Annual Environmental Report

2022

Castledermot

D0236-01

CONTENTS

1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2022 AER

This Annual Environmental Report has been prepared for D0236-01, Castledermot, in Kildare 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 2022.

1.2 TREATMENT SUMMARY

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

- Castledermot WWTP with a Plant Capacity PE of 2400, 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
TPEFF1400D0236SW001	Castledermot WWTP	Treated	Non-Compliant	Ammonia-Total (as N) mg/l ortho-Phosphate (as P) - unspecified mg/l Total Phosphorus (as P) mg/l

1.4 LICENCE SPECIFIC REPORTING

Assessment / Report
Small Stream Risk Score Assessment

2 TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY

2.1 CASTLEDERMOT WWTP - TREATED DISCHARGE

2.1.1 INFLUENT MONITORING SUMMARY - CASTLEDERMOT 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
ortho-Phosphate (as P) - unspecified mg/l	5	4.80	2.45
Ammonia-Total (as N) mg/l	12	61	30
pH pH units	4	7.63	7.54
Suspended Solids mg/l	12	528	207
BOD, 5 days with Inhibition (Carbonaceous) mg/l	12	438	170
COD-Cr mg/l	12	1475	488
Total Nitrogen mg/l	12	249	70
Total Phosphorus (as P) mg/l	12	9.38	4.47
Hydraulic Capacity	N/A	1509	374

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 - TPEFF1400D0236SW001

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	17	Pass
Suspended Solids mg/l	30	75	N/A	12	N/A	N/A	6.51	Pass
BOD, 5 days with Inhibition (Carbonaceous) mg/l	10	20	N/A	12	1	N/A	2.70	Pass
pH pH units	6.00	9.00	N/A	12	N/A	N/A	7.13	Pass
Total Phosphorus (as P) mg/l	0.700	0.840	N/A	12	2	2	0.437	Fail
Ammonia-Total (as N) mg/l	0.600	1.20	N/A	12	2	1	0.291	Fail
ortho-Phosphate (as P) - unspecified mg/l	0.300	0.600	N/A	11	4	2	0.278	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	12	
Conductivity @20°C µS/cm	N/A	N/A	N/A	7	N/A	N/A	623	
Apparent colour PtCo Units	N/A	N/A	N/A	6	N/A	N/A	56	
True Colour PtCo Units	N/A	N/A	N/A	1	N/A	N/A	51	

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):

Plant or Equipment Breakdown & Inadequate Operational Procedures / Training

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 TPEFF1400D0236SW001

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	277669, 184624	RS14L010120	No	No	No	No	Poor
Downstream	277507, 184609	RS14L010140	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 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 concentration downstream of the effluent discharge is noted.

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

As per the 3rd Cycle Barrow Report (HA 14), Agriculture, Urban Runoff and Hydromorphology are significant pressures on Lerr_020 waterbody. The Castledermot WWTP is not cited as a significant pressure in the Cycle 3 Report.

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 - CASTLEDERMOT WWTP

2.1.4.1 Treatment Efficiency Report - Castledermot 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	32520	891	97
SS	39474	2151	95
TN	13390	3820	71
TP	853	144	83
COD	93002	5573	94

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

2.1.4.2 Treatment Capacity Report Summary - Castledermot 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.

Castledermot WWTP	
Peak Hydraulic Capacity (m^3/day) - As Constructed	1350
DWF to the Treatment Plant (m^3/day)	540
Current Hydraulic Loading - annual max (m^3/day)	1509

Castledermot WWTP	
Average Hydraulic loading to the Treatment Plant (m^3/day)	374
Organic Capacity (PE) - As Constructed	2400
Organic Capacity (PE) - Collected Load (peak week)[Note1]	1812
Organic Capacity (PE) - Remaining	588
Will the capacity be exceeded in the next three years? (Yes/No)	No

Note1: 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 - CASTLEDERMOT 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 2022.			

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	No. of incident occurrences	Recurring (Y/N)	Closed (Y/N)
Breach of ELV	Plant or equipment breakdown at WWTP	1	No	Yes
Breach of ELV	Plant or equipment breakdown at WWTP	1	No	Yes
Breach of ELV	Inadequate Operational Procedures / Training	1	No	No

Incident Type	Cause	No. of incident occurrences	Recurring (Y/N)	Closed (Y/N)
Uncontrolled release	EO caused by power failure	1	No	Yes
Uncontrolled release	SWO exceptional rainfall and overflow expected	1	No	Yes
Uncontrolled release	EO caused by pump failure	1	No	Yes

