

# 2024 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT

## Norwich Wastewater Treatment Plant

### 1. GENERAL INFORMATION

Oxford County (the County) prepares a report summarizing wastewater treatment operation and treated effluent discharge quality for every municipal wastewater treatment plant (WWTP) annually. The reports detail the latest effluent quality testing results and quantity statistics, and any non-compliance conditions that may have occurred for the previous year. They are available for review by the end of March on the County website at <http://www.oxfordcounty.ca/waterwastewater> or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible.

If you have any questions or comments concerning the report, please contact the County at the address and phone number listed below or by email at [wastewater@oxfordcounty.ca](mailto:wastewater@oxfordcounty.ca).

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|   |                                     |
|---|-------------------------------------|
| <b>Wastewater Treatment Plant:</b>        | Norwich WWTP                        |
| <b>Wastewater Treatment Plant Number:</b> | 110001480                           |
| <b>Certificate of Approval (CofA):</b>    | 1680-6F6QR5 (August 31, 2005)       |
| <b>Reporting Period:</b>                  | January 1, 2024 – December 31, 2024 |

#### **Wastewater Treatment Plant Owner & Contact Information:**

Oxford County Public Works Department - Wastewater Services  
P.O. Box 1614  
21 Reeve Street  
Woodstock, ON N4S 7Y3  
**Telephone:** 519-539-9800  
**Toll Free:** 866-537-7778  
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## 1.1 System Description

The Norwich WWTP is a Class I facility as defined by Ontario Regulation (O.Reg.) 129/04. The Norwich WWTP is a lagoon wastewater treatment system serving the community of Norwich. The nominally separated wastewater collection system includes four (4) sewage pumping stations (SPS), 26.6 kilometers of sanitary gravity sewers, 4.5 kilometers of sanitary forcemain sewers and 0.6 kilometers of sanitary low-pressure sewers. The wastewater is pumped from the collection system to a splitter box; then to either of two lagoon cells as determined by the operator. Typically, the wastewater is directed to the North cell which is operated in series with the South cell, followed by filtering of the effluent through the sand filter beds performed for a period each day, as required. The lagoons may discharge year-round; however, the freezing period prevents discharge through the filter beds (normally December to April).

The system is maintained by licensed wastewater system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance with the regulations, and collect samples as required by the CofA. Alarms automatically notify operators in the event of failure of critical operational requirements.

The Norwich WWTP is located at Lot 7, Conc. 5, Norwich Township, Ontario, with the Facility description provided below:

|  |                              |
|--|------------------------------|
| <b>Facility</b>                        | Norwich WWTP                 |
| <b>Design Capacity</b>                 | 1,530 m <sup>3</sup> /d      |
| <b>2024 Average Daily Flow</b>         | 1,187 m <sup>3</sup> /d      |
| <b>2024 Maximum Daily Flow</b>         | 5,107 m <sup>3</sup> /d      |
| <b>2024 Total Volume of Wastewater</b> | 434,959 m <sup>3</sup> /year |

## 1.2 Major Expenses

In 2024, the Norwich WWTP had forecasted operating and maintenance expenditures of approximately \$572,000.

Planning for major wastewater system expenses is included within Oxford County's Wastewater Services Master Plan and managed according to our Asset Management and Capital Replacement Program. In addition to regular operational and maintenance expenditures, notable Capital Improvement Projects included:

- \$427,000 to develop Countywide SCADA Master Plan for all wastewater systems

## **2. SUMMARY AND INTERPRETATION OF MONITORING DATA**

### **2.1 Effluent Quality Assurance and Control Measures**

#### ***Sampling Procedure***

Influent samples are taken from the WWTP influent splitter box. The sampling frequency is once per week and samples are tested for Biochemical Oxygen Demand (BOD<sub>5</sub>), Total Suspended Solids (TSS) monthly, Total Phosphorus (TP), and Total Kjeldahl Nitrogen (TKN) weekly.

Effluent samples are taken using a 24-hour composite sampler set to take a sample every 15 minutes for the duration of the discharge period. BOD<sub>5</sub>, TKN and TSS are sampled at least monthly. TP, Total Ammonia Nitrogen (TAN), pH, and temperature samples are taken three times per week. E. coli and dissolved oxygen (DO) are tested at least weekly.

