

Annual Environmental Report

2023



Ballyderihan

D0455-01

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7.1 SMALL STREAM RISK SCORE ASSESSMENT

1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2023 AER

This Annual Environmental Report has been prepared for D0455-01, Ballyclerihan, in Tipperary 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 was no major capital or operational changes undertaken.

1.2 TREATMENT SUMMARY

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

- Ballyclerihan WWTP with a Plant Capacity PE of 2000, 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
TPEFF2900D0455SW001	Ballyclerihan WWTP	Treated	Compliant	N/A

1.4 LICENCE SPECIFIC REPORTING

Assessment / Report

Small Stream Risk Score Assessment

2 TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY

2.1 BALLYCLERIHAN WWTP - TREATED DISCHARGE

2.1.1 INFLUENT MONITORING SUMMARY - BALLYCLERIHAN 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
pH pH units	12	7.20	6.77
Ammonia-Total (as N) mg/l	12	76	53
Total Phosphorus (as P) mg/l	12	29	13
Total Nitrogen mg/l	12	98	69
Suspended Solids mg/l	12	2010	1243
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	12	1036	668
COD-Cr mg/l	12	3270	1765
Hydraulic Capacity	N/A	382	160

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'. The design of the wastewater treatment plant allows for peak values and therefore the peak loads have not impacted on compliance with Emission Limit Values.

2.1.2 EFFLUENT MONITORING SUMMARY - TPEFF2900D0455SW001

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	19	Pass
Temperature °C	25	25	N/A	12	N/A	N/A	14	Pass
Total Nitrogen mg/l	20	24	N/A	12	N/A	N/A	7.31	Pass
Suspended Solids mg/l	10	25	N/A	12	N/A	N/A	4.57	Pass
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	10	20	N/A	12	N/A	N/A	1.86	Pass
pH pH units	9	9	N/A	12	N/A	N/A	7.06	Pass
Ammonia-Total (as N) mg/l	1	2	N/A	12	N/A	N/A	0.186	Pass

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)
ortho-Phosphate (as P) - unspecified mg/l	0.5	0.6	N/A	12	N/A	N/A	0.167	Pass
Total Phosphorus (as P) mg/l	N/A	N/A	N/A	12	N/A	N/A	0.272	
Faecal coliforms cfu/100ml	N/A	N/A	N/A	2	N/A	N/A	867	
Fats, Oils & Greases mg/l	N/A	N/A	N/A	3	N/A	N/A	11	
Conductivity @20°C µS/cm	N/A	N/A	N/A	12	N/A	N/A	432	

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):

Not applicable

Significance of Results:

The WWTP is compliant with the ELV's set in the Wastewater Discharge Licence.

2.1.3 AMBIENT MONITORING SUMMARY FOR THE TREATMENT PLANT DISCHARGE TPEFF2900D0455SW001

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	216319, 128304	RS16B090080	No	No	No	No	Moderate
Downstream	216433, 128345	RS16B090090	No	No	No	No	Moderate

The table below provides a summary of monitoring results for designated ambient monitoring points. The upstream and downstream annual mean values are shown (mg/l), and the difference between both monitoring stations is given as a percentage of the Environmental Quality Standard (EQS) where relevant.

Parameter Name	Upstream Monitoring Point Location	Upstream Monitoring Point Annual Mean	Downstream Monitoring Point Location	Downstream Monitoring Point Annual Mean	EQS	% of EQS
BOD - 5 days (Total) mg/l	RS16B090080	2.67	RS16B090090	3.39	1.50	47.9
Ammonia-Total (as N) mg/l	RS16B090080	0.156	RS16B090090	0.243	0.065	134.5
ortho-Phosphate (as P) - unspecified mg/l	RS16B090080	0.045	RS16B090090	0.132	0.035	249.3
Total Nitrogen mg/l	RS16B090080	2.61	RS16B090090	2.48	N/A	

Parameter Name	Upstream Monitoring Point Location	Upstream Monitoring Point Annual Mean	Downstream Monitoring Point Location	Downstream Monitoring Point Annual Mean	EQS	% of EQS
Temperature °C	RS16B090080	12	RS16B090090	12	N/A	
ortho-Phosphate (as PO4) mg/l	RS16B090080	0.153	RS16B090090	0.156	N/A	
pH pH units	RS16B090080	7.94	RS16B090090	7.74	N/A	
Dissolved Oxygen % O2	RS16B090080	85	RS16B090090	71	N/A	
Dissolved Oxygen mg/l	RS16B090080	9.26	RS16B090090	7.99	N/A	
Ammonia-Total (as NH3) mg/l	RS16B090080	0.127	RS16B090090	0.791	N/A	
Nitrate (as N) mg/l	RS16B090080	2.62	RS16B090090	3.11	N/A	

