

Annual Environmental Report

2019



Edgeworthstown

D0098-01

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1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2019 AER

This Annual Environmental Report has been prepared for D0098-01, Edgeworthstown, in Longford 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 improvements undertaken this year.

1.2 TREATMENT SUMMARY

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

- Edgeworthstown WWTP with a Plant Capacity PE of 2700, 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 |
|---------------------------|---------------------|----------------|-------------------|--------------------------------|
| TPEFF2000D0098SW001 | Edgeworthstown WWTP | Treated | Non-Compliant | Ammonia-Total (as N) mg/l |

1.4 LICENCE SPECIFIC REPORTING INCLUDED IN AER

| Assessment / Report | Included in AER |
|------------------------------------|-----------------|
| Small Stream Risk Score Assessment | Yes |

2 TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY

2.1 EDGEWORTHSTOWN WWTP - TREATED DISCHARGE

2.1.1 INFLUENT MONITORING SUMMARY - EDGEWORTHSTOWN 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 |
|---|-------------------|------------|-------------|
| Total Nitrogen mg/l | 12 | 36.63 | 26.46 |
| COD-Cr mg/l | 12 | 528 | 226.44 |
| BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l | 12 | 260 | 93.38 |
| Suspended Solids mg/l | 12 | 1175 | 132.41 |
| Total Phosphorus (as P) mg/l | 12 | 4.45 | 2.97 |
| Hydraulic Capacity | N/A | 6803.9 | 1567.9 |

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 greater 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 - TPEFF2000D0098SW001

| 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 with Condition 2 Interpretation included | Annual Mean | Overall Compliance (Pass/Fail) |
|---|-----------------------|---|---|--------------------------|-----------------------|--|-------------|--------------------------------|
| COD-Cr mg/l | 125 | 250 | N/A | 12 | N/A | N/A | 17.73 | Pass |
| Suspended Solids mg/l | 35 | 87.5 | N/A | 12 | N/A | N/A | 10.68 | Pass |
| Temperature °C | 25 | N/A | N/A | 12 | N/A | N/A | 11.48 | Pass |
| pH pH units | 6-9 | 6-9 | N/A | 12 | N/A | N/A | 7.11 | Pass |
| BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l | 6 | 12 | N/A | 12 | N/A | N/A | 2.27 | Pass |
| Total Phosphorus (as P) mg/l | 2 | 2.4 | N/A | 12 | N/A | N/A | 0.28 | Pass |
| Ammonia-Total (as N) mg/l | 0.3 | 0.6 | N/A | 12 | 3 | 3 | 0.24 | Fail |
| ortho-Phosphate (as P) - unspecified mg/l | 0.15 | 0.3 | N/A | 12 | N/A | N/A | 0.04 | Pass |
| Visual Inspection Descriptive | N/A | N/A | N/A | 12 | N/A | N/A | N/A | |
| Dissolved Oxygen mg/l | N/A | N/A | N/A | 1 | N/A | N/A | N/A | |

| 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 with Condition 2 Interpretation included | Annual Mean | Overall Compliance (Pass/Fail) |
|---|-----------------------|---|---|--------------------------|-----------------------|--|-------------|--------------------------------|
| BOD - 5 days (Total) mg/l | N/A | N/A | N/A | 1 | N/A | N/A | N/A | |
| Conductivity 20 C μS/cm | N/A | N/A | N/A | 12 | N/A | N/A | 1241.93 | |
| Total Nitrogen mg/l | N/A | N/A | N/A | 12 | N/A | N/A | 19.08 | |

Notes:

1 – This represents the Emission Limit Values after the Interpretation provided for under Condition 2 of the licence is applied

Cause of Exceedance(s):

Inadequate infrastructure.

Significance of Results:

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

2.1.3 AMBIENT MONITORING SUMMARY FOR THE TREATMENT PLANT DISCHARGE TPEFF2000D0098SW001

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 Status |
|--|----------------------|--------------------|---------------|----------------|------|-----------|------------|
| Upstream | 226006, 271139 | RS26B050050 | No | No | No | No | Poor |
| Downstream | 226103, 270544 | RS26B050080 | No | No | No | No | Poor |

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 meet the required EQS. 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 Ammonia and 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.

Other causes of deterioration in water quality in the area are unknown.

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 - EDGEWORTHSTOWN WWTP

2.1.4.1 Treatment Efficiency Report - Edgeworthstown 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) |
|-----------|---------------------------------|----------------------------------|---|
| TP | 729 | 75 | 90 |
| cBOD | 22910 | 609 | 97 |
| SS | 32486 | 2870 | 91 |
| COD | 55556 | 4768 | 91 |
| TN | 6492 | 5644 | 13 |

