Annual Environmental Report

2020

Killmallock

D0106-01

CONTENTS

7.1 AMBIENT MONITORING SUMMARY
7.2 SMALL STREAM RISK SCORE ASSESSMENT

Rev 1 Note: Section 4.1.1 Question 1 answer changed to "Unknown". Approved 13/07/2021.

1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2020 AER

This Annual Environmental Report has been prepared for D0106-01, Killmallock, in Limerick 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.

Not aware of any improvements as this plant is DBO.

1.2 TREATMENT SUMMARY

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

- Kilmallock WWTP - 2020 with a Plant Capacity PE of 4000, 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
TPEFF1900D0106SW002	Kilmallock WWTP - 2020	Treated	Compliant	N/A

1.4 LICENCE SPECIFIC REPORTING INCLUDED IN AER

Assessment / Report	Included in AER
There are no Licence Specific Reports included in the AER.	

2 TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY

2.1 KILMALLOCK WWTP - 2020 - TREATED DISCHARGE

2.1.1 INFLUENT MONITORING SUMMARY - KILMALLOCK WWTP - 2020

A summary of influent monitoring for the treatment plant is presented below. This monitoring is primarily undertaken in order to determine the overall efficiency of the plant in removing pollutants from the raw wastewater.

Parameters	Number of Samples	Annual Max	Annual Mean
Total Phosphorus (as P) mg/l	12	5	2.37
Suspended Solids mg/l	12	151	61.13
Total Nitrogen mg/l	12	41	19.78
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	12	149	63.27
COD-Cr mg/l	12	335	160.29
Hydraulic Capacity	N/A	1444	720

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 tretament 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 - TPEFF1900D0106SW001

Parameter	WWDL ELV (Schedule A)	ELV with Condition 2 Interpretation included Note 1	Interim % reduction from influent concentration	Number of sample results	Number of exceedances	Number of with Condition 2 Interpretation included	Annual Mean	Overall Compliance (Pass/Fail)
COD-Cr mg/l	50	100	N/A	12	N/A	N/A	11.07	Pass
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	15	30	N/A	12	N/A	N/A	1.41	Pass
Suspended Solids mg/l	15	37.5	N/A	12	N/A	N/A	5.21	Pass
pH pH units	9	9	N/A	12	N/A	N/A	7.62	Pass
Ammonia-Total (as N) mg/l	1	1.2	N/A	12	N/A	N/A	0.05	Pass
Total Phosphorus (as P) mg/l	1	1.2	N/A	12	N/A	N/A	0.18	Pass
ortho-Phosphate (as P) - unspecified mg/l	0.3	0.36	N/A	12	N/A	N/A	0.09	Pass

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

Cause of Exceedance(s):

Not applicable

Significance of Results:

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

2.1.3 AMBIENT MONITORING SUMMARY FOR THE TREATMENT PLANT DISCHARGE TPEFF1900D0106SW001

A summary of monitoring from ambient monitoring points associated with the wastewater discharge is provided in the sections below. For discharges to rivers upstream (U/S) and downstream (D/S) location data is provided. For other ambient points in lakes, coastal or transitional waters, monitoring data from the most appropriate monitoring station is selected.

The table below provides details of ambient monitoring locations and details of any designations as sensitive areas.

Ambient Monitoring Point from WWDL (or as agreed with EPA)	Irish Grid Reference	River Station Code	Bathing Water	Drinking Water	FWPM	Shellfish	WFD Status
Upstream	160645, 128426	RS24L010410	No	No	No	No	Moderate
Downstream	159232, 127979	RS24L010460	No	Yes	No	No	Good

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	RS24L010410	0.047	RS24L010460	0.048	0.065	2.6
ortho-Phosphate (as P) - unspecified mg/l	RS24L010410	0.043	RS24L010460	0.043	0.035	1.9
Temperature °C	RS24L010410	9.983	RS24L010460	10.05		

Parameter Name	Upstream Monitoring Point Location	Upstream Monitoring Point Annual Mean	Downstream Monitoring Point Location	Downstream Monitoring Point Annual Mean	EQS	% of EQS
Dissolved Oxygen % O2	RS24L010410	99.158	RS24L010460	98.692		
pH pH units	RS24L010410	8.158	RS24L010460	8.133		
BOD - 5 days (Total) mg/l	RS24L010410	2	RS24L010460	2		

Significance of Results:

The WWTP discharge was compliant with the ELV's set in the wastewater discharge licence.

The ambient monitoring results does not meet the required EQS. The EQS relates to the Oxygenation and Nutrient Conditions set out in the Surface Water Regulations 2009.

The discharge from the wastewater treatment plant does not have an observable impact on the water quality.

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 - KILMALLOCK WWTP - 2020

2.1.4.1 Treatment Efficiency Report - Kilmallock WWTP - 2020

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)
TN	5624	N/A	N/A

Parameter	Influent mass loading (kg/year)	Effluent mass emission (kg/year)	Efficiency (% reduction of influent load)
TP	674	51	92
SS	17384	1482	91
COD	45587	3149	93
cBOD	17995	402	98

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

2.1.4.2 Treatment Capacity Report Summary - Kilmallock WWTP - 2020

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.

Kilmallock WWTP - 2020	
Peak Hydraulic Capacity (m^3/day) - As Constructed	2220
DWF to the Treatment Plant (m^3/day)	780
Current Hydraulic Loading - annual max (m^3/day)	1444
Average Hydraulic loading to the Treatment Plant (m^3/day)	720
Organic Capacity (PE) - As Constructed	4000
Organic Capacity (PE) - Collected Load (peak week)[Note1]	2064
Organic Capacity (PE) - Remaining	1936
Will the capacity be exceeded in the next three years? (Yes/No)	No

Nominal design capacities can be based on conservative design principles. In some cases assessment of existing plants has shown organic capacities significantly higher than the nominal design capacity. Accordingly plants that appear to be overloaded when comparing a collected peak load with the nominal design capacity can be fully compliant due to the safety factors in the original design.

