NIEA - WATER MANAGEMENT UNIT FRESHWATER MONITORING & ASSESSMENT GROUP - INTERNAL DOCUMENT CONTROL					
Records NI Ref		**Status**	**Draft version**	**NIEA FMA Sign Off Date**	
Team	Hydrology & Morphology				
Document Title	NIEA-WMU-FMA Hydrology report on estimated flow variation allowances in Pollanroe Burn with the application of the JNCC Common Standards Monitoring flow targets using updated NRFA baseline river flow reference data up to end of 2023 hydrological year				
Purpose	To update RED Regulation of the allowable variation to natural(ised) flows on the Pollanroe Burn on application of JNCC CSM Flow Guidance.				
Related Documents	AE1/24/2237113 NIEA-WMU-FMA Hydrology Report on estimated flow variation allowances in Pollanroe Burn with Application of JNCC CSM flow guidance AE1/20/574863 "Hydrology Data Covering Note" AE1/20/574877 "Small Catchment Data" AE1/20/574866 "Owenreagh and Owenkillew Rivers" AE1/20/574873 "Predicted Water Treatment Discharge"				
Document Prepared by			**Date**	23/05/2025	
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Hydrology report on estimated flow variation allowances in Pollanroe Burn with the application of the JNCC Common Standards Monitoring flow targets using NRFA data updated to 2023 hydrological year

1. Background

The Northern Ireland Environment Agency (NIEA) commissioned the Qube low flow model on 1st October 2023 as the primary means of estimating river flows in un-gauged catchments in Northern Ireland. This initial release held river flow reference data for the region of influence stations up to the end of the 2019 hydrological year only. A data update was completed in March 2025 to include reference river flow data up to the end of the 2023 hydrological year. As the previous report *AE1/24/2237113* was based on assessments using the older, shorter dataset. This updated report reflects flow assessments using the most current available data, representative of baseline flow conditions.

The Joint Nature Conservation Council (JNCC) has published guidance on flow measures required to maintain favourable status for habitats and species. This guidance is published as Common Standards Monitoring Guidance (CSM) for Rivers in 2016[1]. The guidance is expressed as flow targets specific to river scale, across the entirety of the flow regime as a percentage variation from natural(ised) flow conditions.

This report outlines the application of the flow targets [2] within the CSM to the Pollanroe Burn and downstream river to establish allowable abstraction or discharge.

2. Estimation of Flow Statistics using Qube model

NIEA Hydrology used the Qube proprietary low flow estimation model (updated with river flow reference date to 2023) provided by Wallingford Hydrosolutions [3] to estimate flow statistics.

The Residual Flow function with the Qube model allowed estimation of flow statistics at eight (8) points along a stretch of the Pollanroe Burn from 258550,384050 to

[1] Common Standards Monitoring Guidance for Rivers (jncc.gov.uk)

[2] A Statement on Common Standards for Monitoring Protected Sites (2022) (version 2.1) (jncc.gov.uk)

[3] Home - WHS (hydrosolutions.co.uk)

257500,382600. The distance between the start and end assessment points is approximately 2.16 km. The location of the assessment points is shown in Figure 1.

The Residual Flow function allows a complete flow regime to be generated for several equally spaced points along a specific river length to allow comparison of flow depletion or accretion due to catchment size, run-off characteristics and artificial influences.

As there are currently no identified artificial influences within the Pollanroe Burn catchment, natural(ised) and influenced flows are the same.

In accordance with the CSM Guidance, the Pollanroe Burn is characterised as *Flow Category 1 (headwater)* and the downstream river waterbody Owenreagh (River) East (Drumlea) as *Flow Category 4 (river).* CSM flow categorisation limits and appropriate flow variation allowances are given in Appendix A.

3. Results

3.1 Of the eight points assessed, two are upstream of the proposed Outfall 4 and five are downstream. Flows at the location of the proposed Outfall 4 were also estimated.

- Mean Daily Flows in m^3/day ranged from **2359** (upstream) to **5763** (downstream)
- Q95 Flows in m^3/day ranged from **285** (upstream) to **631** (downstream)

3.2 Application of the flow targets from the CSM Guidance gave the allowable variation from the natural flow for each point to be assessed.

- Allowable variation under Mean Daily Flow conditions in m^3/day ranged from **236** (upstream) to **576** (downstream)
- Allowable variation under Q95 conditions in m^3/day ranged from **14** (upstream) to **32** (downstream)

Figure 1. shows the location of each assessment points.