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

2.1.4.2 Treatment Capacity Report Summary - Edgeworthstown 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.

| Edgeworthstown WWTP | |
|--|--------|
| Peak Hydraulic Capacity (m ³ /day) - As Constructed | 1824 |
| DWF to the Treatment Plant (m ³ /day) | 608 |
| Current Hydraulic Loading - annual max (m ³ /day) | 6803.9 |
| Average Hydraulic loading to the Treatment Plant (m ³ /day) | 1567.9 |
| Organic Capacity (PE) - As Constructed | 2700 |
| Organic Capacity (PE) - Collected Load (peak week) ^{Note1} | 2499 |
| Organic Capacity (PE) - Remaining | 201 |
| 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 - EDGEWORTHSTOWN 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) |
|---|----------|------|------|-------------------|--|---|--|
| There is no Sludge and Other Input data for the Treatment Plant included in the AER. | | | | | | | |

3 COMPLAINTS AND INCIDENTS

3.1 COMPLAINTS SUMMARY

A summary of complaints of an environmental nature is included below.

| Number of Complaints | Nature of Complaint | Number Open Complaints | Number Closed Complaints |
|----------------------|---------------------|------------------------|--------------------------|
| 1 | Blocked Sewer | 0 | 1 |

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 Irish Water 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 | No. of incident occurrences | Recurring (Y/N) | Closed (Y/N) |
|----------------------|-----------------------------------|-----------------------------|-----------------|--------------|
| Spillage | SWO Lack of tank storage capacity | 1 | No | Yes |
| Uncontrolled release | Other | 1 | No | Yes |
| Breach of ELV | Inadequate Infrastructure | 1 | Yes | No |

3.2.2 SUMMARY OF OVERALL INCIDENTS

| Question | Answer |
|--|--------|
| Number of Incidents in 2019 | 3 |
| Number of Incidents reported to the EPA via EDEN in 2019 | 3 |
| 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 | Irish Grid Ref. | Included in Schedule A4 of the WWDL | Significance of the overflow(High / Medium / Low) | Assessed against DoEHLG Criteria | No. of times activated in 2019 (No. of events) | Total volume discharged in 2019 (m3) | Monitoring Status |
|---|-------------------|-------------------------------------|---|----------------------------------|--|--------------------------------------|-------------------|
| SW2 | 233285, 279500 | Yes | Medium | Meeting | Unknown | Unknown | Not Monitored |
| SW3 | 226082, 270589 | Yes | Low | Meeting | Unknown | Unknown | Not Monitored |
| SW4 | 225650, 271860 | Yes | Medium | Meeting | Unknown | Unknown | Not Monitored |

| SWO Summary | |
|--|---------|
| How much sewage was discharged via SWOs in the agglomeration in the year (m3)? | 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 |

SWO Summary

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 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 |
|---|--|------------------|-------------------------|------------------------|-----------------|-----------------------------------|----------|
| D0098-SIP:01 | SW2 Upgrading of Storm Water Overflows to comply with the criteria outlined in the DoEHLG "Procedures and Criteria in relation to Storm Water Overflows, 1995" | C | 31/12/2016 | Yes | Works Completed | | |
| D0098-SIP:02 | SW3 Upgrading of Storm Water Overflows to comply with the criteria outlined in the DoEHLG "Procedures and Criteria in relation to Storm Water Overflows, 1995" | C | 31/12/2016 | Yes | Works Completed | | |

| Specified Improvement Programmes (under Schedule A and C of WWDL) | Description | Licence Schedule | Licence Completion Date | Date Expired? (N/N/A/Y) | Status of Works | Timeframe for Completing the Work | Comments |
|---|---|------------------|-------------------------|-------------------------|-----------------|-----------------------------------|----------|
| D0098-SIP:03 | Waste water treatment plant and ancillary works | C | 31/12/2014 | Yes | Works Completed | | |

A summary of the status of any improvements identified by under Condition 5.2 is included below.

4.2.2 IMPROVEMENT PROGRAMME SUMMARY

| Improvement Identifier | Improvement Description / or any Operational Improvements | Improvement Source | Expected Completion Date | Comments |
|--|---|--------------------|--------------------------|----------|
| There are no Improvements Programme for this Agglomeration. | | | | |

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 Table.

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 list of the various reports required for this agglomeration and a brief summary of their recommendations.

| Licence Specific Report | Required by licence | Year included in AER | Included in this AER | Reference to relevant section of AER |
|---|---------------------|----------------------|----------------------|--------------------------------------|
| Small Stream Risk Score Assessment | Yes | 2018 | Yes | 5.1 |

5.1 SMALL STREAM RISK SCORE ASSESSMENT

The Small Stream Risk Score Assessment Report is included in Appendix 7.2 - Small Stream Risk Score Assessment. A summary of the findings of this report is included below.

| Parameter | Value |
|--|---------|
| Condition 5 Improvement Programme Reference | None |
| Does SSRS indicate discharges are posing a pollution risk? | Yes |
| Does improvement programme include any procedural and/or infrastructural works? | No |
| Downstream SSRS Water Quality Risk | At Risk |
| SSRS Required? | Yes |
| Upstream SSRS Water Quality Risk | At Risk |
| What is Downstream SSRS? | 1.6 |
| What is Upstream SSRS? | 2.4 |

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 | No |
| List reason e.g. changes to monitoring requirements | N/A |
| Have these processes commenced? | N/A |
| Are all outstanding reports and assessments from previous AERs included as an appendix to this AER | Yes |

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

Date: 05/03/2020

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

Katherine Walshe

Acting Head of Environmental Regulation.