2.1.5 SLUDGE / OTHER INPUTS - KILMALLOCK WWTP - 2020

'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)
Domestic /Septic Tank Sludge	3773.75	Weight (Tonnes)	2000	3	No	No	No

3 COMPLAINTS AND INCIDENTS

3.1 COMPLAINTS SUMMARY

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

Number of Complaints	Nature of Complaint	Number Open Complaints	Number Closed Complaints
There were no relevant environmental complaints in 2020.			

3.2 REPORTED INCIDENTS SUMMARY

Environmental incidents that arise in an agglomeration are reported on an on-going basis in accordance with our waste water discharge licences. Where an incident occurs and it is reportable under the licence, it is reported to the Environmental Protection Agency through their Environmental Data Exchange Network, or in some instances by telephone. Some incidents which arise in the agglomeration are recorded by Irish Water but may not be reportable under our licence for example where the incident does not have an impact on environmental performance.

A summary of reported incidents is included below.

3.2.1 SUMMARY OF INCIDENTS

Incident Type	Cause	No. of incident occurrences	Recurring (Y/N)	Closed (Y/N)
Spillage	Blocked Sewer	1	No	Yes

3.2.2 SUMMARY OF OVERALL INCIDENTS

Question	Answer
Number of Incidents in 2020	1
Number of Incidents reported to the EPA via EDEN in 2020	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	Irish Grid Ref.	Included in Schedule A4 of the WWDL	Significance of the overflow(High / Medium / Low)	Assessed against DoEHLG Criteria	No. of times activated in 2020 (No. of events)	Total volume discharged in 2020 (m3)	Monitoring Status
SW3	160258, 128282	Yes	Low	Meeting	Unknown	Unknown	Not Monitored
TBC	161316, 127733	No	Low	Meeting	Unknown	114832	Monitored
TBC	161325, 127726	No	Low	Meeting	Unknown	1917	Monitored
TBC	159988, 128264	No	Low	Meeting	Unknown	Unknown	Not Monitored

SWO Summary	
How much sewage was discharged via SWOs in the agglomeration in the year (m3)?	Unknown
Is each SWO identified as not meeting DoEHLG Guidance included in the Programme of Improvements?	No

SWO Summary	
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?	N/A

4.2 REPORT ON PROGRESS MADE AND PROPOSALS BEING DEVELOPED TO MEET THE IMPROVEMENT PROGRAMME REQUIREMENTS.

4.2.1 SPECIFIED IMPROVEMENT PROGRAMME SUMMARY

A wastewater discharge licence may require a number of reports on specific subject areas to be prepared for the agglomeration in question. These reports are submitted to the EPA as part of the Annual Environmental Report. This section provides list of the various reports required for this agglomeration and a brief summary of their recommendations.

Specified Improvement Programmes (under Schedule A and C of WWDL)	Description	Licence Schedule	Licence Completion Date	Date Expired? (N/NA/Y)	Status of Works	Timeframe for Completing the Work	Comments
D0106-SIP:01	Discharges from SW1 must cease by 01/01/11 at the latest.	A	01/01/2011	Yes	Works Completed		
D0106-SIP:02	New WWTP and ancillary works	C	01/01/2011	Yes	Works Completed		

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

4.2.2 IMPROVEMENT PROGRAMME SUMMARY

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

4.2.3 SEWER INTEGRITY RISK ASSESSMENT

The utilisation of multiple capital maintenance programmes and the outputs of the workshops with the Local Authority Operations Staff held under the programme can be used to satisfy the requirements of Condition 5 regarding network integrity. Improvement works identified by way of these programmes and workshops will be included in the Improvements Summary Table.

5 LICENCE SPECIFIC REPORTS

A wastewater discharge licence may require a number of reports on specific subject areas to be prepared for the agglomeration in question. These reports are submitted to the EPA as part of the Annual Environmental Report. This section provides list of the various reports required for this agglomeration and a brief summary of their recommendations.

5.a Licence Specific Reports Summary Table

Licence Specific Report	Required by licence	Year included in AER	Included in this AER	Reference to relevant section of AER
Small Stream Risk Score Assessment	Yes	2016	No	

5.1 SMALL STREAM RISK SCORE ASSESSMENT

The Small Stream Risk Score Assessment Report has been included in the AER 2016

6 CERTIFICATION AND SIGN OFF

6.1 SUMMARY OF AER CONTENTS

Parameter	Answer
Does the AER include an Executive Summary?	Yes
Does the AER include an assessment of the performance of the Waste Water Works (i.e. have the results of assessments been interpreted against WWDL requirements and or Environmental Quality Standards)?	Yes
Is there a need to advise the EPA for consideration of a Technical Amendment / Review of the licence?	No
List reason e.g. additional SWO identified	N/A
Is there a need to request/advise the EPA of any modification to the existing WWDL with respect to condition 4 changes to monitoring location, frequency etc	No
List reason e.g. changes to monitoring requirements	N/A
Have these processes commenced?	N/A
Are all outstanding reports and assessments from previous AERs included as an appendix to this AER	Yes

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

Signed: Date: 06/05/2021

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

Katherine Walshe

Acting Head of Environmental Regulation.

