# Annual Environmental Report

# 2024

Tullamore

D0039-01

## CONTENTS

# 1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2024 AER

This Annual Environmental Report has been prepared for D0039-01, Tullamore, in Offaly in accordance with the requirements of the wastewater discharge licence for the agglomeration. Specified reports where relevant are included as an appendix to the AER.

## 1.1 ANNUAL STATEMENT OF MEASURES

A summary of any improvements undertaken is provided where applicable.

There were no capital works, significant changes or operational changes undertaken in 2024.

## 1.2 TREATMENT SUMMARY

The agglomeration is served by a wastewater treatment plant(s)

- Tullamore WWTP with a Plant Capacity PE of 45000, the treatment type is 3P - Tertiary P removal.

## 1.3 ELV OVERVIEW

The overall compliance of the final effluent with the Emission Limit Values (ELVs) is shown below. More detailed information on the below ELV's can be found in Section 2.

| Discharge Point Reference | Treatment Plant | Discharge Type | Compliance Status | Parameters failing if relevant |
|---|---|---|---|---|
| **TPEFF2500D0039SW001** | Tullamore WWTP | Treated | Non-Compliant | Ammonia-Total (as N) mg/l<br>ortho-Phosphate (as P) - unspecified mg/l<br>Total Phosphorus (as P) mg/l |

## 1.4 LICENCE SPECIFIC REPORTING

| Assessment / Report |
| --- |
| **There are no Licence Specific Reports included in this AER.** |

# 2 TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY

## 2.1 TULLAMORE WWTP - TREATED DISCHARGE

### 2.1.1 INFLUENT MONITORING SUMMARY - TULLAMORE WWTP

A summary of influent monitoring for the treatment plant is presented below. This monitoring is primarily undertaken in order to determine the overall efficiency of the plant in removing pollutants from the raw wastewater.

| Parameters | Number of Samples | Annual Max | Annual Mean |
|---|---|---|---|
| **Suspended Solids mg/l** | 12 | 1557 | 484 |
| **Total Phosphorus (as P) mg/l** | 12 | 19 | 6.10 |
| **pH pH units** | 12 | 7.81 | 7.48 |
| **COD-Cr mg/l** | 12 | 2434 | 830 |
| **ortho-Phosphate (as P) - unspecified mg/l** | 12 | 12 | 4.02 |
| **Total Nitrogen mg/l** | 12 | 142 | 48 |
| **Ammonia-Total (as N) mg/l** | 12 | 53 | 29 |
| **BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l** | 12 | 1199 | 336 |
| **Hydraulic Capacity** | N/A | 16550 | 5903 |

If other inputs in the form of sludge / leachate are added to the WWTP then these are included in Section 2.1.5 if applicable.

## Significance of Results:

The annual mean hydraulic loading is less than the peak Treatment Plant Capacity. The annual maximum hydraulic loading is less than the peak Treatment Plant Capacity. Further details on the plant capacity and efficiency can be found under the sectional 'Operational Performance Summary'.

## 2.1.2 EFFLUENT MONITORING SUMMARY - TPEFF2500D0039SW001

| Parameter | WWDL ELV (Schedule A) | ELV with Condition 2 Interpretation included Note 1 | Interim % reduction from influent concentration | Number of sample results | Number of exceedances | Number of exceedances with Condition 2 Interpretation included | Annual Mean | Overall Compliance (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|
| **COD-Cr mg/l** | 125 | 250 | N/A | 12 | N/A | N/A | 24 | Pass |
| **Suspended Solids mg/l** | 15 | 37.5 | N/A | 12 | N/A | N/A | 5.58 | Pass |
| **pH pH units** | 6 | 9 | N/A | 12 | N/A | N/A | 7.67 | Pass |
| **BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l** | 8 | 16 | N/A | 12 | N/A | N/A | 1.82 | Pass |
| **Ammonia-Total (as N) mg/l** | 0.5 | 1 | N/A | 12 | 2 | 1 | 0.239 | Fail |
| **Total Phosphorus (as P) mg/l** | 0.5 | 0.6 | N/A | 12 | 1 | 1 | 0.236 | Fail |
| **ortho-Phosphate (as P) - unspecified mg/l** | 0.25 | 0.5 | N/A | 12 | 3 | 1 | 0.162 | Fail |