7 APPENDIX

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|--|
| Appendix |
| Appendix 7.1 - Ambient Monitoring Summary |
| Appendix 7.2 - Small Stream Risk Score Assessment |

Edgeworthstown 2019 Ambient Monitoring Summary

| 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 | 226006, 271139 | RS26B050050 | | | | |
| Downstream Monitoring Point | 226103, 270544 | RS26B050080 | No | No | No | No |

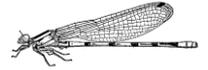
| Ambient Monitoring Point from WWDL (or as agreed with EPA) | Current WFD Status | cBOD | o-Phosphate (as P) | Ammonia (as N) |
|--|--------------------|--------|--------------------|----------------|
| Upstream Monitoring Point | Poor | 0.858 | 0.062 | 0.112 |
| Downstream Monitoring Point | Poor | 0.908 | 0.059 | 0.136 |
| <i>Difference</i> | | 0.050 | -0.004 | 0.024 |
| EQS | | 1.500 | 0.035 | 0.065 |
| % of EQS | | 3.333% | -10.238% | 36.795% |

Edgeworthstown 2019 Ambient Monitoring Data

| Upstream Results | | | | |
|------------------|-----|------------------|----------------|--------------|
| Date | | Ammonia (mg/l) * | Ortho P (mg/l) | BOD (mg/l) * |
| 09/01/19 | U/S | 0.111 | 0.061 | <1 |
| 13/02/19 | U/S | 0.056 | 0.044 | <1 |
| 13/03/19 | U/S | 0.235 | 0.071 | 1.200 |
| 10/04/19 | U/S | 0.035 | 0.03 | <1 |
| 01/05/19 | U/S | 0.027 | 0.043 | <1 |
| 12/06/19 | U/S | 0.290 | 0.085 | <1 |
| 10/07/19 | U/S | 0.076 | 0.113 | <1 |
| 14/08/19 | U/S | 0.064 | 0.062 | <1 |
| 11/09/19 | U/S | 0.097 | 0.087 | <1 |
| 09/10/19 | U/S | 0.121 | 0.066 | 2.800 |
| 13/11/19 | U/S | 0.192 | 0.055 | 1.300 |
| 12/12/19 | U/S | 0.037 | 0.032 | 1.000 |
| Mean | | 0.112 | 0.062 | 0.858 |
| 95%ile | | 0.260 | 0.099 | 1.975 |

| Downstream Results | | | | |
|--------------------|-----|----------------|----------------|--------------|
| Date | | Ammonia (mg/l) | Ortho P (mg/l) | BOD (mg/l) * |
| 09/01/19 | D/S | 0.150 | 0.071 | 1.500 |
| 13/02/19 | D/S | 0.068 | 0.043 | <1 |
| 13/03/19 | D/S | 0.237 | 0.070 | 1.200 |
| 10/04/19 | D/S | <0.02 | 0.031 | <1 |
| 01/05/19 | D/S | 0.170 | 0.049 | 1.800 |
| 12/06/19 | D/S | 0.322 | 0.086 | <1 |
| 10/07/19 | D/S | 0.067 | 0.054 | <1 |
| 14/08/19 | D/S | 0.056 | 0.061 | <1 |
| 11/09/19 | D/S | 0.079 | 0.085 | 1.000 |
| 09/10/19 | D/S | 0.232 | 0.072 | <1 |
| 13/11/19 | D/S | 0.189 | 0.051 | 1.300 |
| 12/12/19 | D/S | 0.048 | 0.033 | 1.100 |
| Mean | | 0.136 | 0.059 | 0.908 |
| 95%ile | | 0.275 | 0.085 | 1.635 |

* Where the concentration in the result is less than the limit of detection (LOD), a value of 50% of the LOD was used in calculating the mean and 95%ile concentrations.



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BIOLOGICAL WATER QUALITY ASSESSMENT OF THE RIVER BLACK, EDGEWORTHSTOWN, CO. LONGFORD



River Black at Tinnynarr

*Water Services Department
Longford County Council
December 2019*

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1 INTRODUCTION

1.1 BACKGROUND

In February 2011, the Environmental Protection Agency issued a Waste Water Discharge License in respect of the waste water treatment plant at Edgeworthstown, Co. Longford (License No. D0098-0). This treatment plant discharges into the River Black at Tinnynarr, Edgeworthstown, Co. Longford. As part of the requirements for this license, it is necessary to monitor the biological quality of the River Black, both upstream and downstream of the waste water treatment plant discharge on an annual basis.

Since 2011, Whitehill Environmental has been commissioned by Longford County Council to undertake the annual investigation of the biological water quality of the River Black close to the discharge point of the treatment plant. This report presents the results of the 2019 monitoring programme.