7 APPENDIX

Appendix
Appendix 7.1 - Ambient monitoring summary
Appendix 7.2 - Small Stream Risk Score Assessment

			Receiving Waters Designation (Yes/No)				Yes	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	160645, 128426	RS24L010410					Moderate	1.000	0.043	0.030
Downstream Monitoring Point	159232, 127480	RS24L010460	No	No	No	No	Moderate	1.000	0.043	0.032
Difference								*0.000*	*0.000*	*0.002*
EQS								1.500	0.035	0.065
% of EQS								0.000%	0.000%	3.077%

Kilmallock Upstream

Location						Parameter					
Station	Station Reference	Station Easting	Station Northing	Sample Reference	Sample Date	Ammonia NH3-N	pH	Biological Oxygen Demand	Dissolved Oxygen % Saturatio	Ortho-Phosphate PO4-P	Temperature
						mg/l	pH units	mg/l	% O2	mg/l	Degrees C
Norlth Bridge U/S Kilmallock STP - E11	RS24L010410	160645	128426	20370139	14-Jan-2020	0.06	8	1	93.1	0.058	6.1
Norlth Bridge U/S Kilmallock STP - E11	RS24L010410	160645	128426	20370514	11-Feb-2020	0.02	7.9	1	96.5	0.058	4.4
Norlth Bridge U/S Kilmallock STP - E11	RS24L010410	160645	128426	20370955	10-Mar-2020	0.1	7.8	1	87.9	0.054	8.7
Norlth Bridge U/S Kilmallock STP - E11	RS24L010410	160645	128426	20371327	12-May-2020	0.02	8.2	1	102	0.032	9
Norlth Bridge U/S Kilmallock STP - E11	RS24L010410	160645	128426	20371556	09-Jun-2020	0.02	8.5	1	107	0.02	12
Norlth Bridge U/S Kilmallock STP - E11	RS24L010410	160645	128426	20371927	14-Jul-2020	0.02	8.4	1	105	0.044	13.9
Norlth Bridge U/S Kilmallock STP - E11	RS24L010410	160645	128426	20372205	11-Aug-2020	0.02	8.3	1	99.6	0.037	15.4
Norlth Bridge U/S Kilmallock STP - E11	RS24L010410	160645	128426	20372487	08-Sep-2020	0.02	8.3	1	105	0.041	14.9
Norlth Bridge U/S Kilmallock STP - E11	RS24L010410	160645	128426	20372835	06-Oct-2020	0.02	8.2	1	98.3	0.033	10.9
Norlth Bridge U/S Kilmallock STP - E11	RS24L010410	160645	128426	20373220	03-Nov-2020	0.02	8.1	1	94.3	0.055	8.3
Norlth Bridge U/S Kilmallock STP - E11	RS24L010410	160645	128426	20373301	10-Nov-2020	0.02	8.1	1	96.2	0.044	10.6
Norlth Bridge U/S Kilmallock STP - E11	RS24L010410	160645	128426	20373638	08-Dec-2020	0.02	8.1	1	105	0.034	5.6
			EQS Std	individual value			6-9				
			EQS Std	good status mean		≤0.065	n/a	≤1.5		≤0.035	n/a
			EQS Std	good status 95%ile		≤0.14	n/a	≤2.6	>80, <120	≤0.075	n/a
				mean		0.030	8.2	1.0	99.2	0.043	10.0
				95%ile		0.078	8.4	1.0	105.9	0.058	15.1
				mean compliance		yes	yes	yes	yes	No	
				95%ile compliance		yes	yes	yss	yes	yes	--

half of level of detection for statistical purposes

exceeds Surface Waters Regulations good status

Note: Individual results which exceed the good status mean are highlighted in red

Kilmallock Downstream

Location						Parameter					
Station	Station Reference	Station Easting	Station Northing	Sample Reference	Sample Date	Ammonia NH3-N	pH	Biological Oxygen Demand	Dissolved Oxygen % Saturatio	Ortho-Phosphate PO4-P	Temperature
						mg/l	pH units	mg/l	% O2	mg/l	Degrees C
Glenfield Br d/s Kilmallock STP WDLE 23	RS24L010460	159232	127980	20370152	14-Jan-2020	0.07	7.9	1	94.7	0.06	6.2
Glenfield Br d/s Kilmallock STP WDLE 23	RS24L010460	159232	127980	20370519	11-Feb-2020	0.02	7.7	1	96	0.062	4.4
Glenfield Br d/s Kilmallock STP WDLE 23	RS24L010460	159232	127980	20370968	10-Mar-2020	0.11	8	1	91.2	0.057	8.8
Glenfield Br d/s Kilmallock STP WDLE 23	RS24L010460	159232	127980	20371332	12-May-2020	0.02	8.2	1	104	0.032	9.1
Glenfield Br d/s Kilmallock STP WDLE 23	RS24L010460	159232	127980	20371569	09-Jun-2020	0.02	8.3	1	105	0.02	12.1
Glenfield Br d/s Kilmallock STP WDLE 23	RS24L010460	159232	127980	20371940	14-Jul-2020	0.02	8.3	1	104	0.044	14.2
Glenfield Br d/s Kilmallock STP WDLE 23	RS24L010460	159232	127980	20372210	11-Aug-2020	0.02	8.4	1	93.4	0.036	15.4
Glenfield Br d/s Kilmallock STP WDLE 23	RS24L010460	159232	127980	20372500	08-Sep-2020	0.02	8.2	1	98.1	0.041	14.8
Glenfield Br d/s Kilmallock STP WDLE 23	RS24L010460	159232	127980	20372840	06-Oct-2020	0.02	8.2	1	98.4	0.032	10.9
Glenfield Br d/s Kilmallock STP WDLE 23	RS24L010460	159232	127980	20373222	03-Nov-2020	0.02	8.1	1	94.8	0.056	8.4
Glenfield Br d/s Kilmallock STP WDLE 23	RS24L010460	159232	127980	20373314	10-Nov-2020	0.02	8.1	1	97.7	0.044	10.6
Glenfield Br d/s Kilmallock STP WDLE 23	RS24L010460	159232	127980	20373643	08-Dec-2020	0.02	8.2	1	107	0.034	5.7
			EQS Std	individual value			6-9				
			EQS Std	good status mean		≤0.065	n/a	≤1.5		≤0.035	n/a
			EQS Std	good status 95%ile		≤0.14	n/a	≤2.6	>80, <120	≤0.075	n/a
				mean		0.032	8.1	1.0	98.7	0.043	10.1
				95%ile		0.088	8.3	1.0	105.9	0.061	15.1
				mean compliance		yes	yes	yes	yes	No	
				95%ile compliance		yes	yes	yes	yes	Yes	--

half of level of detection for statistical purposes

exceeds Surface Waters Regulations good status

Note: Individual results which exceed the good status mean are highlighted in red

