

An
Bord
Pleanála

Technical Report to Inspector

ABP-319612-24_App1

Development

Application for substitute consent under Section 37L
for Quarry at Aghnaskew, Scotshouse, Co.
Monaghan

Type of Application

Substitute Consent

Topic

Adequateness of information for the purpose of
Environmental Impact Assessment: water resources
and aquatic environment

Scientist

Finbarr Quigley B.Sc., M. Appl. Sc.

Senior Planning Inspector

Ronan O'Connor

1.0 Introduction

1.1. Scope of Report to Inspector

- 1.1.1. This report to the Inspector and available to the Board is a written record of my review and examination of the submitted information provided by the applicant as it relates to water resources and the aquatic environment around the development. In my capacity of Inspectorate Environmental Scientist, I have the relevant expertise to provide a professional opinion as to the adequacy of the information for the Inspector and the Board to undertake Environmental Impact Assessment (EIA) of the substitute consent sought for the quarry operations at Aghnaskew, Scotshouse, Co. Monaghan.
- 1.1.2. In assessing this application, I have reviewed the submitted EIAR documents and used the resources available on the WFD App on the EPA's EDEN system for reference.

1.2. Expertise and technical content of Environmental Reports

- 1.2.1. The water chapter (Chapter 8) of the EIAR was prepared by suitably qualified and experienced in-house staff (Senior Geologist) from Malone O'Regan Environmental (MOR). The scope structure and content of the EIAR is in accordance with good practice guidance.
- 1.2.2. Scientific information on hydrogeology, hydrology, groundwaters and surface waters is adequate and covers the period 2016 - 2023. I am satisfied that the on-site water quality monitoring surveys were undertaken in line with good practice methods and INAB and/or ISO17025 accredited laboratories were used for the analysis of samples taken and results reported.

2.0 Consideration of the likely impacts on groundwaters

2.1. Historic Groundwater Data

- 2.1.1. There was no historic data on groundwater quality or levels available for this site.

2.2. Recent Groundwater Quality Data

- 2.2.1. An intrusive site investigation was carried out by the applicant in 2022 which involved installing seven (7) groundwater monitoring wells within the quarry void (GW2 and GW6 within Zone A) and the extension lands (GW3, GW4, GW5, GWB and GWD).

Samples of the groundwater from these wells were taken in December 2022, January 2023 and February 2023 and analysed for a range of parameters.



Figure 1. Groundwater Sampling Locations as per EIAR (Source MOR Environmental)

- 2.2.2. The EIAR reports that elevated ammonia, sulphate and hardness were recorded in samples taken from GW2, GW4, GW6, GWB and GWD between December 2022 and February 2023 when compared to levels outlined in the EPA Interim Guideline Values for Groundwater (2003) document and Schedule 5 of the EC (Environmental Objectives (Groundwater) Regulations, 2010 as amended.
- 2.2.3. Hardness of groundwater is a product of the type of bedrock through which the water flows and is not likely to be impacted by the quarrying activity at this site.
- 2.2.4. The EIAR describes how the natural bedrock (evaporitic lenses in the nearby Cooldarragh Limestone as outlined in Chapter 8) is the expected cause of the elevated sulphate concentration through mineral dissolution of in-situ and extracted bedrock. The elevated sulphate result from GW2 and GW6 were below the threshold (250 mg/L) set in Table C of the Drinking Water Regulations, 2023. Of note is the January 2023 sample taken from GW2 which shows that levels of sulphate dropped significantly

(83% reduction) since the December 2022 sample was taken. This suggests the elevated sulphate concentration recorded in December 2022 was not significant.

- 2.2.5. When considering a comparison of one-off measured values and the threshold values outlined in Schedule 5 of the EC (Environmental Objectives (Groundwater) Regulations, 2010 as amended the following should be considered. Note 4 in Schedule 5 of the EC (Environmental Objectives (Groundwater) Regulations, 2010 as amended states:

“For the general chemical test, further investigation includes the aggregation of data from a representative group of monitoring points, comparison of the aggregated annual arithmetic mean concentration of the relevant pollutant with the threshold value and confirmation of significant impairment of the groundwater body's ability to support human uses.”