Q VALUE ASSESSMENT

Along with other parameters (fish, morphology, chemistry), the Q value is used to determine the ecological status of the waterbody, which is an action required under the obligations set out in the EU Water Framework Directive. Under this Directive, all water bodies are required to meet good status within a certain time period. Ireland is now in the second cycle of the Water Framework Directive and therefore good status should be achieved in all water bodies by the end of this current cycle, i.e., 2021. If a waterbody is unlikely to achieve this status, then it is deemed to be *At Risk*. Table 1 summaries the Q values in relation to Water Framework Directive status.

| Q Value | WFD Status | Pollution Status | Condition |
|--------------|------------|---------------------|----------------|
| Q5, Q4-5 | High | Unpolluted | Satisfactory |
| Q4 | Good | Unpolluted | Satisfactory |
| Q3-4 | Moderate | Slightly polluted | Unsatisfactory |
| Q3, Q2-3 | Poor | Moderately polluted | Unsatisfactory |
| Q2, Q1-2, Q1 | Bad | Seriously polluted | Unsatisfactory |

Table 1 – Q Rating in Relation to WFD Status

SMALL STREAM RISK SCORE (SSRS)

The Small Stream Risk Score (SSRS) is a biological risk assessment system for detecting potential sources of pollution in streams. The main aim of the SSRS is to support the programme of measures for the Water Framework Directive. The main objective of this directive is to ensure the achievement of good ecological status in all water bodies in the EU within a specified time period.

SSRS surveys are designed to assist in the identification of diffuse sources of pollution and they are valuable in pinpointing the likely geographical location of the sources that are causing the main channel rivers in their failure to achieve good status. The SSRS will identify whether the water body in question is At Risk of not achieving good ecological status as required under the Water Framework Directive.

2 METHODOLOGY

2.1 PERSONNEL

This ecological assessment was carried out by Noreen McLoughlin, BA, MSc, MCIEEM, of Whitehill Environmental. Noreen has an honours degree in Zoology and an MSc in Freshwater Ecology from Trinity College, Dublin and she has been a full member of the Chartered Institute of Ecology and Environmental Managements for 14 years. Noreen has over 15 years experience as a professional ecologist in Ireland.

2.2 BIOLOGICAL ASSESSMENT

Biological water quality assessment was carried out at two separate locations on the River Black, both upstream and downstream of the effluent discharge point. These locations are summarised in Table 1 and illustrated in Figure 1.

| Station No. | Location | NGR Location |
|-------------|------------------------|----------------|
| 1 | ~ 35m u/s of discharge | N 260517 70648 |
| 2 | ~35m d/s of discharge | N 26046 70574 |
| | Discharge Point | N 26009 70652 |

Table 1 – Stations Sampled as Part of this Assessment

Fieldwork was carried out on 5th December 2019.

At each station, the surrounding habitats were noted along with other parameters such as water flow, stream depth and the predominance of vegetation. All samples were taken with a Freshwater Biological Association approved hand held sweep net with a mesh diameter of 500µm. At both stations, a two minute kick and stone wash sample was taken at a suitable riffle site, if there was one present. The samples were retained in plastic containers at the sampling site and removed to the laboratory for further analysis. In the lab, any fine mud and debris were removed from each sample by sieving under running water through a 500 µm sieve. The samples were then sorted live in a white tray under a bench lamp. All macro-invertebrates were preserved in 70% methanol, before being counted and identified to the appropriate taxonomic level. This was generally to family level but where necessary to species level.

Based on the relative abundance of indicator species, a biotic index (Q rating) was determined for the sites in accordance with the biological assessment procedure used by the

Environmental Protection Agency. In addition, the Small Stream Risk Score (SSRS) was also calculated for the upstream and downstream stations. This assessment gives a quick overview of the risk status of the water body in question.

