was 0.025 MGD including days of zero flow.
- Hardness = 1570 mg/L as CaCO₃. This value represents a single sample the facility collected on 08/01/2023.
- 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: Private well.
- Additives: RL9906 is used as RO treatment.
- Effluent characterization: This facility is categorized as a secondary industry, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus ammonia, chloride, hardness and phosphorus.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled “MEAN EFFL. CONC.”. Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

The following table presents the average concentrations and loadings at Outfall 001 from 07/01/2019 – 08/31/2023 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
Temperature	63 deg F
pH field	7.2 s.u.

PART 2 – BIOLOGICAL OXYGEN DEMAND AND DISSOLVED OXYGEN

Based on the limited forage fish water classification, **the recommended limitations for BOD₅ are 30 mg/L as a daily maximum and 15 mg/L as a monthly average per s. NR 104.02(3), Wis. Adm. Code.** In order to maintain adequate dissolved oxygen, **a dissolved oxygen limit of 4.0 mg/L daily minimum is also recommended.**

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES

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

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P₉₉) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)

3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q₁₀ method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is not the case for Lakeside Foods and the limits are set based on two times the acute toxicity criteria.

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 0.24 cfs, (1-Q₁₀ (estimated as 80% of 7-Q₁₀)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	ATC	MEAN BACK- GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic		340		680	136	<8.3
Cadmium	457	58.9	0.02	118	23.6	<1.3
Chromium	301	4446	0.50	8892	1778	<2.5
Copper	495	70.2	1.26	140	28.1	<3.4
Lead	356	365	0.65	729	146	<5.9
Nickel	268	1080		2161	432	<2.6
Zinc	333	345	2.61	689	138	<11.6
Chloride (mg/L)		757		1514	303	34.8

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

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

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0.075 cfs (¼ of the 7-Q₁₀), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK- GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic		152		328	65.6	<8.3
Cadmium	175	3.82	0.02	8.20	1.6	<1.3
Chromium	245	275	0.50	592	118	<2.5
Copper	245	22.3	1.26	46.5	9.3	<3.4
Lead	245	66.6	0.65	143	28.5	<5.9
Nickel	245	111		240	48.0	<2.6
Zinc	245	264	2.61	565	113	<11.6
Chloride (mg/L)		395		851	170	34.8

* 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 = 0.47 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	0.02	3047	609	<1.3
Chromium (+3)	3818000	0.50	31445689	6289138	<2.5
Lead	140	0.65	1148	230	<5.9
Nickel	43000		354155	70831	<2.6

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 0.47 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3		110	21.9	<8.3

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.

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

PART 4 – 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. Given the fact that Lakeside does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time.

The available effluent data is summarized below:

Date	Ammonia
07/26/2023	0.22 mg/L

This concentration is low, and well below any of the applicable criteria or acute water quality-based effluent limits. Therefore, **no water quality-based effluent limits is recommended. Monitoring for ammonia nitrogen is recommended in the reissued permit** because there is very limited data available.

PART 5 – PHOSPHORUS

Technology-Based Effluent Limit

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires industrial facilities that discharge greater than 60 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 Lakeside does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. The data demonstrates that the annual monthly average phosphorus loading is less than 60 lbs/month, which is the threshold for industrial facilities in accordance to s. NR 217.04(1)(a)2, Wis. Adm. Code, and therefore no technology-based limit is required.

Annual Average Mass Total Phosphorus Loading

Month	Monthly Avg. mg/L	Total Flow MG/month	Total Phosphorus lb./mo.
Sept 2022	0.26	0.365	0.79
Nov 2022	0.11	0.090	0.083
Jun 2023	0.20	1.048	1.75
Jul 2023	0.17	1.363	1.93
Aug 2023	0.37	0.612	1.89
Average			1.29

Total P (lbs/month) = Monthly average (mg/L) × total flow (MG/month) × 8.34 (lbs/gallon)

Where total flow is the sum of the actual (not design) flow (in MGD) for that month

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

Milwaukee River Basin TMDL

The TMDL report addresses phosphorus water quality impairments within the Milwaukee River Basin and provides waste load allocations (WLAs) required to meet water quality standards. Effluent limitations based on these WLAs must be included in WPDES permits according to s. NR 217.16, Wis. Adm. Code. The TMDL-based limits should be expressed in a manner consistent with the wasteload allocation and assumptions of the TMDL.

The monthly average total phosphorus (TP) effluent limits in lbs/day are calculated based on the maximum monthly phosphorus WLA given in pounds per month as suggested in the TMDL report and implementation guidance. At the time of TMDL development, the surface water discharge from Lakeside Foods was covered under a general permit and was not assigned an individual WLA.

The baseline condition needs to be determined first and percent reductions shall be applied to this baseline. Due to the limited available phosphorus data, the 4-day P₉₉ is used to calculate the baseline condition multiplied by 214 days because Lakeside only discharges May – November:

$$\text{Baseline condition} = 0.073 \text{ lbs/day} \times 214 \text{ days/year}$$

$$\text{Baseline condition} = 15.5 \text{ lbs/year}$$

This discharge is located in reach MI-14. The reduction for this reach is 58% based on the reductions given for a similar facility (RO reject water) which previously discharged to the same storm sewer that Lakeside Food currently does. The annual WLA is calculated below, with the reduction taken from the baseline condition.

$$\text{Annual WLA} = 15.5 \text{ lbs/year} \times (1 - 58\%)$$

$$\text{Annual WLA} = 6.5 \text{ lbs/year}$$

Because of the noncontinuous nature of the discharge, the limit shall be expressed as an annual loading as recommended in the *TMDL Implementation Guidance for Wastewater Permits (2024)*.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from 07/23/2019 – 10/05/2023.

Effluent Phosphorus Data

	Concentration (mg/L)	Mass Discharge (lbs/day)
1-day P ₉₉	0.47	0.13
4-day P ₉₉	0.30	0.073
30-day P ₉₉	0.22	0.044
Mean	0.18	0.032
Std	0.09	0.026
Sample Size	19	19
Range	0.053 - 0.37	0 - 0.083

The phosphorus data from 10/05/2023 was excluded from this evaluation because it was reported as 4.1 mg/L, which is significantly higher than the rest of the data

An interim limit is required per s. NR 217.17, Wis. Adm. Code, when a compliance schedule is needed in the permit to meet WQBELs that extends beyond the term of the permit, including TMDL based limitations. Considering that the interim limit should reflect a concentration that the facility is able to meet without investing in additional “temporary” treatment and should prevent backsliding from current permit conditions, **it is recommended that the interim limit be set equal to be 0.5 mg/L for permit reissuance.** Because there is limited data, the interim limit is equal to the 1-day P₉₉, rounded to two significant figures.

PART 6 – TOTAL SUSPENDED SOLIDS

Milwaukee River Basin TMDL

A water quality target of 12 mg/L TSS, expressed as the median of monthly samples collected between May and October, was established for this TMDL to address impacts caused by sedimentation and turbidity, to comply with narrative criteria in s. NR 102.04(1) Wis. Adm. Code. Wastewater discharges at

or below 12 mg/L are not expected to contribute to sediment impairments or turbidity. Therefore, the TMDL states that wastewater dischargers are not required to meet effluent limits lower than 12 mg/L to satisfy TMDL requirements. **A 12 mg/L limit should be included in the permit as a daily maximum and monthly average.**

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from 07/23/2019 – 10/05/2023.

Effluent TSS Data

	Concentration (mg/L)
Mean*	0.36
Std	0.72
Sample Size	25
Range	<0.95 - 2.6

* The mean concentration was calculated using zero in place of the non-detected results.

PART 7 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from 01/01/2019 – 11/30/2023. The flows are the combined flows from both Lakeside Foods and Random Lake WWTF because they discharge to the same storm sewer. This will result in more conservative calculated limits than using Lakeside Foods' flows alone.

A heat loss equation is used to adjust the calculated limit based upon the length of the storm sewer/storm water conveyance channel before discharge to waters of the state, because the discharge is to a storm sewer. The discharge from permit Outfall 001 travels through at least 1500 feet of storm sewer/storm water conveyance channel before reaching Silver Creek. Under s. NR 106.55(5), Wis. Adm. Code, the default cooling rate is estimated as 1° F for every 400 feet of storm sewer/storm water conveyance channel. The adjusted limits are shown in the table.

