

## Permit Fact Sheet

### General Information

|                                       |                                                                                                                                                                                       |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Permit Number                         | WI-0021181-10-0                                                                                                                                                                       |
| Permittee Name and Address            | OCONOMOWOC WASTEWATER TREATMENT PLANT<br>900 S Worthington St, Oconomowoc, WI 53066                                                                                                   |
| Permitted Facility Name and Address   | Oconomowoc Wastewater Treatment Plant<br>900 S Worthington St, Oconomowoc, WI                                                                                                         |
| Permit Term                           | April 01, 2026 to March 31, 2031                                                                                                                                                      |
| Discharge Location                    | East bank of the Oconomowoc River, approximately 2,200 feet downstream of the North Concord Road bridge in Oconomowoc (SEQ, NEQ, Section 5, T7N-R17E)                                 |
| Receiving Water                       | Oconomowoc River in the Oconomowoc River Watershed of the Upper Rock River Basin in Waukesha County                                                                                   |
| Stream Flow (Q <sub>7,10</sub> )      | 2.1 cfs                                                                                                                                                                               |
| Stream Classification                 | Warm Water Sport Fish (WWSF) community, non-public water supply                                                                                                                       |
| Discharge Type                        | Existing; Continuous                                                                                                                                                                  |
| Annual Average Design Flow            | 4.02 MGD                                                                                                                                                                              |
| Industrial or Commercial Contributors | CIUs – Vorteq Coil Finishers<br>SIUs – Aurora Medical Center; Oconomowoc Memorial Hospital; Bimbo Bakeries USA                                                                        |
| Plant Classification                  | A1 - Suspended Growth Processes; B - Solids Separation; C - Biological Solids/Sludges; P - Total Phosphorus; D - Disinfection; L - Laboratory; SS - Sanitary Sewage Collection System |
| Approved Pretreatment Program?        | N/A                                                                                                                                                                                   |

### Facility Description

The City of Oconomowoc operates a 4.02 million gallon per day (MGD) annual average design flow conventional activated sludge wastewater treatment plant designed to treat an organic loading of 8,340 lbs/day. The plant was placed online in 1977 and currently serves a population of approximately 25,900. Treatment processes include screening, grit removal, primary clarification, activated sludge aeration, secondary clarification, tertiary filtration and UV light disinfection. Ferric chloride is applied at the end of the aeration basins for phosphorus removal. Effluent receives additional aeration (fine bubble diffusers) in the final effluent tanks before flowing into a trapezoidal concrete channel that terminates at the east bank of the Oconomowoc River approximately 800 feet west of the plant. Waste activated sludge is thickened using a gravity belt; the thickened WAS and primary clarifier sludge are anaerobically digested. Biosolids are stored on-site and land applied from spring through fall onto agricultural sites approved by the Department. The plant provides wastewater treatment services for the City of Oconomowoc, Mary Lane S.D., Ixonia S.D. No. 2, Village of Lac La Belle, Lac La Belle S.D., Blackhawk S.D., the Village of Summit and the Village of Oconomowoc Lake. Domestic holding tank and septic tank wastes are also accepted by the facility.

## Substantial Compliance Determination

**Enforcement During Last Permit:** During the permit term, three Notices of Noncompliance (NONs) were sent for chloride effluent limit exceedances (July, July, and August 2021). Additionally, a NON was sent in June 2022 for a Sanitary Sewer Overflow (SSO). The facility has completed all previously required actions as part of the enforcement process.

After a desk top review of all discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on 8/8/2024, this facility has been found to be in substantial compliance with their current permit.

**Compliance determination made by Nick Lent, Wastewater Engineer, on 9/5/25.**

## Sample Point Descriptions

| Sample Point Designation |                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sample Point Number      | Discharge Flow, Units, and Averaging Period                                                                                                                       | Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)                                                                                                                                                                                                                                                                                                                                                                                    |
| 701                      | 2.47 MGD (Avg. 10/1/20-6/30/25)                                                                                                                                   | Influent: 24-hour flow proportional composite sampler intake located in the influent wetwell (after screening and before grit removal).                                                                                                                                                                                                                                                                                                                                        |
| 103                      | N/A – no flow monitoring                                                                                                                                          | Field Blank: Collect the mercury field blank using standard sample handling procedures.                                                                                                                                                                                                                                                                                                                                                                                        |
| 001                      | 2.47 MGD (Avg. 10/1/20-2/28/25)                                                                                                                                   | Effluent: 24-hour flow proportional composite sampler intake is located at the discharge of tertiary disc filters, prior to UV disinfection. Grab samples are collected from the final effluent tank after oxygen uptake.                                                                                                                                                                                                                                                      |
| 601                      | N/A – no flow monitoring                                                                                                                                          | In-stream Sampling Point 601: Representative water samples shall be collected from the Oconomowoc River. Sample point 601 is located downstream of the Oconomowoc WWTP Outfall, prior to the confluence with the Rock River at the Northside Drive bridge (43.10792, -88.61793). Flow shall be measured at the West River Drive bridge crossing (43.09337, -88.60931). Sample point 601 correlates with sample point #18 in the approved AM Plan No. AM-2025-01 (August 2025). |
| 003                      | In 2024, a total of 2,183,200 gallons of liquid sludge was generated. Of that, 654,000 gal. was hauled off-site for disposal and 1,529,200 gal. was land applied. | Liquid Sludge: Class B, anaerobically digested, liquid sludge. Sludge is thickened using a gravity belt and stored on-site. Representative samples shall be collected from the storage tank after mixing, or from trucks as they are loaded.                                                                                                                                                                                                                                   |

## Permit Requirements

### 1 Influent – Monitoring Requirements

#### 1.1 Sample Point Number: 701- INFLUENT TO PLANT

| Monitoring Requirements and Limitations |            |                 |                  |                      |                                            |
|-----------------------------------------|------------|-----------------|------------------|----------------------|--------------------------------------------|
| Parameter                               | Limit Type | Limit and Units | Sample Frequency | Sample Type          | Notes                                      |
| Flow Rate                               |            | MGD             | Daily            | Continuous           |                                            |
| BOD <sub>5</sub> , Total                |            | mg/L            | 5/Week           | 24-Hr Flow Prop Comp |                                            |
| Suspended Solids, Total                 |            | mg/L            | 5/Week           | 24-Hr Flow Prop Comp |                                            |
| Mercury, Total Recoverable              |            | ng/L            | Annual           | 24-Hr Flow Prop Comp | See the Mercury Monitoring permit section. |

##### 1.1.1 Changes from Previous Permit:

Influent limitations and monitoring requirements were evaluated for this permit term and no changes were required.

##### 1.1.2 Explanation of Limits and Monitoring Requirements

Monitoring of influent flow, BOD<sub>5</sub> and total suspended solids is required by s. NR 210.04(2), Wis. Adm. Code, to assess wastewater strengths and volumes and to demonstrate the percent removal requirements in s. NR 210.05, Wis. Adm. Code, and in the Standard Requirements section of the permit.

### 2 In-plant - Monitoring and Limitations

#### 2.1 Sample Point Number: 103- Field Blank

| Monitoring Requirements and Limitations |            |                 |                  |             |                                            |
|-----------------------------------------|------------|-----------------|------------------|-------------|--------------------------------------------|
| Parameter                               | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes                                      |
| Mercury, Total Recoverable              |            | ng/L            | Annual           | Blank       | See the Mercury Monitoring permit section. |

##### 2.1.1 Changes from Previous Permit:

In-plant limitations and monitoring requirements were evaluated for this permit term and no changes were required.

##### 2.1.2 Explanation of Limits and Monitoring Requirements

**Mercury Field Blank** – Monitoring is included in the permit pursuant to s. NR 106.145, Wis. Adm. Code. Field blanks must meet the requirements under s. NR 106.145(9) and (10), Wis. Adm. Code. The permittee shall collect a mercury field blank for each set of mercury samples (a set of samples may include a combination of influent, effluent or other

samples all collected on the same day). Field blanks are required to verify a sample has not been contaminated during collection, transportation or analysis.

### 3 Surface Water - Monitoring and Limitations

#### 3.1 Sample Point Number: 001- EFFLUENT

| Monitoring Requirements and Limitations |             |                 |                  |                      |                                          |
|-----------------------------------------|-------------|-----------------|------------------|----------------------|------------------------------------------|
| Parameter                               | Limit Type  | Limit and Units | Sample Frequency | Sample Type          | Notes                                    |
| BOD5, Total                             | Weekly Avg  | 15 mg/L         | 5/Week           | 24-Hr Flow Prop Comp | Limit applies Nov-April.                 |
| BOD5, Total                             | Weekly Avg  | 7.0 mg/L        | 5/Week           | 24-Hr Flow Prop Comp | Limit applies May-Oct.                   |
| BOD5, Total                             | Monthly Avg | 15 mg/L         | 5/Week           | 24-Hr Flow Prop Comp | Limit applies Nov-April.                 |
| BOD5, Total                             | Monthly Avg | 7.0 mg/L        | 5/Week           | 24-Hr Flow Prop Comp | Limit applies May-Oct.                   |
| BOD5, Total                             | Weekly Avg  | 500 lbs/day     | 5/Week           | Calculated           | Limit applies Nov-April.                 |
| BOD5, Total                             | Weekly Avg  | 233 lbs/day     | 5/Week           | Calculated           | Limit applies May-Oct.                   |
| Suspended Solids, Total                 | Weekly Avg  | 15 mg/L         | 5/Week           | 24-Hr Flow Prop Comp | Limit applies Nov-April.                 |
| Suspended Solids, Total                 | Weekly Avg  | 10 mg/L         | 5/Week           | 24-Hr Flow Prop Comp | Limit applies May-Oct.                   |
| Suspended Solids, Total                 | Monthly Avg | 15 mg/L         | 5/Week           | 24-Hr Flow Prop Comp | Limit applies Nov-April.                 |
| Suspended Solids, Total                 | Monthly Avg | 10 mg/L         | 5/Week           | 24-Hr Flow Prop Comp | Limit applies May-Oct.                   |
| Suspended Solids, Total                 | Weekly Avg  | 431 lbs/day     | 5/Week           | Calculated           | Limit applies Jan, March, April and Dec. |
| Suspended Solids, Total                 | Weekly Avg  | 475 lbs/day     | 5/Week           | Calculated           | Limit applies in Feb.                    |
| Suspended Solids, Total                 | Weekly Avg  | 334 lbs/day     | 5/Week           | Calculated           | Limit applies May and Oct.               |
| Suspended Solids, Total                 | Weekly Avg  | 332 lbs/day     | 5/Week           | Calculated           | Limit applies in June.                   |
| Suspended Solids, Total                 | Weekly Avg  | 232 lbs/day     | 5/Week           | Calculated           | Limit applies July and Sept.             |
| Suspended Solids, Total                 | Weekly Avg  | 221 lbs/day     | 5/Week           | Calculated           | Limit applies in Aug.                    |

| Monitoring Requirements and Limitations |                          |                 |                  |                      |                                                                                                                                                                     |
|-----------------------------------------|--------------------------|-----------------|------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter                               | Limit Type               | Limit and Units | Sample Frequency | Sample Type          | Notes                                                                                                                                                               |
| Suspended Solids, Total                 | Weekly Avg               | 442 lbs/day     | 5/Week           | Calculated           | Limit applies in Nov.                                                                                                                                               |
| Suspended Solids, Total                 | Monthly Avg              | 326 lbs/day     | 5/Week           | Calculated           | Limit applies Jan, March and Dec.                                                                                                                                   |
| Suspended Solids, Total                 | Monthly Avg              | 360 lbs/day     | 5/Week           | Calculated           | Limit applies in Feb.                                                                                                                                               |
| Suspended Solids, Total                 | Monthly Avg              | 327 lbs/day     | 5/Week           | Calculated           | Limit applies in April.                                                                                                                                             |
| Suspended Solids, Total                 | Monthly Avg              | 268 lbs/day     | 5/Week           | Calculated           | Limit applies in May and Oct.                                                                                                                                       |
| Suspended Solids, Total                 | Monthly Avg              | 251 lbs/day     | 5/Week           | Calculated           | Limit applies in June.                                                                                                                                              |
| Suspended Solids, Total                 | Monthly Avg              | 175 lbs/day     | 5/Week           | Calculated           | Limit applies in July.                                                                                                                                              |
| Suspended Solids, Total                 | Monthly Avg              | 167 lbs/day     | 5/Week           | Calculated           | Limit applies in Aug.                                                                                                                                               |
| Suspended Solids, Total                 | Monthly Avg              | 176 lbs/day     | 5/Week           | Calculated           | Limit applies in Sept.                                                                                                                                              |
| Suspended Solids, Total                 | Monthly Avg              | 335 lbs/day     | 5/Week           | Calculated           | Limit applies in Nov.                                                                                                                                               |
| Dissolved Oxygen                        | Daily Min                | 7.0 mg/L        | 5/Week           | Grab                 |                                                                                                                                                                     |
| pH Field                                | Daily Max                | 9.0 su          | 5/Week           | Grab                 |                                                                                                                                                                     |
| pH Field                                | Daily Min                | 6.0 su          | 5/Week           | Grab                 |                                                                                                                                                                     |
| E. coli                                 | Geometric Mean - Monthly | 126 #/100 ml    | 2/Week           | Grab                 | Monitoring and limit apply May through September annually.                                                                                                          |
| E. coli                                 | % Exceedance             | 10 Percent      | Monthly          | Calculated           | Monitoring and limit apply May through September annually. See the E. coli Percent Limit permit section. Enter the result in the eDMR on the last day of the month. |
| Nitrogen, Ammonia (NH3-N) Total         |                          | mg/L            | 3/Week           | 24-Hr Flow Prop Comp |                                                                                                                                                                     |
| Nitrogen, Total Kjeldahl                |                          | mg/L            | Quarterly        | 24-Hr Flow Prop Comp |                                                                                                                                                                     |

| Monitoring Requirements and Limitations |             |                 |                  |                      |                                                                                                                                                                                                     |
|-----------------------------------------|-------------|-----------------|------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter                               | Limit Type  | Limit and Units | Sample Frequency | Sample Type          | Notes                                                                                                                                                                                               |
| Nitrogen, Nitrite + Nitrate Total       |             | mg/L            | Quarterly        | 24-Hr Flow Prop Comp |                                                                                                                                                                                                     |
| Nitrogen, Total                         |             | mg/L            | Quarterly        | Calculated           | Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.                                                                  |
| PFOS                                    |             | ng/L            | 1/ 2 Months      | Grab                 | Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.                                                                                                                    |
| PFOA                                    |             | ng/L            | 1/ 2 Months      | Grab                 | Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.                                                                                                                    |
| Phosphorus, Total                       | Monthly Avg | 0.95 mg/L       | 4/Week           | 24-Hr Flow Prop Comp |                                                                                                                                                                                                     |
| Phosphorus, Total                       | 6-Month Avg | 0.6 mg/L        | 4/Week           | 24-Hr Flow Prop Comp | This is an Adaptive Management interim limit effective upon permit issuance until April 30, 2027.                                                                                                   |
| Phosphorus, Total                       | 6-Month Avg | 0.5 mg/L        | 4/Week           | 24-Hr Flow Prop Comp | This is an Adaptive Management interim limit that goes into effect May 1, 2027. See the Schedules section and permit effluent requirements.                                                         |
| Phosphorus, Total                       |             | lbs/day         | 4/Week           | Calculated           | Calculate the daily mass discharge of phosphorus in lbs/day on the same days phosphorus sampling occurs. $\text{Mass (lbs/day)} = \text{Concentration (mg/L)} \times \text{Flow (MGD)} \times 8.34$ |
| Chloride                                | Weekly Avg  | 525 mg/L        | 4/Month          | 24-Hr Flow Prop Comp | This is an interim limit effective Nov-April. Sampling shall be conducted on four consecutive days one week per month. See the Chloride                                                             |

| Monitoring Requirements and Limitations |             |                 |                   |                      |                                                                                                                                                                                                                                                   |
|-----------------------------------------|-------------|-----------------|-------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter                               | Limit Type  | Limit and Units | Sample Frequency  | Sample Type          | Notes                                                                                                                                                                                                                                             |
|                                         |             |                 |                   |                      | Variance - Implement Source Reduction Measures permit section and the Chloride SRM (Target Value) Schedule.                                                                                                                                       |
| Chloride                                | Weekly Avg  | 510 mg/L        | 4/Month           | 24-Hr Flow Prop Comp | This is an interim limit effective May-Oct. Sampling shall be conducted on four consecutive days one week per month. See the Chloride Variance - Implement Source Reduction Measures permit section and the Chloride SRM (Target Value) Schedule. |
| Chloride                                |             | lbs/day         | 4/Month           | Calculated           | Calculate the daily mass discharge of chloride in lbs/day on the same days chloride sampling occurs.                                                                                                                                              |
| Mercury, Total Recoverable              |             | ng/L            | Annual            | Grab                 | See the Mercury Monitoring permit section.                                                                                                                                                                                                        |
| Acute WET                               |             | TUa             | See Listed Qtr(s) | 24-Hr Flow Prop Comp | Annual monitoring in rotating quarters. See the Whole Effluent Toxicity (WET) Testing permit section.                                                                                                                                             |
| Chronic WET                             | Monthly Avg | 1.2 TUc         | See Listed Qtr(s) | 24-Hr Flow Prop Comp | Annual monitoring in rotating quarters. See the Whole Effluent Toxicity (WET) Testing permit section.                                                                                                                                             |
| Temperature Maximum                     |             | deg F           | 3/Week            | Continuous           | Monitoring only in calendar year 2029 (January 1 - December 31).                                                                                                                                                                                  |

### 3.1.1 Changes from Previous Permit:

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit.

- Addition of PFOS/PFOA monitoring at a frequency of every other month in accordance with s. NR 106.98(2), Wis. Adm. Code.

- Updated the total phosphorus adaptive management interim limit from 0.6 mg/L to 0.5 mg/L (as a 6-month average), to become effective May 1, 2027.
- Addition of a Chronic WET monthly average effluent limit.
- The year in which temperature monitoring is required has been updated to calendar year 2029.

### 3.1.2 Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated 05/19/2025, by Nicole Krueger, PE, Water Resources Engineer.

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

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

**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. Every other month monitoring is included in the permit in accordance with s. NR 106.98(2)(c), Wis. Adm. Code.

**Phosphorus** – Six-month average concentrations shall be calculated on the last day of the month in April and October.

**Adaptive Management** – The City of Oconomowoc has requested, and the Department has approved, a plan to implement a watershed adaptive management approach under s. NR 217.18, Wis. Adm. Code, as a means for Oconomowoc to achieve compliance with the phosphorus water quality standard in s. NR 102.06, Wis. Adm. Code. The phosphorus limitations and conditions in this permit reflect the approved adaptive management (AM) Plan AM-2025-01 (August 2025). The permittee shall design and implement the actions identified in AM Plan No. AM-2025-01 (August 2025) in accordance with the goals and measures identified. The goal of the AM Plan is to reduce phosphorus loadings within the Oconomowoc action area by at a minimum 4,194 lbs/yr by the end of this permit term (December 31, 2030). In addition, annual progress reports are required. See the Schedules section for more details. The Department may terminate the AM option based on the reasons enumerated in s. NR 217.18(3)(e)2, Wis. Adm. Code.

The permit contains an interim adaptive management phosphorus limit of 0.5 mg/L and a compliance schedule for meeting the limit starting May 1, 2027. The averaging periods for the six-month average limit are May through October and November through April. Compliance with the 0.5 mg/L six-month average interim limit is evaluated at the end of each six-month period on April 30th and October 31st annually. There is also a 0.95 mg/L monthly average phosphorus limit in effect for the duration of the reissued permit.

Surface water monitoring requirements are included in the proposed permit in support of the goals and measures of the Adaptive Management Plan. Sampling is required bimonthly (1/ 2 Weeks or 2/Month) as outlined in the approved Adaptive Management Plan.

**Chloride** – The City of Oconomowoc applied for a chloride variance, under the provisions of s. NR 106.83, Wis. Adm. Code, with its application for permit reissuance. The previous permit also included a chloride variance. The Department reviewed Oconomowoc's application for a chloride variance and the information supplied in the application supports the establishment of an interim effluent limit. The permittee and the Department have reached agreement on an interim chloride weekly average limit of 525 mg/L (November – April) and 510 mg/L (May – October), a year-round target value of 470 mg/L, implementation of chloride source reduction measures, and submittal of annual progress reports each year

by January 31<sup>st</sup> (except that the first annual report is due 4/30/26 due to the permit effective date). The chloride source reduction measures that are required to be implemented can be found in the source reduction plan dated 2026-2030.

**Acute and Chronic WET** – Testing is required during the following quarters: October – December 2026; April – June 2027; January – March 2028; July – September 2029; and October – December 2030.

### 3.2 Sample Point Number: 601- Oconomowoc River - Downstream

| Monitoring Requirements and Limitations |            |                 |                  |             |                                                                                                                                                                                      |
|-----------------------------------------|------------|-----------------|------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter                               | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes                                                                                                                                                                                |
| Flow Rate                               |            | cfs             | 2/Month          | Measure     | Provide an estimate of river flow for each day that in-stream phosphorus monitoring is performed May 1 through October 31 annually.                                                  |
| Flow Rate                               |            | cfs             | Per Occurrence   | Measure     | Voluntary river flow estimates for each day that in-stream phosphorus monitoring is performed November 1 through April 30 annually.                                                  |
| Phosphorus, Total                       |            | mg/L            | 2/Month          | Grab        | Collect samples bimonthly May 1 through Oct 31 annually. See permit subsections for sampling and reporting requirements.                                                             |
| Phosphorus, Total                       |            | mg/L            | Per Occurrence   | Grab        | Voluntary monitoring November 1 through April 30 annually. See permit subsections for sampling and reporting requirements.                                                           |
| Phosphorus, Total                       |            | lbs/month       | Monthly          | Calculated  | Calculate and report total monthly phosphorus loads for the months of May through October annually. See permit subsection for calculation of total monthly loads.                    |
| Phosphorus, Total                       |            | lbs/month       | Per Occurrence   | Calculated  | Calculated total phosphorus loads may also be reported for the months of November through April, as data is available. See permit subsection for calculation of total monthly loads. |

### 3.2.1 Changes from Previous Permit:

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit.

- **Total Phosphorus 2/Month** – Bimonthly sampling may now occur any day of the week during the bimonthly sampling period; the previous permit required bimonthly sampling to occur every other Monday.
- Addition of “Per Occurrence” voluntary monitoring for flow and total phosphorus for electronic reporting purposes.

### 3.2.2 Explanation of Limits and Monitoring Requirements

As part of the Adaptive Management plan requirements, downstream monitoring of the Oconomowoc River for river flow rate, in-stream phosphorus concentration, and total monthly in-stream phosphorus loads is required during the months of May through October. Monitoring for these same parameters is voluntary during the months of November through April. When voluntary monitoring is completed, results must be reported on the monthly eDMR. The in-stream phosphorus concentration and river flow rate are used to calculate the total monthly loading of phosphorus in the Oconomowoc River on a monthly basis. This monitoring will allow Oconomowoc to demonstrate reductions in phosphorus loading for each month of the year.

## 4 Land Application - Monitoring and Limitations

| Municipal Sludge Description                                                       |                       |                              |                           |                                                           |                  |                                        |
|------------------------------------------------------------------------------------|-----------------------|------------------------------|---------------------------|-----------------------------------------------------------|------------------|----------------------------------------|
| Sample Point                                                                       | Sludge Class (A or B) | Sludge Type (Liquid or Cake) | Pathogen Reduction Method | Vector Attraction Method                                  | Reuse Option     | Amount Reused/Disposed (Dry Tons/Year) |
| 003                                                                                | Class B               | Liquid                       | Anaerobic Digestion       | Injection when land applied and Volatile Solids Reduction | Land Application | 356 Metric Tons (2024)                 |
| Does sludge management demonstrate compliance? Yes.                                |                       |                              |                           |                                                           |                  |                                        |
| Is additional sludge storage required? No.                                         |                       |                              |                           |                                                           |                  |                                        |
| Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No. |                       |                              |                           |                                                           |                  |                                        |
| Is a priority pollutant scan required? No.                                         |                       |                              |                           |                                                           |                  |                                        |

### 4.1 Sample Point Number: 003- Liquid Sludge

| Monitoring Requirements and Limitations |              |                 |                  |             |       |
|-----------------------------------------|--------------|-----------------|------------------|-------------|-------|
| Parameter                               | Limit Type   | Limit and Units | Sample Frequency | Sample Type | Notes |
| Solids, Total                           |              | Percent         | Quarterly        | Composite   |       |
| Arsenic Dry Wt                          | Ceiling      | 75 mg/kg        | Quarterly        | Composite   |       |
| Arsenic Dry Wt                          | High Quality | 41 mg/kg        | Quarterly        | Composite   |       |
| Cadmium Dry Wt                          | Ceiling      | 85 mg/kg        | Quarterly        | Composite   |       |

| Monitoring Requirements and Limitations       |              |                 |                  |             |                                                                                                                              |
|-----------------------------------------------|--------------|-----------------|------------------|-------------|------------------------------------------------------------------------------------------------------------------------------|
| Parameter                                     | Limit Type   | Limit and Units | Sample Frequency | Sample Type | Notes                                                                                                                        |
| Cadmium Dry Wt                                | High Quality | 39 mg/kg        | Quarterly        | Composite   |                                                                                                                              |
| Copper Dry Wt                                 | Ceiling      | 4,300 mg/kg     | Quarterly        | Composite   |                                                                                                                              |
| Copper Dry Wt                                 | High Quality | 1,500 mg/kg     | Quarterly        | Composite   |                                                                                                                              |
| Lead Dry Wt                                   | Ceiling      | 840 mg/kg       | Quarterly        | Composite   |                                                                                                                              |
| Lead Dry Wt                                   | High Quality | 300 mg/kg       | Quarterly        | Composite   |                                                                                                                              |
| Mercury Dry Wt                                | Ceiling      | 57 mg/kg        | Quarterly        | Composite   |                                                                                                                              |
| Mercury Dry Wt                                | High Quality | 17 mg/kg        | Quarterly        | Composite   |                                                                                                                              |
| Molybdenum Dry Wt                             | Ceiling      | 75 mg/kg        | Quarterly        | Composite   |                                                                                                                              |
| Nickel Dry Wt                                 | Ceiling      | 420 mg/kg       | Quarterly        | Composite   |                                                                                                                              |
| Nickel Dry Wt                                 | High Quality | 420 mg/kg       | Quarterly        | Composite   |                                                                                                                              |
| Selenium Dry Wt                               | Ceiling      | 100 mg/kg       | Quarterly        | Composite   |                                                                                                                              |
| Selenium Dry Wt                               | High Quality | 100 mg/kg       | Quarterly        | Composite   |                                                                                                                              |
| Zinc Dry Wt                                   | Ceiling      | 7,500 mg/kg     | Quarterly        | Composite   |                                                                                                                              |
| Zinc Dry Wt                                   | High Quality | 2,800 mg/kg     | Quarterly        | Composite   |                                                                                                                              |
| Nitrogen, Total Kjeldahl                      |              | Percent         | Quarterly        | Composite   |                                                                                                                              |
| Nitrogen, Ammonium (NH <sub>4</sub> -N) Total |              | Percent         | Quarterly        | Composite   |                                                                                                                              |
| Phosphorus, Total                             |              | Percent         | Quarterly        | Composite   |                                                                                                                              |
| Phosphorus, Water Extractable                 |              | % of Tot P      | Quarterly        | Composite   |                                                                                                                              |
| Potassium, Total Recoverable                  |              | Percent         | Quarterly        | Composite   |                                                                                                                              |
| PFOA + PFOS                                   |              | ug/kg           | Annual           | Calculated  | Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.                                              |
| PFAS Dry Wt                                   |              |                 | Annual           | Grab        | Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information. |
| PCB Total Dry Wt                              | Ceiling      | 50 mg/kg        | Once             | Composite   | Monitoring required in 2027. See Sludge Analysis                                                                             |

| Monitoring Requirements and Limitations |              |                 |                  |             |                                                                                                                                                                      |
|-----------------------------------------|--------------|-----------------|------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter                               | Limit Type   | Limit and Units | Sample Frequency | Sample Type | Notes                                                                                                                                                                |
|                                         |              |                 |                  |             | for PCBs and the Standard Requirements permit sections for Monitoring and Calculating PCB Concentrations in Sludge.                                                  |
| PCB Total Dry Wt                        | High Quality | 10 mg/kg        | Once             | Composite   | Monitoring required in 2027. See Sludge Analysis for PCBs and the Standard Requirements permit sections for Monitoring and Calculating PCB Concentrations in Sludge. |

#### 4.1.1 Changes from Previous Permit:

Sludge limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit.

- **PFAS** – Annual monitoring has been added pursuant to s. NR 204.06(2)(b)9., Wis. Adm. Code.
- **PCBs** – The year in which PCB monitoring is required has been updated to calendar year 2027.

#### 4.1.2 Explanation of Limits and Monitoring Requirements

Requirements for disposal, including land application of municipal sludge, are determined in accordance with ch. NR 204, Wis. Adm. Code. Ceiling and high-quality limits for metals in sludge are specified in s. NR 204.07(5). Requirements for pathogens are specified in s. NR 204.07(6) and in s. NR 204.07 (7) for vector attraction requirements. Limitations for PCBs are addressed in s. NR 204.07(3)(k). Radium requirements are addressed in s. NR 204.07(3)(n).

**PFAS** – The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA has developed a draft risk assessment to determine future land application rates and released this risk assessment in January of 2025. The Department is evaluating this new information. Until a decision is made, the “Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS” should be followed

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 this WPDES permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9., Wis. Adm. Code.

## 5 Schedules

### 5.1 Adaptive Management Interim Limit Compliance Update

| Required Action                                                                                                                                                                                                                                                                                     | Due Date   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>Comply with Adaptive Management Interim Limit:</b> The Adaptive Management interim effluent limit of 0.5 mg/L as a six-month average goes into effect. The averaging periods are May-October and November-April. Compliance with the six-month average limit is evaluated at the end of each six | 05/01/2027 |

|                                                       |  |
|-------------------------------------------------------|--|
| month period on April 30th and October 31st annually. |  |
|-------------------------------------------------------|--|

### 5.1.1 Explanation of Schedule

**Adaptive Management Interim Limit Compliance Update** – This compliance schedule provides the permittee until May 1, 2027 to comply with the phosphorus adaptive management interim limit of 0.5 mg/L. The first 6-month averaging period after the limit becomes effective is May 1, 2027 to October 31, 2027.

## 5.2 Watershed Adaptive Management Option Annual Report Submittals

The permittee shall submit annual reports on the implementation of AM Plan No. AM-2025-01 (August 2025).

| Required Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Due Date   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>Annual Adaptive Management Report #5:</b> Submit an annual Adaptive Management report. The annual adaptive management report shall: <ul style="list-style-type: none"><li>o Identify those actions (Management Measures) from the approved adaptive management plan that were completed during the previous calendar year and those actions that are in progress;</li><li>o Evaluate collected monitoring data;</li><li>o Document progress in achieving the goals and measures identified in the approved adaptive management plan;</li><li>o Describe the outreach and education efforts that occurred during the past calendar year;</li><li>o Identify any corrections or adjustments to the adaptive management plan that are needed to achieve compliance with the phosphorus water quality standards specified in s. NR 102.06, Wis. Adm. Code;</li><li>o Describe any updates needed to Oconomowoc's approved phosphorus optimization plan;</li></ul> and <ul style="list-style-type: none"><li>o Submit results from all sample points outlined in AM Plan No. AM-2025-01 (August 2025) to the Department using the Department's Laboratory Data Entry System (LDES).</li></ul> | 04/30/2026 |
| <b>Annual Adaptive Management Report #6:</b> Submit an Adaptive Management report with the required information described in this section (see above).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 01/31/2027 |
| <b>Annual Adaptive Management Report #7:</b> Submit an Adaptive Management report with the required information described in this section (see above).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 01/31/2028 |
| <b>Annual Adaptive Management Report #8:</b> Submit an Adaptive Management report with the required information described in this section (see above).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 01/31/2029 |
| <b>Final Adaptive Management Report for 2nd Permit Term:</b> Submit the final Adaptive Management (AM) report documenting progress made during the second permit term under AM in meeting the watershed phosphorus reduction target of 10,620 lbs/yr, as well as the anticipated future reductions in phosphorus sources and phosphorus effluent concentrations, which shall be measured in accordance with the AM Plan protocols. The report shall summarize AM activities that have been implemented during the current permit term and state which, if any, actions from the approved AM Plan No. AM-2025-01 (August 2025) were not pursued and why. The report shall include an analysis of trends on both a monthly and six-month average basis for concentrations and mass effluent discharged. Additionally, there shall be an analysis of any improvements to the quality of surface waters in the Adaptive Management Action Area focusing on phosphorus and flow results collected during the permit term. The surface water analysis shall evaluate how the in-stream loadings have                                                                                              | 01/31/2030 |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| changed over the permit term in comparison to implemented AM actions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |
| <b>Renewal of Adaptive Management Plan for Permit Reissuance:</b> If the permittee intends to seek renewal of AM Plan No. AM-2025-01 (August 2025) per s. NR 217.18, Wis. Adm. Code, for the reissued permit term, proposed AM goals and actions based on an updated AM plan shall be submitted to the Department for review and approval. The permittee may propose to adjust load reductions required by AM Plan No. AM-2025-01 (August 2025) either up or down at the beginning of each WPDES permit term to reflect changes in loads associated with point and non-point sources. This schedule may be modified to incorporate any changes in AM goals and actions, removed if the AM program is terminated per the “Adaptive Management Reopener Clause” permit section, or removed if the adaptive management plan has achieved water quality standards as determined by the Department within the AM action area.                                                                                                                 | 09/30/2030 |
| <b>Annual Adaptive Management Report #9:</b> Submit an Adaptive Management report with the required information described in this section (see above).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 01/31/2031 |
| <b>Annual Adaptive Management Report #10:</b> Submit an Adaptive Management report with the required information described in this section (see above).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 01/31/2032 |
| <b>Annual Adaptive Management Report #11:</b> Submit an Adaptive Management report with the required information described in this section (see above).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 01/31/2033 |
| <b>Annual Adaptive Management Report #12:</b> Submit an Adaptive Management report with the required information described in this section (see above).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 01/31/2034 |
| <b>Final Adaptive Management Report:</b> Submit the final Adaptive Management (AM) report documenting progress made throughout the AM project in meeting the watershed phosphorus reduction target of 11,195 lbs/yr, and in stream water quality standards specified in s. NR 102.06, Wis. Adm. Code. The report shall summarize AM activities that have been implemented during the current permit term and state which, if any, actions from the approved AM Plan No. AM-2025-01 (August 2025) were not pursued and why. The report shall include an analysis of trends on both a monthly and six-month average basis for concentrations and mass effluent discharged. Additionally, there should be an analysis of any improvements to the quality of surface waters in the Adaptive Management Action Area focusing on phosphorus and flow results collected during the permit term. The surface water analysis shall evaluate how the in-stream loadings have changed over the permit term in comparison to implemented AM actions. | 09/30/2034 |
| <b>Achieve Water Quality Standards and Adaptive Management Plan Success:</b> All the receiving waters identified within the AM Plan No. AM-2025-01 (August 2025) shall comply with water quality standards specified in s. NR 102.06, Wis. Adm. Code. The permittee shall continue to comply with applicable effluent limits (0.5 mg/L as a 6-month avg and 0.95 mg/L as a monthly avg) and continue monitoring surface waters per AM-2025-01 (August 2025) at a minimum of monthly May through October for total phosphorus.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 12/31/2034 |

### 5.2.1 Explanation of Schedule

**Watershed Adaptive Management Option Annual Report Submittals** – This schedule requires the permittee to submit annual adaptive management (AM) reports that show progress towards meeting the goals and measures contained in the approved AM Plan. The final AM Report for this permit term must document the success of meeting the watershed phosphorus minimum reduction target of 4,194 lbs/yr. This schedule may be modified at permit reissuance, should changes in AM goals and measures or timing necessitate different dates for schedule items.