River: Loobagh	Code:	Date:	Time:
Station no. D/S WWTP.	Location:		Grid (6 figure):
	Stream Order:		Stream flow: Riffle / Riffle/Glide / Slow flow

Field Chemistry	
DO%	108.
DO mg/l	9.83.
Temp (°C)	15.1
Conductivity	
pH	
Bank width (cm)	
Wet width (cm)	
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:

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:

Ecdyonurus Ab	2
Rhithrogena Ab	
Heptagenia Ab	
Ephemerella Ab	2
Caenis Ab	
Paraleptophlebia Ab	
Ephemera danica Ab	
Other Ephem Ab	

Total no. of taxa: 3 — Total Relative Abundance: 4

Plecoptera:

Leuctra Ab	
Isoperla Ab	
Protonemura Ab	
Amphinemura Ab	
Perla Ab	
Dinocras Ab	
Other Plecop Ab	
Other Plecop Ab	

Total no. of Taxa: 1 — Total Relative Abundance: 1

Trichoptera:

Hydropsychidae Ab	3
Polycentropodidae Ab	
Rhyacophila Ab	2
Philopotamidae Ab	1
Limnephilidae Ab	
Sericostomatidae Ab	
Glossosomatidae Ab	
Lepidostomatidae Ab	
Other Trichoptera Ab	

Total no. of Taxa: 3 — Total Relative Abundance: 5

G.O.L.D:

Lymnaea (G) Ab	
Potamopyrgus (G) Ab	
Planorbis (G) Ab	1
Ancylus (G) Ab	2
Physa (G) Ab	
Lumbriculus (Ol) Ab	
Eiseniella (Ol) Ab	
Tubificidae (Ol) Ab	1

Total no. of Taxa: 5 — Total Relative Abundance: 6

Chironomidae (D) Ab	1
Chironomus (D) Ab	
Simuliidae (D) Ab	1
Dicranota (D) Ab	
Tipulidae (D) Ab	
Ceratopogonidae (D) Ab	
Other GOLD Ab	

Asellus:

Absent	✓
Few/Low	
Common/ Numerous	

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*.