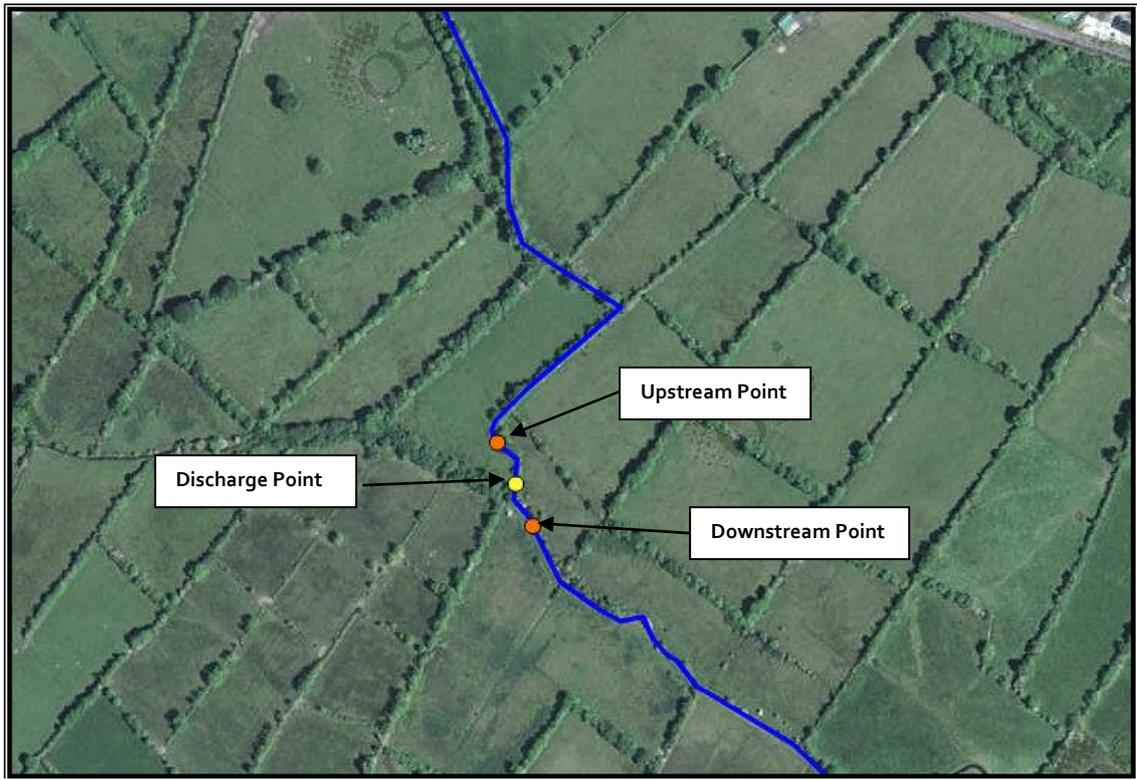


Figure 1 – Location of Sampling Points on the River Black

Q VALUE

Based on the relative abundance of indicator species, the Q value was determined for the sites in accordance with the biological assessment procedure used by the Environmental Protection Agency (Toner *et al.* 2005). The method categorises invertebrates into one of five different groups based on their sensitivity or tolerance to pollution. Group A are the most sensitive forms, Group B are less sensitive, Group C are tolerant, Group D are very tolerant and Group E are the most tolerant. Overall, the higher the biological diversity and the greater the abundance of invertebrate species that are sensitive to organic pollution, then the higher the water quality is assumed to be and the higher the Q value assigned to that sampling station.

The relative abundance of each group of invertebrates in the samples was assigned as follows:

- Present (1/2 individuals)
- Scarce/Few (<1%)
- Small Numbers (<5%)

- Fair Numbers (5-10%)
- Common (10-20%)
- Numerous (25-50%)
- Dominant (50-75%)
- Excessive (>75%)

SSRS

The SSRS methodology only uses certain biological indicators to calculate the risk. The taxa used have been placed into 5 groups:

Group 1 – Ephemeroptera (Mayflies)

Group 2 – Plecoptera (Stoneflies)

Group 3 – Trichoptera (Caddisflies)

Group 4 – G.O.I.D (Gastropods, Oligochaetes and Dipterns)

Group 5 – Asellus (Waterlouse)

The groupings are based on their sensitivity to organic pollution, e.g., mayflies and stoneflies are sensitive to pollution and are given a high score, whilst taxa within Group 4 are less sensitive and are given a lower score. The overall score for each river sample is based on the number of taxon present in each sample along with the relative abundance of each taxon. These scores are added together and divided by five to give an average index score (AIS). The final SSRS is achieved by multiplying the AIS by 2. Table 3 outlines the risk categories.

| SSRS | Risk Category |
|----------|------------------|
| <6.5 | At Risk |
| 6.5-7.25 | Probably at Risk |
| >7.25 | Not at Risk |

Table 3 – SSRS Risk Categories

3 RECEIVING ENVIRONMENT

The Edgeworthstown waste water treatment plant is located in the townland of Tinnynarr, approximately 0.5km south of the town and just off the N4 Dublin – Sligo Road. It is surrounded mostly by agricultural / grazing land. The discharge from the treatment plant enters the River Black at a point approximately half a kilometre south of the treatment plant. A map showing the location of the treatment plant is shown in Figure 1.