The above outlines that using a single sample result to compare against a threshold value is not best practice as the use of an arithmetic mean concentration is the preferred option of assigning a value for a groundwater body for any period. The mean of the two sample results for sulphate taken from borehole GW2 is 128.5 mg/L which is significantly below any of the threshold values outlined in the EIAR.

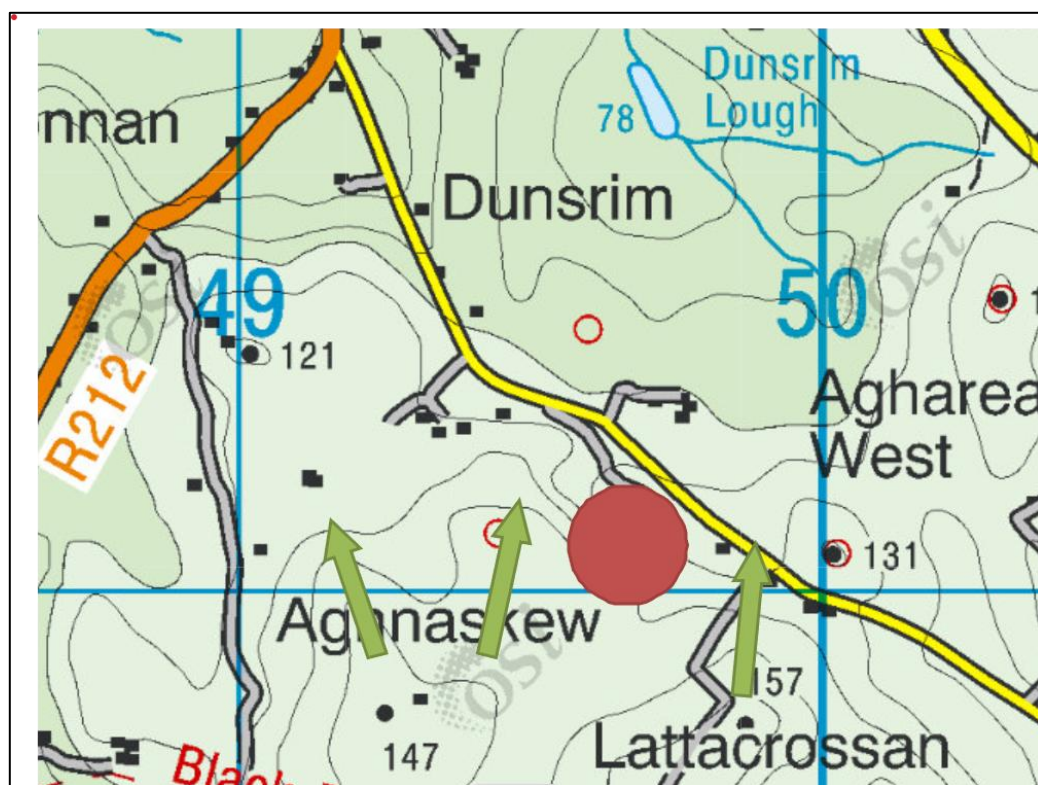


Figure 2 Groundwater flow direction (indicated by arrows) in the locality of the quarry

- 2.2.6. The EIAR reports on elevated ammonia results obtained from samples taken from GW4, GW6 and GWB between December 2022 and February 2023. The groundwater flow in the area surrounding the quarry is from south to north (based on gradient and borehole dip levels) and GW4, GW6 and GWB are upgradient of the quarry operations. This suggests that ammonia levels recorded in GW4, GW6 and GWB are indicative of the groundwater quality in the wider catchment upgradient of the quarry and are not impacted by activities on the site.
- 2.2.7. The EIAR reports on one elevated result for hydrocarbons (total aliphatics and aromatics C5-44) at GWD which is located upgradient of the quarry making the quarry activities an unlikely source.
- 2.2.8. The EIAR concludes that the quarrying activities at the site for the period in question have not had a significant impact on the groundwater quality and based on the groundwater sampling data provided and GSI data reviewed, I agree with this conclusion.