#### ***Laboratory and Field Testing***

Sample results that are used to determine the WWTP compliance are analyzed at a licensed laboratory. Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples for all parameters except for pH, temperature, and DO which are collected and analyzed in the field. Any information generated in-house is used in process control but is not included in this report.

### **2.2 WWTP Performance and Effluent Quality**

#### ***Final Effluent Compliance Limits***

Compliance limits are defined as the maximum effluent concentrations permitted for a given parameter set by the Ministry of Environment, Conservation and Parks (MECP). Compliance limits are detailed within each WWTP CofA. The limits are determined to prevent impairment to the receiving water body quality. The Owner is legally obligated to operate and maintain the treatment system to ensure the compliance limits are achieved.

The Norwich WWTP provided effective treatment in 2024, with 393 samples out of 395 meeting compliance, or 99% in compliance with all its regulatory limits for all effluent discharged from the WWTP:

In June, lagoon levels were low as the Spring discharge was almost complete. As a result, there was less dilution water available and a greater potential for short circuiting through the lagoons which resulted in a non-compliance related to effluent E. coli.

- The Effluent E. coli Monthly Geometric Mean Density Concentration in June was 212.4 colonies/100 mL, which exceeded the CofA Effluent E. coli Monthly Geometric Mean Density Concentration limit of 200 colonies/100mL.

Going forward, Operations staff plan to close the equalization valve between the primary and secondary lagoons earlier in the discharge season to reduce the risk of short circuiting.

The non-compliance was reported to the Ministry of Environment, Conservation and Parks (MECP) at the time of the event.

## Influent Streams and Effluent Streams

The operator measures pH of both the influent and effluent streams. There was no single pH result for the effluent outside the discharge limit of 6.0 to 9.5 in 2024.

In 2024, chlorine was not used at the Norwich WWTP.

There were no single sample un-ionized ammonia effluent results or monthly average un-ionized ammonia effluent results above the CofA limits in 2024.

Influent wastewater characteristics and effluent discharge values are presented in the tables below:

| Influent Wastewater Characteristics (annual average) |                      |                |
|--|----------------------|----------------|
| Parameter  | Concentration (mg/L) | Loading (kg/d) |
| BOD <sub>5</sub>                                     | 223                  | 265            |
| Total Suspended Solids                               | 281                  | 334            |
| Total Phosphorus                                     | 4.7                  | 5.6            |
| Total Kjeldahl Nitrogen                              | 43                   | 51             |

| Effluent Parameter                                  | Sample Frequency (when discharging) | CofA Effluent Limit (Monthly Average) (mg/L unless otherwise indicated) | Monthly Average Result Min-Max (mg/L unless otherwise indicated) | Percentage Removal |
|---|-------------------------------------|---|--|--------------------|
| Biochemical Oxygen Demand (BOD <sub>5</sub> )       | monthly                             | 10.0  | 4.0  | 98.2               |
| Total Suspended Solids (TSS)                        | monthly                             | 10.0  | 2.0 – 4.0  | 98.6 – 99.3        |
| Total Phosphorus (TP) (non-freezing period)*        | 3/week                              | 0.5   | 0.13 – 0.24  | 94.9 – 97.2        |
| Total Phosphorus (TP) (freezing period)*            | 3/week                              | 1.0   | 0.21   | 95.5               |
| Total Ammonia Nitrogen (TAN) (non-freezing period)* | 3/week                              | 3.0   | 0.1 – 0.5  | --                 |
| Total Ammonia Nitrogen (TAN) (freezing period)*     | 3/week                              | 5.0   | 2.2  | --                 |
| E. coli   | weekly                              | 200 colonies/100 mL (monthly Geometric Mean Density)                    | 8.4 – 212.4 colonies/100 mL (monthly Geometric Mean Density)     | --                 |
| Dissolved Oxygen (DO)                               | weekly                              | 4.0   | 6.0 – 8.8  | --                 |
| pH (any single sample)                              | 3/week                              | 6.0 - 9.5   | 6.5 – 7.6  | --                 |

| <b>Effluent Parameter</b>   | <b>Sample Frequency (when discharging)</b> | <b>CofA Effluent Limit (Monthly Average) (mg/L unless otherwise indicated)</b> | <b>Monthly Average Result Min-Max (mg/L unless otherwise indicated)</b> | <b>Percentage Removal</b> |
|---|--|--|---|---------------------------|
| Total Ammonia Nitrogen (any single sample) (non-freezing period)*   | 3/week                                     | 5.0  | 0.1 – 2.4   | --                        |
| Total Ammonia Nitrogen (any single sample) (freezing period)*   | 3/week                                     | 8.0  | 0.1 – 4.2   | --                        |
| Un-ionized Ammonia (any single sample)  |  | 0.2  | 0.001 – 0.018   | --                        |
| * Freezing period means the period of the year during which the water temperature of the receiving stream is equal to or below 5 degrees Celsius, normally from December 1 to April 30. In 2024, the non-freezing period was determined to be March 4 to November 29, as the temperature of the receiving stream was above 5 degrees Celsius. |  |  |   |                           |

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix 'A.'