| Parameter | WWDL ELV (Schedule A) | ELV with Condition 2 Interpretation included Note 1 | Interim % reduction from influent concentration | Number of sample results | Number of exceedances | Number of exceedances with Condition 2 Interpretation included | Annual Mean | Overall Compliance (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|
| **Total Nitrogen mg/l** | N/A | N/A | N/A | 12 | N/A | N/A | 33 | |
| **Nitrite (as N) mg/l** | N/A | N/A | N/A | 12 | N/A | N/A | 0.104 | |
| **Conductivity @20°C µS/cm** | N/A | N/A | N/A | 12 | N/A | N/A | 1478 | |
| **Nitrate (as N) mg/l** | N/A | N/A | N/A | 12 | N/A | N/A | 28 | |

Notes:
1 – This represents the Emission Limit Values after the Interpretation provided for under Condition 2 of the licence is applied
2 – For pH the WWDA specifies a range of pH 6 - 9

## Cause of Exceedance(s):

**Dosing pump failure or maintenance at WWTP & Inadequate Operational Procedures/Training.**

## Significance of Results:

The WWTP is non-compliant with the ELV's set in the Waste Water Discharge Licence. The impact in receiving waters is assessed further in Section 2.

## 2.1.3 AMBIENT MONITORING SUMMARY FOR THE TREATMENT PLANT DISCHARGE TPEFF2500D0039SW001

A summary of monitoring from ambient monitoring points associated with the wastewater discharge is provided in the sections below. For discharges to rivers upstream (U/S) and downstream (D/S) location data is provided. For other ambient points in lakes, coastal or transitional waters, monitoring data from the most appropriate monitoring station is selected.

The table below provides details of ambient monitoring locations and details of any designations as sensitive areas.

| Ambient Monitoring Point from WWDL (or as agreed with EPA) | Irish Grid Reference | River Station Code | Bathing Water | Drinking Water | FWPM | Shellfish | WFD Ecological Status |
|---|---|---|---|---|---|---|---|
| **Upstream** | 233276, 224875 | RS25T030300 | No | No | No | No | Poor |
| **Downstream** | 229513, 225049 | RS25T030400 | No | No | No | No | Moderate |

The results for ambient results and / or additional monitoring data sets are included in the **Appendix 7.1 - Ambient monitoring summary.**

### Significance of Results:

The WWTP discharge was not compliant with the ELV's set in the wastewater discharge licence.

The ambient monitoring results do not meet the required EQS at the upstream and the downstream monitoring locations. The EQS relates to the Oxygenation and Nutrient Conditions set out in the Surface Water Regulations 2009.

Based on ambient monitoring results a deterioration in BOD concentrations downstream of the effluent discharge is noted.

A deterioration in water quality has been identified, however it is not known if it or is not caused by the WWTP.

As per the 3rd Cycle Lower Shannon (Brosna) Catchment Report (HA 25A), the significant pressure on the At Risk Tullamore_040 waterbody is Urban Runoff.

The discharge from the wastewater treatment plant does not have an observable negative impact on the Water Framework Directive status.

## 2.1.4 OPERATIONAL PERFORMANCE SUMMARY - TULLAMORE WWTP

### *2.1.4.1 Treatment Efficiency Report - Tullamore WWTP*

Treatment efficiency is based on the removal of key pollutants from the influent wastewater by the treatment plant. In essence the calculation is based on the balance of load coming into the plant versus the load leaving the plant. The efficiency is presented as a percentage removal rate.

A summary presentation of the efficiency of the treatment process including information for all the parameters specified in the licence is included below:

| Parameter | Influent mass loading (kg/year) | Effluent mass emission (kg/year) | Efficiency (% reduction of influent load) |
|---|---|---|---|
| **cBOD** | 772483 | 4188 | 99 |
| **SS** | 1111741 | 12806 | 99 |
| **TP** | 14018 | 541 | 96 |
| **COD** | 1906187 | 56070 | 97 |
| **TN** | 110244 | 76442 | 31 |

Note: The above data is based on sample results for the number of dates reported.

