# Annual Environmental Report

2022



Castledermot

D0236-01

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#### 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/I	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	

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
ТР	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 (m³/day) - As Constructed	1350
DWF to the Treatment Plant (m³/day)	540
Current Hydraulic Loading - annual max (m³/day)	1509

Castledermot WWTP	
Average Hydraulic loading to the Treatment Plant (m³/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 environme	ental 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 (m³)?	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	С	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	С	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 improver	ments 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**

			Receivin	g Waters D	esignation	(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/ I	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	
ı	Mean	18.257	7.943	1.044	7.525	12.800	7.538	0.109	0.055	0.053	9.514	
9	5%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/ I	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
١	Mean	18.529	8.043	0.819	10.275	10.406	7.618	0.102	0.070	0.048	10.176
9	5%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**

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#### **Appendices**

Appendix 1: Photo log

Appendix 2: SSRS Data Sheets

#### 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 25<sup>th</sup> 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

Таха	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

				SS	RS						S	SRS Risk	Catego	ry		
Site	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

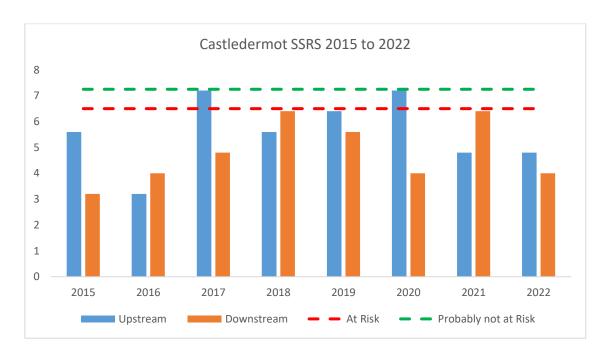


Figure 4.1: Castledermot WWTP SSRS scores 2015 to 2022

#### 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

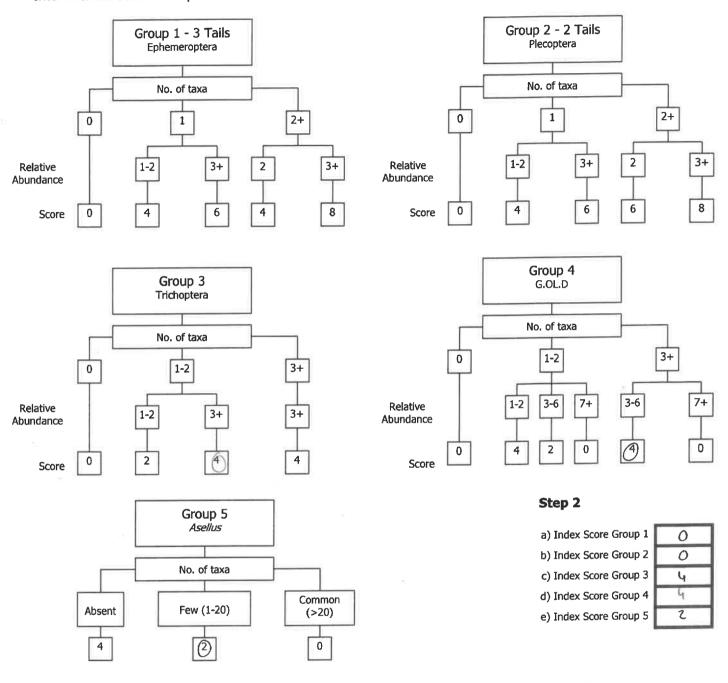


## CASTLEDERMOT DOWNSTREAM

General Comments:  The macroinvertebrates  Group 1 = Ephe	Colour None (Slight) Moderate High  Discharge Flood Normal Low Very Low Dry Recent Flood	arterial drainage Dominant Type Bedrock Boulder (>128mi Cobble (32-128mi Gravel (8-32mm) Fine Gravel (2-8r Sand (0.25-2mm Silt (<0.25mm)  Slope: Low Me Geology: Calcar Substratum Co Loose - Normal Substratum: Stoney bottom-M Degree of siltar Depth of mud: Litter: None - P	y/N Canalised-wide  s:  m)  mm)  mm)  edium – High – Ver  eous-Siliceous-Mixe  ndition: Calcareou  luddy bottom-Mud  tion: Clean-Slight-I  None: <1cm: 1-5c  resent – Moderate  gae:	y High ed us-Compacted- over stones Moderate-Heavy m: 5-10cm: >10cm - Abundant	Stream flow: Riffle Riffle/Glide Slow flow  Shading: High Moderate Cattle access Y: upstream  Photo: Y N  Sewage Fungus: None — Present — Moderate Sampled in Minutes: Pond net x Stone wash x	m - downstrea	
Field Chemi DO% DO mg/l Temp (°C) Conductivity pH Bank width (cm) Wet width (cm) Avg Depth (cm) Staff gauge Velocity Torrential (Fast) Moderate Slow Very slow Clarity Very clear Clear Slightly turbid Highly turbid Highly turbid General Comments:	Colour None (Slight) Moderate High  Discharge Flood Normal Low Very Low Dry Recent Flood	Modifications: arterial drainage Dominant Type Bedrock Boulder (>128m Cobble (32-128m Gravel (8-32mm) Fine Gravel (2-8r Sand (0.25-2mm) Silt (<0.25mm) Slope: Low Me Geology: Calcar Substratum Co Loose - Normal Substratum: Stoney bottom Degree