3.2.2 SUMMARY OF OVERALL INCIDENTS

Question	Answer
Number of Incidents in 2022	6
Number of Incidents reported to the EPA via EDEN in 2022	6
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 2022 (No. of events)	Total volume discharged in 2022 (m3)	Monitoring Status
SW-3	277646, 184620	Yes	Low Significance	Meeting Criteria	Unknown	156	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 sewage was discharged via monitored SWOs in the agglomeration in the year (m^3)?	156
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
D0236-SIP:01	Upgrade of SWO to comply with the criteria outlined in the DoEHLG "Procedures and criteria in relation to storm water overflows, 1995". SW2	C	31/12/2012	Yes	Works Completed		
D0236-SIP:02	Upgrade of SWO to comply with the criteria outlined in the DoEHLG "Procedures and criteria in relation to storm water overflows, 1995". SW3	C	31/12/2012	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	Year included in AER	Included in this AER
Priority Substances Assessment	Yes	2011	No
Small Stream Risk Score Assessment	Yes	2017	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	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	N/A

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

Date: 23/02/2023

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

Acting Head of Environmental Regulation.

7 APPENDIX

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

Castledermot Ambient Monitoring Summary 2022

			Receiving Waters Designation (Yes/No)					Mean (mg/l)		
Ambient Monitoring Point from WWDL (or as agreed with EPA)	**Irish National Grid Reference (Easting, Northing)**	**EPA Feature Coding Tool code**	**Bathing Water**	**Drinking Water**	**FWPM**	**Shellfish**	**Current WFD Status**	**cBOD**	**o-Phosphate (as P)**	**Ammonia (as N)**
Upstream Monitoring Point	277669, 184624	RS14L010120	No	No	No	No	Poor	1.044	0.053	0.055
Downstream Monitoring Point	277507, 184609	RS14L010140	No	No	No	No	Poor	0.819	0.048	0.070
Difference								*-0.225*	*-0.005*	*0.016*
EQS								1.500	0.035	0.065
% of EQS								-15.000%	-14.286%	24.139%

Castledermot Ambient Monitoring Summary 2022

Upstream Results											
Date		Temperature °C	pH pH units	BOD mg/ l	COD mg/l	Suspended solids mg/l	Total Nitrogen mg/l	Total Phosphorus mg/l	Ammonia mg/l	Ortho-Phosphate mg/l	DO mg/l
24/02/2022	U/S		8.01	1			7.6		0.06	0.03	11.6
23/03/2022	U/S	16.6	7.2	< 1			7.9		0.09	0.03	11.1
13/04/2022	U/S	17.2	8.3	< 1			7.9		0.03	0.02	8.1
12/05/2022	U/S	18.2	8.3	< 1			7.9		< 0.02	0.01	10.9
08/06/2022	U/S	20.4	8.1	2.6			7.5		0.03	0.03	9
08/06/2022	U/S	20.4	8.1	3		56	7.5		0.03	0.03	9
06/07/2022	U/S	19.8	8.3	1.1			7.7		0.04	0.04	9.8
17/08/2022	U/S	15.2	8.2	< 1			8.2		0.02	0.04	8.17
06/09/2022	U/S		7.48	0.9	11.8	2.8	6.62	0.11	0.16	0.1	8.67
13/10/2022	U/S		7.75	0.2	6.4	1.6	6.87	0.094	0.06	0.09	9.06
10/11/2022	U/S		7.78	0.4	10.3	0.8	6.82	0.094	0.06	0.09	9.03
02/12/2022	U/S		7.8	0.5	1.6	2.8	7.95	0.139	0.06	0.13	9.74
Mean		**18.257**	**7.943**	**1.044**	**7.525**	**12.800**	**7.538**	**0.109**	**0.055**	**0.053**	**9.514**
95%ile		**20.400**	**8.300**	**2.780**	**11.575**	**45.360**	**8.063**	**0.135**	**0.122**	**0.114**	**11.325**

Downstream Results											
		Temperature °C	pH pH units	BOD mg/ l	COD mg/l	Suspended solids mg/l	Total Nitrogen mg/l	Total Phosphorus mg/l	Ammonia mg/l	Ortho-Phosphate mg/l	DO mg/l
24/02/2022	D/S		8.06	0.2			7.5		0.08	0.03	12.6
23/03/2022	D/S	17.9	8.2	< 1			8.4		0.09	0.02	11.3
13/04/2022	D/S	17.2	8.3	< 1			7.7		< 0.02	0.06	11.1
12/05/2022	D/S	18.2	8.3	< 1			8.1		< 0.02	0.01	10.8
08/06/2022	D/S	20.5	8.1	1		< 4	7.5		0.06	0.03	10.8
08/06/2022	D/S	20.5	8.1	1.1			7.5		0.06	0.03	10.8
06/07/2022	D/S	20.1	8.3	1.3			7.9		0.03	0.05	9.55
17/08/2022	D/S	15.3	8.2	< 1			8.2		< 0.02	0.04	7.98
06/09/2022	D/S		7.56	1.4	15	33.2	6.97	0.149	0.2	0.1	8.67
13/10/2022	D/S		7.76	0.8	10.9	11.2	7.26	0.108	0.13	0.07	9.22
10/11/2022	D/S		7.8	0.6	14.3	1.2	6.48	0.089	0.1	0.08	9.17
02/12/2022	D/S		7.84	0.6	0.9	3.6	7.9	0.063	0.05	0.06	10.12
Mean		**18.529**	**8.043**	**0.819**	**10.275**	**10.406**	**7.618**	**0.102**	**0.070**	**0.048**	**10.176**
95%ile		**20.500**	**8.300**	**1.345**	**14.895**	**28.800**	**8.290**	**0.143**	**0.162**	**0.089**	**11.885**

Note: 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.