The table below summarizes the maximum temperatures reported during monitoring from 07/01/2019 – 08/31/2023.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN				
FEB				
MAR				
APR				
MAY				
JUN	70	72	82	90
JUL	70	77	87	91
AUG	71	77	87	90
SEP	66	73	78	88
OCT	65	69	66	87
NOV	61	61	55	86
DEC				

Reasonable Potential

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

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

Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. The months in which limitations are recommended are shown in bold. Based on this analysis weekly average temperature maximum limits are necessary for the month of November.

The permit currently has the following effective temperature limits which are more stringent than the calculated limits in this evaluation:

Attachment #1
Thermal Limits

Month	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	53	81
FEB	54	81
MAR	56	82
APR	59	84
MAY	69	87
JUN	80	88
JUL	85	89
AUG	85	88
SEP	77	86
OCT	65	85
NOV	53	82
DEC	53	81

Maximum weekly average effluent flow rates have changed since the current permit issuance resulting in slightly different higher thermal limits. **The current limits are recommended to continue in the reissued permit for antibacksliding purposes per s. NR 207.12, Wis. Adm. Code.** The complete thermal table used for the limit calculation is attached in Attachment #3.

PART 8 – WHOLE EFFLUENT TOXICITY (WET)

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

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC₅₀ (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC₂₅ (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of **46%** shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

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

Where:

Attachment #1

Q_e = annual average flow = 0.042 MGD = 0.065 cfs

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

Q_s = $\frac{1}{4}$ of the $7-Q_{10}$ = 0.30 cfs $\div$ 4 = 0.075 cfs

*The IWC is based on the receiving water flows at the point of discharge rather than the flow rates at the downstream WWSF classification for protection of the aquatic life in the immediate receiving water.

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

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 = 46%. 10 Points
Historical Data	0 tests used to calculate RP. 5 Points	0 tests used to calculate RP. 5 Points
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. 0 Points	Same as Acute. 0 Points
Receiving Water Classification	LFF classification and 1.5 downstream to WWSF. 5 Points	Same as Acute. 5 Points
Chemical-Specific Data	No reasonable potential for limits for limits based on ATC; Chloride and ammonia detected. Additional Compounds of Concern: None. 2 Points	Reasonable potential for limits for limits based on CTC; Chloride and ammonia detected. Additional Compounds of Concern: None. 2 Points

Attachment #1

	Acute	Chronic
Additives	1 Water Quality Conditioner (ChemTreat RL9906) used. 1 Point	All additives used more than once per 4 days. 1 Point
Discharge Category	Contact cooling water 5 Points	Same as Acute. 5 Points
Wastewater Treatment	Contact cooling water. 0 Points	Same as Acute. 0 Points
Downstream Impacts	No impacts known 0 Points	Same as Acute. 0 Points
Total Checklist Points:	18 Points	28 Points
Recommended Monitoring Frequency (from Checklist):	2 tests during permit term.	3 tests during permit term.
Limit Required?	No	No
TRE Recommended? (from Checklist)	No	No

- The discharge from Outfall 001 is expected to be low in toxicity and does not have continuous flow.
- After consideration of the guidance provided in the Department's WET Program Guidance Document (2019) and other information described above, no WET tests are recommended in the reissued permit.

PART 9 – ADDITIVE REVIEW

Unlike the metals and toxic substances evaluated in Part 2, most additives have not undergone the amount of toxicity testing needed to calculate water quality criteria. Instead, in cases where the minimum data requirements necessary to calculate a WQC are not met, a secondary value can be used to regulate the substance, according to s. NR 105.05, Wis. Adm. Code. Whenever an additive is discharged directly into a surface water without receiving treatment or an additive is used in the treatment process and is not expected to be removed before discharge, a review of the additive is needed. Secondary values should be derived according to s. NR 105.05, Wis. Adm. Code. Guidance related to conducting an additive review can be found in *Water Quality Review Procedures for Additives* (2019) (<http://dnr.wi.gov/topic/wastewater/Guidance.html>).

Attachment #1

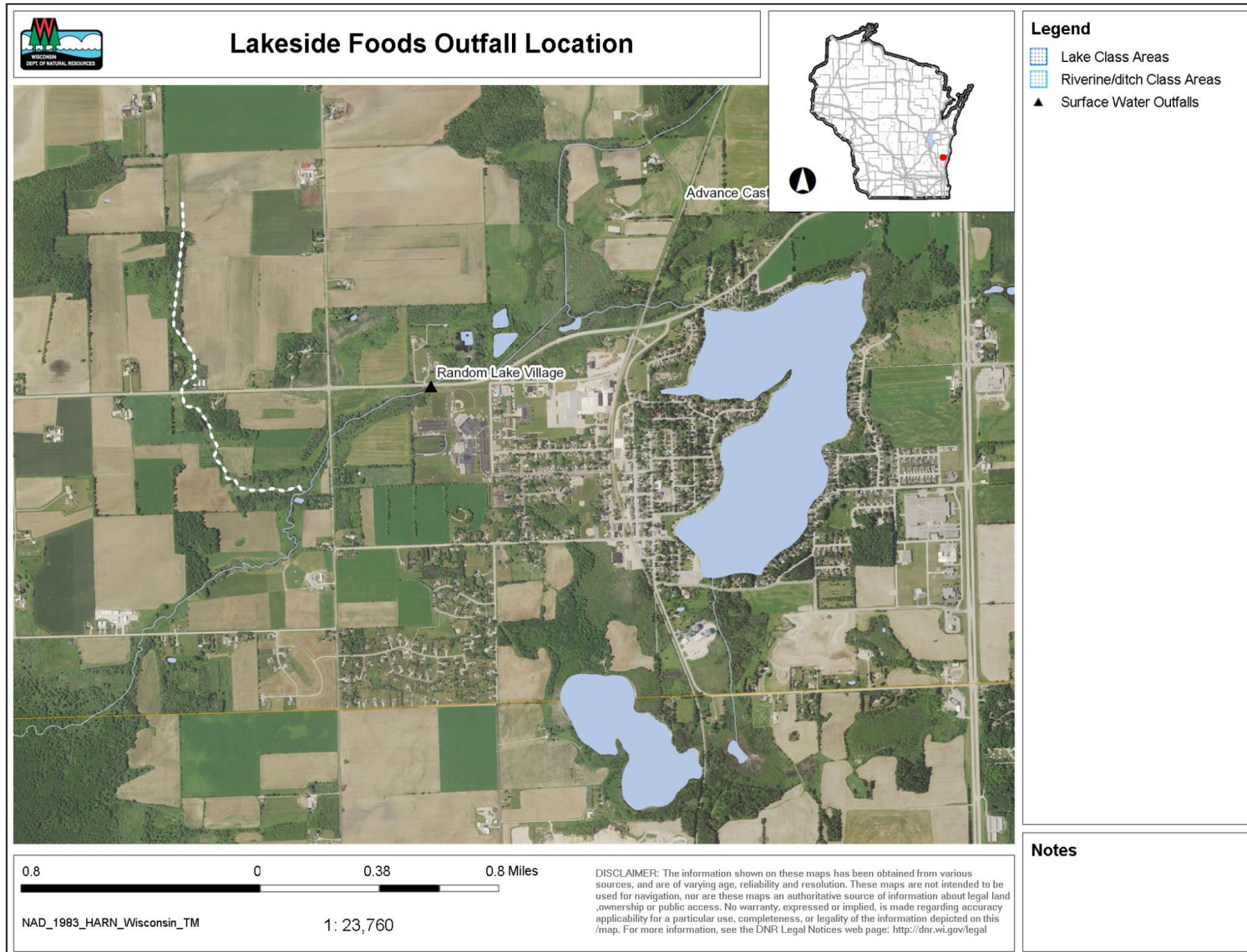
Additive Parameters

Additive Name	Manufacturer	Purpose of Additive including where added	Intermittent or Continuous Feed	Frequency of Use		Maximum/Average Quantity Used	Estimated Effluent Concentration mg/L	Potential Use Restriction mg/L ¹	Is Additive Authorized in Current Permit? ²
				Months per/yr.	Days/week				
RL9906	ChemTreat	RO treatment	Continuous	5	7	0.6 gal/day / 0.3 gal/day	24 mg/L / 12 mg/L	118 mg/L 14.2 mg/L	No

1. Calculated based on toxicity data provided for use restrictions based on acute and chronic secondary values.

The maximum possible effluent concentrations of ChemTreat RL9906 in the discharge from Outfall 001 are lower than the calculated limits for protection of aquatic life. Therefore, these additives are approved at the listed usage rates.