### 5.3 Chloride Source Reduction Measures (Target Value)

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

| Required Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Due Date   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <p><b>Annual Chloride Progress Report:</b> Submit an annual chloride progress report related to the source reduction activities for the previous year. The annual chloride progress report shall:</p> <p>Indicate which chloride source reduction measures or activities in the Source Reduction Plan have been implemented and state which, if any, source reduction measures from the Source Reduction Plan were not pursued and why. Include an assessment of whether each implemented source reduction measure appears to be effective or ineffective at reducing pollutant discharge concentrations and identify actions planned for the upcoming year;</p> <p>Include an analysis of trends in weekly, monthly and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data; and</p> <p>Include an analysis of how effluent chloride varies with time and with significant loadings of chloride. Note that the interim limitations listed in the Surface Water section of this permit remain enforceable until new enforceable limits are established in the next permit issuance.</p> <p>The first annual chloride progress report is to be submitted by the Date Due.</p>                                                                                                                                                                                                                                                                                                                                                    | 04/30/2026 |
| <p><b>Annual Chloride Progress Report #2:</b> Submit the chloride progress report, related to the source reduction activities for the previous year, as defined above.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 01/31/2027 |
| <p><b>Annual Chloride Progress Report #3:</b> Submit the chloride progress report, related to the source reduction activities for the previous year, as defined above.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 01/31/2028 |
| <p><b>Annual Chloride Progress Report #4:</b> Submit the chloride progress report, related to the source reduction activities for the previous year, as defined above.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 01/31/2029 |
| <p><b>Final Chloride Report:</b> Submit the final chloride report documenting the success in meeting the chloride target value of 470 mg/L, as well as the anticipated future reduction in chloride sources and chloride effluent concentrations.</p> <p>The report shall:</p> <p>Summarize chloride source reduction measures that have been implemented during the current permit term and state which, if any, source reduction measures from the Source Reduction Plan were not pursued and why;</p> <p>Include an assessment of which source reduction measures appear to have been effective or ineffective. Evaluate any needed changes to the pollutant reduction strategy accordingly;</p> <p>Include an analysis of trends in weekly, monthly and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data during the current permit term; and</p> <p>Include an analysis of how influent and effluent chloride varies with time and with significant loadings of chloride as identified in the source reduction plan.</p> <p>If the permittee intends to reapply for a chloride variance, for the reissued permit, proposed target limits and a detailed source reduction measures plan, outlining the source reduction activities proposed for the upcoming permit term, shall also be included per ss. NR 106.90 (5) and NR 106.83 (4), Wis. Adm. Code. An updated source reduction measures plan shall:</p> <p>Include an explanation of why or how each source reduction measure will result in reduced discharge</p> | 01/31/2030 |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p>of the target pollutant; and</p> <p>Evaluate any available information on pollutant sources, timing, and concentration to update the mass balance assumptions and expected sources of the pollutant, and</p> <p>Identify any information needs that would help to better determine pollutant sources and make plans to collect that information.</p> <p>Note that the target value is the benchmark for evaluating the effectiveness of the chloride source reduction measures but is not an enforceable limitation under the terms of this permit.</p> |  |
| <p><b>Annual Chloride Reports After Permit Expiration:</b> In the event that this permit is not reissued by the date the permit expires the permittee shall continue to submit annual chloride reports for the previous year following the due date of Annual Chloride Progress Reports listed above. Annual Chloride Progress Reports shall include the information as defined above.</p>                                                                                                                                                                 |  |

### 5.3.1 Explanation of Schedule

**Chloride Source Reduction Measures (Target Value)** – This schedule is required to ensure that the permittee maintains compliance with the conditions and requirements of receiving a variance from the water quality-based chloride effluent limits. Since a compliance schedule is being granted, an interim limit is required. The chloride variance interim limits are weekly average limits of 525 mg/L (November – April) and 510 mg/L (May – October). The schedule requires that annual reports shall indicate which source reduction measures have been implemented during each calendar year, and an analysis of chloride concentration and mass discharge data based on chloride sampling and flow data. The annual reports (due January 31<sup>st</sup> each year, except the first annual report which is due 4/30/26) shall document progress made towards meeting the chloride target value of 470 mg/L (weekly average) by the end of the permit term.

## 5.4 Land Application Management Plan

A management plan is required for the land application system.

| Required Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Due Date   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <p><b>Land Application Management Plan Update:</b> Submit an update to the management plan to optimize the land application system performance and demonstrate compliance with ch. NR 204, Wis. Adm. Code, by the Due Date. This management plan shall 1) specify information on pretreatment processes (if any); 2) identify land application sites; 3) describe site limitations; 4) address vegetative cover management and removal; 5) specify availability of storage; 6) describe the type of transporting and spreading vehicle(s); 7) specify monitoring procedures; 8) track site loading; 9) address contingency plans for adverse weather and odor/nuisance abatement; and 10) include any other pertinent information. Once approved, all landspreading 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.</p> | 11/30/2026 |

### 5.4.1 Explanation of Schedule

**Land Application Management Plan** – An up-to-date Land Application Management Plan is required that documents how the permittee will manage land application consistent with ch. NR 204, Wis. Adm. Code.

## 5.5 PFOS/PFOA Minimization Plan Determination of Need

| Required Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Due Date   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <p><b>Report on Effluent Discharge:</b> Submit a report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations. This analysis should also include a comparison to the applicable narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code.</p> <p>This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 03/31/2027 |
| <p><b>Report on Effluent Discharge and Evaluation of Need:</b> Submit a final report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations of data collected over the last 24 months. The report shall also provide a comparison on the likelihood of the facility needing to develop a PFOS/PFOA minimization plan.</p> <p>This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.</p> <p>The permittee shall also submit a request to the department to evaluate the need for a PFOS/PFOA minimization plan.</p> <p>If the Department determines a PFOS/PFOA minimization plan is needed based on a reasonable potential evaluation, the permittee will be required to develop a minimization plan for Department approval no later than 90 days after written notification was sent from the Department. The Department will modify or revoke and reissue the permit to include PFOS/PFOA minimization plan reporting requirements along with a schedule of compliance to meet WQBELs. Effluent monitoring of PFOS and PFOA shall continue as specified in the permit until the modified permit is issued.</p> <p>If, however, the Department determines there is no reasonable potential for the facility to discharge PFOS or PFOA above the narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code, no further action is required and effluent monitoring of PFOS and PFOA shall continue as specified in the permit.</p> | 03/31/2028 |

### 5.5.1 Explanation of Schedule

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

## Attachments

WQBEL Memo: Water Quality-Based Effluent Limitations for the Oconomowoc Wastewater Treatment Facility WPDES Permit No. WI-0021181-10, by Nicole Krueger, PE, Water Resources Engineer, dated 05/19/2025

Chloride Variance EPA Data Sheet

Chloride SRM (Source Reduction Measures) Plan, City of Oconomowoc, dated 2026-2030

Adaptive Management Plan, AM Plan No. AM-2025-01 (August 2025)

Adaptive Management Conditional Approval Letter, by Nick Lent, Wastewater Engineer (September 2025)

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

No waivers from permit application requirements were requested or granted as part of this permit reissuance.

**Prepared By:** Sarah Donoughe, Wastewater Specialist-Adv

**Date:** October 2, 2025

**CORRESPONDENCE/MEMORANDUM****State of Wisconsin**

DATE: 05/19/2025

TO: Sarah Donoughe – SER

FROM: Nicole Krueger – SER *Nicole Krueger*SUBJECT: Water Quality-Based Effluent Limitations for Oconomowoc Wastewater Treatment Facility  
WPDES Permit No. WI-0021181-10

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable) for the discharge from Oconomowoc in Waukesha County. This municipal wastewater treatment facility (WWTF) discharges to the Oconomowoc River, located in the Oconomowoc River Watershed in the Upper Rock River Basin. This discharge is included in the Rock River Total Maximum Daily Load (TMDL) as approved by EPA on 09/28/2011.

The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

| Parameter                                                 | Daily Maximum | Daily Minimum | Weekly Average                                    | Monthly Average                               | Six-Month Average     | Footnotes |
|-----------------------------------------------------------|---------------|---------------|---------------------------------------------------|-----------------------------------------------|-----------------------|-----------|
| BOD <sub>5</sub><br>May – October<br><br>November – April |               |               | 7.0 mg/L<br>233 lbs/day<br>15 mg/L<br>500 lbs/day | <b>7.0 mg/L</b><br><br><b>15 mg/L</b>         |                       | 1,2       |
| TSS<br>May – October<br>November – April<br>TMDL limits   |               |               | 10 mg/L<br>15 mg/L<br>See Table                   | <b>10 mg/L</b><br><b>15 mg/L</b><br>See Table |                       | 1,2,3     |
| Dissolved Oxygen                                          |               | 7.0 mg/L      |                                                   |                                               |                       | 1         |
| pH                                                        | 9.0 s.u.      | 6.0 s.u.      |                                                   |                                               |                       | 1         |
| <i>E. coli</i><br>May – September                         |               |               |                                                   | 126 #/100 mL<br>geometric mean                |                       | 4         |
| Ammonia Nitrogen                                          |               |               |                                                   |                                               |                       | 1,5       |
| TKN,<br>Nitrate+Nitrite, and<br>Total Nitrogen            |               |               |                                                   |                                               |                       | 1,6       |
| PFOS and PFOA                                             |               |               |                                                   |                                               |                       | 7         |
| Phosphorus<br>Interim<br>AM limit<br>TMDL limits          |               |               |                                                   | 0.95 mg/L                                     | 0.5 mg/L<br>See Table | 3,8       |
| Chloride                                                  |               |               | 450 mg/L                                          |                                               |                       | 9         |
| Mercury                                                   |               |               |                                                   |                                               |                       | 1,5       |
| Acute WET                                                 |               |               |                                                   |                                               |                       | 10,11     |
| Chronic WET                                               |               |               |                                                   | 1.2 TUc                                       |                       | 10,11     |
| Temperature                                               |               |               |                                                   |                                               |                       | 1,5       |

Footnotes:

1. No changes from the current permit.
2. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
3. The TSS and phosphorus mass limits are based on the Total Maximum Daily Load (TMDL) for the Rock River Basin to address phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA on 09/28/2011.

| Month | Monthly Ave<br>Total P<br>Effluent Limit<br>(lbs/day) | Monthly Ave<br>TSS Effluent<br>Limit (lbs/day) | Weekly Ave<br>TSS Effluent<br>Limit (lbs/day) |
|-------|-------------------------------------------------------|------------------------------------------------|-----------------------------------------------|
| Jan   | 8.46                                                  | 326                                            | 431                                           |
| Feb   | 9.89                                                  | 360                                            | 475                                           |
| March | 9.36                                                  | 326                                            | 431                                           |
| April | 9.51                                                  | 327                                            | 431                                           |
| May   | 8.39                                                  | 268                                            | 334                                           |
| June  | 8.17                                                  | 251                                            | 332                                           |
| July  | 6.19                                                  | 175                                            | 232                                           |
| Aug   | 5.74                                                  | 167                                            | 221                                           |
| Sept  | 5.64                                                  | 176                                            | 232                                           |
| Oct   | 6.17                                                  | 268                                            | 334                                           |
| Nov   | 7.40                                                  | 335                                            | 442                                           |
| Dec   | 7.36                                                  | 326                                            | 431                                           |

4. Bacteria limits apply during the disinfection season of May through September. Additional limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
5. Monitoring only.
6. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, quarterly total nitrogen monitoring is recommended for all municipal major permittees. Sections 283.37(5) and 283.55(1)(e), Wis. Stats, and ss. NR 200.065(1)(g) and NR 200.065(1)(h), Wis. Adm. Codes, provide the authority to request this monitoring during the permit term. Total Nitrogen is the sum of nitrate (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), and total Kjeldahl nitrogen (TKN) (all expressed as N).
7. PFOS and PFOA monitoring is recommended at a frequency of once every two months in accordance with s. NR 106.98(2), Wis. Adm. Code.
8. Under the phosphorus Adaptive Management (AM) Plan, the interim limits (and technology-based effluent limit (TBEL)) of 1.0 mg/L, monthly average and 0.5 mg/L, six-month average should be effective within the upcoming permit term. The final water quality based effluent limits are 0.225 mg/L as a monthly average, 0.075 mg/L as a six-month average, and the Rock River TMDL mass limits in the above table.
9. This is the WQBEL for chloride. Alternative effluent limitations of 510 mg/L as a weekly average for May – October and 525 mg/L for November – April may be included in the permit in place of this limit if the chloride variance application that was submitted is approved by EPA. These alternative limits are equivalent to the limits in the current permit.
10. Annual acute and chronic WET monitoring is recommended. The Instream Waste Concentration (IWC) to assess chronic test results is 86%. 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%. The primary control

water used in chronic WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water, upstream of the outfall.

11. 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. Testing should continue after the permit expiration date (until the permit is reissued).

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](mailto:Nicole.Krueger@wisconsin.gov) or Diane Figiel at [Diane.Figiel@wisconsin.gov](mailto:Diane.Figiel@wisconsin.gov).

Attachments (4) – Narrative, Outfall Map, Background Chloride Data, & Thermal Table

PREPARED BY: Nicole Krueger, Water Resources Engineer – SER

E-cc: Nick Lent, Wastewater Engineer – SER  
Diane Figiel, Water Resources Engineer – WY/3  
Nate Willis, Wastewater Engineer – WY/3

Attachment #1  
**Water Quality-Based Effluent Limitations for  
Oconomowoc Wastewater Treatment Facility**

**WPDES Permit No. WI-0021181-10**

Prepared by: Nicole Krueger

**PART 1 – BACKGROUND INFORMATION**

**Facility Description**

The City of Oconomowoc operates a 4.02 million gallon per day (MGD) annual average design flow conventional activated sludge wastewater treatment plant designed to treat an organic loading of 8,340 lbs/day. The plant was placed online in 1977 and currently serves a population of approximately 25,900. Treatment processes include screening, grit removal, primary clarification, activated sludge aeration, secondary clarification, tertiary filtration and UV light disinfection. Ferric chloride is applied at the end of the aeration basins for phosphorus removal. Effluent receives additional aeration (fine bubble diffusers) in the final effluent tanks before flowing into a trapezoidal concrete channel that terminates at the east bank of the Oconomowoc River approximately 800 feet west of the plant. Waste activated sludge is thickened using a dissolved air flotation (DAF), the thickened WAS and primary clarifier sludge are anaerobically digested. Biosolids are stored on-site and land applied from spring through fall onto agricultural sites approved by the Department. The plant provides wastewater treatment services for the City of Oconomowoc, Town of Oconomowoc, Mary Lane S.D., Ixonia S.D. Number 2, Lac La Belle S.D., Blackhawk S.D., the Village of Summit and the Village of Oconomowoc Lake. Domestic holding tank and septic tank wastes are also accepted by the facility.

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

**Existing Permit Limitations**

The current permit, expiring on 09/30/2025, includes the following effluent limitations and monitoring requirements.

| Parameter                                                 | Daily Maximum | Daily Minimum | Weekly Average                                    | Monthly Average                               | Six-Month Average | Footnotes |
|-----------------------------------------------------------|---------------|---------------|---------------------------------------------------|-----------------------------------------------|-------------------|-----------|
| BOD <sub>5</sub><br>May – October<br><br>November – April |               |               | 7.0 mg/L<br>233 lbs/day<br>15 mg/L<br>500 lbs/day | <b>7.0 mg/L</b><br><br><b>15 mg/L</b>         |                   | 1,2       |
| TSS<br>May – October<br>November – April<br>TMDL limits   |               |               | 10 mg/L<br>15 mg/L<br>See Table                   | <b>10 mg/L</b><br><b>15 mg/L</b><br>See Table |                   | 2,3       |
| Dissolved Oxygen                                          |               | 7.0 mg/L      |                                                   |                                               |                   | 1         |
| pH                                                        | 9.0 s.u.      | 6.0 s.u.      |                                                   |                                               |                   | 1         |
| <i>E. coli</i><br>May – September                         |               |               |                                                   | 126 #/100 mL<br>geometric mean                |                   | 4         |
| Ammonia Nitrogen                                          |               |               |                                                   |                                               |                   | 5         |

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| Parameter                                              | Daily Maximum | Daily Minimum | Weekly Average       | Monthly Average            | Six-Month Average | Footnotes |
|--------------------------------------------------------|---------------|---------------|----------------------|----------------------------|-------------------|-----------|
| TKN,<br>Nitrate+Nitrite, and<br>Total Nitrogen         |               |               |                      |                            |                   | 5         |
| Phosphorus<br>Interim Limit<br>AM Limit<br>TMDL limits |               |               |                      | 0.95 mg/L<br><br>See Table | 0.6 mg/L          | 3         |
| Chloride<br>May – October<br>November – April          |               |               | 510 mg/L<br>525 mg/L |                            |                   | 6         |
| Mercury                                                |               |               |                      |                            |                   | 5         |
| Acute WET                                              |               |               |                      |                            |                   | 7         |
| Chronic WET                                            |               |               |                      |                            |                   | 7         |
| Temperature                                            |               |               |                      |                            |                   | 5         |

## Footnotes:

1. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
2. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
3. The TSS and phosphorus mass limit is based on the Total Maximum Daily Load (TMDL) for the Rock River Basin to address phosphorus water quality impairments within the TMDL area.

| Month | Monthly Ave<br>Total P<br>Effluent Limit<br>(lbs/day) | Monthly Ave<br>TSS Effluent<br>Limit (lbs/day) | Weekly Ave<br>TSS Effluent<br>Limit (lbs/day) |
|-------|-------------------------------------------------------|------------------------------------------------|-----------------------------------------------|
| Jan   | 8.46                                                  | 326                                            | 431                                           |
| Feb   | 9.89                                                  | 360                                            | 475                                           |
| March | 9.36                                                  | 326                                            | 431                                           |
| April | 9.51                                                  | 327                                            | 431                                           |
| May   | 8.39                                                  | 268                                            | 334                                           |
| June  | 8.17                                                  | 251                                            | 332                                           |
| July  | 6.19                                                  | 175                                            | 232                                           |
| Aug   | 5.74                                                  | 167                                            | 221                                           |
| Sept  | 5.64                                                  | 176                                            | 232                                           |
| Oct   | 6.17                                                  | 268                                            | 334                                           |
| Nov   | 7.40                                                  | 335                                            | 442                                           |
| Dec   | 7.36                                                  | 326                                            | 431                                           |

4. Additional limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
5. Monitoring only.
6. These are variance interim limits approved by EPA. The WQBEL is 450 mg/L.

7. Annual acute and chronic WET testing is required. The IWC for chronic WET was 86%

### Receiving Water Information

- Name: Oconomowoc River
- Waterbody Identification Code (WBIC): 848200
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q<sub>10</sub> and 7-Q<sub>2</sub> values are from USGS for Station #05425210, where Outfall 001 is located.

7-Q<sub>10</sub> = 2.1 cubic feet per second (cfs)

7-Q<sub>2</sub> = 7.7 cfs

90-Q<sub>10</sub> = 6.5 cfs

Harmonic Mean Flow = 14.5 cfs using a drainage area of 100 mi<sup>2</sup>

The Harmonic Mean has been estimated based on average flow and the 7-Q<sub>10</sub> using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).

|                         | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 7-Q <sub>10</sub> (cfs) | 4.5 | 4.8 | 9.1 | 16  | 8.5 | 4.8 | 3.0 | 2.5 | 3.0 | 4.0 | 5.6 | 4.1 |
| 7-Q <sub>2</sub> (cfs)  | 15  | 17  | 34  | 47  | 28  | 17  | 11  | 10  | 10  | 13  | 19  | 16  |

- Hardness = 247 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of data from chronic WET sampling from 09/11/2018 – 07/25/2023.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)3., Wis. Adm. Code: 50%. A mixing zone demonstration was approved in December 2018 to be higher than the default of mixing zone of 25%.
- Source of background concentration data: Metals data from the Oconomowoc River at Station ID 683368 (100' upstream of Outfall 001 at mid-channel) is used for this evaluation. Chloride data is collected by the facility at just upstream of the discharge. The summary of background chloride data is in Attachment #3. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: None.
- Impaired water status: The Rock River, approximately 11 miles downstream of Outfall 001, is 303(d) listed as impaired for total phosphorus and total suspended solids.

### Effluent Information

- Design flow rate(s):
  - Annual average = 4.02 million gallons per day (MGD)
  - Peak daily = 11.7 MGD
  - Peak weekly = 7.73 MGD
  - Peak monthly = 5.7 MGD (from 1974 facility plan)

The peak daily and weekly design flows were estimated from the annual average design flow and a peaking factor based on data from 10/01/2020 – 02/28/2025.

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For reference, the actual average flow from 10/01/2020 – 02/28/2025 was 2.47 MGD.

- Hardness = 370 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of four samples collected in August 2024 which were reported on the permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Wastewater source: Domestic wastewater with 4 industrial contributors.
- Water supply: Municipality waterworks and private wells.
- Additives:
  - Aquafix – Defoam 3000: Used to control aeration foaming
  - Kemira – Ferric Chloride: Used for phosphorus removal
  - Hawkins Water Treatment – Chlorine: Used for disc filter foaling and filamentous control
  - An additive review is not necessary for any additives where either the toxicity is well documented and understood, can be controlled by a WQBEL, or are not believed to be present in the discharge. Therefore, an additive review is not needed at this time for ferric chloride and chlorine. An additive review is needed for Defoam 3000, which is summarized in the additives section of this memo.
- Effluent characterization: This facility is categorized as a major municipal, so the permit application required effluent sample analyses for all the “priority pollutants” except for the Dioxins and Furans as specified in s. NR 200.065, Table 1, Wis. Adm. Code. The permit-required monitoring for mercury, chloride, ammonia, and phosphorus is used in this evaluation.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2, 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.

**Mercury Effluent Data**

| Sample Date                        | Mercury (ng/L) | Sample Date | Mercury (ng/L) | Sample Date | Mercury (ng/L) |
|------------------------------------|----------------|-------------|----------------|-------------|----------------|
| 02/13/2019                         | 0.26           | 01/09/2020  | 0.32           | 04/06/2021  | 0.85           |
| 04/15/2019                         | 0.44           | 04/02/2020  | 0.74           | 02/02/2022  | 0.50           |
| 07/02/2019                         | 0.38           | 07/06/2020  | 0.54           | 02/21/2023  | 0.43           |
| 11/08/2019                         | 0.39           | 10/06/2020  | 1.8            | 01/11/2024  | 0.34           |
| 1-day P <sub>99</sub> = 2.13 ng/L  |                |             |                |             |                |
| 4-day P <sub>99</sub> = 1.24 ng/L  |                |             |                |             |                |
| 30-day P <sub>99</sub> = 0.78 ng/L |                |             |                |             |                |

**Chloride Effluent Data**

|                        | Chloride (mg/L) |
|------------------------|-----------------|
| 1-day P <sub>99</sub>  | 610             |
| 4-day P <sub>99</sub>  | 542             |
| 30-day P <sub>99</sub> | 502             |
| Mean                   | 480             |
| Std                    | 50.4            |
| Sample size            | 221             |
| Range                  | 330 – 600       |

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The effluent copper data from 04/14/2016 – 08/26/2024 from the most recent two permit applications are shown below:

**Copper Effluent Data**

| Sample Date                       | Copper (µg/L) | Sample Date | Copper (µg/L) | Sample Date | Copper (µg/L) |
|-----------------------------------|---------------|-------------|---------------|-------------|---------------|
| 04/14/2016                        | 5.7           | 05/01/2016  | 6.1           | 05/16/2016  | 6.1           |
| 04/18/2016                        | 7.8           | 05/04/2016  | 5.9           | 08/06/2024  | 14            |
| 04/21/2016                        | 5.6           | 05/07/2016  | 5.8           | 08/13/2024  | 6.3           |
| 04/25/2016                        | 6.3           | 05/10/2016  | 6.2           | 08/20/2024  | 18            |
| 04/28/2016                        | 4.1           | 05/13/2016  | 4.6           | 08/26/2024  | 14            |
| 1-day P <sub>99</sub> = 21.7 µg/L |               |             |               |             |               |
| 4-day P <sub>99</sub> = 13.7 µg/L |               |             |               |             |               |

The following table presents the average concentrations and loadings at Outfall 001 from 10/01/2020 – 02/28/2025 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

**Parameters with Effluent Limits**

|                  | Average Measurement | Average Mass Discharged |
|------------------|---------------------|-------------------------|
| BOD <sub>5</sub> | 1.51 mg/L*          | 20.7 lbs/day            |
| TSS              | 0.84 mg/L*          | 10.4 lbs/day            |
| pH field         | 7.42 s.u.           |                         |
| Dissolved Oxygen | 9.1 mg/L            |                         |
| <i>E. coli</i>   | 2.75 #/100 mL**     |                         |
| Phosphorus       | 0.56 mg/L           | 11.6 lbs/day            |
| Chloride         | 480 mg/L            |                         |

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

\*\* The average measurement for bacteria is calculated as a geometric mean. Values reported below the LOD are replaced with a value of 1 for the calculation of the geometric mean.

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

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

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

**Acute Limits based on 1-Q<sub>10</sub>**

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Adm. Code, (September 1,

2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q<sub>10</sub> receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

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

Where:

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

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

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

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

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

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q<sub>10</sub> method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is the case for Oconomowoc.

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

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

RECEIVING WATER FLOW = 1.68 cfs, (1-Q<sub>10</sub> (estimated as 80% of 7-Q<sub>10</sub>)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

| SUBSTANCE                  | REF. HARD.*<br>mg/L | ATC    | MEAN BACK-GRD. | MAX. EFFL. LIMIT** | 1/5 OF EFFL. LIMIT | MEAN EFFL. CONC. | 1-day P <sub>99</sub> | 1-day MAX. CONC. |
|----------------------------|---------------------|--------|----------------|--------------------|--------------------|------------------|-----------------------|------------------|
| Arsenic                    |                     | 340    |                | 432                | 86.3               | 1.3              |                       |                  |
| Cadmium                    | 370                 | 46.2   | 0.03           | 58.7               | 11.7               | 0.22             |                       |                  |
| Chromium                   | 301                 | 4446   | 0.38           | 5647               | 1129               | <3.3             |                       |                  |
| Copper                     | 370                 | 53.3   | 0.57           | 67.6               |                    |                  | 21.7                  | 18               |
| Lead                       | 356                 | 365    | 0.39           | 463                | 92.6               | <5.4             |                       |                  |
| Mercury (ng/L)             |                     | 830    | 1.16           | 1054               |                    |                  | 2.1                   | 1.8              |
| Nickel                     | 268                 | 1080   |                | 1372               | 274                | <4.7             |                       |                  |
| Zinc                       | 333                 | 345    | 0.68           | 438                | 87.5               | 21               |                       |                  |
| Chloride (mg/L)            |                     | 757    | 64             | 944                |                    |                  | 610                   | 600              |
| Total Phenols <sup>#</sup> |                     | 150731 |                | 191443             | 38289              | 0.013            |                       |                  |

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

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

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# The limit for this substance is based on a secondary value. Acute limits are set equal to the secondary value rather than two times or using the 1-Q<sub>10</sub> s. NR 106.06(3)(b)2 and s. NR 105.05(2)(f)6, Wis. Adm. Code.

**Weekly Average Limits based on Chronic Toxicity Criteria (CTC)**

RECEIVING WATER FLOW = 0.525 cfs (¼ of the 7-Q<sub>10</sub>), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

| SUBSTANCE                  | REF.<br>HARD.*<br>mg/L | CTC   | MEAN<br>BACK-<br>GRD. | WEEKLY<br>AVE.<br>LIMIT | 1/5 OF<br>EFFL.<br>LIMIT | MEAN<br>EFFL.<br>CONC. | 4-day<br>P <sub>99</sub> |
|----------------------------|------------------------|-------|-----------------------|-------------------------|--------------------------|------------------------|--------------------------|
| Arsenic                    |                        | 152   |                       | 165                     | 33.0                     | 1.3                    |                          |
| Cadmium                    | 175                    | 3.82  | 0.03                  | 4.14                    | 0.83                     | 0.22                   |                          |
| Chromium                   | 301                    | 326   | 0.38                  | 353                     | 70.6                     | <3.3                   |                          |
| Copper                     | 495                    | 40.7  | 0.57                  | 44.1                    |                          |                        | 13.7                     |
| Lead                       | 356                    | 95.5  | 0.39                  | 104                     | 20.7                     | <5.4                   |                          |
| Mercury (ng/L)             |                        | 440   | 1.16                  | 477                     |                          |                        | 1.2                      |
| Nickel                     | 268                    | 120   |                       | 130                     | 26.1                     | <4.7                   |                          |
| Zinc                       | 333                    | 345   | 0.68                  | 374                     | 74.7                     | 21                     |                          |
| Chloride (mg/L)            |                        | 395   | 64                    | 451                     |                          |                        | <b>542</b>               |
| Total Phenols <sup>#</sup> |                        | 49000 |                       | 57272                   | 11454                    | 0.013                  |                          |

\* 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.

# The limit for this substance is based on a secondary value.

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

RECEIVING WATER FLOW = 1.64 cfs (¼ of the 90-Q<sub>10</sub>), as specified in s. NR 106.06(4), Wis. Adm. Code

| SUBSTANCE      | WC  | MEAN<br>BACK-<br>GRD. | MO'LY<br>AVE.<br>LIMIT | 1/5 OF<br>EFFL.<br>LIMIT | MEAN<br>EFFL.<br>CONC. | 30-day<br>P <sub>99</sub> |
|----------------|-----|-----------------------|------------------------|--------------------------|------------------------|---------------------------|
| Mercury (ng/L) | 1.3 | 1.16                  | 1.34                   |                          |                        | 0.78                      |

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

RECEIVING WATER FLOW = 3.64 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

| SUBSTANCE                  | HTC     | MEAN<br>BACK-<br>GRD. | MO'LY<br>AVE.<br>LIMIT | 1/5 OF<br>EFFL.<br>LIMIT | MEAN<br>EFFL.<br>CONC. | 30-day<br>P <sub>99</sub> |
|----------------------------|---------|-----------------------|------------------------|--------------------------|------------------------|---------------------------|
| Cadmium                    | 370     | 0.03                  | 586                    | 117                      | 0.22                   |                           |
| Chromium (+3)              | 3818000 | 0.38                  | 6050667                | 1210133                  | <3.3                   |                           |
| Lead                       | 140     | 0.39                  | 222                    | 44.3                     | <5.4                   |                           |
| Mercury (ng/L)             | 1.5     | 1.16                  | 1.7                    |                          |                        | 0.78                      |
| Nickel                     | 43000   | 0.00                  | 68145                  | 13629                    | <4.7                   |                           |
| Total Phenols <sup>#</sup> | 3712    |                       | 8053                   | 1611                     | 0.013                  |                           |
| Toulene                    | 15359   |                       | 33322                  | 6664                     | 0.63                   |                           |

# The limit for this substance is based on a secondary value.

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

RECEIVING WATER FLOW = 3.64 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

| SUBSTANCE  | HCC  | MEAN<br>BACK-<br>GRD. | MO'LY<br>AVE.<br>LIMIT | 1/5 OF<br>EFFL.<br>LIMIT | MEAN<br>EFFL.<br>CONC. |
|------------|------|-----------------------|------------------------|--------------------------|------------------------|
| Arsenic    | 13.3 |                       | 21.1                   | 4.22                     | 1.3                    |
| Chloroform | 1960 |                       | 62.9                   | 12.6                     | 0.2                    |

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

**Conclusions and Recommendations**

Based on a comparison of the effluent data and calculated effluent limitations, **effluent limitations are required for chloride**. Limits and/or monitoring recommendations are made in the paragraphs below:

Chloride – Considering available effluent data from the current permit term (10/04/2020 – 02/05/2025), the 1-day P<sub>99</sub> chloride concentration is 610 mg/L, and the 4-day P<sub>99</sub> of effluent data is 542 mg/L.

**Because the 4-day P<sub>99</sub> exceeds the calculated weekly average WQBEL, an effluent limit is needed in accordance with s. NR 106.05(4)(b), Wis. Adm. Code.**

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

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

**Interim Limit for Chloride**

Section NR 106.82(9), Wis. Adm. Code, defines a “Weekly average interim limitation” as either the 4-day P<sub>99</sub> concentration or 105% of the highest weekly average concentration of the representative data. Ideally, the effluent chloride concentration at facilities with variances will trend downward as time goes on as a result of source reduction measures, and the recalculated interim limit will decline until the plant can meet the WQBEL.

However, changes in precipitation patterns and efforts to reduce inflow and infiltration may prevent chloride concentrations from trending down, which is likely the case for Oconomowoc. Effluent concentrations have held steady in the past few years and the 4-day P<sub>99</sub>’s calculated in this evaluation are slightly higher than the current interim limits that were calculated during a previous evaluation from July 2002 – February 2007.

Although the 4-day P<sub>99</sub> effluent chloride concentrations at Oconomowoc are higher than the current seasonal interim limits, the Department does not find it appropriate to increase the interim concentration

limit in the reissued permit, because it would be counterproductive to meeting the final WQBEL. **Therefore, the current weekly average interim chloride limit is recommended for permit reissuance.**

#### Chloride Effluent Data

|                       | All Data  | May – October | November – April |
|-----------------------|-----------|---------------|------------------|
| 1-day P <sub>99</sub> | 610       | 593           | 623              |
| 4-day P <sub>99</sub> | 542       | 533           | 549              |
| Max 4-day average     | 502       | 498           | 506              |
| Mean                  | 480       | 473           | 478              |
| Standard deviation    | 50.4      | 45.3          | 54.4             |
| Sample size           | 221       | 101           | 122              |
| Range                 | 330 – 600 | 375 – 590     | 330 – 600        |

A target limit and permit language for Source Reduction Measures are not recommended as part of this evaluation. These should follow contact with Oconomowoc. Though if the Department and Oconomowoc are unable to reach agreement on all the terms of a Chloride Variance, the calculated limits described earlier should be included in the permit, in accordance with s. NR 106.83(3), Wis. Adm. Code.

#### Chloride Monitoring Recommendations

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

**In the absence of a variance**, Oconomowoc would be subject to the WQBEL of 450 mg/L as a weekly average (rounded); the weekly average mass limit of 15,100 lbs/day ( $451 \text{ mg/L} \times 3.23 \text{ MGD} \times 8.34$ ); and an alternative wet weather mass limit of 29,000 lbs/day ( $451 \text{ mg/L} \times 7.73 \text{ MGD} \times 8.34$ ). The wet weather mass limit applies when the dry weather mass limit is exceeded and the facility demonstrates to the Department the exceedance occurred during a wet weather event.

Mercury – The WQBEL for total recoverable mercury is 1.3 ng/L. The current permit requires annual monitoring of the influent and effluent for total recoverable mercury. A total of 12 effluent sampling results are available from 05/12/2013 – 01/11/2024 for total recoverable mercury. The average concentration was 0.58 ng/L, and the maximum was 1.8 ng/L. Because the 30-day P<sub>99</sub> of available data (0.78 ng/L) is less than the most stringent WQBEL of 1.3 ng/L, **no WQBEL for mercury is required for permit reissuance. A minimum of annual mercury monitoring is recommended to continue for permit reissuance.**

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code.