Castledermot Small Stream Risk Score 2022

Produced by

AQUAFACT International Services Ltd

For

Kildare County Council

November 2022

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Report Approval Sheet

Client	Kildare County Council
Report Title	Castledermot Small Stream Risk Score 2022
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Rev	Status	Issue Date	Document File Name	Author (s)	Approved by:
1	Draft	30/11/2022	JN1741 Castledermot SSRS 2022	Aaron Skehan	E. McCormack
2	Final	05/12/2022	JN1741 Castledermot SSRS 2022 Final	Aaron Skehan	E. McCormack

AQUAFACT
APEM Group

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Appendices

1. Introduction

AQUAFACT was contracted by Kildare County Council to carry out an SSRS assessment of the discharge belonging to Castledermot wastewater treatment plants. A sample was taken upstream and downstream of the discharge point. The sampling was carried out on the 25th of October 2022.

2. Methodology

2.1. Sampling

Two kick samples were taken (See Figure 2.1 and Table 2.1). The two-minute kick and one minute stone wash sampling method was employed to collect samples of macroinvertebrates for analysis. This involved placing a standard hand net of pore size 500µm in the river, facing upstream and disturbing the riverbed in front of the net mouth. The surveyor then moved in a diagonal direction upstream to ensure that different micro-habitats were included in the sample. Net sweepings of any submerged marginal plants were also conducted. The kick method dislodges macroinvertebrates from the substrates and submerged plant material. This was continued for approximately two minutes and followed by one minute of stone washing (Lucey *et al.*, 1999).

The macroinvertebrate assemblages of each sample were returned to the lab, preserved in 70% industrial methylated spirits, identified and enumerated. The details of the macroinvertebrate assemblages were recorded on data sheets. The resulting species list was then used to assign the SSRS score to the sampled streams.

The IFI's 2010 Biosecurity Protocol for Field Survey Work document was followed during sampling. Nets and all other equipment were thoroughly disinfected between stations.

Figure 2.1: Castledermot SSRS sampling sites.

Table 2.1: Castledermot SSRS station coordinates.

Station	Easting	Northing
Castledermot aSW1-PU	277669	184624
Castledermot aSW1-PD	277507	184609

2.2. Small Stream Risk Score

The Small Streams Risk Score (SSRS) is a biological risk assessment system for identifying rivers that are 'at risk' of failing to achieve the 'good' water quality status goals of the Water Framework Directive (WFD). It was developed by the Environmental Protection Agency (EPA) in association with the Western River Basin District (WRBD) in 2006 and revised in 2009.

The SSRS method is a rapid field methodology for risk assessment that is based solely on macroinvertebrate indicators of water quality and their well-understood response to pollution. Importantly, the SSR score indicates whether or not the stream is at risk from pollution and is not a measurement of the ecological health of the stream. The SSRS score ranges from 0-11.2.

Table 2.2: SSRS Categories.

SSRS range	Category
<6.5	Stream at Risk
>6.5-7.25	Indeterminate stream may be at risk
>7.25	Probably not at risk

3. Results

Table 3.1 presents a list of the taxa recorded in each sample and their relative abundance and Table 3.2 presents the SSRS. The full SSRS data sheets and scoring are presented in Appendix 2. Based on the SSR score both the upstream and downstream stations were categorised as 'Stream at risk' of not meeting Good status, although the upstream station received a higher score. The stream substrate was the same at both stations with a mix of cobbles and gravel. The velocity was fast at both stations. The downstream station was mostly riffle habitat while the upstream station was mostly glide habitat. Significant levels of calcification were present

on the substrate at both upstream and downstream stations. This is likely due to eutrophication.

Table 3.1: SSRS relative abundance of taxa

Taxa	Upstream	Downstream
Trichoptera		
Hydropsychidae	2	2
Sericostomatidae	1	1
Rhyacophila	1	
Oligochaeta		
Lumbriculus		1
Diptera		
Chironomidae		1
Simuliidae		1
Tipulidae	1	

Table 3.2: Biological sampling results.