The estimated effluent concentrations are based on the actual average flow of 0.025 MGD from the current permit term. Because the effluent flow rates can vary a lot, there may be times that the effluent concentration could be greater than the use restrictions. Therefore, **a weekly average limit of 14 mg/L is recommended in the reissued permit.**



Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

Facility:	Lakeside Foods Random Lake	7-Q₁₀:	0.30	cfs	Temp Dates	Flow Dates
Outfall(s):	001	Dilution:	25%		Start:	07/06/19 01/01/19
Date Prepared:	5/8/2024	f:	0		End:	10/24/23 12/31/23
Design Flow (Q_e):	0.04 MGD	Stream type:	Small warm water sport or forage fish co ▼			
Storm Sewer Dist.	1500 ft	Qs:Q_e ratio:	1.2	:1		
		Calculation Needed?	YES			

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs) (cfs)	Representative Highest Effluent Flow Rate (Q _e)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Q _{esl})	Daily Maximum Flow Rate (Q _{ea})		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)		(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	33	49	76	0.53	0.404	0.506	0			52	83
FEB	34	50	76	0.55	0.417	0.639	0			53	82
MAR	38	52	77	0.84	0.685	0.707	0			55	84
APR	48	55	79	1.70	1.487	8.300	0			56	80
MAY	58	65	82	0.79	0.666	0.870	0			66	86
JUN	66	76	84	0.53	0.443	0.669	0	70	72	78	86
JUL	69	81	85	0.40	0.416	0.497	0	70	77	83	87
AUG	67	81	84	0.39	0.423	0.483	0	71	77	83	86
SEP	60	73	82	0.34	0.436	0.503	0	66	73	75	84
OCT	50	61	80	0.43	0.551	0.756	0	65	69	62	83
NOV	40	49	77	0.66	0.456	0.800	0	61	61	51	82
DEC	35	49	76	0.61	0.466	0.531	0			52	84

CORRESPONDENCE/MEMORANDUM

DATE: May 8, 2025

FILE REF: FIN 8623

TO: File

FROM: Zach Watson Hydrogeologist - SCR

SUBJECT: Groundwater Evaluation for Lakeside Foods Random Lake 0032760-09

General Information and Treatment System Description

Lakeside Foods Random Lake is a vegetable processing plant that processes peas, potatoes, beets, carrots, and corn. Plant operation typically occurs May through November. Wastewater is generated from vegetable washing, blanching, and cleaning. Wastewater is screened through a rotary drum to remove coarse and fine solids. The solids are dewatered and used as animal feed or landspread on approved sites. The wastewater is spray irrigated on a 26-acre Sprayfield (Outfall 002) and a 116-acre Sprayfield (Outfall 004). Traveling gun spray irrigation systems are connected to on-site hydrants which are connected to underground laterals extending back to Lakeside's plant. A map showing the location of the sprayfields is provided as **Figure 1**.

Table 1 – Monitoring Requirements and Limitations – 26-acre Sprayfield

Parameter	Current and Proposed Permit WI-0032760-09 and WI-0032760-10		
	Limits and Units	Sample Frequency	Limit Type
Flow Rate		Daily	Daily
Hydraulic Application Rate	7,000 gal/ac/day	Daily	Total Daily
Nitrogen, Max Applied on any Zone	300 lbs/ac/yr	Annual	Total Annual
BOD5 Total	mg/l	2/Month	Composite
Chloride	mg/l	2/Month	Composite
Total Kjeldahl Nitrogen	mg/l	2/Month	Composite
Nitrite+nitrate, Nitrogen	mg/l	2/Month	Composite
Chloride	*lbs/ac/yr	Annual	Total Annual

No sprayfield application December – March

Recommended changes from current permit*Table 2 – Monitoring Requirements and Limitations – 116-acre Sprayfield**

Parameter	Current and Proposed Permit WI-0032760-09 and WI-0032760-10		
	Limits and Units	Sample Frequency	Limit Type
Flow Rate		Daily	Daily
Hydraulic Application Rate	7,000 gal/ac/day	Daily	Total Daily
Nitrogen, Max Applied on any Zone	300 lbs/ac/yr	Annual	Total Annual
BOD5 Total	mg/l	2/Month	Composite
Chloride	mg/l	2/Month	Composite
Total Kjeldahl Nitrogen	mg/l	2/Month	Composite

Nitrite+nitrate, Nitrogen	mg/l	2/Month	Composite
Chloride	*lbs/ac/yr	Annual	Total Annual

No sprayfield application December – March

***Recommended changes from current permit**

Table 3 – 26-acre Sprayfield Monitoring Wells

Sample Point	Well Name	Current Permit WI-0032760-09		Proposed Permit WI-0032760-10	
		Well Location	Well Designation	Well Location	Well Designation
807	MW-1	Downgradient	Point of Standards	Downgradient	Point of Standards
808	MW-4	Downgradient	Point of Standards	Downgradient	Point of Standards
809	MW-8	Background	Non-point of Standards	Background	Non-point of Standards
810	MW-9	Downgradient	Point of Standards	Downgradient	Point of Standards
*818	MW-10	N/A	N/A	Downgradient	Point of Standards
*819	MW-11	N/A	N/A	Downgradient	Point of Standards

***Recommended changes from current permit**

Table 4 – 116-acre Sprayfield Monitoring Wells

Sample Point	Well Name	Current Permit WI-0032760-09		Proposed Permit WI-0032760-10	
		Well Location	Well Designation	Well Location	Well Designation
805	MW-D2	Downgradient	Point of Standards	Downgradient	Point of Standards
806	MW-E	Downgradient	Point of Standards	Downgradient	Point of Standards
811	MW-AR	Background	Non-point of Standards	Background	Non-point of Standards
812	MW-F	Downgradient	Point of Standards	Downgradient	Point of Standards
813	MW-G	Downgradient	Point of Standards	Downgradient	Point of Standards
815	MW-BR	Downgradient	Point of Standards	Downgradient	Point of Standards
816	MW-HRR	Downgradient	Point of Standards	Downgradient	Point of Standards
817	MW-I	Downgradient	Point of Standards	Downgradient	Point of Standards

Table 5 – 26-acre Sprayfield Groundwater Standards

Parameter	Current Permit WI-0032760-09		Proposed Permit WI-0032760-10	
	PAL	ES	PAL	ES
Depth to Groundwater	N/A	N/A	N/A	N/A
Groundwater Elevation	N/A	N/A	N/A	N/A
Nitrite+nitrate, nitrogen	4.6 mg/l (ACL)	10 mg/l	*8.5 mg/l (ACL)	10 mg/l
Chloride	125 mg/l	250 mg/l	125 mg/l	250 mg/l
pH Field	N/A	N/A	*6.5 – 8.5 su	N/A
Ammonia, Nitrogen	1.2 mg/l (ACL)	9.7 mg/l	*0.97 mg/l	9.7 mg/l
Organic Nitrogen	2.4 mg/l	N/A	*2.5 mg/l	N/A

COD	38 mg/l	N/A	*41 mg/l	N/A
-----	---------	-----	-----------------	-----

***Recommended changes from current permit**

Table 6 – 116-acre Sprayfield Groundwater Standards

Parameter	Current Permit WI-0032760-09		Proposed Permit WI-0032760-10	
	PAL	ES	PAL	ES
Depth to Groundwater	N/A	N/A	N/A	N/A
Groundwater Elevation	N/A	N/A	N/A	N/A
Nitrite+nitrate, nitrogen	4.5 mg/l (ACL)	10 mg/l	*2.2 mg/l (ACL)	10 mg/l
Chloride	274 mg/l (ACL)	274 mg/l (ACL)	*125 mg/l	250 mg/l
pH Field	N/A	N/A	*6.4 – 8.4 su	N/A
Ammonia, Nitrogen	1.2 mg/l (ACL)	9.7 mg/l	*0.97 mg/l	9.7 mg/l
Organic Nitrogen	2.3 mg/l	N/A	*2.3 mg/l	N/A
COD	43 mg/l	N/A	*41 mg/l	N/A

***Recommended changes from current permit**

Geology

The bedrock underlying the sprayfields is the Silurian-aged Engadine Formation. The Engadine Formation is comprised of fine to coarse grained gray dolostone. Depth to bedrock is expected to be at least 100 feet below ground surface. The overburden is derived from successions of glaciation. The soils are considered Hochheim silt loams.