### 2.3 Final Effluent Design Objectives

Final Effluent Design Objectives (objectives) are non-enforceable effluent quality values which the Owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily, before environmental impairment occurs and before the compliance limits are exceeded.

In 2024, there was only one monthly objective that was not met at the Norwich WWTP:

- The Effluent E. coli Monthly Geometric Mean Density Concentration objective of 150 colonies/100 mL in June

As the spring discharge was nearing completion, the lagoon levels were low. With less dilution water in the pond, there was greater risk of short circuiting within the lagoons. Operations will look to close valves between primary and secondary ponds sooner in the spring discharge period, to reduce the chance of short circuiting.

The following table presents the range of effluent discharge values vs. CofA Objectives:

| <b>Effluent Parameter</b> | <b>Sample Frequency (when discharging)</b> | <b>Monthly Average Objective Concentration (mg/L unless otherwise indicated)</b> | <b>Monthly Average Result Min-Max (mg/L unless otherwise indicated)</b> |
|---------------------------|--|--|---|
| BOD <sub>5</sub>          | monthly                                    | 5.0  | 4.0   |

| <b>Effluent Parameter</b>                     | <b>Sample Frequency (when discharging)</b> | <b>Monthly Average Objective Concentration (mg/L unless otherwise indicated)</b> | <b>Monthly Average Result Min-Max (mg/L unless otherwise indicated)</b> |
|---|--|--|---|
| TSS   | monthly                                    | 5.0  | 2.0 – 4.0   |
| TP (non-freezing period)*                     | 3/week                                     | 0.3  | 0.13 – 0.24   |
| TP (freezing period)*                         | 3/week                                     | 0.8  | 0.21  |
| Total Ammonia Nitrogen (non-freezing period)* | 3/week                                     | 2.0  | 0.1 – 0.5   |
| Total Ammonia Nitrogen (freezing period)*     | 3/week                                     | 4.0  | 2.2   |
| E. coli                                       | weekly                                     | 150 colonies/100 mL (monthly Geometric Mean Density)                             | 8.4 – 212.4 colonies/100 mL (monthly Geometric Mean Density)            |

\* Freezing period means the period of the year during which the water temperature of the receiving stream is equal to or below 5 degrees Celsius, normally from December 1 to April 30. In 2024, the non-freezing period was determined to be March 4 to November 29, as the temperature of the receiving stream was above 5 degrees Celsius.

Effluent monthly average concentration and monthly average loading objective exceedances in 2024 included the following:

| <b>Date</b> | <b>Parameter</b> | <b>Objective (mg/L unless otherwise indicated)</b>   | <b>Result (mg/L unless otherwise indicated)</b>        |
|-------------|------------------|--|--|
| June 2024   | E. coli          | 150 colonies/100 mL (monthly Geometric Mean Density) | 212.4 colonies/100 mL (monthly Geometric Mean Density) |

### **3. OVERFLOWS, BYPASSING, UPSETS, SPILLS, AND ABNORMAL CONDITIONS**

There were no overflows, bypasses, spills, or abnormal conditions at the Norwich WWTP in 2024.

There were no complaints received in 2024.

### **4. MAINTENANCE OF WORKS**

The operating and maintenance staff at the Norwich WWTP conducts regularly scheduled maintenance of the WWTP equipment. The Norwich WWTP utilizes a database, known as Cartegraph to issue work orders and maintain records for regular maintenance and repair at the Norwich WWTP.

### **5. MONITORING EQUIPMENT MAINTENANCE AND CALIBRATION**

The calibration of flow meters was conducted by JBF Controls Ltd. in accordance with the requirements of the CofA. The records are kept on-site at the Norwich WWTP.

All other operational monitoring equipment is calibrated by staff and records are kept on-site at the Norwich WWTP.