### 2.1.4.2 Treatment Capacity Report Summary - Tullamore WWTP

Treatment capacity is an assessment of the hydraulic (flow) and organic (the amount of pollutants) load a treatment plant is designed to treat versus the current loading of that plant.

| Tullamore WWTP | |
|---|---|
| **Peak Hydraulic Capacity ($m^3$/day) - As Constructed** | 33000 |
| **DWF to the Treatment Plant ($m^3$/day)** | 11000 |
| **Current Hydraulic Loading - annual max ($m^3$/day)** | 16550 |
| **Average Hydraulic loading to the Treatment Plant ($m^3$/day)** | 5903 |
| **Organic Capacity (PE) - As Constructed** | 45000 |
| **Organic Capacity (PE) - Collected Load (peak week)[Note1]** | 27459 |
| **Organic Capacity (PE) - Remaining** | 17541 |
| **Will the capacity be exceeded in the next three years? (Yes/No)** | No |

Nominal design capacities can be based on conservative design principles. In some cases assessment of existing plants has shown organic capacities significantly higher than the nominal design capacity. Accordingly plants that appear to be overloaded when comparing a collected peak load with the nominal design capacity can be fully compliant due to the safety factors in the original design.

## 2.1.5 SLUDGE / OTHER INPUTS - TULLAMORE WWTP

'Other inputs' to the waste water treatment plant are summarised in table below

| Input type | Quantity | Unit | P.E. | % of load to WWTP | Included in Influent Monitoring (Y/N)? | Is there a leachate/sludge acceptance procedure for the WWTP? | Is there a dedicated leachate/sludge acceptance facility for the WWTP? (Y/N) |
|---|---|---|---|---|---|---|---|
| **Landfill Leachate (delivered by tanker)** | 2262.54 | Volume (m3) | 27.55 | 0.11 | Yes | Yes | Yes |
| **Domestic /Septic Tank Sludge** | 25497 | Weight (Tonnes) | 310.1 | 1.18 | Yes | Yes | Yes |
| **Other** | 23369.4 | Weight (Tonnes) | 284.6 | 1.1 | Yes | Yes | Yes |
| **Other** | 3764 | Weight (Tonnes) | 45.83 | 0.17 | Yes | Yes | Yes |

# 3 COMPLAINTS AND INCIDENTS

## 3.1 COMPLAINTS SUMMARY

A summary of complaints of an environmental nature related to the discharge(s) to water from the WWTP and network is included below.

| Number of Complaints | Nature of Complaint | Number Open Complaints | Number Closed Complaints |
|---|---|---|---|
| **There were no relevant environmental complaints in 2024.** | | | |

## 3.2 REPORTED INCIDENTS SUMMARY

Environmental incidents that arise in an agglomeration are reported on an on-going basis in accordance with our waste water discharge licences. Where an incident occurs and it is reportable under the licence, it is reported to the Environmental Protection Agency through their Environmental Data Exchange Network, or in some instances by telephone. Some incidents which arise in the agglomeration are recorded by Uisce Éireann but may not be reportable under our licence for example where the incident does not have an impact on environmental performance.

A summary of reported incidents is included below.

### 3.2.1 SUMMARY OF INCIDENTS

| Incident Type | Cause | Recurring (Y/N) | Closed (Y/N) |
|---|---|---|---|
| **Breach of ELV** | Dosing pump failure or maintenance at WWTP | Yes | Yes |
| **Breach of ELV** | Inadequate Operational Procedures/Training | Yes | Yes |

## 3.2.2 SUMMARY OF OVERALL INCIDENTS

| Question | Answer |
|---|---|
| **Number of Incidents in 2024** | 2 |
| **Number of Incidents reported to the EPA via EDEN in 2024** | 2 |
| **Explanation of any discrepancies between the two numbers above** | N/A |

# 4 INFRASTRUCTURAL ASSESSMENTS AND PROGRAMME OF IMPROVEMENTS

## 4.1 STORM WATER OVERFLOW IDENTIFICATION AND INSPECTION REPORT

A summary of the operation of the storm water overflows and their significance where known is included below:

### 4.1.1 SWO IDENTIFICATION

| WWDL Name / Code for Storm Water Overflow (chamber) where applicable | Irish Grid Ref. (outfall) | Included in Schedule of the WWDL | Significance of the overflow(High / Medium / Low) | Assessed against DoEHLG Criteria | No. of times activated in 2024 (No. of events) | Total volume discharged in 2024 ($m^3$) | Monitoring Status |
|---|---|---|---|---|---|---|---|
| **SW002** | 232859, 224820 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| **SW003** | 235074, 225080 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| **SW004** | 233175, 226540 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| **SW005** | 233238, 224887 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| **SW007** | 233445, 224836 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| **SW010** | 234224, 224931 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |

| WWDL Name / Code for Storm Water Overflow (chamber) where applicable | Irish Grid Ref. (outfall) | Included in Schedule of the WWDL | Significance of the overflow(High / Medium / Low) | Assessed against DoEHLG Criteria | No. of times activated in 2024 (No. of events) | Total volume discharged in 2024 ($m^3$) | Monitoring Status |
|---|---|---|---|---|---|---|---|
| **TBC** | TBC | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| **TBC** | 233756, 225070 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| **TBC** | 234691, 223785 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| **TBC** | 233045, 224853 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |

The contents presented in this table include the most up to date information available at the time of writing. Any TBC SWO(s) were identified as part of the on-going National SWO programme and will be updated in subsequent AER(s) once the information is confirmed.

| SWO Summary | |
|---|---|
| **How much wastewater discharge by metered SWOs during the year ($m^3$)?** | Unknown |
| **Is each SWO identified as not meeting DoEHLG Guidance included in the Programme of Improvements?** | N/A |
| **The SWO Assessment included the requirements of relevant of WWDL schedules?** | Yes |
| **Have the EPA been advised of any additional SWOs / changes to Schedule C3 and A4 under Condition 1.7?** | No |

## 4.2 REPORT ON PROGRESS MADE AND PROPOSALS BEING DEVELOPED TO MEET THE IMPROVEMENT PROGRAMME REQUIREMENTS

### 4.2.1 SPECIFIED IMPROVEMENT PROGRAMME SUMMARY

A wastewater discharge licence may require a number of reports on specific subject areas to be prepared for the agglomeration in question. These reports are submitted to the EPA as part of the Annual Environmental Report. This section provides a list of the various reports required for this agglomeration and a brief summary of their recommendations.

| Specified Improvement Programmes (under Schedule A and C of WWDL) | Description | Licence Schedule | Licence Completion Date | Date Expired? (N/NA/Y) | Status of Works | Timeframe for Completing the Work | Comments |
|---|---|---|---|---|---|---|---|
| **D0039-SIP:01** | Construction of the proposed secondary discharge outfall to the Clodiagh River for p.e. in excess of 30,000, and not greater than 15,000 | C | 01/01/2012 | Yes | Not Started | | |
| **D0039-SIP:02** | De-commissioning of secondary discharge SW14 (SW002) | C | 01/01/2014 | Yes | Works Completed | | |
| **D0039-SIP:03** | De-commissioning of SW003 storm water overflow | C | 01/01/2012 | Yes | Works Completed | | |
| **D0039-SIP:04** | De-commissioning of SW004 storm water overflow | C | 01/01/2014 | Yes | Works Completed | | |
| **D0039-SIP:05** | De-commissioning of SW005 storm water overflow | C | 01/01/2012 | Yes | Works Completed | | |

| Specified Improvement Programmes (under Schedule A and C of WWDL) | Description | Licence Schedule | Licence Completion Date | Date Expired? (N/NA/Y) | Status of Works | Timeframe for Completing the Work | Comments |
|---|---|---|---|---|---|---|---|
| **D0039-SIP:06** | De-commissioning of SW007 storm water overflow | C | 01/01/2014 | Yes | Works Completed | | |
| **D0039-SIP:07** | Discharge to cease: SW003 to Tullamore River | A | 01/01/2012 | Yes | Works Completed | | |
| **D0039-SIP:08** | Discharge to cease: SW004 to Tullamore River | A | 01/01/2014 | Yes | Works Completed | | |
| **D0039-SIP:09** | Discharge to cease: SW005 to Tullamore River | A | 01/01/2012 | Yes | Works Completed | | |
| **D0039-SIP:10** | Installation of storm water storage tank at the inlet of the works | C | 01/01/2012 | Yes | Works Completed | | |
| **D0039-SIP:11** | SW002 to Tullamore River to be discontinued (formerly SW14) | A | 01/01/2014 | Yes | Works Completed | | |
| **D0039-SIP:12** | SW007 to Tullamore River to be discontinued | A | 01/01/2014 | Yes | Works Completed | | |
| **D0039-SIP:13** | Upgrade of the existing WWTP including the installation of storm water storage tank at the inlet of the works | C | 01/01/2012 | Yes | Works Completed | | |
| **D0039-SIP:14** | Upgrading of SW10 to comply with DoE criteria for SWOs. | C | 01/01/2014 | Yes | Works Completed | | |

