

**Dalradian Gold  
Limited**

Curraghinalt Project  
County Tyrone  
Northern Ireland

STATEMENT OF  
CASE:

**WATER DISCHARGE**

PAC  
Refs:2021/WHR01+02

DAERA Refs: TrC  
080/20\_1 + 080/21\_1

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## Executive Summary

Implications for the Owenkillew SAC and associated qualifying interest features (more specifically Freshwater Pear Mussel and Atlantic Salmon) are critical considerations in determining these applications and represent the main issue between the Applicant and DAERA in respect of the Inquiries.

The Owenkillew River SAC is currently reported as being in “unfavourable – no change” condition.

The Conservation Objectives require the ‘maintenance and restoration (where necessary)’ of favourable conservation status in relation to the qualifying features of the SAC. It is the position of DAERA that in applying the Integrity test, an assumption should be made that the site is in favourable condition (meeting its Conservation Objectives). As a result of that, its position, is that any movement away from that (presently hypothetical position of favourable condition) would amount to an adverse effect on Integrity.

The JNCC CSM guidance is advocated (as part of DAERA’s case) as the primary source of guidance in terms of setting limit values to be applied for a range of cited parameters of relevance to FWPM and Atlantic Salmon.

The approach described by NIEA (letter dated 5<sup>th</sup> September 2024), requires the delivery of betterment (in water quality terms) for the SAC through the setting of discharge limits applicable to the two receiving burns with the JNCC CSM guidance being the source of limit values for the key parameters (Nitrate, Ammonia, Phosphorus, BOD and suspended solids). In adopting this approach, the limit value directly reflects the favourable condition target value (for the SAC itself). For other parameters, a combination of EQS annual average, EQS maximum allowable concentrations (MAC) and ‘no deterioration in background water quality’ are proposed.

The Applicant’s proposed approach to the setting of discharge limits is fully protective of the aquatic environment. The approach has regard to JNCC guidance and EQS, but crucially it recognises the reality of the existing baseline position in terms of water quality and qualifying species populations, with due regard had to the evidence base.

The Applicant's approach to the water treatment process and the setting of discharge limits involves delivering 'better than baseline' for key parameters. In this light the approach would directly assist in delivering a movement towards favourable condition insofar as water quality in the SAC is concerned. The overall package also includes further, quantifiable betterment, principally delivered through the complete cessation of farming practices on land under the Applicants control, removing a source of nutrient enrichment of the SAC.

The approach to the setting of discharge limits as advocated by DAERA / NIEA has little grounding in evidence, is ill-conceived and is unworkable. The Applicant's (revised) proposed discharge limit values, allow for a safe conclusion that the proposals will not undermine the relevant Conservation Objectives and that no adverse effect on the Integrity of the SAC arises should these limit values be adopted. The overall package is one of improvement in SAC water quality terms, and this package is the only tangible solution currently being promoted by anyone which can help restore favourable condition within the SAC.

## 1. INTRODUCTION AND BACKGROUND

### Introduction

- 1.1. This Statement of Case (SoC) sets out the Applicant's case relating to matters concerning Water Discharges with specific reference to the applications pursuant to the Curraghinalt Project.
- 1.2. This SoC has been prepared by Karl Goodbun of Karl Goodbun Limited, with technical information and expert opinion additionally provided by Dr Michael Stewart of Kaya Consulting, Mr Steve Judge of Green and Blue Ecology and Mr Steve Coats of RSK.
- 1.3. Matters concerning water discharges are also applicable to the Minerals Planning Application LA10/2017/1249/F (PAC Ref: C005). The proposed water discharges, and the limit values (for parameters) to be applied to any licences granted are integral to the consideration of impacts on certain faunal species. Further, the legal tests associated with The Conservation (Natural Habitats, etc.) Regulations 1995 (as amended) (the "Habitats Regulations") are invoked in relation to the Curraghinalt Project applications (the subjects of the conjoined Inquiries). Water discharges have a direct bearing on the assessment into implications for relevant designated sites, which must consider all relevant pathways for adverse effects to occur on those designated sites as a result of the project.
- 1.4. The implications for the Owenkillev Special Area of Conservation (SAC) and associated qualifying interest features (more specifically Freshwater Pear Mussel and Atlantic Salmon) are critical considerations in determining these applications and represent the main issue between the Applicant and DAERA in respect of the Inquiries. This is because the discharges have implications for water quality in the SAC catchment and since the SAC is reported as being in unfavourable condition.
- 1.5. The case for the Applicant regarding water discharges is set out within this SoC, with reference to TRs, the Environmental Statement (ES, November 2017), the ES Addendum (July 2019) and ES Second Addendum (November 2020).

- 1.6. In order to keep the Applicant's evidence as succinct as possible across the SoCs associated with this conjoined Inquiry, and to avoid duplication of material and repetition of information, as part of this SoC reference is made to Technical Reports ("TRs") submitted as appendices to the SoC in respect of the Minerals Planning Application. In particular, this is of relevance to the TR submitted in respect of Ecology and Nature Conservation, which is necessarily broad in its scope. Also of direct relevance are the TRs submitted in respect of Surface Water and Geochemistry, submitted in respect of the Minerals Planning Application.
- 1.7. The qualifications of the experts who have contributed to this SoC are set out within the TRs described above.
- 1.8. At Annex 1 of this SoC is a TR in respect of the Proposed Discharges. This TR describes the following:
  - 1) Review of consultations and history of calculation of proposed Discharge Consent values;
  - 2) 3 Methodology for Calculation of Discharge Consent Values ;
  - 3) EQS and other standards;
  - 4) ;
  - 5) Updated Proposed Discharge Consent Concentrations;
  - 6) Predicted concentrations associated with Proposed Infrastructure Site (i.e., in Pollanroe Burn, Owenreagh River and Owenkillew River);
  - 7) Predicted concentrations associated with Existing Infrastructure Site (i.e., in Curraghinalt Burn and Owenkillew River); and
  - 8) Summary discussion.
- 1.9. Appended to the Proposed Discharges TR is a Water Quality Baseline Report, dated October 2024. This document describes the relevant water quality baseline and presents a review of baseline conditions with reference to additional sampling data available since 2020 . The additional baseline data provides more information on spatial changes across the catchments. A comparison is made between the new data and those presented in the Second addendum, with a discussion on any differences.

## **Background**

- 1.10. In 1987 a Planning Permission (K/363/86) and an associated discharge consent (No. 10611/87) were granted to Ulster Minerals for mineral exploration at Curraghinalt and at the Current Infrastructure Site. The former incorporated underground tunnels, and the latter was granted with conditions (including a maximum suspended solids condition of 50 mg/L) for discharge to watercourse. A 'settlement system' was evidently in place at the outfall point. It is understood that the use of explosives was not permitted at the time, and the progress underground was found to be correspondingly slow. By circa 1990, the site was closed and largely restored, but drainage from the workings continued in the subsequent decades to the receiving water courses unhindered and, it is understood, unmonitored. In parallel, part of the Owenkillew River immediately downstream of the site became a designated Special Area of Conservation (SAC) in 2008.
- 1.11. In 2009 Dalradian Resources acquired Dalradian Gold Ltd (DGL) which was the holder of the Mineral Prospecting Licence that incorporated the Curraghinalt deposit. By 2013 DGL had further progressed exploration and had submitted a Planning Application for a bulk sample (underground extraction) permission involving the re-opening and extension of existing exploration tunnels. Planning permissions were obtained in 2014 and 2015 (K/2013/0072/F and K/2014/0246/F), which also allowed for associated infrastructure including a water treatment plant.
- 1.12. In February 2014, discharge consent (068/12/02) was granted. This enabled DGL to take control of, and responsibility for, the ongoing discharge into the Curraghinalt Burn, against an extended set of specified water quality limit (enforcement) values. Those limit values were set by NIEA and the 2014 discharge consent remains the current (extant) consent relating to water discharges associated with the Curraghinalt Project.

## **The Discharge Applications**

- 1.13. In terms of discharge, the Curraghinalt Project requires the following:
- 1) Variation to the existing discharge consent (068/12/2) relevant to the Curraghinalt Burn with reference to the following:

- a) This application was submitted in April 2020. The information submitted in support of the extant consent assumed a maximum proposed discharge rate of 9.75 L/s. Discharge quality criteria / limit values were determined on the basis of that discharge rate.
  - b) The proposed variation application requires a minor increase in the maximum flow of up to 12.6 L/s and revised water quality criteria / limit values will need to reflect this. The source of water to the discharge point, the discharge location, and immediate downstream designated sites remain unchanged.
  - c) The Water Framework Directive (Priority Substances and Classification) Regulations 2011 have been superseded by the Water Framework Directive (Classification, Priority Substances and Shellfish Waters) Regulations (Northern Ireland) 2015.
- 2) A new consent enabling discharge into the Pollanroe Burn. This application was also submitted in April 2020, and requires a maximum discharge rate of 83.3 L/s.
- 1.14. The key component of the discharge applications are the sets of water quality discharge criteria that will govern the regulatory limits of the water permitted to be discharged to the receiving environment. That receiving environment can be defined as the Curraghinalt Burn (which flows into the Owenkillew River SAC) and the Pollanroe Burn (which flows into the Owenkillew River, which in turn flows into the Owenkillew River SAC).
- 1.15. The setting of these water quality discharge criteria / limit values, requires the identification of relevant water quality parameters (e.g. metals, nutrients) which need to be monitored and controlled in order to protect the aquatic environment (including habitats and faunal species) and the calculation of concentrations of these parameters above which environmental harm could arise (i.e. the setting of limits above which the mine cannot discharge).
- 1.16. The development of discharge criteria is based on two broad principles:

- 1) Discussion and agreement with regulators with regards the methods to be used to calculate the criteria; and
- 2) The need to be protective of downstream aquatic life and water use, based on consideration of downstream receptors and national and international water quality standards and guidance.

- 1.17. These two guiding principles have been applied by the Applicant. Unlike other UK jurisdictions (e.g., England, Scotland), Northern Ireland has no published technical guidance for the calculation of discharge consent values. Therefore, the approach developed for the Curraghinalt Project was based on discussions with regulators during the PAD process in 2016-2017 and the application of methods developed by the Environment Agency (EA), a relevant statutory authority in England. The EA methodology is publicly available and clearly defined. The process was informed by the collection of baseline water quality data, the EIA assessment process, consultation with stakeholders and through liaison with relevant technical experts (e.g., ecologists), in relation to defining the relevant sensitive receptors (those features of which the discharges need to be protective).
- 1.18. The Applicant and its experts have sought to engage fully with NIEA on the matter of the discharge consent limit values. Since the original applications were made in 2020, meetings between the Applicant (expert team) and NIEA, and correspondence have resulted in revisions to the proposed consent limit values being proposed by the Applicant. The TR included at Annex 1 of this SoC sets out those limit values now proposed by the Applicant, a matter discussed in detail further below.
- 1.19. The approach to the setting of limit values (for the Curraghinalt Project) as now put forward by NIEA is described within the DAERA advice note dated 31st July 2023 and within a subsequent letter from NIEA dated 5<sup>th</sup> September 2024. A copy of this letter is included at Annex 2, with detailed consideration of that letter provided at Annex 3.
- 1.20. The reader is directed to Section 1 of the TR included at Annex 1 of this SoC which describes key aspects of the timeline associated with the discharge consent calculations.

## Summary Headline

- 1.21. As will be demonstrated through this SoC, full regard has been had to the sensitivities associated with the water environment, including implications for relevant designated sites and faunal species. It has sought to engage with and agree, methodologies / approaches for deriving appropriate and proportionate limit values with NIEA. It has, based on sound evidence, put forward a suite of proposed discharge consent limit values, which are not only fully protective of relevant sensitive features, but will deliver a betterment for water quality in the main rivers into which discharge will indirectly flow. On the contrary, the position adopted by DAERA, is inconsistent with approaches by it in determining other discharge consent applications, has no grounding in the evidence and is simply not workable.

## 2. SUMMARY OF RELEVANT BASELINE

- 2.1. In this section of the SoC key baseline information relevant to Water Discharge matters is summarised.
- 2.2. Relevant baseline information is described with reference to field data obtained by the Applicant, data provided by NIEA or otherwise available in the public domain, published information regarding threats and pressures associated with sensitive ecological features (e.g. designated sites and supported protected species) and published management / action plans. The following broad topics are discussed with reference to those TRs within which detailed information can be found:
  - a) River and burn water quality;
  - b) Designated sites;
  - c) Atlantic Salmon;
  - d) Fresh Water Pearl Mussel (FWPM).

### River and Burn Water Quality

- 2.3. The water quality baseline is described within the TR in respect of the Proposed Discharges. That document (see Annex 1 of this SoC) includes, at Appendix 1, detailed information and analysis regarding water quality within the Owenkillev River (SAC), the Owenreagh River<sup>1</sup>, the Curraghinalt Burn and the Pollanroe Burn.
- 2.4. Insofar as matters concern water quality within the Owenkillev River and the Owenreagh River, it is clear that water quality has deteriorated over time and that it continues to deteriorate in the face of increased pressures from unregulated (or inappropriately regulated or managed) activities, notably farming. The reasons for the deterioration are discussed within the “Betterment Plan” (see section 3 of that document) included at Annex 13 of the TR in respect of Ecology and Nature Conservation and the reader is directed to that document.

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<sup>1</sup> ASSI designation, upstream of the confluence with the Pollanroe Burn into which discharges are proposed.

### Designated Sites

- 2.5. The Owenkillew River SAC is hydrologically linked to the proposed discharge point in the Curraghinalt Burn. The Owenreagh River is hydrologically linked to the discharge point within the Pollanroe Burn.
- 2.6. The Owenreagh River was formally designated as an ASSI on 29th March 2018. The EclA (2017 ES submission) considered implications for the site in view of its status as a proposed ASSI (as it was at that time). However, prior to formal designation no site boundaries were defined for the site and as such the assessment proceeded on a precautionary basis and considered the entire length of Owenreagh River as the potential ASSI. In fact, this designated site extends upstream of Cashel Bridge, Greencastle and therefore upstream of the Application Site. Thus, whilst in broad terms hydrological connectivity exists between the Application Site and this ASSI, discharges to water courses as part of the proposed surface water strategy could not impact water quality within the ASSI as all discharges would be relevant to points downstream of the designation.
- 2.7. Qualifying interest features associated with relevant European level designated sites are described within section 4 of the Update sHRA (2020)<sup>2</sup>, which also includes the Conservation Objectives for these sites.

### Atlantic Salmon

- 2.8. Detail regarding baseline information for Atlantic Salmon is discussed within the TR in respect of Ecology and Nature Conservation. Information regarding specific surveys of the Curraghinalt and Pollanroe Burns is presented in section 5 of that TR. Information regarding the population on a wider scale, within the river systems of which the Owenkillew and Owenreagh are part, is discussed in section 13 of the Ecology and Nature Conservation TR. Summary information is presented below.
- 2.9. Atlantic Salmon are present within the Owenkillew River SAC and Owenreagh River (ASSI in part), indeed they are a qualifying interest features associated with both designations.

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<sup>2</sup> Appendix C.10 of FEI2

- 2.10. Stock numbers show a downward trend across Northern Ireland, with a significant reduction in the number of returning (breeding) adults, despite river habitat conditions being assessed as being of good to moderate quality and 'stable'. Very low marine survival rates are evident and are contributing to the decline in numbers but a broad range of pressures affecting population numbers are documented, including those relating to water quality (pollution / eutrophication). However, noting that catch and return is now widely applicable, Atlantic Salmon continue to be fished for under licence from Loughs Agency.
- 2.11. Insofar as the Curraghinalt and Pollanroe Burns are concerned, for both burns, habitat quality has been classed as sub-optimal. The Curraghinalt Burn is particularly poor throughout its length.
- 2.12. There is no evidence that any salmonid fish (of particular relevance to matters concerning the Owenkillew River SAC) permanently live (or spawn) within the Curraghinalt Burn. The data from electrofishing surveys showed no Atlantic Salmon presence. Whilst a small number of Brown Trout were recorded, the data is consistent with a few isolated small brown trout being present in the burn, with access to the burn by salmonid fish species only possible during high flood events. Individual fish are considered to become trapped when the river levels drop and are only expected to be resident within the Curraghinalt Burn in the short term only. eDNA data obtained from survey of the burn in 2024 returned a negative result, demonstrating an absence of Atlantic Salmon.
- 2.13. There is no evidence that salmonid species (including Atlantic Salmon), spawn in Pollanroe Burn. Both Atlantic Salmon and Brown Trout were recorded in the lower section of the burn. Evidence suggests that small numbers of juvenile salmon do visit the lower sections of Pollanroe Burn and Brown trout are expected to be resident in the lower sections of Pollanroe Burn circa 800m downstream of Crockanboy Road bridge. The extent to which these fish species use the burn over the course of the year is dependent upon water levels. During very low flows (e.g. during the summer months) access even to these areas will be significantly restricted or not possible.

### Fresh Water Pearl Mussel

- 2.14. Detail regarding baseline information for Freshwater Pearl Mussel is discussed in section 5 of the TR in respect of Ecology and Nature Conservation. Further information regarding the populations present within the Owenkillev River and Owenreagh River, is discussed in section 13 of the Ecology and Nature Conservation TR. Summary information is presented below.
- 2.15. The most recent survey work was undertaken on behalf of NIEA in 2021 and 2022. NIEA provided the Applicant with a copy of that data. Survey work undertaken in 2021, which focussed on the Owenkillev River SAC and upstream of the Curraghinalt Burn, recorded a total of 2,277 mussels with the densest beds at the upstream end of the survey area.
- 2.16. Survey work undertaken in 2022 included three further sites in the Owenkillev River. These sites are all downstream of the Curraghinalt Burn. A total of 10 mussels are reported for this area.
- 2.17. The 2022 survey work also included a total of nine survey sites in the Owenkillev River downstream of Curraghinalt Burn and the confluence of the Owenreagh/Owenkillev. A total of 365 FWPM are reported by NIEA in this stretch.
- 2.18. Regarding the survey of the Owenreagh River in 2022, no FWPM are reported for the (undesignated) river section downstream of the Pollanroe Burn.
- 2.19. In terms of the conservation status of the species, this is discussed in detail at section 13 of the Ecology and Nature Conservation TR and the reader is directed to that information. Key points are summarised below.
- 2.20. With reference to the 2017 “Condition Assessment”<sup>3</sup> (the most up to date, fully reported assessment of its kind), this states that:

*“The Owenkillev River SAC Condition status remained as Unfavourable – No Change.”*

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<sup>3</sup> Horton, M., Bell, D., Keys, A. & Mitchell, F. (2018) Freshwater pearl mussel survey of Northern Ireland 2017. Report prepared by Ballinderry Rivers Trust for the Northern Ireland Environment Agency. Northern Ireland Environment Agency Research and Development

- 2.21. The Condition Assessment reports an increase (over previous surveys) in the total numbers of mussels observed, however “fails” were recorded in respect of several attributes, including those related to population size, extent and age class, and those associated with water quality (phosphorous, nitrate, BOD and fine sediment), of direct relevance to these applications.
- 2.22. A “pass” is recorded in respect of “filamentous algae”, where less than 5% cover (estimated) is recorded across the assessment units. A proliferation of filamentous algae often indicates that nutrient (e.g. phosphate and nitrate) levels are high. This is significant because the recorded levels of coverage of filamentous algae in the SAC, would not point to a cause for concern regarding nutrient levels in respect of the species.