Available monitoring sample data from the Oconomowoc Waterworks (PWS ID: 26802270) is provided in the table below:

#### Water Supply PFAS Data

| Sample Date | Sample ID  | Well # | PFOS (ng/L) | PFOA (ng/L) |
|-------------|------------|--------|-------------|-------------|
| 03/07/2023  | WB01246-03 | BH420  | 3           | 2.8         |
| 03/07/2023  | WB01246-13 | EM240  | 0           | 0           |

Attachment #1

| Sample Date | Sample ID  | Well # | PFOS (ng/L) | PFOA (ng/L) |
|-------------|------------|--------|-------------|-------------|
| 03/07/2023  | WB01246-08 | EM235  | 0           | 0           |
| 07/29/2024  | WC04714-01 | BH420  | 3.2         | 3.5         |
| Average =   |            |        | 1.55        | 1.58        |

The limited data above shows the municipal water supply is below 1/5<sup>th</sup> of the applicable PFOS and PFOA criteria.

Previous monitoring produced a PFOS result of 1.89 ng/L and a PFOA result of 6.53 ng/L. The result for PFOS is greater than one fifth of the respective criteria for each substance. Based on the effluent flow rate, the types of indirect dischargers contributing to the collection system, the available PFOS/PFOA monitoring data, **PFOS and PFOA monitoring is recommended at a once every two months frequency.**

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

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. Given the fact that Oconomowoc does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time.

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

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

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

Where:

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

The effluent pH data was examined as part of this evaluation. A total of 1164 sample results were reported from 10/02/2020 – 02/28/2025. The maximum reported value was 7.9 s.u. (Standard pH Units). The effluent pH was 7.8 s.u. or less 99% of the time. The 1-day P<sub>99</sub>, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 7.8 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 7.8 s.u. Therefore, a value of 7.8 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 7.8 s.u. into the equation above yields an ATC = 12 mg/L.

#### **Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method**

In accordance with s. NR 106.32(2), Wis. Adm. Code daily maximum ammonia limitations are calculated using the the 1-Q<sub>10</sub> receiving water low flow if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

#### Attachment #1

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

#### Daily Maximum Ammonia Nitrogen Determination

|                   | Ammonia Nitrogen<br>Limit mg/L |
|-------------------|--------------------------------|
| 2×ATC             | 24                             |
| 1-Q <sub>10</sub> | 15                             |

The 1-Q<sub>10</sub> method yields the most stringent limits for Oconomowoc.

#### 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.

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-Q<sub>10</sub> (4-Q<sub>3</sub>, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q<sub>5</sub> (estimated as 85% of the 7-Q<sub>2</sub> if the 30-Q<sub>5</sub> 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 Oconomowoc River, based on the raw fish data in the Fisheries Management Information System. So “ELS Absent” criteria apply from October through March, and “ELS Present” criteria will apply from April through September for a warmwater sport fish classification.

Attachment #1

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**

|                                  |                              | Spring      | Summer       | Winter       |
|----------------------------------|------------------------------|-------------|--------------|--------------|
|                                  |                              | April & May | June – Sept. | Oct. - March |
| <b>Effluent Flow</b>             | Qe (MGD)                     | 4.02        | 4.02         | 4.02         |
| <b>Background Information</b>    | 7-Q <sub>10</sub> (cfs)      | 2.1         | 2.1          | 2.1          |
|                                  | 7-Q <sub>2</sub> (cfs)       | 7.7         | 7.7          | 7.7          |
|                                  | Ammonia (mg/L)               | 0.09        | 0.07         | 0.135        |
|                                  | Average Temperature (°C)     | 12          | 19           | 4            |
|                                  | Maximum Temperature (°C)     | 14          | 21           | 10           |
|                                  | pH (s.u.)                    | 8.09        | 8.08         | 7.70         |
|                                  | % of Flow used               | 50          | 100          | 25           |
|                                  | Reference Weekly Flow (cfs)  | 1.05        | 2.10         | 0.53         |
|                                  | Reference Monthly Flow (cfs) | 3.27        | 6.55         | 1.64         |
| <b>Criteria mg/L</b>             | 4-day Chronic                |             |              |              |
|                                  | Early Life Stages Present    | 5.30        | 3.65         |              |
|                                  | Early Life Stages Absent     |             |              | 11.9         |
|                                  | 30-day Chronic               |             |              |              |
|                                  | Early Life Stages Present    | 2.12        | 1.46         |              |
|                                  | Early Life Stages Absent     |             |              | 4.78         |
| <b>Effluent Limitations mg/L</b> | Weekly Average               |             |              |              |
|                                  | Early Life Stages Present    | 6.18        | 4.86         |              |
|                                  | Early Life Stages Absent     |             |              | 12.9         |
|                                  | Monthly Average              |             |              |              |
|                                  | Early Life Stages Present    | 3.19        | 2.92         |              |
|                                  | Early Life Stages Absent     |             |              | 6.00         |

**Effluent Data**

The following table evaluates the statistics based upon ammonia data reported from 10/02/2020 – 02/28/2025. Data from February 2025 was not included in this evaluation due to a plant upset caused by heavy FOG loading, cold temperatures, and over-wasting which caused the loss of nitrifiers and caused unusually high effluent ammonia effluent concentrations. This data is not representative of current treatment conditions.

**Ammonia Nitrogen Effluent Data**

| Ammonia Nitrogen mg/L  | April - May  | June - September | October - March |
|------------------------|--------------|------------------|-----------------|
| 1-day P <sub>99</sub>  | 2.92         | 1.07             | 5.69            |
| 4-day P <sub>99</sub>  | 1.62         | 0.61             | 3.42            |
| 30-day P <sub>99</sub> | 0.74         | 0.27             | 1.44            |
| Mean*                  | 0.38         | 0.12             | 0.58            |
| Std                    | 0.65         | 0.26             | 1.46            |
| Sample size            | 105          | 207              | 373             |
| Range                  | <0.05 – 4.09 | <0.05 - 3.1      | <0.05 - 9.33    |

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

### **Reasonable Potential**

The need to include ammonia limits in Oconomowoc's permit is determined by calculating 99<sup>th</sup> upper percentile (or P<sub>99</sub>) values for ammonia 10/01/2020 – 02/25/2025 and comparing those to the calculated limits. Based on this comparison, there is no reasonable potential for the discharge to exceed any of the calculated ammonia nitrogen limits. **No limits are needed; however, monitoring is recommended.**

## **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.

**Since Oconomowoc has a monthly average phosphorus limit in effect (0.95 mg/L) that is more stringent than 1.0 mg/L, the need for a TBEL will not be considered further.**

### **Water Quality-Based Effluent Limits (WQBEL)**

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.

The Department has developed a TMDL for the Upper and Lower Rock River Basins. The US EPA approved the Rock River TMDL on September 28, 2011. The document, along with the referenced appendices can be found at: <https://dnr.wisconsin.gov/topic/TMDLs/RockRiver/index.html>

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 Rock River Basin TMDL was developed to protect and improve the water quality of phosphorus impaired waters within the basin and any discharge to an impaired water does not need the s. NR 217.13 WQBEL. In the TMDL development, the WLAs are based on the protection of Battle Creek and Mason Creek, which were impaired during the development. Therefore, the WLAs for Oconomowoc are based on protecting the phosphorus criteria of 0.075 mg/L and the TMDL-based limit can be included in the WPDES permit absent the s. NR 217.13 WQBEL. 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 – Phosphorus**

The monthly average total phosphorus (Total P) effluent limits in lbs/day are calculated based on the monthly phosphorus wasteload allocation (WLA) given in pounds per month as suggested in the *TMDL Implementation Guidance for Wastewater Permits* dated October 1, 2019. The WLA for this facility is found in the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Rock River Basin* report dated July 2011. The limits are equivalent to concentrations ranging from 0.168 mg/L – 0.295 mg/L at the facility design flow of 4.02 MGD. **Monthly average mass effluent limits in accordance with the following table are recommended for this discharge.**

**Total Phosphorus Effluent Limitations**

| <b>Month</b> | <b>Monthly Total P WLA<sup>1</sup><br/>(lbs/month)</b> | <b>Days Per Month</b> | <b>Monthly Ave Total P Effluent Limit<sup>2</sup><br/>(lbs/day)</b> |
|--------------|--------------------------------------------------------|-----------------------|---------------------------------------------------------------------|
| Jan          | 262.14                                                 | 31                    | 8.46                                                                |
| Feb          | 276.95                                                 | 28                    | 9.89                                                                |
| March        | 290.15                                                 | 31                    | 9.36                                                                |
| April        | 285.31                                                 | 30                    | 9.51                                                                |
| May          | 260.19                                                 | 31                    | 8.39                                                                |
| June         | 245.02                                                 | 30                    | 8.17                                                                |
| July         | 191.97                                                 | 31                    | 6.19                                                                |
| Aug          | 177.83                                                 | 31                    | 5.74                                                                |
| Sept         | 169.08                                                 | 30                    | 5.64                                                                |
| Oct          | 191.32                                                 | 31                    | 6.17                                                                |
| Nov          | 221.92                                                 | 30                    | 7.40                                                                |
| Dec          | 228.15                                                 | 31                    | 7.36                                                                |

Footnotes:

1- Rock River TMDL Appendix P. Monthly Total Phosphorus Allocations by Wastewater Treatment Facility (p. 147)

2- Monthly average Total P effluent limit (lbs/day) = monthly Total P WLA (lbs/month) ÷ days per month

These TMDL-based limits are equivalent to the currently calculated limits. Oconomowoc is currently not meeting the TMDL-based limits and a consistent basis and has been implementing their adaptive management (AM) plan to comply with phosphorus requirements. The current AM interim limit is 0.6 mg/L as a six-month average.

**Effluent Data**

The following table summarizes effluent total phosphorus monitoring data from 10/01/2020 – 02/26/2025. The data from 02/07/2023 and 02/08/2023 is not included in this evaluation due to an equipment failure which caused 200 gallons of orthophosphate to be discharged to the collection system. This data is not representative of normal operating conditions.

**Total Phosphorus Effluent Data**

|                        | <b>Concentration<br/>mg/L</b> | <b>Mass<br/>lbs/day</b> |
|------------------------|-------------------------------|-------------------------|
| 1-day P <sub>99</sub>  | 0.69                          | 16.9                    |
| 4-day P <sub>99</sub>  | 0.62                          | 14.0                    |
| 30-day P <sub>99</sub> | 0.58                          | 12.4                    |
| Mean                   | 0.55                          | 11.5                    |
| Std                    | 0.05                          | 1.99                    |
| Sample size            | 925                           | 924                     |
| Range                  | 0.055 - 0.88                  | 7.48 - 26.3             |

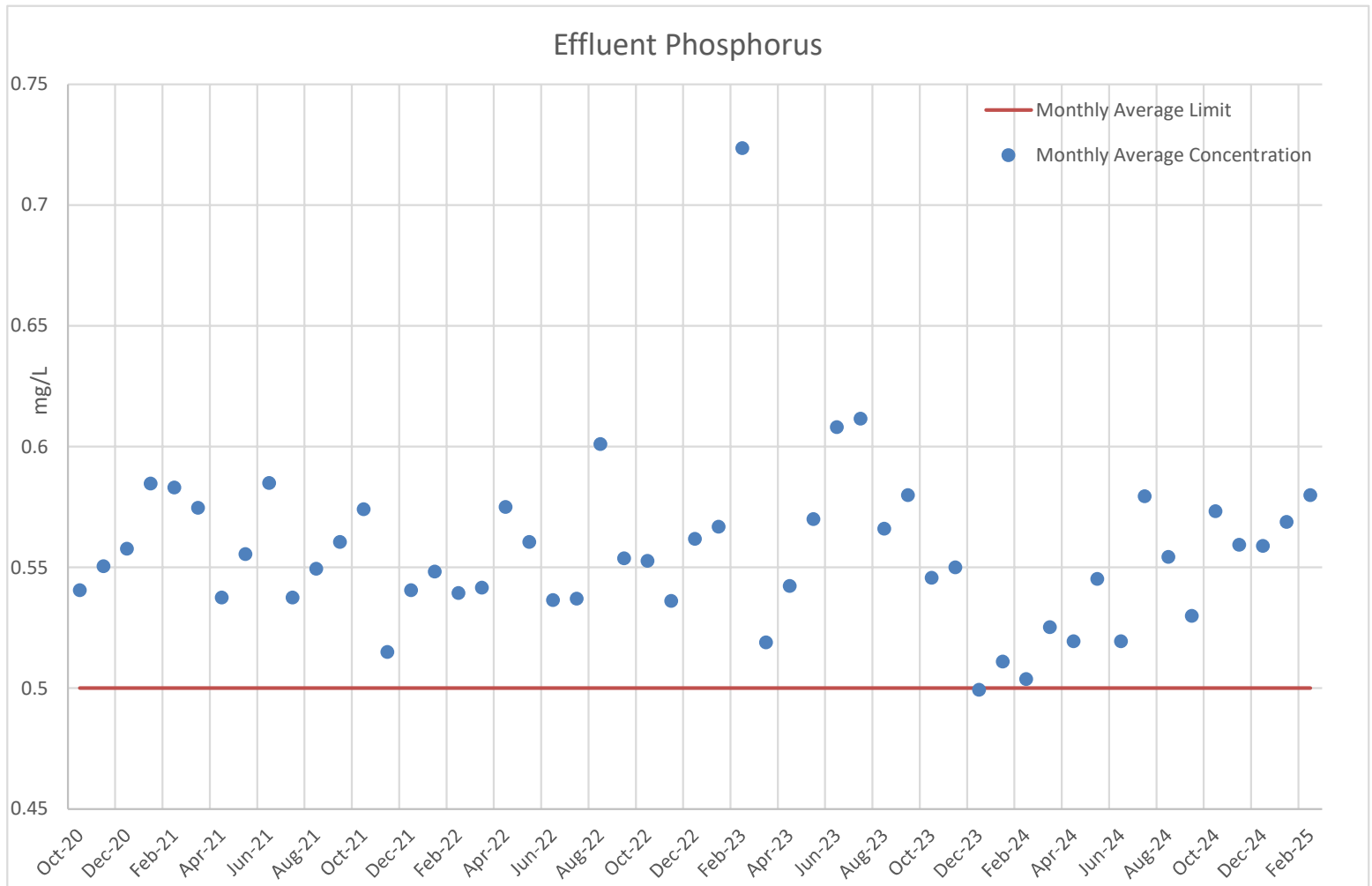
**Adaptive Management Interim Limit**

Oconomowoc intends to pursue adaptive management (AM) to comply with the phosphorus WQBELs.

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Since this is the second permit term in which AM is being pursued, the required interim limit is 0.5 mg/L, expressed as a 6-month average per s. NR 217.18(3)(e)3, Wis. Adm. Code. The permittee may be allowed up to five years to meet this interim limit.

Oconomowoc cannot currently meet 0.5 mg/L on a regular basis (shown in the graph below). Therefore, **until the 0.5 mg/L limit becomes effective, the current six-month average limit of 0.6 mg/L limit may be included in the permit. The current monthly average limit of 0.95 mg/L shall continue as well after the 0.5 mg/L six-month average limit becomes effective.**



## PART 6 – TOTAL SUSPENDED SOLIDS

The Rock River TMDL also has wasteload allocations (WLA) for total suspended solids (TSS). For a municipal facility the limits for TSS must be expressed as weekly and monthly averages. The current permit includes a weekly and monthly average of 15 mg/L for November – April and a weekly and monthly average of 10 mg/L for May – October.

The TMDL-based weekly and monthly average limits are calculated below:

**TSS TMDL-based Effluent Limitations**

| <b>Month</b> | <b>Monthly TSS WLA<sup>1</sup><br/>(tons/month)</b> | <b>Days Per Month</b> | <b>Monthly Ave TSS Effluent Limit<sup>2</sup><br/>(lbs/day)</b> | <b>Weekly Ave TSS Effluent Limit<sup>3</sup><br/>(lbs/day)</b> |
|--------------|-----------------------------------------------------|-----------------------|-----------------------------------------------------------------|----------------------------------------------------------------|
| Jan          | 5.06                                                | 31                    | <b>326</b>                                                      | <b>581</b>                                                     |
| Feb          | 5.04                                                | 28                    | <b>360</b>                                                      | <b>641</b>                                                     |
| March        | 5.06                                                | 31                    | <b>326</b>                                                      | <b>581</b>                                                     |
| April        | 4.90                                                | 30                    | <b>327</b>                                                      | <b>581</b>                                                     |
| May          | 4.15                                                | 31                    | <b>268</b>                                                      | <b>477</b>                                                     |
| June         | 3.77                                                | 30                    | <b>251</b>                                                      | <b>447</b>                                                     |
| July         | 2.72                                                | 31                    | <b>175</b>                                                      | <b>312</b>                                                     |
| Aug          | 2.59                                                | 31                    | <b>167</b>                                                      | <b>297</b>                                                     |
| Sept         | 2.64                                                | 30                    | <b>176</b>                                                      | <b>313</b>                                                     |
| Oct          | 4.15                                                | 31                    | <b>268</b>                                                      | <b>477</b>                                                     |
| Nov          | 5.02                                                | 30                    | <b>335</b>                                                      | <b>596</b>                                                     |
| Dec          | 5.06                                                | 31                    | <b>326</b>                                                      | <b>581</b>                                                     |

## Footnotes:

1- Rock River TMDL Appendix Q. Monthly Total Suspended Solids Allocations by Wastewater Treatment Facility (p. 149)

2- Monthly average TSS effluent limit (lbs/day) = maximum monthly TSS WLA (tons/month) ÷ days per month x 2,000 lbs/ton

3- Weekly average effluent limit (lbs/day) = monthly average limit (lbs/day) x multiplier

The multiplier used in the weekly average limit calculation was determined according to implementation guidance. A coefficient of variation was calculated, based on TSS mass monitoring data, to be 0.9. However, it is believed that the optimization of the wastewater treatment system to achieve the WLA-derived TSS and phosphorus permit limits will reduce effluent variability. Thus, the maximum anticipated coefficient of variation expected by any facility is 0.6. This value, along with monitoring frequency, is used to select the multiplier. This value, along with monitoring frequency, is used to select the multiplier. The current permit specifies TSS monitoring as 5/week; if a different monitoring frequency is used, the stated limits should be reevaluated.

The current TSS limits are shown below:

**Current Effluent TSS Limits**

| <b>Month</b> | <b>Monthly Ave TSS Effluent Limit<br/>(lbs/day)</b> | <b>Weekly Ave TSS Effluent Limit<br/>(lbs/day)</b> |
|--------------|-----------------------------------------------------|----------------------------------------------------|
| Jan          | <b>326</b>                                          | <b>431</b>                                         |
| Feb          | <b>360</b>                                          | <b>475</b>                                         |
| March        | <b>326</b>                                          | <b>431</b>                                         |
| April        | <b>327</b>                                          | <b>431</b>                                         |
| May          | <b>268</b>                                          | <b>334</b>                                         |
| June         | <b>251</b>                                          | <b>332</b>                                         |
| July         | <b>175</b>                                          | <b>232</b>                                         |
| Aug          | <b>167</b>                                          | <b>221</b>                                         |

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| Month | Monthly Ave<br>TSS Effluent<br>Limit<br>(lbs/day) | Weekly Ave<br>TSS Effluent<br>Limit<br>(lbs/day) |
|-------|---------------------------------------------------|--------------------------------------------------|
| Sept  | 176                                               | 232                                              |
| Oct   | 268                                               | 334                                              |
| Nov   | 335                                               | 442                                              |
| Dec   | 326                                               | 431                                              |

The current effective monthly average limits are equal to the calculated limits in this evaluation. The current weekly average limits are more stringent than the calculated weekly limits calculated in this evaluation. This is due to a different multiplication factor used to calculate the TMDL-based limits in 2012. In this evaluation, a multiplication factor of 1.78 was used based on a CV of 0.6 and a monitoring frequency of 5/week. In 2012, a multiplication factor of 1.32 was used to calculate the weekly averages, resulting in more stringent limits. **Because Oconomowoc can meet the current limits, no changes are recommended to the TSS mass limits per antidegradation and antibacksliding requirements in ch. NR 207, Wis. Adm. Code.**

The following table lists the statistics for Total Suspended Solids discharge as both a concentration and a mass, from 10/01/2020 – 02/28/2025.

| TSS Effluent Data      |                      |                |
|------------------------|----------------------|----------------|
| Sample Type            | Concentration (mg/L) | Mass (lbs/day) |
| 1-day P <sub>99</sub>  | 4.03                 | 87.7           |
| 4-day P <sub>99</sub>  | 2.71                 | 56.9           |
| 30-day P <sub>99</sub> | 1.52                 | 31.6           |
| Mean*                  | 0.84                 | 17.4           |
| Std                    | 0.68                 | 15.9           |
| Sample Size            | 1150                 | 1150           |
| Range                  | <2 – 5.9             | 0 – 125        |

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

## 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 10/01/2020 – 02/28/2025.

The table below summarizes the maximum temperatures reported during monitoring from 01/01/2024 – 12/31/2024.

**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   | 55                                                  | 56            | 58                                 | 99                                |
| FEB   | 53                                                  | 54            | 59                                 | 92                                |
| MAR   | 55                                                  | 55            | 65                                 | 110                               |
| APR   | 57                                                  | 59            | 64                                 | 112                               |
| MAY   | 62                                                  | 62            | 72                                 | 103                               |
| JUN   | 66                                                  | 67            | 80                                 | 90                                |
| JUL   | 67                                                  | 68            | 84                                 | 89                                |
| AUG   | 70                                                  | 70            | 85                                 | 88                                |
| SEP   | 70                                                  | 72            | 76                                 | 85                                |
| OCT   | 67                                                  | 69            | <b>67</b>                          | 94                                |
| NOV   | 65                                                  | 65            | <b>55</b>                          | 98                                |
| DEC   | 58                                                  | 59            | <b>56</b>                          | 96                                |

### 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 limits are needed for the months of October, November, and December.

Oconomowoc has submitted a request for consideration of dissipative cooling, referencing a previous

dissipative cooling study and a statement that there have not been substantial changes to the facility. The 2012 DC study demonstrated that the zone of free passage is about half the stream width and that some dissipative cooling happens between the sampling point and where the 800' trapezoidal effluent channel meets the Oconomowoc River. Based on this information, the department has found that it is not necessary to include temperature limits in the reissued permit. **Temperature monitoring is recommended** per the requirements of s. NR 106.59(7), Wis. Adm. Code.

#### Future WPDES Permit Reissuance

Dissipative cooling (DC) requests must be re-evaluated every permit reissuance. The permittee is responsible for submitting an updated DC request prior to permit reissuance. Such a request must either include:

- a) A statement by the permittee that there have been no substantial changes in operation of, or thermal loadings to, the treatment facility and the receiving water; or
- b) New information demonstrating DC to supplement the information used in the previous DC determination. If significant changes in operation or thermal loads have occurred, additional DC data must be submitted to the Department.

### PART 8 – WHOLE EFFLUENT TOXICITY (WET)

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

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC<sub>50</sub> (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC<sub>25</sub> (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The **IWC of 86%**, 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 = 4.02 MGD = 6.22 cfs

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

$Q_s$  =  $\frac{1}{2}$  of the 7- $Q_{10}$  = 2.1 cfs  $\div$  2 = 1.05 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

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Department prior to use. The primary control water must be specified in the WPDES permit.

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.
- 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. Significant changes were made to WET test methods in 2004 and these changes were assumed to be fully implemented by certified labs by no later than June 2005. Data prior to July 2005 is not included in this evaluation.

**WET Data History**

| Date<br>Test<br>Initiated | Acute Results<br>LC <sub>50</sub> % |                   |                  |                | Chronic Results<br>IC <sub>25</sub> % |                   |                  |               | Footnotes<br>or<br>Comments |
|---------------------------|-------------------------------------|-------------------|------------------|----------------|---------------------------------------|-------------------|------------------|---------------|-----------------------------|
|                           | <i>C. dubia</i>                     | Fathead<br>minnow | Pass or<br>Fail? | Used in<br>RP? | <i>C. dubia</i>                       | Fathead<br>Minnow | Pass or<br>Fail? | Use in<br>RP? |                             |
| 08/25/2005                | >100                                | >100              | Pass             | No             | >100                                  | >100              | Pass             | No            | 1                           |
| 12/06/2005                |                                     |                   |                  |                | 78.95                                 | >100              | Fail             | No            | 1                           |
| 01/31/2006                |                                     |                   |                  |                | 82.25                                 | >100              | Fail             | No            | 1                           |
| 02/23/2006                |                                     |                   |                  |                | 25.3                                  |                   | Fail             | No            | 1                           |
| 04/11/2006                |                                     |                   |                  |                | >100                                  | >100              | Pass             | No            | 1                           |
| 05/04/2006                |                                     |                   |                  |                | 59.33                                 | >100              | Fail             | No            | 1                           |
| 07/16/2006                |                                     |                   |                  |                | >100                                  | >100              | Pass             | No            | 1                           |
| 08/08/2006                |                                     |                   |                  |                | >100                                  | >100              | Pass             | No            | 1                           |
| 11/07/2006                | >100                                | >100              | Pass             | No             | >100                                  | >100              | Pass             | No            | 1                           |
| 01/23/2007                |                                     |                   |                  |                | >100                                  | >100              | Pass             | No            | 1                           |
| 02/13/2007                |                                     |                   |                  |                |                                       | >100              | Pass             | No            | 1                           |
| 03/08/2007                |                                     |                   |                  |                | >100                                  | >100              | Pass             | No            | 1                           |
| 03/24/2009                |                                     |                   |                  |                | >100                                  | >100              | Pass             | No            | 2                           |
| 06/11/2009                | >100                                | >100              | Pass             | No             | >100                                  | >100              | Pass             | No            | 2                           |
| 08/10/2009                |                                     |                   |                  |                | >100                                  | >100              | Pass             | No            | 2                           |
| 11/17/2009                |                                     |                   |                  |                | >100                                  | >100              | Pass             | No            | 2                           |
| 05/25/2010                |                                     |                   |                  |                | >100                                  | >100              | Pass             | No            | 2                           |
| 11/09/2010                |                                     |                   |                  |                | >100                                  | >100              | Pass             | No            | 2                           |
| 03/03/2011                |                                     |                   |                  |                | >100                                  | >100              | Pass             | No            | 2                           |
| 08/27/2011                |                                     |                   |                  |                | >100                                  | >100              | Pass             | Yes           |                             |
| 09/08/2011                |                                     |                   |                  |                | >100                                  | >100              | Pass             | Yes           |                             |
| 11/08/2011                |                                     |                   |                  |                | >100                                  | >100              | Pass             | Yes           |                             |
| 02/07/2012                |                                     |                   |                  |                | >100                                  | >100              | Pass             | Yes           |                             |
| 05/22/2012                |                                     |                   |                  |                | >100                                  | >100              | Pass             | Yes           |                             |
| 08/07/2012                |                                     |                   |                  |                | >100                                  | >100              | Pass             | Yes           |                             |
| 10/16/2012                | >100                                | >100              | Pass             | Yes            | >100                                  | >100              | Pass             | Yes           |                             |
| 03/05/2013                |                                     |                   |                  |                | >100                                  | >100              | Pass             | Yes           |                             |

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| Date Test Initiated | Acute Results<br>LC <sub>50</sub> % |                |               |             | Chronic Results<br>IC <sub>25</sub> % |                |               |            | Footnotes or Comments |
|---------------------|-------------------------------------|----------------|---------------|-------------|---------------------------------------|----------------|---------------|------------|-----------------------|
|                     | <i>C. dubia</i>                     | Fathead minnow | Pass or Fail? | Used in RP? | <i>C. dubia</i>                       | Fathead Minnow | Pass or Fail? | Use in RP? |                       |
| 05/14/2013          | >100                                | >100           | Pass          | Yes         | >100                                  | >100           | Pass          | Yes        |                       |
| 08/06/2013          |                                     |                |               |             | >100                                  | >100           | Pass          | Yes        |                       |
| 11/05/2013          |                                     |                |               |             | >100                                  | >100           | Pass          | No         | 3                     |
| 02/18/2014          |                                     |                |               |             | >100                                  | >100           | Pass          | No         | 3                     |
| 07/22/2014          | >100                                | >100           | Pass          | Yes         | >100                                  | >100           | Pass          | Yes        |                       |
| 11/17/2015          | >100                                | >100           | Pass          | Yes         | >100                                  | >100           | Pass          | Yes        |                       |
| 02/23/2016          | >100                                | >100           | Pass          | Yes         | >100                                  | >100           | Pass          | Yes        |                       |
| 05/02/2017          | >100                                | >100           | Pass          | Yes         | >100                                  | >100           | Pass          | Yes        |                       |
| 05/31/2017          |                                     | >100           | Pass          | Yes         |                                       |                |               |            |                       |
| 09/11/2018          | >100                                | >100           | Pass          | Yes         | >100                                  | >100           | Pass          | Yes        |                       |
| 04/12/2021          | >100                                | >100           | Pass          | Yes         | >100                                  | >100           | Pass          | Yes        |                       |
| 02/22/2022          | >100                                | >100           | Pass          | Yes         | 18.1                                  | >100           | Fail          | Yes        |                       |
| 03/27/2022          | >100                                | >100           | Pass          | Yes         | >100                                  | >100           | Pass          | Yes        |                       |
| 04/17/2022          | >100                                | >100           | Pass          | Yes         | >100                                  | >100           | Pass          | Yes        |                       |
| 07/25/2023          | >100                                | >100           | Pass          | Yes         | >100                                  | >100           | Pass          | Yes        |                       |
| 10/08/2024          | >100                                | >100           | Pass          | Yes         | >100                                  | >100           | Pass          | Yes        |                       |

## Footnotes:

1. *Data not representative.* Oconomowoc upgraded their facility in 2008 from sand filters to disc filters so WET testing prior to this upgrade is not representative of current treatment conditions.
  2. *Tests done by S-F Analytical, July 2008 – March 2011.* The DNR has reason to believe that WET tests completed by SF Analytical Labs from July 2008 through March 31, 2011 were not performed using proper test methods. Therefore, WET data from this lab during this period has been disqualified and was not included in the analysis.
  3. *Qualified or Inconclusive Data.* Data quality concerns were noted during testing which calls into question the reliability of the test results.
- 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.**

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

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

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

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

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

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**Chronic WET Limit Parameters**

| <b>TU<sub>c</sub></b> (maximum)<br>100/IC <sub>25</sub> | <b>B</b><br>(multiplication factor from s. NR<br>106.08(6)(c), Wis. Adm. Code, Table 4) | <b>IWC</b> |
|---------------------------------------------------------|-----------------------------------------------------------------------------------------|------------|
| 100/18.1 =<br>5.5                                       | 6.2<br>Based on 1 detect                                                                | 86%        |

$$[(TU_c \text{ effluent}) (B)(IWC)] = 29 > 1.0$$

Therefore, reasonable potential is shown for chronic WET limits using the procedures in s. NR 106.08(6), Wis. Adm. Code, and representative data from 03/03/2011 – 10/08/2024.

Expression of WET limits

Chronic WET limit =  $[100/IWC] TU_c = 1.2 TU_c$  expressed as a monthly average

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

**WET Checklist Summary**

|                                       | <b>Acute</b>                                                                                                                                                                                                             | <b>Chronic</b>                                                                                                                                                                                                            |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>AMZ/IWC</b>                        | Not Applicable.<br><br><b>0 Points</b>                                                                                                                                                                                   | IWC = 86%.<br><br><b>15 Points</b>                                                                                                                                                                                        |
| <b>Historical Data</b>                | 14 tests used to calculate RP.<br>No tests failed.<br><br><b>0 Points</b>                                                                                                                                                | 21 tests used to calculate RP.<br>1 test failed.<br><br><b>0 Points</b>                                                                                                                                                   |
| <b>Effluent Variability</b>           | Little variability, no violations or upsets,<br>consistent WWTF operations.<br><br><b>0 Points</b>                                                                                                                       | Same as Acute.<br><br><b>0 Points</b>                                                                                                                                                                                     |
| <b>Receiving Water Classification</b> | WWSF<br><br><b>5 Points</b>                                                                                                                                                                                              | Same as Acute.<br><br><b>5 Points</b>                                                                                                                                                                                     |
| <b>Chemical-Specific Data</b>         | No reasonable potential for limits based on ATC;<br>Arsenic, cadmium, copper, mercury, zinc, and<br>chloride detected. Additional Compounds of<br>Concern: Toulene, chloroform, and total phenols<br><br><b>5 Points</b> | Reasonable potential for limits for chloride based<br>on CTC; Arsenic, cadmium, copper, mercury,<br>and zinc detected. Additional Compounds of<br>Concern: Toulene, chloroform, and total phenols<br><br><b>10 Points</b> |

|                                                           | <b>Acute</b>                                                                                                        | <b>Chronic</b>                                                             |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| <b>Additives</b>                                          | 1 Biocides and 2 Water Quality Conditioners added. Permittee has proper P chemical SOPs in place<br><b>5 Points</b> | One of the additives is used more than once per 4 days.<br><b>5 Points</b> |
| <b>Discharge Category</b>                                 | 2 Industrial Contributors.<br><b>6 Points</b>                                                                       | Same as Acute.<br><b>6 Points</b>                                          |
| <b>Wastewater Treatment</b>                               | Secondary or Better<br><b>0 Points</b>                                                                              | Same as Acute.<br><b>0 Points</b>                                          |
| <b>Downstream Impacts</b>                                 | No impacts known.<br><b>0 Points</b>                                                                                | Same as Acute.<br><b>0 Points</b>                                          |
| <b>Total Checklist Points:</b>                            | <b>21 Points</b>                                                                                                    | <b>41 Points</b>                                                           |
| <b>Recommended Monitoring Frequency (from Checklist):</b> | 1x yearly                                                                                                           | 1x yearly                                                                  |
| <b>Limit Required?</b>                                    | No                                                                                                                  | Yes<br>Limit = 1.2 TU <sub>c</sub>                                         |
| <b>TRE Recommended? (from Checklist)</b>                  | No                                                                                                                  | No                                                                         |

- After consideration of the guidance provided in the Department's *WET Program Guidance Document* (2022) and other information described above, 1x yearly acute and chronic WET tests are recommended in the reissued permit. 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. Testing should continue after the permit expiration date (until the permit is reissued).
- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. The chronic WET limit shall be expressed as 1.2 TU<sub>c</sub> as a monthly average in the effluent limits table of the permit.
- A minimum of annual chronic monitoring is required because a chronic WET limit is required. Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.
- A minimum of annual acute and chronic monitoring is recommended because Oconomowoc is a major municipal discharger with a design flow greater than 1.0 MGD. Federal regulations at 40 CFR Part 122.21(j) require at least 4 acute and chronic WET tests with each permit application on samples collected since the previous reissuance. Therefore, annual monitoring is recommended in the permit term, so that data will be available for the next permit application.