of siltat Depth of mud: Litter: None - P Filamentous Al None - Present - Main land use to Bog Forestry	er:  Y/N Canalised-wide  as:  m) nm) nm)  edium – High – Ver reous-Siliceous-Mixe ndition: Calcareou  luddy bottom-Mud tion: Clean Slight-I None: <1cm: 1-5cm resent – Moderate  gae:	y High ed us Compacted- over stones Moderate-Heavy m: 5-10cm: >10cm - Abundant lant Sample retained:	Riffle Riffle/Glide Slow flow  Shading: High Moderate  Cattle access Y: upstrear  Photo: Y N  Sewage Fungus: None — Present — Moderate  Sampled in Minutes: Pond net x	m - downstrea	
Field Chemi DO% DO mg/l Temp (°C) Conductivity pH Bank width (cm) Wet width (cm) Avg Depth (cm) Staff gauge Velocity Torrential (Fast) Moderate Slow Very slow Clarity Very clear Clear Slightly turbid Highly turbid General Comments:	Colour None (Slight) Moderate High  Discharge Flood Normal Low Very Low Dry Recent Flood	Modifications: arterial drainage Dominant Type Bedrock Boulder (>128m Cobble (32-128m Gravel (8-32mm) Fine Gravel (2-8r Sand (0.25-2mm) Silt (<0.25mm) Slope: Low Me Geology: Calcar Substratum Co Loose - Normal Substratum: Stoney bottom Degree of siltat Depth of mud: Litter: None - P Filamentous Al None - Present - Main land use to Bog Forestry	y/N Canalised-wide  s:  m)  mm)  mm)  edium – High – Ver  eous-Siliceous-Mixe  ndition: Calcareou  luddy bottom-Mud  tion: Clean-Slight-I  None: <1cm: 1-5c  resent – Moderate  gae:	y High ed us-Compacted- over stones Moderate-Heavy m: 5-10cm: >10cm - Abundant lant Sample retained:	Shading: High - Moderate  Cattle access Y: upstrear  Photo: Y / N  Sewage Fungus: None - Present - Moderate  Sampled in Minutes: Pond net x	m - downstrea	
DO% DO mg/l Temp (°C) Conductivity pH Bank width (cm) Wet width (cm) Avg Depth (cm) Staff gauge Velocity Torrential (Fast) Moderate Slow Very slow Clarity Very clear (Clear) Slightly turbid Highly turbid General Comments:	Colour None Slight Moderate High  Discharge Flood Normal Low Very Low Dry Recent Flood	arterial drainage Dominant Type Bedrock Boulder (>128mi Cobble (32-128mi Gravel (8-32mm) Fine Gravel (2-8r Sand (0.25-2mm Silt (<0.25mm)  Slope: Low Me Geology: Calcar Substratum Co Loose - Normal Substratum: Stoney bottom-M Degree of siltar Depth of mud: Litter: None - P Filamentous Ai None - Present- Main land use t Pasture Bog Forestry	m) mm) mm)  edium – High – Ver eous-Siliceous-Mixe ndition: Calcareou luddy bottom-Mud tion: Clean Slight-I None: <1cm: 1-5ce resent – Moderate  gae:	y High ed us-Compacted- over stones Moderate-Heavy m: 5-10cm: >10cm - Abundant lant Sample retained:	Shading: High - Moderate  Cattle access Y: upstrear  Photo: Y / N  Sewage Fungus: None - Present - Moderate  Sampled in Minutes: Pond net x	m - downstrea	
DO mg/l Temp (°C) Conductivity pH Bank width (cm) Wet width (cm) Avg Depth (cm) Staff gauge Velocity Torrential (Fast) Moderate Slow Very slow Clarity Very clear Clear Slightly turbid Highly turbid General Comments:	Colour None Slight Moderate High  Discharge Flood Normal Low Very Low Dry Recent Flood	Dominant Type Bedrock Boulder (>128mi Cobble (32-128mi Gravel (8-32mm) Fine Gravel (2-8ri Sand (0.25-2mm) Silope: Low Me Geology: Calcar Substratum Co Loose - Normal Substratum: Stoney bottom-M Degree of siltar Depth of mud: Litter: None - P Filamentous Al None - Present - Main land use to Pasture Bog Forestry	m) nm) nm) edium – High – Ver eous-Siliceous-Mix ndition: Calcareou luddy bottom-Mud tion: Clean-Slight-I None: <1cm: 1-5c resent – Moderate gae: - Moderate - Abund u/s: Urban Tillage Other	ed us-Compacted- over stones Moderate-Heavy m: 5-10cm: >10cm - Abundant lant Sample retained:	Shading: High - Moderat  Cattle access Y: upstrear  Photo: Y / N  Sewage Fungus: None - Present - Moderate Sampled in Minutes: Pond net x	m - downstrea	