### 3. CONSIDERATION OF SUBSTANTIVE ISSUES AND THE CASE FOR THE APPLICANT

#### The position of DAERA / NIEA

- 3.1. With reference to the DAERA advice note dated 31st July 2023 and the subsequent letter from NIEA dated 5<sup>th</sup> September 2024 the position of NIEA in relation to the setting of discharge limits can be distilled as follows.
- 3.2. The Owenkillew SAC / ASSI is reported to be in unfavourable condition. It is the position of DAERA that since, the Conservation Objectives require the 'maintenance and restoration (where necessary)' of favourable conservation status in relation to the qualifying features of the SAC, in applying the Integrity test, DAERA suggest that an assumption should be made that the site is in favourable condition (meeting its Conservation Objectives). As a result of that, its position, is that any movement away from that (presently hypothetical position of favourable condition) would amount to an adverse effect on Integrity.
- 3.3. Further, it is the position of DAREEA that in order to ascertain the level of effect from discharges and to provide the level of certainty needed in addressing the relevant legal tests (confirming no adverse effect on Integrity), reliance must be placed upon JNCC Common Standards Monitoring (CSM) Guidance. The CSM guidance is advocated (as part of DAERA's case) as the primary source of guidance in terms of setting limit values to be applied for a range of cited parameters of relevance to FWPM and Atlantic Salmon.
- 3.4. NIEA's current position with regard to the discharge consent limits to be applied is described within its letter of 5th September 2024. The approach described in that letter, requires the delivery of betterment (in water quality terms) for the SAC through the setting of discharge limits applicable to the two receiving burns with the JNCC CSM guidance being the source of limit values for the key parameters (Nitrate, Ammonia, Phosphorus, BOD and suspended solids). In adopting this approach, the limit value directly reflects the favourable condition target value. For other parameters, a combination of EQS annual average, EQS maximum allowable concentrations (MAC) and 'no deterioration in background water quality' are proposed.

- 3.5. A detailed critique of the proposed approach to the setting of limit values in this manner is set out within section 13 of the TR in respect of Ecology and Nature Conservation. Further analysis is provided within the Proposed Discharges TR at Annex 1 of this SoC. The position of the Applicant is summarised below with reference to where detailed information can be found within the evidence submitted in respect of the conjoined Inquiries.

#### Case for the Applicant

- 3.6. In short, it is the position of the Applicant that the (Applicant's) discharge proposals, including the proposed limit (enforcement) values for parameters are fully protective of the water environment, the Owenkillev River SAC and all relevant habitats and faunal species (e.g. the qualifying interest features of the SAC – Freshwater Pearl Mussel and Atlantic Salmon). The approach adopted is described and justified within section 13 of the Ecology and Nature Conservation TR. In this matter the reader is also directed to the Proposed Discharges TR included at Annex 1 of this SoC.
- 3.7. As set out above and explained in detail within the Ecology and Nature Conservation TR, for the key parameters associated with Freshwater Pearl Mussel DAERA / NIEA place sole reliance upon JNCC CSM guidance to define the limit values to be used in the consenting process. Whilst CSM guidance can be used to help set discharge consent values, the following are important considerations:
- a) CSM Guidance is published to help define the condition of an interest feature by reference to targets or target ranges (i.e whether it is in favourable condition and therefore meeting its conservation targets).
  - b) It is to be used as an assessment and management tool and it also serves reporting purposes in relation to designated sites;
  - c) The Pollanroe burn sits well outside of any relevant designation and discharges into the undesignated lower section of the Owenreagh River ASSI;
  - d) The Curraghinalt burn discharges into the Owenkillev River SAC / ASSI and the lower section of the burn is designated as part of the SAC. However, this is on account of the woodland habitat and not for aquatic species interest;

- e) Neither burn supports Freshwater Pearl Mussel and neither burn represents spawning habitat for salmonid species (e.g. Atlantic Salmon);
- f) Whilst Atlantic Salmon (parr) have been recorded in a section of the lower reach of the Pollanroe Burn, the burn is not significant in terms of any supporting role in maintaining the population of Atlantic Salmon within the catchment. In a worst case scenario where the burn is lost to the species as a resource, the effect would not be significant for the population.

3.8. Thus, in these terms, setting the limit values for key parameters in line with CSM guidance at end of pipe, is not appropriate. The discharges need to be protective of the SAC interest features, and (in order to pass the Integrity test associated with the Habitats Regulations), must:

- 1) Avoid deterioration in water quality – moving the feature/s further away from favourable condition;
- 2) Ensure that the aim of reaching and maintaining favourable condition is not retarded.

3.9. The approach to setting the limit / enforcement values advocated by the Applicant (described in detail within the TR included at Annex 1 of this SoC and within section 13 of the Ecology and Nature TR), delivers a betterment over the current situation. The approach is such that for the key parameters, baseline water quality within the main rivers will be improved and put them on the trajectory towards favourable condition, against a backdrop of continuing decline (in the absence of the project). The following summary points are significant considerations when applying the tests of the Habitats Regulations:

- 1) The limit values are enforcement values, they are not actual discharge values. Discharges will necessarily be below the limits in order to avoid enforcement action being taken by the regulator;
- 2) The project will deliver a water treatment process which is the most advanced possible, using reverse osmosis technology (best available technology) giving confidence that the proposed limits will not be breached;
- 3) Because the Mine proposals will effectively re-circulate baseline water from the catchment, the water treatment process will not only be adding nothing, it will be cleaning the baseline. This is a baseline which has arisen due to

- failings in regulation and management outside of the control of the Applicant and has nothing to do with the Project proposals;
- 4) The technology to be used is not currently replicated anywhere else in the catchment or indeed within Northern Ireland;
  - 5) It is not likely that any other body (public or private) will, at any time soon:
    - i. Deliver a comparable water treatment system by way of upgrade, or at the outset of a project;
    - ii. Be able to comply with the discharge limits necessary to meet baseline, let alone better (improve) the baseline.
  - 6) The Applicant's proposals in relation to the setting of discharge limits are part of the solution to the ongoing problem of failures to address water quality issues within the catchment, failures caused by others and not being addressed through regulation or management planning;
  - 7) The litany of failings by the regulators and land managers to address the issue of water quality in the SAC catchment are self-evident from:
    - I. The baseline information,
    - II. The suite of River Basin Management Plans,
    - III. The OEP report (2024)<sup>4</sup>,
    - IV. The 'Threats and Pressures' identified within the SAC Conservation Management Plan;
    - V. The granting of discharge consents associated with a range of projects (e.g. WwTWs, residential development), both prior to and post the Advice Note of July 2023, with limit values for key parameters which have no resemblance to the values now proposed by NIEA in respect of the subject applications;
    - VI. Legislation, guidance and an enforcement regime which fundamentally fails to address nutrient enrichment of watercourses, for example from farming activities.

3.10. In all the above, the reader is directed to Annex 1 of this SoC, section 13 of the Ecology and Nature Conservation TR and Annex 13 of that TR (the Betterment Plan), each of which contains detailed information and analysis relating directly to the above points.

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<sup>4</sup> A Review of Implementation of the Water Framework Directive Regulations and River Basin Management Planning in Northern Ireland

## Betterment

- 3.11. The Applicant's proposals go further than avoiding harm. The proposed discharge limits secure better than baseline for the relevant parameters, putting the SAC on the course to favourable condition. They are also protective of aquatic life within the burns. Moreover, an outline Betterment Plan is submitted and this can be found at Annex 13 of the Ecology and Nature Conservation TR.
- 3.12. The Betterment Plan identifies and quantifies measures which will be delivered by the Applicant that will further enhance water quality in the catchment. To qualify this statement, the measures will deliver enhancement / benefits, but the overall position of SAC favourable condition can only be reached where other sources (of nutrient enrichment for example) are addressed, something which is outside of the Applicant's control and for which the Applicant cannot be penalised through the consenting regime.
- 3.13. The Betterment proposals include the complete removal of agricultural practices which would contribute to nutrient enrichment of watercourses (including the SAC) on land under its control. Grazing and fertiliser use will cease on, in excess of 240ha of land as a direct result of the proposals. With reference to section 6 of the Betterment Plan (Annex 13 of the Ecology and Nature Conservation TR), it has been calculated that:
- 1) For the Project, the (conservative) total calculated nitrogen tonnage emission is 0.59 tonnes per annum;
  - 2) Even when taking a conservative approach to calculating the estimated nitrogen saving for the watercourses (on cessation of farming), the proposal delivers a saving of 0.75 tonnes per annum against the baseline;
- 3.14. Not only will the Project be regulated to a nitrate discharge concentration that does not exceed the current average nitrate baseline concentration (taking the Applicant's approach to discharges) in the upstream Owenreagh river (which flows into the SAC), in view of the calculations the project Betterment Plan will also more than offset the nitrogen discharged by the Project. There will also be 'savings' in relation to Phosphorous, although to a lesser extent.

- 3.15. In addition to measures which will directly reduce nutrient enrichment of the watercourses, other measures are proposed. Habitat enhancement measures, which link directly to improving water quality within the SAC, are to be delivered within three defined Betterment Areas. Further, a monitoring scheme is proposed which is targeted at expanding the baseline data available (for future assessment purposes) in relation to water quality and Freshwater Pearl Mussel.
- 3.16. All of the above are discussed within the Betterment Plan at Annex 13 of the Ecology and Nature Conservation TR. The reader is directed to that document for the detail.

#### 4. SUMMARY AND CONCLUSIONS

- 4.1. Implications for the Owenkillev SAC and associated qualifying interest features (more specifically Freshwater Pear Mussel and Atlantic Salmon) are critical considerations in determining these applications and represent the main issue between the Applicant and DAERA in respect of the Inquiries.
- 4.2. Water quality discharge criteria will govern the regulatory limits of the water permitted to be discharged to the receiving environment, namely, the Curraghinalt Burn (which flows into the Owenkillev River SAC) and the Pollanroe Burn (which flows into the Owenkillev River, which in turn flows into the Owenkillev River SAC).
- 4.3. The Owenkillev River SAC is currently reported as being in “unfavourable – no change” condition.
- 4.4. The Conservation Objectives require the ‘maintenance and restoration (where necessary)’ of favourable conservation status in relation to the qualifying features of the SAC. It is the position of DAERA that in applying the Integrity test, an assumption should be made that the site is in favourable condition (meeting its Conservation Objectives). As a result of that, its position, is that any movement away from that (presently hypothetical position of favourable condition) would amount to an adverse effect on Integrity.
- 4.5. It is also the position of DAERA that in order to ascertain the level of effect from discharges and to provide the level of certainty needed in addressing the relevant legal tests (confirming no adverse effect on Integrity), reliance must be placed upon JNCC Common Standards Monitoring (CSM) Guidance. The CSM guidance is advocated (as part of DAERA’s case) as the primary source of guidance in terms of setting limit values to be applied for a range of cited parameters of relevance to FWPM and Atlantic Salmon.
- 4.6. The approach described by NIEA (letter dated 5<sup>th</sup> September 2024), requires the delivery of betterment (in water quality terms) for the SAC through the setting of discharge limits applicable to the two receiving burns with the JNCC CSM guidance being the source of limit values for the key parameters (Nitrate, Ammonia, Phosphorus, BOD and suspended solids). In adopting this approach, the limit value directly reflects the favourable condition target value (for the SAC

itself). For other parameters, a combination of EQS annual average, EQS maximum allowable concentrations (MAC) and 'no deterioration in background water quality' are proposed.

- 4.7. The Applicant's proposed approach to the setting of discharge limits is fully protective of the aquatic environment. The approach has regard to JNCC guidance and EQS, but crucially it recognises the reality of the existing baseline position in terms of water quality and qualifying species populations, with due regard had to the evidence. That evidence includes:
- i. A declining trend in baseline water quality associated with key parameters;
  - ii. The litany of failures regarding the enforcement and management of direct and diffuse emissions to the receiving watercourses;
  - iii. The lack of Freshwater Pearl Mussel in the burns into which discharges will occur and a lack of the species within the Owenreagh River downstream of the confluence with the Pollanroe Burn;
  - iv. The documented poor quality of the burns in relation to salmonid (e.g. Atlantic Salmon) habitat and the confirmed lack of Atlantic Salmon in the Curraghinalt Burn altogether;
  - v. The low value, in population conservation terms, of the Pollanroe Burn for Atlantic Salmo; and
  - vi. Other guidance and the approach adopted in other jurisdictions (e.g. the Republic of Ireland) relevant to the protection of the water environment and Freshwater Pearl Mussel in particular.
- 4.8. The Applicant's approach to the water treatment process and the setting of discharge limits involves delivering 'better than baseline' for key parameters. In this light the approach would directly assist in delivering a movement towards favourable condition insofar as water quality in the SAC is concerned. The overall package also includes further, quantifiable betterment, principally delivered through the complete cessation of farming practices on land under the Applicants control, removing a source of nutrient enrichment of the SAC.
- 4.9. The approach to the setting of discharge limits as advocated by DAERA / NIEA has little grounding in evidence, is ill-conceived and is unworkable.
- 4.10. Insofar as matters concern the Applicant's (revised) proposed discharge limit values, it can be safely concluded that the proposals will not undermine the

relevant Conservation Objectives and that no adverse effect on the Integrity of the SAC arises should these limit values be adopted. The overall package is one of improvement in SAC water quality terms, and this package is the only tangible solution currently being promoted by anyone which can help restore favourable condition within the SAC.

# Updated Discharge Consent Values for Curraghinalt Mine, Technical Report, October 2024

## Kaya Consulting Limited

This Technical Report (TR) outlines updated discharge consent values for the Curraghinalt Mine, based on information made available and consultations since the Second Addendum to the ES (2020). The Report also updates predictions of the impact of the proposed development on the water quality in watercourses downstream of the proposed and existing infrastructure sites. The updated calculations of the downstream effect of discharges aim to provide a more realistic assessment of the impacts for regulators, compared to the EIA where overly conservative assumptions were made (i.e., discharges at concentrations in excess of those predicted within the mine, pre-water treatment).

As part of this update a review of baseline water quality has been undertaken in light of additional data collected since the Second Addendum to the ES. This is reported in a supporting Appendix, with updated water quality statistics used in this update.

A review of parameters considered within the Discharge Consent is also undertaken, with proposals to remove some parameters from the Discharge Consent, where geochemical work has shown that there is no significant source within the mine.

This note includes the following sections;

- Information on author of Technical Report
- Review of consultations and history of calculation of proposed Discharge Consent calculations;
- Methodology for calculation of discharge consent values;
- Summary of EQS and other standards used for the assessment;
- Updated Discharge Consent Concentrations, including review of parameters considered within the Discharge Consent;
- Updated predicted concentrations in Owenreagh River and Owenkillew River during operations;
- Summary

## 1 Information on Author of Technical Report

My name is Dr Michael Stewart. I am Managing Director at Kaya Consulting Limited (Kaya). I hold an MA in Earth Sciences from Oxford University and a PhD in Geography from the University of Leeds. I am a Chartered Member of the Chartered Institution of Water and Environmental Management (CIWEM).

I have been a professional hydrologist and environmental consultant for over 25 years. Prior to this I was a post-doctorate researcher into flood hydrology and flood modelling for 5 years. For most of my career I have

had a significant involvement in environmental, hydrological and flood modelling, impact assessments and in providing advice to developers and planning authorities.

I have worked on a wide range of projects including major infrastructure projects (roads and powerlines), housing developments, industrial developments and mineral extraction. I have worked on mining projects throughout the world, during my time as a consultant based in Canada and while a Director at Kaya Consulting. Through such work, I have gained experience of the requirements of surface water impact assessments for mining projects, an understanding of the mitigation required and an appreciation of the potential impacts of mining that need to be avoided, mitigated and managed as part of any successful mining development. This has included water quality modelling, including dilution calculations and compliance assessments.

Throughout Kaya's involvement in this project, I have been the lead hydrologist and water quality modeller, undertaking calculations associated with the development of discharge criteria.

This TR considers the calculation of discharge consent values for the Curraghinalt mine, including updates to the proposed consent values in the light of consultations since the Second Addendum to the ES.

## 2 Review of Consultations and History of Discharge Consent Calculations

The following section outlines a timeline of consultations and the background for discharge consent applications at the Curraghinalt site. The stages are summarized in Table 1 and each stage is discussed in the sections below.

**Table 1: Stages of the Timeline discussed in Section 2**

<b>Stage</b>	<b>Date</b>
<i>Discharge Consent Application for Exploration Works</i>	2013
<i>Pre-application discussions with DAERA</i>	2015 - 2017
<i>2017 Environmental Statement</i>	2017
<i>Second Addendum to the ES and Consultations</i>	2020
<i>Discharge applications made</i>	2020
<i>Additional Field Studies Identify Fish in Burns</i>	2021 - 2022
<i>Correspondence and position from NIEA</i>	2023-2024
<i>Updated Discharge Consent Proposals (this TR)</i>	2024

### 2.1 Discharge Consent Application for Exploration Works

The discharge consent application for the Exploration Works (2013) was supported by dilution calculations undertaken by Environ for selected water quality parameters. These calculations considered the Owenkillev River as the 'receiving waters' for the discharge, with comparison to Environmental Quality Standards (EQS). This approach was accepted, and a new consent was granted for the on-going discharge to cover the proposed reopening of the mine workings.

### 2.2 Pre-application discussions with DAERA

A series of pre-application meetings (8 No.) were held from December 2015 to June 2017 where the approach to be taken in the calculation of appropriate discharge consents for the mine site was discussed.

During these meetings the key items that were discussed and agreed were;

1. A list of parameters to be considered in the assessment
2. The Environmental Quality Standards (EQS) to be considered
3. Main rivers (Owenreagh and Owenkillev) to be used as compliance points for assessments and to be considered as 'receiving environments'

These informed the approaches taken for both discharge consent calculations and surface water quality impact assessment. Importantly, they were also used to inform the treatment technology needed prior to the infrastructure being designed and the application being submitted. The key meetings are outlined in Table 2 below.

**Table 2: Key pre-application consultations with relevance to Discharge Consent**

<b>Meeting / Consultation prior to EIA submission</b>	<b>Date</b>	<b>Summary of Relevant Content</b>
<i>Conference Call</i>	30 <sup>th</sup> June 2016	Kaya Consulting presentation on discharge consent methodology, with NIEA confirming they were happy with proposals
<i>PAD sub-meeting (water)</i>	9 <sup>th</sup> November 2016	Discussion of EQS values, detection limits and compliance point for discharges. Kaya Consulting presentation highlighting compliance to be measured in Owenreagh River
<i>PAD sub-meeting (water)</i>	26 <sup>th</sup> January 2017	Similar points to November 2016 meeting, with email exchange after meeting clarifying approach and way forward to be agreed at next sub-group meeting
<i>Discharge Criteria Memo</i>	25 <sup>th</sup> April 2017	Discharge criteria memo formally submitted prior to next sub-group meeting
<i>PAD sub-meeting (water)</i>	15 <sup>th</sup> June 2017	NIEA content with discharge proposals and calculations. The calculations from memo submitted prior to this meeting were then taken forward to 2017 ES.

### 2.3 2017 Environmental Statement

Consistent with pre-application discussions, the following methods were used to calculate discharge consent values for the EIA;

1. Owenkillew and Owenreagh Rivers were considered as sensitive watercourses and calculations were undertaken consistent with England and Wales Environment Agency methods (LIT 10419), due to absence of published Northern Ireland methods. Assessments were based on published Environmental Quality Standards (EQS), which were considered applicable in the main rivers and not small burns.
2. Curraghinalt Burn and Pollanroe Burn were considered as low sensitivity watercourses, based on an assessment by ecologist that of no ecological value. As a result, EQS were not applied to these burns and a limit to discharge quality was based on Drinking Water Standards in the burns and is considered a reasonable approach to provide a practical limit on water quality in the burns. If the discharge criteria calculated for the main rivers was already below the Drinking Water Standards the lower value was used. If baseline was above the Drinking Water Standards and the discharge criteria value calculated for the main rivers, then the discharge criteria set to average baseline, to reflect the existing baseline conditions. This approach of limit setting, rather than mixing modelling in small tributaries, is also consistent with both LIT 10419 guidance and the approach applied by NIEA in the determination of the existing discharge consent (068/12/02).