## PART 9 – ADDITIVES

Unlike the metals and toxic substances evaluated in Part 2, most additives have not undergone the amount of toxicity testing needed to calculate water quality criteria. Instead, in cases where the minimum data requirements necessary to calculate a WQC are not met, a secondary value can be used to regulate the substance, according to s. NR 105.05, Wis. Adm. Code. Whenever an additive is discharged directly into a surface water without receiving treatment or an additive is used in the treatment process and is not

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expected to be removed before discharge, a review of the additive is needed. Secondary values should be derived according to s. NR 105.05, Wis. Adm. Code. Guidance related to conducting an additive review can be found in *Water Quality Review Procedures for Additives* (2022)

<https://dnr.wisconsin.gov/topic/Wastewater/Additives.html>

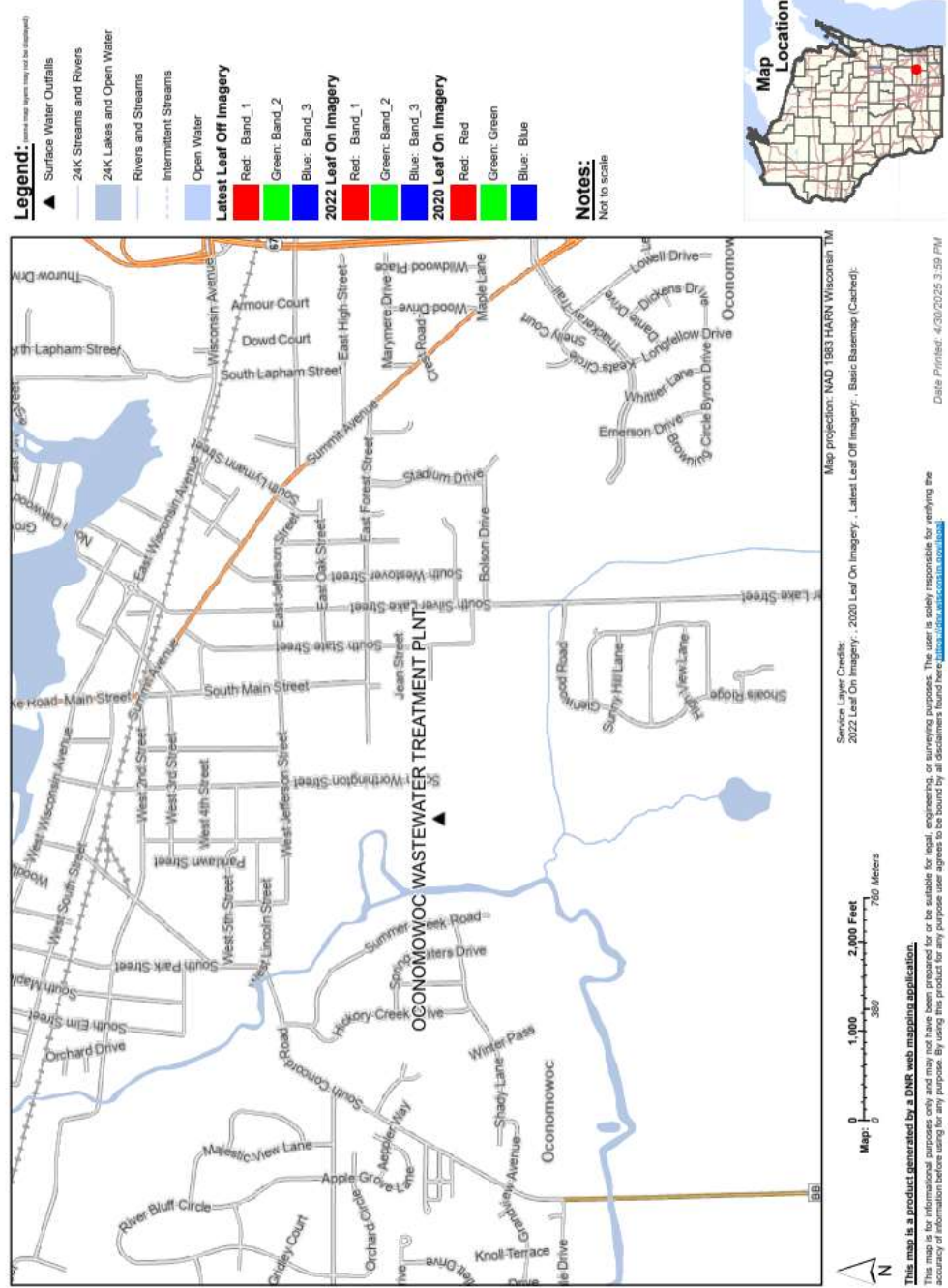
**Additive Parameters**

| Additive Name | Manufacturer | Purpose of Additive including where added | Intermittent or Continuous Feed | Frequency of Use |           | Estimated Effluent Concentration mg/L | Potential Use Restriction mg/L <sup>1</sup> | Is Additive Authorized in Current Permit? |
|---------------|--------------|-------------------------------------------|---------------------------------|------------------|-----------|---------------------------------------|---------------------------------------------|-------------------------------------------|
|               |              |                                           |                                 | Months per/yr.   | Days/week |                                       |                                             |                                           |
| Defoam 3000   | Aquafix      | Defoaming                                 | Intermittent                    | 1                | 7         | 0.89                                  | 2.55                                        | No                                        |

1. Calculated based on toxicity data provided.

The estimated effluent concentration is unknown for Aquafix Defoam 3000. Therefore, to be conservative, the estimated effluent concentration is estimated using the dosage rate of 30 lbs/day and assuming that 100% of the additive is in the effluent. The maximum possible effluent concentrations of Aquafix Defoam 3000 in the discharge from Outfall 001 are lower than the calculated limits for protection of aquatic life. Therefore, this additive is approved at the listed usage rate.

# Oconomowoc Outfall Location



Attachment #3

**Background Chloride Data – Collected by Oconomowoc Outside of Permit Requirements**

|               |     |               |    |               |    |               |    |
|---------------|-----|---------------|----|---------------|----|---------------|----|
| <b>Jan-15</b> | 70  | <b>Aug-17</b> | 60 | <b>Aug-20</b> | 65 | <b>Nov-22</b> | 59 |
| <b>Mar-15</b> | 78  | <b>Sep-17</b> | 62 | <b>Sep-20</b> | 58 | <b>Dec-22</b> | 64 |
| <b>Apr-15</b> | 71  | <b>Oct-17</b> | 63 | <b>Oct-20</b> | 58 | <b>Jan-23</b> | 59 |
| <b>May-15</b> | 66  | <b>Nov-17</b> | 66 | <b>Nov-20</b> | 58 | <b>Feb-23</b> | 65 |
| <b>Jun-15</b> | 68  | <b>Mar-18</b> | 68 | <b>Dec-20</b> | 58 | <b>Mar-23</b> | 67 |
| <b>Jul-15</b> | 74  | <b>Jun-18</b> | 67 | <b>Jan-21</b> | 58 | <b>Apr-23</b> | 63 |
| <b>Aug-15</b> | 81  | <b>Nov-18</b> | 57 | <b>Feb-21</b> | 65 | <b>May-23</b> | 72 |
| <b>Sep-15</b> | 75  | <b>Dec-18</b> | 57 | <b>Mar-21</b> | 56 | <b>Jun-23</b> | 69 |
| <b>Oct-15</b> | 101 | <b>Jan-19</b> | 58 | <b>Apr-21</b> | 62 | <b>Jul-23</b> | 62 |
| <b>Nov-15</b> | 75  | <b>Mar-19</b> | 68 | <b>May-21</b> | 59 | <b>Aug-23</b> | 64 |
| <b>Dec-15</b> | 71  | <b>Apr-19</b> | 58 | <b>Jun-21</b> | 68 | <b>Sep-23</b> | 65 |
| <b>Mar-16</b> | 65  | <b>May-19</b> | 58 | <b>Jul-21</b> | 61 | <b>Oct-23</b> | 76 |
| <b>Apr-16</b> | 67  | <b>Jun-19</b> | 60 | <b>Aug-21</b> | 84 | <b>Nov-23</b> | 71 |
| <b>May-16</b> | 71  | <b>Jul-19</b> | 59 | <b>Sep-21</b> | 65 | <b>Dec-23</b> | 77 |
| <b>Jun-16</b> | 64  | <b>Aug-19</b> | 61 | <b>Oct-21</b> | 65 | <b>Jan-24</b> | 77 |
| <b>Jul-16</b> | 66  | <b>Sep-19</b> | 55 | <b>Nov-21</b> | 68 | <b>Feb-24</b> | 75 |
| <b>Aug-16</b> | 70  | <b>Oct-19</b> | 54 | <b>Dec-21</b> | 67 | <b>Mar-24</b> | 71 |
| <b>Sep-16</b> | 70  | <b>Nov-19</b> | 56 | <b>Jan-22</b> | 69 | <b>Apr-24</b> | 64 |
| <b>Oct-16</b> | 68  | <b>Dec-19</b> | 52 | <b>Mar-22</b> | 57 | <b>May-24</b> | 66 |
| <b>Nov-16</b> | 68  | <b>Jan-20</b> | 54 | <b>Apr-22</b> | 65 | <b>Jun-24</b> | 64 |
| <b>Feb-17</b> | 73  | <b>Feb-20</b> | 55 | <b>May-22</b> | 68 | <b>Jul-24</b> | 59 |
| <b>Mar-17</b> | 62  | <b>Mar-20</b> | 58 | <b>Jun-22</b> | 55 | <b>Aug-24</b> | 56 |
| <b>Apr-17</b> | 67  | <b>Apr-20</b> | 57 | <b>Jul-22</b> | 64 | <b>Sep-24</b> | 65 |
| <b>May-17</b> | 65  | <b>May-20</b> | 56 | <b>Aug-22</b> | 65 | <b>Oct-24</b> | 65 |
| <b>Jun-17</b> | 62  | <b>Jun-20</b> | 57 | <b>Sep-22</b> | 53 | <b>Nov-24</b> | 65 |
| <b>Jul-17</b> | 31  | <b>Jul-20</b> | 69 | <b>Oct-22</b> | 61 | <b>Dec-24</b> | 67 |

## Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

|                                     |                 |     |                                                              |          |                   |                   |
|-------------------------------------|-----------------|-----|--------------------------------------------------------------|----------|-------------------|-------------------|
| <b>Facility:</b>                    | Oconomowoc WWTF |     | <b>7-Q<sub>10</sub>:</b>                                     | 2.10 cfs | <b>Temp Dates</b> | <b>Flow Dates</b> |
| <b>Outfall(s):</b>                  | 001             |     | <b>Dilution:</b>                                             | 50%      | <b>Start:</b>     | 01/01/24          |
| <b>Date Prepared:</b>               | 3/27/2025       |     | <b>f:</b>                                                    | 0        | <b>End:</b>       | 12/31/24          |
| <b>Design Flow (Q<sub>e</sub>):</b> | 4.02            | MGD | <b>Stream type:</b><br>Small warm water sport or forage fish |          |                   |                   |
| <b>Storm Sewer Dist.</b>            | 0               | ft  | <b>Qs:Q<sub>e</sub> ratio:</b>                               | 0.2 :1   |                   |                   |
|                                     |                 |     | <b>Calculation Needed?</b>                                   | YES      |                   |                   |

| Month | Water Quality Criteria        |                     |                | Receiving Water Flow Rate (Qs) |  | Representative Highest Effluent Flow Rate (Q <sub>e</sub> ) |                                                  |   | Representative Highest Effluent Temperature |                    | Calculated Effluent Limit               |                                        |
|-------|-------------------------------|---------------------|----------------|--------------------------------|--|-------------------------------------------------------------|--------------------------------------------------|---|---------------------------------------------|--------------------|-----------------------------------------|----------------------------------------|
|       | T <sub>a</sub> (default) (°F) | Sub-Lethal WQC (°F) | Acute WQC (°F) | (Qs) (cfs)                     |  | 7-day Rolling Average (Q <sub>esl</sub> ) (MGD)             | Daily Maximum Flow Rate (Q <sub>ea</sub> ) (MGD) |   | Weekly Average (°F)                         | Daily Maximum (°F) | Weekly Average Effluent Limitation (°F) | Daily Maximum Effluent Limitation (°F) |
| JAN   | 33                            | 49                  | 76             | 4.50                           |  | 2.636                                                       | 2.744                                            | 0 | 55                                          | 56                 | 58                                      | 99                                     |
| FEB   | 34                            | 50                  | 76             | 4.80                           |  | 2.832                                                       | 4.120                                            | 0 | 53                                          | 54                 | 59                                      | 92                                     |
| MAR   | 38                            | 52                  | 77             | 9.10                           |  | 3.241                                                       | 3.474                                            | 0 | 55                                          | 55                 | 65                                      | 110                                    |
| APR   | 48                            | 55                  | 79             | 16.00                          |  | 4.210                                                       | 4.796                                            | 0 | 57                                          | 59                 | 64                                      | 112                                    |
| MAY   | 58                            | 65                  | 82             | 8.50                           |  | 2.887                                                       | 3.121                                            | 0 | 62                                          | 62                 | 72                                      | 103                                    |
| JUN   | 66                            | 76                  | 84             | 4.80                           |  | 3.871                                                       | 4.740                                            | 0 | 66                                          | 67                 | 80                                      | 90                                     |
| JUL   | 69                            | 81                  | 85             | 3.00                           |  | 3.722                                                       | 3.873                                            | 0 | 67                                          | 68                 | 84                                      | 89                                     |
| AUG   | 67                            | 81                  | 84             | 2.50                           |  | 3.039                                                       | 3.358                                            | 0 | 70                                          | 70                 | 85                                      | 88                                     |
| SEP   | 60                            | 73                  | 82             | 3.00                           |  | 4.743                                                       | 7.165                                            | 0 | 70                                          | 72                 | 76                                      | 85                                     |
| OCT   | 50                            | 61                  | 80             | 4.00                           |  | 2.555                                                       | 2.726                                            | 0 | 67                                          | 69                 | 67                                      | 94                                     |
| NOV   | 40                            | 49                  | 77             | 5.60                           |  | 2.922                                                       | 3.229                                            | 0 | 65                                          | 65                 | 55                                      | 98                                     |
| DEC   | 35                            | 49                  | 76             | 4.10                           |  | 2.649                                                       | 2.776                                            | 0 | 58                                          | 59                 | 56                                      | 96                                     |

# Facility Specific Chloride Variance Data Sheet

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

## Section I: General Information

**A. Name of Permittee:** Oconomowoc Wastewater Treatment Plant  
**B. Facility Name:** Oconomowoc Wastewater Treatment Plant  
**C. Submitted by:** Wisconsin Department of Natural Resources  
**D. State:** Wisconsin **Substance:** Chloride **Date completed:** October 2, 2025  
**E. Permit #:** WI-002181-10-0 **WQSTS #:** (EPA USE ONLY)  
**F. Duration of Variance** **Start Date:** January 1, 2026 **End Date:** December 31, 2030  
**G. Date of Variance Application:** March 24, 2025  
**H. Is this permit a:** ☐ First time submittal for variance  
☒ Renewal of a previous submittal for variance (Complete Section IX)

### I. Description of proposed variance:

The proposed variance for chloride is from the water quality-based effluent limit of 450 mg/L expressed as a weekly average limit, to weekly average interim limits of 525 mg/L from November – April and 510 mg/L from May – October. The permit will also include requirements to implement source reduction measures and a target value of 470 mg/L. The term of the proposed variance is five years, concurrent with the term of the proposed WPDES permit.

This is a renewal of a previous submittal to EPA for a chloride variance for this permittee. The previous permit for this facility contained an interim chloride limit, target value and requirements to implement source reduction measures, in accordance with s. NR 106.83(2), Wis. Adm. Code.

**Citation:** An interim chloride effluent limitation under s. NR 106.83(2), Wis. Adm. Code represents a variance to water quality standards authorized by s. 283.15, Wis. Stats., and 40 CFR §131.14.

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

| Name           | Email                        | Phone        | Contribution                          |
|----------------|------------------------------|--------------|---------------------------------------|
| Sarah Donoughe | Sarah.Donoughe@Wisconsin.gov | 920-366-6076 | Permit Drafter & Variance Coordinator |
| Nick Lent      | Nicholas.Lent@Wisconsin.gov  | 414-239-1938 | Compliance Engineer                   |
| Nicole Krueger | Nicole.Krueger@Wisconsin.gov | 414-897-5750 | Limits Calculator                     |

## Section II: Criteria and Variance Information

**A. Water Quality Standard from which variance is sought:** Chloride (450 mg/L)  
**B. List other criteria likely to be affected by variance:** None.  
**C. Source of Substance:** Primarily from winter road salt application and residential water softeners.  
**D. Ambient Substance Concentration:** 64 mg/L ☒ Measured ☐ Estimated  
☐ Default ☐ Unknown  
**E. If measured or estimated, what was the basis? Include citation.** The facility collects background chloride data just upstream of the outfall. The value used in the limit evaluation is the geomean of data collected from January 2015 – December 2024.  
**F. Average effluent discharge rate:** 4.02 MGD annual **Maximum effluent discharge rate:** 9.0 MGD peak  
average design flow daily design flow  
**G. Effluent Substance Concentration:** 4-day P99 = 542 mg/L ☒ Measured ☐ Estimated  
Average = 480 mg/L ☐ Default ☐ Unknown  
**H. If measured or estimated, what was the basis? Include Citation.** Permit-required effluent monitoring from October 2020 – February 2025 at a frequency of four consecutive days per month.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>I. Type of HAC:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <input type="checkbox"/> <b>Type 1: HAC reflects waterbody/receiving water conditions</b><br><input type="checkbox"/> <b>Type 2: HAC reflects achievable effluent conditions</b><br><input checked="" type="checkbox"/> <b>Type 3: HAC reflects current effluent conditions</b> |
| <b>J. Statement of HAC:</b> The Department has determined the highest attainable condition of the receiving water is achieved through the application of the variance limit in the permit, combined with a permit requirement that the permittee implement its Chloride SRM plan. Thus, the HAC at commencement of this variance is 525 mg/L (November – April) and 510 mg/L (May – October), which reflects the greatest chloride reduction achievable with the current treatment processes, in conjunction with the implementation of the permittee's Chloride SRM plan. The current effluent condition is reflective of on-site optimization measures that have already occurred. This HAC determination is based on the economic feasibility of available compliance options for Oconomowoc at this time (see Economic Section below). The permittee may seek to renew this variance in the subsequent reissuance of this permit; the Department will reevaluate the HAC in its review of such a request. A subsequent HAC cannot be defined as less stringent than this HAC. |                                                                                                                                                                                                                                                                                 |
| <b>K. Variance Limit:</b> 525 mg/L (November – April) and 510 mg/L (May – October)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                 |
| <b>L. Level currently achievable (LCA):</b> 540 mg/L year-round                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                 |
| <b>M. What data were used to calculate the LCA, and how was the LCA derived?</b> ( <i>Immediate compliance with LCA is required.</i> )<br>The LCA equals the 4-day P99.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                 |
| <b>N. Explain the basis used to determine the variance limit (which must be <math>\leq</math> LCA). Include citation.</b><br><br>The variance limits are equal to the current variance limits. Although the LCA is greater than this, less stringent limits are not recommended.<br><br>Chapter NR 106, Subchapter VII, Wis. Adm. Code, allows for a variance; the imposition of a less restrictive interim limit; a compliance schedule that stresses source reduction and public education; and allowance for a target value or limit to be a goal for reduction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                 |
| <b>O. Select all factors applicable as the basis for the variance provided</b> <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 6<br><b>under 40 CFR 131.10(g). Summarize justification below:</b><br>The use of a reverse osmosis system was evaluated. The cost of the system was estimated to an average cost per household that would result in a MHI of 2.35%. Installing centralized lime softening on the current municipal water supply system was also evaluated, and the estimated cost of doing so would be about 2.29% of the MHI. Without a variance, and based on these cost estimates, meeting the water quality standard of 450 mg/L would result in substantial and widespread economic and social impacts to the community.                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                 |
| <b>Section III: Location Information</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                 |
| <b>A. Counties in which water quality is potentially impacted:</b> <u>Waukesha</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                 |
| <b>B. Receiving waterbody at discharge point:</b> <u>Oconomowoc River</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                 |
| <b>C. Flows into which stream/river?</b> <u>Rock River</u> <b>How many miles downstream?</b> <u>10 miles</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                 |
| <b>D. Coordinates of discharge point (UTM or Lat/Long):</b> <u>43.10065, -88.50764</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                 |
| <b>E. What is the distance from the point of discharge to the point downstream where the concentration of the substance falls to less than or equal to the chronic criterion of the substance for aquatic life protection?</b><br>About ½ mile or less. It is assumed that Oconomowoc's effluent is 100% mixed instream at or before ½ mile downstream of the discharge due to the number of turns in the stream and presence of tributaries that flow into the Oconomowoc River downstream of the outfall.<br><br>Additionally, the instream chloride data collected from the Oconomowoc River at Highway BB Bridge (~1 mile downstream of the outfall) has a geomean of 93 mg/L from data collected between November 2020 – November 2023.                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                 |
| <b>F. Provide the equation used to calculate that distance</b> ( <i>Include definitions of all variables, identify the values used for the clarification, and include citation</i> ):<br>Assuming 100 % mixing with the receiving water's minimum monthly 7Q10 of 2.5 cfs (August) is achieved within ½ mile downstream from discharge; $((525 \text{ mg/L} \times 6.219 \text{ cfs}) + (64 \text{ mg/L} \times 2.5 \text{ cfs})) / (6.219 \text{ cfs} + 2.5 \text{ cfs}) = 393 \text{ mg/L}$ . On average flow days, the instream chloride concentrations would be much lower.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                 |

|                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                              |                          |                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------|------------------------------|
| <b>G. What are the designated uses associated with the direct receiving waterbody, and the designated uses for any downstream waterbodies until the water quality standard is met?</b><br>Warm Water Sport Fish (WWSF) community, non-public water supply                                                                                                                                                                                 |                                              |                          |                              |
| <b>H. Identify all other variance permittees for the same substance which discharge to the same stream, river, or waterbody in a location where the effects of the combined variances would have an additive effect on the waterbody:</b> None.                                                                                                                                                                                           |                                              |                          |                              |
| <b>Permit Number</b>                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Facility Name</b>                         | <b>Facility Location</b> | <b>Variance Limit [mg/L]</b> |
| N/A                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |                          |                              |
| <b>I. Please attach a map, photographs, or a simple schematic showing the location of the discharge point as well as all variances for the substance currently draining to this waterbody on a separate sheet</b><br>See attached map (Current Variances - Oconomowoc WWTP Outfall 001).                                                                                                                                                  |                                              |                          |                              |
| <b>J. Is the receiving waterbody on the CWA 303(d) list? If yes, please list</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown<br>the impairments below.                                                                                                                                                                                                                           |                                              |                          |                              |
| <b>River Mile</b>                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Pollutant</b>                             | <b>Impairment</b>        |                              |
| N/A                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |                          |                              |
| <b>K. Please list any contributors to the POTW in the following categories:</b>                                                                                                                                                                                                                                                                                                                                                           |                                              |                          |                              |
| Food processors (cheese, vegetables, meat, pickles, soy sauce, etc.)                                                                                                                                                                                                                                                                                                                                                                      | None                                         |                          |                              |
| Metal Plating/Metal Finishing                                                                                                                                                                                                                                                                                                                                                                                                             | Vorteq Coil Finishers                        |                          |                              |
| Car Washes                                                                                                                                                                                                                                                                                                                                                                                                                                | Bubbles, Fleet Farm, Kwik Trip, Herr's Mobil |                          |                              |
| Municipal Maintenance Sheds (salt storage, truck washing, etc.)                                                                                                                                                                                                                                                                                                                                                                           | None                                         |                          |                              |
| Laundromats                                                                                                                                                                                                                                                                                                                                                                                                                               | Coin Laundry, Sun Laundry                    |                          |                              |
| Other presumed commercial or industrial chloride contributors to the POTW                                                                                                                                                                                                                                                                                                                                                                 | None                                         |                          |                              |
| <b>L. If the POTW does not have a DNR-approved pretreatment program, is a sewer use ordinance enacted to address the chloride contributions from the industrial and commercial users? If so, please describe.</b><br>Oconomowoc does not have a DNR-Approved Pretreatment Program. However, Oconomowoc has sampled industrial users and discovered that the levels of chlorides are consistent with the levels associated with softeners. |                                              |                          |                              |
| <b>Section IV: Pretreatment</b> (complete this section only for POTWs with DNR-Approved Pretreatment Programs. See w:\Variances\Templates and Guidance\Pretreatment Programs.docx)                                                                                                                                                                                                                                                        |                                              |                          |                              |
| <b>A. Are there any industrial users contributing chloride to the POTW? If so, please list.</b><br>N/A                                                                                                                                                                                                                                                                                                                                    |                                              |                          |                              |
| <b>B. Are all industrial users in compliance with local pretreatment limits for chloride? If not, please include a list of industrial users that are not complying with local limits and include any relevant correspondence between the POTW and the industry (NOVs, industrial SRM updates and timeframe, etc)</b><br>N/A                                                                                                               |                                              |                          |                              |
| <b>C. When were local pretreatment limits for chloride last calculated?</b><br>N/A                                                                                                                                                                                                                                                                                                                                                        |                                              |                          |                              |
| <b>D. Please provide information on specific SRM activities that will be implemented during the permit term to reduce the industry's discharge of the variance pollutant to the POTW</b><br>N/A                                                                                                                                                                                                                                           |                                              |                          |                              |

|                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Section V: Public Notice</b>                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| A. Has a public notice been given for this proposed variance?                                                               | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| B. If yes, was a public hearing held as well?                                                                               | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C. What type of notice was given?                                                                                           | <input checked="" type="checkbox"/> Notice of variance included in notice for permit <input type="checkbox"/> Separate notice of variance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| D. Date of public notice:                                                                                                   | October 16, 2025 Date of hearing: December 1, 2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| E. Were comments received from the public in regards to this notice or hearing? (If yes, see notice of final determination) | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Section VI: Human Health</b>                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| A. Is the receiving water designated as a Public Water Supply?                                                              | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| B. Applicable criteria affected by variance:                                                                                | No human health criteria for chloride.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| C. Identify any expected impacts that the variance may have upon human health, and include any citations:                   | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Section VII: Aquatic Life and Environmental Impact</b>                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| A. Aquatic life use designation of receiving water:                                                                         | Warm water sport fish community                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| B. Applicable criteria affected by variance:                                                                                | Chronic toxicity criterion for chloride is 395 mg/L from ch. NR 105, Wis. Adm. Code, applicable in all Wisconsin waters regardless of use designation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| C. Identify any environmental impacts to aquatic life expected to occur with this variance, and include any citations:      | The proposed highest interim limit of 525 mg/L results in an instream concentration of 458 mg/L at the edge of the regulatory mixing zone of 50% mixing allowance using the minimum annual 7-Q <sub>10</sub> stream flow of 2.1 cfs. This value exceeds the genus mean chronic value for one of the 13 species used to determine the criteria (Ceriodaphnia; 417 mg/L).                                                                                                                                                                                                                                                                                     |
| D. List any Endangered or Threatened species known or likely to occur within the affected area, and include any citations:  | There are no Endangered or Threatened species known that would affect the water quality criterion, as the chronic toxicity criterion for chloride is more stringent than all genus mean chronic values for organisms with chloride toxicity data. As a result, no endangered species with data would need more protection than already provided by the existing criterion.<br><br>Citation: U.S. Fish & Wildlife Service – Environmental Conservation Online System ( <a href="http://www.fws.gov/endangered/">http://www.fws.gov/endangered/</a> ) and National Heritage Index ( <a href="http://dnr.wi.gov/topic/nhi/">http://dnr.wi.gov/topic/nhi/</a> ) |
| <b>Section VIII: Economic Impact and Feasibility</b>                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| A. Describe the permittee's current pollutant control technology in the treatment process:                                  | Oconomowoc currently does not have any treatment capability for chloride. Treatment processes include screening, grit removal, primary clarification, activated sludge aeration, final clarification, tertiary filtration and UV light disinfection. Effluent receives additional aeration (fine bubble diffusers) in the final effluent tanks before flowing by gravity into the east bank of the Oconomowoc River.                                                                                                                                                                                                                                        |
| B. What modifications would be necessary to comply with the current limits? Include any citations.                          | As noted above, the cost of providing reverse osmosis at the wastewater treatment facility or centralized lime softening for the drinking water system were evaluated and determined to be prohibitively expensive.                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| C. How long would it take to implement these changes?                                                                       | Unknown; neither modification is economically feasible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| D. Estimate the capital cost (Citation):                                                                                    | \$4,522,500 (source: WDNR Form 3400-193 Chloride Variance Application from permittee)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| E. Estimate additional O & M cost (Citation):                                                                               | \$1,467,300 (source: WDNR Form 3400-193 Chloride Variance Application from permittee)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| F. Estimate the impact of treatment on the effluent substance concentration, and include any citations:                     | Reverse osmosis (RO) systems can be operated to achieve levels of chloride below the water quality standard of 450 mg/L. However, it is not economically feasible for the City of Oconomowoc WWTP at this time.                                                                                                                                                                                                                                                                                                                                                                                                                                             |

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

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

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

**H. Is it technically and economically feasible for this permittee to modify the treatment process to reduce the level of the substance in the discharge?** ☐ Yes ☒ No ☐ Unknown

RO treatment of the City of Oconomowoc WWTP effluent to meet the WQBEL is technically feasible. However, it is not economically feasible. See DNR variance application and screening tool for costs of reverse osmosis. Use of reverse osmosis at the WWTP was evaluated; the resulting total cost for sewer user rates was estimated to result in an average cost to households that would be 2.35% of the MHI. An increase of this magnitude would cause substantial and widespread adverse social and economic impacts in the area where the discharge is located.

Lime softening treatment of the City of Oconomowoc water supply – in lieu of ion-exchange – is technically feasible and would potentially enable the WWTP effluent to meet the chloride WQBEL. However, lime softening is not economically feasible. See the Chloride Variance Economic Eligibility Tool (Lime Softening) screening tool for costs of lime softening. Use of municipal lime softening was evaluated; the resulting cost for sewer user rates was estimated to result in an average cost to households that would be 2.29% of the MHI. An increase of this magnitude would cause substantial and widespread adverse social and economic impacts in the area where the discharge is located.

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

**J. If yes, what prevents this from being done? Include any citations.**

The cost of adding RO to the existing treatment plant's treatment train would cause substantial and widespread adverse social and economic impacts in the area where the discharge is located. Implementation of the SRMs in the proposed permit is preferable economically and environmentally to installing RO.

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

1. Reverse Osmosis (RO) – not economically feasible (2.35% MHI)
2. Regional Lime Softening Treatment – not economically feasible (2.29% MHI)

**Section IX: Compliance with Water Quality Standards**

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

As conditions of this variance, the current permit requires that the permittee (a) maintain effluent quality at or below the interim effluent limitation specified, (b) implement the chloride source reduction measures specified below, (c) follow the approved Source Reduction Plan and (d) perform the actions listed in the Schedule.

1. Continue monitoring chloride concentrations of industrial, commercial, and large water user dischargers. Require industrial and commercial contributors to evaluate water treatment systems.
2. Based on monitoring and data analysis, investigate the need for local chloride limits on industrial & commercial contributors, septic haulers, and Sanitary Districts.
3. Continue public education on proper water softener installation and settings. Provide education information on the City's website, in sewer bill mailings, the City newsletter, and brochures available at

City Hall.

4. Water Softener Incentive Program – contact local water softener companies to discuss partnership opportunities. Develop and present option for incentive program to City Council and implement program if approved.

5. Create and implement an inspection form to determine the type and number of water softeners being used within the service area. The form will be completed during annual water meter replacement inspections.

6. Address inflow and infiltration through the annual inspection of manholes, replacement or lining of sewer pipes, and televise sanitary sewers in accordance with the City street projects and CMOM program.

7. Continue education of DPW snowplow drivers on the efficient use of road salt and brine. Investigate providing training to private salt/snowplow companies. Provide public education on proper salting techniques.

8. Purchase and install equipment on the City's fleet of salt and brine equipment in an effort to reduce the overall chloride application rate. Continue to install brine equipment with the vehicle replacement program.

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

This proposed permit contains a variance to the water quality-based effluent limit (WQBEL) for chloride granted in accordance with s. NR 106.83(2), Wis. Adm. Code. As conditions of this variance the permittee shall (a) maintain effluent quality at or below the interim effluent limitation specified in the proposed permit, (b) implement the chloride source reduction measures specified in the Source Reduction Plan dated 2026-2030, and (c) perform the actions listed in the Chloride SRM (Target Value) Schedule (see the Schedules section of the proposed permit).

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

|                                             |                             |                              |                                                                                                      |
|---------------------------------------------|-----------------------------|------------------------------|------------------------------------------------------------------------------------------------------|
| <b>A. Date of previous submittal:</b>       | <u>August 7, 2020</u>       | <b>Date of EPA Approval:</b> | <u>September 21, 2020</u>                                                                            |
| <b>B. Previous Permit #:</b>                | <u>WI-0021181-09-0</u>      | <b>Previous WQSTS #:</b>     | <u>(EPA USE ONLY)</u>                                                                                |
| <b>C. Effluent substance concentration:</b> | <u>542 mg/L (4-day P99)</u> | <b>Variance Limit:</b>       | <u>510 mg/L (May-October) and 525 mg/L (November-April)</u>                                          |
| <b>D. Target Value(s):</b>                  | <u>470 mg/L</u>             | <b>Achieved?</b>             | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Partial |

Submit Annual Reports

☒ Yes ☐ No

Continue monitoring chloride concentrations of industrial, commercial, and large water user dischargers. Require industrial and commercial contributors to evaluate water treatment systems.

☒ Yes ☐ No

Based on monitoring and data analysis, investigate the need for local chloride limits on industrial & commercial contributors, septic haulers, and Sanitary Districts.

☒ Yes ☐ No

Continue public education on proper water softener installation and settings. Provide education information on the City's website, in sewer bill mailings, the City newsletter, and brochures available at City Hall.

☒ Yes ☐ No

Water Softener Incentive Program – contact local water softener companies to discuss partnership opportunities.