Temp (°C) Conductivity pH Bank width (cm) Wet width (cm) Avg Depth (cm) Staff gauge Velocity Torrential (Fast) Moderate Slow Very slow Clarity Very clear (Clear) Slightly turbid Highly turbid General Comments:	Colour None Slight Moderate High  Discharge Flood Normal Low Very Low Dry Recent Flood	Bedrock Boulder (>128mi Cobble (32-128mi Gravel (8-32mm) Fine Gravel (2-8r Sand (0.25-2mm) Silt (<0.25mm)  Slope: Low Me Geology: Calcar Substratum Co Loose - Normal Substratum: Stoney bottom-M Degree of siltat Depth of mud: Litter: None - P Filamentous AI None - Present - Main land use to Pasture Bog Forestry	m) nm) nm) edium – High – Ver eous-Siliceous-Mix ndition: Calcareou luddy bottom-Mud tion: Clean-Slight-I None: <1cm: 1-5c resent – Moderate gae: - Moderate - Abund u/s: Urban Tillage Other	ed us-Compacted- over stones Moderate-Heavy m: 5-10cm: >10cm - Abundant lant Sample retained:	Photo: Y N  Sewage Fungus: None Present Moderate Sampled in Minutes: Pond net x	m - downstrea	
Conductivity pH Bank width (cm) Wet width (cm) Avg Depth (cm) Staff gauge Velocity Torrential (Fast) Moderate Slow Very slow Clarity Very clear (Clear) Slightly turbid Highly turbid Highly turbid General Comments:	Colour None Slight Moderate High  Discharge Flood Normal Low Very Low Dry Recent Flood	Cobble (32-128m Gravel (8-32mm) Fine Gravel (2-8r Sand (0.25-2mm) Silt (<0.25mm) Slope: Low Me Geology: Calcar Substratum Co Loose - Normal Substratum: Stoney bottom Me Degree of siltar Depth of mud: Litter: None - P Filamentous Al None - Present - Main land use of	nm) ) edium – High – Ver eous-Siliceous-Mixe ndition: Calcareou luddy bottom-Mud tion: Clean-Slight-I None: <1cm: 1-5c resent – Moderate gae: - Moderate - Abund u/s: Urban Tillage Other	ed us-Compacted- over stones Moderate-Heavy m: 5-10cm: >10cm - Abundant lant Sample retained:	Photo: Y N  Sewage Fungus: None Present Moderate Sampled in Minutes: Pond net x	m - downstrea	
pH Bank width (cm) Wet width (cm) Avg Depth (cm) Staff gauge Velocity Torrential (Fast) Moderate Slow Very slow Clarity Very clear Clear Slightly turbid Highly turbid General Comments:	Colour None Slight Moderate High  Discharge Flood Normal Low Very Low Dry Recent Flood	Gravel (8-32mm) Fine Gravel (2-8r Sand (0.25-2mm) Silt (<0.25mm) Slope: Low Me Geology: Calcar Substratum Co Loose - Normal Substratum: Stoney bottom Degree of siltat Depth of mud: Litter: None - P Filamentous Al None - Present - Main land use to Pasture Bog Forestry	hmm)  edium – High – Ver eous-Siliceous-Mixe ndition: Calcareou luddy bottom-Mud tion: Clean-Slight-I None: <1cm: 1-5ct resent – Moderate gae: - Moderate - Abund u/s: Urban Tillage Other	ed us-Compacted- over stones Moderate-Heavy m: 5-10cm: >10cm - Abundant lant Sample retained:	Photo: Y N  Sewage Fungus: None Present Moderate Sampled in Minutes: Pond net x	m - downstrea	