Calculations of the impact of discharges on water quality in the burns and rivers were made based on stochastic dilution calculations using the project water balance model. Results were provided in the ES and predictions for the main rivers were compared to EQS and parameters considered sensitive for Fresh Water Pearl Mussels (FWPM).

Predictions were reviewed by project ecologists and biologists and incorporated into their Impact Assessments within the ES.

## 2.4 Second Addendum to ES, consultations and discharge applications

In 2020, it was understood for the first time that that NIEA's approach to the discharge consent values and impacts assessment was to use the EA's RQP Monte Carlo software. As a result, the method was used for the November 2020 Second Addendum to the EA. The key constraints on the discharge consent values remained as presented in the 2017 EIA, namely:

1. Compliance assessment is undertaken for main rivers using EA methodology with respect to EQS and FWPM parameters; and
2. Drinking Water Standards limits continued to be applied for the small burns

It is noted that prior to submission of the Second Addendum to the ES, the proposed calculation methods for the discharge consents were scrutinised during FEI1 and FEI2. In addition, Golders (consultants for DAERA and DfI) undertook a review of the modelling approaches used in the ES and discharge consent applications. No fundamental issues with the approaches used were highlighted in these consultations. Notably NED stated that 'NED are satisfied that the Pollanroe Burn does not meet the criteria of a headwater', making it clear that the Pollanroe Burn should not be considered as the same as a main watercourse under the WFD. This is consistent with the approach used in the calculation methodology for the discharge consents.

## 2.5 Identification of Fish in Burns

Survey data (Loughs Agency from June 2021 and Ricardo Consultants for the Applicant from June 2022) identified juvenile fish (trout) in the lower reaches of Pollanroe Burn. The surveys also identified a very low number of adult fish (trout) in the Curraghinalt Burn. Fish were not identified in these reaches as part of the baseline work for the EIA.

The lower reaches of Pollanroe Burn are relatively low gradient and as described in the Ecology TR both salmon parr and brown trout of various age classes have been recorded.

The lower reaches of the Curraghinalt Burn are relatively steep and rocky and as described in Ecology TR the fish are considered to move into the Curraghinalt Burn from time to time when conditions allow (extremely high water levels).

## 2.6 Position taken by NIEA from July 2023

In addition to the material discussed above, following the submission of FEI2 in 2020, the process of assessment and evaluation had continued with no material change in the engagement with NIEA. That changed dramatically in September 2023 with the receipt of an Advice Note (that was dated July 2023) setting out a number of propositions. This was followed up with correspondence from NIEA in March, June and September 2024.

This correspondence is addressed in the Discharge Consent Statement of Case (SoC), with the focus on the September 2024 document as the latest iteration of the NIEA position.

## 2.7 Updated Discharge Consent Proposals

An update of the discharge consent proposals has been made and is presented in this document in subsequent sections. They have been updated since 2020 because it was necessary to take into account the following information:

1. Assessment of presence of fish in Curraghinalt and Pollanroe Burns. In the light of the evidence from detailed fish surveys as reported in the Ecology TR a greater level of protection is provided through the proposed discharge limits in respect to the Pollanroe Burn, when compared to the Curraghinalt Burn.
  - In the EIA concentrations in the Pollanroe Burn were limited to Northern Ireland Drinking Water Standards; for this update they are now limited to acute and chronic Environmental Quality Standards (EQS) or baseline if baseline exceeds EQS. It should be noted that in the absence of statutory NI EQS values, both statutory and non-statutory EQS values have been used that are adopted by other regulators with the UK. In a few instances, and in the absence of other UK standards, international standards are referenced. This is considered protective of fish of various age classes.
  - In the EIA concentrations in the Curraghinalt Burn were limited to Northern Ireland Drinking Water Standards.; for this update they are now limited to acute EQS or baseline if baseline exceeds EQS. This is considered protective of adult fish.
2. The JNCC values relevant for FWPM for the Owenreagh and Owenkillew Rivers. The approach taken limits the discharge concentrations to baseline conditions in the Owenreagh and Owenkillew Rivers, such that the discharge will not result in a deterioration in the baseline for these parameters. The mining proposals also include a betterment plan which will be relevant to the consideration of these parameters, as discussed in the Ecology TR.
3. Additional baseline data collected from 2020 to 2024. A review of the discharge consent values is made based on additional baseline data collected from the 2020 EIA to 2024
4. A review of the parameters considered in the discharge consent is also made, with a proposal to remove parameters where geochemical test work has shown they are not present at elevated concentrations within mine water and/or where EQS are at or below laboratory Limits of Detection

These updates are consistent with protection of the downstream environment.

### 3 Methodology for Calculation of Discharge Consent Values

The methodology fundamentally remains the same as presented in the 2017 ES and 2020 Second Addendum in that the aim is that:

- (i) concentrations in the burns and rivers are protective of the environment; and
- (ii) methods closely follow published UK methodologies in the absence of formal methods for Northern Ireland.

Changes are driven by new information provided by field survey or DAERA regarding sensitivities to the downstream environment.

This discussion of the methodology used in the selection of discharge values covers both the existing infrastructure site and proposed infrastructure site. The discussion outlines the similarities and differences between approaches for the Pollanroe and Curraghinalt Burns.

In the ES the following approach was taken:

- Maximum discharge concentrations were calculated based on Environment Agency methods: <https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit>; and LIT 10419 'Modelling: surface water pollution risk assessment' (Environment Agency 2014), with the aim of protecting EQS in the main rivers; Owenreagh and Owenkilley;
- Maximum discharge concentrations were adjusted as applicable, so they were not greater than Drinking Water standards, with the aim of providing a minimum drinking water quality in the Pollanroe Burn and Curraghinalt Burn;
- Discharge concentrations were adjusted so that they were not less than baseline conditions, i.e., there was no requirement to treat water to below baseline conditions;
- Predicted concentrations in the Owenreagh and Owenkilley Rivers were compared to Fresh Water Pearl Mussel (FWPM) guideline values.

The methodology is shown in Figure 1.

The proposed updated methodology is shown in Figure 2 and contains:

- Maximum discharge concentrations were calculated based on Environment Agency methods, with the aim of protecting EQS in the main rivers, Owenreagh and Owenkilley;
- Maximum discharge concentrations were adjusted so they were not greater than Drinking Water standards, to be consistent with the previous approach;
- Maximum discharge concentrations were adjusted so that that they were not higher than acute/short-term EQS values, with the aim of maintaining maximum concentrations in the small burns (Pollanroe and Curraghinalt) below acute EQS values. This is considered protective of adult fish;
- An average discharge criterion is added for the Pollanroe Burn, so that average concentrations in Pollanroe Burn are not higher than chronic/long-term EQS values, with the aim of maintaining

average EQS conditions in the Pollanroe Burn, to be protective of fish of various age classes. This is not required for the Curraghinalt Burn, as discussed above;

- Consideration is made for the application of JNCC (2015) concentrations applicable to BOD, nitrate and phosphorus as well as JNCC (2016) values for other parameters.
- Discharge concentrations were adjusted so that they were not less than baseline conditions, i.e., there was no requirement to treat water to below baseline conditions

Further discussion of the approach taken to revise the proposed discharge consent parameters is provided in the Ecology TR and Discharge Consent SoC.

The parameters included in the assessment within the ES (and considered for regulation of discharges) were selected based on:

- (i) if an appropriate EQS or guideline value could be identified,
- (ii) if an initial desktop pre-geochemical assessment suggested concentrations in the mine might be elevated over natural baseline.

Following the geochemical work presented in the 2020 Second Addendum the results indicated that some of the parameters initially included in the parameter list did not have concentrations in excess of baseline conditions within the mine. These parameters were originally retained in the discharge criteria presented with the 2020 Second Addendum and discharge consent applications for consistency with the 2017 ES, but with this review of the Discharge Consent values we have considered whether these parameters should remain within any Discharge Consent. A review is undertaken in Section 5.1 with some parameters removed from the parameter list.

In addition, parameters where the laboratory Limits of Detection (LOD) is close to the EQS values are highlighted as it is not practical to regulate a discharge close to a concentration value that could not be detected within a laboratory. The analysis suggests certain parameters could be removed from the discharge consent and this is discussed in Section 5.1.

NIEA has suggested that phosphorus is included within the suite of parameters, due to JNCC (2015) having a compliance limit for this parameter, even though geochemical work indicated no significant source associated with mining. Whilst the logic of this approach is questioned, this parameter is included in the Discharge Consent update.

It should be noted that further commentary on correspondence received from DAERA in September 2024 has informed the approach is set out in the Statement of Case and Ecology TR.

Figure 1: 2020 Methodology for Discharge Criteria Calculation

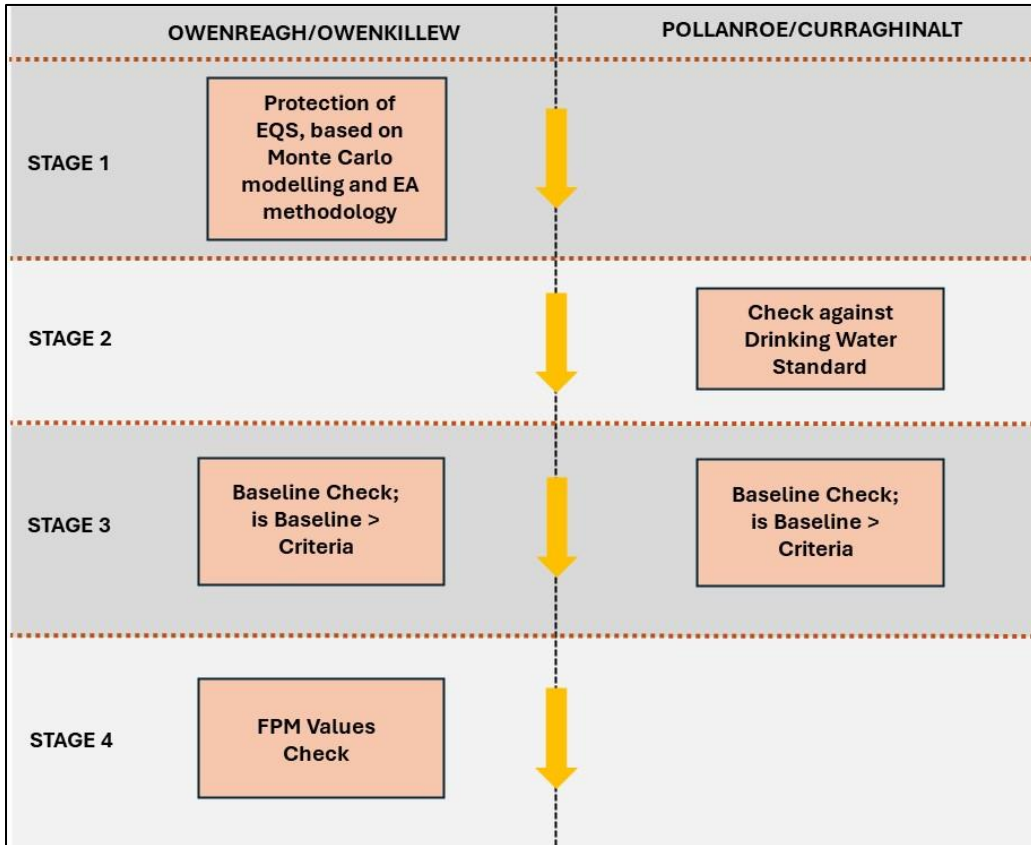
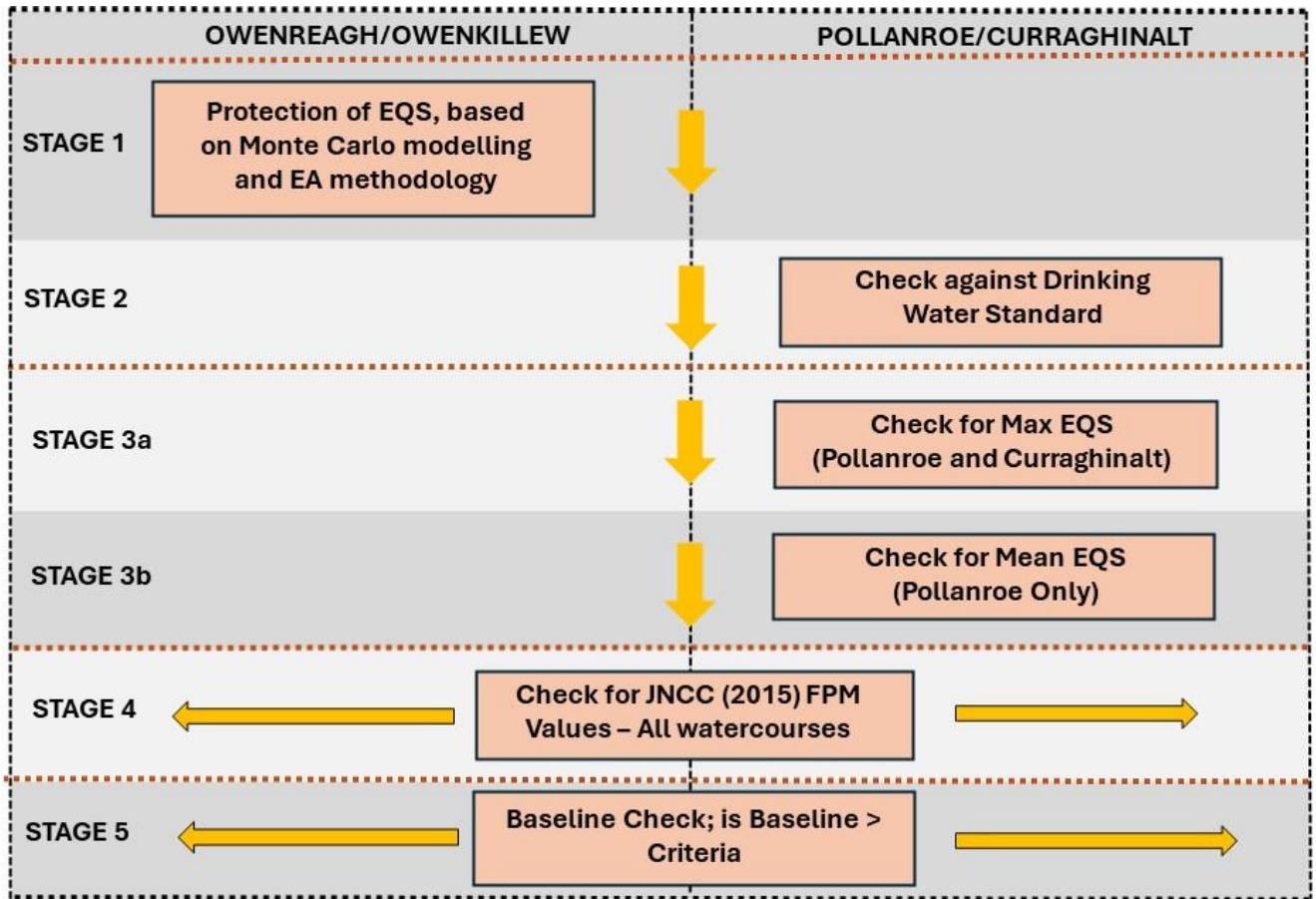


Figure 2: 2024 Methodology for Discharge Criteria Calculation



## 4 EQS and Other Standards

A list of EQS and Drinking Water Standards used in this TR is provided in Table 3.

To be considered as EQS, standards need to be defined through national legislation or be applied by national regulators.

EQS for Northern Ireland are defined in *SR 351 The Water Framework Directive (Classification, Priority Substances and Shellfish Waters) Regulations (Northern Ireland) 2015*.

Other sources of EQS are:

- CCME, Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Aquatic Life (October 2016)
- United States Environmental Protection Agency (USEPA) guidance
- SEPA, WAT-SG-53 or Scotland River Basin District Standards Amendments Directions 2015
- Verbruggen. E.J.M., Smit. C.E., and van Vlaardingen. P.L.A. (2021). Environmental quality standards for barium in surface water. Proposal for an update accordingly to the methodology of the Water Framework Directive. National Institute for Public Health and the Environment. Netherlands.

In the absence of standards for total suspended solid (TSS), a value from the EU Freshwater Fish Directive is used. Whilst this legislation was revoked (2013), it contained a standard for TSS concentrations that was not taken forward into other primary legislation.

Environmental Quality Standards (EQSs) for some metals are expressed in terms of bioavailable metal concentration. This criterion currently applies to copper, zinc, manganese and nickel. The EQS for such metals is referenced as EQS<sub>bioavailable</sub>. The bioavailable concentration gives an estimate of the amount of metal that is biologically active (i.e., as toxicity) and of ecological relevance.

The Water Framework Directive - United Kingdom Technical Advisory Group (WFD-UKTAG) has developed a river and lake assessment method for specific metals (UKTAG, 2014). This document introduces and is accompanied by M-BAT (a Metal Bioavailability Assessment Tool). M-BAT currently predicts metal bioavailability for copper, zinc, manganese and nickel. M-BAT calculates a site-specific PNEC<sub>dissolved</sub> based on the pH, DOC (TOC) and calcium concentrations at the site. PNEC (predicted no-effects concentration) can be considered as a site-specific EQS for the dissolved metal (not the bioavailable component). Site-specific PNEC values for copper, manganese, nickel and zinc were calculated for the 2020 EIA and these values have been updated for this assessment based on a review of baseline water quality data, presented in the baseline review document, which supports this note.

Drinking Water Standards for Northern Ireland are defined in The Water Supply (Water Quality) Regulations (Northern Ireland) 2007 (SR 147) as amended by SR 2009/246, SR 2010/128 and SR 2015/363. In the 2020 EIA and discharge consent applications these were supplemented by a review of drinking water standards from other jurisdictions, including World Health Organisation, United States and UKTAG. These other standards are used here consistent with the 2020 EIA.

In addition to these standards, NIEA have identified JNCC (2015/2016) as key references for FWPM. The JNCC (2015) provides the following annual mean values:

- BOD: 1.0 mg/L
- Nitrate: 0.125 mg/L N
- Phosphorus (mean soluble reactive): 0.005 mg/L for rivers with baseline concentrations are <0.005mg/L. If rivers exceed this target, then use target values from JNCC (2016) for high altitude, low alkalinity rivers = mean annual average of 0.015mg/L. Maximum concentrations for phosphorus favourable condition in SAC/ASSI rivers in JNCC (2016) are 0.02mg/L. Given baseline conditions the JNCC (2016) maximum value is considered for this assessment.

In the 2020 EIA guideline values from the British Standard BS EN 16859:2017; Guidance standard on monitoring FWPM populations and their environment and the EU agri-environmental indicator for nitrate were also considered. Values from the JNCC report (2015) have also been considered in response to my understanding of how DAERA has more recently considered relevant parameters for the proposed consent, in particular relating to FWPM.