☒ Yes ☐ No

|                                                                                                                                                                                                                        |                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Develop and present option for incentive program to City Council and implement program if approved.                                                                                                                    |                                                                                   |
| Create and implement an inspection form to determine the type and number of water softeners being used within the service area. The form will be completed during annual water meter replacement inspections.          | <input checked="" type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>No</b> |
| Address inflow and infiltration through the annual inspection of manholes, replacement or lining of sewer pipes, and televise sanitary sewers in accordance with the City street projects and CMOM program.            | <input checked="" type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>No</b> |
| Continue education of DPW snowplow drivers on the efficient use of road salt and brine. Investigate providing training to private salt/snowplow companies. Provide public education on proper salting techniques.      | <input checked="" type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>No</b> |
| Purchase and install equipment on the City's fleet of salt and brine equipment in an effort to reduce the overall chloride application rate. Continue to install brine equipment with the vehicle replacement program. | <input checked="" type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>No</b> |

# City of Oconomowoc

## Chloride SRM Action Plan

2026-2030

| EDUCATION/OUTREACH                                                                                                   |                                                                                                                                                                                                               |                                                                                                                                                                     |                                                                                                            |                                                                                                            |                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| SRM Activity                                                                                                         | 2026                                                                                                                                                                                                          | 2027                                                                                                                                                                | 2028                                                                                                       | 2029                                                                                                       | 2030                                                                                                       |
| Water Softener educational information provided on City Website                                                      | Review existing information and update as needed                                                                                                                                                              | Annual Review and document if any updates are needed                                                                                                                | Annual Review and document if any updates are needed                                                       | Annual Review and document if any updates are needed                                                       | Annual Review                                                                                              |
| Educate DPW drivers on salt use and efficient application processes                                                  | Annual, in-person meeting held with snowplow drivers, topics will be reflected in the annual report                                                                                                           | Annual, in-person meeting held with snowplow drivers, topics will be reflected in the annual report                                                                 | Annual, in-person meeting held with snowplow drivers, topics will be reflected in the annual report        | Annual, in-person meeting held with snowplow drivers, topics will be reflected in the annual report        | Annual, in-person meeting held with snowplow drivers, topics will be reflected in the annual report        |
| Discuss chloride regulations with Sanitary Districts and encourage them to promote educational and wise use efforts. | Establish a point of contact and learn about current or previous efforts targeting chloride reductions. Chloride reduction efforts and outcomes of these discussions will be documented in the annual report. | Share info. and encourage Sanitary Districts to increase chloride awareness. Info shared and outcomes of these discussions will be documented in the annual report. | Annual Review and document the use of educational materials and wise use efforts by the Sanitary Districts | Annual Review and document the use of educational materials and wise use efforts by the Sanitary Districts | Annual Review and document the use of educational materials and wise use efforts by the Sanitary Districts |
| Expand outreach targeting large water users                                                                          | Update list of large water consumers broken down by type as applicable. i.e. car washes, schools, hospitals etc.                                                                                              | Survey followed up by phone calls to document chloride reduction strategies in use.                                                                                 | Through letters and online guidance, educate large users on voluntary methods to reduce chlorides          | Share findings and maintain lines of communication, Review sampling data results                           | Assess progress and determine steps for continued success                                                  |

| INCENTIVES                                                                                                                                                                    |                                                                                                                    |                                                                                                                                              |                                                                                                                                        |                                                                                                                    |                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| SRM Activity                                                                                                                                                                  | 2026                                                                                                               | 2027                                                                                                                                         | 2028                                                                                                                                   | 2029                                                                                                               | 2030                                                                                                               |
| Water Softener Incentive Program - Institution of water softener "tune-ups" or replacement through collaboration with water softener businesses and the participating public. |                                                                                                                    | If approved and as part of budget development, set aside a fund to allow for submittal of efforts for reimbursements to residents/businesses | Roll out reimbursement program for water softener tune-ups or replacement, communication done through City web-site and Facebook pages | Review progress and continue with reimbursement program. Appropriate changes will be communicated with the public. | Review progress and continue with reimbursement program. Appropriate changes will be communicated with the public. |
| MONITORING / SOURCE IDENTIFICATION                                                                                                                                            |                                                                                                                    |                                                                                                                                              |                                                                                                                                        |                                                                                                                    |                                                                                                                    |
| Sampling and analysis of Residential areas in our collection system                                                                                                           | Establish strictly residential sampling points within our system and gather composite samples for analysis         | Gather composite samples from residential sites. Review efforts and modify procedure as appropriate                                          | Gather composite samples from residential sites. Review efforts and modify procedure as appropriate                                    | Review data and establish need for ongoing analysis                                                                | See assessment from 2028, Response dependent on value and need                                                     |
| Sampling and analysis of select Commercial and Industrial customers                                                                                                           | Review businesses included and continue sampling effort                                                            | Review businesses included and continue sampling effort                                                                                      | Review businesses included and continue sampling effort                                                                                | Review businesses included and continue sampling effort                                                            | Review businesses included and continue sampling effort                                                            |
| Sampling and analysis of hauled in waste                                                                                                                                      | As hauler sampling protocols will be changing we will incorporate Chloride testing                                 | Continue random sampling of both holding and septic tank waste                                                                               | Continue random sampling of both holding and septic tank waste                                                                         | Evaluate data and determine need for additional analysis                                                           | See assessment from 2028, Response dependent on value and need                                                     |
| Sampling and analysis of Sanitary Districts                                                                                                                                   |                                                                                                                    | Identify appropriate sample points                                                                                                           | Obtain composite sample for analysis per Sanitary District                                                                             | Obtain composite sample for analysis per Sanitary District                                                         | See assessment from 2028, Response dependent on value and need                                                     |
| Inventory water softeners in conjunction with Water Dept. meter change outs. Information housed on GIS                                                                        | In conjunction with Water Dept. meter change outs, water softener inventory is being collected and tracked via GIS | Ongoing effort                                                                                                                               | Review data collected and determine need for targeted incentives                                                                       | See assessment from 2028, Response dependent on value and need                                                     |                                                                                                                    |

| SRM Activity                                                                                                                             | 2026                                                                                                     | 2027                                                                                                     | 2028                                                                                                     | 2029                                                                                                     | 2030                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>EQUIPMENT</b>                                                                                                                         |                                                                                                          |                                                                                                          |                                                                                                          |                                                                                                          |                                                                                                          |
| Purchase and install brine equipment to be used on City's salt trucks. Incorporate standards as part of the vehicle replacement program. | Provide specific equipment notes per communication with DPW staff. Notes to be included in annual report | Provide specific equipment notes per communication with DPW staff. Notes to be included in annual report | Provide specific equipment notes per communication with DPW staff. Notes to be included in annual report | Provide specific equipment notes per communication with DPW staff. Notes to be included in annual report | Provide specific equipment notes per communication with DPW staff. Notes to be included in annual report |

**OCONOMOWOC WATERSHED  
PROTECTION PROGRAM**

**CITY OF OCONOMOWOC  
WAUKESHA COUNTY, WISCONSIN**

**August 2025  
(AM-2025-001)**

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**City of Oconomowoc**  
**Oconomowoc Watershed Protection Program**

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**LIST OF ABBREVIATIONS**

|        |                                                                    |
|--------|--------------------------------------------------------------------|
| AEA    | Agricultural Enterprise Areas                                      |
| AM     | Adaptive Management                                                |
| CSA    | Critical Source Areas                                              |
| EPA    | Environmental Protection Agency                                    |
| GIS    | Geographical Information Systems                                   |
| HUC    | Hydrologic Unit Code                                               |
| LWC    | Land and Water Conservation                                        |
| MGD    | Million Gallons Per Day                                            |
| MS4    | Municipal Separate Storm Sewer System                              |
| NLCD   | National Land Use Database                                         |
| NRCS   | National Resource Conservation Service                             |
| OWPP   | Oconomowoc Watershed Protection Program                            |
| POC    | Point of Compliance                                                |
| R/M    | Ruekert & Mielke, Inc.                                             |
| RCPP   | Regional Conservation Partnership Program                          |
| RUSLE  | Revised Universal Soil Loss Equation                               |
| SEWRPC | Southeastern Wisconsin Regional Planning Commission                |
| SLAMM  | Source Loading and Management Model                                |
| STEPL  | Spreadsheet Tool for Estimating Pollutant Load                     |
| SWAT   | Soil and Water Assessment Tool                                     |
| SWIMS  | Surface Water Integrated Monitoring System                         |
| TMDL   | Total Maximum Daily Load                                           |
| TP     | Total Phosphorus                                                   |
| TSS    | Total Suspended Solids                                             |
| USGS   | United States Geological Survey                                    |
| USLE   | Universal Soil Loss Equation                                       |
| UW     | University of Wisconsin Extension                                  |
| WAC    | Wisconsin Administrative Code                                      |
| WDATCP | Wisconsin Department of Agriculture, Trade and Consumer Protection |
| WDNR   | Wisconsin Department of Natural Resources                          |
| WPDES  | Wisconsin Pollutant Discharge Elimination System                   |
| WQC    | Water Quality Criterion                                            |
| WWTF   | Wastewater Treatment Facility                                      |

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## **OCONOMOWOC WATERSHED PROTECTION PROGRAM**

### **INTRODUCTION AND BACKGROUND**

The City of Oconomowoc's (City) Adaptive Management Plan (AM) effort is named the Oconomowoc Watershed Protection Program (OWPP). The City received approval for this AM as part of their Wisconsin Pollutant Discharge Elimination System (WPDES) permit renewal in October 2020. The permit contains final mass-based limits for Total Suspended Solids (TSS) and Total Phosphorus (TP). The mass-based limits are derived from the Rock River Total Maximum Daily Load (TMDL) approved by the Environmental Protection Agency (EPA) in September of 2011 (The Cadmus Group, Inc., 2011).

The TMDL was created as a requirement of Section 303(d) of the Federal Clean Water Act for impaired water bodies. The TMDL determines the maximum amount of pollutant that a water body is capable of assimilating while continuing to meet the existing water quality standards. After this maximum load was established for the Rock River Basin as a whole, waste load allocations were established for both point and nonpoint sources in the watershed (The Cadmus Group, Inc., 2011).

The TMDL affects both WWTFs and Municipal Separate Storm Sewer Systems (MS4s). In this way, the Oconomowoc MS4 will be required to achieve compliance with similar pollutant limits as the WWTF. Both entities can meet the limits for TSS without any significant facility or infrastructure improvements. Therefore, the compliance effort for the City has been limited in scope to meet future TP limits.

The Oconomowoc WWTF uses an activated sludge treatment process. The treatment processes include influent screening, influent pumping, grit removal, primary clarification, aeration using submerged membrane diffusers, final clarification, tertiary filters, ultraviolet light disinfection, and effluent aeration. Facility solids are treated through anaerobic digestion. From digestion, solids are thickened prior to storage. Biosolids are spread on farmland for soil conditioning. Effluent from the WWTF flows into a channel approximately 800 feet westward to the Oconomowoc River. The Oconomowoc River flows into the Rock River in eastern Jefferson County. The Rock River flows west towards the Mississippi River and eventually reaches the Gulf of Mexico.

The monthly average TP limits, expressed as concentrations at the design flow of 4.0 million Gallons Per Day (MGD), range from 0.17 mg/L in August and September to 0.30 mg/L in February. At this time, the WWTF cannot meet the final TP limits without significant facility improvements. The Utility currently has membrane disc filters designed to remove TSS before disinfection. However, these filters were not designed to remove TP to the levels required to meet the final permit. The Adaptive Management interim effluent limit of 0.6 mg/L, as a six-month average, went into effect on 11/01/2020. Under the initial permit (WPDES Permit No. WI-0021181-09-0) the WWTF has met effluent TP compliance with an average TP value of 0.56 mg/l.

The WWTF uses ferric chloride for phosphorus removal. Since the installation of an Ortho Phosphate analyzer and new chemical feed pumps, we have seen a significant decrease in pounds of effluent phosphorous. The City adds an average of 120 gallons of ferric chloride per day to reduce TP in the effluent between 0.6 & 0.5 mg/L. The current dosing point is at the end of the aeration basins. WWTF staff have experimented in the past with different dosing locations and configurations with limited success in increasing TP removal efficiency. Based on this experimentation operations has confirmed that higher chemical doses can be applied to safely reach the adaptive management final limits of 0.5 mg/L. However, at a level below 0.4 mg/L the filters quickly blind with chemical and take on a distinctive orange color associated with the ferric chloride.

After further evaluation of possible treatment alternatives, the WWTF will be able to comply with the interim limit using existing treatment processes with an expected start date of May 2027. The utility is estimating there will be four additional process trials prior to committing to the 0.5 Mg/L limit in May 2027.

The City continues to identify AM as the preferred compliance alternative for the WWTF and MS4 under Wisconsin Administrative Code (WAC) Chapters NR 217 and 216, respectively. The City submitted its preliminary Watershed Adaptive Management Request Form 3200-139 on February 23, 2015.

The City continues to meet the three eligibility conditions of AM as outlined below:

1. **The receiving water does not meet water quality criteria for TP:** The Oconomowoc River at the point of compliance Coinciding with the implementation of non-point improvement projects, the river at the point of compliance has shown a reduction of median TP concentration (May-Oct). Without an ongoing adaptive management program to sustain improvement projects, water quality in the receiving water will likely trend back toward the original concentration of 0.096 mg/L which is above the TMDL standard of 0.075 mg/L.
2. **The watershed is non-point source dominated:** Based on the WDNR's Pollutant Load Ratio Estimation Tool, the TP loading in the watershed upstream of the WWTF is 70 percent non-point source and 30 percent point source.
3. **The WWTF needs filtration or equivalent technology to meet the Water Quality Based Effluent Limit:** Currently, the facility is unable to reach a level of 0.4 mg/L T-Phosphorus. Filtration or an equivalent removal technology is necessary to reach the lower limit.

The City feels AM (Adaptive Management) is the best alternative for several reasons. First, the adaptive management program in the Oconomowoc River watershed has been effective in reducing TP (total phosphorus) concentrations in the river. Long-term conservation practices, alongside significant collaboration from the agricultural community, have contributed to a marked reduction in the median TP concentration at the Point of Compliance (POC). The program has resulted in concentrations trending below the AM plan target of 0.075 mg/L 0.060 mg/L threshold (80% confidence interval is 0.064 mg/L) during both 2023 and 2024, from May to October. This indicates that water quality criteria (WQC) are within reach. While water quality criteria are showing progress, we believe the recent data may not fully reflect the true improvement in water quality. The past two seasons have been impacted by significant drought conditions. This weather influence likely had a substantial effect on TP concentrations in the Oconomowoc River. Given these conditions, we are not confident that the concentrations would remain below 0.075 mg/L without such favorable weather, and management of non-point improvements, thus the river still meets the criteria for Adaptive Management eligibility.

The POC for this project is strategically located just upstream of the confluence of the Oconomowoc and Rock Rivers. The Oconomowoc WWTF outfall is approximately nine river miles upstream, providing opportunities for implementing management measures both upstream and downstream of the treatment facility. These upstream improvements should result in noticeable water quality benefits at the confluence. Moreover, focusing upstream from the WWTF offers great community benefits, particularly in the “Lake Country” area, where projects that improve water quality have generated strong community support. Cleaner water flowing downstream through the many lakes has led to significant buy-in from various government agencies, organizations, and local residents. In addition, there are several opportunities to reduce pollutant loading downstream of the WWTF, which will theoretically lead to the greatest TP reductions at the point of compliance. Additional discussion, on the point of compliance, is included in the following sections of the report.

The Oconomowoc River Watershed offers opportunities for beneficial partnerships. A key partner will be the City of Oconomowoc MS4, whose collaboration with the wastewater utility will benefit the stormwater utility as a path to achieving TP compliance. The roles of other project partners will be detailed in the next section.

There are five other MS4 permittees in the watershed. These other MS4s did not participate in the initial AM Plan. After storm water modeling is completed for the other MS4s, each community will determine if it is advantageous for them to join the AM program. As of 12/31/2024, no other MS4s have elected to join the AM program.

The AM program is the most cost-effective method for achieving the Water Quality Criteria (WQC) for the Oconomowoc River. AM directly addresses the root sources of pollutant loading, while alternative technologies (such as phosphorus removal at the WWTF) have significantly higher capital and operational costs while also being more energy- and chemical-intensive. The City recognizes the sustainable long- term environmental and community benefits of the AM approach, which also aligns with specific TP and TSS reduction goals outlined in the Rock River TMDL

The OWPP is committed to sustaining this progress and ensuring continuous improvement in water quality. Due to a four-year delay in permit issuance following the original Adaptive Management (AM) plan approval in 2016, the end of the initial 15-year implementation period will now occur early in the 3<sup>rd</sup> permit term following the current one (around the end of 2031).

Considering this and the observed improvements already seen in water quality, the OWPP is requesting that the current third permit term be extended from 2031 to 2034, aligning it with the WWTF’s discharge permit. The City intends to continue implementing select projects voluntarily through the next two permit terms to ensure water quality is maintained and maximum benefits to the watershed are realized. As such, Tables (15) and (16) have been updated to reflect a potential framework of additional practices and milestones.

To support the lasting success of this adaptive management program, if the OWPP achieves a phosphorus concentration below 0.075 mg/L in the Oconomowoc River, the City proposes maintaining a final total phosphorus effluent concentration of 0.50 mg/L and adaptive management as a compliance strategy beyond 2034. The City seeks a commitment from the WDNR to support the long-term operational success of the OWPP as a lasting compliance strategy. Without this support, the City would likely be forced to pursue significant infrastructure upgrades at the WWTF to meet required phosphorus reductions. However, such upgrades would not benefit the majority of the Oconomowoc River Watershed, whereas a nonpoint source program like the OWPP delivers broader water quality improvements that serve both public waters and local communities.

Without continued support from the WDNR, the momentum built across the watershed could decline, potentially undoing past progress in both the landscape and waterways. This risk increases as land contracts expire, and no coordinating entity remains in place to sustain the past implementation.

## PARTNERS

The City has formed a network of partnerships and outlined the roles and responsibilities of each partner. This existing organization will be applied to the AM program and developed further as a part of the OWPP

To effectively engage non-point sources, the City has formed a Farmer Leadership Group known as Farmers for Lake Country (FFLC). This is a group of several landowners and farmers who will lead the effort in working with the agricultural community to implement phosphorus Management Measures. This group will be the point group in making local farmers aware of the AM program and its objectives, promoting the program, coordinating with the agricultural community to identify opportunities for pollutant reduction, and implementing specific agricultural conservation practices which correspond to phosphorus reductions. The group is comprised of farmers from Jefferson, Waukesha and Washington Counties who understand field-scale conservation practices and the benefits of the OWPP to the larger community.

The largest contributing partner Tall Pines Conservancy (TPC) is a local nonprofit that specializes in land conservation, specifically conservation easements. TPC also serves as a main collaborator for the farmer leadership group FFLC. TPC is a huge key to the success of OWPP and has served a major role in many OWPP projects, communications, and events.

The county Land and Water Conservation (LWC) Departments will be an important asset to the AM program. The counties represented in the Oconomowoc River Watershed are Jefferson, Waukesha, Dodge, and Washington Counties. Since the watershed area in Dodge County is very small, this county will not be an initial partner. If in the future it is evident that significant pollutant reduction could take place in this small area, Dodge County will be included as a partner in the plan. In development of the original AM plan (WQT-2016-001) coordinated with LWC Department staff to compile a list of Critical Source Areas (CSAs), determining appropriate Management Measures for those areas, and estimating pollutant reduction levels.

The counties will provide in-kind and paid technical assistance for City of Oconomowoc. They will provide technical assistance on identifying CSAs and appropriate Management Measures in their respective watershed areas. They will also continue to provide support and work with the Farmer Leadership Group directly.

The largest group of partners consists of those that are not farmers, landowners, or county groups. These include engineering consulting firms, lake management districts, MS4's, government bodies, private landowners, land conservation and environmental groups, and universities.

The roles and responsibilities of all OWPP partners are summarized in Table 1 at the end of this section.

Communication in the OWPP will depend on the type of information to be conveyed and the scale to which it will be communicated. On a broad scale, the City, with help from Tall Pines Conservancy and Farmers for Lake Country will lead the effort to promote public awareness and education of the OWPP and its objectives. In addition, the OWPP's website will be maintained to share basic information on the OWPP development to the public and partners.

Communication associated with Management Measure implementation will be led by the City working in conjunction with the Farmer Leadership Group. Communication at this level will include targeted CSAs, specific Management Measure implementation, and project timelines. Communication will also include the status of annual compliance activities for Management Measures already implemented. Using GIS management software, detailed information will be available to the Farmer Leadership Group and other designated partners. Partner meetings will take place for this set of partners, with more frequent meetings as an option if needed. When appropriate, guests will be invited to these meetings. For example, landowners, farmers, and county LWC Department staff would be invited to meetings covering details of specific Management Measure implementation projects. The majority of the work in the OWPP will take place at this level.

Communication for practices such as wetland restoration and streambank stabilization will be led by the City in conjunction with participating engineering consulting firms, lake management districts, the City of Oconomowoc MS4, government bodies, private landowners, land conservation and environmental groups, and universities. Meetings will occur as needed for this set of activities. The attendees of these meetings will be determined by the type of activity involved. For example, for a wetland restoration project, the Wisconsin DNR and SEWRPC would both be included.

**City of Oconomowoc**  
**Oconomowoc Watershed Protection Program**

**Table 1. OWPP Partner R**

| <b>OWPP - Program Partners (1/2025)</b>                   |                                                                                                                                                        |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Partner Name</b>                                       | <b>Partner Type and Responsibility</b>                                                                                                                 |
| <b>Major Partners</b>                                     |                                                                                                                                                        |
| Tall Pines Conservancy                                    | Land Trust - Direct funding of conservation projects, in-Kind services for event planning, coordination, set-up                                        |
| Lake Country Clean Waters                                 | Liaison group for connecting with Lake Districts and related groups - Cooperative training, in-kind services for events                                |
| Farmers For Lake Country                                  | Farmer Led group made up of proactive farmers - In-kind services to man events, provide labor for BMP projects, provide equipment for BMP installation |
| Mead & Hunt                                               | GIS database coordinators, Adaptive management Consultant.                                                                                             |
| Ruekert & Mielke, Inc.                                    | Consultant - Original Adaptive management proposal, RCPP first Cycle proposal, GIS System maintenance, special project research,                       |
| Lac La Belle Management District                          | Project Partner, Funding Partner, presenters, and general program contributions                                                                        |
| North Lake Management District                            | Project Partner, Funding Partner, presenters, and general program contributions                                                                        |
| Friess lake Advancement Association                       | Project Partner, Funding Partner, presenters, and general program contributions                                                                        |
| Cedar Creek Farmers                                       | Washington County Producer Led Farmer Group, Event Partner, Agricultural Community Partner                                                             |
| <b>Partners</b>                                           |                                                                                                                                                        |
| American Farmland Trust                                   | Statewide Land Trust working specifically with farmers                                                                                                 |
| Camp Whitcomb/Mason                                       | Works with OWPP on BMP projects                                                                                                                        |
| Carmelites of Holy Hill                                   | None to date                                                                                                                                           |
| Clean Wisconsin                                           | Advisory group for Adaptive Management Program and MS4 permits                                                                                         |
| Earth Care                                                | Consultant for Agricultural project coordination, event presentations, liaison to farmers, ag BMP contracts                                            |
| Eco-Resource Consulting, Inc.                             | Consultant for streambank restoration, BMP project installations, liaison to other key partners                                                        |
| Greener Oconomowoc                                        | Environmental group supporting OWPP                                                                                                                    |
| Gathering Waters                                          | Statewide Land Trust Consortium assists with publicity and provides educational materials.                                                             |
| Jefferson County Land and Water Conservation Department   | County agency providing support for mailings, publicity and GIS data                                                                                   |
| KT Kayak Rentals                                          | Kayak Rental firm provides support at educational events, provides monitoring labor                                                                    |
| SEH Engineering                                           | Consultant working in conjunction with OWPP on specific projects                                                                                       |
| Local Lake Management Districts, 7                        | Provide direct funding for BMP Projects, support for materials dissemination,                                                                          |
| Local Municipalities, 6                                   | Provide support for mailings, dissemination of educational materials                                                                                   |
| Mid-Kettle Moraine                                        | Environmental group providing support for events                                                                                                       |
| Native Range Ecology                                      | Consultant, liaison, project coordinator                                                                                                               |
| National Resource Conservation Service (NRCS/USDA)        | USDA agency providing direct funding for BMP Projects, expertise/advice for projects,                                                                  |
| PDPW – Professional Dairy Prod. WI Producers of Wisconsin | Provides program support through mailings                                                                                                              |
| Pabst Farms                                               | None to date                                                                                                                                           |
| Paddleboard Specialists                                   | Provides direct funding and In-Kind services for publicity and for storm water projects                                                                |
| Pheasants Forever                                         | Sportsman group provides direct funding for BMP projects                                                                                               |
| Rock River Coalition                                      | Rock River Basin focused group provides in-kind services for publicity and for monitoring                                                              |
| Sand County Foundation                                    | Flow/Mass Study - unsuccessful                                                                                                                         |

## City of Oconomowoc Oconomowoc Watershed Protection Program

|                                                                           |                                                                                                                                 |
|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Erin Meadows Farms                                                        | Farm provides in-kind services for legal advice, Farmer Led inputs, and BMP projects                                            |
| Southeastern Wisconsin Regional Planning Commission                       | Provides support and technical advice and data                                                                                  |
| Trout Unlimited                                                           | Sportsman group provides direct funding for BMP projects                                                                        |
| TLE Consulting, LLC                                                       | Consulting firm providing technical and program management work, including volunteer coordination, grant writing, and donations |
| University of Wisconsin - Extension                                       | Provides educational materials, presenters, and general program contributions                                                   |
| UWM School of Freshwater Sciences                                         | None to date                                                                                                                    |
| Washington County Land and Water Conservation Department                  | County agency providing support for mailings, publicity and GIS data                                                            |
| Waukesha County Land Resources Division of Parks and Land Uses Department | County agency providing support for mailings, publicity, GIS data, direct funding of jointly managed projects                   |
| Wisconsin Department of Agriculture, Trade and Consumer Protection        | Statewide agency providing grant funding for Farmer Led initiatives and Nut. Management Plan                                    |
| Wisconsin Department of Natural Resources                                 | Provides support for monitoring data review, technical presentations, event assistance                                          |

## WATERSHED DESCRIPTION AND LOAD REDUCTION GOALS

The action area for the OWPP is the Oconomowoc River Watershed. Most of the priority original CSAs are in western Waukesha County and eastern Jefferson County, due to their proximity to the point of compliance OWPP staff directed significant effort over the course of the first permit term to address land management practices in this region. However, Washington County also has several large areas where Management Measures have and will be effective in improving water quality. Improvements made to these areas have benefited the many lakes in the watershed, serving as examples of conservation practices to the surrounding community, and will help in the long-term sustainability of reducing phosphorus.

Map 1 in Appendix A. shows the watershed as well as surface water details, county boundaries, twelve-digit Hydrologic Unit Code (HUCs) areas, impaired waters, major highways and interstates, municipal boundaries, the City monitoring points, dam locations, and WWTF locations in the proximity of the watershed. The WDNR Pollutant Load Ratio Estimation Tool indicates that 70 percent of the TP load in the Oconomowoc River Watershed is from non-point sources and 30 percent is from point sources – namely the Oconomowoc WWTF. The Oconomowoc WWTF is the only treatment facility WPDES permittee in the watershed. There are multiple MS4 WPDES permittees in the watershed. The watershed includes several municipalities including the Town of Erin, Town of Merton, Village of Richfield, Town of Concord, Village of Slinger, Village of Hartland, Village of Nashotah, Village of Merton, Village of Chenequa, Village of Lac La Belle, Village of Oconomowoc Lake, City of Oconomowoc, and the Village of Summit. Tables 2 through 5 describe each HUC-12 area in the action area. Note that HUC-12 areas were adjusted to agree with the total area of the watershed layer given in the WDNR Surface Water Data Viewer. In light of this, the HUC-12 areas given in Table 2 are approximate and do not reflect the acreages associated with the HUC-12 layer in the Surface Water Data ViSewer.

**City of Oconomowoc**  
**Oconomowoc Watershed Protection Program**

**Table 2. AM Action Area Description for Plan Development**

| <b>HUC and Watershed Name</b>                                                                                                                                                       | <b>Total Area of Watershed</b>         |                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------------------|
|                                                                                                                                                                                     | <b>Acres</b>                           | <b>Square Miles</b>                              |
| 070900010501<br>Oconomowoc River                                                                                                                                                    | 36,003                                 | 56.2                                             |
| <b>County</b>                                                                                                                                                                       | <b>Area of Watershed in the County</b> | <b>Percentage of Watershed Within the County</b> |
| Washington                                                                                                                                                                          | 28,646                                 | 80%                                              |
| Waukesha                                                                                                                                                                            | 7,357                                  | 20%                                              |
| What watershed scale was used to develop the action area?                                                                                                                           |                                        |                                                  |
| <input checked="" type="checkbox"/> Full HUC 12<br><input type="checkbox"/> Portion of the HUC 12<br><input type="checkbox"/> Based on TMDL Reach<br><input type="checkbox"/> Other |                                        |                                                  |

**Table 3. AM Action Area Description for Plan Development**

| <b>HUC and Watershed Name</b>                                                                                                                                                       | <b>Total Area of Watershed</b>         |                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------------------|
|                                                                                                                                                                                     | <b>Acres</b>                           | <b>Square Miles</b>                              |
| 070900010502<br>Oconomowoc River                                                                                                                                                    | 19,059                                 | 29.8                                             |
| <b>County</b>                                                                                                                                                                       | <b>Area of Watershed in the County</b> | <b>Percentage of Watershed Within the County</b> |
| Waukesha                                                                                                                                                                            | 16,229                                 | 85%                                              |
| Washington                                                                                                                                                                          | 2,427                                  | 13%                                              |
| Dodge                                                                                                                                                                               | 403                                    | 2%                                               |
| What watershed scale was used to develop the action area?                                                                                                                           |                                        |                                                  |
| <input checked="" type="checkbox"/> Full HUC 12<br><input type="checkbox"/> Portion of the HUC 12<br><input type="checkbox"/> Based on TMDL Reach<br><input type="checkbox"/> Other |                                        |                                                  |

**Table 4. AM Action Area Description for Plan Development**

| <b>HUC and Watershed Name</b>    | <b>Total Area of Watershed</b>         |                                                  |
|----------------------------------|----------------------------------------|--------------------------------------------------|
|                                  | <b>Acres</b>                           | <b>Square Miles</b>                              |
| 070900010503<br>Oconomowoc River | 11,953                                 | 18.7                                             |
| <b>County</b>                    | <b>Area of Watershed in the County</b> | <b>Percentage of Watershed Within the County</b> |
| Waukesha                         | 11,621                                 | 97%                                              |
| Jefferson                        | 332                                    | 3%                                               |
|                                  |                                        |                                                  |

What watershed scale was used to develop the action area?

- ☒ Full HUC 12  
☐ Portion of the HUC 12  
☐ Based on TMDL Reach  
☐ Other

**Table 5. AM Action Area Description for Plan Development**

| HUC and Watershed Name                                                                                                                                                              | Total Area of Watershed            |                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|----------------------------------------------|
| 070900010504                                                                                                                                                                        | Acres                              | Square Miles                                 |
| Oconomowoc River                                                                                                                                                                    | 16,735                             | 26.1                                         |
| County                                                                                                                                                                              | Area of Watershed<br>in the County | Percentage of Watershed<br>Within the County |
| Waukesha                                                                                                                                                                            | 9,360                              | 56%                                          |
| Jefferson                                                                                                                                                                           | 7,375                              | 44%                                          |
| What watershed scale was used to develop the action area?                                                                                                                           |                                    |                                              |
| <input checked="" type="checkbox"/> Full HUC 12<br><input type="checkbox"/> Portion of the HUC 12<br><input type="checkbox"/> Based on TMDL Reach<br><input type="checkbox"/> Other |                                    |                                              |

The Oconomowoc River Watershed is a sub-watershed of the Rock River Watershed, both of which are in the Mississippi River basin. The Oconomowoc River Watershed has a large number of lakes. Waukesha County contains all or portions of 33 major lakes with a combined surface area of approximately 14,000 acres (21.9 square miles), or about 3.8% of the total area of the County. This area represents about 38% of the combined surface area of the 101 major lakes in the seven-county Southeastern Wisconsin Region, which is larger contribution than any other county in the region. In addition, much of the Oconomowoc River Watershed is considered a high ground water recharge area designated by the SEWRPC. The Oconomowoc River generally flows in a southwesterly direction and passes directly through seven lakes, and one mill pond is connected to another 5 major lakes that contribute the flow of the Oconomowoc River. West of the City of Oconomowoc, the river flows west and north to the confluence with the Rock River. The Rock River eventually joins the Mississippi River through the State of Illinois.

The Rock River is impaired and identified on the EPA 303 (d) list for both TSS and TP. The Oconomowoc River Watershed also contains several surface waters which are impaired for either TSS or TP including Flynn, Battle, and Mason Creeks. In addition, WDNR's 2024 impaired waters list includes three lakes impaired with excess TSS or TP: North Lake, Friess Lake, Lac La Belle, and Okauchee Lake.

Several of the lakes within the action area have lake management districts or some public organization with a mission to protect and rehabilitate a specific inland lake, for example, the North Lake Management District. These lake management groups will serve as partners in implementing management measures to support the OWPP's objectives of improved water quality and reduced soil loss. Additionally, these management districts will play a crucial role in ensuring the long-term maintenance and sustainability of the projects. Public inland lake protection and rehabilitation districts are bodies governed by a Board of Commissioners and a voting membership. These organizations are created for the purpose of undertaking lake protection programs in the surrounding area. These organizations may sue or be sued, make contracts, accept gifts, purchase, lease, devise or otherwise acquire, hold, maintain or dispose of property, disburse money, contract debt, and do any other acts necessary to carry out a program of lake protection and rehabilitation.

The watershed also includes an Agricultural Enterprise Areas (AEA). The AEA program is a voluntary program supported by the State of Wisconsin, Department of Agriculture, and WDATCP. The program is open to farmers who implement and maintain good land use practices. In return, farmers receive assurance that surrounding land will be protected from development. Approximately 27,000 acres in the watershed in Waukesha and Dodge Counties are already in this program.

Per recommendation of the WDNR, it was assumed that the overall point of compliance for the City of Oconomowoc WWTF and MS4 will be at the confluence of the Oconomowoc and Rock Rivers. This point will be monitored near the bridge at Northside Drive (Site 18(River601)) for ease of accessibility. Also, there are no river offshoots that contribute to the Oconomowoc River between Site 18 and the confluence, allowing for a representative sample that is not generally influenced by mixing and backflow of the Rock River. The Oconomowoc River flows from east to west at this location. Northside Drive runs in the north-south direction.

The action area where the City of Oconomowoc MS4 operates or drains includes several TMDL reaches, specifically reaches 25, 26, 27, and 55. These reaches, except reach 55; will be monitored as a part of the OWPP to ensure that the appropriate TP reductions are achieved. The outlet of Reach 27 coincides with the overall point of compliance described above and does not contain any portion of the MS4 system. Existing city monitoring near the outlet of Reach 26 which contains a portion of the MS4 shows that the Water Quality Criterion of 0.075 mg/L TP is being met (Site 15 in Appendix B). This site will continue to be monitored to ensure that this reach remains in compliance. Reach 55 contains a portion of the Oconomowoc MS4, but this area will not be included in the OWPP as it is outside of the Oconomowoc River Watershed. Therefore, the AM program will only be used to help the City MS4 reach TP compliance in TMDL Reach 25, 26, and 27.

The Monitoring point at the intersection of the bridge on North Morgan Street and the Oconomowoc River was added to per recommendation by the WDNR. This monitoring point, denoted as Site 14b, will serve to provide historical data near the outlet of Reach 25. There are no other river offshoots that contribute to the Oconomowoc River between Site 14b and the true outlet of Reach 25. This location is downstream of an unnamed tributary to the Oconomowoc

River located about 1/2 mile west of Silver Lake Street. Morgan Road runs in the north-south direction. The river at this location flows southwesterly at the bridge. If, at the end of the adaptive management project, in-stream compliance has not been met at the end of Reach 27, the MS4 can still be compliant with the goals of the TMDL if the in-stream monitoring data at this site shows water quality goals have been met in Reach 25. If the in-stream monitoring at both Reach 25 and Reach 27 does not show compliance with the goals of the TMDL, the modeling can still be used to show the percent reduction for phosphorus has been met in Reach 25 for the MS4 system.

In 2015 the City had been proactive in establishing baseline monitoring information. The United States Geological Survey (USGS) was contracted to estimate the flow rates at the WWTF outfall and at the confluence with the Rock River (Waschbusch, 2015). The flow data is shown in Tables 6 and 7 below. Table 7.1 shows the average flow rate through 2024.