Bank width (cm) Wet width (cm) Avg Depth (cm) Staff gauge Velocity Torrential (Fast) Moderate Slow Very slow Clarity Very clear (Clear) Slightly turbid Highly turbid General Comments:	Colour None Slight Moderate High  Discharge Flood Normal Low Very Low Dry Recent Flood	Fine Gravel (2-8r Sand (0.25-2mm Silt (<0.25mm)  Siope: Low Me Geology: Calcar Substratum Co Loose - Normal Substratum: Stoney bottom M Degree of siltat Depth of mud: Litter: None - P Filamentous Al None - Present - Main land use of Bog Forestry	nm) ) edium – High – Ver eous-Siliceous-Mixe ndition: Calcareou luddy bottom-Mud tion: Clean-Slight-I None: <1cm: 1-5c resent – Moderate gae: - Moderate - Abund u/s: Urban Tillage Other	ed us-Compacted- over stones Moderate-Heavy m: 5-10cm: >10cm - Abundant lant Sample retained:	Photo: Y N  Sewage Fungus: None Present Moderate Sampled in Minutes: Pond net x	m - downstrea	
Wet width (cm)  Avg Depth (cm)  Staff gauge  Velocity  Torrential  (Fast)  Moderate  Slow  Very slow  Clarity  Very clear  Clear  Slightly turbid  Highly turbid  General Comments:	Colour None Slight Moderate High  Discharge Flood Normal Low Very Low Dry Recent Flood	Sand (0.25-2mm Silt (<0.25mm)  Slope: Low Me Geology: Calcar Substratum Co Loose - Normal Substratum: Stoney bottom-M Degree of siltar Depth of mud: Litter: None - P Filamentous Al None - Present - Main land use of Bog Forestry	edium – High – Ver eous-Siliceous-Mixe ndition: Calcareou luddy bottom-Mud tion: Clean-Slight-I None: <1cm: 1-5cm resent – Moderate gae: - Moderate - Abund u/s: Urban Tillage Other	ed us-Compacted- over stones Moderate-Heavy m: 5-10cm: >10cm - Abundant lant Sample retained:	Photo: Y N  Sewage Fungus: None Present Moderate Sampled in Minutes: Pond net x	m - downstrea	
Avg Depth (cm) Staff gauge Velocity Torrential (Fast) Moderate Slow Very slow Clarity Very clear (Clear) Slightly turbid Highly turbid  General Comments:  The macroinvertebrates Group 1 = Ephe	Colour None Slight Moderate High  Discharge Flood Normal Low Very Low Dry Recent Flood	Slope: Low Me Geology: Calcar Substratum Co Loose - Normal Substratum: Stoney bottom-M Degree of siltar Depth of mud: Litter: None - Present- Main land use of Pasture Bog Forestry	ndition: Calcareou luddy bottom-Mud tion: Clean-Slight-I None: <1cm: 1-5ci resent — Moderate gae: - Moderate - Abund u/s: Urban Tillage Other	ed us-Compacted- over stones Moderate-Heavy m: 5-10cm: >10cm - Abundant lant Sample retained:	Photo: Y N  Sewage Fungus: None Present Moderate Sampled in Minutes: Pond net x	m - downstrea	
Staff gauge  Velocity  Torrential  (Fast)  Moderate  Slow  Very slow  Clarity  Very clear  Clear  Slightly turbid  Highly turbid  General Comments:	None (Slight) Moderate High  Discharge Flood Normal Low Very Low Dry Recent Flood	Geology: Calcar Substratum Co Loose - Normal Substratum: Stoney bottom Degree of siltat Depth of mud: Litter: None - P Filamentous Al None - Present - Main land use of Bog Forestry	ndition: Calcareou luddy bottom-Mud tion: Clean-Slight-I None: <1cm: 1-5ci resent — Moderate gae: - Moderate - Abund u/s: Urban Tillage Other	ed us-Compacted- over stones Moderate-Heavy m: 5-10cm: >10cm - Abundant lant Sample retained:	Photo: Y N  Sewage Fungus: None Present Moderate Sampled in Minutes: Pond net x	m - downstrea	
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Torrential (Fast) Moderate Slow Very slow Clarity Very clear (Clear) Slightly turbid Highly turbid General Comments:	None (Slight) Moderate High  Discharge Flood Normal Low Very Low Dry Recent Flood	Substratum Co Loose - Normal Substratum: Stoney bottom-M Degree of siltar Depth of mud: Litter: None - P Filamentous Al None - Present - Main land use to Pasture Bog Forestry	Indition: Calcareon  Indidy bottom-Mud  Ition: Clean Slight-I  None: <1cm: 1-5cm  resent — Moderate  gae:	over stones Moderate-Heavy m: 5-10cm: >10cm - Abundant lant Sample retained:	Photo: Y N  Sewage Fungus: None Present Moderate Sampled in Minutes: Pond net x		am or