Station	SSRS score	SSRS category
Castledermot aSW1-PU	4.8	Stream at risk
Castledermot aSW1-PD	4.0	Stream at risk

4. Castledermot WWTP comparison 2015 to 2022

Table 4.1 compares the SSRS results from 2015 to 2022 and **Error! Reference source not found.** displays the trend over time. Both upstream and downstream stations have been 'at risk' since 2015 with the exception of 2017 and 2020 when upstream was 'Indeterminate stream may be at risk'. In 2016, 2018 and 2021 the downstream sample had a higher SSRS score than the upstream. In all other years the upstream sample scored higher.

Table 4.1: Castledermot WWTP- SSRS Comparison 2015 -2022

Site	SSRS								SSRS Risk Category							
	2015	2016	2017	2018	2019	2020	2021	2022	2015	2016	2017	2018	2019	2020	2021	2022
U/S	5.6	3.2	7.2	5.6	6.4	7.2	4.8	4.8	AR	AR	Indet.	AR	AR	Indet.	AR	AR
D/S	3.2	4	4.8	6.4	5.6	4.0	6.4	4.0	AR	AR	AR	AR	AR	AR	AR	AR

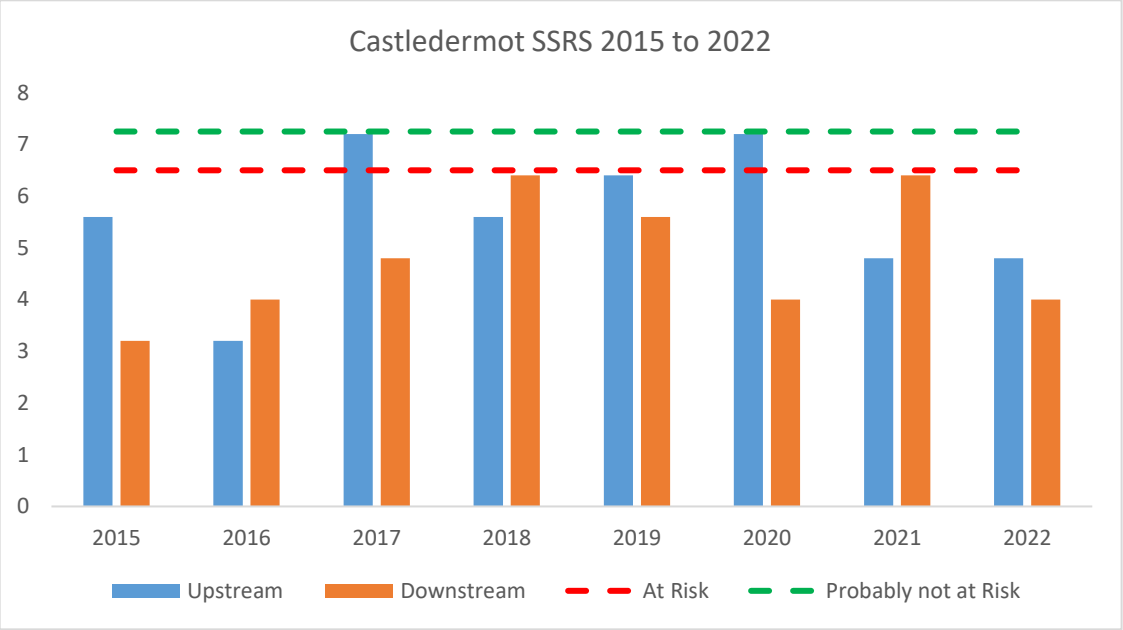


Figure 4.1: Castledermot WWTP SSRS scores 2015 to 2022

5. References

EPA. 2015. Guidance on Application and Use of the SSRS in Enforcement of Urban Waste Water Discharge Authorisations in Ireland. https://www.epa.ie/publications/compliance--enforcement/waste-water/SSRS-in-Enforcement-of-UWWDAs.pdf Accessed September 2021.

Lucey, J., Bowman, J.J., Klabby, K.J., Cunningham, P., Lehane, M., MacCarthaigh, M., McGarrigle, M.L. and Toner, P.F. 1999. Water Quality in Ireland, 1995 – 1997. EPA.

Appendix 1

Photo log

Castledermot upstream

Castledermot downstream

Appendix 2

SSRS Data Sheets

CASTLEDERMOT DOWNSTREAM

River:	Code:	Date: 25-10-22	Time: 15.30
Station no. DOWNSTREAM	**Location:** CASTLEDERMOT		**Grid (6 figure):**
	Stream Order:		**Stream flow:** Riffle / (Riffle/Glide) / Slow flow

Field Chemistry	
DO%	
DO mg/l	
Temp (°C)	
Conductivity	
pH	
Bank width (cm)	5
Wet width (cm)	3
Avg Depth (cm)	
Staff gauge	
Velocity	**Colour**
Torrential	None
(Fast)	(Slight)
Moderate	Moderate
Slow	High
Very slow	
Clarity	**Discharge**
Very clear	Flood
(Clear)	(Normal)
Slightly turbid	Low
Highly turbid	Very Low
	Dry
	(Recent Flood)

