

Permit Fact Sheet

General Information

| | | |
|----------------------------------|---|----------------|
| Permit Number: | WI-0032123-09-0 | |
| Permittee Name: | Forest Junction Sanitary District | |
| Mailing Address: | PO Box 132, Forest Junction, WI 54123 | |
| Facility Address: | W1650 Rusch Rd, Brillion, WI 54110 | |
| Discharge Location: | W1650 Rusch Rd, Brillion, WI 54110 NW ¼, SW ¼ of Section 9, Township 20 North, Range 20 East, Town of Brillion, Calumet County, WI | |
| Receiving Water: | Plum Creek (Water Body Identification Code Number 125100), in the Plum and Kankapot Creeks Watershed (LF03), in the Lower Fox River Drainage Basin of the Lake Michigan Basin in Calumet County and land application in Calumet County. | |
| StreamFlow (Q _{7,10}): | 0 cfs | |
| Stream Classification: | Limited forage fish (LFF) community, non-public water supply from the discharge location for 2 ¼ miles to the confluence of unnamed tributary WBIC 125600. | |
| Discharge Type: | Existing Continuous Discharge | |
| Design Flow(s) | Daily Maximum | 0.309 MGD |
| | Weekly Maximum | Not determined |
| | Monthly Maximum | Not determined |
| | Annual Average | 0.056 MGD |
| Significant Industrial Loading? | None | |
| Operator at Proper Grade? | <p>Facility Subclasses & Classification: Facility is classified at the basic level for the following subclasses: A2 (Attached Growth Processes), A4 (Ponds, Lagoons, and Natural Systems), P (Total Phosphorus), and SS (Sanitary Sewage Collection System).</p> <p>OIC Subclasses & Classification: Todd Weyenberg is certified at the advanced level for the following subclasses: A1 (Suspended Growth Processes), A2 (Attached Growth Processes), A4 (Ponds, Lagoons, and Natural Systems), B (Solids Separation), C (Biological Solids/Sludge Handling, Processing, & Reuse), and P (Total Phosphorus); basic level for SS (Sanitary Sewage Collection System); and OIT for D (Disinfection) and L (Laboratory).</p> | |
| Approved Pretreatment Program? | N/A | |

Facility Description

The Forest Junction Utilities owns and operates the Forest Junction Sanitary District Wastewater Treatment Facility that treats residential and commercial domestic wastewater from the Forest Junction Sanitary District sanitary sewer collection system. The paragraphs below describe the liquid and solids treatment train of the Forest Junction Sanitary District Wastewater Treatment Facility.

Liquid Treatment Train: The wastewater from the Forest Junction Sanitary District flows by gravity to the main influent lift station to the wastewater treatment facility. The lift station consists of a wet well where 24-hour flow proportional composite samples are collected of the influent. A magnetic meter is installed on the forcemain to the wastewater treatment facility. After the main influent lift station, the wastewater enters a covered aerated lagoon. The aerated lagoon is divided into three cells using baffles that flows in series. The first cell is complete mix then two cells that are partial mix. Aeration and mixing are provided by fine bubble diffusers. The entire aeration lagoon is covered by an insulated synthetic cover. From the main lift station during high flow condition, the influent may be pumped through to one of two equalization ponds (former primary and secondary stabilization lagoons). Following the aerated lagoon, wastewater flows to a single covered settling lagoon. Ferric chloride is added in the manhole between the aerated lagoon and settling lagoon. The facility has two chemical feed pumps. One chemical pump is used as backup when the other is down for maintenance. The settling lagoon is provided with a floating mechanical mixer. The entire settling lagoon is covered by an insulated synthetic cover. Following the settling lagoon, the wastewater flows to a Lemna polishing reactor. The polishing reactor consists of a 8-foot x 24-foot x 12-foot deep concrete tank with fine bubble diffusers and four fixed film PVC media modules. The polishing reactor is covered by floating synthetic cover. After the polishing reactor, the final effluent flows through V-notched weir where ultrasonic flow meter measures the flow rate and an automatic sampler is available to collect effluent samples. The final effluent flows by gravity to the Plum Creek via Outfall 001.

Solids Treatment Train: The treatment system consists of a lagoon system. There are no biosolids or sludge treatment and storage systems. All settled sludge is stored in the lagoons. The sludge from the lagoons is removed on an infrequent basis. The sludge in the settling lagoon was last removed in 2024 and pumped to the equalization ponds. Any sludge removed from the treatment lagoons is to be land applied to department approved sites or hauled to another permitted facility and is tracked under Outfall 002. The solids that settle in the equalization ponds are regulated under Outfall 003.

Substantial Compliance Determination

Enforcement During Last Permit: The facility received notices of noncompliance (NONs) on June 7, 2022, February 27, 2023, October 2, 2023, and June 11, 2024, for repeated total BOD₅ and ammonia nitrogen effluent limit exceedances. The facility is currently taking corrective actions for the total BOD₅ and ammonia nitrogen effluent limit exceedances. The corrective actions already completed include sludge removal from the settling pond in May 2024, removal of the weeds and rooted plants from the lagoons and increasing the cleaning frequency of the polishing reactor and fixed film modules in the polishing reactors.

After a desk top review of all discharge monitoring reports, compliance maintenance annual reports, land application reports, compliance schedule items, and a site visit on November 3, 2022, this facility has been found to be in substantial compliance with their current permit.

Compliance determination entered by Trevor Moen, Wastewater Engineer on October 7, 2024.

Fact Sheet Organization

This fact sheet explains the rationale and assumptions used in deriving the conditions and requirements set forth in this permit. Additionally, this fact sheet highlights changes in permit conditions that the department proposes to make when reissuing the WPDES permit. This fact sheet compares conditions in the previous permit to those in the reissued permit. The previous permit remains in effect until the permit is reissued. The tables that follow were taken from the permit and are numbered in this fact sheet as they are numbered in the permit. Bolded and highlighted text and cells within tables indicate permit conditions that are new or different from those found in the previous permit.

| Sample Point Designation | | |
|---------------------------------|---|---|
| Sample Point Number | Discharge Flow, Units, and Averaging Period | Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable) |
| 701 | Daily Average: 0.0496 MGD (April 2018 to June 2024) | INFLUENT - At Sampling Point 701, the permittee shall collect representative samples of the influent from the influent automatic composite sampler drawing 24-hour flow proportional composite samples from the main lift station wet well located near the intersection of U.S. Highway 10 and Rusch Road. (M.H. 6). The permittee shall measure the influent flow rate using a continuous flow recording device on the force main from the main lift station as the influent is pumped to the aerated lagoon. |
| 001 | Daily Average: 0.0743 MGD (April 2018 to June 2024) | EFFLUENT - At Sampling Point 001, the permittee shall collect representative samples of the final effluent from the effluent automatic composite sampler drawing 24-hour flow proportional composite samples from the open channel after the polishing reactor, except that the permittee shall collect grab samples of the effluent for pH and dissolved oxygen following the V-notched weir prior to being discharged to Plum Creek via Outfall 001. The permittee shall collect representative samples for temperature from the end of pipe prior to being discharged to Plum Creek via Outfall 001. The permittee shall measure the effluent flow rate using a continuous flow recording device after the polishing reactor. Starting on May 1, 2029, the permittee shall collect grab samples of the effluent for E. coli, pH, and dissolved oxygen following the disinfection system prior to being discharged to Plum Creek via Outfall 001. |
| 002 | Sludge Generated: 1.6 dry metric tons (~30,000 gallons) removed in 2023 and hauled to another permitted facility. | TREATMENT LAGOONS SLUDGE - Class B liquid sludge that accumulates in the treatment lagoons. At Sampling Point 002, the permittee shall collect representative composite samples from various locations and depths of the aerated and settling lagoons then composite them for analysis. At the time of sample collection, the permittee shall evaluate the depth or quantity of sludge in the lagoons and shall submit these findings with the characteristics report form. |
| 003 | New sampling point. | EQ & EMERGENCY LAGOONS SLUDGE - Class B liquid sludge that accumulates in the equalization and emergency lagoons used occasionally for equalizing influent flows and loads to the wastewater treatment facility. At Sampling Point 003, the permittee shall collect representative composite samples from various locations and depths of the equalization and emergency lagoons then composite them for analysis. At the time of sample collection, the permittee shall evaluate the depth or quantity of sludge in the lagoons and shall submit these findings with the characteristics report form. |

1 Influent – Monitoring Requirements

Sample Point Number: 701- INFLUENT

| Monitoring Requirements and Limitations | | | | | |
|---|------------|-----------------|------------------|----------------------|-------|
| Parameter | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes |
| Flow Rate | | MGD | Daily | Continuous | |
| BOD ₅ , Total | | mg/L | Weekly | 24-Hr Flow Prop Comp | |
| Suspended Solids, Total | | mg/L | Weekly | 24-Hr Flow Prop Comp | |

Changes from Previous Permit:

- No changes from the previous permit.

Explanation of Limits and Monitoring Requirements

Flow Rate, BOD₅, and TSS Monitoring: Influent monitoring is needed to assess loading to the facility and treatment performance. Requirements for flow, BOD₅, and TSS are established in accordance with s. NR 210.04(2), Wis. Adm. Code. Influent monitoring for flow, BOD₅, and TSS remains unchanged from the previous permit.

Sampling Frequency: The department shall determine on a case-by-case basis the monitoring frequency to be required for each parameter in a permit pursuant to s. NR 205.066, Wis. Adm. Code. The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual WPDES permits based on the size and type of the facility, in order to characterize influent quality and variability, to detect events of noncompliance, and to ensure fairness and consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. Previously permitted monitoring frequencies for influent flow, BOD₅ and TSS are consistent with the standard monitoring frequency outlined in guidance. The sampling frequencies for influent flow, BOD₅ and TSS remain unchanged from the previous permit.

Sample Type: The department shall require the use of 24-hour flow proportional samplers for monitoring influent wastewater quality except where the department determines through the permit issuance process that other sample types may adequately characterize the influent quality pursuant to s. NR 210.04(4), Wis. Adm. Code. The 24-hour flow-proportional sampling is the most representative method of collecting wastewater samples for wastewater coming into and being discharged from a wastewater treatment plant on a continuous basis. The sample type for BOD₅ and TSS remains unchanged from the previous permit. For municipal waste at a treatment facility, methods of flow measurement shall include a continuous recording device pursuant to s. NR 218.05(1), Wis. Adm. Code. The sample type of influent flow rate remains unchanged from the previous permit.