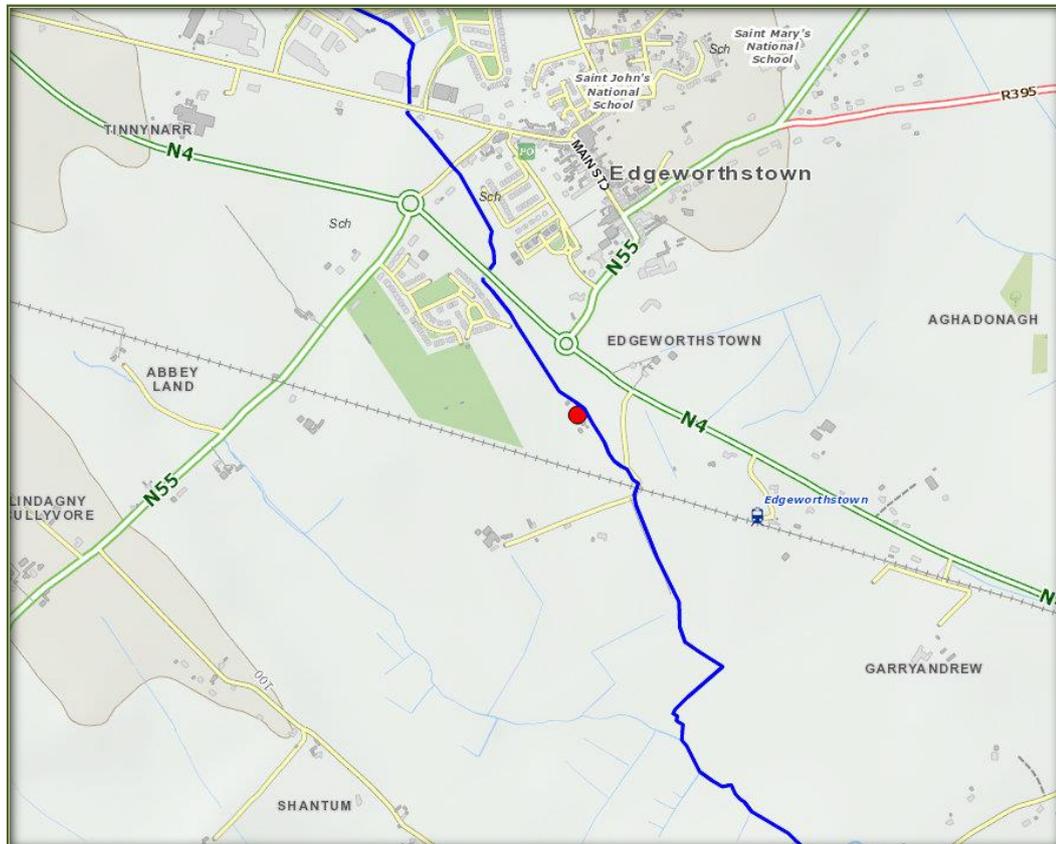


Figure 1 – Site Location Map. The Course of the River Black is Highlighted in Blue. The Location of the Treatment Plant is Shown with a Red Dot.

3.1 THE RIVER BLACK

The River Black rises in the townland of Lisnanagh, approximately 3km north-west of Edgeworthstown. It then flows through low lying agricultural land where it is joined by a network of drainage ditches. On the western outskirts of the town it flows behind a pet food factory and through a housing estate. On the east side of the town it flows through agricultural land again and towards the Longford – Westmeath county boundary where it flows through an area of raised and cutover bog and a conifer plantation. Historically (old version OSI maps) the River Black flowed into and out of Glen Lough (prior to the drainage scheme that drained this lake) before it flowed north-east and then south-east towards the River Inny, where it joined it in the townland of Boltomy just downstream of Lough Iron.

However, since the lake was drained the flow of the river has been altered and it is now connected to the marsh area of Glen Lough by a drainage channel.

3.2 RECEIVING WATER QUALITY

EPA'S BIOLOGICAL WATER QUALITY MONITORING

Since the commencement of the EPA's Water Quality Monitoring Programme, the River Black has consistently failed to reach good ecological status, i.e., it has always been of poor – moderate water quality. The earliest information from the EPA comes from 1987, when a Q value of 1-2 (i.e., bad status / severe pollution) was assigned to the river at the sampling station at the Ballymahon Bridge in Edgeworthstown (upstream of the waste water treatment plant).

In 2017, the River Black at the Ballymahon Road Bridge received a Q2-3 (Poor Ecological Status). This is a deterioration since 2011, when a Q3-4 (moderate status) was obtained. Other points sampled by the EPA include the bridge at Ballinlaghta and the bridge at Lissanure. The latest EPA rating (2017) from the Ballinlaghta station is a Q3, i.e., moderate status. This is a deterioration from 2014, when a Q3-4 was obtained.

PREVIOUS MONITORING RESULTS

Tables 2 and 3 summarise the previous results obtained by Whitehill Environmental during the biological water quality monitoring studies on the River Black. The 2010 results were obtained as part of the Appropriate Assessment Screening for the original license application. Subsequent results were obtained upon condition of the granting of the license. The SSRS for the River Black only commenced in 2016.

| Year | Q Value & Status Upstream | Q Value & Status Downstream |
|-------------|---------------------------|-----------------------------|
| 2010 | Q3: Poor Status | Q3: Poor Status |
| 2011 | Q3: Poor Status | Q3: Poor Status |
| 2012 (2013) | Q3: Poor Status | Q3-4: Moderate Status |
| 2013 | Q3: Poor Status | Q3: Poor Status |
| 2015 | Q3: Poor Status | Q3: Poor Status |
| 2016 | Q3: Poor Status | Q3: Poor Status |
| 2017 | Q3: Poor Status | Q3: Poor Status |
| 2018 | Q3: Poor Status | Q2-3: Poor Status |

Table 2 – Summary of Findings of the Previous Biological Water Quality Assessment.

| Year | SSRS & Risk Status Upstream | SSRS & Risk Status Downstream |
|------|-----------------------------|-------------------------------|
| 2016 | 1.6 | 3.2 |
| 2017 | 1.6 | 4 |
| 2018 | 2.4 | 1.6 |

Table 3 – Summary of Findings of the Previous SSRS for the River Black

4 RESULTS OF THIS ASSESSMENT

Results from the current biological water quality monitoring are summarised in Table 3.