3.0 Consideration of the likely impacts on surface waters

3.1. Historic surface water data

- 3.1.1. The quarry was granted a Discharge Licence under Section 4 of the Local Government (Water Pollution) Act 1977 and 1990 as amended by Monaghan County Council in 2015 which permitted the discharge of trade effluent from the site into adjacent surface waters, subject to conditions. The discharged effluent consisted of pumped groundwater, surface water and rainwater captured in a lagoon in the quarry floor which was passed through a settlement pond(s) and hydrocarbon interceptor before discharging into a road-side drain. This roadside drain discharges into a surface watercourse to the north-east of the quarry which then flows in a northerly direction before flowing into a small (0.5Ha) lake called Dunsrim Lough.
- 3.1.2. For the purposes of monitoring the discharge from this facility, Monaghan County Council took eight grab samples of the trade effluent being discharged from the quarry between May 2016 and November 2019. These samples were analysed for the emission limit value parameters listed on the discharge licence granted to the quarry operators; pH, BOD, suspended solids, ortho-phosphate (MRP), total ammonia. In addition, the samples were analysed for the following parameters: COD, conductivity and nitrate which do not have any emission limit values.

- 3.1.3. The results of the eight samples taken showed that pH, BOD and ortho-phosphate (MRP) were below the emission limit values in the licence for all samples analysed.
- 3.1.4. In relation to suspended solids, it was noted that four of the eight samples taken had levels above the emission limit value (20 mg/l). The range of results for the eight samples was from 4 – 49 mg/l with a mean value of 21.5 mg/l and a standard deviation of 14.8. This suggests that the suspended solids values obtained were highly variable and achieving the emission limit value was problematic during this period.
- 3.1.5. In relation to total ammonia, it was noted that six of the eight samples taken had levels above the emission limit value (0.3 mg/l as N). The range of results for the eight samples was from 0.12 – 1.06 mg/l as N with a mean value of 0.60 mg/l as N and a standard deviation of 0.4. This suggests that the total ammonia values measured were highly variable and achieving the emission limit value was highly problematic during this period. There is no indication that the facility had a treatment process capable of removing ammonia from the trade effluent discharged during this period. The settlement pond(s) and hydrocarbon interceptor referenced in the EIAR would have minimal impact on total ammonia levels in the effluent.
- 3.1.6. In relation to nitrate, the range of results for the eight samples taken was from 8.31 – 13.98 mg/l as N with a mean value of 7.1 mg/l as N and a standard deviation of 2.2. This suggests that the nitrate values measured in this period were stable and elevated. There was no emission limit value for nitrate on the discharge licence in operation during this period.
- 3.1.7. In summary, the results of this monitoring programme operated by Monaghan County Council show that the trade effluent discharge from the quarry exceeded the emission limit values of the discharge licence for suspended solids and ammonia during this period. This does not automatically infer a significant impact on receiving surface waters.
- 3.1.8. The EIAR compares the results from Monaghan County Council's analysis of samples of the trade effluent discharging from the quarry (2016 – 2019) against what it describes as surface water acceptance criteria (SWACs) for the environmental quality standards set for waters of a 'Good Status' which are set out in Schedule 5 (Table 9) of the EC Environmental Objectives (Surface Water) Regulations, 2009 (S.I. No. 272

of 2009). This is not an appropriate method of assessing the status impact of the development for the following reasons.