2 Surface Water - Monitoring and Limitations

Sample Point Number: 001- EFFLUENT

| Monitoring Requirements and Limitations | | | | | |
|--|----------------------|-----------------|------------------|----------------------|--|
| Parameter | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes |
| Flow Rate | | MGD | Daily | Continuous | |
| BOD5, Total | Daily Max | 30 mg/L | 3/Week | 24-Hr Flow Prop Comp | |
| BOD5, Total | Monthly Avg | 15 mg/L | 3/Week | 24-Hr Flow Prop Comp | |
| Suspended Solids, Total | Daily Max | 30 mg/L | 3/Week | 24-Hr Flow Prop Comp | |
| Suspended Solids, Total | Monthly Avg | 20 mg/L | 3/Week | 24-Hr Flow Prop Comp | |
| Suspended Solids, Total | Weekly Avg | 36 lbs/day | 3/Week | Calculated | See the TMDL Limitations section in the permit. |
| Suspended Solids, Total | Monthly Avg | 20 lbs/day | 3/Week | Calculated | See the TMDL Limitations section in the permit. |
| Suspended Solids, Total | | lbs/month | Monthly | Calculated | Calculate and report the total monthly mass of TSS discharged in lbs/month on the last day of the month on the eDMR. |
| Suspended Solids, Total | | lbs/yr | Monthly | Calculated | Calculate and report the 12-month rolling sum of the total monthly mass of TSS on the last day of the month on the eDMR. |
| pH Field | Daily Max | 9.0 su | 3/Week | Grab | |
| pH Field | Daily Min | 6.0 su | 3/Week | Grab | |
| Dissolved Oxygen | Daily Min | 4.0 mg/L | 3/Week | Grab | |
| Nitrogen, Ammonia Variable Limit | | mg/L | 3/Week | See Table | See the Daily Maximum Ammonia Nitrogen Limits section below. |
| Nitrogen, Ammonia (NH ₃ -N) Total | Daily Max - Variable | mg/L | 3/Week | 24-Hr Flow Prop Comp | See the Daily Maximum Ammonia Nitrogen Limits section below. |
| Nitrogen, Ammonia (NH ₃ -N) Total | Weekly Avg | 3.2 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit applies April through May each year. |

| Monitoring Requirements and Limitations | | | | | |
|--|-------------------|------------------------|-------------------------|----------------------|--|
| Parameter | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes |
| Nitrogen, Ammonia (NH3-N) Total | Weekly Avg | 5.0 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit applies June through September each year. |
| Nitrogen, Ammonia (NH3-N) Total | Weekly Avg | 9.0 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit applies October through March each year. |
| Nitrogen, Ammonia (NH3-N) Total | Monthly Avg | 1.3 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit applies April through May each year. |
| Nitrogen, Ammonia (NH3-N) Total | Monthly Avg | 2.4 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit applies June through September each year. |
| Nitrogen, Ammonia (NH3-N) Total | Monthly Avg | 3.8 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit applies October through March each year. |
| Phosphorus, Total | Monthly Avg | 0.99 mg/L | 3/Week | 24-Hr Flow Prop Comp | |
| Phosphorus, Total | Monthly Avg | 0.49 lbs/day | 3/Week | Calculated | See the TMDL Limitations section in the permit. |
| Phosphorus, Total | | lbs/month | Monthly | Calculated | Calculate and report the total monthly mass of TP discharged in lbs/month on the last day of the month on the eDMR. |
| Phosphorus, Total | | lbs/yr | Monthly | Calculated | Calculate and report the 12-month rolling sum of the total monthly mass of TP on the last day of the month on the eDMR. |
| Temperature Maximum | | deg F | 3/Week | Grab | Monitoring only year-round until August 31, 2029. Starting on September 1, 2029, monitoring only January to August and October to December each year. See Effluent Temperature Monitoring and Effluent Temperature Limitations Sections and Temperature Limits and Dissipative Cooling Evaluation compliance schedule in the permit. |

| Monitoring Requirements and Limitations | | | | | |
|---|--------------------------|-----------------|-------------------|----------------------|---|
| Parameter | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes |
| Temperature Maximum | Weekly Avg | 74 deg F | 3/Week | Grab | Limit effective on September 1st, 2029 and applies each September. See Effluent Temperature Monitoring and Effluent Temperature Limitations Sections and Temperature Limits and Dissipative Cooling Evaluation compliance schedule in the permit. |
| Chloride | | mg/L | Monthly | 24-Hr Flow Prop Comp | Monitoring only required from January 2028 to December 2028. |
| E. coli | Geometric Mean - Monthly | 126 #/100 ml | Weekly | Grab | Monitoring and limit effective May through September annually per the Disinfection and Effluent Limitations for E. coli compliance schedule. |
| E. coli | % Exceedance | 10 Percent | Monthly | Calculated | Monitoring and limit effective May through September annually per the Disinfection and Effluent Limitations for E. coli compliance schedule. See the E. coli Percent Limit section in the permit. Enter the result in the DMR on the last day of the month. |
| Nitrogen, Total Kjeldahl | | mg/L | See Listed Qtr(s) | 24-Hr Flow Prop Comp | See Nitrogen Series Monitoring section in the permit. |
| Nitrogen, Nitrite + Nitrate Total | | mg/L | See Listed Qtr(s) | 24-Hr Flow Prop Comp | See Nitrogen Series Monitoring section in the permit. |
| Nitrogen, Total | | mg/L | See Listed Qtr(s) | Calculated | See Nitrogen Series Monitoring section in the permit. Total Nitrogen = Total Kjeldahl Nitrogen (mg/L) + Total (Nitrite + Nitrate) |

| Monitoring Requirements and Limitations | | | | | |
|---|------------|-----------------|-------------------|----------------------|--|
| Parameter | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes |
| Chronic WET | | TUc | See Listed Qtr(s) | 24-Hr Flow Prop Comp | See the Whole Effluent Toxicity Testing section in the permit. |

Changes from Previous Permit

- The sample type has been changed for several parameters from “Grab” to “24-hour flow proportional composite”.
- The BOD₅ effluent limit has been changed from a weekly average to a daily maximum limit.
- The monthly average BOD₅ effluent limit has been changed to 15 mg/L
- The TSS effluent limit has been changed from a weekly average to a daily maximum limit.
- An additional reporting requirement for lbs/month will be used to calculate the facility’s 12-month rolling sum of total monthly discharge, which can be compared directly to the facility’s designated WLAs for total phosphorus and TSS. The department modified the note language for reporting monthly and annual total phosphorus loadings.
- The sample frequency has been changed from “weekly” to “3/week” for ammonia nitrogen.
- Some weekly average, and monthly average effluent limits for ammonia nitrogen have been lowered.
- The daily maximum limits for ammonia nitrogen have been replaced with daily maximum variable limits.
- Temperature monitoring and an effluent limit for September has been added and will become effective per a compliance schedule.
- Monthly chloride monitoring for 2028 has been added to the permit.
- Escherichia coli (E. coli) monitoring and limits have been added and will become effective per a compliance schedule.
- Nitrogen series monitoring has been added to the permit.

Explanation of Limits and Monitoring Requirements

More information and explanation about the proposed water quality-based effluent limits (WQBELs) is found in the “Water Quality-Based Effluent Limitations for Forest Junction Sanitary District WPDES Permit No. WI-0032123-09” memo dated May 24, 2024.

Flow Rate Monitoring: For municipal waste at a treatment facility, methods of flow measurement shall include a continuous recording device pursuant to s. NR 218.05(1), Wis. Adm. Code.

Secondary Treatment Limits for BOD₅, TSS, pH, and DO: Publicly owned treatment works with a discharge to a surface water classified as a limited forage fish (LFF) water shall meet the secondary treatment effluent limits specified for BOD₅, TSS, pH, and DO in s. NR 210.05(2), Wis. Adm. Code excluding the TSS mass limits. The permittee discharges to Plum Creek which was reclassified from a limit aquatic life water to an LFF. Therefore, effluent limitations in s. NR 210.05(2), Wis. Adm. Code apply. This has resulted in the BOD₅ weekly average limit changing to a daily maximum limit; the monthly average BOD₅ effluent limit being changed to 15 mg/L; and the TSS weekly average limit changing to a daily maximum limit from the previous permit. The concentration limits for pH and DO remain unchanged from the previous permit.

TMDL derived TSS Mass Effluent Limitations: If the department determines a limitation is necessary, effluent limitation shall be also consistent with a total maximum daily load (TMDL) if a TMDL has been approved by the U.S.

Environmental Protection Agency (USEPA) for the receiving waterbody consistent with s. NR 205.067(3)(a), Wis. Adm. Code. The discharge to Plum Creek which is within the Lower Fox River Basin TMDL area. The Lower Fox River Basin TMDL for total phosphorus and total suspended solids was approved by the USEPA in March 2012. The department has determined that TSS effluent limitations are necessary. Therefore, the department must also calculate TMDL derived TSS limits to be consistent with the Lower Fox River Basin TMDL. The approved total suspended solids waste load allocation (WLA) for the permittee is 2,471 lbs/year which results in calculated total suspended solids mass limits of 36 lbs/day as a weekly average and 20 lbs/day as a monthly average. These TMDL derived TSS mass effluent limitations remain unchanged from the previous permit. However, since the TSS WLA is expressed as an annual load (lbs/yr), the permittee must also calculate and report the rolling 12-month sums of total monthly loads for TSS. Rolling 12-month sums can be compared directly to the annual wasteload allocation.

Ammonia: Ammonia limits were calculated using current acute and chronic ammonia toxicity criteria for the protection of aquatic life included in Tables 2C and 4B of ch. NR 105, Wis. Adm. Code. Subchapter IV of ch. NR 106 establishes the procedure for calculating WQBELs for ammonia. The department has determined lower weekly average and monthly average limits are needed for June to September, and October to March. Daily maximum variable limits (see table below) have replaced the single daily maximum limits for certain times of the year from the previous permit. The daily maximum variable ammonia nitrogen limits are based the effluent pH with range 6.0 to 9.0 s.u.

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

Total Phosphorus: Phosphorus requirements are based on the Phosphorus Rules as detailed in chs. NR 102 (water quality standards) and NR 217, Wis. Adm. Code (effluent standards and limitations for phosphorus). Chapter NR 217 of the Wis. Adm. Code addresses point source dischargers of phosphorus to surface waters. Currently, there are three types of limit calculations used to determine if a phosphorus limit is needed: a technology based effluent limit (TBEL), a WQBEL determined by stream criteria and an effluent limit based on a TMDL allocation.

- A TBEL of 1.0 mg/L is needed if a facility discharges more than the threshold of 150 pounds per month (s. NR 217.04(1)(a)1., Wis. Adm. Code). The data demonstrates that the annual monthly average phosphorus loading is less than 150 lbs/month. However, the current permit has a monthly average limit of 0.99 mg/L that served as an interim limit. This limit remains applicable unless a more stringent WQBEL is given.
- The department has determined to include the total phosphorus TMDL derived limitations in lieu of the WQBELs calculated under s. NR 217.13, Wis. Adm. Code pursuant to s. NR 217.16, Wis. Adm. Code.
- The discharge to the Plum Creek which is within the Lower Fox River Basin TMDL area. The Lower Fox River Basin TMDL for total phosphorus and total suspended solids was approved by the USEPA in March 2012. If the department determines a WQBEL is necessary, limitations shall be consistent with a TMDL if a TMDL has been approved by the USEPA for the receiving waterbody consistent with s. NR 205.067(3)(a), Wis. Adm. Code. The department has determined that total phosphorus WQBELs are necessary. Therefore, the department must also calculate TMDL derived total phosphorus limits to be consistent with the Lower Fox River Basin TMDL. The approved total phosphorus WLA for the permittee is 122 lbs/year which results in a calculated total phosphorus

mass limit of 0.49 lbs/day as a monthly average. This TMDL derived total phosphorus mass effluent limitation remain unchanged from the previous permit.

Since the total phosphorus WLA is expressed as an annual load (lbs/yr), the permittee must also calculate and report the rolling 12-month sums of total monthly loads for total phosphorus. Rolling 12-month sums can be compared directly to the annual wasteload allocation.