## **6. INSPECTION, PILOTS, AND TRIALS**

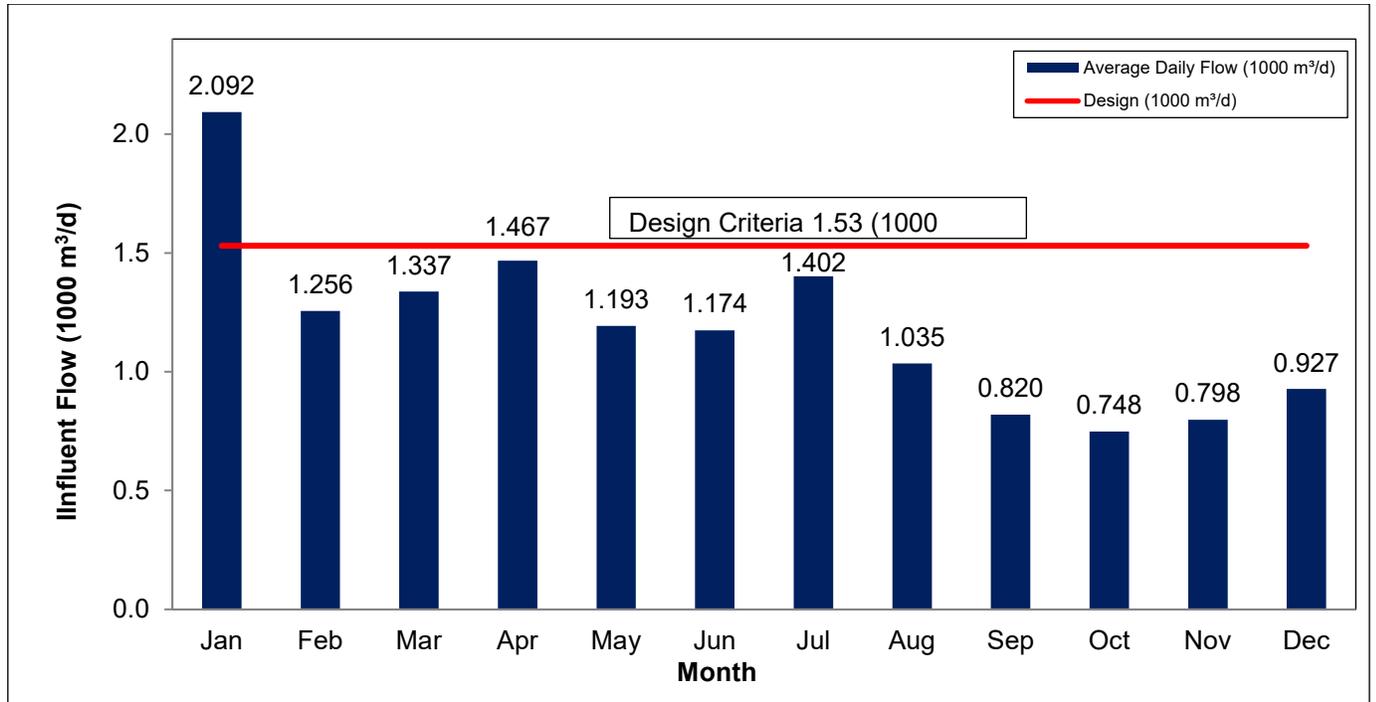
The MECP did not perform an inspection of the Norwich WWTP in 2024. The MECP inspections typically occur on a 3-year schedule.