3.3 Further downstream assessments were conducted to establish the likely location were CSM Guidance flow targets may be met, based on a proposed discharge volume of 7212 m^3/day at Outfall 4.

3.4 It was estimated that the CSM flow target may not be met across the entire flow regime for a considerable distance downstream of Outfall 4. The CSM flow target is only likely to be met downstream of the confluence of the Owenkillew and Glenelly Rivers at 245325,388095 which is **18.1km downstream** of the Pollanroe Burn. Figure 2. shows the extent of the river stretch that may not meet the CSM flow target due to the proposed discharge.

4. Discussion

- The CSM Guidance flow targets are aimed at protecting natural flow conditions, both scale and variation, to offer favourable conditions to protected species and habitats.

- The specific flow targets are dependent on river size but range from a 5-15% variation under low flow conditions to 15-20% under high low conditions.

- These flow targets align broadly with the environmental water resource standards for High status objective setting under The Water Framework Directive (Priority Substances and Classification) (Amendment) Regulations (Northern Ireland) 2015[4].

- As this assessment found that the allowable variation to natural flow at the proposed discharge point (Outfall 4) at mean daily flow is **330** m^3/day (Figures 1 & 3), this is effectively the limit on either net discharge or net abstraction at this point to maintain downstream compliance with CSM flow targets under these conditions. Flow targets apply across the entirety of the flow regime to ensure natural variation.

- A proposed discharge volume of 7212 m^3/day under mean flow conditions may exceed the target flow variation by **more than 20 times** at Outfall 4.

- A discharge of 7212 m^3/day may only meet the CSM flow targets under flows exceeding 48,080 m^3/day (no more than 15% of the flow). This is far in excess of the estimated Q 0.1 flow of 32,660 m^3/day which is only expected to be exceeded 0.1 % of the time or **one day in every 2.7 years.**

- A mean discharge at Outfall 4 of **1076** m^3/day may only meet the CSM flow targets under flows exceeding 7173 m^3/day (no more than 15% of the flow). This is equivalent to the estimated **Q 11** flow which is only expected to be exceeded as a daily mean **40 days per year.**

[4] The Water Framework Directive (Classification, Priority Substances and Shellfish Waters) Regulations (Northern Ireland) 2015

- ***Curraghinalt Gold Mine Project - Site Water Balance – 2020 Update (Table. 23)***[5] proposed that operations to Year 6 may result in increases in flow in Pollanroe Burn at the Owenkillew confluence of **15.9% to 59.5%** across the year. In each of the monthly circumstances estimated, discharge operations would **exceed the JNCC CSM flow targets across the entirety of Pollanroe Burn** downstream of Outfall 4.

- Figure 3. Shows the natural(ised) mean daily flow at each assessment point and the corresponding CSM flow target value

- Figure 4. Shows the natural(ised) Q95 flow at each assessment point and the corresponding CSM flow target value when flows are > Q95 and <Q95 respecively.

Hydrology & Morphology
Freshwater Monitoring & Assessment
Regulation & Enforcement Division

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5. Dalradian Gold Limited - Curraghinalt Mine Project Site Water Balance Update 2020 (October 2020), Kaya Consulting Limited

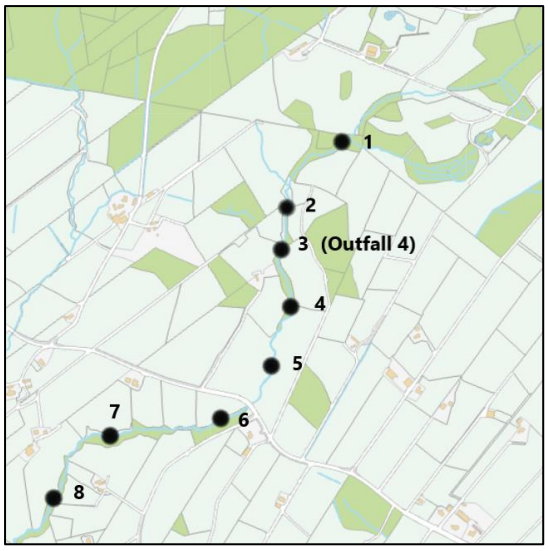

Figure 1. Location of assessment points, including Outfall 4

Figure 2. River stretch extent in red where CSM Flow Target may not be met due to proposed discharge (approximately 18.1 km).