JNCC (2016) '*Common Standards Monitoring Guidance for Rivers*' contains guidance for:

- Mean BOD: 1.5 mg/L, this is higher than the value in JNCC (2015), so is not considered further
- Total Ammonia (90%ile): 0.25 mg/L, this is higher than the EQS for Total Ammonia, so is not considered further
- Phosphorus: as per JNCC (2015) noted above

In addition, NIEA requires the following concentrations for treated sewage effluent

- BOD: 1.5 mg/L (with 13% decrease in average BOD concentrations in receiving waters allowed against baseline)
- Total Ammonia: 0.1 mg/L N (with 28% decrease in average ammonia concentrations in receiving waters allowed against baseline)

This is relevant to the proposed infrastructure site (discharges to the Pollanroe Burn) only, with no treated sewage discharges at the existing infrastructure site.

Again, as noted above, further discussion of the approach taken to revise the proposed discharge consent parameters is provided in the Ecology TR and Discharge Consent SoC.

**Table 3: EQS and Drinking Water Standards**

Parameter	Unit	STANDARDS		
		EQS (if two values they relate to Proposed/Existing Infrastructure sites)		Drinking Water Standards (WSR and others)
		Annual Average	Max (or other)	
pH	s.u.	<sup>a</sup> 6.6 – 9.0 or 5.1 – 9.0	None	None
BOD	mg/L	None	3 (90%ile)	None
Temperature	°C	None	20	None
TSS	mg/L	25	None	None
<i>Nutrients/Salts</i>				
Total Ammonia	mg/L N	None	0.2 (90%ile)	0.39 <sup>b</sup>
Nitrate	mg/L N	3	124	11.3 <sup>c</sup>
Nitrite	mg/L N	None	None	0.15 <sup>d</sup>
Chloride	mg/L	250	None	250
Fluoride	mg/L	1	3	1.5
Phosphorus (reactive)	mg/L	0.016 <sup>e</sup>	None	
Sulphate	mg/L	400	None	250
<i>Metals (Dissolved)</i>				
Aluminium	µg/L	None	None	200
Antimony	µg/L	None	None	5
Arsenic	µg/L	50	None	10
Barium	µg/L	620	1100	1.3
Boron	µg/L	1500	29000	1000 (max)
Cadmium	µg/L	0.08	0.45	5
Chromium (III)	µg/L	4.7	32 (95%ile)	None
Chromium (VI)	µg/L	3.4	None	10
Total Chromium (CrIII + CrVI)	µg/L	8.1	None	50
Cobalt	µg/L	3	100	None
Copper (bioavailable equivalent <sup>e</sup> )	µg/L	14.0/14.5 <sup>f,g</sup>	None	2000
Iron	mg/L	1	None	0.2
Lead	µg/L	7.2	14	10
Manganese (bioavailable equivalent <sup>e</sup> )	µg/L	276/136 <sup>f,g</sup>	None	50
Mercury	µg/L	None	0.07	1
Molybdenum	µg/L	73		70
Nickel (bioavailable equivalent <sup>e</sup> )	µg/L	12.2/13.2 <sup>f,g</sup>	34	20
Selenium	µg/L	3.1	10.48	10
Silver	µg/L	0.5	1	100
Sodium	mg/L	None	None	200
Uranium	µg/L	15	33	30
Zinc (bioavailable equivalent <sup>e</sup> )	µg/L	20.7/21.7 <sup>f,g</sup>	None	3000
<i>EQS Sources</i>				
SR 351				
Verbruggen et al (2021)				
SEPA, WAT-SG-53 or Scotland River Basin District Standards Amendments Directions 2015				
Freshwater Fish Directive				
CCME				
USEPA (2016)				

<sup>a</sup> pH range of 6.6 to 9.0 is for 'Clear Waters' with Dissolved Organic Carbon < 10mg/L. A pH range of 5.1 to 9.0 is for 'Humic Waters' with Dissolved Organic Carbon > 10 mg/L. There are Total Organic Carbon concentrations >10 mg/L on average in the Owenreagh River. The

average pH in the Owenreagh River is 6.74 with a standard deviation of 0.49, suggesting natural pH can be lower than the range for 'Clear Water'

<sup>b</sup> WSR reference standard is 0.5 mg/L ammonia as NH<sub>4</sub>. Value of 0.39 mg/L is ammonia as N.

<sup>c</sup> Standard is 50 mg/L nitrate as NO<sub>3</sub>. Value of 11.3 mg/L is nitrate as N.

<sup>d</sup> Standard is 0.50 mg/L nitrite as NO<sub>2</sub>. Value of 0.15 mg/L is nitrite as N.

<sup>e</sup> Site-specific EQS from SR351, Part 2, 3, with Alkalinity = 39.5 mg/L (average of Owenkillew River samples upstream of Curraghinalt); 130m elevation

<sup>f</sup> Site-specific EQS from PNEC calculation, based on calculations in Baseline Update

<sup>g</sup> The 'bio-available equivalent' values for copper, zinc, manganese and nickel are used as these are the back-calculated dissolved metals concentrations equivalent to the bioavailable standard under SR351 These are calculated for the Owenreagh and Owenkillew Rivers.

## 5 Updated Proposed Discharge Consent Concentrations

### 5.1 Review of List of Parameters

The list of parameters in the Discharge Consent reviewed was based on:

- Parameters where maximum concentrations in mine waters that are low compared to background concentrations and EQS or guideline values
- Parameters where LOD is close to EQS or guideline value

Selected parameters (summarized in Section 5.1.1) are removed from the proposed Discharge Consent limits.

#### 5.1.1 Parameters with no Source within Mine Site

A review of all the parameters in the original Discharge Consent application was undertaken and Table 4 below provides a comprehensive reference of the sources of the relevant parameters where the maximum concentration predicted in mine water was close to baseline and/or well below any standard or guideline value. The maximum concentrations in mine water were calculated based on the geochemical testwork and modelling, with the maximum values used in the 2020 Surface Water Impact Assessment also provided in Table 5. This value is the maximum of the predicted underground mine water, Dry Stack Facility seepage and Dry Stack Facility runoff.

Nitrite, aluminium and silver mine water concentrations are less than baseline, with selenium also reflecting detection limits in the sampling, so showing no measurable quantities in mine water.

Chloride, boron, fluoride and sodium mine water concentrations are above average baseline concentrations but significantly below any standard or guideline, with boron, chloride and fluoride having a published non-statutory EQS value (based on SEPA guidance) and boron having an EQS from Canadian guidance. As a result, these parameters would have negligible impact on background concentrations, with no identified EQS for the protection of aquatic life in Northern Ireland.

**Table 4: Parameters with no Source within Mine Site**

Parameter	Unit	Detection Limit	Mean Baseline Concentration in Pollanroe Burn (SW25)	Mean Baseline Concentration in Owenreagh River (SW11)	Maximum Concentration in Mine Water Predictions <sup>a</sup>	EQS or Other Standard
Nitrite	mg/L N	0.006	<sup>b</sup> 0.003	<sup>b</sup> 0.003	<detection	No EQS, Drinking Water 0.15mg/L
Chloride	mg/L	0.3	9.6	13.5	15	Non statutory EQS plus Drinking Water 250mg/L
Fluoride	mg/L	0.3	<sup>b</sup> 0.15	<sup>b</sup> 0.19	0.32	SEPA EQS 1mg/L (average) and Drinking Water 1.5mg/L
Aluminium	µg/L	1.5	56	48	1.6	No EQS, Drinking Water 200 µg/L
Boron	µg/L	12	<sup>b</sup> 6.1	<sup>b</sup> 5.2	49	CCME EQS 1500µg/L (average) and Drinking Water 1000µg/L
Selenium	µg/L	1.2	<sup>b</sup> 0.68	<sup>b</sup> 0.69	1.2	USEPA EQS 3.1µg/L (average) and Drinking Water 10µg/L
Silver	µg/L	5	<sup>b</sup> 2.5	<sup>b</sup> 2.5	<detection	NI EQS 0.5 µg/L (average) and Drinking Water 100 µg/L
Sodium	mg/L	200	6.2	8.9	16	No EQS, Drinking Water 200 mg/L

*a From Table 9-25 of EIA Appendix C4, Surface Water Impact Assessment*

*b Average controlled by number of samples below detection limit*

### 5.1.2 Parameters where LOD is close to EQS

The parameters for which the laboratory limit of detection (LOD) is at or below a guideline value or standard are;

- Chromium III, LOD; 6 µg/L, EQS average 4.7 µg/L
- Chromium VI, LOD; 5 µg/L, EQS average 3.4 µg/L
- Silver, LOD; 5µg/L, EQS average 0.5 µg/L

For these parameters above, regulating discharges from the mine to values so close to detection is not practical, as it is not possible for the laboratory to measure concentrations at the standard.

### 5.1.3 Summary of Parameter Review

Based on this review, it is proposed that the parameters outlined in previous sections are removed from the Discharge Consent. This will simplify the set of parameters to be assessed further and focus regulations on parameters with potential to impact downstream water quality.

It is proposed that parameters removed from the Discharge Consent are still monitored and reported as part of the environmental monitoring work for the operational mine site (as outlined in project SGEMAP, Surface and Groundwater Environmental Monitoring and Action Plan).

## 5.2 Updated Discharge Consent Values

Consistent with the 2020 EIA different discharge consent values are proposed for the Proposed and Existing Infrastructure Sites based on the local conditions at the two sites.

Importantly, in setting these criteria both long-term and short-term exposures are considered, as applicable, to both the measured presence of fish in the burn(s) and water quality objectives for the main rivers. In many cases this has resulted in the need for both a spot maximum compliance standard and an annual compliance standard (typically a mean value).

We are unaware of any discharge consents within Northern Ireland that actively accounts for immediate and direct exposure to fish – effectively the possibility of fish living within, or passing through, an unmixed effluent close to the outfall point. The alternative, as set out below, is to apply Environmental Quality Standards at end of pipe.

### 5.2.1 Updated Discharge Consent Values for Proposed Infrastructure Site

The updated proposed discharge consent values are shown in Tables 5 and 6 for non-metals and metals respectively. The methodology follows that described in Section 3 and excludes parameters discussed in Section 5.1. Proposed discharge criteria will have a range of both maximum criterion which must be met at all times to demonstrate short-term compliance as applicable, together with annual criteria to be typically deployed such that average discharge concentrations meet the required criteria. It is envisaged the latter will be calculated and reported annually for the preceding year to demonstrate long-term compliance.

**Table 5: Updated Proposed Discharge Consent Values - Proposed Infrastructure Site (Non-Metals)**

Parameter	Unit	2020 Discharge Criteria	New Discharge Criteria		Comment
			Spot / Max Criteria	Mean Criteria	
pH	s.u.	6.2-9.0	6.2-9.0	-	UNCHANGED
Temperature	°C	20	20	-	UNCHANGED
TSS	mg/L	50	50	25 (mean)	Max retained as per 2020 criteria. Annual criteria set to old Freshwater Fish Directive value.
BOD	mg/L	1.35 (90%ile)	3 (90%ile)	1.0 (mean)	Max set to max EQS and mean set to JNCC (2015) value for BOD and FWPMs, with JNCC value equal to average baseline in the Owenreagh River.
Total Ammonia	mg/L N	0.39	0.25 (90%ile)	0.2 (90%ile)	Max updated to JNCC (2016) value for SAC rivers at 0.25 mg/L N (90%ile). Annual criteria set to adjusted mean calculated based on 90%ile EQS
Nitrate	mg/L N	11.3	11.3	0.42(mean)	Max is Drinking Water, with Annual Criteria set to baseline in Owenreagh River upstream of Pollanroe Burn, which is above the JNCC (2015) value for nitrate
Nitrite	mg/L N	0.15	<u>Remove</u>		REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Phosphorus	mg/L	None	-	0.02 (mean)	Annual Criteria set to Owenkillew SAC baseline using NIEA long term data as described in Horton et al. 2018. The Owenreagh River upstream of Pollanroe Burn is above the JNCC (2016) mean value
Chloride	mg/L	250	<u>Remove</u>		REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Fluoride	mg/L	1.5	<u>Remove</u>		REMOVE from Discharge Consent List, but monitor /report within SGEMAP
Sulphate	mg/L	250	250	-	Max set to Drinking Water Standard which is less than non- statutory UK EQS of 400 mg/L. Annual criteria not required

**Table 6: Updated Proposed Discharge Consent Values - Proposed Infrastructure Site (Metals)**

Parameter	Unit	2020 Discharge Criteria	New Discharge Criteria		Comment
			Spot / Max Criteria	Annual compliance Criteria	
Aluminium	µg/L	200	Remove		REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Antimony	µg/L	5	5	-	Max is Drinking Water Standard and significantly less than international EQS. No UK EQS
Arsenic	µg/L	10	10	-	Max is Drinking Water Standard and less than SR351 AA EQS of 50 mg/L. Annual criteria not required.
Barium	µg/L	1300	1100	620 (mean)	Updated for Verbruggen et al. (2021) MAC and AA EQS
Boron	µg/L	1000	Remove		REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Cadmium	µg/L	0.28	0.26	0.08 (mean)	Max is based on calculations for Owenreagh River, which is lower than SR351 MAC EQS (0.45 mg/L). Annual standard set to SR351 AA EQS.
Chromium (III)	µg/L	20	Remove		REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Chromium (VI)	µg/L	10	Remove		REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Total Chromium (CrIII + CrVI)	µg/L	30	30	8.1 (mean)	Max is based on calculations for Owenreagh River in Appendix 1, which is lower than Drinking Water Standard. Annual criteria standard set to SR351 AA EQS for sum of CrIII & CrVI.
Cobalt	µg/L	11.5	11.3	3 (mean)	Max is based on calculations for Owenreagh River, in Appendix 1, which is lower than MAC EQS. Annual standard set to SEPA non-statutory EQS.
Copper <sup>a</sup>	µg/L	40	54	14 (mean)	Max is based on calculations for Owenreagh River in Appendix 1, which is lower than Drinking Water Standard. Mean standard set to SR351 AA EQS.
Iron	mg/L	0.68	0.61	-	Max set to mean baseline in Pollanroe (less than SR351 AA EQS (1 mg/L), but above Drinking Water Standard). Annual criteria not required as Max is already protective of chronic EQS.
Lead	µg/L	10	10	7.2 (mean)	Max is Drinking Water Standard and less than MAC EQS (14 µg/L), with Mean standard set to SR351 AA EQS.
Manganese <sup>a</sup>	µg/L	218	187	-	Max set to mean baseline in Pollanroe (above Drinking Water Standard and SR351AA EQS). No need for mean standard if max is already <mean. Mean baseline updated since 2020.
Mercury	µg/L	0.094	0.07	-	Max updated to SR351 MAC EQS
Molybdenum	µg/L	68	68	-	Set to Drinking Water Standard in Pollanroe, with minor adjustment (decrease) based on review of seepage and baseline data. Max value already protective of international AA EQS.
Nickel <sup>a</sup>	µg/L	20	20	12.2 (mean)	Max is Drinking Water Standard, with annual standard set to SR351 AA EQS.
Selenium	µg/L	10	Remove		REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Silver	µg/L	3.24	Remove		REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Sodium	mg/L	200	Remove		REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Uranium	µg/L	30	30	15 (mean)	Max is Drinking Water Standard and less than international MAC EQS, with annual standard set to international (CCME) AA EQS.
Zinc <sup>a</sup>	µg/L	73.3	73.3	20.7 (mean)	Max is Drinking Water Standard, with Mean standard set to SR351 AA EQS.

*a bio-available equivalent*

## 5.2.2 Updated Discharge Consent Values for Existing Infrastructure Site

The updated proposed discharge consent values are shown in Tables 7 and 8 for non-metals and metals respectively. The methodology follows that described in Section 3 and excludes parameters discussed in Section 5.1. All proposed discharge criteria will have a maximum criterion which must be met at all times.

As outlined in Section 3, annual average exposure limits are not needed for Curraghinalt Burn with respect to fish. However, some annual criteria are included in the Curraghinalt Burn limits to ensure discharges of parameters relevant to the Owenkillew River and FWPM favourable condition (as set out by JNCC) cannot add to the established baseline in the Owenkillew.

**Table 7: Existing Infrastructure Site - Updated Proposed Discharge Consent Values (Non-Metals)**

Parameter	Unit	2020 Discharge Criteria	New Discharge Criteria		Comment
			Spot / Max Criteria	Annual compliance Criteria	
pH	s.u.	6.2-9.0	6.2-9.0	-	UNCHANGED
Temperature	°C	20	20	-	UNCHANGED
TSS	mg/L	50	50	-	UNCHANGED
BOD	mg/L	1.35 (90%ile)	3 (90%ile)	1.0 (mean)	Max set to max EQS. Mean set to JNCC (2015) value for BOD and FWPMs, which is above mean baseline in Owenkillew River.
Total Ammonia	mg/L N	0.39	0.25 (90%ile)	0.2 (90%ile)	Max updated to JNCC (2016) value for SAC rivers at 0.25 mg/L N (90%ile). Mean set to adjusted mean calculated based on 90%ile EQS
Nitrate	mg/L N	11.3	11.3	0.2 (mean)	Max is Drinking Water, with annual mean Criteria set to baseline in Owenkillew River upstream of Curraghinalt Burn, which is above the JNCC (2015) value for nitrate
Nitrite	mg/L N	0.15	Remove		REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Phosphorus	mg/L	None	-	0.02 (mean)	Annual Criteria set to baseline in Owenkillew SAC using NIEA long term data and as described in Horten <i>et al.</i> 2018. River upstream of Curraghinalt Burn, is above the JNCC (2016) mean value
Chloride	mg/L	250	Remove		REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Fluoride	mg/L	1.5	Remove		REMOVE from Discharge Consent List, but monitor within SGEMAP
Sulphate	mg/L	250	250	-	UNCHANGED - Max set to Drinking Water Standard which is less than non-statutory UK AA EQS of 400 mg/L (SEPA WAT-SG-53).

**Table 8: Existing Infrastructure Site - Updated Proposed Discharge Consent Values (Metals)**

Parameter	Unit	2020 Discharge Criteria	New Discharge Criteria	Comment
			Spot / Max Criteria	
Aluminium	µg/L	200	Remove	REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Antimony	µg/L	5	5	UNCHANGED - Max is Drinking Water Standard and significantly less than international EQS. No UK EQS
Arsenic	µg/L	10	10	UNCHANGED - Max is Drinking Water Standard and less than AA SR351 EQS
Barium	µg/L	1300	1100	Updated for Verbruggen et al. (2021) MAC EQS
Boron	µg/L	1000	Remove	REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Cadmium	µg/L	0.67	0.45	Max updated to SR351 MAC EQS
Chromium (III)	µg/L	40	Remove	REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Chromium (VI)	µg/L	10	Remove	REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Total Chromium (CrIII + CrVI)	µg/L	50	50	UNCHANGED - Max is Drinking Water Standard
Cobalt	µg/L	52	52	UNCHANGED - Max is based on calculations for Owenkillew River in 2020 EIA, which is lower than MAC EQS (100 µg/L SEPA WAT-SG-53)
Copper <sup>a</sup>	µg/L	9.43	239	Max is based on updated calculations for Owenkillew River in Appendix 1, which is lower than Drinking Water Standard
Iron	mg/L	1.98	2.38	Max set to updated mean baseline in Curraghinalt (above Drinking Water Standard)
Lead	µg/L	10	10	UNCHANGED - Max is Drinking Water Standard which is less than MAC-EQS (14 µg/L in The Scotland River Basin District (Standards) Amendment Directions 201518.
Manganese <sup>a</sup>	µg/L	69.7	72	Max set to updated mean baseline in Curraghinalt (above Drinking Water Standard)
Mercury	µg/L	0.339	0.07	Max updated to SR351 EQS 95%ile
Molybdenum	µg/L	70	70	UNCHANGED - Max is Drinking Water Standard which is less than international EQS
Nickel <sup>a</sup>	µg/L	20	20	UNCHANGED - Max is Drinking Water Standard which is less than MAC EQS (34 µg/L in The Scotland River Basin District (Standards) Amendment Directions 201518)
Selenium	µg/L	10	Remove	REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Silver	µg/L	5.33	Remove	REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Sodium	mg/L	200	Remove	REMOVE from Discharge Consent List, but monitor/report within SGEMAP
Uranium	µg/L	30	30	Max is Drinking Water Standard which is less than international MAC EQS
Zinc <sup>a</sup>	µg/L	192	204	Max is based on updated calculations for Owenkillew River in Appendix 1, which is lower than Drinking Water Standard

*a bio-available equivalent*

## 6 Predicted concentrations associated with Proposed Infrastructure Site (i.e., in Pollanroe Burn, Owenreagh River and Owenkillev River)

Predicted concentrations in the Owenreagh River are provided for parameters where there have been changes to the discharge consent values. A summary is provided in this section with details for each parameter provided as parameter sheets in Appendix 2.