A summary of the status of any other improvements identified by under Condition 5 assessments- is included below.

## 4.2.2 IMPROVEMENT PROGRAMME SUMMARY

| Improvement Identifier | Improvement Description / or any Operational Improvements | Improvement Source | Expected Completion Date | Comments |
|---|---|---|---|---|
| **No additional improvements planned at this time.** | | | | |

## 4.2.3 SEWER INTEGRITY RISK ASSESSMENT

The utilisation of multiple capital maintenance programmes and the outputs of the workshops with the Local Authority Operations Staff held under the programme can be used to satisfy the requirements of Condition 5 regarding network integrity. Improvement works identified by way of these programmes and workshops will be included in the Improvements Summary Tables 4.2.1 and 4.2.2.

# 5 LICENCE SPECIFIC REPORTS

A wastewater discharge licence may require a number of reports on specific subject areas to be prepared for the agglomeration in question. These reports are submitted to the EPA as part of the Annual Environmental Report. This section provides a list of the various reports required for this agglomeration and a brief summary of their recommendations.

| Licence Specific Report | Required by licence | Included in this AER |
|---|---|---|
| **D0039-01-Priority Substances Assessment** | Yes | No |

# 6 CERTIFICATION AND SIGN OFF

## 6.1 SUMMARY OF AER CONTENTS

| Parameter | Answer |
|---|---|
| **Does the AER include an Executive Summary?** | Yes |
| **Does the AER include an assessment of the performance of the Waste Water Works (i.e. have the results of assessments been interpreted against WWDL requirements and or Environmental Quality Standards)?** | Yes |
| **Is there a need to advise the EPA for Consideration of a Technical Amendment/Review of the Licence?** | No |
| **List reason e.g. additional SWO identified** | N/A |
| **Is there a need to request/advise the EPA of any modification to the existing WWDL with respect to condition 4 changes to monitoring location, frequency etc** | Yes |
| **List reason e.g. changes to monitoring requirements** | Ambient Monitoring Location Changes |
| **Have these processes commenced?** | No |
| **Are all outstanding reports and assessments from previous AERs included as an appendix to this AER** | N/A |

I certify that the information given in this Annual Environmental Report is truthful, accurate and complete:

Date: 26/04/2025

This AER has been produced by Uisce Éireann's Environmental Information System (EIMS) and has been electronically signed off in that system for and on behalf of,

Eleanor Roche

Head of Environmental Regulation.

# 7 APPENDIX

| Appendix |
| --- |
| **Appendix 7.1 - Ambient monitoring summary** |

# Tullamore Ambient Monitoring Summary 2024

| Ambient Monitoring Point from WWDL (or as agreed with EPA) | Irish National Grid Reference (Easting, Northing) | EPA Feature Coding Tool code | Receiving Waters Designation (Yes/No) | | | |
|---|---|---|---|---|---|---|
| | | | Bathing Water | Drinking Water | FWPM | Shellfish |
| Upstream Monitoring Point | 233276, 224875 | RS25T030300 | No | No | No | No |
| Downstream Monitoring Point | 229513, 225049 | RS25T030400 | No | No | No | No |

| Ambient Monitoring Point from WWDL (or as agreed with EPA) | Current WFD Status | cBOD | o-Phosphate (as P) | Ammonia (as N) |
|---|---|---|---|---|
| Upstream Monitoring Point | Poor | 1.566 | 0.047 | 0.1614 |
| Downstream Monitoring Point | Moderate | 1.735 | 0.033 | 0.0684 |
| *Difference* | | *0.169* | *-0.014* | *-0.093* |
| EQS | | 1.500 | 0.035 | 0.065 |
| % of EQS | | 11.246% | -40.493% | -142.992% |