Temperature: Forest Junction did not monitor for temperature during the current permit term. Forest Junction did report maximum temperatures during previous permit term from 02/02/2011 – 10/26/2016. Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent temperature limits. Based on this analysis, a weekly average temperature maximum limit of 74°F is necessary for the month of September. The facility cannot currently meet the final temperature limit for September. Therefore, the department has included a compliance schedule to allow the permittee time to install treatment to meet the final temperature effluent limitation or explore relief from the limit. The following general options are available for a facility to explore potential relief from the weekly average limit for September:

- Effluent monitoring data: Verification or additional effluent monitoring (flow and/or temperature) may be appropriate if there were questions on the representativeness of the current effluent data.
- Monthly low receiving water flows: Contract with USGS to generate monthly low flow estimates for the receiving water to be used in place of the annual low flow. Given the fact the receiving water low flow is 0 cfs, this option is unlikely to provide relief.
- Dissipative cooling demonstration: Effluent limitations based on sub-lethal criteria may be adjusted based on the potential for heat dissipation from municipal treatment plants as described in s. NR 106.59(4), Wis. Adm. Code.
- Collection of site-specific ambient temperature: Default background temperatures for streams in Wisconsin, so actual data from the direct receiving water may provide for relaxed thermal limits but only if the site-specific temperatures are lower than the small stream defaults used in the limit calculation.
- A variance to the water quality standard.

Chloride: Effluent chloride concentrations are below the calculated WQBELs; therefore, limits are not required. However, monthly monitoring is required in 2028 to ensure that 11 sample results are available at the next permit reissuance to meet the reasonable potential data requirements of s. NR 106.85, Wis. Adm. Code.

E. coli: Revisions to bacteria surface water quality criteria to protect recreational uses and accompanying E. coli WPDES permit implementation procedures became effective on May 1, 2020. The new rule requires that WPDES permits for facilities with required disinfection include monitoring for E. coli while facilities are disinfecting during the recreation period and establish effluent limitations for E. coli established in s. NR 210.06(2), Wis. Adm Code. The administrative code rule changes included the following actions: revised the bacteria water quality criteria from fecal coliform to E. coli to protect recreation in ch. NR 102, Wis. Adm. Code.; removed fecal coliform criteria for certain individual waters from ch. NR 104, Wis. Adm. Code; revised permit requirements for publicly owned sewage treatment works in ch. NR 210, Wis. Adm. Code; and, updated approved analytical methods for bacteria in ch. NR 219, Wis. Adm. Code.

Forest Junction had previously been exempted from disinfection based on the limited aquatic life or limited forage fish classification of the receiving water. Section NR 210.06(3)(g), Wis. Adm. Code, states that disinfection decisions may be made based on the hydrologic classifications listed in s. NR 104.02(1), Wis. Adm. Code (not on the water quality classifications - i.e., limited forage fish, limited aquatic life - that are defined in s. NR 104.02(3), Wis. Adm. Code). The hydrologic classification for the Plum Creek is listed in ch. NR 104, Wis. Adm. Code, as continuous. Continuous streams have a higher likelihood of providing opportunities for full contact recreational activities. Therefore, disinfection should not be exempted based solely on this hydrological classification.

The permittee discharges to Plum Creek which the permittee must ensure is suitable for supporting recreational use and protect humans from illness caused by fecal contamination due to recreational contact with surface water. The Plum Creek is not classified as a public water supply. Therefore, the permittee is required to disinfect during the recreation season pursuant to s. NR 210.06(1)(a), Wis. Adm. Code. Section NR 210.06(2)(a)1., Wis. Adm. Code, includes two limits which

must be included in permits for facilities which are required to disinfect in order to protect recreation season (May to September): The geometric mean of E. coli bacteria in effluent samples collected in any calendar month cannot exceed 126 counts/100 mL. No more than 10% of E. coli bacteria samples collected in any calendar month can exceed 410 counts/100 mL.

The permittee has not monitored for E. coli during the previous permit term and currently does not have a disinfection system to meet the final E. coli effluent limitations. Therefore, the department has included a compliance schedule to allow the permittee time to install a disinfection system to meet the final E. coli effluent limitations.

Nitrogen Series Monitoring (NO₂+NO₃, TKN and Total N): The department has included annual effluent monitoring for total nitrogen in rotating quarters since the permittee is a minor municipal discharge (<1 MGD) in the permit through the authority under s. 283.55(1)(e), Wis. Stats., which allows the department to require the permittee to submit information necessary to identify the type and quantity of any pollutants discharged from the point source. More information on the justification to include total nitrogen monitoring in wastewater permits can be found in the “Guidance for Total Nitrogen Monitoring in Wastewater Permits” dated October 1, 2019.

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

The department has determined that due to the available chronic WET testing data and with consideration of the guidance, chronic WET testing is required at frequency of 3 per permit term in the permit. Chronic WET tests shall be done in rotating quarters in order to collect seasonal information about this discharge. WET testing shall continue after the permit expiration date (until the permit is reissued).

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

Sampling Frequency: The department shall determine on a case-by-case basis the monitoring frequency to be required for each parameter in a permit pursuant to s. NR 205.066, Wis. Adm. Code. The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual WPDES permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure fairness and consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term.

The department has determined at this time that an increase in monitoring frequency for ammonia nitrogen is warranted. Data submitted during the previous permit term continues to show noncompliance with ammonia nitrogen effluent limitations. Also, the change of the sampling frequency for ammonia nitrogen was necessary due to the lowering of weekly and monthly average limits that will allow more representative samples of the ammonia nitrogen to be collected and factor in any variability during a week for this facility. If the permittee believes the facility should be eligible to return to the previously permitted monitoring frequency based on performance during the permitted term, they may request a reduction with their next permit application.

Previously permitted monitoring frequencies for BOD₅, TSS, pH, DO, and total phosphorus are consistent with the standard monitoring frequency outlined in the guidance and remain unchanged from the previous permit. Monitoring frequency for E. coli is consistent with the monitoring frequency outlined in the guidance.

Sample Type: The department shall require the use of 24-hour flow proportional samplers for monitoring effluent wastewater quality except where the department determines through the permit issuance process that other sample types may adequately characterize the effluent quality pursuant to s. NR 210.04(4), Wis. Adm. Code. The 24-hour flow-proportional sampling is the most representative method of collecting wastewater samples for wastewater coming into and being discharged from a wastewater treatment plant on a continuous basis. Grab samples for pH, DO, and E. coli are required as compositing and holding such samples would change the test results and is noncompliant with maximum holding times specified in ch. NR 219, Wis. Adm. Code. Therefore, the sample type for BOD₅, TSS, ammonia nitrogen, total phosphorus, chloride, and chronic WET testing has been changed to “24-hour flow proportional composite” from the previous permit. The permittee currently has an automatic effluent composite sampler, so a schedule is not needed to install one at the facility.

3 Land Application - Monitoring and Limitations

| Municipal Sludge Description | | | | | | |
|---|-----------------------|------------------------------|--|--|--|--|
| Sample Point | Sludge Class (A or B) | Sludge Type (Liquid or Cake) | Pathogen Reduction Method | Vector Attraction Method | Reuse Option | Amount Reused/Disposed (Dry Tons/Year) |
| 002 | B | Liquid | No land application during permit term | No land application during permit term | Land Application or Hauled to another Facility | 1.6 dry metric tons (~30,000 gallons) removed in 2023 and hauled to another permitted facility |
| 003 | B | Liquid | Not Used | Not Used | Land Application or Hauled to another Facility | Not Used |
| Does sludge management demonstrate compliance? Yes. | | | | | | |
| Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? Yes. | | | | | | |
| Is a priority pollutant scan required? No, the design flow rate is less than 5 MGD. Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD. | | | | | | |

Sample Point Number: 002- TREATMENT LAGOONS SLUDGE and 003- EQ & EMERGENCY LAGOONS SLUDGE

| Monitoring Requirements and Limitations | | | | | |
|---|--------------|-----------------|------------------|-------------|---|
| Parameter | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes |
| Solids, Total | | Percent | Once | Composite | Monitoring required once in 2026 and again if the lagoon sludge is land applied or hauled to another permitted facility in any year. |
| Arsenic Dry Wt | Ceiling | 75 mg/kg | Once | Composite | Monitoring required once in 2026 and again if the lagoon sludge is land applied or hauled to another permitted facility in any year. Limits applicable only when lagoon sludge is land applied. |
| Arsenic Dry Wt | High Quality | 41 mg/kg | Once | Composite | |
| Cadmium Dry Wt | Ceiling | 85 mg/kg | Once | Composite | |
| Cadmium Dry Wt | High Quality | 39 mg/kg | Once | Composite | |
| Copper Dry Wt | Ceiling | 4,300 mg/kg | Once | Composite | |
| Copper Dry Wt | High Quality | 1,500 mg/kg | Once | Composite | |

| Monitoring Requirements and Limitations | | | | | |
|---|--------------|-----------------|------------------|-------------|--|
| Parameter | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes |
| Lead Dry Wt | Ceiling | 840 mg/kg | Once | Composite | |
| Lead Dry Wt | High Quality | 300 mg/kg | Once | Composite | |
| Mercury Dry Wt | Ceiling | 57 mg/kg | Once | Composite | |
| Mercury Dry Wt | High Quality | 17 mg/kg | Once | Composite | |
| Molybdenum Dry Wt | Ceiling | 75 mg/kg | Once | Composite | |
| Nickel Dry Wt | Ceiling | 420 mg/kg | Once | Composite | |
| Nickel Dry Wt | High Quality | 420 mg/kg | Once | Composite | |
| Selenium Dry Wt | Ceiling | 100 mg/kg | Once | Composite | |
| Selenium Dry Wt | High Quality | 100 mg/kg | Once | Composite | |
| Zinc Dry Wt | Ceiling | 7,500 mg/kg | Once | Composite | |
| Zinc Dry Wt | High Quality | 2,800 mg/kg | Once | Composite | |
| Radium 226 Dry Wt | | pCi/g | Once | Composite | |
| Nitrogen, Total Kjeldahl | | Percent | Per Application | Composite | Monitoring only required when lagoon sludge is land applied in any year. |
| Nitrogen, Ammonia (NH3-N) Total | | Percent | Per Application | Composite | |
| Phosphorus, Total | | Percent | Per Application | Composite | |
| Phosphorus, Water Extractable | | % of Tot P | Per Application | Composite | |
| Potassium, Total Recoverable | | Percent | Per Application | Composite | |
| PFOA + PFOS | | ug/kg | Once | Calculated | Monitoring required once in 2026 and again if the lagoon sludge is land applied or hauled to another permitted facility in any year. Report the sum of PFOA and PFOS. See PFAS Permit Sections in the permit for more information. |

| Monitoring Requirements and Limitations | | | | | |
|---|------------|-----------------|------------------|-------------|---|
| Parameter | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes |
| PFAS Dry Wt | | | Once | Grab | Monitoring required once in 2026 and again if the lagoon sludge is land applied or hauled to another permitted facility in any year. Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information. |

Changes from Previous Permit:

- Sludge monitoring requirements have been added for Outfall 003.
- Nutrient monitoring has been added to the permit for each outfall.
- PCB monitoring once during the permit has been removed.
- PFAS monitoring has been added to the permit for each sludge outfall.

Explanation of Limits and Monitoring Requirements

Outfall 002 and 003: If a permittee generates more than one type of sludge, each sludge type shall be sampled and analyzed in accordance with the WPDES permit pursuant to s. NR 204.06(2)(a), Wis. Adm. Code. The facility generates sludge in the equalization and emergency storage lagoons and in the treatment lagoons. Therefore, the department has included separate sludge monitoring requirements for each sludge type.

Metals, Nutrients, Pathogen Control, Vector Attraction Reduction Monitoring: The parameters to be analyzed in the sludge were determined pursuant to s. NR 204.06(2)(b), Wis. Adm. Code. The ceiling and high-quality limits for metals in sludge are specified in s. NR 204.07(5), Wis. Adm. Code. Requirements for pathogen control are specified in s. NR 204.07(6), Wis. Adm. Code and in s. NR 204.07(7), Wis. Adm. Code for vector attraction reduction requirements. Nutrients are required to be analyzed to track that nutrient recommendations for the crop are not exceeded. Specifically, the amount of available nitrogen from sludge and other nitrogen sources applied per growing season may not exceed the nitrogen requirement of the crop pursuant to s. NR 204.07(8)(a), Wis. Adm. Code.