(Fast ) Moderate Slow Very slow Clarity Very clear Clear Slightly turbid Highly turbid General Comments:	Slight Moderate High  Discharge Flood Normal Low Very Low Dry Recent Flood	Loose - Normal Substratum: Stoney bottom-M Degree of siltar Depth of mud: Litter: None - P Filamentous Al None - Present - Main land use of P Bog Forestry	luddy bottom-Mud tion: Clean-Slight-I None: <1cm: 1-5cm resent — Moderate  gae: - Moderate - Abund u/s: Urban Tillage Other	over stones  Moderate-Heavy m: 5-10cm: >10cm - Abundant  lant Sample retained:	Photo: Y N  Sewage Fungus: None Present Moderate Sampled in Minutes: Pond net x		- -
Moderate Slow Very slow Clarity Very clear Clear Slightly turbid Highly turbid General Comments:  The macroinvertebrates Group 1 = Ephe	Moderate High  Discharge Flood Normal Low Very Low Dry Recent Flood	Substratum: Stoney bottom-M Degree of siltar Depth of mud: Litter: None - P Filamentous Al None - Present - Main land use t Pasture Bog Forestry	None: <1cm: 1-5cm resent — Moderate  gae: Moderate - Abundaris: Urban Tillage Other	Moderate-Heavy m: 5-10cm: >10cm - Abundant lant Sample retained:	Sewage Fungus: None Present Moderate Sampled in Minutes: Pond net x	e - Abundant	-
Slow Very slow Clarity Very clear Clear Slightly turbid Highly turbid General Comments: The macroinvertebrates Group 1 = Ephe	Pischarge Flood Normal Low Very Low Dry Recent Flood	Degree of siltar Depth of mud: Litter: None - P Filamentous Ai None - Present - Main land use to Pasture Bog Forestry	None: <1cm: 1-5cm resent — Moderate  gae: Moderate - Abundaris: Urban Tillage Other	Moderate-Heavy m: 5-10cm: >10cm - Abundant lant Sample retained:	Sewage Fungus: None Present Moderate Sampled in Minutes: Pond net x	e - Abundant	-
Very slow Clarity Very clear Clear Slightly turbid Highly turbid  General Comments:  The macroinvertebrates Group 1 = Ephe	Pischarge Flood Normal Low Very Low Dry Recent Flood	Depth of mud: Litter: None - P Filamentous Al None - Present - Main land use of P Bog Forestry	None: <1cm: 1-5cd resent — Moderate gae: - Moderate - Abund u/s: Urban Tillage Other	m: 5-10cm: >10cm - Abundant lant Sample retained:	Sewage Fungus: None Present Moderate Sampled in Minutes: Pond net x	e - Abundant	-
Clarity Very clear Clear Slightly turbid Highly turbid  General Comments:  The macroinvertebrates  Group 1 = Ephe	Flood Normal Low Very Low Dry Recent Flood	Depth of mud: Litter: None - P Filamentous Al None - Present - Main land use of P Bog Forestry	None: <1cm: 1-5cd resent — Moderate gae: - Moderate - Abund u/s: Urban Tillage Other	m: 5-10cm: >10cm - Abundant lant Sample retained:	Sewage Fungus: None Present Moderate Sampled in Minutes: Pond net x	e - Abundant	-
Clear  Slightly turbid  Highly turbid  General Comments:  The macroinvertebrates  Group 1 = Ephe	Low Very Low Dry Recent Flood	Litter: None - P Filamentous Al None - Present - Main land use t Pasture Bog Forestry	resent - Moderate  gae: - Moderate - Abund  u/s:  Urban  Tillage  Other	- Abundant lant Sample retained:	Sewage Fungus: None Present Moderate Sampled in Minutes: Pond net x	e - Abundant	-
Slightly turbid  Highly turbid  General Comments:  The macroinvertebrates  Group 1 = Ephe	Low Very Low Dry Recent Flood	Filamentous Al None – Present – Main land use of Pasture Bog Forestry	gae: - Moderate - Abund u/s: Urban Tillage Other	lant Sample retained:	None Present Moderate Sampled in Minutes: Pond net x	e - Abundant	_
