

Annual Environmental Report

2023



Kilmuckridge

D0161-01

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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 D0161-01, Kilmuckridge, in Wexford 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.

1.2 TREATMENT SUMMARY

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

- Kilmuckridge 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
TPEFF3300D0161SW001	Kilmuckridge WWTP	Treated	Non-Compliant	Ammonia-Total (as N) mg/l

1.4 LICENCE SPECIFIC REPORTING

Assessment / Report

Small Stream Risk Score Assessment

2 TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY

2.1 KILMUCKRIDGE WWTP - TREATED DISCHARGE

2.1.1 INFLUENT MONITORING SUMMARY - KILMUCKRIDGE 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
COD-Cr mg/l	12	998	697
BOD, 5 days with Inhibition (Carbonaceo mg/l	12	566	311
Total Nitrogen mg/l	12	76	60
Suspended Solids mg/l	12	416	265
Total Phosphorus (as P) mg/l	12	9.50	6.61
Hydraulic Capacity	N/A	888	407

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 - TPEFF3300D0161SW001

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	25	Pass
Suspended Solids mg/l	35	87.5	N/A	12	N/A	N/A	11	Pass
BOD, 5 days with Inhibition (Carbonaceo mg/l	25	50	N/A	12	N/A	N/A	3.33	Pass
Temperature °C	25	25	N/A	12	N/A	N/A	9.14	Pass
pH pH units	9	9	N/A	12	N/A	N/A	7.67	Pass
Ammonia-Total (as N) mg/l	2	2.4	N/A	12	1	1	1.32	Fail
ortho-Phosphate (as P) - unspecified mg/l	0.7	0.84	N/A	12	N/A	N/A	0.412	Pass
Total Phosphorus (as P) mg/l	N/A	N/A	N/A	12	N/A	N/A	0.680	
Nitrite (as N) mg/l	N/A	N/A	N/A	12	N/A	N/A	0.225	

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)
Conductivity @20°C µS/cm	N/A	N/A	N/A	12	N/A	N/A	748	
Total Nitrogen mg/l	N/A	N/A	N/A	12	N/A	N/A	21	
Nitrate (as N) mg/l	N/A	N/A	N/A	12	N/A	N/A	13	
Visual Inspection Descriptive	N/A	N/A	N/A	12	N/A	N/A	N/A	

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):

Refer to Incident Section of Report

Significance of Results:

The WWTP is non compliant with the ELV's set in the wastewater Discharge License. The impact on receiving waters is assessed further in Section2

2.1.3 AMBIENT MONITORING SUMMARY FOR THE TREATMENT PLANT DISCHARGE TPEFF3300D0161SW001

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	316559, 141532	RS11L010220	No	No	No	No	Moderate
Downstream	317187, 141086	RS11L010310	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
Ammonia-Total (as N) mg/l	RS11L010220	0.106	RS11L010310	0.188	0.065	127.3
ortho-Phosphate (as P) - unspecified mg/l	RS11L010220	0.086	RS11L010310	0.298	0.035	607.1
Temperature °C	RS11L010220	15	RS11L010310	16	N/A	
pH pH units	RS11L010220	7.88	RS11L010310	7.85	N/A	
Total Nitrogen mg/l	RS11L010220	5.10	RS11L010310	6.12	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
BOD, 5 days with Inhibition (Carbonaceous) mg/l	RS11L010220	1.93	RS11L010310	2.43	N/A	
Dissolved Oxygen mg/l	RS11L010220	6.92	RS11L010310	6.62	N/A	

Significance of Results:

The WWTP discharge was not compliant with the ELV's set in the wastewater discharge licence for the following: Ammonia-Total (as N) mg/l.

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, 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: 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 - KILMUCKRIDGE WWTP

2.1.4.1 Treatment Efficiency Report - Kilmuckridge 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	42915	458	99
TN	8281	2854	66
COD	96121	3470	96
TP	911	94	90
SS	36472	1575	96

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

2.1.4.2 Treatment Capacity Report Summary - Kilmuckridge 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.

Kilmuckridge WWTP	
Peak Hydraulic Capacity (m³/day) - As Constructed	2700
DWF to the Treatment Plant (m³/day)	450
Current Hydraulic Loading - annual max (m³/day)	888
Average Hydraulic loading to the Treatment Plant (m³/day)	407.49
Organic Capacity (PE) - As Constructed	2000
Organic Capacity (PE) - Collected Load (peak week)^{Note1}	1617
Organic Capacity (PE) - Remaining	383
Will the capacity be exceeded in the next three years? (Yes/No)	Yes