Discharge concentrations are based on proposed discharge consent values or maximum predicted mine water concentrations, if lower than the discharge consent values, i.e., the mine water is expected to meet discharge consent values even before treatment. The mine water predictions were presented in the Second Addendum to the ES Surface Water Impact Assessment Table 9-25, with values summarized in Appendix 2.

Predictions for the Owenreagh River are based on the Monte Carlo modelling approach, consistent with that used in the calculation of discharge consent values for the Second Addendum to the ES. To be conservative, the calculations assume that the mine water is discharged into the main rivers at the three calculation points (Owenreagh at Pollanroe, Owenreagh at its mouth. Owenkillev just downstream of Owenreagh River confluence).

The key flow and baseline water quality inputs are summarized in the bullet points below, with the modelled discharge from the mine summarized in Table 9.

### **Flows**

- Flow in Owenreagh River, upstream of Pollanroe Burn: 1,480 L/s average, 280 L/s 95%ile flow
- Flow in Owenreagh River, upstream of Owenkillev River: 2,490 L/s average, 380 L/s 95%ile flow
- Discharge to Pollanroe Burn 24.5 L/s Average, with 8.2 L/s standard deviation
- Flow in Owenkillev River downstream of Owenreagh River: 7,490 L/s average, 1140 L/s 95%ile flow

### **Water Quality**

- Station used for water quality for Owenreagh upstream of Pollanroe Burn: SW11
- Station used for water quality for Owenreagh upstream of Owenkillev River: SW09
- Station used for water quality for Owenkillev upstream of Owenreagh River: SW08

It is noted that although two discharge consents are requested, discharges from the mine to the Pollanroe Burn is the main discharge proposed, with any discharges to the Curraghinalt Burn during operations a contingency for underground mine water. Both discharges are not predicted to occur at the same time.

The discharge concentrations used in the calculations are summarized in Table 9.

Table 10 compares the predicted change in water quality in the Owenreagh River downstream of the Pollanroe Burn as a percentage of EQS (or Drinking Water Standard, in absence of EQS) for the updated calculations and those in the 2020 EIA. For all parameters the new predictions show a lower change in

concentration as a percentage of the standard compared to the 2020 EIA. The changes are most marked for key FWPM parameter where there has been a substantial reduction in the discharge concentrations. It should be noted that:

- For mercury the new downstream concentration in the Owenreagh is higher than in the 2020 EIA, but this is due to a change in the laboratory Limit of Detection in the post-2020 data, which has increased average baseline mercury concentrations. As almost all mercury field samples record concentrations below detection, the detection limit effectively controls the average concentration. As a result, the increase in concentrations in the new calculations reflects the change in baseline and not the impact of the mine discharge. In fact, the mine discharge has a lower percentage increase from baseline than in the 2020 EIA. However, overall given there is no significant source of mercury at the mine and no significant (recordable) concentrations of mercury in the watercourses, there is no significant impact of the mine predicted for mercury concentrations.
- For manganese and zinc the updated baseline shows a higher average concentration in the Owenreagh compared to the 2020 EIA. Therefore, the increase in concentrations in the new calculations reflects the change in baseline and not the impact of the mine discharge. In fact, the mine discharge has a lower percentage increase from baseline than in the 2020 EIA.

Table 11 compares the predicted change in water quality in the Owenreagh River at its mouth (just before it joins the Owenkillev). The results are similar to those discussed above, but with further dilution between the Pollanroe Burn and the Owenkillev River confluences.

Calculations undertaken for the Owenkillev River downstream of the Owenreagh confluence based on the results of the Monte Carlo calculations (i.e., using the Owenreagh River concentrations upstream of the confluence with and without the discharge into the Pollanroe Burn as inflows to the Owenkillev). Given the additional dilution in the Owenkillev (average flow of 5 m<sup>3</sup>/s compared to 2.49 m<sup>3</sup>/s in the Owenreagh) the model predicted no measurable change in water quality in the Owenkillev.

**Table 9: Input Concentrations for Discharge Calculations – Proposed Infrastructure Site**

Parameter	Discharges used for water quality calculations
<b>Non-Metals</b>	
TSS	No calculations as no change in discharge consent values from EIA (2020)
BOD	Discharge at maximum mine water concentration (0.89mg/L), which is below the proposed discharge consent value (max of 3mg/L and average of 1mg/L)
Total Ammonia	Discharge at average of 0.1 mg/L, which is consistent with 90%ile value of 0.2mg/L (which is EQS). This is based on review of baseline data where the 90%ile ammonia concentration is double the average
Nitrate	Discharge at average baseline for Owenreagh River (0.34mg/L), which is the proposed discharge consent value. As discharge is set at baseline then no downstream calculations are undertaken
Phosphorus	Proposed discharge is at average baseline for Owenkillew River (0.02mg/L), with no source of phosphorus identified within the underground mine, with water in mine expected to have phosphorus at baseline groundwater levels, which is below the proposed standard and baseline conditions in the Owenkillew River, so no calculations are undertaken.
Sulphate	Discharge at maximum mine water concentration (19mg/L), which is below the proposed discharge consent value which is Drinking Water Standard of 250mg/L and Mean SEPA EQS of 218mg/L
<b>Metals</b>	
Antimony	No calculations as no change in discharge consent values from EIA (2020)
Arsenic	No calculations as no change in discharge consent values from EIA (2020)
Barium	Discharge at maximum mine water concentration (0.31mg/L), which is below the proposed discharge consent values of 1.1mg/L (Max) and 0.62mg/L (Mean)
Cadmium	Discharge at maximum mine water concentration (0.000072mg/L), which is below the proposed discharge consent value of 0.00028mg/L (Max) and 0.00008mg/L (Mean)
Dissolved Chromium (CrIII + CrVI)	No change in inputs from EIA (2020), but recent baseline data has updated detection limit, so calculations updated. Discharge at maximum mine water concentration (0.007mg/L), which is below the proposed discharge consent value of 0.03mg/L (Max) and 0.0081mg/L (Mean)
Cobalt	Discharge at maximum mine water concentration (0.0081mg/L), which is below the proposed discharge consent value of 0.0015mg/L (Max) and 0.003mg/L (Mean)
Copper	Discharge at maximum mine water concentration (0.0092mg/L), which is below the proposed discharge consent value of 0.04mg/L (Max) and 0.014mg/L (Mean)
Iron	No calculations as no significant change in discharge consent values from EIA (2020)
Lead	Discharge at maximum mine water concentration (0.0013mg/L), which is below the proposed discharge consent value of 0.01mg/L (Max) and 0.0072mg/L (Mean)
Manganese	Discharge at proposed Pollanroe Burn average concentration (discharge criteria value) of 0.187mg/L
Mercury	Discharge at proposed max discharge criteria value of 0.00007mg/L
Molybdenum	Discharge at maximum mine water concentration (0.039mg/L), which is below the proposed discharge consent value which is Max 0.068mg/L
Nickel	Discharge at maximum mine water concentration (0.0068mg/L), which is below the proposed discharge consent value of 0.02mg/L (Max) and 0.0122mg/L (Mean)
Uranium	Discharge at maximum mine water concentration (0.0092mg/L), which is below the proposed discharge consent value of 0.03mg/L (Max) and 0.015mg/L (Mean)
Zinc	Discharge at proposed mean discharge criteria value of 0.0207mg/L (Mean)

**Table 10: Updated Downstream Predictions – Owenreagh River Downstream of Pollanroe Burn**

Parameter	Unit	Predicted Concentration in Receiving River		Increase in Concentration in Receiving River as Percent of EQS	
		Owenreagh Downstream of Pollanroe Burn – 2020 EIA	Owenreagh Downstream of Pollanroe Burn – Updated	Owenreagh Downstream of Pollanroe Burn – 2020 EIA	Owenreagh Downstream of Pollanroe Burn – Updated
<b>Non-Metals</b>					
TSS	mg/L	No change in Discharge Consent value from 2020 EIA			
BOD	mg/L	1.11	1.11	10%	0%
Total Ammonia	mg/L N	0.13 (90%ile)	0.12 (90%ile)	10%	5%
Nitrate	mg/L N	Proposed discharge is at baseline conditions so no predicted change			
Phosphorus	mg/L	Proposed discharge is at baseline conditions so no predicted change			
Sulphate	mg/L	1.21	1.59	Not calculated	0.2%
<b>Metals</b>					
Antimony		No change in Discharge Consent value from 2020 EIA			
Arsenic		No change in Discharge Consent value from 2020 EIA			
Barium	µg/L	42.3	7.14	<sup>a</sup> Not calculated	0%
Cadmium	µg/L	0.037	0.025	10%	4%
Chromium (CrIII + CrVI)	µg/L	5.19	0.51	9%	2.5%
Cobalt	µg/L	0.39	0.30	10%	7%
Copper	µg/L	2.13	1.27	10%	2.5%
Iron		No significant change in Discharge Consent value from 2020 EIA			
Lead	µg/L	0.61	0.30	4%	0.7%
Manganese	µg/L	82.3	<sup>b</sup> 85.9	3%	<sup>b</sup> 1%
Mercury	µg/L	0.012 (95%ile)	<sup>c</sup> 0.102	10%	<sup>c</sup> 0%
Molybdenum	µg/L	2.01	1.23	3%	1.5%
Nickel	µg/L	0.76	0.61	8%	1.9%
Uranium	µg/L	3.23	2.68	5%	1.2%
Zinc	µg/L	6.77	<sup>b</sup> 8.02	10%	<sup>b</sup> 2.8%

*a There was no Barium EQS considered in EIA 2020*

*b Average baseline concentrations increased since 2020 EIA, resulting in higher predicted concentrations in river. But EQS has also increased resulting in lower percentage increase in EQS*

*c Almost all baseline water quality samples for Mercury are below detection limit, such that detection limits impact on average baseline water quality. Higher detection limits in baseline samples from 2020 results in higher average background concentrations than in 2020 EIA. As a result, there is lower predicted impact of discharge, albeit this is also affected by detection limits. Overall, discharge criteria is lower for mercury so impacts would be lower than in 2020 EIA.*

**Table 11: Updated Downstream Predictions – Owenreagh River at its Mouth**

Parameter	Unit	Predicted Concentration in Receiving River		Increase in Concentration in Receiving River as Percent of EQS	
		Owenreagh at its Mouth – 2020 EIA	Owenreagh at its Mouth – Updated	Owenreagh at its Mouth – 2020 EIA	Owenreagh at its Mouth – Updated
<b>Non-Metals</b>					
TSS	mg/L	No change in Discharge Consent value from 2020 EIA			
BOD	mg/L	1.11	1.11	10%	0%
Total Ammonia	mg/L N	0.13 (90%ile)	0.11 (90%ile)	10%	5%
Nitrate	mg/L N	Proposed discharge is at baseline conditions so no predicted change			
Phosphorus	mg/L	Proposed discharge is at baseline conditions so no predicted change			
Sulphate	mg/L	1.21	1.59	Not calculated	0.2%
<b>Metals</b>					
Antimony		No change in Discharge Consent value from 2020 EIA			
Arsenic		No change in Discharge Consent value from 2020 EIA			
Barium	µg/L	32.7	10.72	Not calculated	0%
Cadmium	µg/L	0.031	22.3	6%	3.9%
Chromium (CrIII + CrVI)	µg/L	5.17	0.44	6%	1.6%
Cobalt	µg/L	0.30	0.26	7%	5%
Copper	µg/L	1.83	1.38	7%	2.6%
Iron		No significant change in Discharge Consent value from 2020 EIA			
Lead	µg/L	0.56	0.41	3%	0.7%
Manganese	µg/L	81.6	71.1	1%	1%
Mercury	µg/L	0.011 (95%ile)	<sup>c</sup> 0.0113	6%	<sup>c</sup> 0%
Molybdenum	µg/L	1.43	0.88	2%	1%
Nickel	µg/L	0.65	0.53	3%	1.2%
Uranium	µg/L	3.0	2.74	3%	1.1%
Zinc	µg/L	5.86	<sup>b</sup> 6.21	7%	<sup>b</sup> 1.8%

*a There was no Barium EQS considered in EIA 2020*

*b Average baseline concentrations increased since 2020 EIA, resulting in higher predicted concentrations in river. But EQS has also increased resulting in lower percentage increase in EQS*

*c Almost all baseline water quality samples for Mercury are below detection limit, such that detection limits impact on average baseline water quality. Higher detection limits in baseline samples from 2020 results in higher average background concentrations than in 2020 EIA. As a result, there is lower predicted impact of discharge, albeit this is also affected by detection limits. Overall, discharge criteria is lower for mercury so impacts would be lower than in 2020 EIA.*

## 7 Predicted concentrations associated with Existing Infrastructure Site (i.e., in Curraghinalt Burn and Owenkillew River)

Predicted concentrations in the Owenkillew River are provided for parameters where there have been changes to the discharge consent values. A summary is provided in this section with details for each parameter provided as parameter sheets in Appendix 2.

Discharge concentrations are based on proposed discharge consent values or maximum predicted mine water concentrations, if lower than the discharge consent values, i.e., the mine water is expected to meet discharge consent values even before treatment. Predictions for the Owenkillew River are based on the Monte Carlo modelling approach.

The key flow and baseline water quality inputs are summarized in the bullet points below, with the discharge from the mine summarized in Table 12.

### **Flows**

- Flow in Owenkillew River upstream of Curraghinalt Burn: 4,430 L/s average, 660 L/s 95%ile flow
- Flow in Owenkillew River upstream of Owenreagh River: 5,000 L/s average, 760 L/s 95%ile flow
- Discharge to Curraghinalt Burn 11.7 L/s Average, with 0.7 L/s standard deviation

### **Water Quality**

- Station used for water quality for Owenkillew upstream of Curraghinalt Burn: SW05
- Station used for water quality for Owenkillew upstream of Owenreagh River: SW08

It is noted that although two discharge consents are requested, discharges from the mine to the Pollanroe Burn is the main proposed discharge, with any discharges to the Curraghinalt Burn during operations a contingency for underground mine water. Both discharges are not predicted to occur at the same time.

The discharge concentrations used in the calculations are summarized in Table 12.

Table 13 compares the predicted change in water quality in the Owenkillew River downstream of the Curraghinalt Burn as a percentage of EQS (or Drinking Water Standard, in absence of EQS) for the updated calculations and those in the 2020 EIA. For all parameters the new predictions show a lower change in concentration as a percentage of the standard compared to the 2020 EIA (apart from ammonia at the mouth of the Owenkillew, but this is due to the change in baseline conditions as noted in the footnote of the table and the predicted concentration in the river post-development is less than in the 2020 EIA). The changes are most marked for key FWPM parameters where there has been a substantial reduction in the discharge concentrations. It should be noted that:

- For mercury the new downstream concentration in the Owenkillew is higher than in the 2020 EIA, but this is due to a change in the laboratory Limit of Detection in the post-2020 data, which has increased average baseline mercury concentrations. As almost all mercury field samples record

concentrations below detection, the detection limit effectively controls the average concentration. As a result, the increase in concentrations in the new calculations reflects the change in baseline and not the impact of the mine discharge. In fact, the mine discharge has a lower percentage increase from baseline than in the 2020 EIA. However, overall given there is no significant source of mercury at the mine and no significant (recordable) concentrations of mercury in the watercourses, there is no significant impact of the mine predicted for mercury concentrations.

- For manganese and zinc the updated baseline shows a higher average concentration in the Owenkillew compared to the 2020 EIA. Therefore, the increase in concentrations in the new calculations reflects the change in baseline and not the impact of the mine discharge. In fact, the mine discharge has a lower percentage increase from baseline than in the 2020 EIA for zinc and the same, negligible, change for manganese.

Table 14 compares the predicted change in water quality in the Owenkillew River just upstream of its confluence with the Owenreagh River. The results are similar to those discussed above, but with further dilution between the Curraghinalt Burn and the Owenreagh River confluences.