Hydrogeology

A regional groundwater flow map for Sheboygan County was unable to be obtained. Groundwater elevations at the 26-acre Sprayfield fell between approximately 855 – 880 feet above mean sea level during the current permit term (**Figure 4**). Groundwater elevations at the 116-acre Sprayfield fell between approximately 865 – 960 feet above mean sea level during the current permit term (**Figure 7**). Depth to water is typically consistent between monitoring wells and approximately 5 – 15 below the top of casing. The groundwater flow paths are generally a subdued representation of the surface topography. Groundwater flow paths for the 26-acre Sprayfield are difficult to determine with the current groundwater monitoring system (**Figure 2**). Groundwater flow at the 116-acre Sprayfield is from the north and flows radially outwards to the south and to the west except for the northeastern portion of the field where it flows southeast (**Figure 3**).

Land Treatment Effluent Quality and Loading Rates

The hydraulic application rates for the 26-acre and 116-acre sprayfields typically averaged 500 - 2,000 gal/ac/day. The 26-acre sprayfield was only used for one month in 2022 where the average hydraulic application rate was 100 gal/ac/day. BOD5 in the spray irrigation effluent ranged up to 13,800 mg/l and averaged 5,940 mg/l during the current permit term. The results for chloride show significant variability ranging from approximately 50 – 1,000 mg/l during the current permit term. The concentration of chloride is shown to vary by more than 700 mg/l between bi-monthly samples. The concentration of total Kjeldahl nitrogen ranged up 422 mg/l during the current permit term. The nitrogen and chloride loading rates for 2013 – 2022 are provided below in **Tables 7** and **8**. Lakeside Foods Random Lake had nitrogen loading rates above 300 lbs/ac/yr once at the 26-acre Sprayfield and three times at the 116-acre Sprayfield. These loading rates were acceptable based upon the conditional nitrogen loading rates provided in section 2.2.1.4 of the Permit.

Table 7 – Nitrogen Loading Rates (lbs/ac/yr)

Year	26-acre Sprayfield	116-acre Sprayfield
2013	*200	*210
2014	*290	*330
2015	--	--
2016	--	--
2017	*96	*210
2018	*280	*370
2019	150	380
2020	310	410
2021	146	297
2022	1	396

lbs/ac/yr = pounds per acre per year

As reported on the annual short report forms (maximum nitrogen applied to any zone)

*From Annual Reports provided by Applied Science

-- No data

Table 8 – Average Chloride Loading Rates (lbs/ac/yr)

Year	26-acre Sprayfield	116-acre Sprayfield
2013	100	110
2014	770	880
2015	--	--
2016	--	--
2017	150	630
2018	300	490
2019	150	420
2020	320	350
2021	34	414
2022	3	565

As reported in the Annual Reports provided by Applied Science.

-- No data

Chloride Background Information

The primary source of chloride in the effluent was and still is from the regeneration cycle from water softeners. Prior to 2014, this water softener regeneration was sent to the Village of Random Lake WWTP. The concentration of chloride began to increase in concentration as Lakeside Foods was no longer able to send water softener regeneration to the WWTP. A reverse osmosis system was installed in 2016 and has resulted in decreased chloride concentrations. However, maintenance issues for the reverse osmosis system have resulted in increased chloride concentrations in recent years.

Background Groundwater Quality

26-acre Sprayfield

Background groundwater quality is defined by the results from samples collected at monitoring well MW-8. The results from samples collected at MW-8 indicate an elevated presence of nitrite+nitrate. The results ranged up to 7.7 mg/l during the current permit term. The results for nitrite+nitrate were low from (i.e., < 1 mg/l) from November 2018 – May 2021 and recently sharply increased. Variable concentrations of nitrite+nitrate have been observed consistently over the past twenty plus years of monitoring where results were over 20 mg/l. The results for chloride are low and generally around 10 mg/l in concentration. The results for ammonia, organic nitrogen, and COD are generally low or non-detect.

116-acre Sprayfield

Background groundwater quality is defined by the results from samples collected at monitoring well MW-AR. The results from samples collected at MW-AR indicate an elevated presence of nitrite+nitrate. Most results other than the December 2019 result of 5 mg/l were below 2 mg/l during the current permit term. The result for nitrite+nitrate in November 2022 (i.e., 14.7 mg/l) represents a significant increase relative to prior results. This rapid change in concentration (i.e., a change greater than 10 mg/l) has been observed before at MW-AR but not since 2009. The results for chloride are variable and ranged up to 173 mg/l during the current permit term. The results for ammonia, organic nitrogen, and COD are generally low or non-detect.

Downgradient Groundwater Quality

26-acre Sprayfield

The results from samples collected at downgradient monitoring wells indicated elevated concentrations of chloride. The results for chloride have generally increased at monitoring wells MW-4 and MW-1 during the permit term and averaged 234 and 92 mg/l, respectively. The results for chloride at MW-9 have generally declined from significantly elevated concentrations (~1,000 mg/l in 2003) and averaged 379 mg/l during the current permit term. The results for ammonia, nitrite+nitrate, organic nitrogen, and COD are generally non-detect.

116-acre Sprayfield

The results for chloride through the first part of the permit term generally declined at most monitoring wells. However, the results for chloride have recently begun to increase at monitoring wells MW-BR and MW-F. The results for chloride ranged up to 222 mg/l (MW-HRR March 2018). The results for chloride at downgradient monitoring wells were typically below 25 mg/l until 2014. The results for nitrite+nitrate at downgradient monitoring wells are typically low (i.e., < 0.5 mg/l). The highest result for nitrite-nitrate during the current permit term was 2.1 mg/l at monitoring well MW-G. The results for ammonia, organic nitrogen, and COD are generally non-detect. There was one result for ammonia in November 2022 at MW-F where the concentration was 2.2 mg/l.

Exceedance Review

Table 9 - Monitoring Well Groundwater Standard Exceedances during permit WI-0032760-09 (January 1, 2019 – December 31, 2022)

Well Name	Parameter	ES Exceedances	PAL/ACL Exceedances
MW-1	Chloride	5/16	16/16
MW-4	Chloride	0/16	6/16
MW-9	Chloride	14/15	15/15
MW-F	COD	N/A	1/16
MW-G	Ammonia	0/16	1/16

Shown above are the number of sample result groundwater standard exceedances for the identified parameter over the number of samples analyzed for that parameter. For example, 1/16 means that there was one result for the specified parameter that exceeded the groundwater standard for a total of 16 samples analyzed for that parameter.

Treatment System Impact to Groundwater Quality

26-acre Sprayfield

The results for chloride at MW-9 have exhibited a slow decline in concentration from approximately 900 mg/l in 2003 – 2005 to an approximate average of 400 mg/l in the past few years. Because MW-9 is located near the bottom of the topographical drainage pathway (i.e., Silver Creek), it appears to be a receptor of outside anthropogenic sources for chloride. For a long period of time, the results for chloride at MW-9 were much higher than the sprayfield chloride concentrations. The results for chloride from samples collected at downgradient monitoring wells MW-1 and MW-4 indicate that there is likely some observable contribution of chloride from the treatment system. The results from the samples collected at downgradient monitoring wells do not indicate any nitrogen related impacts from the Sprayfield operation. However, the characterization of groundwater flow paths is difficult to determine based upon the current groundwater monitoring system configuration. Therefore, there is still some uncertainty regarding the impact of the 26-acre sprayfield on local groundwater.