PCB monitoring: PCB monitoring is not required this permit term but will be included in the next reissuance. There are no potential industrial sources and a review of historic PCB data shown results well below high quality and ceiling limitations as stated in s. NR 204.07(3)(k), Wis. Adm. Code.

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

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

Sample Frequency for Outfall 002 and 003: Facilities with lagoons which land apply or dispose of sludge on an infrequent basis shall sample their sludge once every 5 years and analyze it for the metals listed in Table 1 of s. NR 204.07(5)(a), Wis. Adm. Code, Therefore, the sampling frequency for metals and PFAS is once in 2026 for Outfall 002 and Outfall 003 and again in any given year if the sludge will land applied or hauled to another permittee facility. Sampling for nutrients, pathogen control requirements, and vector reduction requirements is only required once in any given year if the sludge will be land applied to a department sites.

4 Schedules

4.1 Disinfection and Effluent Limitations for E. coli

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

| Required Action | Due Date |
|--|------------|
| Progress Report: The permittee shall submit a progress report on development and submittal of a facility plan for upgrades to meet disinfection requirements and E. coli limits. | 09/30/2025 |
| Submit Facility Plan: The permittee shall submit a Facility Plan per s. NR 110.09, Wis. Adm. Code with proposed disinfection alternatives to meet final E. coli effluent limitations. The permittee may submit an abbreviated facility plan if the department determines that the modifications are minor. | 04/30/2026 |
| Final Plans and Specifications: The permittee shall submit final construction plans to the Department for approval pursuant to ch. NR 108, Wis. Adm. Code, specifying treatment plant upgrades that must be constructed to achieve compliance with final E. coli limitations and a schedule for completing construction of the upgrades by the complete construction date specified below. | 03/31/2027 |
| Treatment Plant Upgrade to Meet Limitations: The permittee shall initiate bidding, procurement, and/or construction of the project. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats., prior to initiating activities defined as construction under ch. NR 108, Wis. Adm. Code. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. | 09/30/2027 |
| Construction Upgrade Progress Report: The permittee shall submit a progress report on construction upgrades. | 09/30/2028 |
| Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. | 03/31/2029 |
| Achieve Compliance: The permittee shall achieve compliance with final E. coli limitations. | 04/30/2029 |

4.2 Temperature Limits Compliance and Dissipative Cooling Evaluation

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

| Required Action | Due Date |
|--|------------|
| Report on Effluent Discharges: Submit a report effluent temperature with conclusion regarding compliance. Informational Note: Refer to the Surface Water subsections regarding 'Determination of Need for Effluent Limits' and 'Dissipative Cooling Demonstration - POTW Weekly Average Limits' regarding requests for Department determination on the need for limits an follow-up procedures for demonstration of dissipative cooling per NR 106.59, Wis. Adm. Code, as well as re-evaluation of the limits pursuant to NR 106 Subchapters V & VI or NR 102.26, Wis. Adm. Code. | 10/31/2025 |
| Action Plan: Submit an action plan for complying with all applicable effluent temperature limits. | 10/31/2026 |
| Construction Plans: Submit construction plans (if construction is required for complying with effluent temperature limits) and include plans and specifications with the submittal. | 10/31/2027 |

| Required Action | Due Date |
|--|------------|
| Initiate Actions: Initiate actions identified in the plan. | 10/31/2028 |
| Complete Actions: Complete actions necessary to achieve compliance with effluent temperature limits. | 08/31/2029 |
| Achieve Compliance: The permittee shall achieve compliance with the final temperature maximum effluent limit for September. | 09/01/2029 |

4.3 Sludge Management Plan

If the lagoons are to be desludged during this permit term, a sludge management plan is required to demonstrate compliance with ch. NR 204, Wis. Adm. Code.

| Required Action | Due Date |
|---|----------|
| <p>Sludge Management Plan Submittal: The permittee shall submit a sludge management plan for approval if removal of sludge from the lagoons will occur during the permit term. The plan shall demonstrate compliance with ch. NR 204 Wis. Adm. Code and at minimum address 1) How and where is sludge sampled; 2) Available sludge storage details and location(s); 3) How will the sludge be removed with details on volume, characterization and how will the treatment plant continue to function during the drawdown; 4) Describe the type of transportation and spreading vehicles and loading and unloading practices; 5) Identify approved land application sites, apply for needed sites, site limitations, total acres needed and vegetative cover management; 6) Specify record keeping procedures including site loading; 7) Address contingency plans for adverse weather and odor/nuisance abatement; and 8) Include any other pertinent information such as other disposal options that may be used or specifications of any pretreatment processes.</p> <p>Once approved, all sludge management activities shall be conducted in accordance with the plan. Any changes to the plan must be approved by the department prior to implementing the changes. No desludging may occur unless approval from the department is obtained. Daily logs shall be kept that record where the sludge has been disposed.</p> <p>The plan is due at least 60 days prior to desludging.</p> | |

4.4 Capacity, Management, Operation, and Maintenance (CMOM) Program

The permittee shall have written documentation of the CMOM program components in accordance with s. NR 210.23(4), Wis. Adm. Code.

| Required Action | Due Date |
|---|------------|
| Revised CMOM Program: Review and revise the Capacity, Management, Operation and Maintenance (CMOM) Program to meet the requirements of s. NR 210.23, Wis. Adm. Code. A revised copy of the program shall be submitted to the department by the due date. | 03/31/2025 |

Explanation of Schedules

Disinfection and Effluent Limitations for E. coli: A compliance schedule is included in the permit to provide time for the permittee to submit a facility plan, final construction plans and specifications, and install the disinfection treatment system for meeting effluent E. coli water quality-based effluent limits and disinfection requirements pursuant to s. NR 210.06, Wis. Adm. Code.

Temperature Limits Compliance and Dissipative Cooling Evaluation: A compliance schedule is included in the permit to provide time for the permittee to evaluate options for meeting the final water quality-based effluent limit for

temperature in September or gather data to request relief from the final temperature effluent limit pursuant to ss. NR 106.117 and NR 106.62, Wis. Adm. Code.

Sludge Management Plan: Per s. NR 204.11(1), Wis. Adm. Code, the department may require the permittee to develop a sludge management plan. The permittee shall submit the plan to the department for approval and operate in compliance with the approved plan if removal of sludge from the lagoons will occur during the permit term. The plan shall include a description of the facility's sludge management program and how the permittee plans to operate the facility in compliance with the requirements of the permit and ch. NR 204, Wis. Adm. Code. The sludge management plan shall be submitted to the department for approval at least 60 days prior to desludging any lagoon.

5 Standard Requirements

Changes from Previous Permit

The Standard Requirements section contains conditions and requirements that are, for the most part, applicable to all municipal permittees consistent with ss. NR 205.07(1) and NR 205.07(2), Wis. Adm. Code. Other standard requirements may be added as reminders. Changes to the standard requirements section include:

- Section 5.1.4: The limit of quantitation was updated for TSS for purposes of calculating NR 101 fees. A reminder was added about the reporting requirements when there is no discharge through a permitted outfall for flow related parameters.
- Section 5.4.7: The department has added a reminder about the expression of the E. coli limits and to enter a value of 1 for a result of 0 when calculating the geometric mean.
- Section 5.4.8: The department has added the seasonal disinfection requirements to reflect the changes in the disinfection rules.
- The department has removed the monitoring and calculating requirements for PCB Concentrations in Sludge as sludge PCB monitoring is not required during this permit term.
- Sections 5.5.11 to 5.5.14: The department has added all applicable sludge pathogen reduction and vector control requirements as well as sludge hauling requirements that may be applicable to the permittee if the permittee decides to land apply sludge in any given year.

6 Summary of Reports Due

A summary of reports due has been added for informational purposes for the permittee to keep track of the due dates of reports and schedule items.

Other Comments/Changes from Previous Permit:

None.

Justification Of Any Waivers from Permit Application Requirements

No waivers were requested from permit application requirements.

Attachments:

“Water Quality-Based Effluent Limitations for Forest Junction Sanitary District WPDES Permit No. WI-0032123-09” memo dated May 24, 2024.

Expiration Date:

December 31, 2029

Prepared By:

**Trevor Moen
Wastewater Engineer
Bureau of Water Quality**

Date: 10/21/2024

Post Fact Check Revision Date: 11/05/2024

Post Public Notice Revision Date:

CORRESPONDENCE/MEMORANDUM

DATE: 05/24/2024

TO: Trevor Moen – NER

FROM: Nicole Krueger – SER *Nicole Krueger*

SUBJECT: Water Quality-Based Effluent Limitations for Forest Junction Sanitary District
WPDES Permit No. WI-0032123-09

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 Forest Junction Sanitary District in Calumet County. This municipal wastewater treatment facility (WWTF) discharges to an unnamed tributary of Plum Creek, located in the Plum and Kankapot Creek Watershed in the Lower Fox River Basin. This discharge is included in the Lower Fox River Total Maximum Daily Load (TMDL) as approved by EPA in March 2012. The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

| Parameter | Daily Maximum | Daily Minimum | Weekly Average | Monthly Average | Footnotes |
|---|---------------|---------------|----------------|--------------------------------|-----------|
| Flow Rate | | | | | 1,2 |
| BOD ₅ | 30 mg/L | | | 15 mg/L | 3 |
| TSS | 30 mg/L | | 36 lbs/day | 20 mg/L 20 lbs/day | 3,4 |
| pH | 9.0 s.u. | 6.0 s.u. | | | 1 |
| Dissolved Oxygen | | 4.0 mg/L | | | 3 |
| Bacteria | | | | | 5 |
| Final Limit <i>E. coli</i> | | | | 126 #/100 mL geometric mean | |
| Ammonia Nitrogen | | | | | 6 |
| April – May | 8.8 mg/L | | 3.2 mg/L | 1.3 mg/L | |
| June – August | 10 mg/L | | 5.0 mg/L | 2.4 mg/L | |
| September | 10 mg/L | | 5.0 mg/L | 2.4 mg/L | |
| October | | | 9.0 mg/L | 3.8 mg/L | |
| November – March | 12 mg/L | | 9.0 mg/L | 3.8 mg/L | |
| Phosphorus Interim TMDL | | | | 0.99 mg/L 0.49 lbs/day | 4 |
| Chloride | | | | | 7 |
| TKN, Nitrate+Nitrite, and Total Nitrogen | | | | | 8 |
| Chronic WET | | | | | 9,10 |
| Temperature September | | | 74 deg F | | 11 |

Footnotes:

1. No changes from the current permit.
2. Monitoring only.

3. These concentration limits are based on the Limited Forage Fish (LFF) community of the immediate receiving water as described in s. NR 104.02(3)(a), Wis. Adm. Code.
4. The TSS and phosphorus mass limits are based on the TMDL for the Lower Fox River Basin to address phosphorus water quality impairments within the TMDL area.
5. Bacteria limits apply during the disinfection season of May through September. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
6. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round.

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

7. Monitoring at a frequency to ensure that 11 samples are available at the next permit issuance.
8. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen monitoring is recommended for all minor municipal permittees. Total Nitrogen is the sum of nitrate (NO₃), nitrite (NO₂), and total kjeldahl nitrogen (TKN) (all expressed as N).
9. The Instream Waste Concentration (IWC) to assess chronic test results is 100%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 75%, 50%, 25% & 12.5% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water upstream of the discharge or lab water.
10. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).
11. A compliance schedule may be included in the reissued permit to meet the temperature limit.