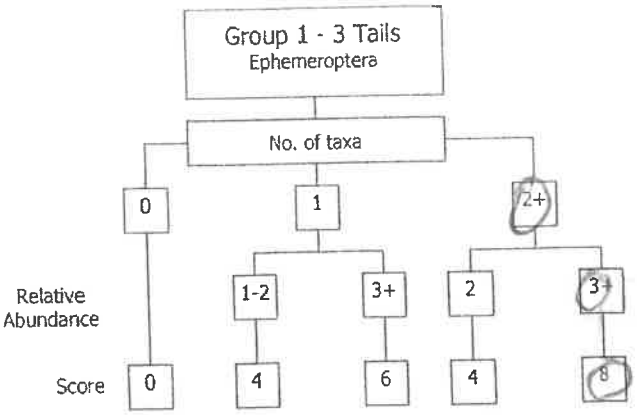
Slight colouration

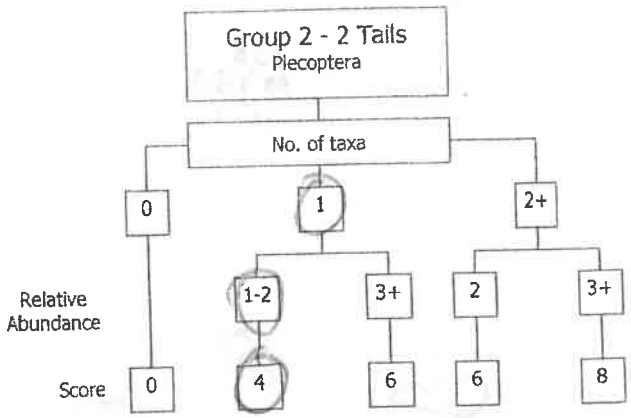
Gammarus

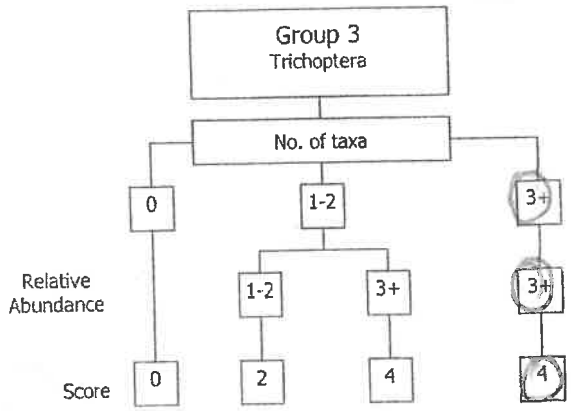
Baetis 6

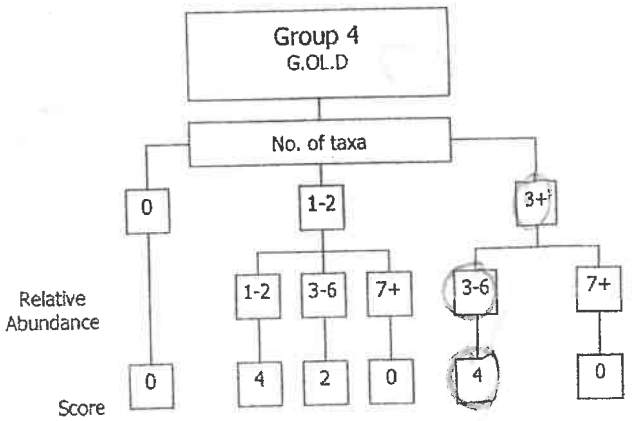
crayfish

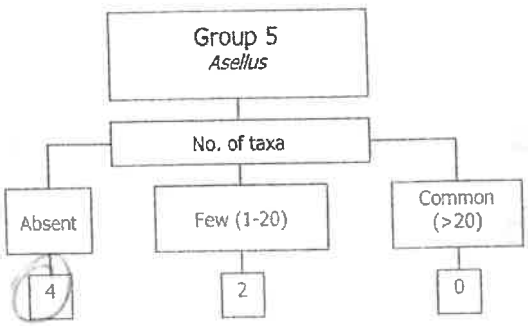
Step 1. Calculate the Index Score by circling the appropriate box representing the total number of taxa and the total abundance calculated from ***each macroinvertebrate group*** calculated from page 1 of the recording sheet and enter in to the boxes in Step 2.











Step 2

a) Index Score Group 1	8
b) Index Score Group 2	6
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)	Average Index Score (AIS) TIS/5 (5 for 5 groups)	SSR Score (AIS x 2)
24	4.8	9.6

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
☒ 9.6	☐	☐

Surveyor (signed): A Insley Name (print): ADRIAN INSLEY Date: 29 / 07 / 20.

River: Loobagh	Code:	Date: 29-07-20	Time: 09:50
Station no.	Location:		Grid (6 figure):
	Stream Order: 4th.		Stream flow: Riffle / Riffle/Glide ✓ / Slow flow

Field Chemistry	
DO%	109
DO mg/l	
Temp (°C)	15.1.
Conductivity	
pH	
Bank width (cm)	10m
Wet width (cm)	180cm
Avg Depth (cm)	10cm
Staff gauge	no

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

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 2
Stone wash x 30sec
Weed sweep x 30sec.

General Comments:

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: (bundance – Ab)

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

Ephemeroptera:

✓✓✓ *Ecdyonurus* Ab	3
Rhithrogena Ab	
Heptagenia Ab	
✓✓ *Ephemerella* Ab	2
Caenis Ab	
Paraleptophlebia Ab	
Ephemera danica Ab	
Other Ephem Ab	
Total no. of taxa	2
Total Relative Abundance	54

Plecoptera:

✓✓✓✓✓✓ *Leuctra* Ab	2
Isoperla Ab	
Protonemura Ab	
Amphinemura Ab	
Perla Ab	
Dinocras Ab	
Other Plecop Ab	
Other Plecop Ab	
Total no. of Taxa	1
Total Relative Abundance	02

Trichoptera:

Hydropsychidae Ab	
Polycentropodidae Ab	
34 *Rhyacophila* Ab	1
Philopotamidae Ab	
Limnephilidae Ab	
Sericostomatidae Ab	
6+ Glossosomatidae Ab	2
Lepidostomatidae Ab	
Other Trichoptera Ab	
Total no. of Taxa	2
Total Relative Abundance	03

G.OL.D:

Lymnaea (G) Ab	
✓ *Potamopyrgus* (G) Ab	1
Planorbis (G) Ab	
4 *Ancylus* (G) Ab	2
Physa (G) Ab	
Lumbriculus (Ol) Ab	
Eiseniella (Ol) Ab	
✓✓ *Tubificidae* (Ol) Ab	1
✓ Chironomidae (D) Ab	2
Chironomus (D) Ab	
50+ Simuliidae (D) Ab	4
✓ *Dicranota* (D) Ab	1
Tipulidae (D) Ab	
Ceratopogonidae (D) Ab	
Other GOLD Ab	
Total no. of Taxa	16
Total Relative Abundance	11

Asellus

Absent	✓
Few/Low	
Common/ Numerous	

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

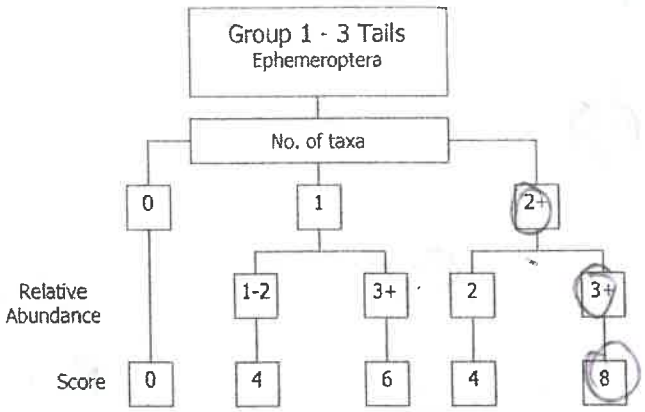
NOTE *Baetis* is an Ephemeropteran and is the most commonly occurring invertebrate genus in streams in Ireland. It is vital that *Baetis* is not counted in SSRS. See Appendix B for more details on how to identify *Baetis*.

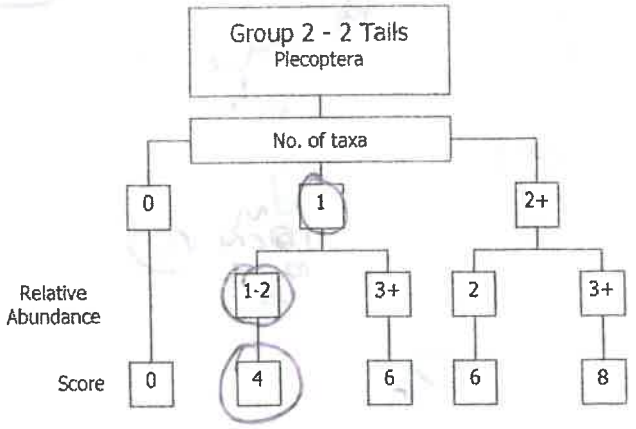
Hydracaede.