116-acre Sprayfield

As shown in **Table 7** and **8**, the loading rates for nitrogen and chloride are higher for the 116-acre Sprayfield. The loading of nitrogen to the 116-acre Sprayfield has not resulted in increasing concentrations of ammonia or nitrite-nitrate at downgradient monitoring wells. The concentration of chloride began to increase at downgradient monitoring wells associated with the 116-acre Sprayfield in 2014. Elevated chloride concentrations then began to plateau around 2017 and have generally declined since that time. As mentioned in the downgradient groundwater quality section, there has been a slight increase recently at a few monitoring wells. All of these trends are consistent with the diversion of water softener regeneration to the Random Lake WWTP prior to 2014, installation of the reverse osmosis system in 2016, and down-time associated with maintenance in recent years.

Indicator Parameter PALs

Indicator Parameter PALs are developed following the procedures described in s. NR 140.20(2), Wis. Adm. Code. Indicator parameters do not have Enforcement Standards. The PAL for an indicator parameter is a benchmark for evaluating site specific trends. When significant increases in the trends are observed, the facility and the department's response action under s. NR 140.24 Wis. Adm. Code should be to investigate the source of the compound. The indicator PALs for this facility were calculated using whichever of the two following methods provides a greater ACL.

- $\sum [\text{Background groundwater quality} + (\text{Standard Deviation of results} \times 3)]$
- $\sum [\text{Background groundwater quality} + \text{Minimum Increase (NR 140.20 Table 3)}]$

Alternative Concentration Limits

Alternative concentration Limits (ACLs) can be developed and provided for a groundwater monitoring system utilizing the procedures described in s. NR 140.28, Wis. Adm. Code. For example, if a high percentage of results from samples collected at the background monitoring well(s) exceed the NR 140 PAL, if there are multiple results exceeding the NR 140 ES, or if there is a pattern of PAL exceedances (i.e., seasonal variation), calculation of an ACL may be appropriate. The concentrations at a background well should not necessarily act as a minimum expectation of groundwater quality at downgradient wells, especially if those established concentrations at a background well are in exceedance of an NR 140 ES. ACLs are calculated using the results

from samples collected at the background monitoring well(s) during the current permit term for the upcoming permit term using whichever of the two following methods provides the more restrictive ACL.

- $\sum [\text{Standard Deviation of Results} + \text{Average of Results} + \text{PAL}] = \text{ACL}$
- $\sum [(\text{Standard Deviation of Results} \times 3) + \text{PAL}] = \text{ACL}$

Groundwater ACLs and indicator parameter PALs for the current permit term were calculated using monitoring data from MW-8 (26-acre Sprayfield) and MW-AR (116-acre Sprayfield) during the prior permit term. The indicator parameter PALs and ACLs for use in the upcoming permit WI-0032760-10 are presented in **Tables 5** and **6** and were calculated using results from MW-8 (26-acre Sprayfield) and MW-AR (116-acre Sprayfield) during the current permit term (June 1, 2020 – March 31, 2025).

Conclusions, Recommendations and Schedule Requirements

- The groundwater monitoring system for the 26-acre sprayfield does not adequately define groundwater flow paths through and downgradient of the treatment system. Two additional monitoring wells should be installed to both portions of the 26-acre Sprayfield. Figure 2 proposes potential locations for these monitoring wells. A compliance schedule should be included in the upcoming permit for the installation of these two new monitoring wells. Approval of the location and specifications of these monitoring wells will be required prior to installation of the monitoring wells.
- Include a compliance schedule for the submission of annual chloride source reduction measures reports.