**Table 12: Input Concentrations for Discharge Calculations – Existing Infrastructure Site**

<b>Parameter</b>	<b>Discharges used for water quality calculations</b>
<b>Non-Metals</b>	
TSS	No calculations as no change in discharge consent values from EIA (2020)
BOD	Discharge at maximum mine water concentration (0.89mg/L), which is below the proposed discharge consent value (max of 1.35mg/L)
Total Ammonia	Discharge at average of 0.1 mg/L, which is consistent with 90%ile value of 0.2mg/L (which is EQS). This is based on review of baseline data where the 90%ile ammonia concentration is double the average
Nitrate	Discharge at average baseline for Owenkillew River (0.2mg/L), which is the proposed discharge consent value. As discharge is set at baseline then no downstream calculations are undertaken
Phosphorus	Proposed discharge is at average baseline for Owenkillew River (0.02mg/L), with no source of phosphorus identified within the underground mine, with water in mine expected to have phosphorus at baseline groundwater levels, which is below the proposed standard and baseline conditions in the Owenkillew River, so no calculations are undertaken.
Sulphate	Discharge at maximum mine water concentration (19mg/L), which is below the proposed discharge consent value which is Drinking Water Standard of 250mg/L.
<b>Metals</b>	
Antimony	No calculations as no change in discharge consent values from EIA (2020)
Arsenic	No calculations as no change in discharge consent values from EIA (2020)
Barium	Discharge at maximum mine water concentration (0.31mg/L), which is below the proposed discharge consent value which is 1.1mg/L
Cadmium	Discharge at maximum mine water concentration (0.000072mg/L), which is below the proposed discharge consent value which is maximum EQS of 0.00045mg/L
Dissolved Chromium (CrIII + CrVI)	No change in inputs from EIA (2020), but recent baseline data has updated detection limit, so calculations updated. Discharge at maximum mine water concentration (0.0071 mg/L), which is below the proposed discharge consent value which is 0.05mg/L
Cobalt	Discharge at maximum mine water concentration (0.0081 mg/L), which is below the proposed discharge consent value which is 0.0052mg/L
Copper	Discharge at maximum mine water concentration (0.0092mg/L), which is below the proposed discharge consent value which is 0.00943mg/L
Iron	Maximum mine water concentration (1mg/L) which is below the proposed discharge consent value which is 2.38mg/L
Lead	Discharge at maximum mine water concentration (0.0013mg/L), which is below the proposed discharge consent value which is Drinking Water Standard of 0.01mg/L
Manganese	Discharge at proposed Curraghinalt Burn average concentration (discharge criteria value) of 0.072mg/L
Mercury	Proposed discharge consent value (max EQS of 0.00007mg/L) is less than baseline and detection limit.
Molybdenum	Discharge at maximum mine water concentration (0.039mg/L), which is below the proposed discharge consent value which is Drinking Water Standard of 0.07mg/L
Nickel	Discharge at maximum mine water concentration (0.0068mg/L), which is below the proposed discharge consent value which is Drinking Water Standard of 0.02mg/L
Uranium	Discharge at maximum mine water concentration (0.0092mg/L), which is below the proposed discharge consent value of 0.03mg/L (Max)
Zinc	Discharge at maximum mine water concentration (0.12mg/L), which is below the proposed discharge consent value which is 0.192mg/L

**Table 13: Updated Downstream Predictions – Owenkillew River Downstream of Curraghinalt Burn**

Parameter	Unit	Predicted Concentration in Receiving River		Increase in Concentration in Receiving River as Percent of EQS	
		Owenkillew Downstream of Curraghinalt – 2020 EIA	Owenkillew Downstream of Curraghinalt – Updated	Owenkillew Downstream of Curraghinalt – 2020 EIA	Owenkillew Downstream of Curraghinalt – Updated
<b>Non-Metals</b>					
TSS	mg/L	No change in Discharge Consent value from 2020 EIA			
BOD	mg/L	2.3 (90%ile)	<sup>a</sup> 0.79	10%	0%
Total Ammonia	mg/L N	0.072 (90%ile)	0.32 (90%ile)	5%	0%
Nitrate	mg/L N	Proposed discharge is at baseline conditions so no predicted change			
Phosphorus	mg/L	Proposed discharge is at baseline conditions so no predicted change			
Sulphate	mg/L	2.82	1.30	Not calculated	0%
<b>Metals</b>					
Antimony	µg/L	No change in Discharge Consent value from 2020 EIA			
Arsenic	µg/L	No change in Discharge Consent value from 2020 EIA			
Barium	µg/L	16.2	14.5	<sup>c</sup> Not calculated	0.4%
Cadmium	µg/L	0.035	0.024	10%	3.9%
Chromium (CrIII + CrVI)	µg/L	5.51	0.23	3%	0.5%
Cobalt	µg/L	0.46	0.23	10%	1.7%
Copper	µg/L	1.20	1.11	3%	0.3%
Iron	mg/L	0.93	0.9	1%	0%
Lead	µg/L	0.35	0.26	8%	0.4%
Manganese	µg/L	92.1	<sup>d</sup> 94.2	<1%	<1%
Mercury	µg/L	0.012 (95%ile)	<sup>d</sup> 0.167	10%	0%
Molybdenum	µg/L	0.57	0.21	6%	0%
Nickel	µg/L	0.71	0.68	3%	0.3%
Uranium	µg/L	2.6	2.54	<1%	0.3%
Zinc	µg/L	5.01	<sup>e</sup> 7.75	10%	4.4%

a Updated discharge consent has Mean criteria for BOD, while 2020 EIA considered 90%ile EQS only

b Baseline 90%ile concentration is impacted by one large concentration in dataset. Therefore, the higher concentration predicted post-development is entirely due to this change in baseline and not the discharge. If this value is removed then the baseline 90%ile is 0.1 mg/L, with 5% of EQS increase in baseline predicted

b There was no Barium EQS considered in EIA 2020

c Almost all baseline water quality samples for Mercury are below detection limit, such that detection limits impact on average baseline water quality. Higher detection limits in baseline samples from 2020 results in higher average background concentrations than in 2020 EIA. As a result, there is lower predicted impact of discharge, albeit this is also affected by detection limits. Overall, discharge criteria is lower for mercury so impacts would be lower than in 2020 EIA.

d Average baseline concentrations increased since 2020 EIA, resulting in higher predicted concentrations in river. But EQS has also increased resulting in lower percentage increase in EQS

**Table 14: Updated Downstream Predictions – Owenkillew River Upstream of Owenreagh River**

Parameter	Unit	Predicted Concentration in Receiving River		Increase in Concentration in Receiving River as Percent of EQS	
		Owenkillew upstream of Owenreagh River – 2020 EIA	Owenkillew upstream of Owenreagh River – Updated	Owenkillew upstream of Owenreagh River – 2020 EIA	Owenkillew upstream of Owenreagh River – Updated
<b>Non-Metals</b>					
TSS	mg/L	No change in Discharge Consent value from 2020 EIA			
BOD	mg/L	2.0 (90%ile)	<sup>a</sup> 0.72	0%	0%
Total Ammonia	mg/L N	0.123 (90%ile)	0.11 (90%ile)	2%	5%
Nitrate	mg/L N	Proposed discharge is at baseline conditions so no predicted change			
Phosphorus	mg/L	Proposed discharge is at baseline conditions so no predicted change			
Sulphate	mg/L	2.3	1.4	Not calculated	0%
<b>Metals</b>					
Antimony	µg/L	No change in Discharge Consent value from 2020 EIA			
Arsenic	µg/L	No change in Discharge Consent value from 2020 EIA			
Barium	µg/L	16.3	9.42	<sup>c</sup> Not calculated	0%
Cadmium	µg/L	0.025	0.017	1%	1%
Chromium (CrIII + CrVI)	µg/L	5.48	0.25	5%	0.4%
Cobalt	µg/L	0.43	0.18	9%	1.7%
Copper	µg/L	1.33	1.06	3%	0.2%
Iron	mg/L	0.96	0.81	0%	0%
Lead	µg/L	0.36	0.40	1%	0.7%
Manganese	µg/L	96.1	<sup>d</sup> 97.0	0%	0%
Mercury	µg/L	0.009 (95%ile)	<sup>d</sup> 0.110	6%	0%
Molybdenum	µg/L	0.49	0.36	<1%	0.3%
Nickel	µg/L	0.65	0.60	2%	0.3%
Uranium	µg/L	2.9	2.74	2%	0.7%
Zinc	µg/L	6.01	<sup>e</sup> 7.13	9%	4.1%

*a Updated discharge consent has Mean criteria for BOD, while 2020 EIA considered 90%ile EQS only*

*b Slight increase in percentage uplift for ammonia due to lower overall baseline concentration. The predicted post-development concentration for ammonia is lower than in 2020*

*b There was no Barium EQS considered in EIA 2020*

*c Almost all baseline water quality samples for Mercury are below detection limit, such that detection limits impact on average baseline water quality. Higher detection limits in baseline samples from 2020 results in higher average background concentrations than in 2020 EIA. As a result, there is lower predicted impact of discharge, albeit this is also affected by detection limits. Overall, discharge criteria is lower for mercury so impacts would be lower than in 2020 EIA.*

*d Average baseline concentrations increased since 2020 EIA, resulting in higher predicted concentrations in river. But EQS has also increased resulting in lower percentage increase in EQS*

## 8 Summary

This TR outlines updated discharge criteria values for the two Discharge Consent applications. i.e., for the proposed and existing infrastructure sites. It also updates predictions of water quality in the downstream watercourses as a result of these discharges. A summary of the proposed and 2020 discharge criteria is provided in Sections 8.1 and 8.2 below.

Compared to the Second Addendum to the ES predicted downstream effects (in terms of changes in baseline water quality) are generally reduced, apart from sites where the baseline concentrations have been updated with additional data collected from 2020 to 2024.

Overall, the update has reduced many of the discharge consent values. MAC and average EQS will not be exceeded in Pollanroe Burn to protect fish of various age classes. MAC EQS will not be exceeded in Curraghinalt Burn to protect adult fish which may visit the burn. New criteria have been added for parameters which are considered important for FWPM, i.e., BOD and nitrate, with a consent value added for phosphorus.

## 8.1 Summary: Proposed Infrastructure Site

Updated Discharge Consent values for the Proposed Infrastructure Site are outlined in Tables 15a and 15b.

**Table 15a: Proposed Infrastructure Site: Updated Proposed Discharge Consent Values (Non-Metals)**

Parameter	Unit	Proposed 2020 Discharge Criteria	Proposed New Discharge Criteria	
			Spot / Max Criteria	Mean Criteria
pH	s.u.	6.2-9.0	6.2-9.0	-
Temperature	°C	20	20	-
TSS	mg/L	50	50	25
BOD	mg/L	1.35 (90%ile)	3 (90%ile)	1
Total Ammonia	mg/L N	0.39	0.25 (90%ile)	0.2 (90%ile)
Nitrate	mg/L N	11.3	11.3	0.42
Nitrite	mg/L N	0.15	None	
Chloride	mg/L	250	None	
Fluoride	mg/L	1.5	None	
Phosphorus	mg/L	None	-	0.02
Sulphate	mg/L	250	250	-

**Table 15b: Proposed Infrastructure Site: Updated Proposed Discharge Consent Values (Metals)**

Parameter	Unit	2020 Discharge Criteria	New Discharge Criteria	
			Spot / Max Criteria	Mean Criteria
Aluminium	µg/L	200	None	
Antimony	µg/L	5	5	-
Arsenic	µg/L	10	10	-
Barium	µg/L	1300	1100	620
Boron	µg/L	1000	None	
Cadmium	µg/L	0.28	0.28	0.08
Chromium (III)	µg/L	20	None	
Chromium (VI)	µg/L	10	None	
Total Chromium (CrIII + CrVI)	µg/L	30	30	8.1
Cobalt	µg/L	11.5	11.5	3
Copper <sup>a</sup>	µg/L	40	54	14
Iron	mg/L	0.68	0.61	-
Lead	µg/L	10	10	7.2
Manganese <sup>a</sup>	µg/L	218	187	-
Mercury	µg/L	0.094	0.07	-
Molybdenum	µg/L	68	68	-
Nickel <sup>a</sup>	µg/L	20	20	12.2
Selenium	µg/L	10	None	
Silver	µg/L	3.24	None	
Sodium	mg/L	200	None	
Uranium	µg/L	30	30	15
Zinc <sup>a</sup>	µg/L	73.3	73.3	20.7

*a bio-available equivalent*

## 8.2 Summary: Existing Infrastructure Site

Updated Discharge Consent values for the Existing Infrastructure Site are outlined in Tables 16a and 16b.

**Table 16a: Existing Infrastructure Site: Updated Proposed Discharge Consent Values (Non-Metals)**

Parameter	Unit	2020 Discharge Criteria	New Discharge Criteria	
			Spot / Max Criteria	Mean Criteria
pH	s.u.	6.2-9.0	6.2-9.0	-
Temperature	°C	20	20	-
TSS	mg/L	50	50	-
BOD	mg/L	1.35 (90%ile)	3 (90%ile)	1
Total Ammonia	mg/L N	0.39	0.25 (90%ile)	0.2 (90%ile)
Nitrate	mg/L N	11.3	11.3	0.2
Nitrite	mg/L N	0.15	None	
Chloride	mg/L	250	None	
Fluoride	mg/L	1.5	None	
Phosphorus	mg/L	None	-	0.02
Sulphate	mg/L	250	250	-

**Table 16b: Existing Infrastructure Site: Updated Proposed Discharge Consent Values (Metals)**

Parameter	Unit	2020 Discharge Criteria	New Discharge Criteria	
			Spot / Max Criteria	Mean Criteria
Aluminium	µg/L	200	None	
Antimony	µg/L	5	5	-
Arsenic	µg/L	10	10	-
Barium	µg/L	1300	1100	-
Boron	µg/L	1000	None	
Cadmium	µg/L	0.67	0.45	-
Chromium (III)	µg/L	40	None	
Chromium (VI)	µg/L	10	None	
Total Chromium (CrIII + CrVI)	µg/L	50	50	-
Cobalt	µg/L	52	52	-
Copper <sup>a</sup>	µg/L	9.43	239	-
Iron	mg/L	1.98	2.38	-
Lead	µg/L	10	10	-
Manganese <sup>a</sup>	µg/L	69.7	72	-
Mercury	µg/L	0.339	0.07	-
Molybdenum	µg/L	70	70	-
Nickel <sup>a</sup>	µg/L	20	20	-
Selenium	µg/L	10	None	
Silver	µg/L	5.33	None	
Sodium	mg/L	200	None	
Uranium	µg/L	30	30	-
Zinc <sup>a</sup>	µg/L	192	204	-

<sup>a</sup> bio-available equivalent

## 9 Appendix 1: Updated compliance calculations for Owenreagh and Owenkillew Rivers (using Monte Carlo model)

DAERA uses a 'Monte Carlo' modelling approach that is consistent with methods used by the EA and the Scottish Environment Protection Agency (SEPA). The EA has published details of its procedures on the use of a two-stage process in the development and assessment of any discharge criteria, based on initial screening tests and detailed modelling. The methods are outlined in:

- <https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit>; and
- LIT 10419 'Modelling: surface water pollution risk assessment' (Environment Agency 2014).

These methods were used for the 2020 EIA and Discharge Consent applications. NIEA have not suggested this approach is inappropriate or indicated an alternative approach.

In overview, the EA methods look to:

- Prevent concentrations in receiving waters from exceeding an EQS;
- Limit increase in background concentrations in receiving waters to less than 10% of EQS, for parameters where background concentrations are less than the EQS; and
- Limit increase in background concentrations in receiving waters to less than 3% of EQS, for parameters where background concentrations are already more than the EQS.

The receiving waters for the calculations are considered as the large watercourses (Owenkillew and Owenreagh Rivers). LIT 10419 (Section 5.2) discusses releases to small burns and highlights different approaches that includes use of BAT (Best Available Technology) or limiting discharges to <EQS to prevent failure of EQS in the smaller watercourse. Both these approaches (use of Reverse Osmosis treatment) and setting discharge limits to EQS for smaller burns are considered in this note.

This Appendix updates the calculations presented in the Second Addendum to the ES for the setting of limits appropriate for the larger watercourses. As outlined in the main text, for most cases these values are not carried forward for the final Discharge Consent, as there are other limits (lower values) applied when setting the Discharge Consent values. However, these calculations are the first stage in the process.

For simplicity and as the methods are outlined in more detail in previous documents submitted with the 2020 EIA, a summary of the analyses is presented here, rather than full details of the calculations and outputs. However, the same approach is taken as in 2020.

### **Flows**

- Flow in Owenreagh River, upstream of Pollanroe Burn: 1,480 L/s average, 280 L/s 95%ile flow
- Discharge to Pollanroe Burn 24.5 L/s Average, with 8.2 L/s standard deviation
- Flow in Owenkillew River upstream of Curraghinalt Burn: 4,430 L/s average, 660 L/s 95%ile flow
- Discharge to Curraghinalt Burn 11.7 L/s Average, with 0.7 L/s standard deviation

## Water Quality

- Station used for water quality for Owenreagh upstream of Pollanroe Burn: SW11
- Station used for water quality for Owenkillew upstream of Curraghinalt Burn: SW05

**Table A1.1: Summary of results for Proposed Infrastructure Area (Owenreagh)**

Parameter	Unit	EQS (Annual Average unless stated)	Baseline Quality (Annual Average unless stated)	% change of EQS allowed	Downstream Target	Calculated Discharge Consent Value
<b>Physical/Nutrients/Salts</b>						
TSS	mg/L	25	6.19	10	8.69	73.4
BOD	mg/L	3 (90%ile)	2.16 (90%ile)	10	2.46 (90%ile)	12.1 (Mean)
Total Ammonia	mg/L N	0.2 (90%ile)	0.12 (90%ile)	10	0.126 (90%ile)	0.12 (Mean)
Nitrate	mg/L N	3	0.272	10	0.572	11.5
Chloride	mg/L	250	13.5	10	38.5	951
Fluoride	mg/L	1	0.186	10	0.286	3.13
Sulphate	mg/L	400	2.20	10	42.2	1510
<b>Metals (dissolved)</b>						
Arsenic	µg/L	50	0.630	10	5.63	187
Barium	µg/L	620	7.37	10	69.4	2350
Boron	µg/L	1500	5.16	10	155	5650
Cadmium	µg/L	0.08	0.0223	10	0.0303	0.255
Dissolved Chromium (CrIII + CrVI)	µg/L	8.1	0.305	10	1.12	30.1
Cobalt	µg/L	3	0.0878	10	0.388	11.3
Copper	µg/L	14	1.05	10	2.45	53.7
Iron	mg/L	1	0.60	10	0.70	4.57
Lead	µg/L	7.2	0.249	10	0.97	26.4
Manganese	µg/L	276	83.9	10	112	1170
Mercury	µg/L	0.07 (max)	0.227 (90%ile)	3	0.234 (90%ile)	0.227 (90%ile)
Molybdenum	µg/L	73	0.189	10	7.49	275
Nickel	µg/L	12.2	0.419	10	1.64	45.7
Selenium	µg/L	3.1	0.689	10	1.0	10.4
Silver	µg/L	0.5	2.5	3	2.55	4.38
Uranium	µg/L	15	2.5	10	4.0	59.0
Zinc	µg/L	20.7	7.45	10	9.52	76.9

**Table A1.2: Summary of results for Existing Infrastructure Area (Owenkillew)**

Parameter	Unit	EQS (Annual Average unless stated)	Baseline Quality (Annual Average unless stated)	% change of EQS allowed	Downstream Target	Calculated Discharge Consent Value
<b>Physical/Nutrients/Salts</b>						
TSS	mg/L	25	5.10	10	7.99	473
BOD	mg/L	3 (90%ile)	1.52 (90%ile)	10	1.82 (90%ile)	1.52 (90%ile)
Total Ammonia	mg/L N	0.2 (90%ile)	0.220 (90%ile)	10	0.24(90%ile)	12.1 (Mean)
Nitrate	mg/L N	3	0.153	10	0.489	56
Chloride	mg/L	250	9.85	10	35.3	4400
Fluoride	mg/L	1	0.155	10	0.255	11.5
Sulphate	mg/L	400	1.21	10	42.1	7050
<b>Metals (dissolved)</b>						
Arsenic	µg/L	50	0.860	10	5.98	880
Barium	µg/L	620	12.1	10	74.1	10300
Boron	µg/L	1500	5.81	10	156	25800
Cadmium	µg/L	0.08	0.021	10	0.032	1.5
Dissolved Chromium (CrIII + CrVI)	µg/L	8.1	0.189	10	1.18	171
Cobalt	µg/L	3	0.183	10	0.483	51.9
Copper	µg/L	14	1.06	10	2.44	239
Iron	mg/L	1	0.903	3	1.0	18.3
Lead	µg/L	7.2	0.229	10	1.04	136
Manganese	µg/L	276	93.8	10	115	3660
Mercury	µg/L	0.07 (max)	0.168	3	0.168	0.168
Molybdenum	µg/L	73	0.196	10	7.55	1260
Nickel	µg/L	12.2	0.637	10	1.92	221
Selenium	µg/L	3.1	0.618	10	0.902	46.8
Silver	µg/L	0.5	2.5	3	2.55	11.1
Uranium	µg/L	15	2.5	10	4.0	261
Zinc	µg/L	20.7	6.79	10	8.24	204

## 10 Appendix 2: Summary of Mine Water Predictions (from Second Addendum to the ES)

**Table A2-1: Table 9-25 from 2020 Surface Water Impact Assessment showing Mine Water Predictions. Highest value for each parameter is shaded orange**

Parameter	Unit	<sup>a</sup> Underground Water - Max Concentration	<sup>b</sup> DSF Seepage	<sup>b</sup> Active DSF Runoff	<sup>b</sup> Reclaimed DSF Runoff
<b>Non Metals</b>					
BOD	mg/L	0.89	0.89	0.89	0.89
Total Ammonia	mg/L as N	60	2.6	1.4	0.088
Nitrate	mg/L as N	910	40	22	1.3
Nitrite	mg/L as N	1.5E-11	6.6E-13	4.9E-13	3E-14
Chloride	mg/L	15	3.2	0.0013	8.5
Fluoride	mg/L	0.32	0.14	0.00012	0
Sulphate	mg/L	19	49	0.012	4.5
<b>Metals</b>					
Aluminium	µg/L	1.6	1.5	1.1	4.9
Antimony	µg/L	11	9.7	0.027	0
Arsenic	µg/L	16	22	0.061	0
Barium	µg/L	310	55	5.4	0
Boron	µg/L	49	65	0.18	0
Cadmium	µg/L	0.072	0.095	0.00026	0
Chromium (III)	µg/L	8.8E-20	2.5E-20	5.9E-20	0
Chromium (VI)	µg/L	7	7.1	0.019	0
Total Chromium	µg/L	7	7.1	0.019	0
Cobalt	µg/L	8.1	0.66	0.0018	0
Copper	µg/L	9.2	1.4	0.0038	0
Iron	mg/L	1	0.093	0.00026	0.35
Lead	µg/L	1.3	0.37	0.001	0
Manganese	µg/L	370	0.000000094	0.0000043	0
Mercury	µg/L	0.099	0.006	0.000016	0
Molybdenum	µg/L	39	240	0.66	0
Nickel	µg/L	6.8	3.2	0.0082	0
Selenium	µg/L	1.2	1	0.0023	0
Silver	µg/L	2.9	0.14	0.00038	0
Sodium	mg/L	16	2	0.0054	4.5
Uranium	µg/L	9.2	7.6	0.02	0
Zinc	µg/L	120	6.3	0.016	0

*a Maximum of underground mine water predictions from geochemical modelling*

*b From geochemical modelling*

*c Based on sewage treatment plant specification*

Our reference: TC 80/20 and TC 81/20  
Your Ref: KLB\HSF\48638-1

**By email to:** [k.blair@cfrlaw.co.uk](mailto:k.blair@cfrlaw.co.uk)

5<sup>th</sup> September 2024

Dear Cleaver, Fulton and Rankin,

**Re : Your client Dalradian Gold Ltd: Applications TC 80/20 and TC 81/20 for consent to discharge**

I write further to your letter of the 21<sup>st</sup> May 2024 and our response of the 11<sup>th</sup> June in respect of consent standards for the proposed gold mine at Camcosy Road, Gortin, Co. Tyrone.