### ***Municipal Class Environmental Assessment Study***

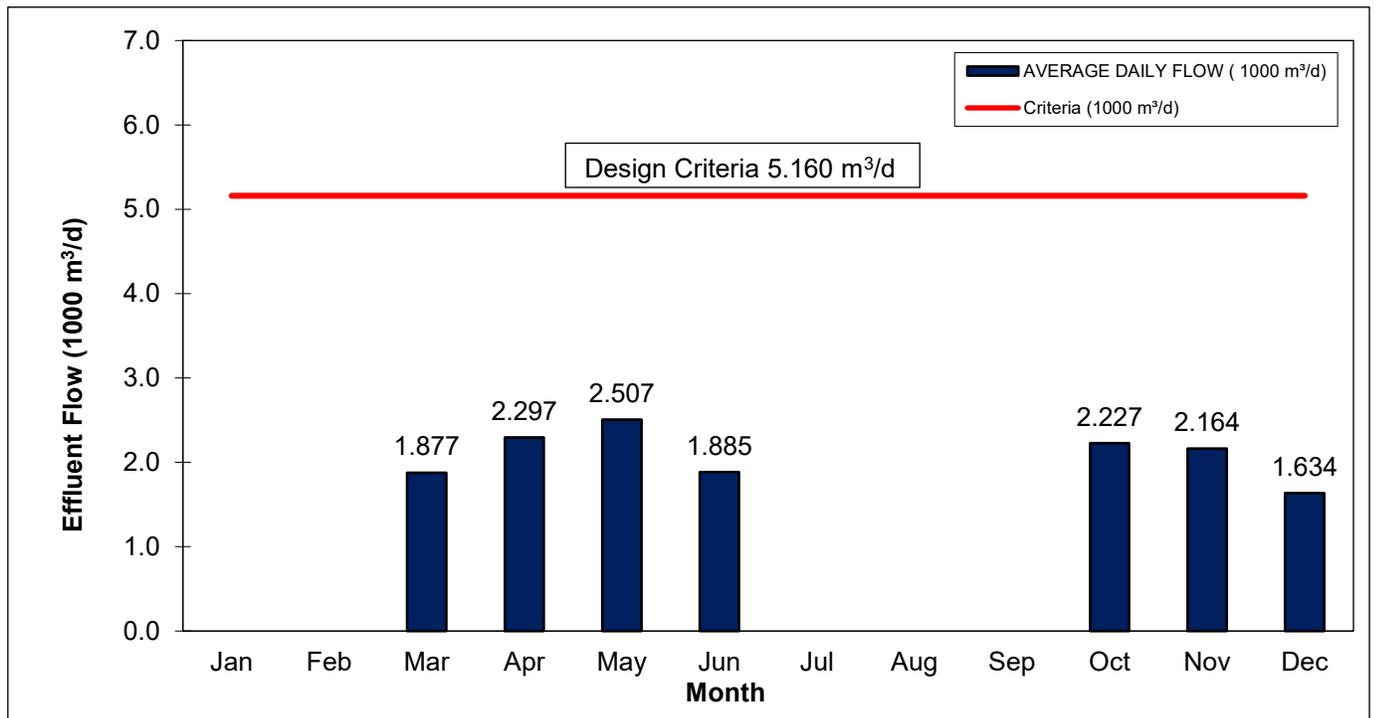
In response to approved future growth in the Township of Norwich, and associated projected increases in Norwich WWTP flow rates, the County re-initiated the Municipal Class EA Study for capacity expansion of the Norwich WWTP. This Study will determine the most cost-effective, environmentally sound, and sustainable approach to expanding the Norwich WWTP to meet the wastewater servicing needs of the community within the 25-year planning horizon. The Study is in Phase 4 of the EA process and is expected to be completed in the coming months.