Figure 1 – Lakeside Foods Random Lake Sprayfield Locations

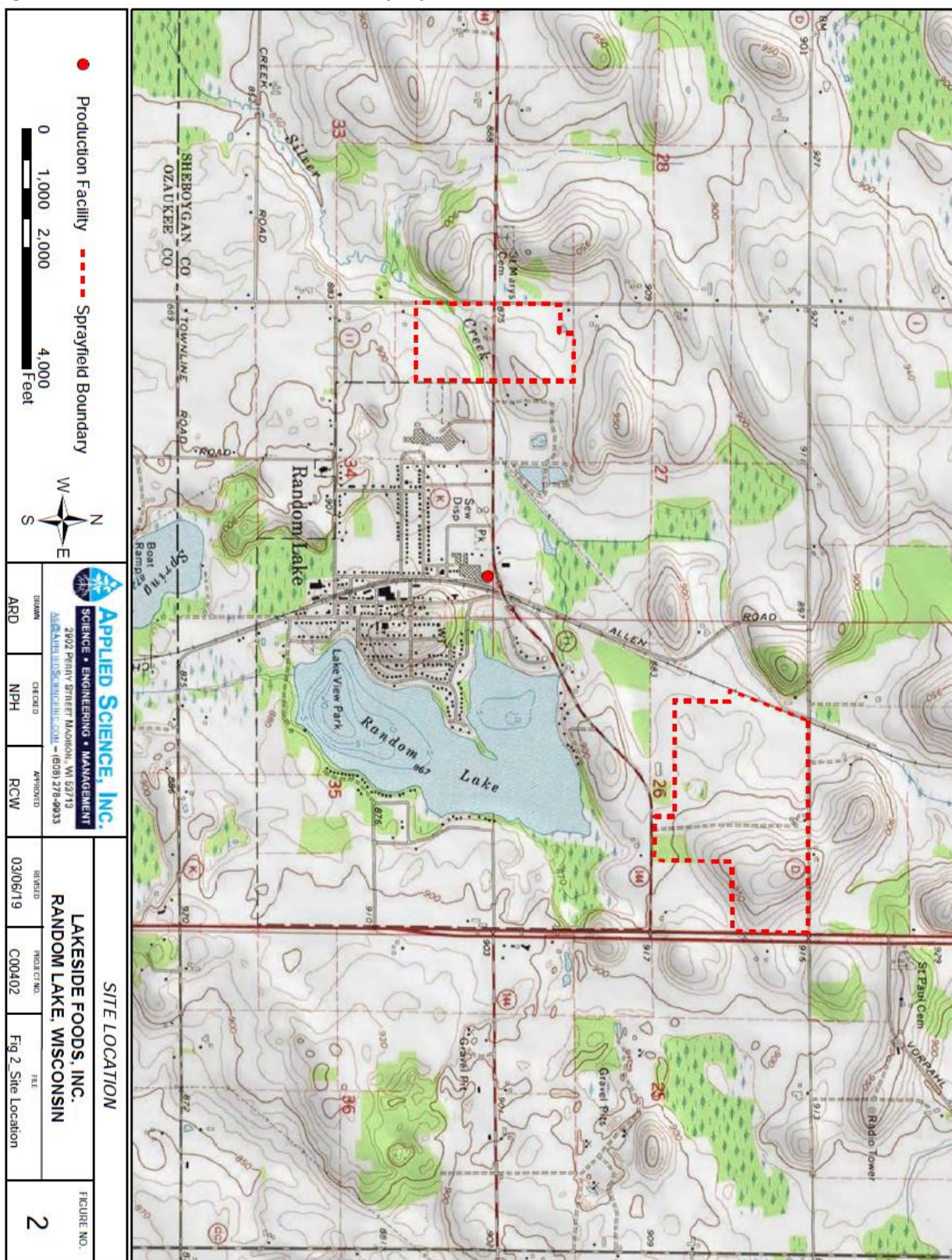


Figure 2 – 26-acre Sprayfield Groundwater Flow Map – November 2021

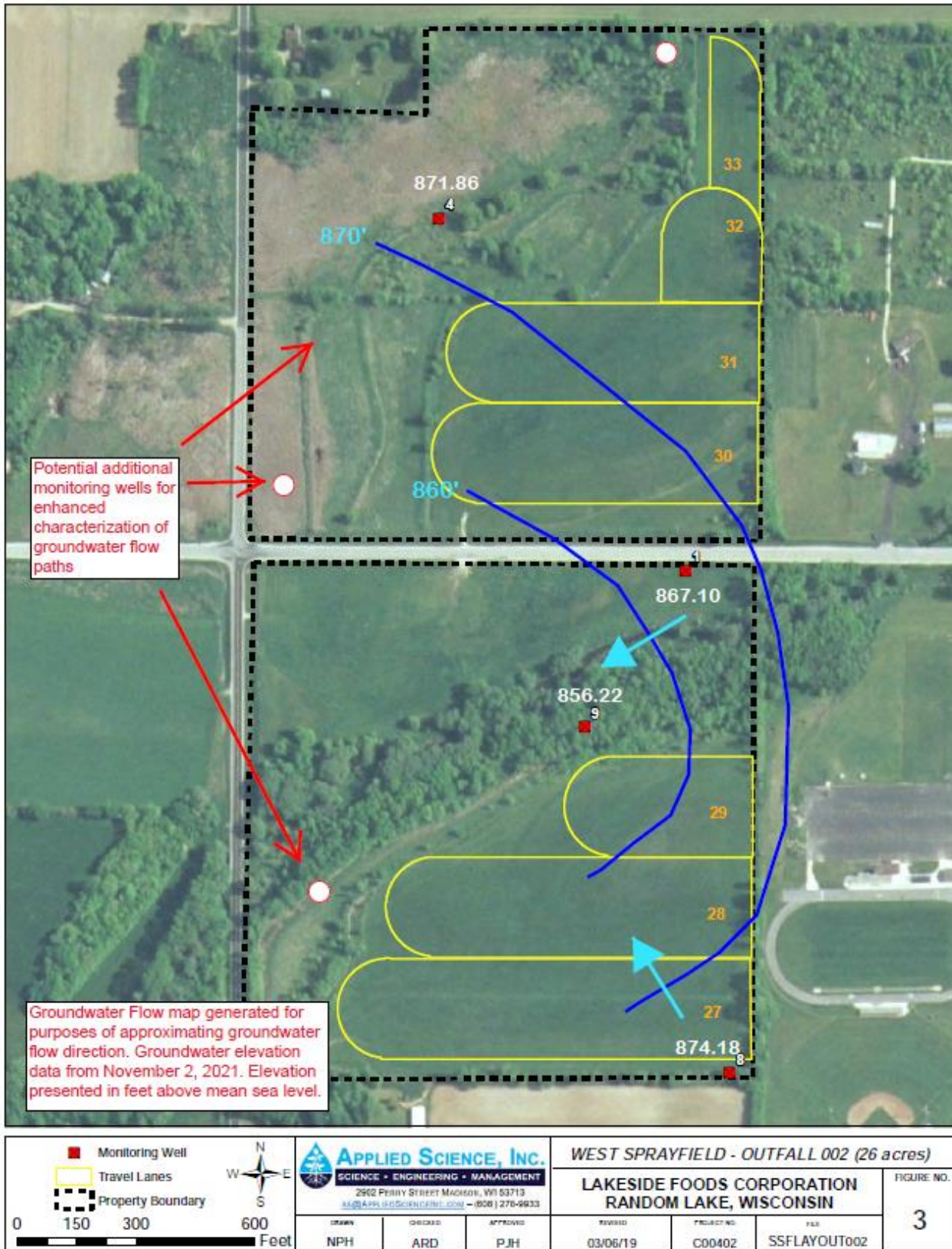