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 - KILMUCKRIDGE 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)
Abatement equipment off-line	Plant or equipment breakdown at WWTP	No	No

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
TBC	316761,141244	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	TBC

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
D0161-SIP:01	Upgrade of WWTP to achieve limit for Orthophosphate by 31/12/13	C	31/12/2014	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
D0161-01-Priority Substances Assessment	Yes	No
D0161-01-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?	N/A
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?	N/A
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: *Kilmuckridge* Waste Water Treatment Plant 2023



**Report to Uisce Éireann
Limnos Consultancy, January 2024**

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Kilmuckridge WWTP

Introduction

Small Streams Risk Score (SSRS) assessments on the Litter More River upstream and downstream of the Kilmuckridge 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 Kilmuckridge WWTP. The river flows South.

Table 2. Location of sites sampled upstream and downstream of Kilmuckridge WWTP.

Location	Kilmuckridge WWTP Upstream	Kilmuckridge WWTP Downstream
EPA Code	RS11L010220	RS11L010310
Station	Bridge in Kilmuckridge	100m d/s WWTP discharge
River	Litter More	Litter More
Easting	316560	316778
Northing	141532	141242

Results

Site Photographs

Figure 2 shows photographs taken at Site 1 and Site 2 upstream and downstream of the Kilmuckridge WWTP on 5 December 2023, taken when sampling.



Figure 2. Upstream (U/S) and downstream (D/S) of Kilmuckridge 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. In this case no taxa belonging to pollution-sensitive groups: Group 1, 2 or 3 Ephemeroptera, Plecoptera and Trichoptera were found. Both sites has seven taxa.

The upstream site was dominated by *Asellus* and Tubificidae were numerous. Both are highly tolerant of organic pollution. The presence of the red 'blood worm' *Chironomus* also indicates very poor conditions. The SSRS score of 1.6 is very low and the Q-Value assigned was Q2 – indicating Bad Status upstream of the WWTP discharge. The site downstream of the WWTP discharge once again had excessive numbers of *Gammarus* with numerous blackfly larvae Simuliidae and *Baetis rhodani*. The score was higher than the upstream site at an SSRS of 2.4 and a Q-value of Q2-3. This further emphasises the very poor condition of the stream in the village of Kilmuckridge upstream of the WWTP. As indicated in the 2022 report on Kilmuckridge, this does not necessarily mean that the WWTP has little impact on the stream.

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

		Kilmuckridge	Kilmuckridge
		Upstream WWTP	Downstream WWTP
SSRS Group	Taxon	05/12/2023	05/12/2023
4, GOID	Chironomidae	Few	Few
4, GOID	<i>Chironomus</i>	Few	-
4, GOID	Lumbriculidae	Few	-
4, GOID	Simuliidae	-	Numerous
4, GOID	Tubificidae	Numerous	Few
5, Asellus	<i>Asellus</i>	Dominant	Few
n/a	<i>Baetis rhodani</i>	-	Numerous
n/a	<i>Erpobdella octoculata</i>	-	Few
n/a	<i>Gammarus</i>	Numerous	Excessive
n/a	<i>Glossiphonia complanata</i>	Few	-
	Number Taxa	7	7
	SSRS	1.6	2.4
		Stream at Risk!	Stream at Risk!
	Q-Value	Q2	Q2-3

Physico-Chemical Results

Table 4 gives the physico-chemical measurements made on the day of sampling. Dissolved oxygen was somewhat better than those recorded in 2022, but still low enough to give cause for concern. Conductivity was once again very high at 577 and 665 $\mu\text{S}/\text{cm}$ respectively, upstream and downstream. .

Table 4. Physico-chemical results for Kilmuckridge River, 5 December 2023.

Station	Dissolved Oxygen (DO) % Saturation	DO mg/l	Temp. °C	Conductivity $\mu\text{S}/\text{cm}$	pH
Upstream Kilmuckridge WWTP	90.4	11.05	6.7	577	7.39
Downstream Kilmuckridge WWTP	85.7	10.33	7.2	665	7.30

Summary

The Litter More River was once again in very poor condition in Kilmuckridge village upstream of the Kilmuckridge WWTP discharge. The pollution source may be agricultural or industrial – investigative assessment is needed to source the cause. Downstream of the WWTP discharge the stream was in better condition than at the upstream site although still in poor condition. It is difficult to assess the extent of the impact of the WWTP due to the stream’s bad status upstream. On the day of sampling a maintenance team were repairing a set of gears in the WWTP’s oxidation ditch. The plant hadn’t been working properly for the past few days.

Reference

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