Modifications: Y/N Canalised-widened-bank erosion-arterial drainage

Dominant Types:
Bedrock
Boulder (>128mm)
Cobble (32-128mm)
Gravel (8-32mm)
Fine Gravel (2-8mm)
Sand (0.25-2mm)
Silt (<0.25mm)

Slope: (Low) – Medium – High – Very High

Geology: Calcareous-Siliceous-Mixed

Substratum Condition: (Calcareous)-Compacted-Loose - Normal

Substratum: (Stoney bottom)-Muddy bottom-Mud over stones

Degree of siltation: (Clean)-Slight-Moderate-Heavy

Depth of mud: None: <1cm: 1-5cm: 5-10cm: >10cm

Litter: None – (Present) – Moderate - Abundant

Shading: High – (Moderate) – Low - None

Cattle access Y: upstream – (downstream) or N

Photo: (Y) / N

Filamentous Algae: None – Present – Moderate - Abundant

Sewage Fungus: None – Present – Moderate - Abundant

Main land use u/s:
(Pasture) Urban
Bog Tillage
Forestry Other

Sample retained: Y / N

Sampled in Minutes:
Pond net x
Stone wash x
Weed sweep x

General Comments:
Calcification present

Macroinvertebrate Composition

The macroinvertebrates are divided into the following 5 specific groups:

- Group 1 = Ephemeroptera (3-tails) – note that tails may be damaged during sampling
- Group 2 = Plecoptera (2-tails) - note that tails may be damaged during sampling
- Group 3 = Trichoptera
- Group 4 = G.OL.D (Gastropoda, Oligochaeta and Diptera)
- Group 5 = *Asellus*
- Calculate the total number of taxa and relative abundance of each macroinvertebrate group below: (Abundance – Ab)

Relative Abundance	
1-5	1
6-20	2
21-50	3
51-100	4
101+	5

Ephemeroptera:		**Plecoptera:**	
Ecdyonurus Ab		*Leuctra* Ab	
Rhithrogena Ab		*Isoperla* Ab	
Heptagenia Ab		*Protonemura* Ab	
Ephemerella Ab		*Amphinemura* Ab	
Caenis Ab		*Perla* Ab	
Paraleptophlebia Ab		*Dinocras* Ab	
Ephemera danica Ab		Other Plecop Ab	
Other Ephem Ab		Other Plecop Ab	
Total no. of taxa	**Total Relative Abundance**	**Total no. of Taxa**	**Total Relative Abundance**

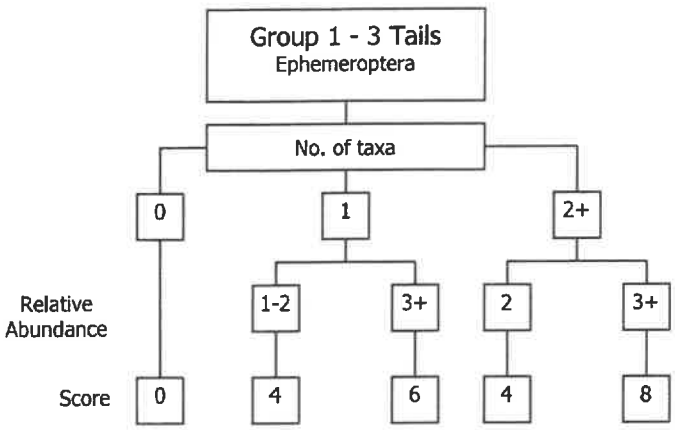
Trichoptera:		**G.OL.D:**				**Asellus:**	
Hydropsychidae Ab	11	*Lymnaea* (G) Ab		Chironomidae (D) Ab	1	Absent	
Polycentropodidae Ab		*Potamopyrgus* (G) Ab		*Chironomus* (D) Ab		Few/Low	✓
Rhyacophila Ab		*Planorbis* (G) Ab		Simuliidae (D) Ab	3	Common/ Numerous	
Philopotamidae Ab		*Ancylus* (G) Ab		*Dicranota* (D) Ab			
Limnephilidae Ab		*Physa* (G) Ab		Tipulidae (D) Ab			
Sericostomatidae Ab	3	*Lumbriculus* (Ol) Ab	5	Ceratopogonidae (D) Ab			
Glossosomatidae Ab		*Eiseniella* (Ol) Ab		Other GOLD Ab			
Lepidostomatidae Ab		Tubificidae (Ol) Ab					
Other Trichoptera Ab							
Total no. of Taxa	2	**Total Relative Abundance**	3	**Total no. of Taxa**	3	**Total Relative Abundance**	3