**Table 6.** Flow Characteristics at the WWTF Outfall from Waschbusch, 2015

|                     | <b>Flow (cfs)</b> | <b>Flow (MGD)</b> |
|---------------------|-------------------|-------------------|
| Annual Average Flow | 97                | 62.76             |
| 7Q10                | 2.1               | 1.36              |
| 7Q2                 | 7.7               | 4.98              |

**Table 7.** Flow Characteristics at the Confluence with the Rock River from Waschbusch, 2015

|                     | <b>Flow (cfs)</b> | <b>Flow (MGD)</b> |
|---------------------|-------------------|-------------------|
| Annual Average Flow | 119               | 76.99             |
| 7Q10                | 2.7               | 1.75              |
| 7Q2                 | 9.6               | 6.21              |

**Table 7.1.** Flow Characteristics at the Confluence with the Rock River from OWPP, 2024

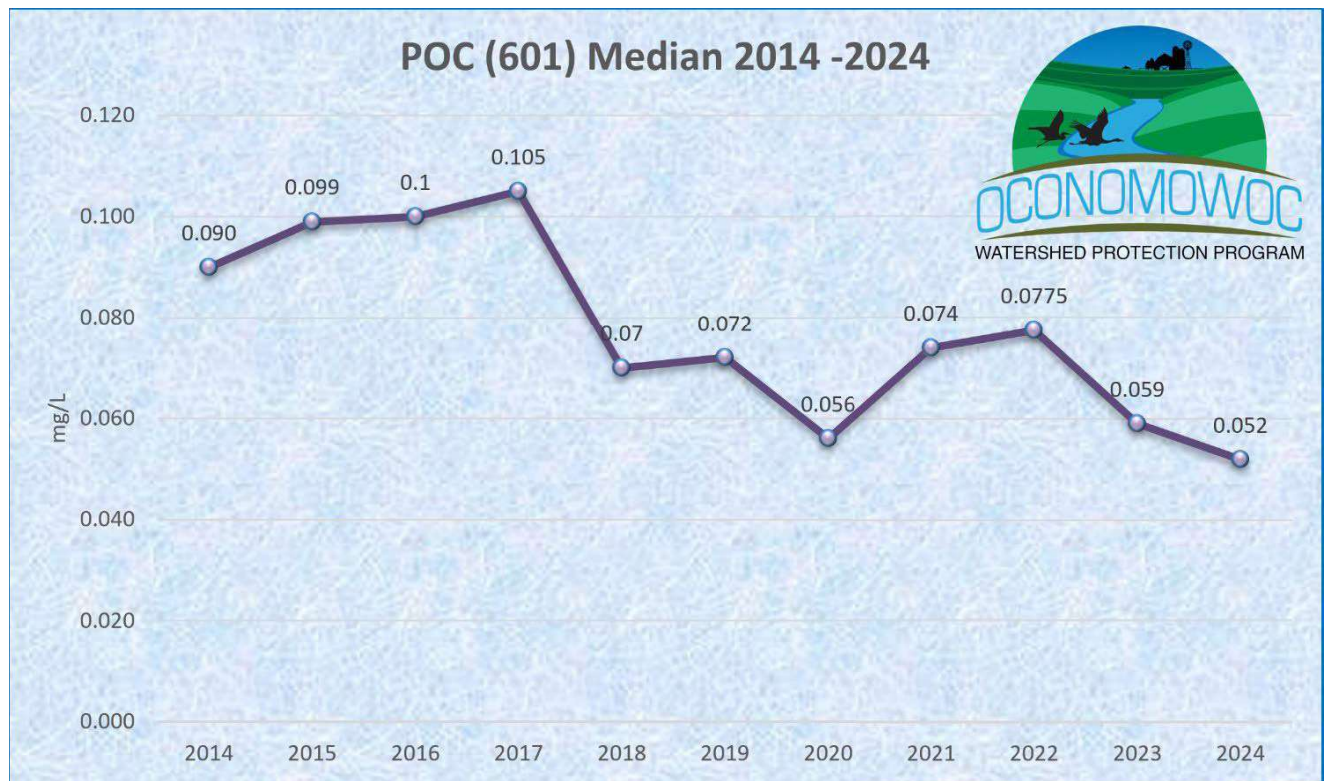
|                     | <b>Flow (cfs)</b> | <b>Flow (MGD)</b> |
|---------------------|-------------------|-------------------|
| Annual Average Flow | 185               | 119               |

WWTF staff have also monitored numerous points in the watershed in recent years for TP. This data is shown in Table 7.1. The site numbers in Appendix B correspond to the monitoring locations shown in Map 1 in Appendix A.

Upstream of the WWTF, the TP concentration at the monitoring locations is generally less than 0.1 mg/L, with some higher values in the northern portion of the watershed. There is a noticeable increase in TP concentration just downstream of the WWTF outfall discharge (Site #14). The TP concentration at the confluence (Site #18) ranges from 0.026 to 0.089 mg/L in the 2023-2024 dataset. The average concentration at the confluence during the months of May through October through 2020-2024 is 0.070 mg/L. The results from the city sampling at the confluence are summarized in Table 8 below. The full set of May-Oct data is shown in Figure 1. The data is organized with the upper watershed on the left and the confluence on the right side of the graph. Only monitoring results taken directly from the Oconomowoc River are shown. As a result of precipitation extremes falling close to our sampling periods the annual flow for 2024 was influenced to be shown higher than expected, based off this the OWPP will continue to use the flow information from the 2015 dataset.



**Figure 1. Point of Compliance May-Oct 2014-2024**



**Figure 1.1 2021vs2024 May-Oct Monitoring Data Full Watershed**



Initially, TP will be the only pollutant considered in the OWPP. TSS will not be addressed directly. TSS allocations in the TMDL are already being met or are close to being met. However, further TSS reductions will be achieved in the process of reducing TP by reducing levels of particulate phosphorus in the action area. For the City of Oconomowoc MS4, it is anticipated that minimal effort will be needed to reach the required TSS reduction levels in its storm water permit. The city has been very proactive in addressing storm water pollution in the last 10 to 15 years. Since the City can take credit for all storm water pollutant control activities and facilities implemented since 2004, the additional required TSS reductions are expected to be marginal. The soil in the watershed, especially the City of Oconomowoc area, is sandy and coarse and has a high infiltration rate. This soil characteristic helps reduce runoff from urban storm water. Future storm water modeling efforts will show exactly what the required amount of TSS reduction will be.

The load reduction target for TP at the confluence of the Oconomowoc River and the Rock River was originally determined using the following procedure:

$Q_e$  - Flow from WWTF

$C_e$  - WWTF Effluent Total Phosphorus Concentration

$Q_s$  - Flow of Oconomowoc River at Confluence

$C_s$  - Total Phosphorus Concentration at Confluence

Original Point Source Load =  $Q_e \times C_e \times 8.34 \times 365 \text{ days/year} = 2.46 \text{ MGD} \times 0.075 \text{ mg/L} \times 8.34 \times 365 \text{ days/year} = 5,617 \text{ lb/year}$ .

Original Load in Receiving Water =  $Q_s \times C_s \times 8.34 \times 365 \text{ days/year} = 76.99 \text{ MGD} \times 0.096 \text{ mg/L} \times 8.34 \times 365 \text{ days/year} = 22,499 \text{ lb/year}$ .

Allowable Load Credit =  $(Q_s + Q_e) \times WQC \times 8.34 \times 365 \text{ days/year} = (76.99 + 2.46) \text{ MGD} \times 0.075 \text{ mg/L} \times 8.34 \times 365 \text{ days/year} = 18,143 \text{ lb/year}$ .

Total Reduction Needed =  $5,617 + 22,499 - 18,143 \text{ lb/year} = 9,973 \text{ lb/year}$ .

Total Reduction Achieved 2020-2024: 9,073 lb/year

The original scope of reduction needed to meet WQC was calculated to be 9,973 lbs/year. Best estimate of reduction achieved through 2024 is 9,073 lbs/year. Weather conditions may change, and concentrations could skew higher, some additional practices, and maintenance of existing practices are proposed for the second permit term of AM, described later in this report. The mission of the OWPP is to continuously enhance the water quality of the Oconomowoc River. While progress has been made toward meeting water quality goals, there is still a significant need for improvement through better management practices, targeted restoration projects, and increased community engagement. Long-term sustainability of the watershed remains a distant goal, requiring ongoing commitment and collaboration.

## WATERSHED INVENTORY

A watershed inventory is an important step towards better understanding the action area to be affected by the AM program. This step will allow the OWPP stakeholders to make informed decisions about specific actions to be taken in the watershed to improve water quality.

The watershed inventory has helped identify important and unique features of the Oconomowoc River Watershed and organize this information in a way that summarizes a large amount of relevant data in a manageable format. Input from project partners and stakeholders as well as Geographic Information System (GIS) software were used to obtain much of the data presented in this section, including the watershed boundary, streams, rivers, and surface water information, impaired waterways, TMDL reaches, soils data, land use statistics, zoning information, as well as other relevant information to the inventory. This information was used to help identify sources of watershed impairment and direct efforts of water quality monitoring and remediation, as will be explained later in this document.

The Oconomowoc River Watershed is a relatively large action area for water quality improvements. The watershed is approximately 83,750 acres, or 131 square miles (WDNR Surface Water Data Viewer: Watershed Layer, 2015), which encompasses land distributed in four counties in southeast Wisconsin as shown in Table 9 below.

**Table 9.** Oconomowoc River Watershed Land Area Distribution by County

| <b>County</b> | <b>Approximate Land Area<br/>(acres)</b> |
|---------------|------------------------------------------|
| Dodge         | 400                                      |
| Jefferson     | 7,725                                    |
|               | 31,050                                   |
| Waukesha      | 44,575                                   |

Map 2 in Appendix A shows an aerial view image of the Oconomowoc River Watershed with water body names. The watershed's northern boundary is near Slinger, WI in Washington County where the Coney River system flows south and joins with the Oconomowoc River. The Oconomowoc River then flows southwest through Friess Lake, Little Friess Lake, and Lowes Lake before being joined by Flynn Creek just north of the Washington County line. Other bodies of water in the Washington County portion of the Oconomowoc River Watershed include Hickey Lake, Beck Lake, McConville Lake, Malloy Lake, Murphy Lake, Werner Pond, and several other smaller lakes and ponds. In total, the Washington County portion of the action area has approximately 400 acres of surface water.

The small portion of the watershed that is in Dodge County does not contain any significant streams, rivers, or bodies of water. After leaving Washington County, the Oconomowoc River continues to flow southwest across the Waukesha County line, through the Monches Millpond and into North Lake. Both the Little Oconomowoc River and Mason Creek similarly flow into North Lake from the north (Mason Creek is one of two Class 1 trout streams in the watershed, the other being Rosenow Creek). After flowing west out of North Lake, the Oconomowoc River flows through a series of lakes northeast of the City of Oconomowoc including Okauchee Lake, Upper Oconomowoc Lake, Oconomowoc Lake, Fowler Lake, and Lac La Belle (Rosenow Creek also flows into Lac La Belle from the east). Next, the river continues south and west out of the City of Oconomowoc and across the Jefferson County line. Other notable water bodies in the Waukesha County portion of the watershed include Lake Kesus, Silver Lake, Laura Lake, Tierney Lake, Cornell Lake, Beaver Lake, Grass Lake, Florence Lake, Forest Lake, Moose Lake, Pine Lake, Round Lake, Garvin Lake, Sybil Lake, Tamarack Lake, and Crystal Lake. This portion of the watershed contains approximately 5,900 acres of surface water, which is the largest amount in the Oconomowoc River Watershed.

After crossing the Jefferson County line, the Oconomowoc River is joined by Battle Creek from the south and continues to flow west. Near the crossing with Highway F, the Oconomowoc River turns northwest and eventually joins the Rock River at the outlet of the watershed. The confluence of the Rock and Oconomowoc Rivers is the point of compliance for the OWPP. Other bodies of water in the Jefferson County portion of the watershed include Mud Lake and Round Lake, with the surface water in this portion totaling 145 acres. According to the WDNR, 41% of the fish and aquatic life in the rivers and streams throughout the entire action area are considered in poor condition.

There are several documented dams in the action area. The table below shows information regarding these dams, which are in order from upstream to downstream. The data shown is provided by the WDNR Surface Water Data Viewer, and dam locations are indicated on Map 1 of Appendix A. Note that several monitoring stations are located at dam sites.

**Table 10.** Dam Information for the Oconomowoc River Watershed

| No. | Dam                                  | Adjacent River System | County     | Key Seq. No. | Field File No. | Size  | Hydraulic Height (ft.) |
|-----|--------------------------------------|-----------------------|------------|--------------|----------------|-------|------------------------|
| 1   | Richfield Dam                        | Coney River           | Washington | 4443         | 66.09          | Small | 24.0                   |
| 2   | Monches (Burgs) Dam                  | Oconomowoc River      | Waukesha   | 326          | 67.14          | Large | 11.0                   |
| 3   | Lake Keesus Dam                      | Oconomowoc River      | Waukesha   | 1568         | 67.34          | Small | 1.0                    |
| 4   | Beaver Lake Outlet                   | -                     | Waukesha   | 1567         | 67.32          | Small | 1.0                    |
| 5   | Okauchee Lake (Upper Oconomowoc) Dam | Oconomowoc River      | Waukesha   | 220          | 67.42          | Large | 12.0                   |
| 6   | Oconomowoc Lake (Danforth) Dam       | Oconomowoc River      | Waukesha   | 1029         | 67.26          | Large | 1.0                    |
| 7   | Peacock (Fowler Lake) Dam            | Oconomowoc River      | Waukesha   | 650          | 67.17          | Large | 7.0                    |
| 8   | Lake Labelle Dam                     | Oconomowoc River      | Waukesha   | 1570         | 67.39          | Small | 1.0                    |

The topography of the Oconomowoc River Watershed generally slopes from higher elevations in the northeast to lower elevations near the confluence of the Oconomowoc and Rock Rivers. The headwaters of the Oconomowoc River in the Village of Richfield have an approximate elevation of 980 feet. The elevation drops to about 860 feet at the outlet of Lac La Belle in the City of Oconomowoc, 850 feet at the WWTF outfall, and 840 feet at the confluence with the Rock River. The greatest elevation change thus occurs from the northeast part of the watershed to the area near the City of Oconomowoc, which is a relatively low point in the watershed as reflected in the high density of surface water bodies.

Soils data for the watershed was obtained using the Soil Survey Geographic Database (SSURGO) in conjunction with GIS. Several relevant types of soil information were obtained from the database, including the total area occupied by each soil type, soil erosion characteristics of the soils, and soil drainage and flooding information. See Appendix C for the complete soil information table for the Oconomowoc River Watershed.

There are 167 varieties of soils at various slopes represented in the Oconomowoc River Watershed. Soils that populate over 2% of the total land area are listed in Table 11. Loams and silty loams are the most prevalent soil types in the area, with a considerable amount of poorly drained hydric soil (Houghton muck) typical of floodplains and lake plains.

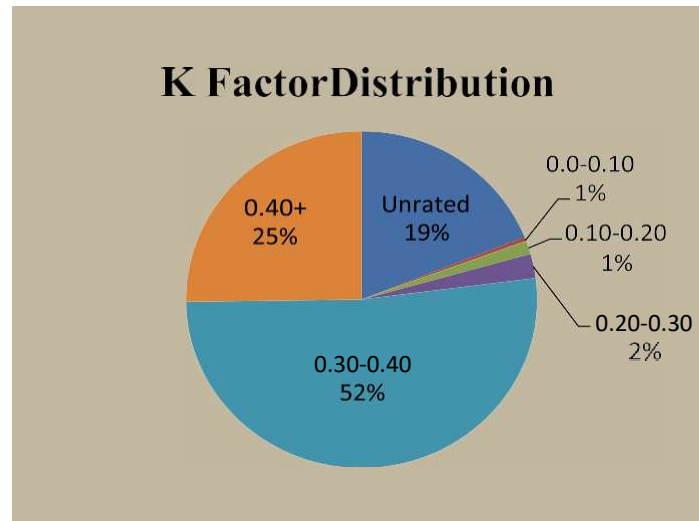
**Table 11.** Largest Represented Soils by Area in the Oconomowoc River Watershed

| <b>Soil Symbol</b> | <b>Soil Name</b>                                                  | <b>Area (ac)</b> | <b>% Cover</b> |
|--------------------|-------------------------------------------------------------------|------------------|----------------|
| FsB                | Fox silt loam, 2 to 6 percent slopes                              | 8688.9           | 10.4%          |
| FsA                | Fox silt loam, 0 to 2 percent slopes                              | 6055.0           | 7.2%           |
| ThB                | Theresa silt loam, 2 to 6 percent slopes                          | 4997.1           | 6.0%           |
| HmC2               | Hochheim loam, 6 to 12 percent slopes, eroded                     | 4121.4           | 4.9%           |
| ThB2               | Theresa silt loam, 2 to 6 percent slopes, eroded                  | 2995.4           | 3.6%           |
| Hu                 | Houghton muck                                                     | 2990.4           | 3.6%           |
| CrE                | Casco-Rodman complex, 20 to 30 percent slopes                     | 2961.0           | 3.5%           |
| CeC2               | Casco loam, 6 to 12 percent slopes, eroded                        | 2487.6           | 3.0%           |
| HmD2               | Hochheim loam, 12 to 20 percent slopes, eroded                    | 2294.8           | 2.7%           |
| HtA                | Houghton muck, 0 to 2 percent slopes                              | 2167.5           | 2.6%           |
| MmA                | Matherton silt loam, 0 to 3 percent slopes                        | 2141.2           | 2.6%           |
| CeD2               | Casco loam, 12 to 20 percent slopes, eroded                       | 2134.8           | 2.5%           |
| SeA                | St. Charles silt loam, gravelly substratum, 0 to 2 percent slopes | 1931.1           | 2.3%           |
| Sm                 | Sebewa silt loam                                                  | 1752.1           | 2.1%           |

Several key characteristics of soil have implications for water quality. These soil characteristics are included in Appendix C. First, the general erodibility of the soils is a good indication of how susceptible different types of soil are to releasing particulate phosphorus to nearby surface waters. Soil erodibility is described by many factors provided by SSURGO, but most importantly by the whole soil erosion factor  $K_w$  and the ground slope. The soil erosion factor quantifies the tendency of soil particles to detach from their surroundings, as well as their ability to be transported by water, while accounting for the number of rocks in a given soil. This factor is an important empirical coefficient in a number of soil loss estimation models such as the Universal Soil Loss Equation (USLE) and the Revised USLE (RUSLE). It is a function of the soil's texture, structure, organic matter content, and permeability. In general, then,  $K_w$  values will improve with anything that enhances infiltration into the soil, impedes the transport of runoff, or improves the natural cohesion of soil particles. Values of  $K_w$  range from 0.02 to 0.69, with higher values indicating a greater propensity for the soil to erode. Another factor contributing to soil erosion provided by SSURGO is the ground slope. Greater soil slopes lead to greater risk of soil detachment and transport due to the increased velocity of runoff over the surface.

The watershed contains predominantly high-rated K factor soils. Figure 2 below illustrates this distribution based on the area of land that each type of soil occupies. In addition, Map 3 in Appendix A shows a map of the Oconomowoc River Watershed with the different soil plots shaded based on K value. The darker blue and yellow indicate larger  $K_w$  values and a greater risk of soil erosion. Many of the areas with greatest risk of soil erosion are northeast of Oconomowoc near

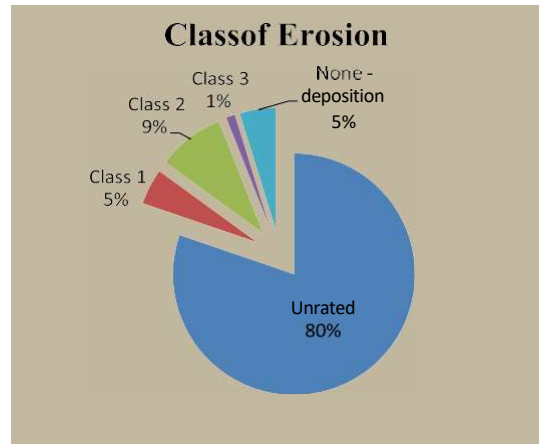
Mason Creek, the Little Oconomowoc River, and Flynn Creek. However, there are some areas of high erosion risk around Battle Creek and the area south of the confluence of the Oconomowoc and Rock rivers, which may provide critical opportunities for runoff mitigation near the point of compliance.



**Figure 2.**  $K_w$  Factor Distribution by Land Area for the Oconomowoc River Watershed

The SSURGO data also includes a soil description giving a class of accelerated erosion which is shown in Figure 3. The classes of accelerated erosion describe the amount of soil that has been removed from the upper horizons of the soil profile. Class A describes sheet erosion where less than 25% of the upper soil has been eroded. Class B describes 25-75% soil removal, and Class C describes soil erosion greater than 75% that usually occurs when deep rills or gullies form on sloped fields. A third rating, “None – deposition”, describes soil which is not prone to transport off site. Unfortunately, the majority of the soils in watershed were unrated, giving a limited picture of the extent of existing soil erosion in the action area. This limitation emphasizes the need for site exploration and windshield surveys which will be described later in this document.

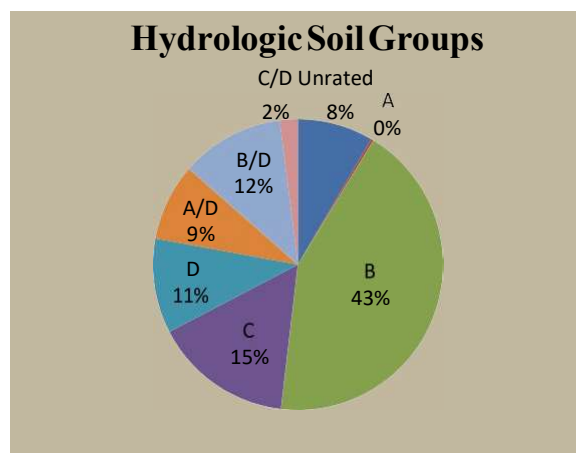
The ability for soil to either drain or retain water is another important factor in understanding the behavior of water in a watershed. The SSURGO data provides several soil descriptions along these lines as well, the most important of which are the soil hydric rating and the hydrologic soil group. Hydric soil is soil that is saturated with water for all or parts of the year, characteristic of soils found in wetlands or floodplains. This frequent saturation leads to a lack of oxygen in the soil (anaerobic conditions) which promotes the growth of wetland vegetation and species. Hydric soils maintain their physical characteristics even when converted to farmland, keeping these areas prone to water accumulation.



**Figure 3.** Distribution of Erosion Classes by Land Area for the Oconomowoc River Watershed

The hydrologic soil group system was developed by the NRCS to describe the infiltration rate of water into the ground by dividing soils into four categories: A, B, C, and D. Class A is characterized by high infiltration rates and low runoff potential, while Class D consists of soils with low infiltration and high risk of runoff and soil transport. Class A soils are typically sandy or granular, Class B soils are silts and loams, Class C soils are sandy clay loams, and Class D soils have high contents of clayey soils or a high-water table. If two classes are listed, the first letter describes the soil if it is drained by a man-made drainage system while the second letter describes the soil in its natural state.

In the Oconomowoc River Watershed, about 20% of the soil is hydric (17,200 acres) with the rest being non-hydric or unrated. Figure 4 below illustrates the distribution of hydrologic soil groups in the watershed by area. The results show most of the soil is Class B, which is intuitive given the large amounts of silt loam in the area. There is also a considerable amount of less drainable soil in Classes C and D, with a potential for more poorly drained soil depending on the drainage condition of the dual classifications. Map 4 of Appendix A shows both hydrological soil group ratings and the location of hydric soils.



**Figure 4.** Hydrologic soil group distribution in the Oconomowoc River Watershed

Other SSURGO data that is presented in Appendix C includes the general drainage condition and flooding frequency of the soils listed. Over 80% of the soils were not rated to flood or to rarely flood, with only 3% of the soils rated to flood occasionally or frequently. Table 12 shows the ratings of drainage conditions by area. These supporting soil descriptions indicate that most of the watershed is not at risk of flooding, while there is a significant portion of soils that present a risk of overland water flow and erosion.

**Table 12.** Drainage Condition of the Soils in the Oconomowoc River Watershed

| <b>Drainage Condition</b>    | <b>Area (ac)</b> | <b>% Cover</b> |
|------------------------------|------------------|----------------|
| Very poorly drained          | 9512.5           | 11.4%          |
| Poorly drained               | 5269.2           | 6.3%           |
| Somewhat poorly drained      | 5451.6           | 6.5%           |
| Moderately well drained      | 1351.4           | 1.6%           |
| Well drained                 | 44634.6          | 53.3%          |
| Somewhat excessively drained | 10716.8          | 12.8%          |
| Excessively drained          | 47.8             | 0.1%           |
| Unrated                      | 6765.8           | 8.1%           |

The National Land Use Database (NLCD) was used to assess land use in the action area. Map 5 in Appendix A shows the land use map for the watershed, and Table 13 summarizes land use information and agricultural statistics in a tabular format (agricultural statistics were provided by county LWC Departments). In addition, Maps 6 and 7 in Appendix A illustrate the locations of wetlands and floodplains in the action area. Over half of the land use in the watershed consists of croplands or grasslands, with most croplands consisting of typical row crop rotations. Due to the prevalence of dairy farming in the area, there is also a significant amount of forage crops in the action area. Approximately half of the existing cropland is not tilled at any point during the year, while about 35% of the cropland is conventionally tilled. About 16% of the land consists of forests, 13% of the land consists of wetland-type vegetation, and 7.5% of the land is open water. 6% of the land area is developed, with the majority of residential and urban area near the City of Oconomowoc. Most livestock in the watershed are dairy cows (49%), with a sizeable portion of beef cattle and horses.

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**Table 13. AM Land Use Overview**

| <b>Current Land Use</b>                       |                                    |                                   |                                                                   |                                                 |
|-----------------------------------------------|------------------------------------|-----------------------------------|-------------------------------------------------------------------|-------------------------------------------------|
| <b>Land Use</b>                               | <b>Approximate Land Cover (ac)</b> | <b>Approximate Land Cover (%)</b> | <b>Typical Impervious Fraction/Runoff Coefficient<sup>1</sup></b> | <b>Approximate Impervious Area in Watershed</b> |
| High Density Urban                            | 1,426                              | 1.7%                              | 0.7                                                               | 1.2%                                            |
| Low Intensity Urban                           | 2,990                              | 3.6%                              | 0.3                                                               | 1.1%                                            |
| Golf Course                                   | 697                                | 0.8%                              | 0.2                                                               | 0.2%                                            |
| Primary Row Crops                             | 4,111                              | 4.9%                              | 0.1                                                               | 0.5%                                            |
| Corn                                          | 12,543                             | 15.0%                             | 0.1                                                               | 1.5%                                            |
| Other Row Crops                               | 3,379                              | 4.0%                              | 0.1                                                               | 0.4%                                            |
| Forage Crops                                  | 14,508                             | 17.3%                             | 0.1                                                               | 1.7%                                            |
| Grassland                                     | 11,811                             | 14.1%                             | 0.1                                                               | 1.4%                                            |
| Mix/Other Coniferous                          | 1,319                              | 1.6%                              | 0.1                                                               | 0.2%                                            |
| Oak                                           | 1,276                              | 1.5%                              | 0.1                                                               | 0.2%                                            |
| Mixed/Other Broad-Leaved Deciduous            | 10,840                             | 12.9%                             | 0.1                                                               | 1.3%                                            |
| Open Water                                    | 6,243                              | 7.5%                              | 0.0                                                               | 0.0%                                            |
| Emergent/Wet Meadow                           | 3,324                              | 4.0%                              | 0.08                                                              | 0.3%                                            |
| Lowland Shrub (Broad-Leaved Deciduous)        | 2,505                              | 3.0%                              | 0.08                                                              | 0.2%                                            |
| Lowland Shrub (Broad-Leaved Evergreen)        | 150                                | 0.2%                              | 0.08                                                              | 0.0%                                            |
| Lowland Shrub (Needle-Leaved)                 | 140                                | 0.2%                              | 0.08                                                              | 0.0%                                            |
| Forested Wetland (Broad-Leaved Deciduous)     | 4,601                              | 5.5%                              | 0.08                                                              | 0.4%                                            |
| Forested Wetland (Coniferous)                 | 326                                | 0.4%                              | 0.08                                                              | 0.0%                                            |
| Forested Wetland (Mixed Deciduous/Coniferous) | 64                                 | 0.1%                              | 0.08                                                              | 0.0%                                            |
| Barren                                        | 1,295                              | 1.5%                              | 0.2                                                               | 0.3%                                            |
| Shrubland                                     | 202                                | 0.2%                              | 0.2                                                               | 0.0%                                            |
| <b>Total</b>                                  | <b>83,750</b>                      | <b>100.0%</b>                     |                                                                   | <b>11.0%</b>                                    |
| <b>Description of Cropping Practices</b>      |                                    |                                   |                                                                   |                                                 |
| <b>Common Rotations</b>                       | <b>Approximate Land Cover (ac)</b> |                                   | <b>Approximately Land Cover (%)</b>                               |                                                 |
| Corn-Soybean                                  | 9,768                              |                                   | 45.3%                                                             |                                                 |
| Hayland                                       | 2,556                              |                                   | 11.9%                                                             |                                                 |
| Dairy Rotation                                | 2,171                              |                                   | 10.1%                                                             |                                                 |
| Corn-Oats-Hay (5 Year)                        | 1,776                              |                                   | 8.2%                                                              |                                                 |
| Row-Grain-Hay (7 Year)                        | 1,754                              |                                   | 8.1%                                                              |                                                 |
| Corn-Soybean w/Cover Crop                     | 1,332                              |                                   | 6.2%                                                              |                                                 |
| Row-Grain-Hay (6 Year)                        | 1,116                              |                                   | 5.2%                                                              |                                                 |
| Corn-Soybean-Wheat                            | 957                                |                                   | 4.4%                                                              |                                                 |
| Continuous Corn                               | 82                                 |                                   | 0.4%                                                              |                                                 |
| Potato-Grain-Vegetable                        | 36                                 |                                   | 0.2%                                                              |                                                 |
| <b>Total</b>                                  | <b>21,548</b>                      |                                   | <b>100.0%</b>                                                     |                                                 |

<sup>1</sup>Runoff coefficients are used in the rational equation, which is one of the simplest methods to determine peak discharge from drainage basin runoff. These values are provided as a general approximation for decision-making purposes and should be modified as appropriate.

**Table 13. AM Land Use Overview (continued)**

| <b>Tillage Practices</b>                  |                                                  |
|-------------------------------------------|--------------------------------------------------|
| <b>Common Rotations</b>                   | <b>Approximate Land Cover (ac)</b>               |
| No-till (ac)                              | 10,072                                           |
| Conservation Tillage (30% or more) (ac)   | 2,643                                            |
| Conventional Tillage (less than 30%) (ac) | 6,999                                            |
| Unknown (ac)                              | 1,834                                            |
| <b>Livestock Density</b>                  |                                                  |
|                                           | <b>Approximate Number of Animas in Watershed</b> |
| Dairy                                     | 1,545                                            |
| Beef                                      | 833                                              |
| Horses                                    | 625                                              |
| Poultry                                   | 20                                               |
| Pork                                      | 10                                               |
| Other                                     | 145                                              |
| Total                                     | 3,178                                            |

The zoning maps for Jefferson and Waukesha Counties were reviewed to compare existing land use with potential future land use. Information provided by Jefferson and Waukesha Counties indicated how land use could change near some of the larger cities and areas where Management Measures will be implemented. Based on this exercise, land use in Jefferson County is not expected to change significantly and there will not be significant development. For Waukesha County, the City of Oconomowoc Zoning Map was reviewed. The zoning map indicated several areas designated “urban reserve” along the western edge of the City of Oconomowoc at the Waukesha County line as well as in the southwestern and northeastern parts of the City. This zoning designation denotes land that is in transition between urban and rural areas, and has the potential to be zoned for industrial or residential use in the future. The urban reserve areas on the southwestern part of the City are the most important to monitor in the future as many lots are adjacent to the Oconomowoc River flowing south out of Lac La Belle. The area east and northeast of the City of Oconomowoc consists of the Oconomowoc, Okauchee and North Lakes. These lakes already have significant development at or near the shoreline. Okauchee Lake in particular has significant development that extends thousands of feet from its northern and western borders. It is anticipated that the northern half of Okauchee Lake will be served with a sanitary sewer system in the future.

There are several secondary projects and objectives associated with the OWPP that will be occurring alongside agricultural Management Measures as a part of the AM program. One of these secondary objectives is to reduce known runoff problems in the watershed. There has been severe soil deposition in North Lake in the area where Mason Creek enters the lake. This has been a well-documented problem for many years. The Rock River TMDL identified the area tributary to Mason Creek as extremely high in background non-point baseline TSS and TP loading per acre. There is also evidence of streambank erosion along Mason Creek. Several OWPP partners are participating in projects along Mason Creek whenever they occur. The Town of Merton, Village of Merton, North Lake Management District, Tall Pines Conservancy, Trout Unlimited, and SEWRPC have been organizing to address this problem for the past several years. Also,

SEWRPC in 2017, using a EPA 319 grant, has developed a Nine Key Element plan for Mason Creek known as the Mason Creek Watershed Protection Plan. This plan was utilized for a large-scale stream restoration re-meander project, the OWPP and project partners will continue to benefit from the development of the 9KE plan. Through coordination with the OWPP, additional resources may be brought to this area.

The restoration of degraded habitat for fish and wildlife in the watershed is another secondary objective. One way to reduce phosphorus runoff from agricultural lands is to restore wetlands. Waukesha and Washington counties have identified areas where wetland restoration is possible. Increased wetland areas will allow birds, waterfowl, and other wildlife to depend on these lands for their habitat.

Another secondary objective of the OWPP is to save energy through the application of municipal biosolids from wastewater treatment facilities on agricultural land. The Oconomowoc Wastewater Utility can directly help with this objective as a source of fully digested, safe, and stable biosolids that have high levels of nitrogen and TP. Through this program, additional farmers in the watershed will be made aware of this resource. Farmers can save money by using biosolids instead of traditional fertilizers to condition their soils. Per WAC, biosolids applied to farm field must be incorporated in the ground as it is applied. This reduces any possibility that the nutrients from the biosolids could runoff. The OWPP will ensure that biosolids are incorporated into the soil. Using biosolids as a natural fertilizer reduces energy consumption as traditional fertilizer production is energy and water intensive.

Several partners involved in the OWPP see the potential benefits of improved lake health and water quality through this project as a secondary objective. Concerns for the lakes in the action area include the clarity of the water, health of habitat for fish and other aquatic organisms, and excessive aquatic plant growth. With reduced TSS and TP, the water quality in the lakes should be improved. This in turn may reduce the need for extensive aquatic plant harvesting that several of the lakes need to conduct for boating purposes.

The last secondary objective is farmland preservation. The Tall Pines Conservancy is a key partner in the OWPP. This land trust works to provide restrictions to prevent farm land from becoming developed into a different land use. Land trusts are an essential tool to preserve the rural character of many of the townships in the watershed. Waukesha County in particular has experienced development pressure and the loss of high-quality farmland. Typically, the deed restrictions have requirement that sound conservation practices are in place and working to reduce soil and nutrient runoff. In this way, the objectives of the AM program and farmland preservation are common.