- 3.1.9. Article 35 of S.I. No. 272 of 2009 states that “The ecological status, or ecological potential, of a body of surface water shall be assigned by the Agency and shall be based on the results of the monitoring systems established for the relevant biological quality elements, expressed as ecological quality ratios, the monitoring results for the general quality elements and specific pollutants supporting the biological quality elements, and where relevant for classification purposes, the monitoring results for the hydromorphological quality elements.”
- 3.1.10. S.I. No. 272 of 2009 defines annual average EQS being “for each representative monitoring point within the waterbody, the arithmetic mean of the concentrations measured over a twelve-month monitoring period does not exceed the standard.”
- 3.1.11. The comparison of a result from a single sampling episode against an annual arithmetic mean is not best practice.
- 3.1.12. S.I. No. 272 of 2009 defines “representative monitoring point” as “a surface water monitoring point identified by the Agency in accordance with the requirements of Article 10 of the 2003 Regulations which is to be used to calculate the status of a body of surface water for the purpose of Part IV of these Regulations and which does not lie within the mixing zone of a point of discharge.”
- 3.1.13. The sampling programme and location applied by Monaghan County Council during the period 2016 – 2019 while appropriate for the purpose of assessing compliance with the discharge licence, was not appropriate for comparison against the values outlined in Table 9 of Schedule 5 of S.I. No. 272 of 2009.

3.2. Recent surface water data

- 3.2.1. The applicant arranged for surface water sampling to be carried out at various locations in and around the quarry monthly between October 2022 and October 2023. The sampling locations are identified in the figure below:



Figure 3 Surface water sampling locations

3.2.2. The water quality monitoring data for the discharge location from the quarry (SW2) for the period October 2022 – October 2023 shows that annual average data for all parameters measured were below the Emission Limit Values set in the Discharge Licence granted by Monaghan County Council. This indicates that while individual sample results may have exceeded the ELVs on occasion, the general quality of the effluent discharge from the quarry during this period was of a satisfactory nature and not likely to be a significant risk to the water quality in the wider Gortnana_010 waterbody.

Parameter	SW2	ELV
BOD	0.56	5
SS	12.47	20
MRP	0.01	0.3
Ammonia	0.18	0.3
COD	15.00	N/A
Nitrate	5.54	N/A
Sulphate*	888.50	N/A
*Note only 2 samples taken for sulphate		

Figure 4 Water Quality results from the discharge location SW2 (Oct 2022 – Oct 2023 Annual Average) compared to Emission Limit Values (ELVs)

3.2.3. A review of the annual average water quality data for SW4, SW5 and SW6 provides a robust assessment of the impacts of the quarry on water quality both locally and in a wider context. These annual average figures can be compared to the Surface Water Objective (SWO) Environmental Quality Standards (EQS). BOD and Ortho-phosphate data suggests the quarry has no impact on these parameters in the watercourses downstream. Elevated BOD and ortho-phosphate readings at SW6 are not related to the quarry and indicate another source in the catchment. Total Ammonia values are elevated (relative to the EQS) in all sites measured including SW3 which is upstream of the discharge from the quarry. It was noted that the method detection limit (MDL) for the analysis of Total Ammonia was <0.1 mg N/L which is above the EQS for this parameter. There may have been results lower than 0.1 mg N/L, but the laboratory employed cannot quote results below this MDL and a value of <0.1 mg N/L was reported in the EIAR. This can have the impact of artificially raising the annual average value for a parameter.

Parameter	SW4	SW5	SW6	SWO EQS
BOD	1.42	1.07	2.61	1.5
SS	9.40	7.76	9.44	NA
MRP	0.01	0.01	0.10	0.035
Ammonia	0.14	0.11	0.12	0.065
COD	15.10	20.22	27.56	NA
Nitrate	4.49	4.74	2.33	NA
Sulphate	552.00	425.00	67.00	NA
*Note only 2 samples taken for sulphate SW4- Roadside drain d/s quarry discharge SW5 - Surface watercourse u/s wetland area SW6 - Surface watercourse u/s Dunsrim Lough				

Figure 4 Surface water sampling data (Annual Averages (Oct 2022 – Oct 2023) by sampling location)

- 3.2.4. The water quality data showed that both total ammonia and nitrate results in SW1 (lagoon in the quarry floor) decreased significantly between November and December 2022. These decreases are possibly due to a change in the blasting operations within the quarry where ammonium nitrate is commonly used as an explosive agent. This decreased level was noted throughout all further samples taken in 2023.
- 3.2.5. The applicant analysed all surface water samples taken in January and February 2023 for sulphate and found that the levels recorded ranged from 913 mg/l (as SO_4^{2-}) in the lagoon (SW1) to 55mg/l (as SO_4^{2-}) upstream of Dunsrim Lough (SW6). This agrees

with the findings in relation to high sulphate in the bedrock discussed in 2.2.4 above. There are no environmental quality standards for sulphate in surface waters.