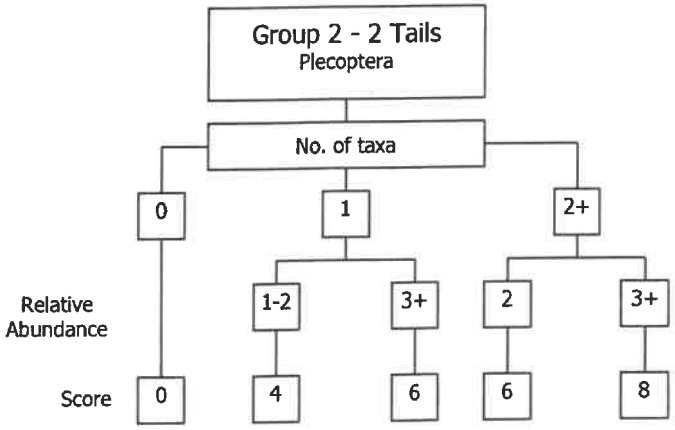
NOTE: *Asellus* must be recorded as absent if none are found

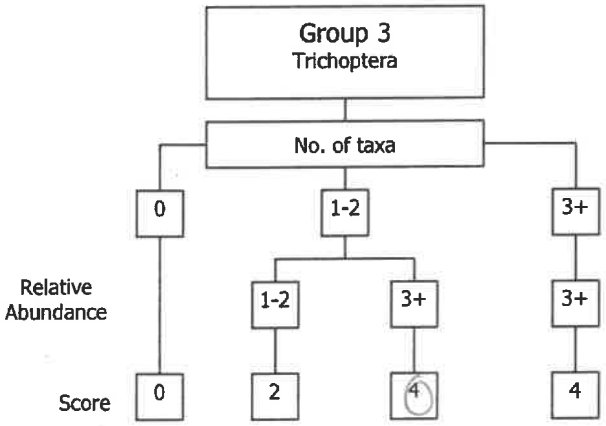
NOTE *Baetis* is an Ephemeropteran and is the most commonly occurring invertebrate genus in streams in Ireland. It is vital that *Baetis* is not counted in SSRS. See Appendix B for more details on how to identify *Baetis*.

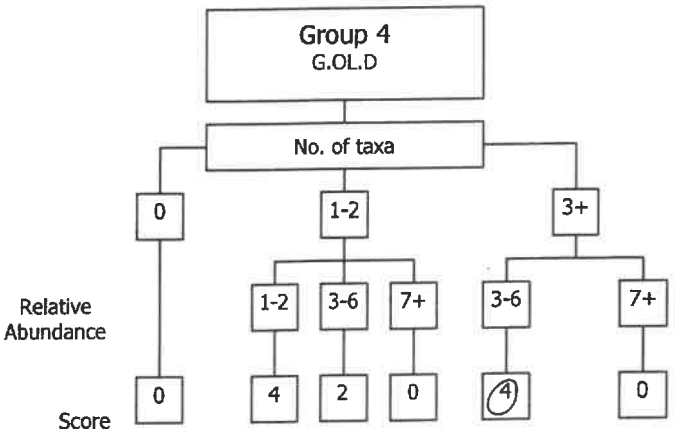
CASTLEDERMOT DOWNSTREAM

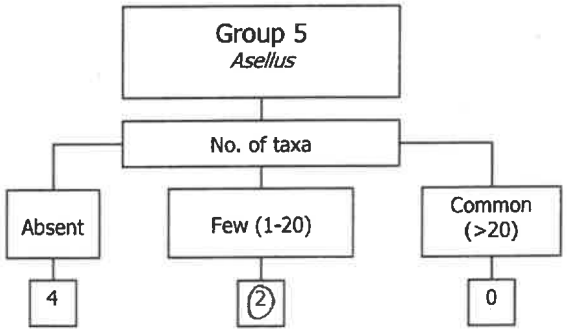
Step 1. Calculate the Index Score by circling the appropriate box representing the total number of taxa and the total abundance calculated from ***each macroinvertebrate group*** calculated from page 1 of the recording sheet and enter in to the boxes in Step 2.











Step 2

a) Index Score Group 1	0
b) Index Score Group 2	0
c) Index Score Group 3	4
d) Index Score Group 4	4
e) Index Score Group 5	2

Step 3. Calculate the Total Index Score, the Average Index Score and the SSR Score using the boxes below

Total Index Score (TIS) sum (a+b+c+d+e)	10	Average Index Score (AIS) TIS/5 (5 for 5 groups)	2	**SSR Score** (AIS x 2)	4.0

Step 4. Assess the stream by comparing the final SSR score with the categories below and tick the appropriate box

> 7.25 Probably not at risk		> 6.5 – 7.25 Indeterminate Stream may be at risk		<6.5 Stream at risk	✓

Surveyor (signed): Karen Ftaher Name (print): AARON SKEHAN Date: 25 / 10 / 22

[redacted] CASTLEDERMOT UPSTREAM

River:	Code:	Date: 25-10-22	Time:
Station no. UPSTREAM	**Location:** CASTLEDERMOT		**Grid (6 figure):**
	Stream Order:		**Stream flow:** (Riffle) Riffle/Glide Slow flow