## APPENDIX A: GRAPHS OF 2024 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS

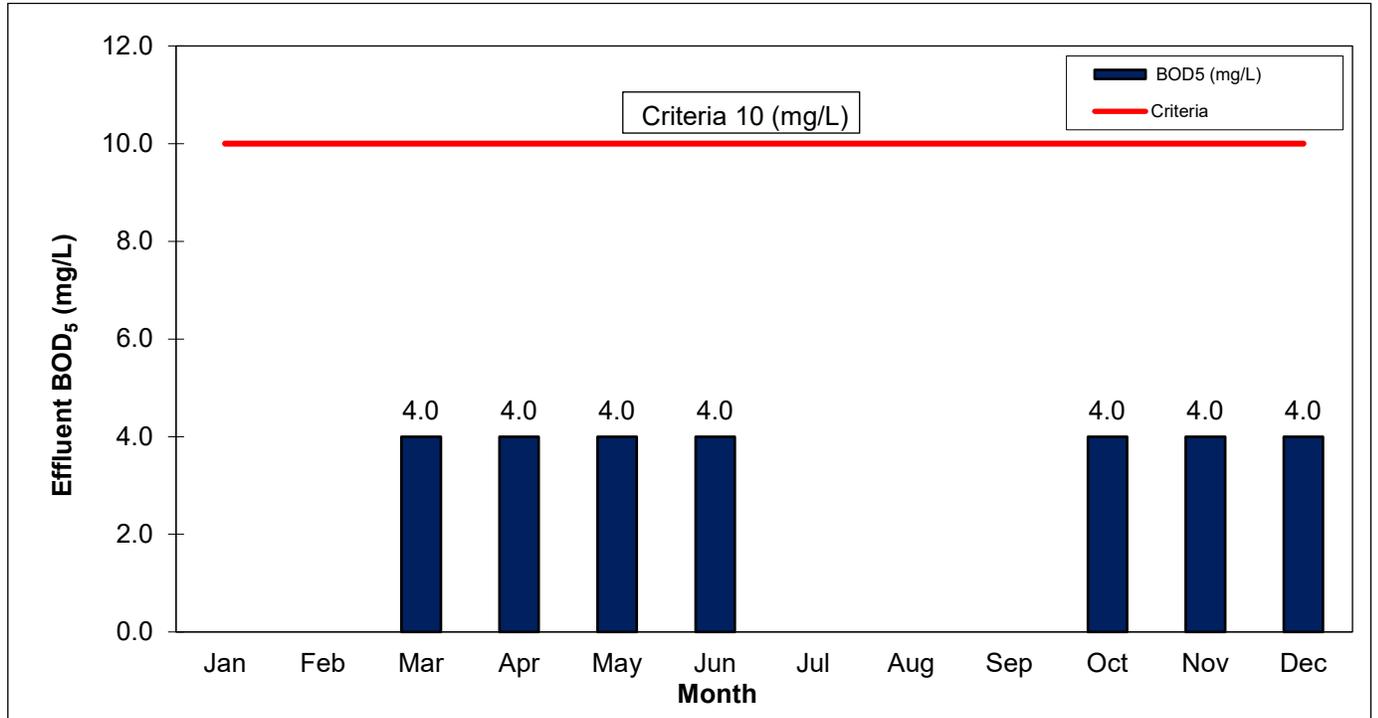
Norwich WWTP Influent, Monthly Average Daily Flow (1000 m<sup>3</sup>/d), 2024



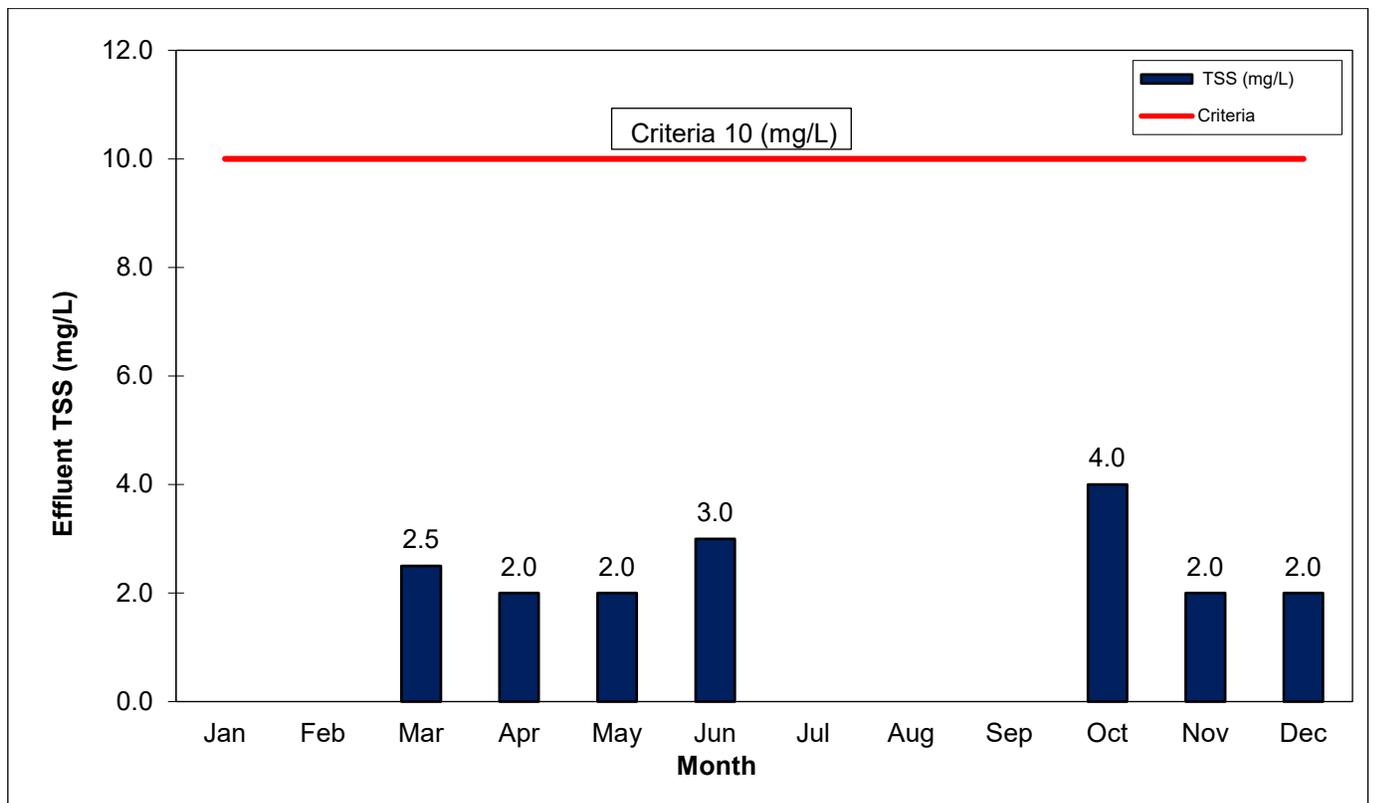
Norwich WWTP Effluent, Monthly Average Daily Flow (1000 m<sup>3</sup>/d), 2024