- 3.2.6. Section 6.4.2 of the EIAR states the following “Algae were observed growing in outflow pipe and the water being discharged from the outflow was of a grey colour. The gravel and cobble on the stream bed was covered in a fine sediment layer and algae were observed to be growing on numerous large cobbles within the stream.” The EIAR does not refer to this issue within the water chapter (8). The presence of algae on the outflow pipe from the quarry and the stream into which it flows is not unusual as the discharge contains permitted level of nutrients. This does not indicate a significant impact.

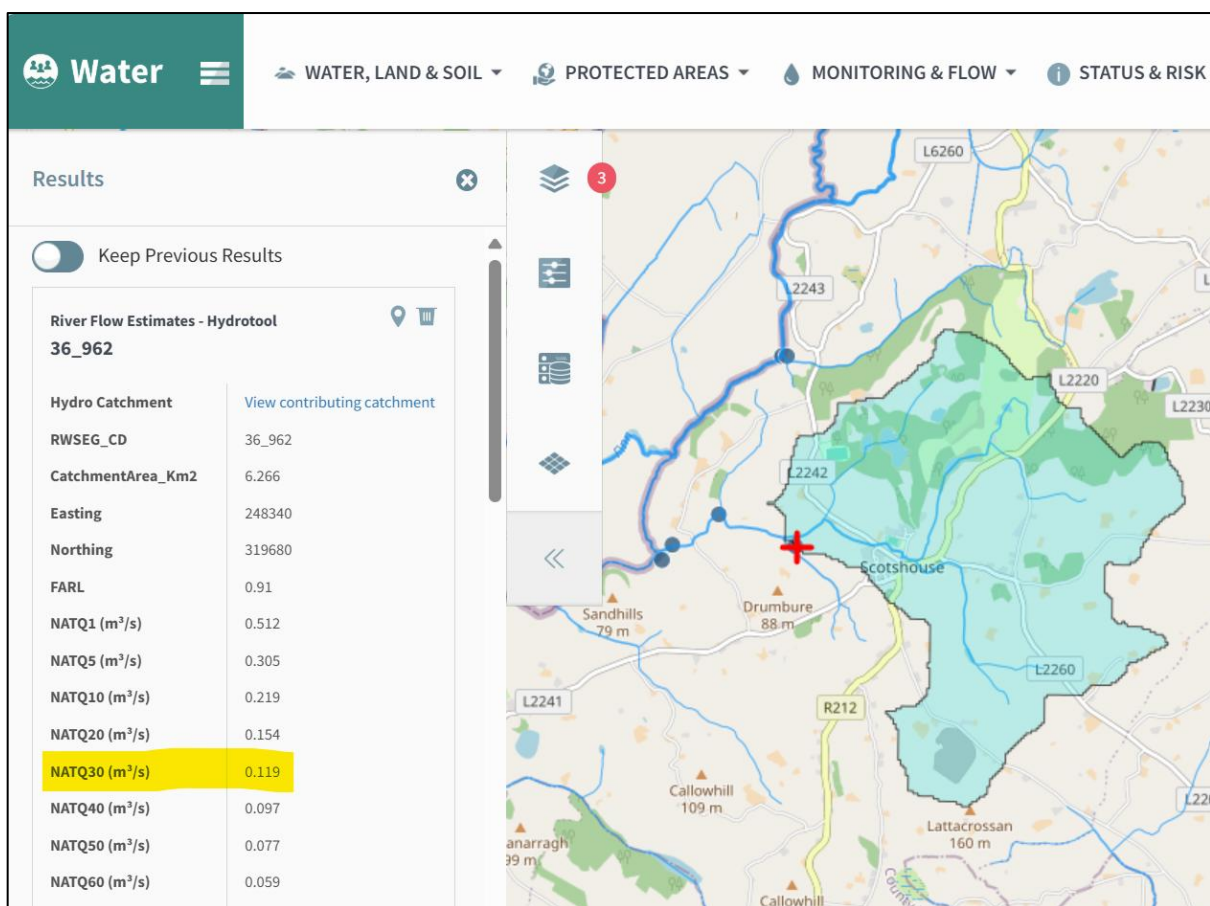


Figure 5 Hydrotool data for the Gortnana waterbody (Source EPA EDEN)

- 3.2.7. I completed a loadings assessment using data from the EIAR and the EPA’s Hydrotool on EDEN. I assessed the loading of Total Ammonia discharging from the quarry assuming a maximum discharge rate of 360m³/day (licence limit) and an annual average Total Ammonia value of 0.18mg N/L. Using this information, I calculated that the quarry would discharge **23.65kg** Total Ammonia as N/yr into the waterbody. Using the EPA Hydrotool (see figure 5 above) I then calculated the loading of Total Ammonia

which would generate a concentration of 0.065mg N/L (Good Status annual average EQS) at this location. The 30%tile Q (flow) value (0.119m³/sec) for this location was applied which at 0.065mg N/L would generate a loading of **243.9kg** Total Ammonia as N/yr. Therefore, the discharge from the quarry has the capacity to generate 9.7% of the allowed loading downstream if good status (based on total ammonia alone) is to be achieved at that location. This is a conservative estimate given the daily discharge rates from the quarry have been recorded at 25-30% of permitted levels. This confirms that the discharges of total ammonia from the quarry are not significant in the context of the Gortnana_010 waterbody.

- 3.2.8. The same procedure was applied to discharges of Orthophosphate (MRP) from the quarry assuming an annual average value of 0.01mgP/L and discharge rate of 360m³/day. I calculated that the quarry would discharge approximately **1.31kg** Orthophosphate as P/yr into the waterbody. The EQS for good status in the waterbody is an annual average of 0.035mgP/L which would require a maximum loading of **131.3kg** Ortho phosphate as P. Therefore, the discharge from the quarry has the capacity to generate 1% of the allowed loading downstream if good status (based on Ortho phosphate alone) is to be achieved at that location.