1. Please find attached a paper outlining our approach to consent to discharge standards for these applications. This has been prepared in line our understanding of the legal requirements under both the Habitats Regulations and the Water Framework Regulations applicable in Northern Ireland.
2. In our letter of the 11<sup>th</sup> June we outlined the NIEA approach to setting consent standards to ensure adequate protection of water quality for Freshwater Pearl Mussels, as identified in the Owenkillew River, into which these proposed discharges, will eventually be made. These are further iterated in the attached paper. We consider these to be fundamental to the assessment of your client's application and we look forward to hearing from you on this point. You may wish to note that the Conservation Objectives (Supporting advice Annex) for all Northern Ireland SAC rivers are in the process of being updated and will likely reflect these standards. The updated documents will be published very shortly.
3. At para 14 of our June 11<sup>th</sup> letter we undertook to provide a separate response on standards in respect of metals and those that we would seek to apply to the smaller burns (Curraghinalt Burn and Pollenroe Burn). These are now also detailed in the attached paper.
4. You will note that in line with the requirements of the 2015 regulations, we are seeking to set standards which ensure that EQS for priority substances (where published) is

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not exceeded in these smaller water courses.

5. In para 7 of your letter of the 21<sup>st</sup> May you indicated that the information presented on the 23<sup>rd</sup> January regarding Max allowable concentrations allowed the 'EQS issue to fall away'. NIEA have not responded to the information provided to indicate any agreement to the position outlined at that meeting. In the attached document we have made the case for a range of suitable standards based on EQS annual average, MAC and background water quality based on the availability of applicable published standards and the relative toxicity of the components of the proposed discharge in the aquatic environment. Where a max allowable concentration is published e.g. for Cadmium, this will be considered in setting end of pipe standards. For e.g. Nickel, there is no published Max allowable EQS and as such, the Annual average EQS is applicable.
6. We note you have outlined the reasoning behind the proposition that Dutch (for barium), Canadian and US standards should be applicable. As far as we are aware, these standards have not been widely adopted by other European Agencies or been subject to the same level of scrutiny and consultations process, prior to adoption, that the published EQS's have and therefore their applicability to this context is not demonstrated.
7. In para 10 of your letter you highlight the apparent disparity in the scale of application of the 2017 WFD regs and those made in 2015. NIEA sees no reason not to read the 2015 regulations as the EQS for priority substances listed in table 47 to be applied to 'surface waters or parts thereof'. NIEA is therefore taking this approach for the relevant standards (in this case for Nickel, Lead, Cadmium and Mercury). The other published environmental standards in the 2015 regulations should not be exceeded to ensure the overall water body classification is not compromised, which is assessed by measurement of water quality in the main rivers.
8. At the meeting in January 2024, your client provided some details for a suggested approach for standards and indicated that certain parameters need not be carried forward as they are not likely to be present in the discharge. We note this rationale has been applied to Aluminum and Sodium. Please provide the supporting evidence that there is no source for these elements within the proposed discharge.
9. Chromium (III), (IV) and silver have also been removed due to the limit of detection. Table 5 shows the 'in river' standards relative to the limit of detection for the NIEA laboratory. There appears to be an order of magnitude difference which should not limit assessment. We have therefore continued to include standards for these in the attached tables. Once end of pipe standards are calculated we may revisit this aspect.
10. Guidance is provided in the attached document regarding relevant standards for suspended solids. This is based on advice from Loughs Agency as the body with

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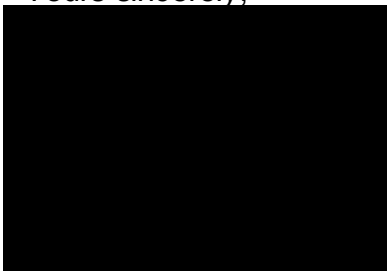
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responsibility for fish health and from NIEA Natural Environment Division.

11. As outlined at our meeting in January 2024, given the presence of treated sewage effluent in the proposed discharge into the Pollenroe Burn, a suitable standard for Phosphorous will be required and this is based on the JNCC standards, as detailed in the attached. To enable calculation of a suitable end of pipe consent limit, we would appreciate if you could confirm the volume of sewage effluent.
12. Based on the British Water Standard Flow and Loads document, the estimated output from an industrial premises with a canteen would be 100 litres per person per day. Your client has widely publicised that, when operational, the mine offers employment for 350 full time employees. Assuming all 350 employees are on site, this equates to  $100 \times 350 = 35000$  l i.e. 35 cubic metres of sewage per day. It is presumably safe to assume that not all 350 employees will be on the site at one time, with shift patterns etc., but please confirm that the estimated 12 m<sup>3</sup>/day provided in the application is accurate.
13. Your client's application also includes references to the use of various chemicals on site including sodium hypochlorite, citric acid, descalant, sulphuric acid, sodium hydroxide, sodium bisulphite and flocculants. We request clarification from your client on how these chemicals are to be used on site, details of the relevant Chemical safety data sheets, the pollution prevention and storage arrangements. If these are already provided in the existing supporting documents for the application, please direct us to e.g. the relevant section of the Environmental Statement.

I hope the above and attached is helpful in clarifying our position on the setting of discharge consent limits for these two applications. Should you require any further information please contact us at [NIEADalradianProject@daera-ni.gov.uk](mailto:NIEADalradianProject@daera-ni.gov.uk)

Yours sincerely,



[Redacted]

**WATER REGULATION**

**Tel 028 90569570**

**Enc.** Note on applicable standards

**cc.** Brian Kelly, Dalradian Gold Ltd.

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NIEA consent limits: Dalradian Gold Project September 2024

1. JNCC standards for protection of FWPMs apply to water quality within the SAC (Table 1). Consent conditions will be set at 'end of pipe' to ensure this standard is met within the Owenkillow River.

**Table 1:** Water Quality Standards FWPM from JNCC CSM Guidance for Freshwater Fauna (extract from Favourable condition table 1, page 15)

<i>Attribute</i>	<i>Target</i>
Water Quality: for FWPM, organic pollution, reactive phosphorous, acidification and other nutrients are particularly important	See sub attributes below. Generally targets included in the CSM guidance for Rivers should be used. These targets are intended to support a healthy, naturally functioning river ecosystem which protects the whole biological community and individual species to a degree characteristic of the river. All chemical targets and also biological targets relating to macroinvertebrates and diatoms are applicable. However, depending on circumstances, UKTAG standards for Higher Ecological Status under the WFD may be applicable. In addition to habitat based targets, some more stringent targets for pearl mussel are set out below.
(a) Phosphorus	In locations where annual mean soluble reactive phosphorous (SRP) levels are <5ug/l the target should be 5 ug/l. for rivers that exceed this target a suggested target is the more stringent value of either a high ecological status* values for SRP under the WFD or the SRP target for the CS river habitat**
(b) Nitrogen-nitrate	Annual median value of <0.125 mg/l
(c) BOD	Mean BOD <1.0 mg/l

\* High Ecological status value for WFD; class boundary high to good calculated at 15ug/l for the Owenkillow at Drumlea and 17 ug/l at Trinamadden Bridge.

\*\* Table 5 and 6 of the JNCC CSM Guidance for Rivers: values between 5-40 ug/l depending on alkalinity, altitude and substrate. Relevant standard from table 6 is 20ug/l

2. Standards to protect Salmon apply to the lower reaches of the Curraghinalt Burn and to the Pollenroe Burn where Salmon have been identified, habitat suited to salmonid fish has been identified and the functional links between this habitat and that within the SAC has been established.

**Table 2a:** Water Quality standards from JNCC guidance for freshwater fauna for protection of Atlantic Salmon (extract from Favourable condition. Table 5, p 51)

<i>Attribute</i>	<i>Target</i>
Water Quality: organic pollution reactive phosphorous and other pollutants	Targets included in the CSM guidance for Rivers should be used. Atlantic Salmon are susceptible to a range of water quality impacts, particularly in juvenile life stages (egg, fry, parr and smolt. Generally, water quality should not be injurious to any life stage. All reached within the designated site contact or should

	contain Atlantic Salmon should comply with the targets given Data from the last 3 years should be used.
Fine sediment	No unnaturally high level of siltation. Siltation targets included in the CSM guidance for Rivers may be approved.

**Table 2 b.** JNCC CSM Standards for Freshwater rivers 2016

(data summarized from a number of tables throughout the Water Quality section pages 11-15)

<i>Attribute</i>	<i>Target</i>
Mean BOD	1.5 mg/l
90%tile total ammonia (NH3-mg/l)	0.25
Soluble reactive phosphorous (ug/L)	* 15 ug/l (rivers) and 7 ug/l (headwaters)
Acidification: Mean ANC pH (Humic waters, with DOC>10 mg/l)	>80 >5.1

\* high alkalinity and high altitude values for Rivers (apply to Owenreagh and Owenkillow ) and headwaters (apply to Curraghinalt Burn and Pollenroe Burn)

- Environmental Quality Standards to protect water quality in respect of certain priority substances are published in the 2015 WFD regs (Water Framework Directive (Classification, priority substances and Shellfish waters Regulations (Northern Ireland) 2015). Standards outlined in table 47 (of the 2015 regs) (priority substances) are applicable in the small burns, the remaining values are applicable at water body scale.

**Table 3:** EQS standards applicable to proposed application.

<i>Parameter</i>	<i>Unit</i>	<i>EQS (priority subs regs 'EQS regs' 2015</i>		<i>Compliance point</i>
		<i>Annual mean</i>	<i>Max</i>	
BOD	mg/l		4 (90%ile) Good status	Water body
Total Ammonia	mg/l	n/a	0.3 (90%ile) Good Status	Water body
Arsenic	µg/L	50	n/a	Water body
Cadmium	µg/L	0.08	0.45	Burn
Chromium (III)	µg/L	4.7	32 (95%ile)	Water body
Chromium (VI)	µg/L	3.4	n/a	Water body
Copper	µg/L	1 diss/PNEC)	n/a	Water body
Iron	mg/l	1	n/a	Water body
Lead	µg/L	1.2	14	Burn
Manganese	µg/L	123 bioavailable	n/a	Water body
Mercury	µg/L	n/a	0.07 (95%ile)	Burn
Nickel	µg/L	4	34	Burn
Zinc	µg/L	11.9 bioavailable	n/a	Water body

- Where there are no relevant published standards, maintenance of the existing water quality i.e. no deterioration, is the relevant standard.

**Table 4:** Upstream water quality for CB and PB.

<i>Parameter</i>	<i>Unit</i>	<b><i>Curraghinalt Burn</i></b>	<b><i>Pollanroe Burn</i></b>
		<i>Observed mean Quality Upstream of proposed discharge into Curraghinalt Burn (DGL data)</i>  <i>Data taken from table 3.8, Oct 2020 Proposed discharge criteria report for Curraghinalt/Owenkillew)</i>	<i>Observed mean Quality Upstream of proposed discharge into Pollanroe Burn (DGL data)</i>  <i>Data taken from table 3.8 Oct 2020 Proposed discharge criteria report for Pollen Roe/Owenreagh</i>
Suspended solids	mg/l	6.21	6.11
BOD	mg/l	0.99	0.89
Ammonia	mg/l	0.039	0.073
Nitrate	mg/l	0.12	0.23
Nitrite	mg/l	0.017	0.003
Chloride	mg/l	8.28	9.6
Fluoride	mg/l	0.15	0.15
Sulphate	mg/l	0.44	2.13
Phosphorous (SRP)		No data	No data
Aluminium	µg/l	82.2	59.0
Antimony	µg/l	1.18	1.22
Arsenic	µg/l	1.24	0.92
Barium	ug/l	15.1	20.14
Boron	mg/l	15.1	6.0
Cadmium	µg/l	5.40	0.015
Chromium III	µg/l	0.021	2.85
Chromium VI	µg/l	2.64	2.85
Chromium III & VI	µg/l	2.64	5.70
Copper	µg/l	5.28	1.22
Iron	mg/l	0.34	0.68
Lead	µg/l	1.690	0.28
Manganese	µg/l	1.98	218
Mercury	µg/l	0.28	0.0061
Molybdenum	µg/l	69.7	0.11
Nickel	µg/l	0.0061	0.48
Selenium	µg/l	0.17	0.73
Silver	µg/l	0.36	2.5
Sodium	mg/l	0.64	6.08
Uranium	µg/l	5.18	2.5
Zinc	ug/l	5.61	4.69

Based on these principles and applying the RQP tool (Monte Carlo) model, discharge limits will be calculated, which would form conditions of the Consent. These would be measured for compliance purposes at 'end of pipe'.

The Conservation objectives impose a requirement to maintain or restore [the water quality] to reach favourable condition. Whilst this applies specifically to the area of the SAC, given the 'functional linkage' established by the fish survey, these standards may apply to other areas of river system, where selection features for the SAC may be present.

Furthermore, for suspended solids, following consultation with Loughs Agency as the competent authority for fisheries, it was recommended that NIEA should adhere to the previously published JNCC Freshwater Fauna parameters to ensure continuity in mitigating negative environmental impacts on salmonids in the Foyle and Carlingford Catchments.

**Table 5.** Summary of 'in river' standard sources and values. NB. where different values are applicable to the CB or PB, these are both given in the value column.

<i>Parameter (from application form)</i>	<i>Unit</i>	<i>Relevant standard source</i>	<i>Value CB/PB</i>	<i>Limit of detection (NIEA lab.)</i>
Suspended solids	mg/l	JNCC (2005)	10/25	2
BOD	mg/l	JNCC (FWPM)	1.5	>2
Ammonia	mg/l	JNCC (Rivers)	0.25	0.01
Nitrate	mg/l	JNCC (FWPM)	0.125	0.06
Nitrite	mg/l	Background/Upstream	0.0017/0.003	0.005
Chloride	mg/l	Background/Upstream	8.28/9.6	4
Fluoride	mg/l	Background/Upstream	0.15	0.1
Sulphate	mg/l	Background/Upstream	0.44/2.13	1.2
Phosphorous (as SRP)	ug/l	JNCC (FWPM/Rivers)	15/17	TBC
Aluminium	µg/l	Background/Upstream	82.2/60.2	100
Antimony	µg/l	Background/Upstream	1.18/1.27	0.02
Arsenic	µg/l	EQS	50	0.05
Barium	ug/l	Background/Upstream	15.1/20.4	TBC
Boron	mg/l	Background/Upstream	15.1/6.0	5
Cadmium	µg/l	EQS	0.08	0.02
Chromium III	µg/l	EQS	4.7	0.25
Chromium VI	µg/l	EQS	3.4	0.05
Chromium III & VI	µg/l	EQS (total Chromium)	8.1	0.25
Copper	µg/l	EQS (bioavail)	1	0.5
Iron	mg/l	EQS	1	0.02
Lead	µg/l	EQS	1.2	0.05
Manganese	µg/l	EQS (bioavail)	123	0.5
Mercury	µg/l	EQS (max)	0.07	0.005

Molybdenum	µg/l	Background/Upstream	69.7/0.11	0.02
Nickel	µg/l	EQS	5	0.25
Selenium	µg/l	Background/Upstream	0.17/0.73	0.2
Silver	µg/l	Background/Upstream	0.36/2.5	0.02
Sodium	mg/l	Background/Upstream	0.64/6.08	0.4
Uranium	ug/l	Background/Upstream	5.18/2.5	0.02
Zinc	ug/l	EQS (bioavail)	11.9	0.5

Table 5 therefore summarises the ‘in river’ standards which NIEA consider to be applicable to discharges to the Curraghinalt Burn and to the Pollenroe Burn. The background/upstream values are taken from the 2020 data on water quality in the two burns, provided in the application. This data will be further reviewed to ensure there is no significant change in water quality since this time, in setting the consent limits.

5. Other components of the discharge e.g. flocculants or other chemical additives. Suitable standards will be set based on the components of the flocculent additives and their ecological toxicity,
6. Temperature: the temperature of the discharge shall ensure that the standards outlined in table 4 of the 2015 regulations are met i.e. for good status, in Salmonid waters, the 98<sup>th</sup> percentile is 23 degrees.

*Water Regulation, 04/09/2024.*

## Detailed consideration of NIEA's letter of 5<sup>th</sup> September 2024

- 1.1. In a letter dated 5<sup>th</sup> September 2024, NIEA Water Regulation Unit described its current position regarding water discharge applications TC 80/20 and TC 81/20. Attached to that letter is a document providing further detail on its approach to setting discharge standards for the applications. It is stated that

*“This has been prepared in line our understanding of the legal requirements under both the Habitats Regulations and the Water Framework Regulations applicable in Northern Ireland.”*

- 1.2. The letter confirms that these standards are very likely to be formally adopted, forming part of the Supporting Advice linked to Northern Ireland SAC rivers Conservation Objectives. It is stated:

*“You may wish to note that the Conservation Objectives (Supporting advice Annex) for all Northern Ireland SAC rivers are in the process of being updated and will likely reflect these standards. The updated documents will be published very shortly.”*

- 1.3. In the light of the above, it is likely that the information contained within the letter and attached document will represent NIEA's formal position at the conjoined Inquiry, and also possible that the approach will be formally adopted, to be used as part of the assessment process associated with discharge consent applications (potentially) affecting Northern Ireland SAC rivers (i.e. broader than considerations relating solely to the Owenkillew River SAC).