Highly turbid  General Comments:  The macroinvertebrates  Group 1 = Ephe	Very Low Dry Recent Flood	None – Present –  Main land use t Pasture Bog Forestry	Moderate - Abund u/s: Urban Tillage Other	Sample retained:	None Present Moderate Sampled in Minutes: Pond net x	e - Abundant	
Highly turbid  General Comments:  The macroinvertebrates  Group 1 = Ephe	Very Low Dry Recent Flood	Main land use to Pasture Bog Forestry	u <b>/s:</b> Urban Tillage Other	Sample retained:	Sampled in Minutes: Pond net x	e - Abundant	
General Comments:  The macroinvertebrates  Group 1 = Ephe	Recent Flood	Pasture Bog Forestry	Urban Tillage Other	retained:	Pond net x		
General Comments:  The macroinvertebrates  Group 1 = Ephe	Recent Flood	Bog Forestry	Tillage Other				
General Comments:  The macroinvertebrates  Group 1 = Ephe		Forestry	Other	1,,	Stone wash x		
The macroinvertebrates  Group 1 = Ephe	Calcific	1					
The macroinvertebrates  Group 1 = Ephe	Calcific	cation pres			Weed sweep x		
<ul> <li>Group 1 = Ephe</li> </ul>		Macroinverte		sition		Relative	
Group 1 = Ephe	s are divided into	the following 5 spe	ecific groups:			Abundar	
	emeroptera (3-ta	ils) – note that tails	may be damaged	during sampling		1-5 6-20	
<ul> <li>Group 2 = Pleco</li> <li>Group 3 = Trich</li> </ul>		note triat tails may	De Gamageo Gum	y sampling		21-50	3
		Oligochaeta and Di	iptera)			51-100	
Group 5 = Asell	llus				balance (Abrumdanea Ab)	101+	
<ul> <li>Calculate the tol</li> </ul>	tal number of tax	xa and relative abu	ndance of each ma	croinvertebrate grou	up below: (Abundance – Ab)	I armanana	
Ephemeroptera:		<i>Ecdyonurus</i> Ab	Plecop	tera:		Leuctra Ab	
N #		Rhithrogena Ab		0		Isoperla Ab	
·-		<i>Heptagenia</i> Ab		h====	Prote	onemura Ab	
-		<i>Ephemerella</i> Ab		9	Amph	<i>hinemura</i> Ab	
7 <i>i</i> =		Caenis Ab		-		Perla Ab	
-	n-	-		N.		Dinocras Ab	
i e		raleptophlebia Ab	·	(		er Plecop Ab	
-	Epl .	<i>hemera danica</i> Ab		,——			
		Other Ephem Ab		-		r Plecop Ab	_
Total no. of taxa	Total Rel	lative Abundance	Total ne	o, of Taxa	Total Relative A		
Trichoptera:	Hydropsychida		D: Lymnae	a (G) Ab	Chironomidae (D) Ab	Aselius:	
	LLACTOR SACTION	e Ab II G.OL		s (G) Ab	Chironomus (D) Ab	Abser	
li i	Polycentropodida	10 10 100 100 100	Potamopyrgu		Simuliidae (D) Ab 3	Few/Low	V
Se-		e Ab		is (G) Ab	Oliviania (C)		
	Polycentropodida	ae Ab ila Ab	Potamopyrgu Planorbi	is (G) Ab is (G) Ab	Dicranota (D) Ab	Common/	
	Polycentropodida Rhyacophi	ae Ab ila Ab ae Ab	Potamopyrgu Planorbi Ancylu		Oliviania (C)	Common/ Numerous	
	Polycentropodida Rhyacophi Philopotamida	ae Ab ae Ab ae Ab	Potamopyrgu Planorbi Ancylu	s (G) Ab a (G) Ab	Dicranota (D) Ab	Numerous	
	Polycentropodida Rhyacophi Philopotamida Limnephilida	ae Ab ila Ab ae Ab ae Ab ae Ab	Potamopyrgu Planorbi Ancylu Phys	s (G) Ab a (G) Ab s (Ol) Ab 5	Dicranota (D) Ab Tipulidae (D) Ab	Numerous  NOTE: As	
	Polycentropodida Rhyacophi Philopotamida Limnephilida Sericostomatida	ae Ab ae Ab ae Ab ae Ab ae Ab	Potamopyrgu Planorbi Ancylu Phys Lumbriculus	s (G) Ab a (G) Ab s (OI) Ab 5	Dicranota (D) Ab Tipulidae (D) Ab Ceratopogonidae (D) Ab	Numerous	ellus
	Polycentropodida Rhyacophi Philopotamida Limnephilida Sericostomatida Glossosomatida	ae Ab	Potamopyrgu Planorbi Ancylu Phys Lumbriculus Eiseniella	s (G) Ab a (G) Ab s (OI) Ab 5	Dicranota (D) Ab Tipulidae (D) Ab Ceratopogonidae (D) Ab	Numerous  NOTE: As must be	sellus es