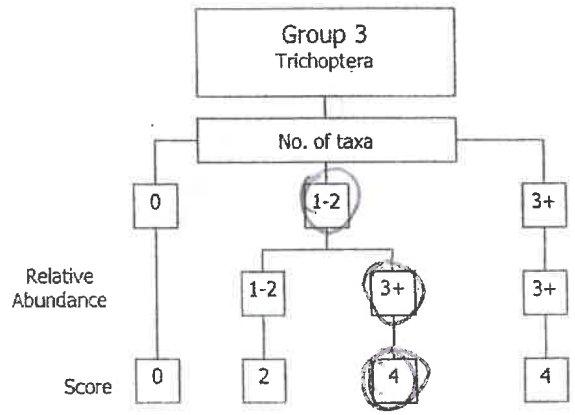
Coleoptera

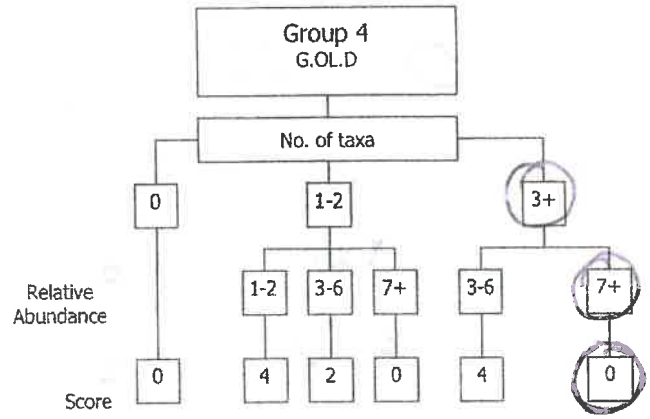
Baetis gammarus.

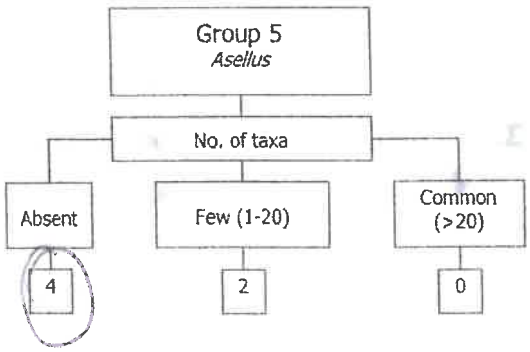
Step 1. Calculate the Index Score by circling the appropriate box representing the total number of taxa and the total abundance calculated from ***each macroinvertebrate group*** calculated from page 1 of the recording sheet and enter in to the boxes in Step 2.











Step 2

a) Index Score Group 1	8
b) Index Score Group 2	4
c) Index Score Group 3	4
d) Index Score Group 4	0
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)	20	Average Index Score (AIS) TIS/5 (5 for 5 groups)	4	**SSR Score** (AIS x 2)	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): A. Insley Name (print): ADRIAN INSLEY Date: 29 / 04 / 20

River: Loobagh	Code:	Date:	Time:
Station no. D/S WWTP.	Location:		Grid (6 figure):
	Stream Order:		Stream flow: Riffle / Riffle/Glide / Slow flow

Field Chemistry	
DO%	108.
DO mg/l	9.83.
Temp (°C)	15.1
Conductivity	
pH	
Bank width (cm)	
Wet width (cm)	
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:

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:

Ecdyonurus Ab	2
Rhithrogena Ab	
Heptagenia Ab	
Ephemerella Ab	2
Caenis Ab	
Paraleptophlebia Ab	
Ephemera danica Ab	
Other Ephem Ab	

Total no. of taxa: 3 — Total Relative Abundance: 4

Plecoptera:

Leuctra Ab	
Isoperla Ab	
Protonemura Ab	
Amphinemura Ab	
Perla Ab	
Dinocras Ab	
Other Plecop Ab	
Other Plecop Ab	

Total no. of Taxa: 1 — Total Relative Abundance: 1

Trichoptera:

Hydropsychidae Ab	3
Polycentropodidae Ab	
Rhyacophila Ab	2
Philopotamidae Ab	1
Limnephilidae Ab	
Sericostomatidae Ab	
Glossosomatidae Ab	
Lepidostomatidae Ab	
Other Trichoptera Ab	

Total no. of Taxa: 3 — Total Relative Abundance: 5

G.O.L.D:

Lymnaea (G) Ab	
Potamopyrgus (G) Ab	
Planorbis (G) Ab	1
Ancylus (G) Ab	2
Physa (G) Ab	
Lumbriculus (Ol) Ab	
Eiseniella (Ol) Ab	
Tubificidae (Ol) Ab	1

Total no. of Taxa: 5 — Total Relative Abundance: 6

Chironomidae (D) Ab	1
Chironomus (D) Ab	
Simuliidae (D) Ab	1
Dicranota (D) Ab	
Tipulidae (D) Ab	
Ceratopogonidae (D) Ab	
Other GOLD Ab	

Asellus:

Absent	✓
Few/Low	
Common/ Numerous	

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*.