#### IDENTIFY PROGRESS AND WHERE FUTURE REDUCTIONS CAN OCCUR

Potential CSAs for agricultural and non-agricultural lands were identified in a variety of ways; initially engineers and county staff members were involved to identify CSA's. During the first permit term of the Adaptive Management Plan, OWPP staff working in the watershed were able to identify additional CSA areas. These areas are numbered within the CSA table as decimal subsets; for example, CSA: 14, CSA: 14.1. This method has had an indication to be successful based on in-river monitoring data and by calculations. With the added CSA locations there are a total of 104, there has been a successful implementation of a project on 43% of all identified source areas in the adaptive management plan. 41% of the original CSAs have either been determined no action is needed or a project has been completed. Although there are many projects identified on the landscape to be completed many of the landowners in these areas have been approached in the past several years. Despite the great success the OWPP has had

getting projects on the ground, there has been many hesitant landowners to enroll in the program. The primary focus of the OWPP during the second permit term, as outlined in this segment of the adaptive management program, will be on making progress with improvements to lakes, streams, and MS4 systems, specifically targeting surface waters and riparian areas. Additionally, we will revisit source areas where previous efforts were unsuccessful, and the OWPP will continue to identify new areas where land implementation projects can be beneficial

In Jefferson County and western Waukesha County, a preliminary list of sites was compiled by using orthophotography overlaid with topographic maps. Areas with steeper slopes and minimal natural buffer between farmland and the river were identified. The City of Oconomowoc then contracted with Ken Denow, a soil scientist formerly with the WDNR, to conduct a windshield survey of these areas and other areas nearby. Through this windshield survey, a general understanding of the soil types, crop rotations, and drainage patterns was obtained for the identified sites.

In Waukesha County, GIS was first used to identify cropland areas within 750 feet of surface waters. Then the county analyzed these areas using soil maps and orthophotography overlaid with topographic information to further refine areas for phosphorus runoff reduction potential.

Washington County had very specific information on areas for runoff and phosphorus reduction potential. The lands identified in Washington County were further refined using orthophotography overlaid with topographic information.

Maps 8 and 9 in Appendix A show the CSAs identified in the action area. Map 8 shows the southwest portion of the watershed. Map 9 shows the northeast portion of the watershed. Two maps were needed to show the areas for phosphorus reduction potential at a usable scale. Each CSA has a unique identification number.

Table 14 below further describes the CSAs compiled for the action area. The numbers in the table correspond to the numbers shown in Maps 8 and 9 of Appendix A

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**Table 14. OWPP CSAs and Management Measures**

Blue sections are LT Project areas we have added, some of which are already addressed and under contract. Others are identified for future work.

Brown sections = No action needed.

| This section taken from AMP |                    |                       |                           |                      |                                                                                                |                                                                                                                                                           | Project Update                   |                                                                                                |
|-----------------------------|--------------------|-----------------------|---------------------------|----------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------------------------------------------------|
| CSA #                       | County, Township   | Lat, Long             | General Land Use Category | Controlled Area (Ac) | Suggested Management Measure Description                                                       | Comments                                                                                                                                                  | Project Status: Action taken?    | Practice installed or reason for inaction                                                      |
| 1                           | Jefferson, Ixonia  | 43.113245, -88.619499 | Cropland                  |                      | Nutrient management; additional buffer; conservation tillage; cover crop.                      | Small field near the confluence of the Rock and Oconomowoc Rivers.                                                                                        | No                               | Too close to confluence, ie in front of compliance point                                       |
| 2                           | Jefferson, Ixonia  | 43.112620, -88.616174 | Cropland                  | 2                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop.   | Field slopes to Oconomowoc River at two different points.                                                                                                 | No                               | Too close to confluence, ie in front of compliance point                                       |
| 3                           | Jefferson, Concord | 43.098922, -88.612055 | Cropland                  | 4                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop.   | Multiple areas of the field are adjacent to the river with minimal buffer.                                                                                | Yes                              | Buffer Strips, Seasonal cover crops on entire field                                            |
| 4                           | Jefferson, Concord | 43.097767, -88.617280 | Cropland                  | 6                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop.   | Direct runoff conduits to river; additional buffer necessary.                                                                                             | Yes                              | Seasonal cover crops on entire field                                                           |
| 5                           | Jefferson, Concord | 43.094727, -88.608983 | Cropland                  | 5                    | Nutrient management; additional buffer; reroute field drain; conservation tillage; cover crop. | Crops adjacent to river; drainage ditch ties directly into the river.                                                                                     | No                               | Will be investigating. There is an internal drain area with a lead to the river                |
| 6                           | Jefferson, Concord | 43.097375, -88.602579 | Cropland                  | 9                    | Nutrient management; additional buffer; conservation tillage; cover crop.                      | Offshoot of Oconomowoc River near the confluence is surrounded by highly erodible soil. Further site investigation needed to understand drainage pattern. | No. Determined no action needed. | This exact CSA site drains to ditches that feed the Rock. See new Site 6.1                     |
| 6.1                         | Jefferson, Concord | 43.092921, -88.598423 | Cropland                  | 4                    | Nutrient management, buffer, conservation tillage, cover crop.                                 | Field drains under River Rd via culvet. Significant tiling there too.                                                                                     | New Project Identified           | Field drains under River Rd via culvet. Significant tiling there too.                          |
| 7                           | Jefferson, Concord | 43.086521, -88.602593 | Cropland                  | 6                    | Nutrient management; additional buffer; reroute field drain; conservation tillage; cover crop. | Field drains directly to the river; possible dairy pasture next to river.                                                                                 | Yes                              | Cover crops, buffers, animal mangt,                                                            |
| 7.1                         | Jefferson, Concord | 43.086507, -88.575232 | Cropland                  | 10                   | Prairie planting, Wetland Restoration, Perennial Cover                                         | Field drains to wetland and ditch that outputs directly to River                                                                                          | New Project Added, Complete      | Prairie planting, Wetland Restoration, Perennial Cover                                         |
| 7.2                         | Jefferson, Concord | 43.082282, -88.606967 | Cropland                  | 4                    | Nutrient management; additional buffer; conservation tillage; cover crop.                      | Field drains to ditch the goes to River                                                                                                                   | New Project Identified           | Nutrient management; additional buffer; reroute field drain; conservation tillage; cover crop. |
| 8                           | Jefferson, Concord | 43.087677, -88.602350 | Cropland                  | 4                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop.   | Signs of erosion around the source of an ephemeral stream connecting to the Oconomowoc River.                                                             | No                               | Needs work.                                                                                    |

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| CSA # | County, Township   | Lat, Long                 | General Land Use Category | Controlled Area (Ac) | Suggested Management Measure Description                                                                           | Comments                                                                                                                                   | Project Status: Action taken?          | Practice installed or reason for inaction                                                          |
|-------|--------------------|---------------------------|---------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------------------------------------------------------------------------|
| 8.1   | Jefferson, Concord | 43.0763 38, - 88.5968 39  | Cropland                  | 4                    | Nutrient management; additional buffer; conservation tillage; cover crop.                                          | Ditch system flows north to Oconomowoc River.                                                                                              | New Project Identified                 | Needs investigation                                                                                |
| 8.2   | Jefferson, Concord | 43.0807 11, - 88.5973 54  | Cropland                  |                      | Nutrient management; additional buffer; conservation tillage; cover crop.                                          | Ditch system flows north to Oconomowoc River.                                                                                              | New Project Identified                 | Needs investigation                                                                                |
| 9     | Jefferson, Concord | 43.0722 35, - 88.6072 79  | Cropland                  | 3                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop.                       | Signs of erosion around the source of anephemeral stream connecting to the Oconomowoc River.                                               | No                                     | Needs work.                                                                                        |
| 9.1   | Jefferson, Concord | 43.0793 44, - 88.6304 04  | Cropland                  |                      | Nutrient management; additional buffer; conservation tillage; cover crop.                                          | Field drains to ditch that leads to Oconomowoc River, close to Hwy F.                                                                      | New Project<br>Area Added<br>Completed | Perennial, harvestable cover.                                                                      |
| 10    | Jefferson, Concord | 43.0726 16, - 88.5937 07  | Cropland                  | 1                    | Nutrient management; additional buffer; conservation tillage; cover crop.                                          | Minimal buffer to adjacent stream.                                                                                                         | No                                     | Needs work- currently for sale. Will wait for new owners before approaching for long term project. |
| 11    | Jefferson, Concord | 43.0682 17, - 88.5919 01  | Cropland                  | 1                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop.                       | Minimal buffer to adjacent stream; signs of erosion to stream location.                                                                    | No                                     | Needs work- currently for sale. Will wait for new owners before approaching for long term project. |
| 11.1  | Jefferson, Concord | 43.0706 59, - 88.5870 98  | Cropland                  |                      | Nutrient management; additional buffer; conservation tillage; cover crop.                                          | Ditch system flows north to Oconomowoc River.                                                                                              | New Project Identified                 | Needs work- currently for sale. Will wait for new owners before approaching for long term project. |
| 12    | Jefferson, Concord | 43.0628 66, - 88.6076 89  | Cropland                  | 3                    | Nutrient management; rotate contours 45 degrees; additional buffer; conservation tillage; cover crop.              | Offshoot of Oconomowoc River south of the interstate is surrounded by moderate to highly erodible soil. Field drains directly into stream. | No                                     | Lower priority due to pond but still worth a project                                               |
| 13    | Jefferson, Concord | 43.0679 26, - 88.5699 31  | Cropland                  | 12                   | Nutrient management; additional buffer; grassed waterways; reroute field drains; conservation tillage; cover crop. | Minimal buffer to adjacent stream/drainage network; signs of erosion to stream; highly erodible soil in the area.                          | No                                     | High priority ditch system draining into Battle Creek                                              |
| 14    | Jefferson, Concord | 43.0819 50, - 88.5742 55  | Cropland                  | 1                    | Nutrient management; additional buffer; rotate contours 90 degrees; conservation tillage; cover crop.              | Small areas of field adjacent to Oconomowoc River.                                                                                         | No                                     | Further contact needed.                                                                            |
| 15    | Jefferson, Concord | 43.0785 92, - 88.5580 61  | Cropland                  | 3                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop.                       | Relatively steep slope to the confluence of Battle Creek and Oconomowoc River.                                                             | No                                     | High priority for area close to Battle Creek                                                       |
| 15.1  | Jefferson, Concord | 43°04'46.4"N 88°33'44.7"W | Cropland                  | 5                    | Buffer or cap tile                                                                                                 | Tile drains into ocon river<br>Dirty water observed flowing from tile                                                                      | Yes                                    | Entire field put into hay ground. OWPP buffer program 2024                                         |
| 16    | Jefferson, Concord | 43.0638 90, - 88.5578 20  | Cropland                  | 6                    | Nutrient management; additional buffer; grassed waterways; reroute field drains; conservation tillage; cover crop. | Minimal buffer to adjacent stream/drainage network; signs of erosion to stream.                                                            | Yes                                    | Buffers , field borders, seasonal cvrs                                                             |

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| CSA # | County, Township     | Lat, Long             | General Land Use Category | Controlled Area (Ac) | Suggested Management Measure Description                                                                                      | Comments                                                                                                                            | Project Status: Action taken?    | Practice installed or reason for inaction                                                      |
|-------|----------------------|-----------------------|---------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------------------------------------------------|
| 17    | Jefferson, Concord   | 43.082165, -88.548016 | Cropland                  | 2                    | Nutrient management; additional buffer; grassed waterways; reroute field drains; conservation tillage; cover crop.            | Signs of erosion to drainage ditches on west and south sides of the field; ditches drain to both Oconomowoc River and Battle Creek. | No                               | Needs work.                                                                                    |
| 18    | Jefferson, Concord   | 43.088621, -88.553319 | Cropland                  | 3                    | Nutrient management; additional buffer; reroute drainage; conservation tillage; cover crop.                                   | Field adjacent to the river; contains highly erodible soil types.                                                                   | No                               | Needs work.                                                                                    |
| 19    | Jefferson, Concord   | 43.088530, -88.541900 | Cropland                  | 2                    | Nutrient management; additional buffer; reroute drainage; conservation tillage; cover crop.                                   | Field adjacent to the river; contains highly erodible soil type; some field drainage appears to tie into the Oconomowoc River.      | Yes                              | Seasonal cover                                                                                 |
| 20    | Waukesha, Summit     | 43.092539, -88.535525 | Cropland                  | 2                    | Wetland restoration; nutrient management; additional buffer; reroute field drains; conservation tillage; cover crop.          | Soybean field with hydric soils (high flooding potential) close to the river; field drains directly to river.                       | Yes                              | Permanent Pollinator Cover                                                                     |
| 20.1  | Waukesha, Summit     | 43.093032, -88.543456 | Cropland                  |                      | Perennial Cover                                                                                                               | Fields adjacent to Oconomowoc River. They are in permanent harvestable cover, under contract.                                       | New Project Area Added Completed | Permanent Harvestable Cover                                                                    |
| 20.2  | Waukesha, Summit     | 43.094716, -88.540388 | Cropland                  | 4                    | Prairie planting/Perennial Cover                                                                                              | Portion of field drain to ditch leading to River. Prairie plantings now provide buffer.                                             | New Project Area Added Completed | Permanent prairie planting                                                                     |
| 20.3  | Waukesha, Summit     | 43.177282, -88.399634 | Cropland                  | 2                    | Buffer                                                                                                                        | Field drains to south through neighboring farm field and then to River                                                              | New Project Area Added Completed | Buffer planted                                                                                 |
| 21    | Waukesha, Summit     | 43.096515, -88.537801 | Cropland                  | 3                    | Nutrient management; additional buffer; grassed waterways; reroute field drains; conservation tillage; cover crop.            | Several signs of erosion to river; significant field slopes into wetland area.                                                      | Yes                              | Pollinator Cover                                                                               |
| 22    | Waukesha, Summit     | 43.100765, -88.535359 | Cropland                  | 1                    | Nutrient management; additional buffer; reroute field drainage; rotate contours 90 degrees; conservation tillage; cover crop. | Small contact area between field and adjacent river; drainage ditch ties into river.                                                | Yes                              | Perennial cover                                                                                |
| 22.1  | Waukesha, Oconomowoc | 43.113051, -88.533873 | Cropland                  | 7                    | Reduced tillage, buffers, cover crops, wetland restoration.                                                                   | Fields border ditches leading to Allen Creek. Extremely wet area removed from annual cropping.                                      | New Project Area Added Completed | Fields border ditches leading to Allen Creek. Extremely wet area removed from annual cropping. |
| 22.2  | Waukesha, Oconomowoc | 43.109838, -88.531984 | Cropland                  | 4                    | Reduced tillage, buffers, cover crops                                                                                         | Fields border ditches leading to Allen Creek. Extremely wet area removed from annual cropping.                                      | New Project Area Added Completed | Cover crops, Buffer planted                                                                    |
| 22.3  | Waukesha, Oconomowoc | 43.117656, -88.537182 | Cropland                  | 5                    | Reduced tillage, buffers, cover crops                                                                                         | Fields border ditches leading to Allen Creek. Extremely wet area removed from annual cropping.                                      | New Project Area Added Completed | Cover crops, Buffer planted                                                                    |

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| CSA # | County, Township   | Lat, Long             | General Land Use Category | Controlled Area (Ac) | Suggested Management Measure Description                                                                                      | Comments                                                                                                                 | Project Status: Action taken?          | Practice installed or reason for inaction |
|-------|--------------------|-----------------------|---------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 23    | Waukesha, Summit   | 43.101674, -88.531400 | Cropland                  | 1                    | Nutrient management; additional buffer; reroute field drainage; rotate contours 90 degrees; conservation tillage; cover crop. | Small field area slopes into the river; drainage ditch ties into river.                                                  | No                                     | Needs to be investigated                  |
| 24    | Waukesha, Summit   | 43.036862, -88.513365 | Cropland                  | 2                    | Nutrient management; additional buffer; grassed waterways; rotate contours 90 degrees; conservation tillage; cover crop.      | Field adjacent to the river; sizable slopes with minimal buffer.                                                         | No                                     | Needs to be investigated                  |
| 24.1  | Waukesha, Summit   | 43.080983, -88.502330 | Cropland                  | 1                    | Perennial Cover- Hay, Prairie Planting                                                                                        | Fields adjacent to ditch just downstream of Silver Lake. Ditch leads to Battle Creek.                                    | New Project<br>Area Added<br>Completed | Perennial Cover- Hay, Prairie Planting    |
| 25    | Waukesha, Summit   | 43.103897, -88.506212 | Public Park               | 1                    | Optimize fertilizer usage; additional buffer.                                                                                 | Champion Field adjacent to river; City of Oconomowoc can easily put conservation practices into place.                   | No                                     | Needs to be investigated                  |
| 26    | Jefferson, Concord | 43.076758, -88.548347 | Cropland                  | 5                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop.                                  | Field slopes to Battle Creek at several points and contains some highly erodible soils.                                  | Yes                                    | Seasonal cover, Animal mngt,              |
| 27    | Waukesha, Summit   | 43.082238, -88.538162 | Cropland                  | 1                    | Nutrient management; additional buffer; grassed waterway; conservation tillage; cover crop.                                   | Field drains to a northern offshoot of Battle Creek.                                                                     | No action needed                       | Now a subdivision                         |
| 28    | Jefferson, Concord | 43.075436, -88.542372 | Cropland                  | 2                    | Nutrient management; additional buffer; grassed waterway; conservation tillage; cover crop; wetland restoration.              | Field on both sides of a northern offshoot of Battle Creek.                                                              | No                                     | Needs work.                               |
| 29    | Waukesha, Summit   | 43.065258, -88.537197 | Cropland                  | 3                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop.                                  | Field on both sides of Battle Creek with significant slopes to the river; signs of existing erosion on both fields.      | Yes                                    | Seasonal cvr                              |
| 30    | Waukesha, Summit   | 43.063930, -88.527743 | Cropland                  | 1                    | Nutrient management; additional buffer; conservation tillage; cover crop.                                                     | Minimal buffer to drainage ditch.                                                                                        | No                                     | Needs work.                               |
| 31    | Waukesha, Summit   | 43.060129, -88.532177 | Cropland                  | 1                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop.                                  | Significant slope to river area.                                                                                         | No                                     | Needs work.                               |
| 32    | Waukesha, Summit   | 43.057328, -88.5346   | Cropland                  | 2                    | Nutrient management; additional buffer; reroute field drainage; rotate contours 45 degrees; conservation tillage;             | Minimal buffer to drainage ditch which flows into Battle Creek; signs of erosion into drainage                           | No                                     | Needs work.                               |
| 33    | Waukesha, Summit   | 43.056875, -88.528298 | Cropland                  | 1                    | Wetland Restoration                                                                                                           | Signs of erosion into drain to Battle Creek; area recommended for wetland restoration by Waukesha County LWC Department. | No                                     | Needs work                                |
| 34    | Waukesha, Summit   | 43.051585, -88.516961 | Cropland                  | 7                    | Nutrient management; additional buffer; conservation tillage; cover crop.                                                     | Some addition buffer could be needed by river.                                                                           | No                                     | Is this a lawn? Needs investigation.      |

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|-------|----------------------|-----------------------|---------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 35    | Waukesha, Summit     | 43.055066, -88.515920 | Cropland                  | 1                    | Nutrient management; additional buffer; grassed waterways; rotate contours 90 degrees; conservation tillage; cover crop; wetland restoration.      | Signs of erosion to river location; grassed waterway recommended.                                        | No                            | Needs work.                                                                                                            |
| 36    | Waukesha, Summit     | 43.058117, -88.507600 | Cropland                  | 2                    | Nutrient management; additional buffer; reroute drainage; grassed waterways; conservation tillage; cover crop.                                     | Signs of erosion into ditch which eventually drains to Battle Creek.                                     | No                            | Animals concentrated here?                                                                                             |
| 37    | Waukesha, Summit     | 43.068308, -          | Cropland                  | 10                   | Wetland Restoration                                                                                                                                | Large area near Battle Creek recommended for wetland restoration by                                      | No                            | Needs investigation                                                                                                    |
| 38    | Waukesha, Oconomowoc | 43.154395, -88.516423 | Cropland                  | 11                   | Nutrient management; additional buffer; grassed waterway; conservation tillage; cover crop; wetland restoration.                                   | Signs of significant erosion to stream draining to Lac La Belle; grassed waterway recommended.           | Ye                            | Perennial Cvr, south 10 acres, working on north half                                                                   |
| 39    | Waukesha, Oconomowoc | 43.141518, -88.497118 | Cropland                  | 8                    | Nutrient management; additional buffer; rotate contours 90 degrees; grassed waterway; conservation tillage; cover crop; wetland restoration.       | Signs of erosion to field drainage with minimal buffer.                                                  | Ye                            | Seasonal cvr on some acres. Perennial buffers Installed 2024                                                           |
| 40    | Waukesha, Oconomowoc | 43.140242, -88.48275  | Cropland                  | 5                    | Nutrient management; additional buffer; grassed waterway; conservation tillage; cover crop; wetland restoration.                                   | Field drains to Rosenow Creek offshoot to the north; signs of erosion to stream location.                | No                            | This is a TPC Easement Not sure if internal drainage areas outlet. No till and Seasonal covers applied here regularly. |
| 41    | Waukesha, Oconomowoc | 43.144745, -88.475757 | Cropland                  | 5                    | Nutrient management; additional buffer; grassed waterway; conservation tillage; cover crop; wetland restoration.                                   | Minimal buffer on both sides of stream offshoot; stream crossing apparent from aerial photography.       | Ye                            | Actually addressed north portion of this with a WRE project. <b>Additional field work SE of wetland is needed.</b>     |
| 42    | Waukesha, Oconomowoc | 43.123576, -88.468090 | Cropland                  | 3                    | Additional buffer; wetland restoration.                                                                                                            | Recent develop in this area; may require additional protection of Rosenow Creek.                         | Ye                            | Scrapes and native plant                                                                                               |
| 43    | Waukesha, Merton     | 43.148417, -88.403573 | Cropland                  | 7                    | Nutrient management; additional buffer; grassed waterways; rotate contours 90 degrees; conservation tillage; cover crop; reevaluate site drainage. | Crops adjacent to river between North Lake and Okauchee Lake.                                            | Ye                            | Annual cover crops planted.                                                                                            |
| 44    | Waukesha, Merton     | 43.155795, -88.397444 | Cropland                  | 3                    | Nutrient management; additional buffer; grassed waterways; rotate contours 90 degrees; conservation tillage; cover crop; reevaluate site drainage. | Crops adjacent to river between North Lake and Okauchee Lake.                                            | Ye                            | Annual Cvr, flown or drilled                                                                                           |
| 45    | Waukesha, Merton     | 43.171957, -88.379867 | Cropland                  | 8                    | Nutrient management; additional buffer; conservation tillage; cover crop; wetland restoration.                                                     | Several fields adjacent to stream draining to North Lake.                                                | No                            | Western field higher priority. NE and SE fields appear to drain to wetland areas.. Not highest priority                |
| 46    | Waukesha, Merton     | 43.174542, -88.389537 | Cropland                  | 1                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop; wetland restoration.                                  | Field slopes towards Mason Creek; additional buffer possibly needed.                                     | Ye                            | Buffer along river                                                                                                     |
| 47    | Waukesha, Merton     | 43.183146, -88.392669 | Cropland                  | 4                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop; wetland restoration.                                  | Signs of erosion to a drainage ditch between two fields; grassed waterway possibly needed on east field. | Ye                            | Permanent Cover.                                                                                                       |

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|-------|------------------|--------------------------|---------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------|
| 47.1  | Waukesha, Merton | 43.1772 82 - 88.3996 34  | Cropland                  |                      | Nutrient management; additional buffer; conservation tillage; cover crop.                                                                     | Field is close to Mason Creek. Drains to ditch that leads to Creek                                                                | New Project Area Added            | Needs investigation.                                                                                         |
| 48    | Waukesha, Merton | 43.1896 28, - 88.3869 79 | Cropland                  | 6                    | Nutrient management; additional buffer; grassed waterway; conservation tillage; cover crop; wetland restoration.                              | Field drains to a northern offshoot of Mason Creek.                                                                               | No                                | Needs investigation. SW corner in particular. Pond behind large house may provide some retention.            |
| 48.1  | Waukesha, Merton | 43.1793 01, - 88.4043 89 | Cropland                  | 3                    | Nutrient management; additional buffer; grassed waterways; rotate contours 90 degrees; conservation tillage; cover crop; wetland restoration. | Field drains to SW into Mason Creek. Runoff observed in high rain events.                                                         | New Project Area Added, Completed | Mid-field contour strip/buffer slowed water movement and reduced runoff. Cover Crops applied here regularly. |
| 49    | Waukesha, Merton | 43.1887 27, - 88.4078 25 | Cropland                  | 1                    | Nutrient management; additional buffer; grassed waterways; rotate contours 90 degrees; conservation tillage; cover crop; wetland restoration. | Minimal buffer to Mason Creek; field contours perpendicular to the creek.                                                         | Yes                               | Native planting and stream re-meandering project TPC                                                         |
| 50    | Waukesha, Merton | 43.1932 86, - 88.4032 83 | Cropland                  | 2                    | Nutrient management; additional buffer; grassed waterway; conservation tillage; cover crop; wetland restoration.                              | Field on both sides of a northern offshoot of Mason Creek; stream crossings apparent from aerial photos.                          | Yes                               | Site is being converted to wetland bank by private owner.                                                    |
| 51    | Waukesha, Merton | 43.1917 59, - 88.4115 99 | Cropland                  | 6                    | Nutrient management; additional buffer; grassed waterways; reroute drainage; conservation tillage; cover crop.                                | Field drains directly to the river at multiple locations; some areas with minimal buffer.                                         | Yes                               | Buffer strips adj to creek w branch                                                                          |
| 52    | Washington, Erin | 43.2023 64, - 88.4162 05 | Cropland, Feedlot         | 5                    | Pasture/Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop.                                          | Significant slope to river area; Washington County LWCD indicates the presence of a feedlot and pasture management opportunities. | Yes parts of                      | Buffer strips, animal control, cover crops.                                                                  |
| 53    | Washington, Erin | 43.2072 87, - 88.3978 19 | Cropland                  | 7                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop.                                                  | Two small fields adjacent to the creek; further site investigation necessary.                                                     | No                                | Appears to have solid cover and tree plantings. Investigation needed but lower priority                      |
| 54    | Waukesha, Merton | 43.1766 21, - 88.3703 63 | Feedlot                   | 0.3                  | Manure storage/management; filter strips.                                                                                                     | Feed lot next to Little Oconomowoc River west offshoot.                                                                           | No                                | Hoff Rd area. Investigate.                                                                                   |
| 55    | Waukesha, Merton | 43.1764 90, - 88.3591 82 | Cropland                  | 1                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop; wetland restoration.                             | Fields on three sides of the Little Oconomowoc River with some areas with minimal buffer and significant slopes.                  | No                                | Needs investigation.                                                                                         |
| 56    | Waukesha, Merton | 43.1810 73, - 88.3620 60 | Cropland                  | 1                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop; wetland restoration.                             | Little Oconomowoc River is adjacent to the field on three sides; some vehicle tracks crossing the river.                          | No                                | Needs investigation.                                                                                         |
| 57    | Waukesha, Merton | 43.1791 98, - 88.3692 45 | Cropland                  |                      | Nutrient management; additional buffer; grassed waterway; conservation tillage; cover crop.                                                   | Signs of erosion into the adjacent stream.                                                                                        | No                                | Needs investigation.                                                                                         |

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|-------|--------------------|--------------------------|---------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 57.1  | Waukesha, Merton   | 43.1533 58, - 88.3733 29 | Cropland                  |                      | Reduced Tillage, cover crop, buffer                                                                                                                                                                 | Field drains to a culvert under Nelson drive and under residential lot immediately into North Lake.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | New Project Area Added Completed | Perennial Cover- Prairie buffer planted.                                                                                                                                                                                                                                                                                         |
| 57.2  | Waukesha, Chenequa | 43°08'26                 | Waterfront                | 2                    | Bank Stabilization removal of Buckthorn, Revegetation                                                                                                                                               | Property and lawn drain to bare shoreline, bare mud bank vulnerable to erosion from intermittent flowing stream                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | New Project area Added Completed | Bank Stabilization, Lake Improvement                                                                                                                                                                                                                                                                                             |
| 58    | Washington, Erin   | 43.2414 44, - 88.3639 07 | Cropland, Feedlot         | 35                   | Sedimentation pond installation/maintenance; manure storage optimization; nutrient/pasture management; wetland restoration; additional buffer; grassed waterways; conservation tillage; cover crop. | A large sedimentation pond would help the Erin Meadows farm and neighboring farms reduce runoff and be a source of irrigation water. The pond could also serve a nearby dairy and beef cattle farm located on both sides of the river. In addition, an existing sedimentation pond needs to be cleaned out for better performance. There are seven springs on this farm that could be developed with a grass waterway to create a new trout stream. The Washington County LWCD also indicates the need for wetland restoration, pasture management, and manure storage optimization at this site. | Yes                              | Two small sedimentation basins were created to trap runoff from farm to the NE of Gallo. Animal farm to the east was uninterested at the time due to personal reasons. OWPP de-emphasized this area due to consistently good water quality readings in monthly monitoring. Two lakes south of this CSA serve as retention ponds. |
| 59    | Washington, Erin   | 43.2492 16, - 88.3522 84 | Cropland                  | 4                    | Nutrient management; additional buffer; check field contours; reroute drainage; grassed waterways; conservation tillage; cover crop.                                                                | Several fields surrounding a complicated drainage network; further site investigation necessary to determine most effective BMPs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | No                               | Needs investigation. Lower priority due location high up and generally good water Q for Little Ocon                                                                                                                                                                                                                              |
| 60    | Waukesha, Merton   | 43.1642 81, - 88.3548 53 | Cropland                  | 12                   | Nutrient management; additional buffer; conservation tillage; cover crop.                                                                                                                           | Field adjacent to Funks Millpond.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | No                               | Fields to north in OCP are in program. Investigation on fields to south needed where close to a wet spot/drainage area.                                                                                                                                                                                                          |
| 61    | Waukesha, Merton   | 43.1687 32, - 88.3472 90 | Cropland                  | 17                   | Wetland Restoration                                                                                                                                                                                 | Field draining to Funks Millpond; significant signs of erosion in center of field; opportunity for wetland restoration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | No, action not needed.           | Much of field is internally draining. This was investigated and there is sufficient buffer area south in flat forested area along IAT.                                                                                                                                                                                           |
| 62    | Waukesha, Merton   | 43.1658 53, - 88.3461 02 | Cropland                  | 5                    | Nutrient management; wetland restoration; rotate contours 90 degrees; additional buffer; grassed waterway; conservation tillage; cover crop.                                                        | Field on both sides of tributary to Funks Millpond; signs of erosion to stream; opportunity for wetland restoration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | No                               | Needs investigation.                                                                                                                                                                                                                                                                                                             |

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|-------|-----------------------|-----------------------|---------------------------|----------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 62.1  | Waukesha, Merton      | 43.172651, -88.317193 | Cropland                  |                      | Perennial Cover                                                                              | Field flows to a ravine that drains to Lake Keesus. Early spring melt was identified issue                                             | New Project<br>Area Added<br>Completed | Prairie planting installed, ravine drainage slowed by annual check dam installation.                                                           |
| 63    | Waukesha, Merton      | 43.176823, -88.349449 | Cropland                  | 3                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop. | Signs of significant erosion to the Oconomowoc River in multiple areas.                                                                | Yes                                    | Oconomowoc Conservancy Park Created. 4 fields now in reforestation                                                                             |
| 64    | Washington, Erin      | 43.216611, -88.330096 | Cropland                  |                      | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop. | Two small fields adjacent to the creek; further site investigation necessary.                                                          | No                                     | Needs investigation                                                                                                                            |
| 65    | Washington, Erin      | 43.227020, -88.327181 | Cropland                  | 2                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop. | Flynn Creek cuts through the field, and there are signs of erosion to the creek.                                                       | YES                                    | 2024-750ft of creek Cleared of Buckthorn, Re seeded banks. Phase 2 - 2025                                                                      |
| 66    | Washington, Erin      | 43.238459, -88.318669 | Cropland                  | 10                   | Wetland Restoration                                                                          | Several fields surrounding a complicated drainage network; Washington County LWCD indicates site as priority wetland restoration area. | Yes- by owner                          | Needs investigation                                                                                                                            |
| 67    | Washington, Erin      | 43.245314, -88.309547 | Cropland                  | 2                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop. | Field with signs of erosion adjacent to Flynn Creek.                                                                                   | No                                     | Needs investigation.                                                                                                                           |
| 68    | Washington, Erin      | 43.249043, -88.305541 | Cropland                  | 2                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop. | Minimal buffer to Flynn Creek.                                                                                                         | No                                     | Areas north in HH Ski area are in program. Pollinator 8 Ac, cvr crops to east                                                                  |
| 68.1  | Washington, Richfield | 43.241180, -88.260867 |                           |                      | No Till, Nutrient Management, Buffer                                                         |                                                                                                                                        | New Project<br>Area Added              | SW quarter of the field drains to Friess Lake through culvert under 164. Farmed by Dennis Stuetgen. Buffer installed. Property is up for sale. |
| 69    | Washington, Richfield | 43.259668, -88.268711 | Cropland                  | 2                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop. | Ephemeral stream drains the field to the Oconomowoc River, and no conservational practices are in place.                               | No                                     | Field needs some investigation. Field to southeast are of greater concern.                                                                     |
| 70    | Washington, Richfield | 43.270409, -88.256031 | Cropland                  | 1                    | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop. | Several fields surrounding the Coney River with minimal buffer in place.                                                               | Yes                                    | Lofy Farm. Lofy has been using seasonal cover crops for many years prior to our AMP.                                                           |

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|--|-------|----------------------|-------------------|---------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------|
|  | 71    | Washington Richfield | 3.26716, -8.23044 | Cropland                  | 95                   | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop; reevaluate site drainage.                             | There is an opportunity to improve severe runoff conditions on the Pleasant Hill sod farm. Sedimentation basins and traps for runoff capture and irrigation would be located downstream of the sod farm at strategic locations. An innovative phosphorus filtration process could be used at the ponds to remove TSS and TP. | No. Determined not needed for now.   | Sod Farm. Water quality downstream is regularly. So far not a big concern.                                        |
|  | 72    | Washington Richfield | 3.27070, -8.22983 | Cropland                  | 40                   | Nutrient management; additional buffer; grassed waterways; rotate contours 90 degrees; conservation tillage; cover crop; reevaluate site drainage. | Signs of erosion into the nearby headwaters of the Oconomowoc River.                                                                                                                                                                                                                                                         | No. Determined not needed for now.   | See above                                                                                                         |
|  | 73    | Washington Polk      | 3.29207, -8.26550 | Cropland                  | 60                   | Nutrient management; additional buffer; conservation tillage; cover crop; contour farming.                                                         | Coney Rivers winds around set of fields with a relatively steep slope to the water; some signs of erosion.                                                                                                                                                                                                                   | No                                   | Needs work.                                                                                                       |
|  | 73.1  | Washington, Polk     | 3.2944, -8.27271  | Cropland                  |                      | Nutrient management; conservation tillage; cover crop.                                                                                             |                                                                                                                                                                                                                                                                                                                              | New Project Area Added.<br>Completed | We have discussed buffers w expanded buffers along the creek on his own in 2022. No long term contract currently. |
|  | 74    | Washington Polk      | 3.29838, -8.27211 | Cropland                  | 17.5                 | Nutrient management; additional buffer; conservation tillage; cover crop.                                                                          | Coney Rivers cuts through set of field; minimal buffer; some signs of erosion.                                                                                                                                                                                                                                               | No                                   | Needs work.                                                                                                       |
|  | 75    | Washington Polk      | 3.30131, -8.27565 | Cropland                  | 10                   | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop.                                                       | Field with significant slope to the Coney River.                                                                                                                                                                                                                                                                             | No                                   | We have drone investigated all of the creek from Hwy E W to the RHS Park. Nothing noted that is a big concern.    |
|  | 76    | Washington Polk      | 3.29860, -8.28631 | Cropland                  | 65                   | Nutrient management; barnyard improvements; additional buffer; grassed waterways; conservation tillage; cover crop.                                | Coney River cuts through two fields with signs of erosion; field to north may need barnyard improvements.                                                                                                                                                                                                                    | Yes parts of                         | 8 acres on the north side of E across from Meyer farm put into per cvr. Used for forage 3 or 4 ctgs per year.     |
|  | 77    | Washington Polk      | 3.29202, -8.28793 | Cropland                  | 70                   | Drain tile diversion; nutrient management; additional buffer; conservation tillage; cover crop.                                                    | Signs of erosion and drain tiles near Coney River fork; minimal buffer to the river.                                                                                                                                                                                                                                         | Yes                                  | TPC Easement - includes conservation measures, cvr crops, tile outlet rep, reduced tillage                        |
|  | 78    | Washington Polk      | 3.28757, -8.29817 | Cropland                  | 55                   | Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop.                                                       | Fields with significant slope to the Coney River.                                                                                                                                                                                                                                                                            | Yes                                  | No Till implemented on majority of the fields starting in 2022 and Multi-species cover applied.                   |
|  | 79    | Washington Polk      | 3.31454, -8.28168 | Cropland                  | 15                   | Nutrient management; additional buffer; conservation tillage; cover crop.                                                                          | Coney River cuts through set of fields just south of Mud Lake; additional buffer may be necessary.                                                                                                                                                                                                                           | No                                   | Needs investigation                                                                                               |

## DESCRIBE MANAGEMENT MEASURES

The OWPP team identified various Management Measures to be used as methods to achieve water quality improvement. The agricultural Management Measures are briefly described in the text below and can be seen associated with CSAs in Table 14. Multiple Management Measures were identified for most areas to provide flexibility. In most of the areas, communication with the landowners have been attempted, many efforts have been successful. See column “Project Status: Action Taken” for standings of CSA’s. The exact Management Measures to be implemented will depend on the scenario of the landscape and what the landowner is agreeable to. -

The OWPP will utilize existing nonpoint pollution control programs and related program partners as a resource for the design and implementation of Management Measures. The following practices are the primary management measures to be used by the OWPP but the OWPP will not be limited to the following.