Significance of Results:

The WWTP discharge was 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 Ammonia, BOD and Ortho-Phosphate., 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 - BALLYCLERIHAN WWTP

2.1.4.1 Treatment Efficiency Report - Ballyclerihan 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)
SS	47833	211	100
COD	67908	890	99
TP	516	13	98
TN	2660	338	87
cBOD	25700	86	100

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

2.1.4.2 Treatment Capacity Report Summary - Ballyclerihan 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.

Ballyclerihan WWTP	
Peak Hydraulic Capacity (m ³ /day) - As Constructed	1347
DWF to the Treatment Plant (m ³ /day)	449
Current Hydraulic Loading - annual max (m ³ /day)	382

Ballyclerihan WWTP	
Average Hydraulic loading to the Treatment Plant (m ³ /day)	160
Organic Capacity (PE) - As Constructed	2000
Organic Capacity (PE) - Collected Load (peak week) ^{Note1}	1078
Organic Capacity (PE) - Remaining	922
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 - BALLYCLERIHAN 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 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 2023.			

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	WWTP biological sludge issue	Yes	Yes

3.2.2 SUMMARY OF OVERALL INCIDENTS

Question	Answer
Number of Incidents in 2023	1
Number of Incidents reported to the EPA via EDEN in 2023	1
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 2023 (No. of events)	Total volume discharged in 2023 (m3)	Monitoring Status
SW2	216379,128331	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	Monitored
SW3	216379,128331	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	Not Monitored

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 (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
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
There are no Specified Improvement Programmes for this Agglomeration.							

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
D0455-01-Small Stream Risk Score Assessment	Yes	Yes

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	No

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

Signed: Date: 11/03/2024

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 - Small Stream Risk Score Assessment

SSRS Compliance Monitoring: *Clerihan* Waste Water Treatment Plant 2023



Report to Tipperary County Council

Limnos Consultancy, January 2024

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Clerihan WWTP

Introduction

Small Streams Risk Score (SSRS) assessments on the Ballyclerihan Stream upstream and downstream of the Clerihan waste water treatment plant (WWTP) are outlined in this report. The assessments were made in December 2023. Limnos Consultancy was contracted by Irish Water to undertake the surveys.

Methodology

Small Streams Risk Score (SSRS)

Samples were taken using an ISO compliant kick-sampling sampling method compatible with the Environmental Protection Agency (EPA) Standard Operating Procedure for sampling aquatic macroinvertebrates. Samples were taken upstream and downstream of the discharge from the WWTP. SSRS results were assigned based on the macroinvertebrate fauna.

The author was the main initiator of the SSRS system developed by the Western River Basin District and the EPA under his supervision in 2005–2006 (McGarrigle 2014). He has undertaken SSRS training of local authority and other professional staff at the Local Government Water Services Training Centres around the country for over 100 personnel.

The SSRS was calculated based on selected sub-groups of the macroinvertebrates recorded. The score is calculated based on the number of taxa and their relative abundance in four main invertebrate groups as follows:

- Group 1: Ephemeroptera (excluding *Baetis rhodani*)
- Group 2: Plecoptera
- Group 3: Trichoptera
- Group 4: GOLD (Gastropoda, Oligochaeta, Diptera)
- Group 5: *Asellus*

The first three groups above, mayflies, stoneflies, and caddis flies, are regarded as pollution-sensitive whereas gastropods, oligochaetes, dipterans and *Asellus* are relatively pollution-tolerant. The maximum score that can be achieved is

11.2 and threshold scores deciding the degree of risk of not being at good ecological status are as follows:

- > 7.25 Probably not at risk
- > 6.5 to 7.25 Indeterminate
- < 6.5 Stream may be at risk.

Samples were taken with a standard 1 mm mesh pond net. A 3-minute kick sample was combined with a 1-minute stonewash. Samples were placed on a white tray and, once cleaned of debris such as leaves and twigs and excessive sand or gravel by decanting and hand picking, the sample was examined carefully to identify the macroinvertebrates. At least 25 minutes were spent identifying and assigning each taxon found to a relative abundance category. Table 1 gives the definition of the relative abundance terms Few, Common, Numerous, Dominant and Excessive. The numeric code is used in the results tables below.

Table 1. Relative abundance table.

Abundance	Number of Individual Specimens	Relative abundance numeric code
Few:	1 to 5 individuals	1
Common:	6 to 20	2
Numerous:	21-50	3
Dominant:	51 to 100	4
Excessive:	>100	5

Physico-Chemical Measurements

Physico-chemical measurements were also made for dissolved oxygen, temperature and conductivity using a HACH HQ40d meter with appropriate compatible probes.