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, Thermal Table, & Map

PREPARED BY: Nicole Krueger, Water Resources Engineer – SER

E-cc: Trevor Moen, Wastewater Engineer – NER
 Heidi Schmitt Marquez, Regional Wastewater Supervisor – NER
 Diane Figiel, Water Resources Engineer – WY/3
 Nate Willis, Wastewater Engineer – WY/3

Attachment #1
**Water Quality-Based Effluent Limitations for
Forest Junction Sanitary District**

WPDES Permit No. WI-0032123-09

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

The Forest Junction Sanitary District provides wastewater collection and treatment for the unincorporated community of Forest Junction in Calumet County. This facility, which was upgraded in 2016, includes an aerated lagoon followed by a settling lagoon and polishing reactor. Phosphorus removal is accomplished by chemical addition in the control structure between the aerated lagoon and settling lagoon. M.H. 6, the influent sample point, is immediately adjacent to the lift station that conveys raw wastewater from the sanitary district to the facility.

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

Existing Permit Limitations

The current permit, which expired March 31, 2023, includes the following effluent limitations and monitoring requirements.

| Parameter | Daily Maximum | Daily Minimum | Weekly Average | Monthly Average | Footnotes |
|------------------|---------------|---------------|-----------------------|-----------------------|-----------|
| Flow Rate | | | | | 1 |
| BOD ₅ | | | 30 mg/L | 20 mg/L | 2 |
| TSS | | | 30 mg/L 36 lbs/day | 20 mg/L 20 lbs/day | 2 |
| pH | 9.0 s.u. | 6.0 s.u. | | | 3 |
| Dissolved Oxygen | | 4.0 mg/L | | | 3 |
| Ammonia Nitrogen | | | | | |
| April – May | 8.8 mg/L | | 3.2 mg/L | 1.3 mg/L | |
| June – August | 10 mg/L | | 8.6 mg/L | 3.3 mg/L | |
| September | 10 mg/L | | 17 mg/L | 4.8 mg/L | |
| October | | | 21 mg/L | 8.3 mg/L | |
| November – March | 20 mg/L | | 11 mg/L | 4.5 mg/L | |
| Phosphorus | | | | | 4 |
| Interim | | | | 0.99 mg/L | |
| TMDL | | | | 0.49 lbs/day | |
| Chloride | | | | | 1 |
| Acute WET | | | | | 5 |
| Chronic WET | | | | | 5 |

Footnotes:

1. Monitoring only.
2. These concentration limits are based on the Limited Aquatic Life (LAL) community of the immediate receiving water as described in s. NR 104.02(3)(b), Wis. Adm. Code.

Attachment #1

3. 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.
4. The TMDL-based mass limit for phosphorus became effective on April 1, 2021.
5. Acute WET testing is required twice during the permit term and chronic WET testing is required three times during the permit term. The IWC for chronic WET was 100%.

Receiving Water Information

- Name: Plum Creek
- Waterbody Identification Code (WBIC): 125100
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Although Plum Creek is not listed in ch. NR 104, Wis. Adm. Code, a Limited forage fish (LFF) classification was determined to be appropriate for this receiving water, non-public water supply.
 - Previously, the limits were based on a limited aquatic life classification. Site visits and fish surveys were completed in 2015 and 2022 which determined the natural community is LFF from the outfall for 2 ¼ miles to the confluence of unnamed tributary WBIC 125600. More fish surveys were recommended in the future because the receiving water could potentially support a warmwater sport fish community. This would result in more stringent limits in the future.
- 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 estimates where Outfall 001 is located:

LFF classification at the discharge location
7-Q₁₀ = 0 cfs (cubic feet per second)
7-Q₂ = 0 cfs

WWSF classification approximately 2 ¼ miles downstream:
7-Q₁₀ = 0.02 cfs
7-Q₂ = 0.05 cfs

- Hardness = 219 mg/L as CaCO₃. This value represents the geometric mean of data from chronic WET testing from 05/28/2009 – 08/20/2019.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: Not applicable where the receiving water low flows are zero.
- Source of background concentration data: Background concentrations are not included because they don't impact the calculated WQBEL when the receiving water low flows are equal to zero.
- Multiple dischargers: None.
- Impaired water status: The immediate receiving water is 303(d) listed as impaired for total suspended solids.

Effluent Information

- Design flow rate(s):
 - Annual average = 0.056 MGD (Million Gallons per Day)
 - For reference, the actual average flow from 03/01/2019 – 02/29/2024 was 0.049 MGD.
- Hardness = 311 mg/L as CaCO₃. This value represents the geometric mean of data from 04/13/2022 – 04/27/2022.

Attachment #1

- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water source: Domestic wastewater with water supply from wells.
- Additives: Ferric chloride is used for phosphorus removal.
- Effluent characterization: This facility is categorized as a minor municipality, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus ammonia, chloride, hardness and phosphorus.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled “MEAN EFFL. CONC.”. Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Effluent Copper Data

| Sample Date | Copper µg/L | Sample Date | Copper µg/L | Sample Date | Copper µg/L |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|
| 04/13/2022 | 15 | 05/01/2022 | 13 | 05/15/2022 | 15 |
| 04/19/2022 | 14 | 05/05/2022 | 14 | 05/18/2022 | 13 |
| 04/24/2022 | 14 | 05/08/2022 | 15 | 05/22/2022 | 14 |
| 04/27/2022 | 13 | 05/11/2022 | 15 | | |
| 1-day P ₉₉ = 16 µg/L | | | | | |
| 4-day P ₉₉ = 15 µg/L | | | | | |

Effluent Chloride Data

| Sample Date | Copper µg/L | Sample Date | Copper µg/L | Sample Date | Copper µg/L |
|----------------------------------|-------------|-------------|-------------|-------------|-------------|
| 04/08/2019 | 290 | 01/05/2021 | 328 | 11/16/2022 | 334 |
| 07/24/2019 | 327 | 04/13/2021 | 264 | 02/13/2023 | 314 |
| 10/16/2019 | 252 | 07/27/2021 | 203 | 04/18/2023 | 202 |
| 01/15/2020 | 303 | 10/18/2021 | 269 | 07/24/2023 | 343 |
| 04/06/2020 | 235 | 01/17/2022 | 319 | 10/16/2023 | 303 |
| 07/08/2020 | 333 | 04/13/2022 | 282 | | |
| 10/13/2020 | 412 | 07/13/2022 | 291 | | |
| 1-day P ₉₉ = 433 mg/L | | | | | |
| 4-day P ₉₉ = 359 mg/L | | | | | |

The following table presents the average concentrations and loadings at Outfall 001 from 03/01/2019 – 02/29/2024 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

| Parameter | Average Measurement | Average Mass Discharged |
|------------------|---------------------|-------------------------|
| BOD ₅ | 8.4 mg/L* | |
| TSS | 5.5 mg/L | 2.1 lbs/day |
| pH field | 7.4 s.u. | |
| Phosphorus | 0.33 mg/L* | 0.14 lbs/day |
| Ammonia Nitrogen | 1.9 mg/L* | |
| Dissolved Oxygen | 5.7 mg/L | |

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

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

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

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P₉₉) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Acute Limits based on 1-Q₁₀

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q₁₀ receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

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

Where:

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

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

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

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

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

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q₁₀ method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is the case for Forest Junction.

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).

Attachment #1

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 0 cfs

| SUBSTANCE | REF. HARD.* mg/L | ATC | MEAN BACK-GRD. | MAX. EFFL. LIMIT** | 1/5 OF EFFL. LIMIT | MEAN EFFL. CONC. | 1-day P ₉₉ | 1-day MAX. CONC. |
|-----------------|---------------------|------|----------------|--------------------|--------------------|------------------|-----------------------|------------------|
| Arsenic | | 340 | | 340 | 68.0 | <14 | | |
| Cadmium | 311 | 37.9 | | 37.9 | 7.6 | <0.3 | | |
| Chromium | 301 | 4446 | | 4446 | 889 | <1.3 | | |
| Copper | 311 | 45.3 | | 45.3 | | | 16 | 15 |
| Lead | 311 | 320 | | 320 | 64.0 | 4.6 | | |
| Nickel | 268 | 1080 | | 1080 | 216 | 9.1 | | |
| Zinc | 311 | 325 | | 325 | 64.9 | 7.7 | | |
| Chloride (mg/L) | | 757 | | 757 | | | 433 | 412 |

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

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

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0 cfs

| SUBSTANCE | REF. HARD.* mg/L | CTC | MEAN BACK-GRD. | WEEKLY AVE. LIMIT | 1/5 OF EFFL. LIMIT | MEAN EFFL. CONC. | 4-day P ₉₉ |
|-----------------|---------------------|------|----------------|-------------------|--------------------|------------------|-----------------------|
| Arsenic | | 152 | | 152 | 30.4 | <14 | |
| Cadmium | 175 | 3.8 | | 3.82 | 0.76 | <0.3 | |
| Chromium | 219 | 251 | | 251 | 50.2 | <1.3 | |
| Copper | 219 | 20.2 | | 20.2 | | | 15 |
| Lead | 219 | 59.7 | | 59.7 | 11.9 | 4.6 | |
| Nickel | 219 | 101 | | 101 | 20.3 | 9.1 | |
| Zinc | 219 | 239 | | 239 | 47.8 | 7.7 | |
| Chloride (mg/L) | | 395 | | 395 | | | 359 |

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

Monthly Average Limits based on Wildlife Criteria (WC)

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

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 0 cfs

| SUBSTANCE | HTC | MEAN BACK-GRD. | MO'LY AVE. LIMIT | 1/5 OF EFFL. LIMIT | MEAN EFFL. CONC. |
|---------------|---------|----------------|------------------|--------------------|------------------|
| Cadmium | 370 | | 370 | 74.0 | <0.3 |
| Chromium (+3) | 3818000 | | 3818000 | 763600 | <1.3 |

Attachment #1

| | | | | | |
|--------|-------|--|-------|------|-----|
| Lead | 140 | | 140 | 28.0 | 4.6 |
| Nickel | 43000 | | 43000 | 8600 | 9.1 |

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 0 cfs

| SUBSTANCE | HCC | MEAN BACK-GRD. | MO'LY AVE. LIMIT | 1/5 OF EFFL. LIMIT | MEAN EFFL. CONC. |
|-----------|------|----------------|------------------|--------------------|------------------|
| Arsenic | 13.3 | | 13.3 | 2.66 | <14 |

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

Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are not required for the parameters in this section.

Chloride – Considering available effluent data from the current permit term (04/08/2019 – 10/16/2023), the 1-day P₉₉ chloride concentration is 433 mg/L, and the 4-day P₉₉ of effluent data is 359 mg/L.

These effluent concentrations are below the calculated WQBELs for chloride, therefore no effluent limits are needed. **Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.**

Mercury – The permit application did not require monitoring for mercury because Forest Junction is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3, Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, “there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5), Wis. Adm. Code.” A review of the past five years of sludge characteristics data reveals that the sample result are within expected analytical ranges and well below the 17 mg/kg level. The single sample available from the previous 5 years was reported as <2.16 mg/kg (08/22/2023). Therefore, no mercury monitoring is recommended at Outfall 001.

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

**PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS
FOR BOD₅ AND TSS**

The current permit has biological oxygen demand (BOD₅) limits of 30 mg/L as a weekly average and 20 mg/L as a monthly average based on a previously assumed LAL classification. Because this discharge is

to an LFF community, limits for BOD₅, dissolved oxygen (DO), and total suspended solids (TSS) per NR 104.02(3)(a) and NR 210.05(2), Wis. Adm. Code apply.