### Nutrient Management Plan

Nutrient management plans are required by NR 151. The purpose of the plans is for farmers to have a proactive plan for managing the amount of nutrients in the soil for optimum crop yields. The plans also help prevent an excess of nutrients in the soil. When there is an excess of nutrients, pollutant runoff associated with soil loss is exacerbated. The plans consider the soil type, crop rotation, nutrient uptake of the crops, the amount and type of fertilizer applied, and other general operation details. The goal of the plans is to balance the optimum amount of nutrients required for a particular farming operation, considering soil type, field slope, crop rotation, and tillage practices.

### Cover Crops

Cover crops are vegetation that is planted typically in the fall after the main crop (for example corn or soybeans) is harvested. The cover crop grows quickly and establishes a substantive root structure near the surface of the soil, thus holding the soil in place and helping to prevent soil erosion. The crop dies in the cold weather, but the root structure remains in the soil to stabilize it during the winter months. Winter wheat and winter rye are two examples of cover crops that could be used in the OWPP. Aerial application of cover crop seeds will also be a practice that will be supported.

### Riparian Buffers

Riparian buffers are meant to inhibit solids transport and promote nutrient uptake from runoff originating from agricultural operations before reaching nearby surface water. Riparian buffers are typically effective starting at a minimum width of 30 feet. OWPP has been successful engaging with farmers and landowners in the Oconomowoc River watershed implementing conservation buffers and harvestable buffers. Riparian buffers will continue to be a key focus for phosphorous reductions by land improvement. Through the harvesting program, the buffer area still provides some economic value to farmers. Harvesting also removes the phosphorus taken up by the plant.

### Improved Tillage

Improved tillage practices can result in healthier soil and reduced soil loss. Improvements could include implementing no-till or conservation tillage practices to reduce the magnitude of tilling (e.g. going from chisel plowing to disc tilling).

### Grassed Waterways

Grassed waterways are drainage channels in a field that are planted with grass to reduce erosion and the transport of TSS to the ditch line. Grassed waterways are typically more effective at TSS reduction compared to TP. However, there is still benefit for TP reduction.

### Retention Ponds

Retention ponds help to capture solids and particulate phosphorus during and after a precipitation event. The ponds collect the storm water and settle out the solids as opposed to having the solids transported to surface water. There are several locations in Washington County where these ponds can be implemented.

### Barnyard Improvements

Barnyard improvements consist of practices that could be implemented in areas of concentrated livestock feeding. These areas typically lack vegetation or well-established root systems because of the high traffic from livestock. Improvements could include the installation of terraces, re- grading, having multiple feed points, and covering the feed points.

### Wetland Restoration

Wetland restoration would consist of taking land in a low area with hydric soils out of production and converting it back into a wetland. Some farmland in the area has been drained with a network of tile drains to convert it into farmland. This land is still marginal for production and is prone to flooding with heavy rain. Waukesha and Washington counties have identified specific areas that would be good candidates for wetland restoration. In addition, there are a couple of agricultural areas in Jefferson County that may be successfully converted to wetland.

### ESTIMATE LOAD REDUCTION EXPECTED BY PERMIT TERM

Since field level implementation has started at the OWPP many projects have been contracted, installed, and maintained. These projects require modeling to determine their phosphorus reduction benefit. There was a need for an agricultural land use model that had a more accurate representation than the STEPL model, which was stated to be the standard method used in the initial adaptive management plan for permit 1. OWPP has developed methods to estimate Phosphorous load reductions from agricultural areas in the Oconomowoc River Watershed using SnapPlus as the program to facilitate the design. A baseline was established for farm operations in the Oconomowoc River Watershed, then different types of conservation practices were added to evaluate average P load reductions across the watershed.

The factors that were evaluated to develop this model were soil types, tillage practice, soil test nutrient levels, farm fertilization, and lastly crop rotation.

First, the five most prevalent soil types in the watershed had to be identified and weighted in proportion to each other.

Spring chisel/Spring disk tillage was used to define the model's baseline tillage practice. This practice was determined because it is less aggressive variation of tillage, thus leading towards a more conservative Phosphorus reduction estimate.

The Soil test nutrient levels entered into the model were based on county averages, these averages were then weighted for their percent makeup in the watershed, with the exception of the Organic matter test level.

Organic matter was reduced to meet a more realistic scenario.

Field fertilization within the model was set in accordance to UW A2809 recommendations, being in compliance with NR.151; which is the standard that is programmed into SnapPlus. Within the fertilizer baseline there was an exception given to starter fertilizer applications. Generally, starter would be used on corn plantings, even if the soil test value had sufficient phosphorus concentration. Snap Plus recommendations would not recommend any phosphorous application. This starter application was included to better depict a real-life scenario.

Three main farming rotations were set as:

- Corn soy rotation (2 years). This rotation is assumed to be 65% of agricultural fields.
- Corn-soy-wheat rotation (3 years). This rotation is assumed to be 20% of agricultural fields.
- Dairy rotation: per model provided by Andrew Craig at DATCP: Corn, soybean, corn silage, and 3 years of alfalfa, with solid manure and additional fertilizer applied. This rotation is assumed to be 15% of agricultural fields.

Yields were set based on county averages.

Cover crops selected for the model were small grains (rye or wheat), which overwinter and are terminated by spraying, tillage, or crimping. Cover crops were planted after soybeans and wheat but not after corn, this is due to the soil protection from corn residue and spotty results observed in the field from covers following a corn crop.

The models were run with various types of conservation tillage, as well as with buffers applied.

**Initial results of the model:**

**No Till:** Converting fields from tillage to No Till provided a significant average annual P load reduction of over 2.37 lbs per acre.

**Strip Till:** Converting fields from tillage to Strip Till also yielded 2.17lbs per acre of annual P reduction.

**Cover Crops:** Applying cover crops to farms with conventional tillage averaged .47lbs per acre annual P reduction. However, adding cover crops to farms that already employ no till practices, and adding planting green appeared to offer little to no benefit. This runs counter to field observations and discussions are ongoing as to whether the model adequately captures practices such as planting green.

**Buffers:** Buffer widths are not adjustable within Snap Plus and deliver a single P reduction value for fields regardless of field size. To account for greater impacts a larger buffer would have on the landscape, using SnapPlus phosphorous loading values, OWPP created a methodology with approval from WI-DNR to portray how a larger filter strip with more acreage of perennial cover would result in a larger phosphorus reduction.

**Perennial Cover:** Converting annual cropping to perennial cover provides the greatest benefit, reducing the P load to nearly zero per field. SnapPlus showed this value to be 2.92lb/ac/yr or 2.85lb/ac/yr if the cover was harvested.

The current exercise of running Snap Plus has been valuable and provided guidance on the impact of practices. To adequately adjust the model, OWPP working with WI-DNR will need to assess the following:

- Acres controlled by specific buffers, and how we will define “controlled acres”
- Acres converted to permanent perennial cover and whether the prior annual practices included tillage.
- What extent of changes that occurred within our agricultural landscape can be accounted for by OWPP
- How planting green affects phosphorous reductions considering the ample protection provided by the green residue in the vulnerable months of May and June. SnapPlus does not account for the soil holding capacity of a cover crop with sufficient biomass.
- Creation of a methodology to account for phosphorous reduction occurring from miscellaneous conservation practices. For example, livestock restriction from waterways, tile repair, water embankment structures, erosion control, and restored wetlands.

A detailed summary of our modeling reduction methods along with our Filter Strip Addendum and calculation examples can be found at the end of this report in Appendix D. Included within the appendix is the WI-DNR acknowledgment to Oconomowoc’s methods for “counting pounds”. OWPP acknowledges the use of this model will require refinement over time.

OWPP’s modeled phosphorous loads from agricultural areas in the Oconomowoc River Watershed were developed with guidance from Andrew Craig and Dr. Laura Good. We thank them for their time spent helping with the complexity of this model.

Consultants, engineers, WiDNR Staff, or county LWC Departments will be consulted for realistic pollutant reductions for Management Measures that are not able to be modeled with the previously stated model. These include streambank stabilization, Lake improvements, and wetland restoration.

In addition to the agricultural Management Measures described above, other means of nonpoint nutrient management will be explored in the OWPP. One such option is phosphorus reduction through lake improvements. There are several lake management districts represented in the watershed that have given their support to the project. Phosphorus reductions in these lake systems can be achieved in several ways. The approach for phosphorus mitigation for each management district will be determined by the needs of each lake system and the resources of the communities surrounding the lake. Potential lake management options may include mechanical harvesting of excess aquatic plant growth, dredging, private lake shore maintenance and restoration, wetland restoration, watercraft inspection programs, and proper storm water management strategies. Any Management Measures should be accompanied by methodical water quality monitoring which may help project partners better understand existing TP levels in the lakes and its transport downstream.

Another source of phosphorus reductions in the Oconomowoc River Watershed will be streambank stabilization. Existing research has shown that this option can be a cost-effective means of reducing phosphorus loads to surface waters (Center for Watershed Protection et al., 2005; Dove et al., 2009; Bair, 2011). Large scale streambank restorations will use engineering calculations to determine phosphorous load reductions. Other streambank stabilization practices or projects that use natural or engineered materials to prevent bank erosion and the transport of sediment into surface waters will calculate reductions based on the following. These sediments have been shown to transport large amounts of TP. Dove et al. 2009 estimate that streambank erosion contributes approximately 93 lbs. of TP per 1,000 feet of channel per year. Therefore, the OWPP estimated that approximately 75 lbs. of TP could be mitigated per 1,000 feet of channel per year with proper streambank stabilization techniques. The average cost of stream restoration of \$129,135 per river mile was estimated (Bair, 2011), and it was estimated that 1,000 lbs. of phosphorus reduction could be achieved with this practice.

An additional 2,000 lbs. of phosphorus reductions were estimated by implementing additional urban Management Measures in the Oconomowoc MS4. For the purposes of the AM plan, it was assumed that the MS4 area and reductions from this area included both regulated and non-regulated areas in the city. Non-regulated City areas would include areas that do not drain to the storm sewer system. This estimate was generated from a report written in 2008 by MSA Professional Services, Inc., where baseline TSS loading without any controls was established at 1,030 tons of TSS per year. The sediment reduction program that the City of Oconomowoc has in place was estimated to remove 212 tons of the baseline TSS load. Assuming 0.39% phosphorus content in TSS from the Windows Source Loading and Management Measures (WINSLAMM) modeling program approximately 4,466 pounds of phosphorus is being discharged to the Oconomowoc River from Reach 25.

The portion of the City in TMDL Reach 26 or Reach 27, (approximately 30 percent of the city which is also in the Oconomowoc River Watershed) will be included in the MS4 contributions to the Adaptive Management Program. Considering the current loading, the reduction of 2,000 lbs. of phosphorus per year was determined to be reasonable. Non- structural practices such as narrowing road cross sections and requiring more stringent post construction storm water control regional will provide phosphorus reductions. Additional reductions may come through implementation of structural practices grass swales, detention ponds, settling basins, infiltration devices, or other urban storm water pollutant reduction practices.

Necessary infrastructure repairs will be evaluated for storm water quality controls when projects are planned. Comparison of periodic storm water quality modeling updates with in-stream monitoring data will determine progress towards P reductions.

The OWPP initially estimated 2,500lbs of phosphorus reduction to meet the interim limit of 0.6 mg/L at the Oconomowoc WWTF during the first permit term. During this period, we found 1,423lb/year reduction was necessary to achieve an average TP of 0.56 mg/l. This optimization was achieved through chemical treatment at the end of the aeration basins with Ferric Chloride. The

0.5 mg/L TP limit in the second and third permit terms will require greater chemical additions in order to obtain TP compliance at the WWTP. Previous dosing studies have indicated that these levels can be reached without excessive blinding of the existing filters. It was assumed that additional 40 gallons per day of chemical will be needed to maintain this level. The Oconomowoc WWTF staff will test the achievability of this goal relatively early in the permit cycle to observe its effect on phosphorus at the point of compliance as well as how the facility reacts to the additional chemical.

Table 15 below shows the breakdown of calculated reductions for permit term 1, with original plan reductions in parentheses, and the estimated reductions for permit terms 2 and 3, measured in pounds per year. The original AM plan was approved in 2016, but the WPDES permit was issued in October 2020. This led to a front-loading of reductions during permit term 1 and a shorter permit term 3. As long as the WQC is clearly met at the point of compliance, the reductions shown in the five categories below are targets only. If future data from the point of compliance trends back above the water quality criteria, then compliance may once again depend on achieving the yearly reduction by the end of each permit term as outlined below. WWTF effluent reductions for permit term 2 were included to account for the reduction required to meet the interim limit of 0.5 mg/l TP.

**Table 15.** Estimated TP Reduction by Permit Term

|                                 | <b>Permit<br/>Term 1<br/>2020'-24'</b> | <b>Permit<br/>Term 2<br/>2025'-29'</b> | <b>Permit<br/>Term 3<br/>2030'-34'</b> | <b>Total</b>      |
|---------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|-------------------|
| <b>WWTF Effluent Reductions</b> | 1,423<br>(2,504)                       | 750                                    |                                        | 2173<br>(2,504)   |
| <b>CSA Management Measures</b>  | 6,501<br>(2,175)                       | 500                                    |                                        | 7,001<br>(3,246)  |
| <b>Lake Improvements</b>        | 167<br>(200)                           | 200                                    | 100                                    | 467<br>(1,000)    |
| <b>Streambank Stabilization</b> | 144<br>(200)                           | 200                                    | 100                                    | 444<br>(1,000)    |
| <b>City of Oconomowoc MS4</b>   | 360                                    | 375                                    | 375                                    | 1,110<br>(2,000)  |
| <b>Total</b>                    | 8,595<br>(5,079)                       | 2,025<br>(2,771)                       | 575<br>(1,900)                         | 11,195<br>(9,750) |

\*No reductions from affiliated stream projects that used TRM funding was counted in this plan.

\*MS4 reductions for permit terms 2 & 3 are anticipated at 75lb/yr based off previous years' trend.

## MEASURING SUCCESS

The City has a standard monitoring program for TP in the watershed. The monitoring used in the OWPP will be based on the standard monitoring already in place. For the past seven years, the wastewater utility has conducted once a month monitoring of various points in the watershed from May-October. These locations are shown in map 1 of appendix A. Official data used for compliance determination and assessment of OWPP progress will be at sample 18 (River 601), sampling will be completed at this location on the first and fifteenth days of each month; or the nearest day between Monday and Friday. The parameters tested at the points are TP and, at some locations, TSS as well. Most of the monitoring locations will be monitored once per month. The sampling will occur on or close to the same day every month. By sampling the same day, there will be a reduction in any bias in the pollutant concentrations from very wet or very dry weather. This sampling method is in accordance with Wisconsin DNR guidance.

Some of the critical monitoring points (e.g. just upstream and downstream of the WWTF outfall and the confluence) will be monitored twice per month on the same days as River 601. For these locations, samples will be collected on the first and fifteenth days of each month, including compliance sample 601.

The City will conduct “unofficial” sampling to assist in understanding of the watershed hydrology and influence of TP through the watershed. Event-specific sampling will be used to determine how increased river flow rates affect TP and TSS levels.

Unofficial monitoring will also take place at additional locations in the watershed as practices are implemented. The monitoring will help determine if the implemented Management Measures are effective. Edge-of-field monitoring may take place to better assess reductions in phosphorus loading to surface waters.

When sampling, City staff will take a grab sample from the portion of the river with the greatest flow at a depth below the water surface of three to six inches. The sample bottles are rinsed three times before the sample is taken. Staff are careful not to disturb the river bottom while taking the sampling. In addition, staff collect the sample facing upstream.

During monitoring days, samples that are taken will be analyzed the same day and will not require acid preservation. If samples are to be analyzed at a later date, the monitoring guidance in Section 5.01 of the Guidance for Implementing Wisconsin’s Phosphorus Quality Standards for Point Source Discharges will be followed. The sample containers will be preserved using 1 ml (or slightly more if necessary) of 50% sulfuric acid solution. This ensures the samples have a pH of 2 or lower. Containers will be put on ice in a cooler shortly after they are collected. The analytical portion of the testing is conducted at the Oconomowoc WWTF which is a certified laboratory (ID: 268004550).

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When necessary, the city intends to utilize local volunteers to assist in water quality observations. Any monitoring personnel used through this program would be fully trained in the proper collection and preservation procedures.

Information on the monitoring locations is summarized in the table below.

**Table 16. AM Monitoring Overview**

| <b>Monitoring Location</b> |                                        |                 |                  |                                   |                           |                 |
|----------------------------|----------------------------------------|-----------------|------------------|-----------------------------------|---------------------------|-----------------|
| <b>Sample Point</b>        | <b>Sample Point Description</b>        | <b>Latitude</b> | <b>Longitude</b> | <b>Parameters to be Collected</b> | <b>Sampling Frequency</b> | <b>SWIMS ID</b> |
| 03b                        | Coney River Pleasant Hill Rd (CR8)     | 43.265789       | 88.256544        | TP                                | Monthly                   | 1001653         |
| 02                         | Oconomowoc River Hillside Rd.          | 43.264010       | -88.241699       | TP                                | Monthly                   | 10050681        |
| 01                         | Oconomowoc River Hwy. 167              | 43.251229       | -88.272887       | TP                                | Monthly                   | 673272          |
| 0                          | Oconomowoc River Hubertus Rd.          | 43.221488       | -88.289700       | TP                                | Monthly                   | 683246          |
| 1                          | Flyn Creek Emerald Rd.                 | 43.209365       | -88.336630       | TP                                | Monthly                   | 10054530        |
| 2                          | Hwy. Q Monches                         | 43.193608       | -88.338054       | TP                                | Monthly                   | 10047575        |
| 3                          | Mason Creek CW                         | 43.181144       | -88.405995       | TP                                | Monthly                   | 10016883        |
| 4                          | Mason Creek No. Woods Dr.              | 43.160064       | -88.380645       | TP                                | Monthly                   | 10039679        |
| 5                          | Oconomowoc River Hwy. 83               | 43.159970       | -88.370098       | TP                                | Monthly                   | 683245          |
| 5b                         | Little Oconomowoc River. No. Woods Dr. | 43.160644       | -88.372893       | TP                                | Monthly                   | 10012489        |
| 6                          | Oconomowoc River Hwy. K                | 43.139345       | -88.406940       | TP                                | Monthly                   | 10029397        |
| 9                          | Oconomowoc River Cemetery              | 43.112414       | -88.488332       | TP                                | Monthly                   | 10054533        |
| 11                         | Rosenow Creek (Blackhawk)              | 43.128992       | -88.504776       | TP                                | Monthly                   | 10054534        |
| 12                         | Oconomowoc River Wisconsin Ave         | 43.118278       | -88.518856       | TP                                | Monthly                   | 10051688        |
| 12b                        | Cottonwood Creek Lang Rd (CCLang)      | 43.15078        | -88.5125158      | TP                                | Monthly                   | 683419          |
| 13                         | Oconomowoc River (up)                  | 43.105539       | -88.511613       | TP                                | Monthly                   | 10010872        |
| 14a                        | Oconomowoc River (down)                | 43.095803       | -88.521340       | TP                                | Monthly                   | 10032583        |
| 15                         | Battle Creek Hwy. B                    | 43.074758       | -88.545601       | TP                                | Monthly                   | 1001699         |
| 16                         | Oconomowoc River Hwy. F                | 43.082673       | -88.586287       | TP                                | Monthly                   | 10040854        |
| 18<br>(601)                | Oconomowoc River Point of Compliance   | 43.113318       | -88.617344       | TP                                | 2x/Month                  | 10021224        |

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|                                  |                                       |                                                         |          |
|----------------------------------|---------------------------------------|---------------------------------------------------------|----------|
| <b>Sampling Methodology</b>      |                                       |                                                         |          |
| Who will collect samples?        | City of Oconomowoc Wastewater Utility |                                                         |          |
| Lab Information                  | Name:                                 | Wastewater Treatment Facility                           |          |
|                                  | Lab ID:                               | 268004550                                               |          |
|                                  | Address:                              | 900 South Worthington<br>Street Oconomowoc, WI<br>53066 |          |
| Phosphorus Analysis              | Methodology Used:                     | 4500E Standard Method 22nd Ed.                          |          |
|                                  | LOD:                                  | 0.026 mg/l                                              |          |
|                                  | LOQ:                                  | 0.088 mg/l                                              |          |
| <b>Other Lab Analysis for AM</b> |                                       |                                                         |          |
| Pollutant 1 Name:                | Methodology Used:                     | LOD                                                     | LOQ      |
| Chloride*                        | 4500 Chl. - B Std. Meth. 22nd         | N/A                                                     | N/A      |
| Pollutant 2 Name:                | Methodology Used:                     | LOD                                                     | LOQ      |
| TSS*                             | 2540-D Std. Meth. 22nd                | 2.0 mg/l                                                | 2.0 mg/l |
| Pollutant 3 Name:                | Methodology Used:                     | LOD                                                     | LOQ      |
| Temp.                            | N/A Traceable Inst.                   | N/A                                                     | N/A      |

\*Frequency of analysis varies based on river conditions, weather events, and ambient temperature.

### FINANCIAL SECURITY

There are many costs involved in the OWPP. The City of Oconomowoc has recognized these expenses and is fully committed in continuing the investment through the next permit term. Costs include (1) implementing agricultural Management Measures such as cover crops, riparian buffers, nutrient management plans, sedimentation basins and grassed waterways; (2) implementing other practices such as wetland restoration or streambank restoration; (3) optimizing the WWTF to meet interim limits; (4) conducting outreach and education; (5) modeling; (6) river monitoring; (7) administration.

## IMPLEMENTATION PROGRESS, PROJECTION, AND SCHEDULE

A detailed implementation schedule is presented in Table 19. This table outlines the projected phosphorus reduction in pounds per year from 2025 through 2034, broken down by key sources of reduction. It provides an incremental breakdown of reductions, occurring every two years, and will serve as a guide for tracking progress and identifying where significant reductions can be achieved over time.

The OWPP will review the monitoring data in detail throughout the watershed once per year. The concentration at the confluence will be analyzed specifically with regard to the median value 30 days apart for the months of May through October. The monitoring data will be used to directly evaluate the progress of the OWPP.

Several benchmarks will be used to monitor indirect progress of the program. These are described below:

### [Interim Phosphorus optimization plan](#)

Optimization to meet interim limits of TP at the WWTF consists of the additional chemical usage needed to meet the lower interim permit term TP concentrations from 0.6 mg/L to 0.5 mg/L. The WWTF can meet an effluent TP level of 0.5 mg/L with ferric chloride. Alternatives to achieve 0.5 mg/l will be trialed in the beginning years of permit term 2. An implementation plan will be finalized after trial data is evaluated. The city's goal will be to implement the phosphorous optimization plan to reach 0.5 mg/L by May 1, 2027.

### [Contracts](#)

The City of Oconomowoc uses several types of agricultural contracts to implement Management Measures in CSAs or practice areas. A variety of contracts have been created for each program ranging from yearly to 10-year contracts. In addition, a contracts will be in place for the OWPP working outside of the RCPP or any other subsidized program. The contracts are important because they will outline specifically what the OWPP is offering farmer or landowners in exchange for implementing

Management Measures. The template contracts will be used as a starting point for a contract with a landowner or farmer.

### GIS Program Management.

In the world of natural resource management, the need for effective tools to support adaptive management strategies is paramount. Over the course of the first permit term there was an integration of geographic information systems (GIS) and The Oconomowoc Watershed Protection Program. This database that was developed is now a pivotal component in supporting the function of the adaptive management plan as well as easing the load of data management with the accumulated project portfolio.

### Modeling

Modeling will continue to be an important part of the OWPP program. OWPP has modeled phosphorous loads from agricultural areas on the Oconomowoc River Watershed using Snap Plus, with guidance from Andrew Craig and Dr. Laura Good.

For this model, OWPP created representative field conditions by importing data on the most common soil types, nutrient content, yields, fertilization practices, and tillage methods in each county across the watershed. This data was then weighted for their percent constitution in the watershed and then combined to establish representative conditions of the watershed. Methodology for phosphorous reduction calculations can be found in Appendix D. Modeling and equations will continue to evolve over permit term 2. The next phase of modeling reductions will be integrating the equation into our GIS management system and using automated spatial analysis to identify and populate vectors of the analysis.

### Streambank Stabilization Reductions

A portion of the required target reductions come from streambank stabilization. The OWPP has worked with project partners to identify sections of streams and rivers where reductions could be targeted. During the second permit term projects to achieve streambank stabilization reductions are expected to take place on Mason, Rosenow, Flynn, and Cottonwood Creek. The SEWRPC has worked in the Mason Creek area in recent years to identify sources of runoff to North Lake. There are several streambank projects along Mason Creek that have been identified by SEWRPC. The OWPP will work SEWRPC and the North Lake Management District on these projects. The OWPP, in partnership with the Lac La Belle Management District, has identified two sections of streams in need of restoration. The OWPP will work with the management on the implementation of these improvements.

### Lake Reductions

The Oconomowoc River watershed contains many lakes. These lakes provide the benefits of recreation, wildlife habitat and clean water. The Clean Water Association (CWA) and Lake Country Clean Waters (LCCW) are partners that promote clean water specifically in and around lake communities. Both groups raise money to support activities that reduce runoff in around the many lake communities in the watershed. The activities could be erosion control, bank stabilization, harvesting of excessive aquatic plant growth, wetland restoration and commercial fertilizer control. The CWA fundraising will directly support the portion of the target reduction in the OWPP from the lakes.

### Flow Monitoring

The OWPP has extensive monitoring in place for TP concentrations in the watershed. In addition to the monthly permit monitoring OWPP staff deploy to areas of interest in the watershed and monitor additional surface waters. The OWPP has been successful through evaluation of streams and flow monitoring to indicate which tributaries are contributing to the largest loadings of phosphorous. By doing this we have been able to focus some efforts on regions where we think we can make the biggest difference. This type of monitoring will develop into specific studies in the first to benefit individual lakes over the course of the second permit term.

### MS4 Reductions

A portion of the required TP reduction comes from the City of Oconomowoc MS4. Based on storm water modeling conducted by the city, approximately 34,000 pounds of phosphorus per year was discharged to both regulated and non-regulated portions of TMDL Reach 25. The reductions in the MS4 area could come from improvements at parks, golf courses, the incorporation of TSS collection structures, additional detention ponds, or changes in street sweeping. In support of the required reduction for the City's MS4; 1,110 pounds of potential reductions have been identified; these areas are of interest and on the list for improvements to come by the end of the year 2034. The WiDNR has reissued the Cities MS4 permit.

**Table 17.** Project Milestones and Incremental Pounds Per Year Reductions.

| Reduction Sources                                                                      | Pounds per Year Reduction Year End 2025 | Pounds per Year Reduction Year End 2027 | Pounds per Year Reduction Year End 2029 | Pounds per Year Reduction Year End 2034 | Total |
|----------------------------------------------------------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-------|
| WWTF Effluent to 0.5 mg/LS                                                             |                                         | 750                                     |                                         |                                         | 750   |
| Implementation of CSAs identified (out of a total of 4,414 pounds per year identified) |                                         |                                         | 500                                     |                                         | 500   |
| Lake Improvements                                                                      |                                         | 100                                     | 100                                     | 100                                     | 300   |
| Streambank Stabilization                                                               | 100                                     |                                         | 100                                     | 100                                     | 300   |
| City of Oconomowoc MS4                                                                 | 75                                      | 150                                     | 150                                     | 375                                     | 750   |
| Total                                                                                  | 175                                     | 1000                                    | 850                                     | 575                                     | 2,600 |

The water quality milestone, noted in our AM permit, is achieving TP concentration at the confluence of the Oconomowoc River and the Rock River of less than or equal to 0.075 mg/L. The data will be assessed in accordance with the Wisconsin Consolidated Assessment and Listing Methodology. The OWPP's goal of meeting the water quality milestone within ten years is on track to be achieved. A TP concentration of 0.06 mg/L is an estimate concentration of where the grand median needs to be for the upper confidence limit to be at or below water quality criteria of 0.075 mg/L. TP concentrations at the confluence in 2023 and 2024 have been trending in compliance with the water quality interval target of 0.060 mg/L.

Various practices will be used in combination for the annual compliance check for load reductions per permit term. The most important practice will be the river monitoring program. The standard program will be used as the indicator. Non-official sampling at different times (e.g. a very wet period) or different places (e.g. a small stream feeding into the Oconomowoc River with a location not in Appendix B) will not be used for the load reduction assessment. Rather, this information will be used to ascertain how different weather patterns affect phosphorus transport through the watershed and the effectiveness of specific Management Measures.

Another important part of the program will involve status checks with partners in the agricultural community. Through the Farmer Leadership Group known as Farmers for Lake Country (FFLC), the OWPP has established a farmer peer-led audit system. The OWPP relies on this group to make advancement in the agricultural community. The leadership, knowledge, trust, and support from the farmers in lake country has led to great success. It is all partners involved intentions to keep the group supported and sustained for the foreseeable future. This type of compliance mechanism will promote trust rather than a top-down system. The farmer-led system will also help reduce the compliance checking effort of the City of Oconomowoc.

After the conclusion of the Adaptive Management (AM) period in 2035, the Oconomowoc Watershed Protection Program (OWPP) requests to continue to be a WPDES compliance strategy for improving and sustaining water quality in the Oconomowoc River Watershed. By focusing on additional reductions from nonpoint sources, the largest contributor to pollution in the watershed—the program will maintain its collaborative approach with local agricultural communities, municipalities, and stakeholders.

The OWPP will also prioritize maintaining or replacing reductions achieved through current and past projects, particularly those aimed at agricultural land management practices. Continuing cost-sharing initiatives will ensure that landowners are equipped to implement measures that support water quality. Together with targeted management efforts upstream and downstream of the treatment facility, these actions will drive long-term reductions in total phosphorus (TP) concentrations at the point of compliance.

The OWPP has already demonstrated success in reducing TP concentrations, particularly through adaptive management practices and the collaboration of local agricultural stakeholders. These efforts will continue to enhance water quality, ensuring the Oconomowoc River consistently meets water quality standards well beyond 2034.

In addition to addressing nonpoint source pollution, the Wisconsin Department of Natural Resources would support the OWPP by allowing the continued use of a 0.5 mg/L effluent phosphorus concentration limit as part of the compliance strategy.

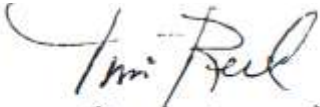
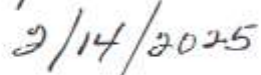
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This decision enables the city to balance improvements in nonpoint source pollution with manageable effluent limits, providing a flexible and cost-effective path to compliance.

The OWPP will also remain a valuable educational asset in the watershed. Through outreach programs, it will continue to engage the public and stakeholders, building support for long-term water quality improvements and helping ensure the continued success of the program.

Looking forward, the OWPP's ability to adapt to emerging challenges, combined with continued collaboration and funding, will ensure that nonpoint source control efforts remain effective. The program will also maintain its focus on cost-effective, sustainable strategies that deliver lasting environmental and community benefits. With these ongoing efforts, the OWPP will serve as a model of successful watershed management, helping to meet water quality goals in compliance with the Rock River Basin's Total Maximum Daily Load (TMDL) standards. The OWPP's commitment to innovation, collaboration, and stewardship will secure its role as a cornerstone of the city's water quality efforts beyond 2034.

The City of Oconomowoc understands that the OWPP is a long-term program that will continue for several more years or more and is fully committed to supporting this program.

Name:   
Title:   
Date: 

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September 5, 2025

Erik Joost, Watershed Coordinator  
Oconomowoc Wastewater Treatment Plant  
900 S. Worthington St.  
Oconomowoc, WI 53066

Subject: City of Oconomowoc (WPDES Permit No. WI-0021181)  
Adaptive Management Plan – Conditional Approval

Dear Mr. Joost:

The Wisconsin Department of Natural Resources (WDNR) has received the final draft of the Adaptive Management (AM) Plan. The plan was submitted on August 22, 2025, and included updates that were requested on July 3, 2025. The WDNR has reviewed the AM plan and has no additional comments at this time.

Based on the WDNR's review, the AM Plan is in general conformance with the WDNR Adaptive Management Guidance and requirements contained in s. NR 217.18, Wis. Adm. Code. The plan indicates that the City will utilize AM to comply with the effluent limitations for total phosphorus for their discharge from the City of Oconomowoc Wastewater Treatment Facility, Outfall 001, to the Oconomowoc River. Actions outlined in the AM plan involve nonpoint phosphorus reductions throughout the entire Oconomowoc River Watershed. For continued AM eligibility, phosphorus reductions undertaken by the City and various AM partners are expected to offset the WWTF's entire phosphorus loading to the Oconomowoc River, 4,194 lbs/year, within the second permit term. This value was listed in the last annual progress report and reflects the average annual loading of total phosphorus from the WWTF between October 1, 2020, and December 31, 2024.

The WDNR conditionally approves the AM Plan as a basis for phosphorus compliance during the next WPDES permit term. The WDNR has assigned the AM plan a tracking number of AM-2025-01 and will be referenced as such in the draft WPDES permit. The draft permit will contain an interim limit for phosphorus and reporting requirements consistent with s. NR 217.18, Wis. Adm. Code. The final AM plan will be included as part of the public notice package for permit reissuance, and final approval is subject to public comment and EPA review.

The WDNR appreciates your continued interest in watershed-based phosphorus compliance. If you have any questions or comments, please contact me at (414) 897-5723 or [nicholas.lent@wisconsin.gov](mailto:nicholas.lent@wisconsin.gov).

Thank you,

**Nick Lent**  
Wastewater Engineer  
Wisconsin Department of Natural Resources

e-CC: Tim Reel – City of Oconomowoc  
Sarah Donoughe – WDNR  
Matt Claucherty – WDNR