- 3.2.9. In summary, having reviewed the water quality data (2016 – 2023) contained in the EIAR and carrying out my own desk-top assessments, I am satisfied the operation of the quarry will not significantly impact surface water quality.

4.0 Assessment of Water Framework Directive (WFD) Impact

4.1. Groundwater WFD Compliance

- 4.1.1. The quarry is located within the Cavan Groundwater waterbody (IE_NW_G_061) which has a WFD Risk rating of “Not at Risk” for the WFD Cycle 3. The environmental objective for the waterbody is to achieve Good Status and it is currently on target to achieve this status.
- 4.1.2. The chemical groundwater status for the Cavan Groundwater waterbody is considered good. The qualitative tests to assess if a groundwater waterbody is at risk of failing the WFD objectives are:
- Is there evidence of saline or other intrusions?

- Are there impacts on the environmental objectives of associated surface waters/chemical status test?
- Are there impacts on the groundwater-dependent terrestrial ecosystems (GWDTE) – chemical assessment test?
- Drinking Water Protected Area test?
- General Chemical Assessment test?

The 2016-2021 status assessment for the Cavan Groundwater waterbody (IE_NW_G_061) showed that all four of the above tests passed the assessment and were at 'Good' status. There is no evidence of any saline intrusion in the groundwater at this location. In addition, there is no evidence that the environmental objectives of associated surface water bodies have been compromised by the activities in the quarry. There are no groundwater-dependent terrestrial ecosystems associated with the groundwater at this location. There are no failures for the drinking water protection or general chemical assessment tests.

4.1.3. The data submitted in the EIAR when considered along with the EPA's groundwater status data demonstrate no significant impact on groundwater quality from the quarrying activities at the site in question.