| Station | Location | Q Value & Status | SSRS |
|---------|------------------------|-------------------------------------|----------------------|
| 1 | ~ 35m u/s of discharge | Q ₃ - <i>Poor Status</i> | 1.6 - <i>At Risk</i> |
| 2 | ~ 35m d/s of | Q ₃ - <i>Poor Status</i> | 1.6 - <i>At Risk</i> |

Table 3 – Summary of Findings of the 2019 Biological Water Quality Assessment

STATION ONE

The sample from station 1 (upstream of discharge) was dominated by Group C taxa and overall these were found in the sample in excessive numbers. Group C macro-invertebrates are tolerant of moderate levels of organic pollution. The Group C taxa were dominated by the dipteran larvae from the Simuliidae family which were found here in excessive numbers (2,000+). In the sample from this spot from the previous year, no Simuliidae were recorded. Other Group C taxa represented in the sample included the fresh-water shrimp *Gammarus duebeni* (5%) whilst the mayfly *Baetis rhodani* was present in small numbers. Group A taxa (sensitive to organic pollution) were absent and Group B taxa (less sensitive) were scarce. They were mostly represented by cased caddis larvae from the Limnephilidae family, who are generally slightly more tolerant of organic pollution than other cased caddis families. Group D taxa were also scarce in the sample and they were represented by the water louse *Asellus aquaticus* and leeches from the Erpobdellidae family. Group D taxa are very tolerant of organic pollution. Based on the relative abundance of these indicator groups and the occurrence of Group C taxa in excessive numbers, this station was assigned a Q₃, i.e., poor status. Under the requirements of the EU Water Framework Directive, this is unsatisfactory.

The SSRS obtained at Station 1 was also low (1.6), putting it well within the At Risk category. The reason for this low score was due to the absence of Ephemeroptera and Plecoptera and the relatively high numbers of GOLD taxa (Gastropods, Oligochaetes, Dipterns) and *Asellus*.

STATION TWO

Station 2 (downstream of the discharge) was also dominated by Group C taxa and they comprised over 95% of the total faunal assemblage. As at the previous station, Simuliidae were the most common organisms in the family, comprising over 49% of the total faunal assemblage. The mayfly *Baetis rhodani* was also common in the sample. The native amphipod *Gammarus duebeni* was noted in small numbers and for the first time at this location, the invasive amphipod *Gammarus pulex* was also recorded in small numbers. This amphipod is known to outcompete and displace *Gammarus duebeni* in river systems. Although *Gammarus pulex* and *G. duebeni* are not differentiated for the purpose of the Q rating, it is known that *G. pulex* is more tolerant of organic pollution than *G. duebeni*.

The most sensitive Group A taxa were absent from this sample, whilst Group B taxa were scarce. This group was represented mostly by cased caddis from Glossosomatidae family. Group D taxa were present in the sample in small numbers and they were mostly represented by the water louse *Asellus aquaticus*. Although not used as part of the Q assessment, it was noted what worms from the Naidinae order were present in large numbers in the sample. These worms are very tolerant of pollution.

Overall, based on the relative abundance of these indicator groups and the overall occurrence of Group C taxa in excessive numbers, this station was assigned a Q₃, i.e., poor status.

The SSRS obtained at this station was 1.6, which puts this station in the At Risk category.

5 DISCUSSION AND CONCLUSIONS

There has been no significant change in the ecological status of the River Black upstream of the discharge. It has maintained its Q₃, which is the value it has received since the start of this monitoring programme. There has been a slight decrease in the SSRS result, decreasing from 2.4 to 1.6, which was the value previously obtained in 2016 and 2017. The river at this point remains well within the At Risk category.

In the 2018 assessment, the downstream station received a Q₂₋₃; which was the lowest Q rating obtained at this station since sampling commenced in 2013. In previous years, this station consistently received a Q₃ and the 2019 result sees an improvement in the status of this station and a return of a Q₃ value. In 2018, a Q₂₋₃ was assigned here as Group D taxa dominated in the sample with a proportion of 51%. This has decreased to 3.4%, which is similar to the Group D proportions noted in the years before 2018. Whilst this increase in biological status is to be welcomed, overall the biological status of the river at this point remains unsatisfactory. In addition, the abundance of the Nais worms (Naidinae) remained quite high in the sample. These usually respond to organic pollution by large increases in numbers. The SSRS result for this station remained the same as 2018, i.e., 1.6.

Overall, the status of the River Black along its entire length is unsatisfactory. Currently, there is no significant deterioration in the ecological status of the river at points upstream and downstream of the Edgeworthstown WWTP discharge point.