Location of Sites Sampled

Figure 1 maps the sampling sites and Table 2 gives the details of the locations sampled.

Figure 1. Location of upstream and downstream monitoring sites for Clerihan WWTP. The river flows to the East..



Table 2. Location of sites sampled upstream and downstream of Clerihan WWTP on 6 December 2023.

Location	Clerihan WWTP Upstream	Clerihan WWTP Downstream
EPA Code	RS16B090080	RS16B090100
Station	Upstream Clerihan WWTP	Downstream Clerihan WWTP
River	Clerihan Stream	Clerihan Stream
Easting	216320	216587
Northing	128305	128349

Results

Site Photographs

Figure 2 shows photographs taken when sampling upstream and downstream of the Clerihan WWTP on 6 December 2023.



Figure 2. Upstream (U/S) and downstream (D/S) of Clerihan WWTP.

Macroinvertebrates - SSRS

Table 3 gives the recorded macroinvertebrate taxa for the standard kick samples taken at these sites. The taxa are ordered from top to bottom by their SSRS group, noting that not all taxa belong to an SSRS group.

Table 3. Relative abundances of macroinvertebrates recorded upstream and downstream of Clerihan WWTP discharge point.

		Clerihan	Clerihan
		Upstream WWTP	Downstream WWTP
		Date of Sampling	
SSRS Group	Taxon	06/12/2023	06/12/2023
3, Trich	Limnephilidae	-	Few
4, GOLD	Chironomidae	Common	Common
4, GOLD	<i>Chironomus</i>	Few	-
4, GOLD	<i>Radix balthica</i>	-	Common
4, GOLD	Simuliidae	-	Few
4, GOLD	Tubificidae	Few	Few
5, Asellus	<i>Asellus</i>	Dominant	Dominant
n/a	<i>Baetis rhodani</i>	-	Few
n/a	<i>Helobdella</i>	Few	Few
n/a	<i>Dytiscus</i>	Few	Few
n/a	<i>Gammarus</i>	Numerous	-
	Number of Taxa	7	9
	SSRS	1.6	2.4
		Stream at risk!	Stream at risk!
	Q-Value	Q2-3	Q2-3

Both sites were in Poor condition with the upstream site scoring lower than the site downstream of the WWTP.

The upstream site had just seven taxa with none of the pollution-sensitive types belonging to the SSRS Groups 1, 2 and 3. The presence of *Chironomus* usually indicates strong organic pollution and the dominance of *Asellus* also suggests organic pollution. The sites scored 1.6 on the SSRS scale and was assigned a Q-Value of Q2-3, putting it at the lower end of Poor ecological status. This site is on the outskirts of the village of Clerihan and it is assumed that the source of pollution is agricultural as the upstream catchment is intensively farmed.

The downstream site scored slightly higher than the upstream site with an SSRS of 2.4. This is largely due to the presence of the cased caddis Limnephilidae, the only sensitive taxon noted at either site. *Asellus* was once again dominant indicating serious pressure on the system. It is not clear, however, whether the WWTP discharge is placing additional pressure on the stream. With poor upstream conditions it is difficult to assess extra impacts as the scoring systems tend to ‘telescope’ when conditions are Poor or Bad, meaning that additional impacts do not lower the status very much. A cleaner upstream control is required to properly assess the impact of a discharge.

Physico-Chemical Results

Table 4 gives the physico-chemical measurements made on the day of sampling. Dissolved oxygen saturation is a bit low at both sites but this is in keeping with the observed macroinvertebrates, particularly the occurrence of *Chironomus* and abundant *Asellus* both of which can thrive in low oxygen saturation conditions. The conductivity is very high at both sites, particularly in relation to the pH values of 7.01 and 6.66 – possibly indicating anthropogenic influences.

Table 4. Physico-chemical results for Clerihan River, 6 December 2023.

Station	Dissolved Oxygen (DO) % Saturation	DO mg/l	Temp. °C	Conductivity µS/cm	pH
Upstream Clerihan WWTP	91.7	11.03	7.3	637	7.01
Downstream Clerihan WWTP	88.4	10.55	7.6	631	6.66

Summary

The Clerihan Stream is in Poor condition both upstream and downstream of the WWTP although somewhat improved downstream of the WWTP. The poor upstream conditions damp down the signal from the WWTP making it difficult to assess its actual impact on the stream. Water chemistry may provide additional information on its impact.

Reference

McGarrigle, M. 2014. “Assessment of Small Water Bodies in Ireland.” *Biology and Environment* 114B(3). doi: 10.3318/BIOE.2014.15.