Figure 3 – 116-acre Sprayfield Groundwater Flow Map – November 2021

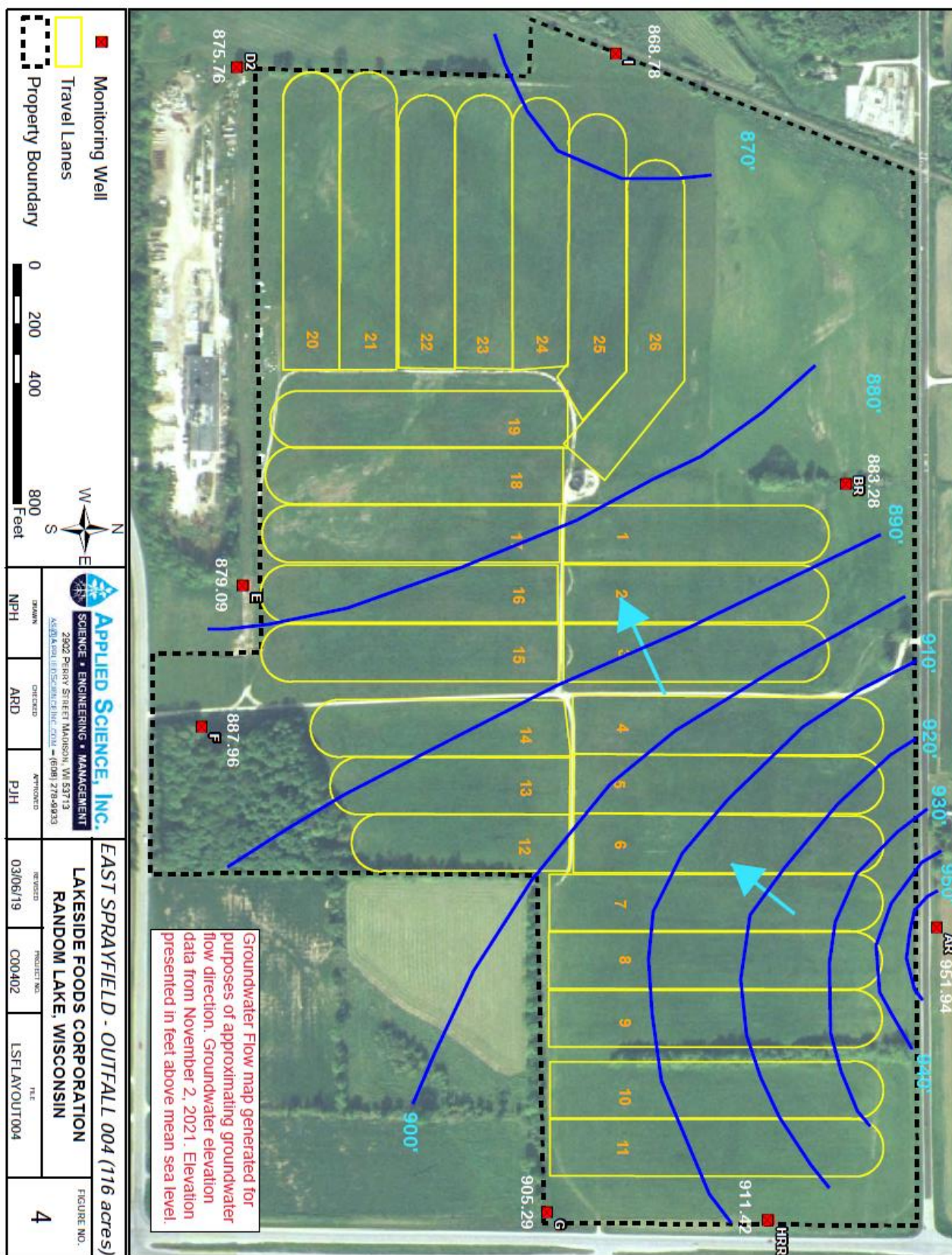


Figure 4

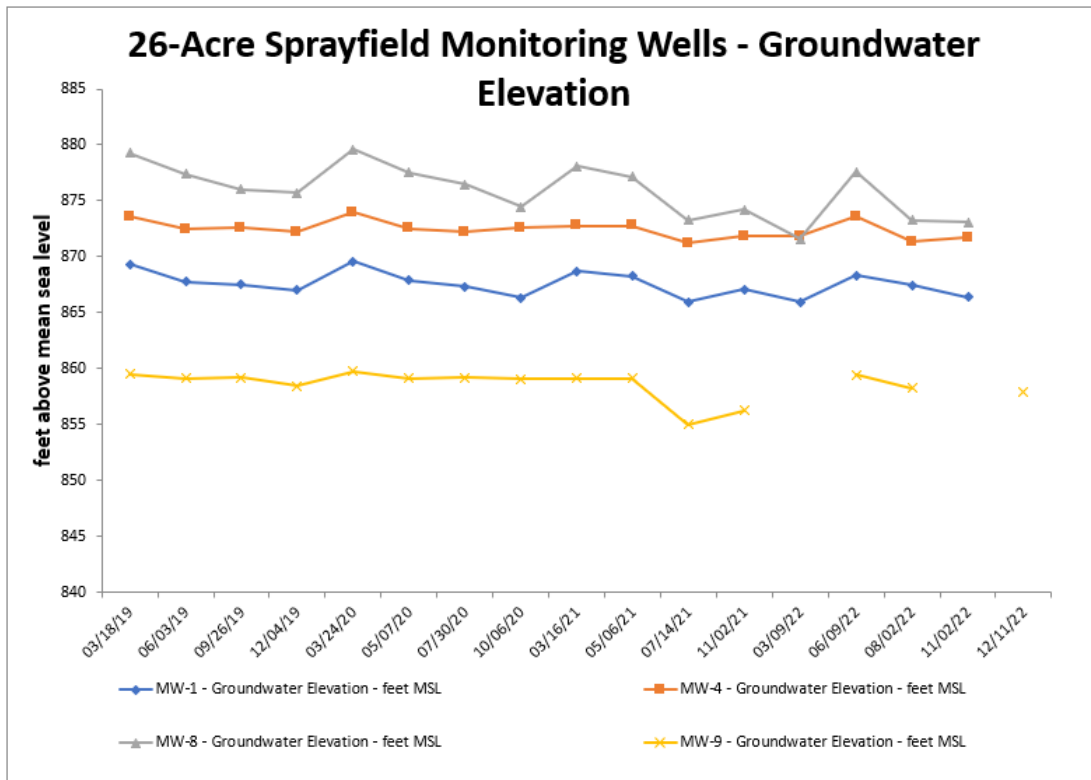


Figure 5

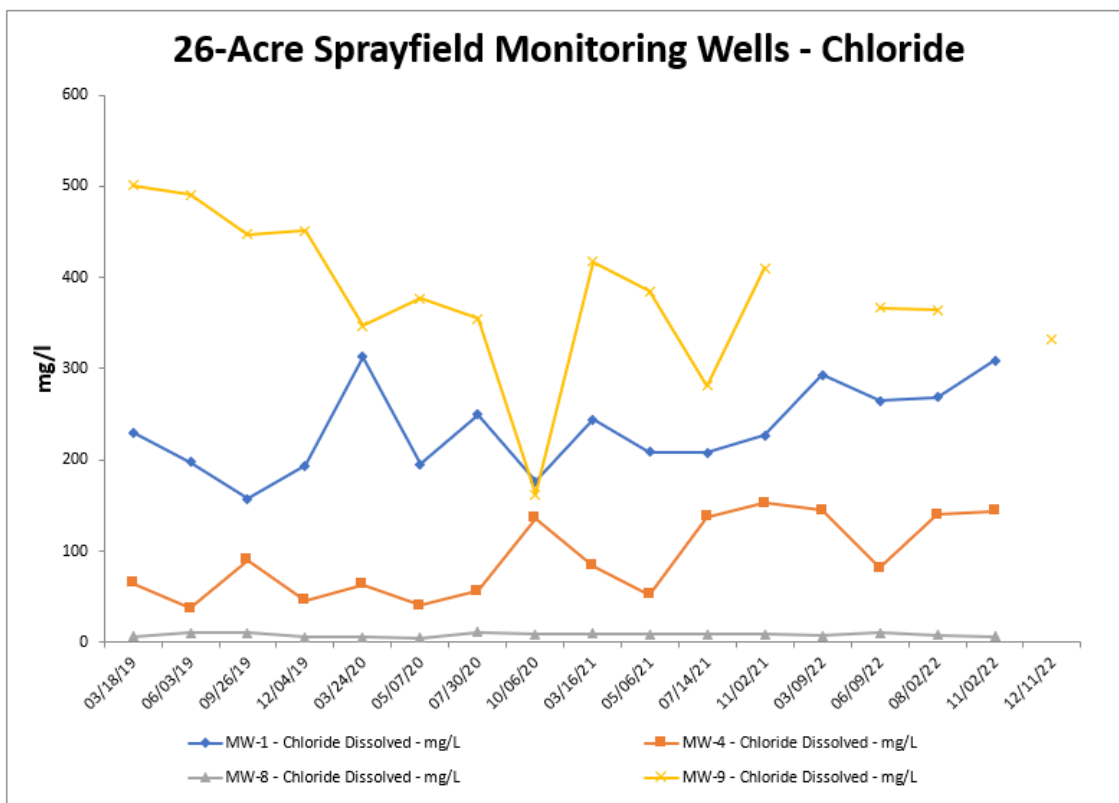