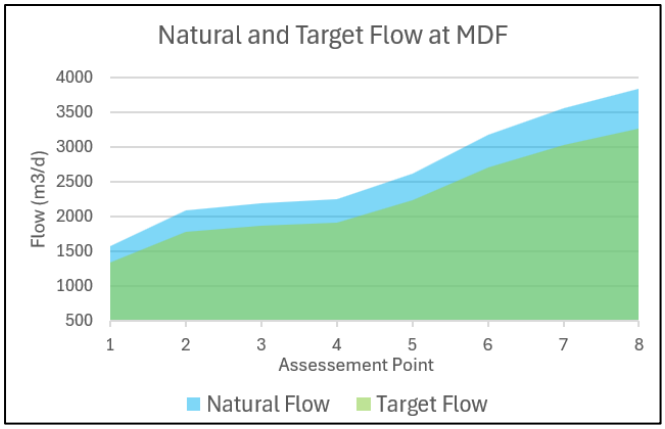

Figure 3. Allowable variation from natural(ised) flow in m^3/day MDF under CSM flow targets

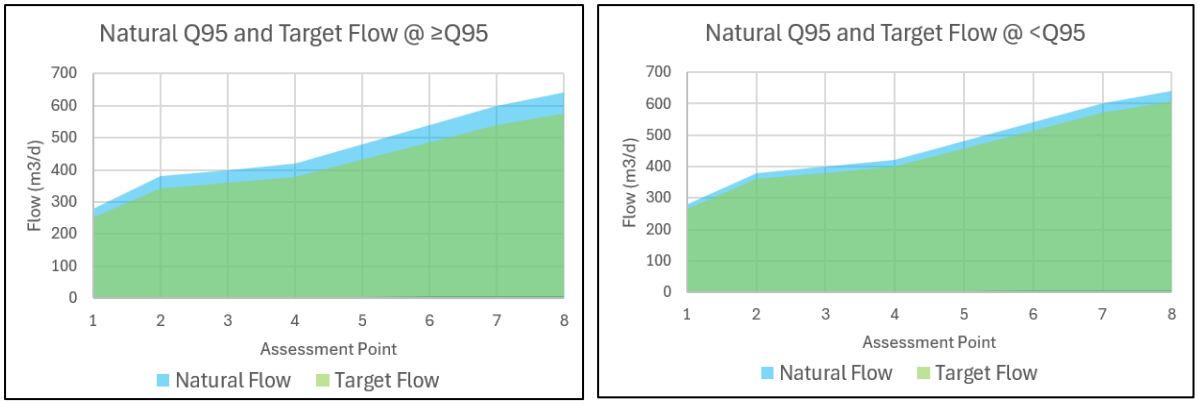

Figure 4: Allowable variation from natural(ised) flow in m^3/day at flows ≥Q95 and flows <Q95 under CSM flow targets

Appendix A

From Common Standards Monitoring Guidance for Rivers[1] (jncc.gov.uk)

Table 3. Flow targets in relation to river size and discharge

River size	< Qn_{95} (Low flows)	Qn_{50-95} (Low-moderate flows)	Qn_{10-50} (Moderate-high flows)	> Qn_{10} (High flows)
Headwater	5	10	15	15
River	10	15	20	10
Large river	15	20	20	20

Qn: daily naturalised flow. Figures are percentage deviations from daily naturalised flow.
River Habitat Survey (RHS) river flow categories are used to discriminate river size (see below). Figures show annual mean flow.

- Flow category 1: < 0.31 $m^3 s^{-1}$ (headwater)
- Flow category 2: 0.31 - 0.62 $m^3 s^{-1}$ (headwater)
- Flow category 3: 0.62 - 1.25 $m^3 s^{-1}$ (river)
- Flow category 4: 1.25 - 2.5 $m^3 s^{-1}$ (river)
- Flow category 5: 2.5 - 5.0 $m^3 s^{-1}$ (river)
- Flow category 6: 5 -10 $m^3 s^{-1}$ (river)
- Flow category 7: 10 - 20 $m^3 s^{-1}$ (river)
- Flow category 8: 20 - 40 $m^3 s^{-1}$ (river)
- Flow category 9: 40 - 80 $m^3 s^{-1}$ (large river)
- Flow category 10: > 80 $m^3 s^{-1}$ (large river)