# Ambient Monitoring Data 2024

| Station | Sample Date | Temp | pH | BOD | COD | Suspended solids | Total Nitrogen as N | Total Phosphorus as P | Total Ammonia as N | Ortho-Phosphate as P | Nitrite as N | Nitrate as N | Conductivity | DO | DO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Degrees C | pH units | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | µS/m | mg/l | % sat |
| Upstream | 18/01/2024 | 3.8 | 8.01 | 1.7 | 23 | 7.5 | 7.7 | 0.032 | 0.074 | 0.015 | 0.018 | 4.257 | 691 | 12.16 | 93.1 |
| Upstream | 14/03/2024 | 9.1 | 7.76 | 1.9 | 33 | 27 | 2.9 | 0.075 | 0.063 | 0.065 | 0.054 | 2.207 | 571 | 10.2 | 91.4 |
| Upstream | 25/03/2024 | 11.1 | 8.21 | < 1 | 32 | 36.2 | 3.3 | < 0.1 | 0.045 | < 0.02 | 0.015 | 2.3 | 622 | 11 | 90.1 |
| Upstream | 26/03/2024 | 10.2 | 8.21 | 7.5 | 43 | 29.2 | 4.4 | 0.28 | 1.5 | 0.25 | 0.023 | 2.7 | 648 | 11.1 | 92.1 |
| Upstream | 17/04/2024 | 9 | 7.98 | < 1 | 28 | 2.5 | 2.9 | 0.036 | 0.039 | 0.018 | 0.008 | 2.756 | 694 | 10.31 | 89.5 |
| Upstream | 15/05/2024 | 13.4 | 8.05 | < 1 | < 20 | < 2.5 | 4.1 | 0.119 | < 0.02 | 0.104 | 0.013 | 2.631 | 691 | 9.85 | 96.3 |
| Upstream | 11/06/2024 | 14 | 7.99 | 1.4 | < 20 | < 2.5 | 5.5 | 0.016 | < 0.02 | < 0.006 | 3.082 | 0.013 | 674 | 10.89 | 105.7 |
| Upstream | 18/07/2024 | 15.8 | 7.91 | < 1 | < 20 | < 2.5 | 2.41 | 0.027 | < 0.02 | 0.014 | 2.217 | 0.019 | 654 | 8.24 | 83.4 |
| Upstream | 22/08/2024 | 14.6 | 7.9 | < 1 | < 20 | 4 | 2.49 | 0.04 | 0.15 | 0.029 | 0.052 | 2.012 | 668 | 7.73 | 77.5 |
| Upstream | 12/09/2024 | 11.4 | 7.96 | < 1 | < 20 | 5.5 | 2.22 | 0.033 | < 0.02 | 0.015 | 0.012 | 1.772 | 645 | 9.52 | 88.2 |
| Upstream | 24/10/2024 | 11.7 | 7.89 | < 1 | < 20 | < 2.5 | 1.69 | 0.036 | < 0.02 | 0.025 | 0.01 | 1.297 | 694 | 8.35 | 78.2 |
| Upstream | 19/11/2024 | 7.3 | 7.88 | 2.2 | 37 | 8 | 2.32 | 0.078 | 0.081 | 0.04 | 0.015 | 2.194 | 637 | 9.33 | 79 |
| Upstream | 11/12/2024 | 6.9 | 7.7 | < 1 | 27 | < 2.5 | 3.27 | 0.758 | 0.075 | 0.019 | 0.022 | 2.621 | 717 | 9.11 | 76.3 |
| | **Mean** | **10.638** | **7.958** | **1.566** | **23.681** | **9.903** | **3.477** | **0.123** | **0.161** | **0.047** | **0.426** | **2.060** | **662.000** | **9.830** | **87.754** |
| | **95%ile** | **15.080** | **8.210** | **4.320** | **39.400** | **32.000** | **6.380** | **0.471** | **0.690** | **0.162** | **2.563** | **3.356** | **703.200** | **11.524** | **100.060** |