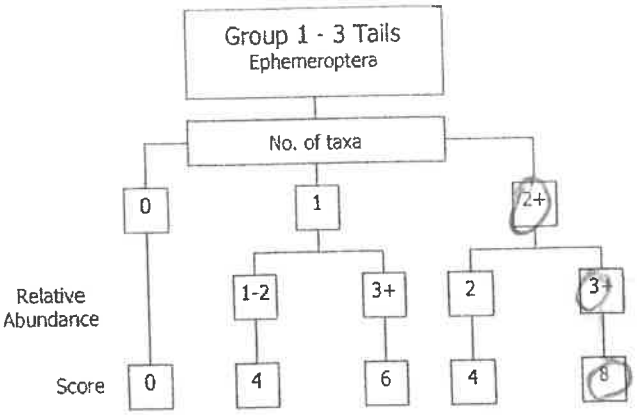
Slight colouration

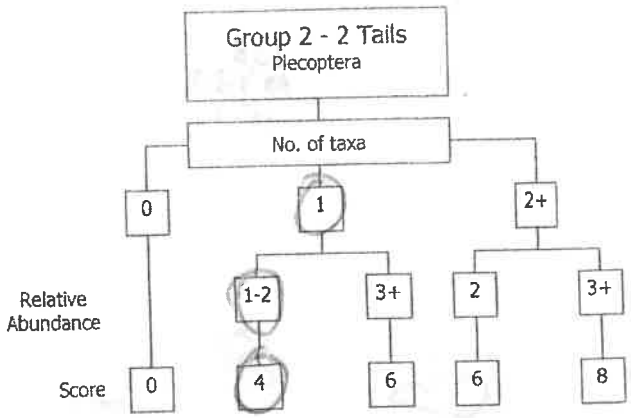
Gammarus

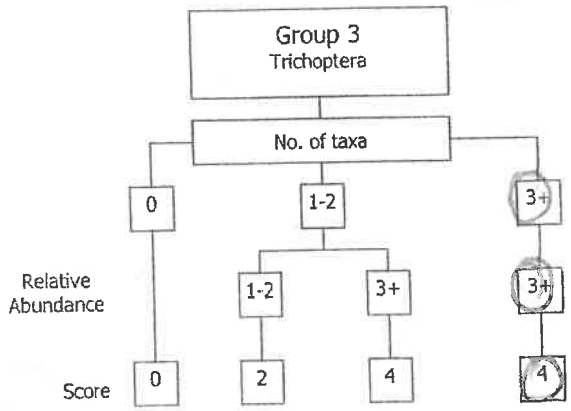
Baetis 6

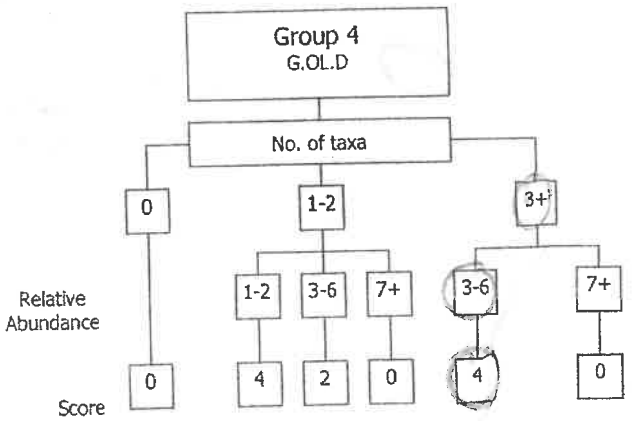
crayfish

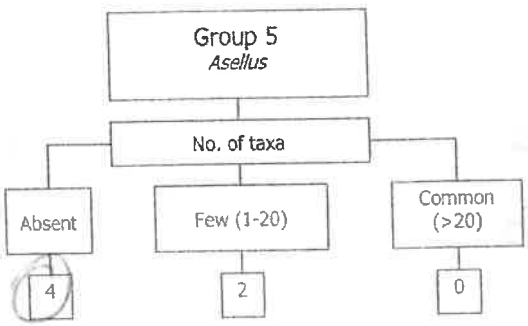
Step 1. Calculate the Index Score by circling the appropriate box representing the total number of taxa and the total abundance calculated from ***each macroinvertebrate group*** calculated from page 1 of the recording sheet and enter in to the boxes in Step 2.











Step 2

a) Index Score Group 1	8
b) Index Score Group 2	6
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)	Average Index Score (AIS) TIS/5 (5 for 5 groups)	SSR Score (AIS x 2)
24	4.8	9.6

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
☒ 9.6	☐	☐

Surveyor (signed): A Insley Name (print): ADRIAN INSLEY Date: 29 / 07 / 20.

River: Loobagh	Code:	Date: 29-07-20	Time: 09:50
Station no.	Location:		Grid (6 figure):
	Stream Order: 4th.		Stream flow: Riffle / Riffle/Glide ✓ / Slow flow

Field Chemistry	
DO%	109
DO mg/l	
Temp (°C)	15.1.
Conductivity	
pH	
Bank width (cm)	10m
Wet width (cm)	180cm
Avg Depth (cm)	10cm
Staff gauge	no

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

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 2
Stone wash x 30sec
Weed sweep x 30sec.

General Comments:

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: (bundance – Ab)

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

Ephemeroptera:

✓✓✓ *Ecdyonurus* Ab	3
Rhithrogena Ab	
Heptagenia Ab	
✓✓ *Ephemerella* Ab	2
Caenis Ab	
Paraleptophlebia Ab	
Ephemera danica Ab	
Other Ephem Ab	
Total no. of taxa	2
Total Relative Abundance	54

Plecoptera:

✓✓✓✓✓✓ *Leuctra* Ab	2
Isoperla Ab	
Protonemura Ab	
Amphinemura Ab	
Perla Ab	
Dinocras Ab	
Other Plecop Ab	
Other Plecop Ab	
Total no. of Taxa	1
Total Relative Abundance	02

Trichoptera:

Hydropsychidae Ab	
Polycentropodidae Ab	
34 *Rhyacophila* Ab	1
Philopotamidae Ab	
Limnephilidae Ab	
Sericostomatidae Ab	
6+ Glossosomatidae Ab	2
Lepidostomatidae Ab	
Other Trichoptera Ab	
Total no. of Taxa	2
Total Relative Abundance	03