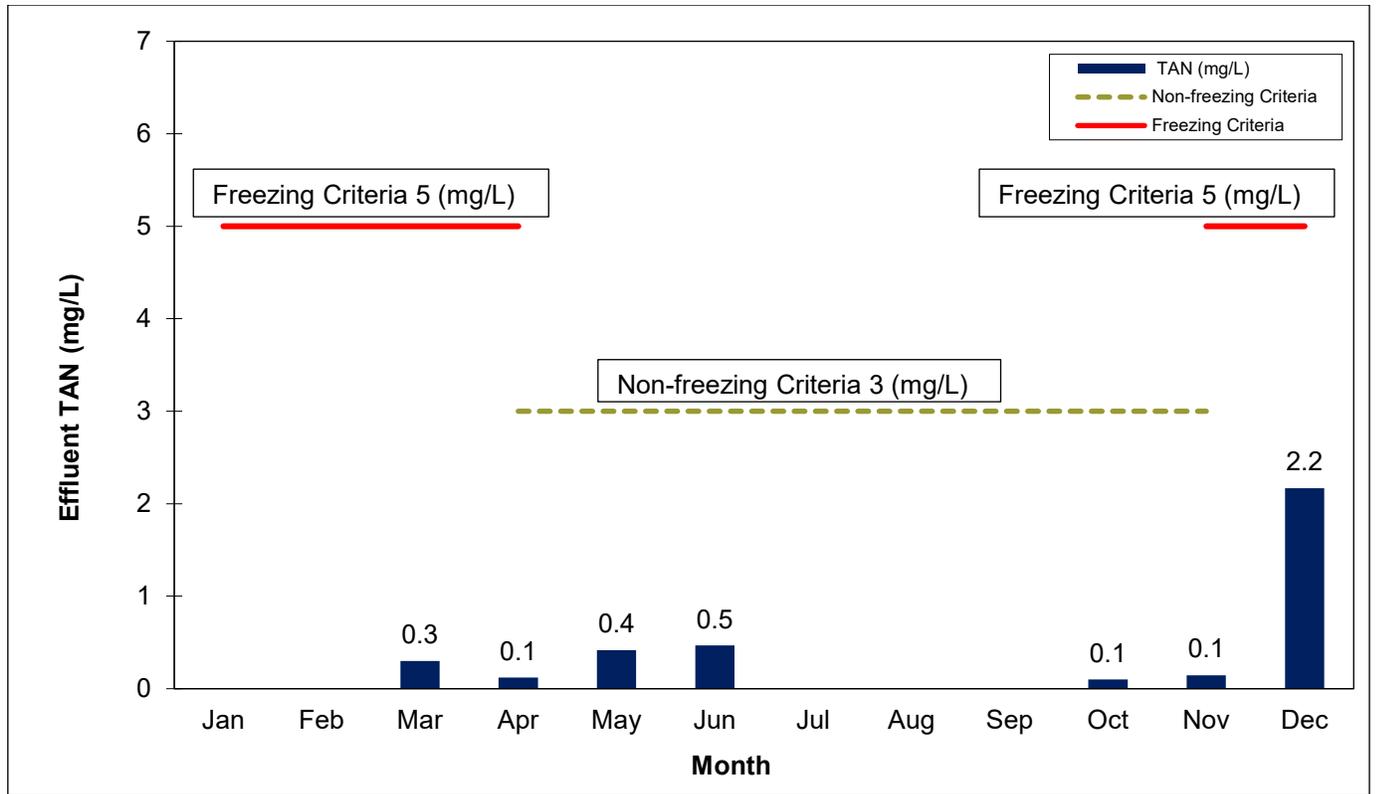
Norwich WWTP Effluent, Monthly Average BOD<sub>5</sub> (mg/L), 2024