| Station | Sample Date | Temp | pH | BOD | COD | Suspended solids | Total Nitrogen as N | Total Phosphorus as P | Total Ammonia as N | Ortho-Phosphate as P | Nitrite as N | Nitrate as N | Conductivity | DO | DO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Degrees C | pH units | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | µS/m | mg/l | % sat |
| Downstream | 18/01/2024 | 4.9 | 7.8 | 2.1 | < 20 | 11 | 7.6 | 0.035 | 0.062 | 0.014 | 0.028 | 5.383 | 732 | 11.87 | 93.5 |
| Downstream | 14/03/2024 | 9.4 | 7.72 | 2 | 30 | 29 | 3.2 | 0.067 | 0.048 | 0.065 | 0.03 | 2.771 | 605 | 10.2 | 91.5 |
| Downstream | 25/03/2024 | 10.1 | 8.14 | 8.1 | 41 | 41.6 | 4.1 | 0.12 | 0.044 | 0.038 | 0.023 | 2.7 | 651 | 12.1 | 89.1 |
| Downstream | 26/03/2024 | 10.3 | 8.26 | 2.7 | 34 | 25.6 | 3.4 | < 0.1 | 0.28 | < 0.02 | 0.015 | 2.3 | 620 | 11.2 | 92.2 |
| Downstream | 17/04/2024 | 9.2 | 7.84 | < 1 | 25 | 5 | 3.2 | 0.034 | 0.026 | 0.017 | 0.007 | 2.88 | 693 | 9.64 | 84.1 |
| Downstream | 15/05/2024 | 13.8 | 7.77 | < 1 | < 20 | < 2.5 | 8.9 | 0.061 | 0.025 | 0.048 | 0.017 | 6.363 | 779 | 9.4 | 92.5 |
| Downstream | 11/06/2024 | 13.6 | 7.76 | 1.3 | < 20 | < 2.5 | 9.2 | 0.057 | 0.217 | 0.035 | 7.766 | 0.099 | 817 | 11.82 | 113.7 |
| Downstream | 18/07/2024 | 15.1 | 7.8 | < 1 | < 20 | < 2.5 | 6.3 | 0.054 | < 0.02 | 0.043 | 6.125 | 0.041 | 754 | 8.08 | 80.7 |
| Downstream | 22/08/2024 | 14.3 | 7.62 | < 1 | < 20 | < 2.5 | 4.7 | 0.05 | 0.025 | 0.039 | 0.024 | 4.494 | 798 | 7.41 | 73.7 |
| Downstream | 12/09/2024 | 12.6 | 7.82 | < 1 | < 20 | 3 | 7.86 | 0.046 | < 0.02 | 0.026 | 0.012 | 7.362 | 807 | 9.31 | 88.3 |
| Downstream | 24/10/2024 | 12.3 | 7.65 | < 1 | < 20 | 2.5 | 5.68 | 0.044 | < 0.02 | 0.029 | 0.021 | 5.747 | 775 | 7.62 | 72.2 |
| Downstream | 19/11/2024 | 8 | 7.8 | 1.4 | < 20 | 5 | 2.84 | 0.161 | 0.071 | 0.04 | 0.025 | 2.494 | 608 | 8.74 | 76 |
| Downstream | 11/12/2024 | 7 | 7.8 | < 1 | 34 | 2.5 | 4.38 | 0.046 | 0.049 | 0.02 | 0.017 | 3.744 | 742 | 9.92 | 81.1 |
| | **Mean** | **10.815** | **7.829** | **1.735** | **21.318** | **10.175** | **5.489** | **0.065** | **0.068** | **0.033** | **1.085** | **3.568** | **721.615** | **9.793** | **86.815** |
| | **95%ile** | **15.093** | **8.210** | **6.387** | **40.440** | **34.730** | **8.536** | **0.404** | **0.546** | **0.142** | **5.060** | **6.147** | **803.850** | **12.020** | **103.726** |

*Note: Where the concentration in the result is less than the limit of detection (LOD), a value of LOD/sqrt(2) was used in calculating the mean and 95%ile concentrations.*