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.

**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 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)	Average Index Score (AIS) TIS/5 (5 for 5 groups)	SSR Score (AIS x 2)
---	--	------------------------

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

## CASTLEDERMOT UPSTREAM

Station no.		Code:	Date:	25-10-22			
Station no.		Location: C	ASTLEDER	mot	Grid (6 figure):		
	TREAM	Stream Order:	Diecono.	10 ,	Stream flow:		
			Samaliand valda	ned bank erecion	Riffle		
Field Cher		Modifications: Y/N Carterial drainage	analised-wide	ned-bank erosion-	Riffle/Glide Slow flow		
DO%		Dominant Types:			SIOW HOW		
DO mg/l		Bedrock					
Temp (°C)		Boulder (>128mm)					
Conductivity		Cobble (32-128mm) Gravel (8-32mm)					
pH		Fine Gravel (2-8mm)					
Bank width (cm)	4	Sand (0.25-2mm)					
Wet width (cm)		Silt (<0.25mm)					
Avg Depth (cm)		Slopey Low - Medium	- High - Very	High	Shading: High - Moder	ato Low - No	no
Staff gauge	Colour	Geology: Calcareous-	Siliceous-Mixe	d	Snading: night - Model	ate Low - No	IIC.
Velocity Torrential	Colour	Substratum Condition			Cattle access Y: upstre	am -⁄downstre	am)or
Fast	Slight	Loose - Normal	on. Calcareou	Scompacico			
Moderate	Moderate	Substratum:					
Slow	High	Stoney bottom-Muddy	bottom-Mud o	over stones	Photo: YV N		
Very slow		Degree of siltation:	Clean-Slight-M	loderate-Heavy			
Clarity	Discharge	Depth of mud: None	: <1cm: 1-5cn	n: 5-10cm: >10cm			
Very dear	11000	Litter: None - Present					35
Clear	MOLITICAL		t - Moderate -	ADUITUATIC			
Slightly turbid		Filamentous Algae:	austa Abumda		Sewage Fungus: None – Present – Modera	ite - Ahundant	
Highly turbid		None - Present - Mod Main land use u/s:	erate - Abunda	Sample	Sampled in Minutes:	ice Abaricane	
nighiy turbiu		Pasture	Urban	retained:	Pond net x		
		Bog	Tillage	Y/N	Stone wash x		
		Forestry	Other		Weed sweep x		
	: Calcification	on present			, Nacional Property of the Control o		
	Calcification	Hacroinvertebrat		ition	Nacconcop II	Relative	
The macroinvertebrate Group 1 = Eph Group 2 = Ple Group 3 = Tric Group 4 = G.C	es are divided into the themeroptera (3-tails) - no choptera (DLD (Gastropoda, O	Aacroinvertebrate the following 5 specific (a) – note that tails may be day to that tails may be day	groups: be damaged o amaged during	luring sampling sampling		Abunda 1-5 6-20 21-50 51-100 101+	
The macroinvertebrate Group 1 = Eph Group 2 = Ple Group 3 = Tric Group 4 = G.C Group 5 = Ase Calculate the t	es are divided into the memorphera (3-tails) - no choptera DLD (Gastropoda, Oellus cotal number of taxa	Aacroinvertebrathe following 5 specific (a) – note that tails may be day ofte that tails may be day of the that tails and Dipteration and relative abundance	groups: be damaged damaged during ) e of each mac	luring sampling sampling roinvertebrate grou	p below: (Abundance – Ab)	Abunda 1-5 6-20 21-50 51-100 101+	
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he macroinvertebrate Group 1 = Eph Group 2 = Ple Group 3 = Tric Group 4 = G.0 Group 5 = Ase Calculate the t	es are divided into the memorphera (3-tails) - no choptera DLD (Gastropoda, Oellus rotal number of taxa	Acroinvertebrain the following 5 specific to the following	groups: be damaged damaged during ) e of each mac	luring sampling sampling roinvertebrate grou	p below: (Abundance – Ab)	Abunda 1-5 6-20 21-50 51-100 101+  Leuctra Ab Isoperia Ab otonemura Ab phinemura Ab Peria Ab Dinocras Ab	
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he macroinvertebrate Group 1 = Eph Group 2 = Plee Group 3 = Trie Group 4 = G.C Group 5 = Ase Calculate the t  Total no. of taxa	es are divided into the memorphera (3-tails) - no choptera DLD (Gastropoda, Oellus rotal number of taxa  Para Epher	Macroinvertebrain the following 5 specific b) – note that tails may be deadle to the tails may be dead	groups: be damaged during ) e of each mac Plecopt  Total no Lymnaea Potamopyrgus	of Taxa (G) Ab (G) Ab (G) Ab	Otto  Total Relative  Chironomidae (D) Ab  Chironomus (D) Ab  Simuliidae (D) Ab  Dicranota (D) Ab	Abunda 1-5 6-20 21-50 51-100 101+  Leuctra Ab Isoperia	nt v
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The macroinvertebrate Group 1 = Eph Group 2 = Plee Group 3 = Trie Group 4 = G.C Group 5 = Ase Calculate the t  Total no. of taxa	es are divided into the memorphera (3-tails) - no choptera (2-tails) - no chop	Macroinvertebrain the following 5 specific to 10 – note that tails may be deadling to that tails may be deadling to that tails may be deadling to the tails	proups: be damaged during ) e of each mac Plecopt  Total no Lymnaea Potamopyrgus Planorbis Ancylus	of Taxa  (G) Ab (G) Ab (G) Ab (G) Ab (G) Ab (G) Ab	Ott  Total Relative Chironomis (D) Ab Simuliidae (D) Ab Dicranota (D) Ab Tipulidae (D) Ab Tipulidae (D) Ab	Abunda 1-5 6-20 21-50 51-100 101+  Leuctra Ab Isoperla	nce
The macroinvertebrate Group 1 = Eph Group 2 = Plee Group 3 = Trie Group 4 = G.C Group 5 = Ase Calculate the t  Total no. of taxa	es are divided into the memorphera (3-tails) - no choptera (2-tails) - no chop	Macroinvertebrain the following 5 specific to 1) — note that tails may be dead to the following 5 specific to 2) — note that tails may be dead to the following 5 specific to 2) — note that tails may be dead to the following fo	groups: be damaged during ) e of each mac Plecopt  Total no Lymnaea Potamopyrgus Planorbis Ancylus Physa Lumbriculus Eiseniella	of Taxa (G) Ab (OI) Ab (OI) Ab (OI) Ab	Otto Chironomus (D) Ab Chironota (D) Ab Dicranota (D) Ab Tipulidae (D) Ab 3	Abunda 1-5 6-20 21-50 51-100 101+  Leuctra Ab Isoperia	nce
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**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*.