Figure 6

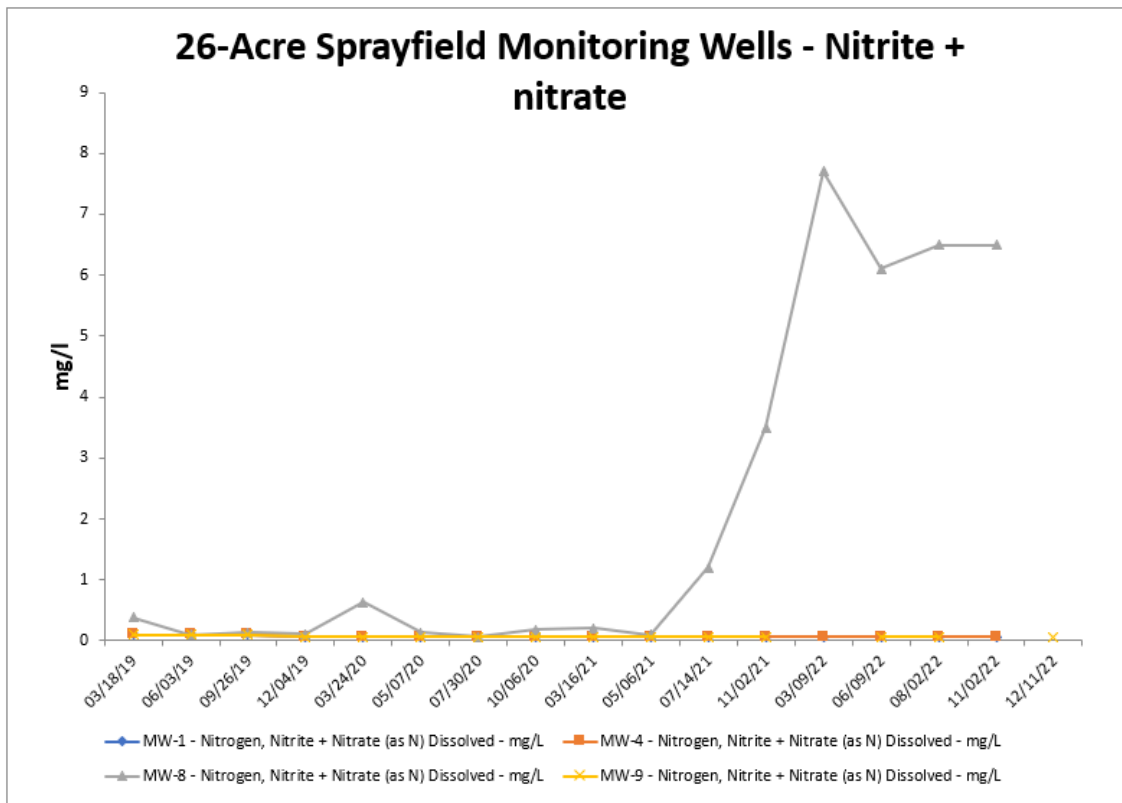


Figure 7

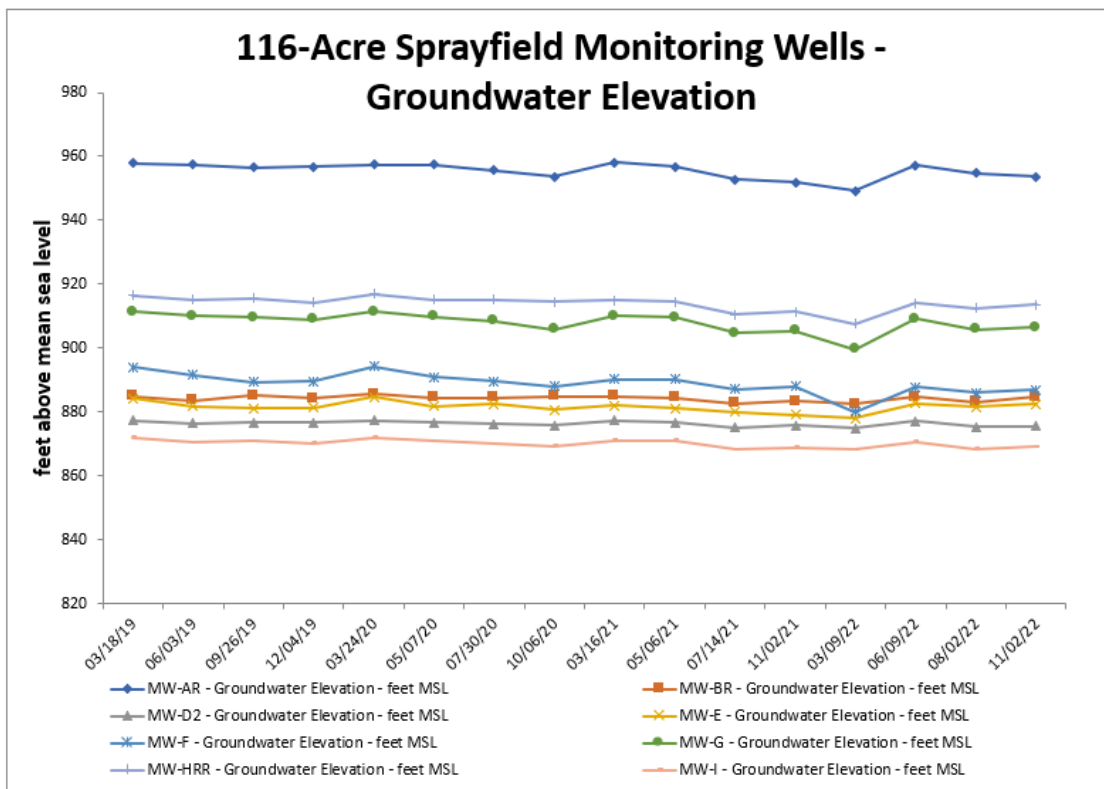


Figure 8

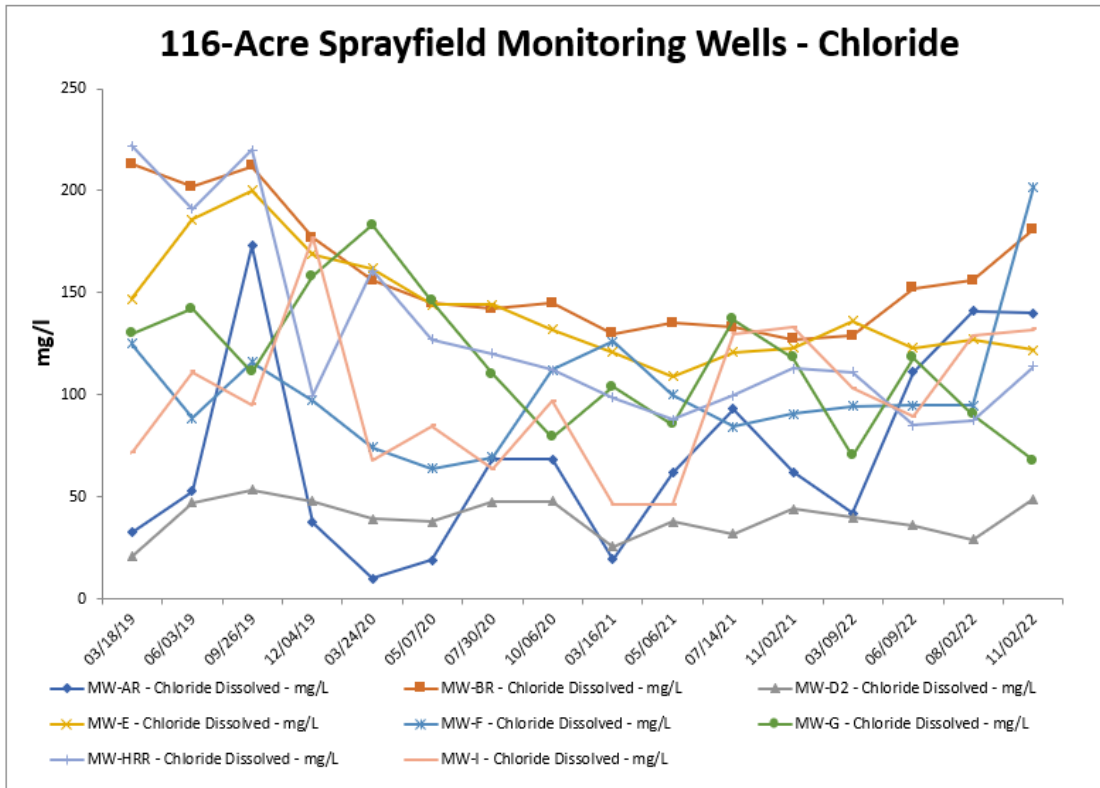


Figure 9

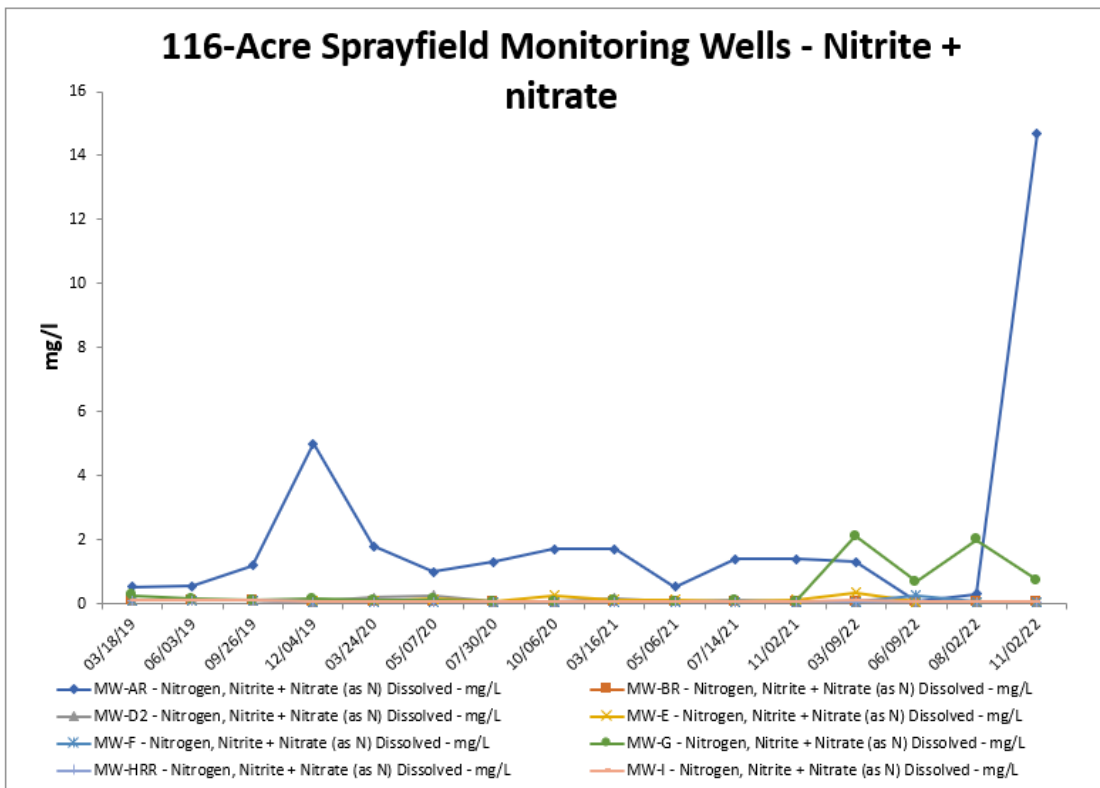


Figure 10