Field Chemistry	
DO%	
DO mg/l	
Temp (°C)	
Conductivity	
pH	
Bank width (cm)	4
Wet width (cm)	2
Avg Depth (cm)	
Staff gauge	

Velocity	Colour
Torrential	None
(Fast)	(Slight)
Moderate	Moderate
Slow	High
Very slow	

Clarity	Discharge
Very clear	Flood
(Clear)	Normal
Slightly turbid	Low
Highly turbid	Very Low
	Dry
	(Recent Flood)

Modifications: Y/N Canalised-widened-bank erosion-arterial drainage

Dominant Types:
Bedrock
Boulder (>128mm)
Cobble (32-128mm)
Gravel (8-32mm)
Fine Gravel (2-8mm)
Sand (0.25-2mm)
Silt (<0.25mm)

Slope: (Low) – Medium – High – Very High

Geology: Calcareous-Siliceous-Mixed

Substratum Condition: (Calcareous) Compacted-Loose - Normal

Substratum:
(Stoney bottom) Muddy bottom-Mud over stones

Degree of siltation: Clean-Slight-Moderate-Heavy

Depth of mud: None: <1cm: 1-5cm: 5-10cm: >10cm

Litter: None – Present – Moderate - Abundant

Shading: High – (Moderate) – Low - None

Cattle access Y: upstream – (downstream) or N

Photo: (Y) / N

Filamentous Algae:
None – Present – Moderate - Abundant

Sewage Fungus:
None – Present – Moderate - Abundant

Main land use u/s:

(Pasture)	Urban
Bog	Tillage
Forestry	Other

Sample retained: Y / N

Sampled in Minutes:
Pond net x
Stone wash x
Weed sweep x

General Comments:

Calcification present

Macroinvertebrate Composition

The macroinvertebrates are divided into the following 5 specific groups:

- Group 1 = Ephemeroptera (3-tails) – note that tails may be damaged during sampling
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- Calculate the total number of taxa and relative abundance of each macroinvertebrate group below: (Abundance – Ab)

Relative Abundance	
1-5	1
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51-100	4
101+	5

Ephemeroptera:		**Plecoptera:**	
Ecdyonurus Ab		*Leuctra* Ab	
Rhithrogena Ab		*Isoperla* Ab	
Heptagenia Ab		*Protonemura* Ab	
Ephemerella Ab		*Amphinemura* Ab	
Caenis Ab		*Perla* Ab	
Paraleptophlebia Ab		*Dinocras* Ab	
Ephemera danica Ab		Other Plecop Ab	
Other Ephem Ab		Other Plecop Ab	
Total no. of taxa	**Total Relative Abundance**	**Total no. of Taxa**	**Total Relative Abundance**

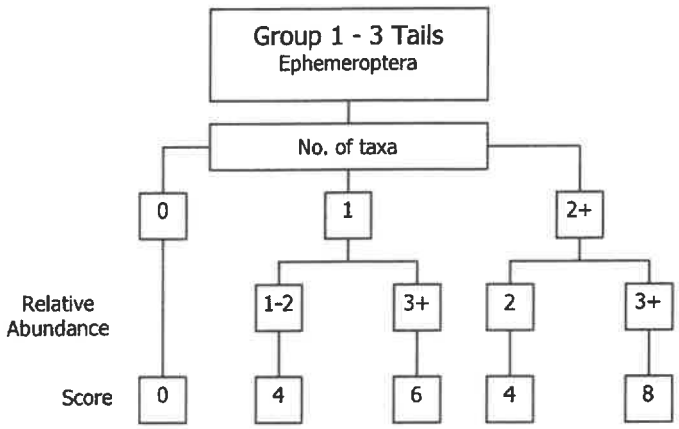
Trichoptera:		**G.OL.D:**				**Asellus:**	
Hydropsychidae Ab	6	*Lymnaea* (G) Ab		Chironomidae (D) Ab		Absent	✓
Polycentropodidae Ab		*Potamopyrgus* (G) Ab		*Chironomus* (D) Ab		Few/Low	
Rhyacophila Ab	2	*Planorbis* (G) Ab		Simuliidae (D) Ab		Common/ Numerous	
Philopotamidae Ab		*Ancylus* (G) Ab		*Dicranota* (D) Ab			
Limnephilidae Ab		*Physa* (G) Ab		Tipulidae (D) Ab	3		
Sericostomatidae Ab	1	*Lumbriculus* (OI) Ab		Ceratopogonidae (D) Ab			
Glossosomatidae Ab		*Eiseniella* (OI) Ab		Other GOLD Ab			
Lepidostomatidae Ab		Tubificidae (OI) Ab					
Other Trichoptera Ab							
Total no. of Taxa	3	**Total Relative Abundance**	4	**Total no. of Taxa**	1	**Total Relative Abundance**	1