- 1.4. As a headline point, the overall approach to setting discharge limits as described by NIEA in its most recent correspondence is fundamentally flawed. It is baseless in view of the scientific evidence regarding the lack of use of the Curraghinalt Burn by Atlantic Salmon, limited use of Pollanroe Burn by that species and the absence of Freshwater Pearl mussel from both. It is also categorically unworkable in a practical sense due to issues with detection limits, the suggestion that mixing modelling is to be undertaken for the burns and the fact that for some (broadly non-harmful) parameters, no increase (above baseline) would be possible. The outcome of such an approach will likely be that it will not be possible for anyone

who discharges water into the catchment to fully comply with discharge consents which align with the new guidance. All set against a background where current conditions within the rivers have arisen through a lack of proper regulation and a lack of delivery in terms of projects and mechanisms identified by stakeholders as being required to address issues concerned with maintaining / restoring the favourable conservation status of the Owenkillew River SAC. These broad points are expanded upon below with reference to the information contained within NIEA's letter.

- 1.5. Whilst the detail regarding approach to setting discharge limit values is contained within an attached document, the letter itself highlights some key points and these are discussed below.
- 1.6. Paragraph 5 confirms that NIEA's approach has been to use a combination of EQS annual average, EQS Maximum Allowable Concentration (MAC) and background water quality. It is stated:

*"In the attached document we have made the case for a range of suitable standards based on EQS annual average, MAC and background water quality based on the availability of applicable published standards and the relative toxicity of the components of the proposed discharge in the aquatic environment. Where a max allowable concentration is published e.g. for Cadmium, this will be considered in setting end of pipe standards. For e.g. Nickel, there is no published Max allowable EQS and as such, the Annual average EQS is applicable."*

- 1.7. Whilst there remains a disagreement in relation to which parameters should be subject to standards derived from EQS annual average, EQS MAC and background water quality, it is agreed that all three should be used in the setting of the limit values. The Applicant proposes to discharge at better than baseline for key parameters (with reference to Freshwater Pearl Mussel), MAC EQS for other relevant parameters in the Curraghinalt Brun and both MAC EQS and AA EQS for other relevant parameters in the Pollanroe Burn (given the recorded presence of Atlantic Salmon parr).
- 1.8. Paragraph 6 confirms that NIEA is of the view that (on its understanding) Dutch, Canadian and US standards cannot be used to guide the setting of limit values

because they are not widely adopted by other European Agencies or have been subject to the same level of scrutiny and consultation as EQS values. It is stated:

*“We note you have outlined the reasoning behind the proposition that Dutch (for barium), Canadian and US standards should be applicable. As far as we are aware, these standards have not been widely adopted by other European Agencies or been subject to the same level of scrutiny and consultations process, prior to adoption, that the published EQS’s have and therefore their applicability to this context is not demonstrated.”*

- 1.9. The Applicant has reviewed a range of guidance considered relevant to the setting of discharge limits. In the case of Barium (cited specifically by NIEA) the Applicant drew reference to Dutch guidance which was considered appropriate. The approach of NIEA, as discussed below, is to apply JNCC values in respect of certain key parameters, EQS on the remainder where an EQS is available, then a ‘no increase from upstream baseline’ for any not caught by JNCC or EQS. As discussed below, there is no scientific basis at all for imposing a ‘no increase from baseline’ enforcement value on parameters which are not recognised (e.g. through EQS) as being a risk to the aquatic ecosystem. The approach by the Applicant is logical and can be characterised as looking more widely, drawing reference to other studies or processes to inform the position. NIEA’s approach is illogical and unworkable, for reasons discussed further below in relation to the ‘no increase from baseline’ point regarding certain parameters.
- 1.10. Paragraph 8 concerns the Applicant’s proposition that certain parameters need not be taken forward for regulation on the basis that they are not likely to be present in the discharge. On this point NIEA request further evidence that the elements (Aluminium and Sodium are cited) will not be present within the discharge.
- 1.11. It is correct that the Applicant has sought to remove some parameters from regulation through the discharge consenting process. Whilst some will be present within the discharge (rainwater for example contains sodium), the important point is that some parameters are not going to be at levels which are in any way significant in terms of impacts on water quality / aquatic life, noting for example that no EQS is given. Reference is drawn to Table 9-25 (at page 137) of the Surface Water Impact Assessment (October 2020) (App C4\_of the Second Addendum to the ES). In respect of Aluminium, the reported average baseline

value in Pollanroe Burn is 59 µg/L, whereas the sum value for project sources is 9.1 (1.6 + 1.5 + 1.1 + 4.9), before treatment. For Sodium, the reported average baseline value in Pollanroe Burn is 6.1 mg/L and whilst the sum value for project sources is greater (22.5mgL) this is an element which could occur at significantly higher concentrations without causing any deleterious effects in water quality terms. This is a matter discussed in more detail further below.

- 1.12. Paragraph 9 concerns the Applicant's proposition that Silver and Chromium should not be taken forward for regulation on the basis of limits of detection. NIEA consider that detection limits are not an issue for these elements. It is stated:

*"There appears to be an order of magnitude difference which should not limit assessment. We have therefore continued to include standards for these in the attached tables. Once end of pipe standards are calculated we may revisit this aspect."*

- 1.13. In relation to the removal of parameters (from the discharge consent) due to limits of detection, there is a concern that NIEA are misguidedly placing a reliance upon half detection limits in some instances. In this context, "half detection limit" applies to a situation where, in order to generate data which can be used for analytical purposes, all recorded data with a value which is "less than detect" is halved. This ensures that a set of data is available for statistical analysis (where it would otherwise be disregarded), but the data does not comprise true values. It is imperative that any limits being set can be robustly measured against, so including limits below the level of detection is not appropriate.
- 1.14. Paragraphs 11 and 12 confirm NIEA's rationale behind a need for the regulation of Phosphorus within the discharges, that being on the basis that treated sewage effluent is proposed to be discharged into the Pollanroe Burn.
- 1.15. Detailed discussion regarding Phosphorus is presented above within this TR. The simple point on this matter is that the actual discharge of Phosphorus attributable to the Mine project after treatment, will be negligible. It is the baseline catchment water, recirculated as part of the project which has a bearing on the discharged water. Regulation on Phosphorus would, on the face of it, appear an acceptable approach to setting the discharge consent limits, but in setting the enforcement limit, due regard must be had to the baseline situation because the Applicant will

be treating baseline water as part of the water treatment process. The result of this approach is that the catchment baseline water is being regulated (and potentially enforced against) and not the mine proposals. That approach cannot be justified.

- 1.16. Paragraph 13 concerns the proposed use of chemicals on site (e.g. sodium hypochlorite, citric acid, descalant, sulphuric acid, sodium hydroxide, sodium bisulphite and flocculants) and NIEA request clarification on how these chemicals are to be used, details of the Chemical safety data sheets and the pollution prevention and storage arrangements.
- 1.17. In this matter I draw attention to the fact that following the removal of cyanide use from the project, a Hazardous Substance Consent (HSC) determination was submitted to DfI. It was concluded that an HSC was not required. Since no permit is required, the management / control of chemicals on site can be detailed within operational management plans, secured by condition where necessary.
- 1.18. As discussed above, the detail of NIEA's proposed approach is set out within the attachment to the letter (5<sup>th</sup> September 2024). This is discussed below.
- 1.19. At paragraph 1 of the attachment NIEA references JNCC (CSM) standards for the protection of FWPMs applying in respect of water quality and it cites Favorable condition table 1 included at page 15 of JNCC CSM Guidance for Freshwater Fauna. Specifically regarding Phosphorus, that table (also discussed above within this TR) states that where the baseline value for Phosphorus exceeds 5 ug/l, "*the more stringent value of either a high ecological status values for SRP under the WFD or the SRP target for the CS river habitat*" should be used.
- 1.20. NIEA notes accompany the table and these explain that, in relation to a high ecological status value for WFD purposes, high to good status is calculated at 15ug/l for the Owenkillew at Drumlea and 17 ug/l at Trinamadden Bridge. With reference to the JNCC CSM Guidance for Rivers, values between 5-40 ug/l are applicable, depending on alkalinity, altitude and substrate, with the relevant standard (from table 6 of the CSM Guidance) being 20ug/l.

- 1.21. At this point, it should be noted that the value proposed by NIEA to be taken forward in relation to Phosphorus is 15/17 ug/l. This is despite the fact that JNCC CSM Guidance for Rivers specifically states that

*'Where a reach is not compliant with the relevant target in Table 6, this target should normally be adopted in conservation objectives'.*

- 1.22. With reference to the TR in respect of Surface Water, data shows that the relevant background value for Phosphorus is circa 20 ug/L, therefore it is considered that 20 ug/L should be taken forward as both the relevant discharge limit value and the target for CSM assessment. The JNCC target of 5 ug/l is clearly not relevant, as now accepted by NIEA. There is also the obvious risk that a feature is consistently recorded as being in unfavourable condition due to a failing on Phosphorous levels, where in fact the elevated levels are simply a facet of the baseline and no harm is evidenced. Regarding the later point, I refer back to the fact that increased levels of Phosphorous do not have a toxicity effect. Effects are secondary and linked to increased filamentous algae cover, which is positively concluded not to be an issue for the SAC Freshwater Pearl Mussel population.

- 1.23. Paragraph 2 of the attachment concerns Atlantic Salmon. It is stated that:

*"Standards to protect Salmon apply to the lower reaches of the Curraghinalt Burn and to the Pollenroe Burn where Salmon have been identified, habitat suited to salmonid fish has been identified and the functional links between this habitat and that within the SAC has been established."*

- 1.24. To be clear and with reference to the survey findings presented in this TR, there is no evidence that Atlantic Salmon use the Curraghinalt Burn (indeed there is positive evidence that they do not), and whilst juvenile Atlantic Salmon have been recorded within the Pollanroe Burn, there is no evidence that this is a spawning site. This is a matter discussed further below in relation to TSS.

- 1.25. Table 2a sets out the water quality standards relevant to the protection of Atlantic Salmon as presented within the JNCC guidance for freshwater fauna (Favourable condition Table 5 at page 51 of that guidance). Table 2b relates to the JNCC CSM guidance for rivers (2016) and it is stated that the information presented in the

table incorporates (relevant) information taken from a number of tables throughout the Water Quality section pages 11-15. The table is reproduced below:

<i>Attribute</i>	<i>Target</i>
Mean BOD	1.5 mg/l
90%tile total ammonia (NH <sub>3</sub> -mg/l)	0.25
Soluble reactive phosphorous (ug/L)	* 15 ug/l (rivers) and 7 ug/l (headwaters)
Acidification: Mean ANC pH (Humic waters, with DOC>10 mg/l)	>80 >5.1

\* high alkalinity and high altitude values for Rivers (apply to Owenreagh and Owenkillev ) and headwaters (apply to Curraghinalt Burn and Pollanroe Burn)

1.26. Specifically regarding Phosphorus, two points arise. First, it is made plain within the CSM guidance that these are ‘generic targets’. Second, with reference to the footnote to the table, NIEA have seemingly, incorrectly considered the rivers to represent high alkalinity (and high altitude rivers). From available evidence (e.g. see Tables 6-7 regarding water chemistry in the 2017 Surface Water Baseline report), the rivers are classified as low alkalinity. For Phosphorus, therefore, as discussed above, it is determined with reference to JNCC CSM Guidance for Freshwater Fauna, and background water quality data, that 20 ug / l would be the appropriate target.

1.27. Again with reference to the table reproduced above, the footnote states that for the purpose of setting the limit values, the Curraghinalt Burn and Pollanroe Burn are classed as ‘headwaters’. It is notable that previously Natural Environment Division of NIEA has confirmed that it does not consider the Pollanroe Burn to meet the criteria applicable to headwaters. It stated in correspondence regarding the Addendum to the ES that:

*“NED are satisfied that the Pollanroe Burn does not meet the criteria of a headwater and due its highly modified current state and are content that to the extent possible the watercourses will be naturalised after the operational phase in accordance with the conceptual Closure Plan Appendix B5 and the Landscape Restoration Plan.”*

1.28. Paragraph 3 concerns EQS values. It is stated:

*“Environmental Quality Standards to protect water quality in respect of certain priority substances are published in the 2015 WFD regs (Water Framework Directive (Classification, priority substances and Shellfish waters Regulations (Northern Ireland) 2015). Standards outlined in table 47 (of the 2015 regs) (priority substances) are applicable in the small burns, the remaining values are applicable at water body scale.”*

1.29. Table 3 then sets out the EQS standards which NIEA considered are applicable to the proposed application. I simply highlight here that there would appear to be errors within this table, for example 95%ile is not applicable to mercury and this should also be referred to as a bioavailable concentration. For zinc, this should be “bioavailable plus ambient background”.

1.30. Paragraph 4 concerns NIEA’s proposed approach to regulating parameters where there are no relevant published standards. The approach being “no deterioration” in the existing baseline water quality. Table 4 then sets out, with reference to data presented by the Applicant in the ES, upstream water quality data relevant to the Curraghinalt and Pollanroe burns. Paragraph 4 states:

*“Where there are no relevant published standards, maintenance of the existing water quality i.e. no deterioration, is the relevant standard.”*

1.31. This approach is not logical and cannot be taken forward in a practical manner. In real terms it would deliver higher protection for parameters not listed as priority substances (i.e. they are low toxicity) under the WFD. As an example, SEPA guidance (2020)<sup>1</sup> gives a non-statutory (not taken forward into the legislation) annual mean EQS for sulphate at 400 mg/L as being protective of the freshwater environment. In contrast, the test proposed by NIEA is ‘no deterioration’ on upstream water quality. With reference to Table 4 of the NIEA document that would mean a discharge of <2.5 mg/L. That is substantially below groundwater quality, which already discharges naturally into the rivers as baseflow.

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<sup>1</sup> Supporting Guidance (WAT-SG-53) Environmental Quality Standards and Standards for Discharges to Surface Waters (2020)

- 1.32. NIEA go on to state that based on the principles discussed, the RQP tool (Monte Carlo) model will be used in order to calculate the discharge limits, to be measured for compliance purposes at end of pipe. It is stated:

*"Based on these principles and applying the RQP tool (Monte Carlo) model, discharge limits will be calculated, which would form conditions of the Consent. These would be measured for compliance purposes at 'end of pipe'".*

- 1.33. This approach is misguided and cannot practically be implemented. Mixing modelling cannot be applicable to the burns and EA guidance<sup>2</sup> is very clear on this point. Section 5.2 states:

*"In some situations, an effluent will be discharged to a small receiving water, tributary or dry ditch where dilution is very limited. In this situation, modelling is likely to show that some or all of the substances in an effluent will require a numeric emission limit"*

- 1.34. Following this the guidance states that Best Available Technology (BAT) treatment technology should apply and it refers to the 'main river' being the focus in terms of not being adversely impacted. Specifically regarding this point, the Applicant has of course followed the BAT approach in proposing the RO plant, by way of an example.

- 1.35. Monte Carlo modelling is used to determine criteria which will not increase the background or baseline concentration by 10% of the environmental quality standard. Importantly, where there is little or no dilution (such as in the burns) this means that the discharge criteria will end up at about 10% of the environmental quality standard. This creates the perverse situation where the burns would be determined to have far more restrictive discharge criteria than would be applicable if the discharge was direct to the SAC.

- 1.36. To illustrate the absurdity of this situation, it is highly likely that discharge of water taken from the Owenreagh River directly into the Pollanroe Burn would not comply with criteria derived in this manner and it is certain that the discharge of

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<sup>2</sup> LIT 10419 Modelling: surface water pollution risk assessment risk assessment (2014), Environment Agency.

groundwater would not comply. There is no logical rationale to apply Monte Carlo modelling in the manner seemingly proposed by NIEA.

- 1.37. Table 5 of the NIEA document presents the “in river” standards which NIEA consider to be applicable to discharges to the Curraghinalt and Pollanroe Burns. Subject to review “to ensure there is no significant change in water quality since this time” the stated values are those which are proposed to be used in setting the consent limits. It is also confirmed, ahead of presenting the proposed ‘in river’ limit values, that NIEA has taken direction from Loughs Agency regarding TSS, with the advice being that NIEA should adhere to JNCC CSM Freshwater Fauna parameters “*to ensure continuity in mitigating negative environmental impacts on salmonids in the Foyle and Carlingford Catchments*”.
- 1.38. Several points arise in relation to the values presented and these are discussed below.
- 1.39. Regarding TSS, a value of 10 ug / l is given for the Curraghinalt Burn and 25 ug / l for the Pollanroe Burn. 10 ug / l cannot be substantiated in this instance. The only guidance which the Applicant is aware of which references such a value is that from 2003 titled “Siltation in Rivers. 3: Integrated Assessment Procedure<sup>3</sup>”. However, this concentration is linked to spawning Atlantic salmon only. As previously discussed, there is no evidence that either Curraghinalt Burn or Pollanroe Burn are, or have been, used by Salmon to spawn and Atlantic Salmon have never been recorded in the Curraghinalt Burn.
- 1.40. In relation to TSS, it is also important to keep in mind that TSS impacts are focussed on the construction stage, with impacts being temporary and reversible, and no worse than ‘natural’ background levels during flood events. Once the Mine is operational, the water treatment process (which includes the RO plant) will screen out almost all TSS.
- 1.41. Regarding Nitrate, NIEA have adopted the JNCC target value as relevant to FWPMs (0.125). Both Pollanroe and Curraghinalt Burns are unsuitable habitat for FWPMs and there is no evidence of their presence. Further, with reference to

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<sup>3</sup> Smith B, Naden P & Cooper D (2003). Siltation in Rivers. 3: Integrated Assessment Procedure. Conserving Natura 2000 Rivers Conservation Techniques Series. English Nature, Peterborough

NIEAs table 4, baseline concentrations are already at / exceeding this value. The corollary of this is plainly that, not only will the Applicant need to deal with its own discharges, but it will be expected to clean the existing baseline water quality.

- 1.42. The NIEA approach would imply that all discharges to burns or rivers connected to a FWPM SAC would need to comply with 0.125mg/L at end of pipe. This means that all water users in these catchments would not be allowed to discharge, or even recirculate, natural river or burn water without treatment. That is plainly illogical.
- 1.43. With reference to Chloride, NIEA state that the limit value will be based upon a no deterioration criteria, with a value of 8.28/9.6 given. With reference to SEPA guidance (2020), by way of example, a non-statutory Annual mean EQS is given as 250 mg/L. Discharges of chloride of a significant order of magnitude higher than NIEA's proposed 8.28/9.6 limit, would have no adverse effect on the aquatic environment. To put this in context, NIEA's approach would have serious repercussions for the winter salting of roads if this no deterioration criteria were wider reaching. If increases above baseline are a real, rather than fanciful issue for water courses, it is hard to see how the application of road salt could ever be sanctioned. However, the salting of roads can of course continue, because it does not give rise to the effects which NIEA appear to be attempting to mitigate, in the absence of any supporting evidence.
- 1.44. Matters concerning Phosphorus have already been discussed above. Limit values of 15 and 17 are proposed by NIEA in respect of the Curraghinalt and Pollanroe burns. This does not take proper account of the JNCC guidance which NIEA place so much weight upon and nor does it account properly for the existing baseline position. As discussed elsewhere within this SoC, the Mine proposals will effectively re-circulate existing baseline water and through the proposed water treatment process add nothing discernible in relation to Phosphorus. As previously explained the Applicant will be expected to clean the existing baseline water quality.

### Summary conclusion

- 1.45. The Applicant has proposed a series of limit (enforcement) values which are fully protective of the aquatic environment, including Freshwater Pearl Mussel and Atlantic Salmon. The approach has regard to JNCC guidance and EQS, but crucially it recognises the reality of the existing baseline position in terms of water quality and qualifying species populations, with due regard had to that evidence. Conversely, NIEA's position has little grounding in evidence, is ill-conceived and unworkable.