Based on the receiving water classification of LFF, **the recommended limitations for BOD₅ are 30 mg/L as a daily maximum and 15 mg/L as a monthly average and the recommended limitations for TSS are 30 mg/L as a daily maximum and 20 mg/L as a monthly average.** In order to maintain adequate dissolved oxygen in the receiving water, **a dissolved oxygen limit of 4.0 mg/L daily minimum is recommended to continue.**

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. The current permit has daily maximum, weekly average and monthly average limits. These limits are re-evaluated at this time due to the following changes:

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

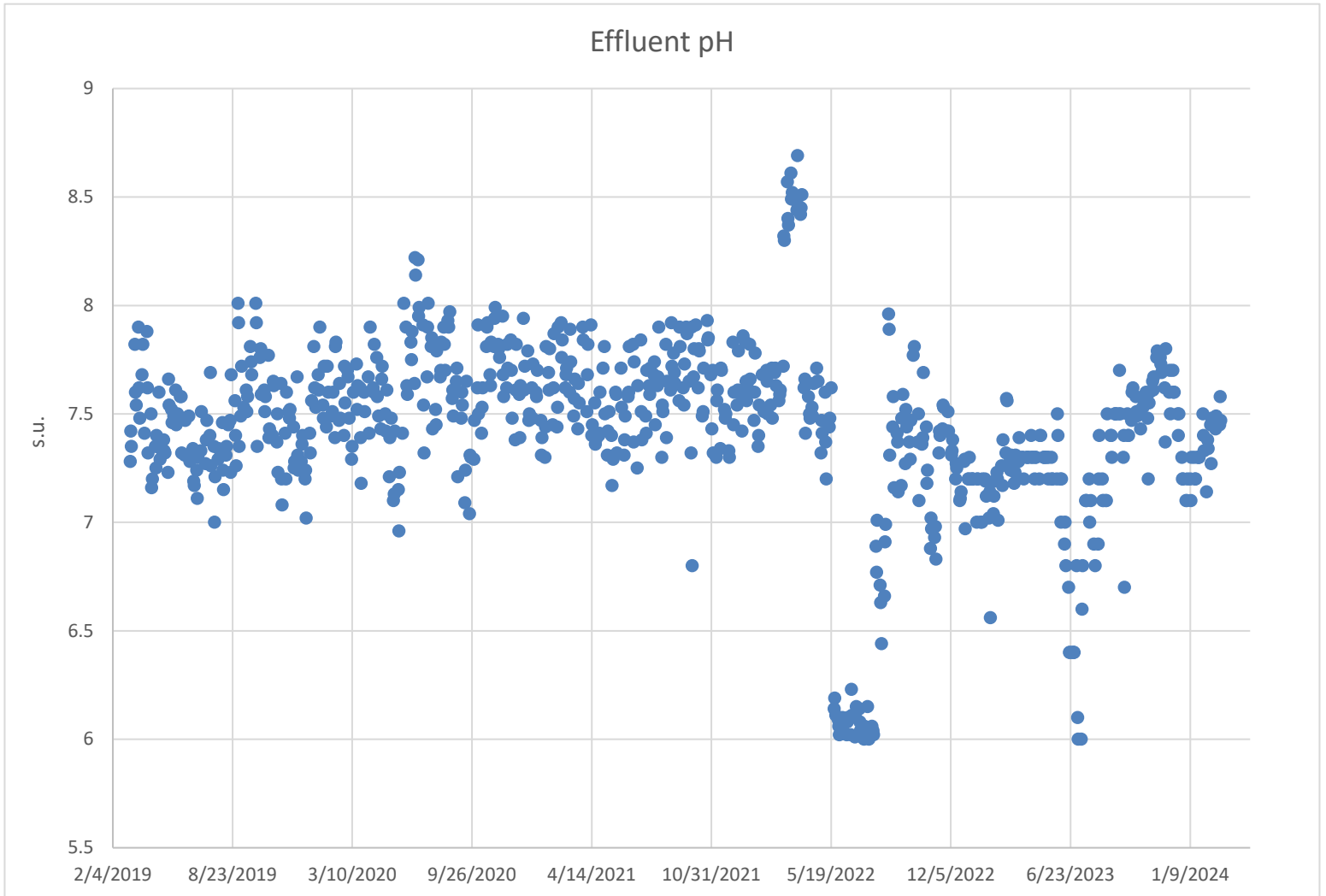
Daily maximum limitations are based on acute toxicity criteria in ch. NR 105, Wis. Adm. Code, which are a function of the effluent pH and the receiving water classification. The acute toxicity criterion (ATC) for ammonia is calculated using the following equation:

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

Where:

A = 0.411 and B = 58.4 for a Limited Forage Fishery, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH from the current permit term is shown below:



The effluent pH data was examined as part of this evaluation. The facility replaced their pH probe in July 2022 due to malfunction so data prior to this is excluded in this evaluation.

A total of 260 sample results were reported from 07/06/2022 – 02/29/2024. The maximum reported value was 7.96 s.u. (Standard pH Units). The effluent pH was 7.84 s.u. or less 99% of the time. The 1-day P_{99} , calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.18 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.13 s.u. Therefore, a value of 7.84 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 7.84 s.u. into the equation above yields an ATC = 17 mg/L.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method

In accordance with s. NR 106.32(2), Wis. Adm. Code daily maximum ammonia limitations are calculated using the the 1- Q_{10} receiving water low flow if it is determined that the previous method of acute

ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q₁₀ (estimated as 80 % of 7-Q₁₀) and the 2×ATC approach are shown below.

Daily Maximum Ammonia Nitrogen Determination

| | Ammonia Nitrogen Limit mg/L |
|-------------------|-----------------------------|
| 2×ATC | 23 |
| 1-Q ₁₀ | 12 |

The 1-Q₁₀ method yields the most stringent limits for Forest Junction.

This limit is greater than the current daily maximum limits for April – September. If Forest Junction would like to request an increase to the existing permit limits an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter-by-parameter basis and includes consideration of operations, maintenance and temporary upsets. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current limits must be continued in the reissued permit.

Presented below is a table of daily maximum limitations corresponding to various effluent pH values. Use of this table is not necessarily recommended in the permit, but it is presented herein for informational purposes.

Daily Maximum Ammonia Nitrogen Limits –LFF

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

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

The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, because those limits relate to the assimilative capacity of the receiving water.

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

Limited Forage Fish

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

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

Where:

pH = the pH (s.u.) of the receiving water,

E = 1.0,

C = the minimum of 3.09 or $3.73 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or

C = $3.73 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Absent), and

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

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

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q₁₀ (4-Q₃, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q₅ (estimated as 85% of the 7-Q₂ if the 30-Q₅ is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 °C, 25% of the flow is used if the Temperature < 11 °C, and 50% of the flow is used if the Temperature ≥ 11 °C but < 16 °C.

Section NR 106.32 (3), Wis. Adm. Code, provides a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 °C, during the winter and spring months. Burbot, an early spawning species, are not believed to be present in the unnamed tributary based on conversations with local fisheries biologists. So “ELS Absent” criteria apply from October through April, and “ELS Present” criteria will apply from May through September for an LFF classification.

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

Weekly and Monthly Ammonia Nitrogen Limits – LFF

| | | Spring | Summer | Winter |
|-------------------------------|------------------------------|--------|--------------|--------------|
| | | May | June – Sept. | Oct. – April |
| Effluent Flow | Q _e (MGD) | 0.056 | 0.056 | 0.056 |
| Background Information | 7-Q ₁₀ (cfs) | 0 | 0 | 0 |
| | 7-Q ₂ (cfs) | 0 | 0 | 0 |
| | Ammonia (mg/L) | 0.07 | 0.05 | 0.125 |
| | Average Temperature (°C) | 12 | 19 | 4 |
| | Maximum Temperature (°C) | 14 | 21 | 10 |
| | pH (s.u.) | 8.09 | 8.08 | 8.00 |
| | % of Flow used | 50 | 100 | 25 |
| | Reference Weekly Flow (cfs) | 0 | 0 | 0 |
| | Reference Monthly Flow (cfs) | 0 | 0 | 0 |
| | 4-day Chronic | | | |

Attachment #1

| | | Spring | Summer | Winter |
|--|---------------------------|--------|--------------|--------------|
| | | May | June – Sept. | Oct. – April |
| Criteria mg/L | Early Life Stages Present | 6.8 | 6.8 | |
| | Early Life Stages Absent | | | 25 |
| | 30-day Chronic | | | |
| | Early Life Stages Present | 2.7 | 2.7 | |
| | Early Life Stages Absent | | | 9.8 |
| Effluent Limitations mg/L | Weekly Average | | | |
| | Early Life Stages Present | 6.8 | 6.8 | |
| | Early Life Stages Absent | | | 25 |
| | Monthly Average | | | |
| | Early Life Stages Present | 2.7 | 2.7 | |
| | Early Life Stages Absent | | | 9.8 |

Warmwater Sport Fish Classification – 2 ¼ miles downstream of Outfall 001

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

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

Where:

pH = the pH (s.u.) of the receiving water,

E = 0.854,

C = the minimum of 2.85 or $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or

C = $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Absent), and

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

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

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q₁₀ (4-Q₃, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q₅ (estimated as 85% of the 7-Q₂ if the 30-Q₅ is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 °C, 25% of the flow is used if the Temperature < 11 °C, and 50% of the flow is used if the Temperature ≥ 11 °C but < 16 °C.

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

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

Weekly and Monthly Ammonia Nitrogen Limits – WWSF

Attachment #1

| | | Spring | Summer | Winter |
|----------------------------------|------------------------------|-------------|--------------|--------------|
| | | April & May | June – Sept. | Oct. - March |
| Effluent Flow | Qe (MGD) | 0.056 | 0.056 | 0.056 |
| Background Information | 7-Q ₁₀ (cfs) | 0.02 | 0.02 | 0.02 |
| | 7-Q ₂ (cfs) | 0.05 | 0.05 | 0.05 |
| | Ammonia (mg/L) | 0.04 | 0.05 | 0.125 |
| | Average Temperature (°C) | 12 | 19 | 4 |
| | Maximum Temperature (°C) | 14 | 21 | 10 |
| | pH (s.u.) | 8.06 | 8.08 | 7.99 |
| | % of Flow used | 50 | 100 | 25 |
| | Reference Weekly Flow (cfs) | 0.010 | 0.020 | 0.005 |
| | Reference Monthly Flow (cfs) | 0.021 | 0.043 | 0.011 |
| Criteria mg/L | 4-day Chronic | | | |
| | Early Life Stages Present | 5.5 | 3.7 | |
| | Early Life Stages Absent | | | 8.2 |
| | 30-day Chronic | | | |
| | Early Life Stages Present | 2.2 | 1.5 | 3.3 |
| Effluent Limitations mg/L | Early Life Stages Absent | | | |
| | Weekly Average | | | |
| | Early Life Stages Present | 6.2 | 4.5 | |
| | Early Life Stages Absent | | | 8.7 |
| | Monthly Average | | | |
| Early Life Stages Present | 2.8 | 2.2 | | |
| Early Life Stages Absent | | | 3.7 | |

Ammonia Decay

The Department must establish limits to protect downstream uses, according to s. NR 106.32(1)(b), Wis. Adm. Code. Ammonia decay may be considered when determining limits at the outfall to protect the downstream classification, according to s. NR 106.32(4)(c), Wis. Adm. Code. Where the calculated limits are more restrictive based on downstream uses, ammonia decay can be considered to determine if these more restrictive limits are needed or if the ammonia will decay before it reaches the point of the classification change.

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

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

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

The velocity of receiving water is assumed to be 5 miles per day and the distance from the point of discharge to the classification change is approximately 2.25 miles for a travel time of 0.45 days. After

decay, the limits are increased as shown in the following table. The most stringent limits between the limits calculated in this evaluation and the current limits are shown below in bold.