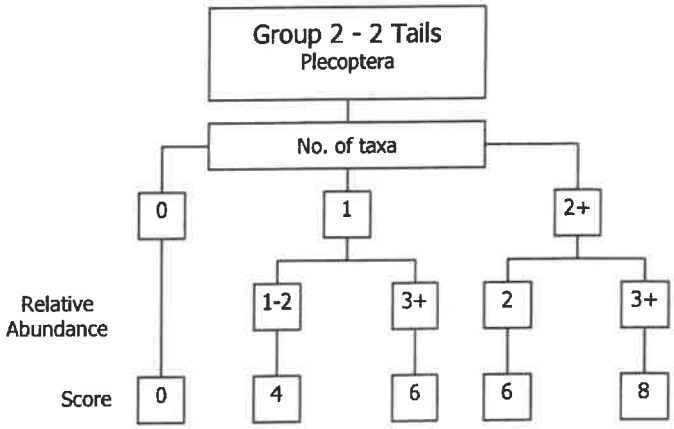
NOTE: *Asellus* must be recorded as absent if none are found

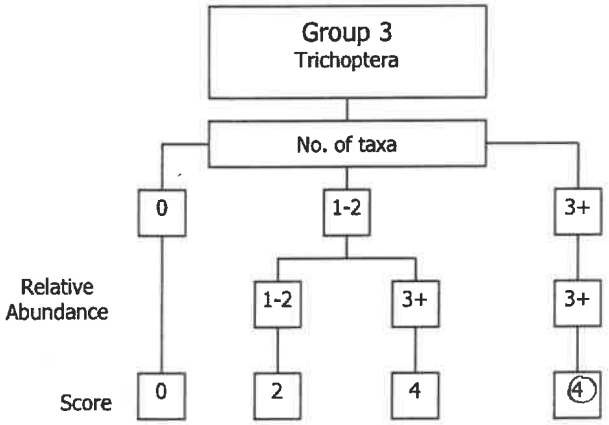
NOTE *Baetis* is an Ephemeropteran and is the most commonly occurring invertebrate genus in streams in Ireland. It is vital that *Baetis* is not counted in SSRS. See Appendix B for more details on how to identify *Baetis*.

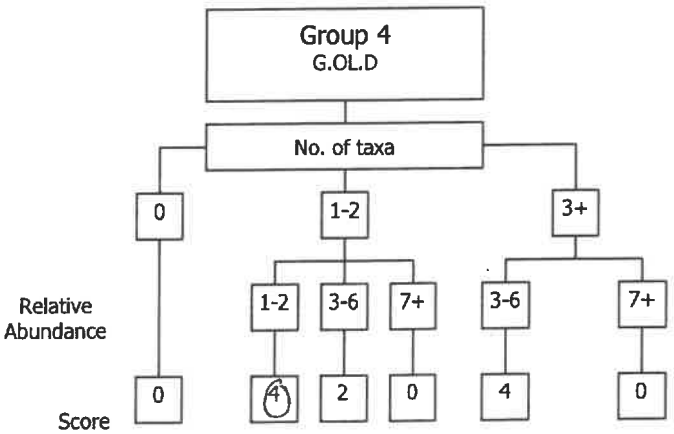
CASTLE DERMOT UPSTREAM

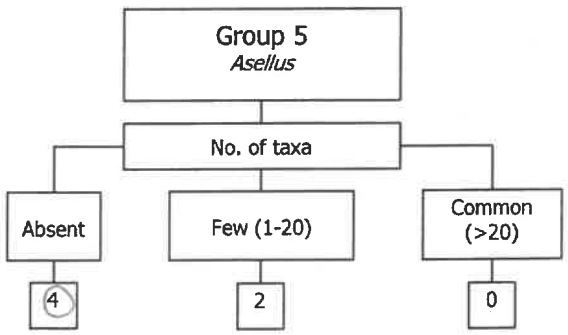
Step 1. Calculate the Index Score by circling the appropriate box representing the total number of taxa and the total abundance calculated from ***each macroinvertebrate group*** calculated from page 1 of the recording sheet and enter in to the boxes in Step 2.











Step 2

a) Index Score Group 1	0
b) Index Score Group 2	0
c) Index Score Group 3	4
d) Index Score Group 4	4
e) Index Score Group 5	4

Step 3. Calculate the Total Index Score, the Average Index Score and the SSR Score using the boxes below

Total Index Score (TIS) sum (a+b+c+d+e)	12	Average Index Score (AIS) TIS/5 (5 for 5 groups)	2.4	**SSR Score** (AIS x 2)	4.8

Step 4. Assess the stream by comparing the final SSR score with the categories below and tick the appropriate box

> 7.25 Probably not at risk		> 6.5 – 7.25 Indeterminate Stream may be at risk		<6.5 Stream at risk	✓

Surveyor (signed): Aaron Skehan Name (print): AARON SKEHAN Date: 25 / 10 / 22