G.OL.D:

Lymnaea (G) Ab	
✓ *Potamopyrgus* (G) Ab	1
Planorbis (G) Ab	
4 *Ancylus* (G) Ab	2
Physa (G) Ab	
Lumbriculus (Ol) Ab	
Eiseniella (Ol) Ab	
✓✓ *Tubificidae* (Ol) Ab	1
✓ Chironomidae (D) Ab	2
Chironomus (D) Ab	
50+ Simuliidae (D) Ab	4
✓ *Dicranota* (D) Ab	1
Tipulidae (D) Ab	
Ceratopogonidae (D) Ab	
Other GOLD Ab	
Total no. of Taxa	16
Total Relative Abundance	11

Asellus

Absent	✓
Few/Low	
Common/ Numerous	

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

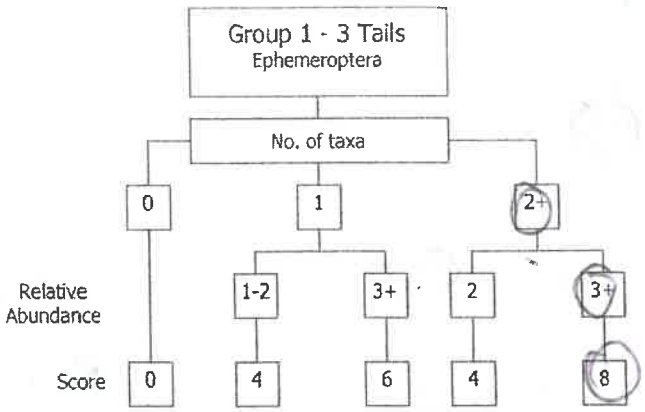
NOTE *Baetis* is an Ephemeropteran and is the most commonly occurring invertebrate genus in streams in Ireland. It is vital that *Baetis* is not counted in SSRS. See Appendix B for more details on how to identify *Baetis*.

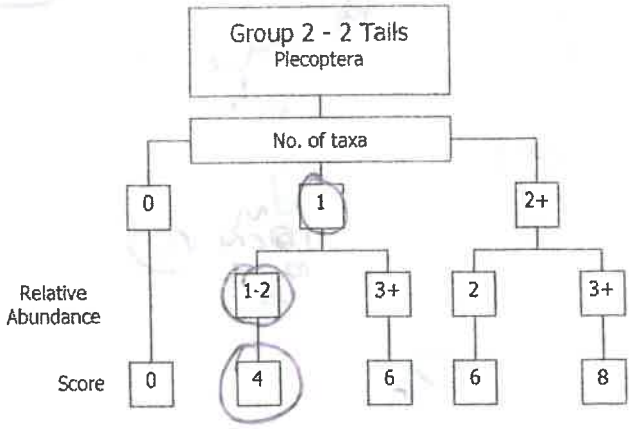
Hydracaede.

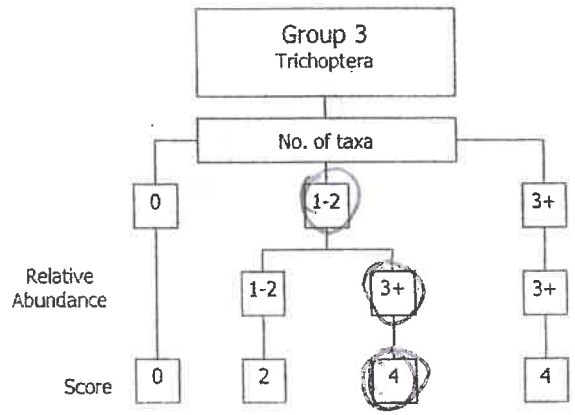
Coleoptera

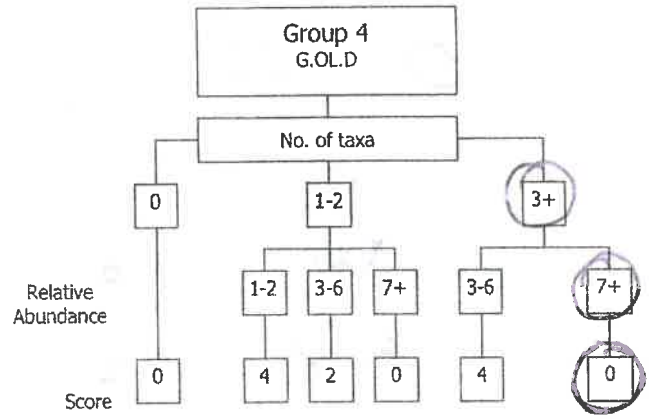
Baetis gammarus.

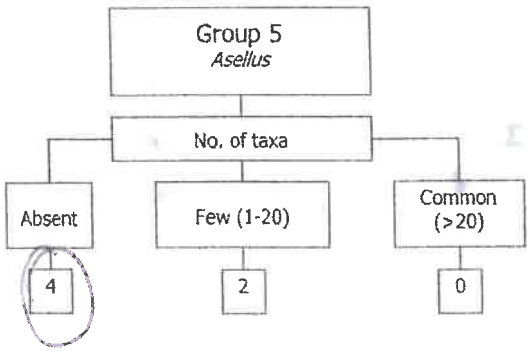
Step 1. Calculate the Index Score by circling the appropriate box representing the total number of taxa and the total abundance calculated from ***each macroinvertebrate group*** calculated from page 1 of the recording sheet and enter in to the boxes in Step 2.











Step 2

a) Index Score Group 1	8
b) Index Score Group 2	4
c) Index Score Group 3	4
d) Index Score Group 4	0
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)	20	Average Index Score (AIS) TIS/5 (5 for 5 groups)	4	**SSR Score** (AIS x 2)	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): A. Insley Name (print): ADRIAN INSLEY Date: 29 / 04 / 20