Ammonia Nitrogen Decay Limits Comparison

| Months Applicable | LFF | | WWSF | | After decay | | Current Limits | |
|-------------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|
| | Weekly Average mg/L | Monthly Average mg/L | Weekly Average mg/L | Monthly Average mg/L | Weekly Average mg/L | Monthly Average mg/L | Weekly Average mg/L | Monthly Average mg/L |
| April | 25 | 9.8 | 6.2 | 2.8 | 6.8 | 2.8 | 3.2 | 1.3 |
| May | 6.8 | 2.7 | 6.2 | 2.8 | 6.6 | 2.7 | 3.2 | 1.3 |
| June – August | 6.8 | 2.7 | 4.5 | 2.2 | 5.0 | 2.4 | 8.6 | 3.3 |
| September | 6.8 | 2.7 | 4.5 | 2.2 | 5.0 | 2.4 | 17 | 4.8 |
| October | 25 | 9.8 | 8.7 | 3.7 | 9.0 | 3.8 | 21 | 8.3 |
| November – March | 25 | 9.8 | 8.7 | 3.7 | 9.0 | 3.8 | 11 | 4.5 |

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from 03/05/2019 – 02/28/2024, with those results being compared to the calculated limits to determine the need to include ammonia limits in Forest Junction’s permit for the respective month ranges. That need is determined by calculating 99th upper percentile (or P₉₉) values for ammonia during each of the month ranges and comparing the daily maximum values to the daily maximum limit.

Ammonia Nitrogen Effluent Data

| Ammonia Nitrogen mg/L | April - May | June – August | September | October | November – March |
|------------------------|--------------|---------------|--------------|--------------|------------------|
| 1-day P ₉₉ | 12.7 | 15.5 | 0.40 | 1.24 | 20.2 |
| 4-day P ₉₉ | 7.08 | 8.55 | 0.22 | 0.67 | 11.1 |
| 30-day P ₉₉ | 3.21 | 3.97 | 0.11 | 0.31 | 5.06 |
| Mean* | 1.64 | 2.12 | 0.06 | 0.16 | 2.60 |
| Std | 2.87 | 3.44 | 0.09 | 0.31 | 4.67 |
| Sample size | 42 | 76 | 20 | 22 | 114 |
| Range | <0.11 – 11.4 | <0.11 – 18 | <0.11 – 0.27 | <0.11 – 1.13 | <0.11 – 17 |

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

Based on this comparison, daily maximum, weekly average, and monthly average limits are needed for November – August.

The permit currently has daily maximum, weekly average, and monthly average limits year-round. Where there are existing ammonia nitrogen limits in the permit, the limits must be retained regardless of reasonable potential, consistent with s. NR a106.33(1)(b), Wis. Adm. Code:

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

Conclusions and Recommendations

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

Final Ammonia Nitrogen Limits

| | Daily Maximum mg/L | Weekly Average mg/L | Monthly Average mg/L |
|------------------|--------------------|---------------------|----------------------|
| April – May | 8.8/Variable | 3.2 | 1.3 |
| June – August | 10/Variable | 5.0 | 2.4 |
| September | 10/Variable | 5.0 | 2.4 |
| October | | 9.0 | 3.8 |
| November – March | 12/Variable | 9.0 | 3.8 |

Forest Junction may decide to continue having the variable daily maximum ammonia limits or have the single daily maximum limits in the reissued permit.

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

Section NR 102.04(5), Wis. Adm. Code, states that all surface waters shall be suitable for supporting recreational use and shall meet E. coli criteria during the recreation season. Section NR 102.04(5)(b), Wis. Adm. Code, allows the Department to make exceptions when it determines, in accordance with s. NR 210.06(3), Wis. Adm. Code, that wastewater disinfection is not required to meet E. coli limits and protect the recreational use. Section NR 210.06(3), Wis. Adm. Code, tasks the Department with determining the need for disinfection using a site-specific analysis based on potential risk to human or animal health. It sets out the factors that must be considered in determining the necessity to disinfect municipal wastewater or to change the length of the disinfection season.

Forest Junction had previously been exempted from disinfection based on the limited aquatic life or limited forage fish community classification of the receiving water. The hydrologic classification for Plum Creek is continuous. Continuous streams have a higher likelihood of providing opportunities for full contact recreational activities. Therefore, disinfection should not be exempted based solely on this hydrological classification.

The Department has considered the information required by s. NR 210.06(3), Wis. Adm. Code, and has determined that the discharge cannot meet bacteria limits without disinfection. Section NR 210.06(2)(a)1, Wis. Adm. Code, includes two limits which must be included in permits for facilities which are required to disinfect:

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

These limits are required during May through September. The permit will include a compliance schedule to meet these limits.

Attachment #1
PART 5 – PHOSPHORUS

Technology-Based Effluent Limit

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

Because Forest Junction currently has a limit of 0.99 mg/L, this limit should be included in the reissued permit. This limit remains applicable unless a more stringent WQBEL is given.

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

Water Quality Based Limit – Phosphorus

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

Section NR 217.16, Wis. Adm. Code, states that the Department may include a TMDL-derived water quality based effluent limit (WQBEL) for phosphorus in addition to, or in lieu of, a s. NR 217.13 WQBEL in a WPDES permit. The LFR TMDL establishes TP wasteload allocations (WLAs) to reduce the loading in the entire watershed including WLAs to meet water quality standards for tributaries to the Lower Fox River. Therefore, implementing the TMDL provide WQBELs to protect immediate receiving waters and a s. NR 217.13 WQBEL is not needed.

This limit should be expressed in a manner consistent with the wasteload allocation and assumptions of the TMDL. If after two permit terms, the Department determines the nonpoint source load allocation has not been substantially reduced, the Department may include the s. NR 217.13 WQBEL unless these reductions are likely to occur.

TMDL Limits

Total phosphorus (TP) effluent limits in lbs/day are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs* (April 2020) and are based on the annual phosphorus (WLA) given in pounds per year. The WLA found in the *Total Maximum Daily Loads and Watershed Management Plan for Total Phosphorus and Total Phosphorus and Total Suspended Solids in the Lower Fox River Basin and Lower Green Bay (LFR TMDL)* report dated March 2012 are expressed as maximum annual loads (lbs/year). The TP WLA for Forest Junction is 122 lbs/year. The following table summarizes Forest Junction’s annual loading from the current permit term:

| Year | TP lbs/year |
|------|-------------|
| 2020 | 19.4 |
| 2021 | 62.9 |
| 2022 | 50.0 |
| 2023 | 76.6 |

Because Forest Junction is already meeting the annual WLA of 122 lbs/year, the **current TMDL-based limit of 0.49 lbs/day as a monthly average is recommended to continue in the reissued permit.**

Effluent Data

The following table summarizes the phosphorus data from the current permit term. The mass data was calculated from the concentration and corresponding effluent flow rate from the same day.

| Total Phosphorus Data | | |
|------------------------------|-------------------------------|-------------------------|
| | Concentration mg/L | Mass lbs/day |
| 1-day P ₉₉ | 1.86 | 1.08 |
| 4-day P ₉₉ | 1.01 | 0.60 |
| 30-day P ₉₉ | 0.53 | 0.28 |
| Mean* | 0.33 | 0.15 |
| Std | 0.39 | 0.24 |
| Sample size | 780 | 780 |
| Range | 0.01 – 4.5 | 0.00225 – 2.956 |

PART 6 – TOTAL SUSPENDED SOLIDS

TMDL Limits – Total Suspended Solids

Total suspended solids (TSS) effluent limits in lbs/day are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs* (April 2020) and are based on the annual phosphorus wasteload allocation (WLA) given in pounds per year. The WLA found in the *Total Maximum Daily Loads and Watershed Management Plan for Total Phosphorus and Total Phosphorus and Total Suspended Solids in the Lower Fox River Basin and Lower Green Bay (LFR TMDL)* report dated March 2012 are expressed as maximum annual loads (lbs/year). The TSS WLA for Forest Junction is 2,471 lbs/year. The following table summarizes Forest Junction’s annual loading from the current permit term:

| Annual TSS Loading | |
|---------------------------|---------------------|
| Year | TSS lbs/year |
| 2020 | 571 |
| 2021 | 2209 |
| 2022 | 598 |
| 2023 | 836 |

Because Forest Junction is already meeting the annual WLA of 2,471 lbs/year, the **current TMDL-based limits of 36 lbs/day as a weekly average and 20 lbs/day as a monthly average are recommended to continue in the reissued permit.**

Effluent Data

The following table summarizes the TSS data from the current permit term. The mass data was calculated from the concentration and corresponding effluent flow rate from the same day.

| Effluent TSS Data | | |
|--------------------------|-----------------------|--------------------------|
| | TSS (mg/L) | TSS (lbs/day) |
| | | |

Attachment #1

| | | |
|------------------------|---------|------------|
| 1-day P ₉₉ | 74.7 | 29.2 |
| 4-day P ₉₉ | 53.0 | 18.9 |
| 30-day P ₉₉ | 23.0 | 7.87 |
| Mean | 6.07 | 2.68 |
| Std | 25.0 | 8.21 |
| Sample Size | 703 | 703 |
| Range | 2 - 662 | 0.23 – 204 |

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 03/01/2019 – 02/29/2024.

Forest Junction did not monitor for temperature during the current permit term. The table below summarizes the maximum temperatures reported during monitoring from monitoring from previous permit terms from 02/02/2011 – 10/26/2016.

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 | | | 54 | 78 |
| FEB | 34 | 34 | 54 | 79 |
| MAR | 36 | 39 | 57 | 80 |
| APR | 57 | 59 | 63 | 81 |
| MAY | 67 | 70 | 70 | 84 |
| JUN | 74 | 82 | 77 | 85 |
| JUL | 76 | 77 | 81 | 86 |
| AUG | 73 | 75 | 79 | 86 |
| SEP | 74 | 77 | 73 | 85 |
| OCT | 60 | 63 | 63 | 83 |
| NOV | 43 | 46 | 54 | 80 |

Attachment #1

| 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) |
| DEC | 43 | 50 | 54 | 79 |

Reasonable Potential

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

- An acute limit for temperature is recommended for each month in which the representative daily maximum effluent temperature for that month exceeds the acute WQBEL. The representative daily maximum effluent temperature is the greater of the following:
 - (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 September.**

There is not temperature data available for the month of January. Section NR 106.59(2)(b), Wis. Adm. Code, allows the use of temperature effluent data, on a case-by-case basis, from at least two other POTWs within a 100-mile radius that utilize similar wastewater treatment technology and have a similar ratio of domestic to industrial waste stream composition, or representative data of the POTW. Morrison WWTF, approximately 9 miles away, had a maximum temperature in January of 48 deg F and Hilbert WWTF, approximately 5 miles away, had a maximum temperature in January of 49 deg F.

The following general options are available for a facility to explore potential relief from the weekly average limit for September:

- Effluent monitoring data: Verification or additional effluent monitoring (flow and/or temperature) may be appropriate if there were questions on the representativeness of the current effluent data.
- Monthly low receiving water flows: Contract with USGS to generate monthly low flow estimates for the receiving water to be used in place of the annual low flow. Given the fact the receiving water low flow is 0 cfs, this option is unlikely to provide relief.

Attachment #1

- Dissipative cooling demonstration: Effluent limitations based on sub-lethal criteria may be adjusted based on the potential for heat dissipation from municipal treatment plants as described in s. NR 106.59(4), Wis. Adm. Code.
- Collection of site-specific ambient temperature: default background temperatures for streams in Wisconsin, so actual data from the direct receiving water may provide for relaxed thermal limits but only if the site-specific temperatures are lower than the small stream defaults used in the above tables
- A variance to the water quality standard: This is typically considered to be the least preferable and most complex option as it requires the evaluation of the other alternatives.