6 APPENDIX I- RESULTS OF RIVER BLACK MONITORING

Station One (Upstream) – Q Value

| Indicator Group | Taxon | Number | Abundance |
|------------------------|--------------------------------|--------------|-------------|
| Group A | Absent | 0 | 0 |
| (Very sensitive) | | | |
| Group B | | 9 | 0.3 |
| (Moderately sensitive) | Cased Trichoptera | | |
| | Limnephilidae | 6 | 0.2 |
| | Glossosomatidae | 3 | 0.1 |
| | | | |
| Group C | | 3,171 | 99 |
| (Moderately tolerant) | Ephemeroptera | | |
| | <i>Baetis rhodani</i> | 181 | 5.6 |
| | | | |
| | Amphipoda | | |
| | <i>Gammarus duebeni</i> | 172 | 5.3 |
| | <i>Gammarus pulex</i> | 1 | 0.3 |
| | | | |
| | Diptera | | |
| | Chironomidae | 7 | 0.2 |
| | Simuliidae | 2,800 | 87.5 |
| | | | |
| | Caseless Trichoptera | | |
| | Polycentropodidae | 3 | 0.9 |
| | | | |
| | Coleoptera | | |
| | Elminthidae | 7 | 0.2 |
| | | | |
| Group D | | 18 | 0.56 |
| (Very tolerant) | Isopoda | | |
| | <i>Asellus aquaticus</i> | 12 | 0.4 |
| | | | |
| | Hirudinae | | |
| | <i>Erpobdellidae stagnalis</i> | 4 | 0.1 |
| | | | |
| | Bivalvia | | |
| | Pisidium | 2 | 0.06 |
| | | | |
| Group E | Absent | 0 | 0 |
| (Most tolerant) | | | |
| | | | |
| Not Assigned | | 2 | 0.06 |
| | Oligochaeta | | |
| | Naidinae | 2 | 0.06 |
| | | | |
| | | | |
| Total Abundance | | 3,200 | |
| Q Value | | Q3 | |

Results from the Biological Water Quality Monitoring of Station One (Upstream of Discharge)

Station Two (Downstream) – Q Value

| Indicator Group | Taxon | Number | Abundance |
|------------------------|-----------------------------|-----------------|-------------|
| Group A | Absent | 0 | 0 |
| (Very sensitive) | | | |
| Group B | | 14 | 0.7 |
| (Moderately sensitive) | Cased Trichoptera | | |
| | Limnephilidae | 1 | 0.4 |
| | Glossosomatidae | 13 | 0.6 |
| Group C | | 1,930 | 95.4 |
| (Moderately tolerant) | Ephemeroptera | | |
| | <i>Baetis rhodani</i> | 498 | 24.6 |
| | Amphipoda | | |
| | <i>Gammarus duebeni</i> | 112 | 5.5 |
| | <i>Gammarus pulex</i> | 93 | 4.6 |
| | Diptera | | |
| | Chironomidae | 58 | 2.9 |
| | Simuliidae | 992 | 49 |
| | Tipulidae | 2 | 0.1 |
| | Dicranota | 12 | 0.6 |
| | Psychodidae | 4 | 0.2 |
| | Coleoptera | | |
| | Elminthidae | 62 | 3 |
| | Caseless Trichoptera | | |
| | Polycentropodidae | 4 | 0.2 |
| Group D | | 70 | 3.4 |
| (Very tolerant) | Isopoda | | |
| | <i>Asellus aquaticus</i> | 61 | 3 |
| | Hirudinae | | |
| | Erpobdellidae | | |
| | <i>Helobdella stagnalis</i> | 1 | 0.04 |
| | Glossiphonidae | 8 | 0.4 |
| Group E | | 9 | 0.4 |
| (Most tolerant) | Diptera | | |
| | Chironomus | 9 | 0.4 |
| Not Assigned | | | |
| | Oligochaetes | | |
| | Naidinae | Abundant (100s) | |
| Total Abundance | | 2,023 | |
| Q Value | | Q2/3 | |

Results from the Biological Water Quality Monitoring of Station Two (Downstream of Discharge)

| Indicator Group | Taxon | No of Taxa | Total Relative Abundance ^{*2} | Score |
|-----------------------------------|--------------------------|------------|--|---------|
| Group 1 | Ephemeroptera | 0 | 0 | 0 |
| Group 2 | Plecoptera | 0 | 0 | 0 |
| Group 3 | Trichoptera | 2 | 2 | 2 |
| Group 4 | G O I D | 3 | 8 | 0 |
| Group 5 | <i>Asellus aquaticus</i> | | Few | 2 |
| Total Index Score (TIS) | | | | 4 |
| Average Index Score (AIS = TIS/5) | | | | 0.8 |
| SSR Score (AIS x 2) | | | | 1.6 |
| SSRS Category | | | | At Risk |

SSRS (Upstream)

| Indicator Group | Taxon | No of Taxa | Total Relative Abundance ^{*2} | Score |
|-----------------------------------|--------------------------|------------|--|---------|
| Group 1 | Ephemeroptera | 0 | 0 | 0 |
| Group 2 | Plecoptera | 0 | 0 | 0 |
| Group 3 | Trichoptera | 3 | 4 | 4 |
| Group 4 | G O I D | 7 | 20 | 0 |
| Group 5 | <i>Asellus aquaticus</i> | | Common | 0 |
| Total Index Score (TIS) | | | | 4 |
| Average Index Score (AIS = TIS/5) | | | | 0.8 |
| SSR Score (AIS x 2) | | | | 1.6 |
| SSRS Category | | | | At Risk |

SSRS (Downstream)