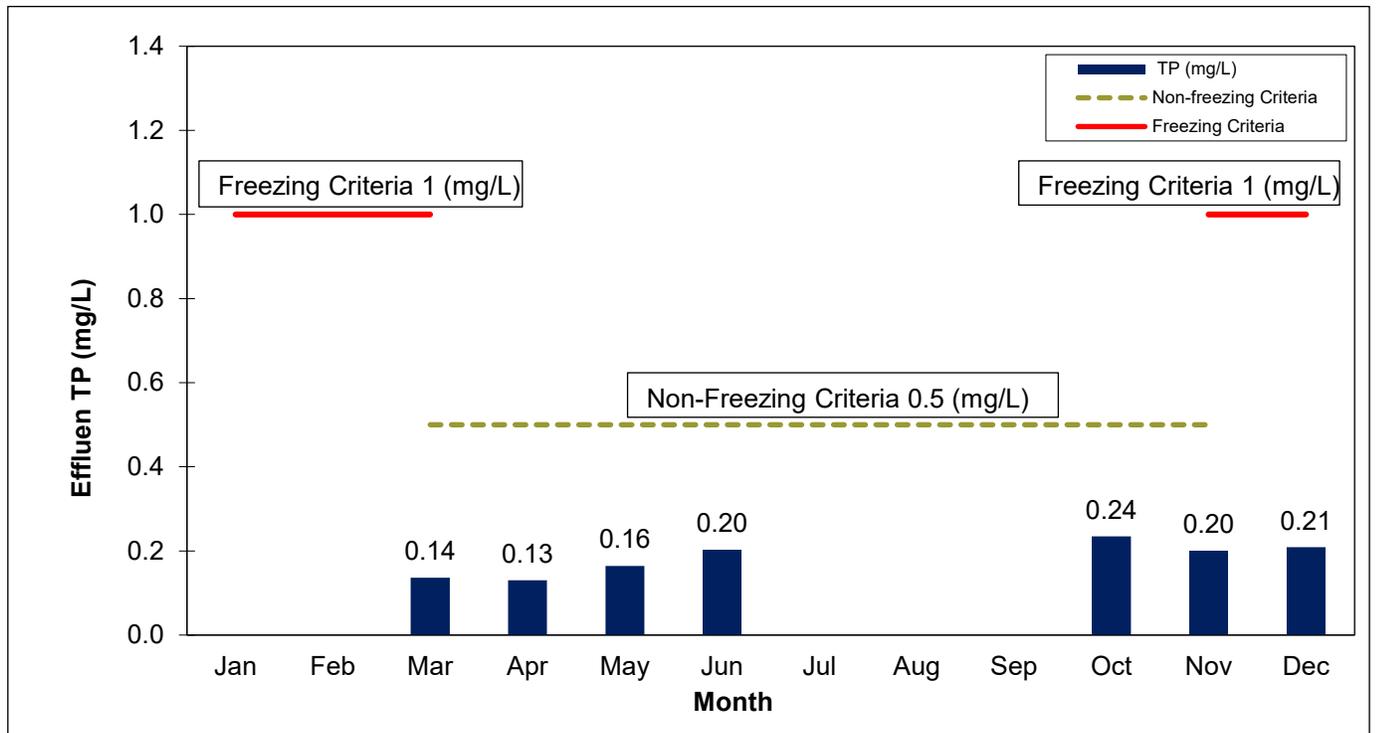
Norwich WWTP Effluent, Monthly Average TSS (mg/L), 2024



Norwich WWTP Effluent, Monthly Average TAN (mg/L), 2024



Norwich WWTP Effluent, Monthly Average TP (mg/L), 2024



Norwich WWTP Effluent, Monthly Geometric Mean Density E. coli (colonies/100 mL), 2024