These options are explained in additional detail in the August 15, 2013 Department *Guidance for Implementation of Wisconsin's Thermal Water Quality Standards*
<http://dnr.wi.gov/topic/surfacewater/documents/ThermalGuidance2edition8152013.pdf>

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 **100%** shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

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

Where:

Q_e = annual average flow = 0.056 MGD = 0.087 cfs

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

Q_s = $\frac{1}{4}$ of the 7-Q₁₀ = 0 cfs \div 4 = 0 cfs

- 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

Attachment #1

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. If there is no flow upstream, lab water may be used instead. The specific receiving water location must be specified in the WPDES permit.

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

WET Data History

| Date Test Initiated | Acute Results LC ₅₀ % | | | | Chronic Results IC ₂₅ % | | | | | Footnotes or Comments |
|---------------------|-------------------------------------|----------------|---------------|-------------|---------------------------------------|----------------|---------------------------|---------------|------------|-----------------------|
| | <i>C. dubia</i> | Fathead minnow | Pass or Fail? | Used in RP? | <i>C. dubia</i> | Fathead Minnow | Algae (IC ₅₀) | Pass or Fail? | Use in RP? | |
| 10/11/2005 | | | | | >100 | >100 | 83.5 | Fail | No | 1 |
| 10/20/2005 | | | | | >100 | >100 | | Pass | No | 1 |
| 10/17/2006 | | | | | 92.3 | >100 | | Pass | No | 1 |
| 05/16/2007 | | | | | >100 | >100 | | Pass | No | 1 |
| 10/30/2007 | | | | | >100 | >100 | | Pass | No | 1 |
| 10/14/2008 | | | | | >100 | >100 | | Pass | No | 1 |
| 05/28/2009 | >100 | >100 | Pass | Yes | >100 | >100 | | Pass | No | 1 |
| 08/12/2010 | | | | | >100 | >100 | | Pass | No | 1 |
| 10/30/2012 | >100 | >100 | Pass | Yes | >100 | >100 | | Pass | No | 1 |
| 08/20/2019 | >100 | >100 | Pass | Yes | >100 | >100 | | Pass | Yes | |
| 06/20/2020 | >100 | >100 | Pass | Yes | >100 | >100 | | Pass | Yes | |
| 11/02/2021 | | | | | >100 | >100 | | Pass | Yes | |
| 03/12/2024 | >100 | >100 | Pass | Yes | >100 | >100 | | Pass | Yes | |

Footnotes:

1. Forest Junction went through a major upgrade in 2015. Data prior to this is not considered representative of current treatment conditions.
- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. **WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.**

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

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

According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa and TUc effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC₅₀, IC₂₅ or IC₅₀ ≥ 100%).

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

Attachment #1

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

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

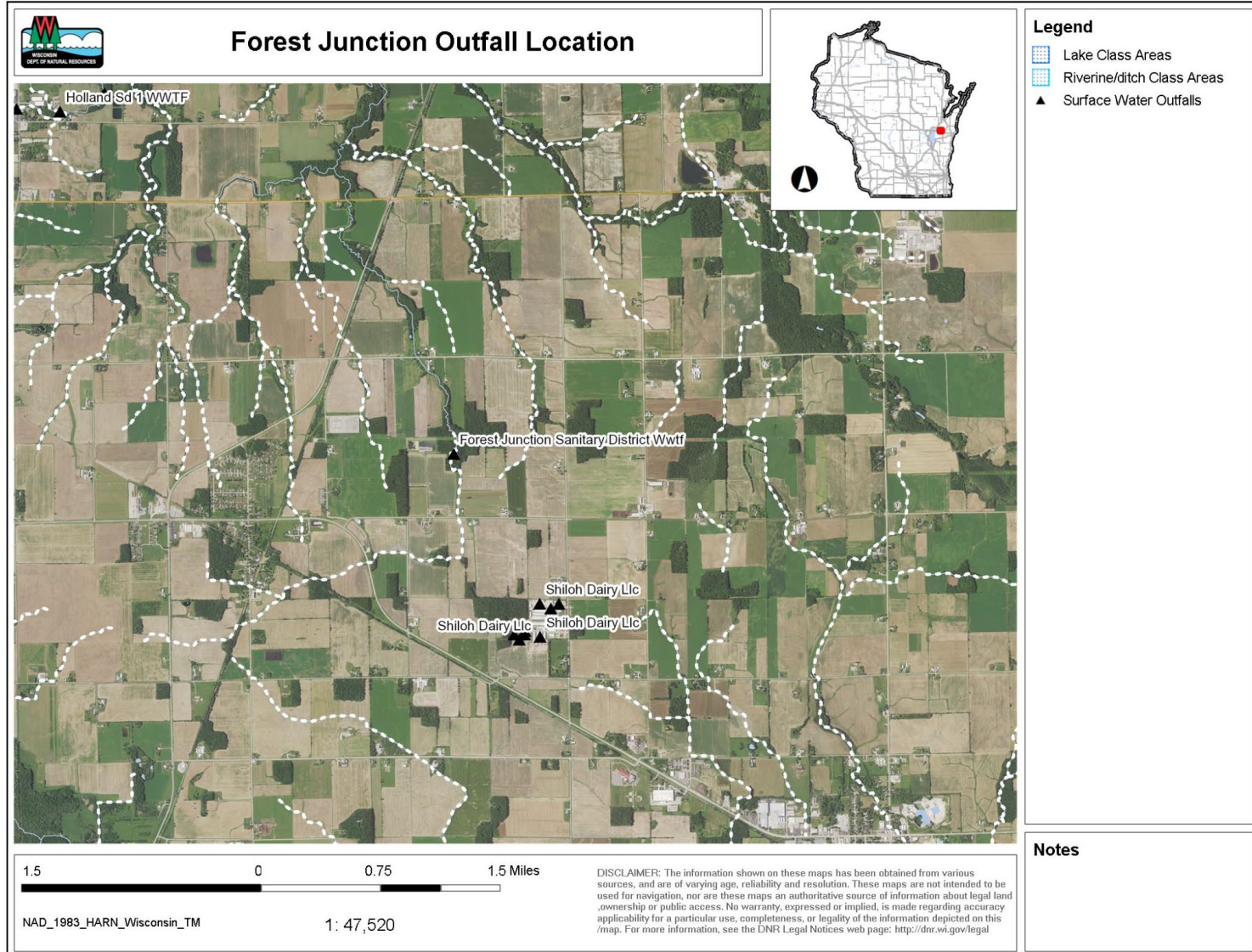
WET Checklist Summary

| | Acute | Chronic |
|---------------------------------------|--|--|
| AMZ/IWC | Not Applicable. 0 Points | IWC = 100%. 15 Points |
| Historical Data | 2 tests used to calculate RP. No tests failed. 0 Points | 4 tests used to calculate RP. No tests failed. 0 Points |
| Effluent Variability | Little variability, no violations or upsets, consistent WWTF operations. 0 Points | Same as Acute. 0 Points |
| Receiving Water Classification | Variance water, less than 4 miles to WWSF classification. 5 Points | Same as Acute. 5 Points |
| Chemical-Specific Data | Reasonable potential for limits for ammonia based on ATC; Copper, lead, nickel, zinc, and chloride detected. Additional Compounds of Concern: None. 8 Points | Reasonable potential for limits for ammonia based on CTC; Copper, lead, nickel, zinc, and chloride detected. Additional Compounds of Concern: None. 8 Points |
| Additives | Ferric chloride is used. Permittee has proper P chemical SOPs in place: No 1 Point | All additives used more than once per 4 days. 1 Point |
| Discharge Category | 0 Industrial Contributors. 0 Points | Same as Acute. 0 Points |
| Wastewater Treatment | Secondary or better. 0 Points | Same as Acute. 0 Points |
| Downstream Impacts | No impacts known. 0 Points | Same as Acute. 0 Points |
| Total Checklist Points: | 14 Points | 29 Points |

Attachment #1

| | Acute | Chronic |
|---|-----------------------|-----------------------------|
| Recommended Monitoring Frequency (from Checklist): | No tests recommended. | 3 tests during permit term. |
| Limit Required? | No | No |
| TRE Recommended? (from Checklist) | No | No |

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, 3 tests/permit term chronic WET tests are recommended in the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing should continue after the permit expiration date (until the permit is reissued).



Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

| | | | | | |
|-------------------------------------|-----------------|---|-------------------------------|-------------------|-------------------|
| Facility: | Forest Junction | 7-Q₁₀: | 0.00 cfs | Temp Dates | Flow Dates |
| Outfall(s): | 001 | Dilution: | 25% | Start: | 02/02/11 03/01/19 |
| Date Prepared: | 4/18/2024 | f: | 0 | End: | 10/26/16 02/29/24 |
| Design Flow (Q_e): | 0.06 MGD | Stream type: | Limited forage fish community | | |
| Storm Sewer Dist. | 0 ft | Q_s:Q_e ratio: | 0.0 :1 | | |
| | | Calculation Needed? | YES | | |

| Month | Water Quality Criteria | | | Receiving Water Flow Rate (Q _s) (cfs) | Representative Highest Effluent Flow Rate (Q _e) | | f | Representative Highest Monthly Effluent Temperature | | Calculated Effluent Limit | |
|-------|--------------------------|----------------|-----------|---|---|--|---|---|---------------|------------------------------------|-----------------------------------|
| | T _a (default) | Sub-Lethal WQC | Acute WQC | | 7-day Rolling Average (Q _{es1}) (MGD) | Daily Maximum Flow Rate (Q _{ea}) (MGD) | | Weekly Average | Daily Maximum | Weekly Average Effluent Limitation | Daily Maximum Effluent Limitation |
| | (°F) | (°F) | (°F) | | (MGD) | (MGD) | | (°F) | (°F) | (°F) | (°F) |
| JAN | 37 | 54 | 78 | 0.00 | 0.133 | 0.189 | 0 | | | 54 | 78 |
| FEB | 39 | 54 | 79 | 0.00 | 0.112 | 0.168 | 0 | 34 | 34 | 54 | 79 |
| MAR | 43 | 57 | 80 | 0.00 | 0.172 | 0.288 | 0 | 36 | 39 | 57 | 80 |
| APR | 50 | 63 | 81 | 0.00 | 0.127 | 0.210 | 0 | 57 | 59 | 63 | 81 |
| MAY | 59 | 70 | 84 | 0.00 | 0.079 | 0.132 | 0 | 67 | 70 | 70 | 84 |
| JUN | 64 | 77 | 85 | 0.00 | 0.075 | 0.099 | 0 | 74 | 82 | 77 | 85 |
| JUL | 69 | 81 | 86 | 0.00 | 0.076 | 0.145 | 0 | 76 | 77 | 81 | 86 |
| AUG | 68 | 79 | 86 | 0.00 | 0.120 | 0.235 | 0 | 73 | 75 | 79 | 86 |
| SEP | 63 | 73 | 85 | 0.00 | 0.093 | 0.243 | 0 | 74 | 77 | 73 | 85 |
| OCT | 55 | 63 | 83 | 0.00 | 0.079 | 0.129 | 0 | 60 | 63 | 63 | 83 |
| NOV | 46 | 54 | 80 | 0.00 | 0.071 | 0.108 | 0 | 43 | 46 | 54 | 80 |
| DEC | 40 | 54 | 79 | 0.00 | 0.069 | 0.126 | 0 | 43 | 50 | 54 | 79 |