Total no. of Taxa

Total Relative Abundance

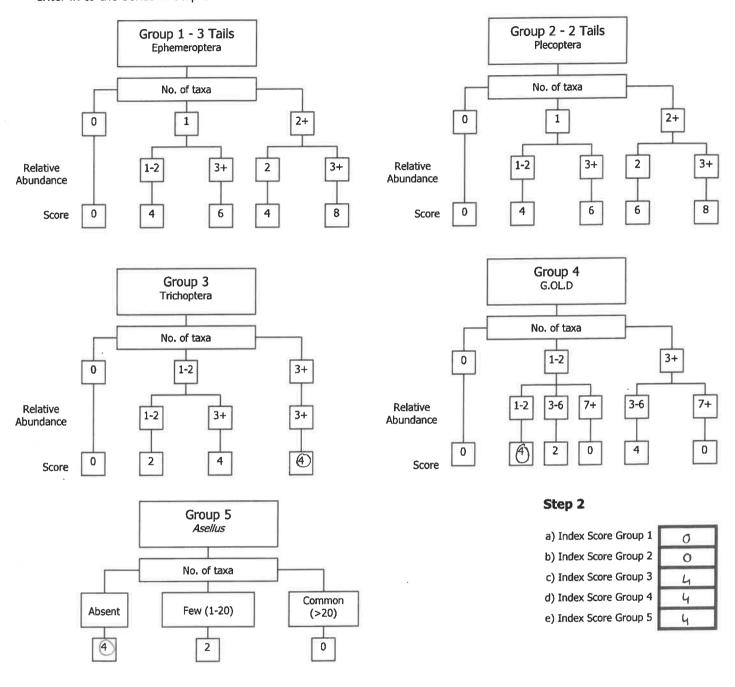
Total no. of

Taxa

are found

Total Relative Abundance

**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 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) 2.4 SSR Score (AIS × 2)

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

Stream at risk

Surveyor (signed): Karon John Name (print): AARON SKEHAN Date: 25 / 10 / 27