4.1.4. The quantitative groundwater status for the Cavan Groundwater waterbody is also considered good. The quantitative tests to assess if a groundwater waterbody is at risk of failing the WFD objectives are:

- Is there evidence of saline or other intrusions due to change in groundwater levels?
- Are there impacts on the environmental objectives of associated surface waters?
- Are there impacts on the groundwater-dependent terrestrial ecosystems due to alterations in groundwater levels?
- Is there an exceedance of the available groundwater resource by the long-term annual abstraction through assessing water balances.

The 2016-2021 status assessment for the Cavan Groundwater waterbody (IE_NW_G_061) showed that all four of the above tests passed the assessment and were at 'Good' status. There is no evidence of any saline intrusion in the groundwater at this location, based on available chloride monitoring data. In addition, there is no

evidence that the environmental objectives of associated surface water bodies have been compromised by the activities in the quarry. There are no groundwater-dependent terrestrial ecosystems associated with the groundwater at this location. In terms of long-term abstraction and water balances, the Cavan Groundwater waterbody covers an area of 1,409.5km² and the quarry site in question is 0.08km² in size which represents 0.005% of the entire waterbody in area. The water balance calculations to assess compliance with WFD are carried out as a minimum at waterbody scale (EC-Technical Report-2015-90) and in any case, the water abstracted from the groundwater at this site is delivered to the surface waterbody adjacent to it where it can then recharge to groundwaters or continue to supply surface waters hence remains within the same hydrological system.

- 4.1.5. The applicant submitted a Water Framework Directive Assessment Report (Appendix 8-6) as part of the EIAR documentation. This document outlines the potential impacts on the ground water body and identifies mitigation measures required to prevent any deterioration in quantity or quality status.
- 4.1.6. The data submitted in the EIAR when considered along with the EPA's groundwater status data demonstrate no significant impact on groundwater quantity in the Cavan Groundwater waterbody from the quarrying activities at the site in question.

4.2. Surface Water WFD Compliance

- 4.2.1. The quarry is located within the Gortnana_010 waterbody (IE_NW_36G750800) which has a WFD risk rating of "At Risk" for the WFD cycle 3. The environmental objective for the waterbody is to achieve Good Status and it is currently not on target to achieve this status.
- 4.2.2. The "At Risk" rating of the Gortnana_010 waterbody for the WFD Cycle 2 was based on a modelled assessment technique due to the absence of any ecological monitoring locations in the waterbody. For the purposes of assigning "At Risk" status to waterbodies in cycle 3 of the WFD, the EPA describe this waterbody as being "unassigned with no changes" from cycle 2.
- 4.2.3. As part of the characterisation process for this waterbody, the EPA have identified "Anthropogenic Pressures" as being the significant pressures in the Gortnana_010 waterbody. Because the risk rating assigned to this waterbody has historically been based on modelled (extrapolated) data, the EPA have identified a need for further

investigation to confirm this risk rating. Other pressures identified during the cycle 2 characterisation process were agriculture (pasture), urban wastewater and urban run-off and these pressures were 'not significant' at that time, due to lack of available information and monitoring data.

- 4.2.4. Monaghan County Council were involved in the characterisation process for cycle 2 (2016-2021) where their input was sought by the EPA on the likely pressures within the waterbody. They did not identify extractive industries as a pressure (significant or otherwise) in the Gortnana_010 waterbody for the second cycle. Monaghan County Council granted a discharge licence to the operator of the quarry in 2015.
- 4.2.5. The Gortnana_010 waterbody inputs into the Finn (Monaghan)_050 waterbody (UKGBNI1NW363604080) which is a cross-border waterbody. This waterbody is at risk of not achieving Good Status for cycle 3 of the WFD and has a status of "Poor Ecological Status". Agriculture (pasture) was listed as a significant pressure for the 2nd cycle of the WFD with urban wastewater as a not significant pressure.
- 4.2.6. The applicant submitted a Water Framework Directive Assessment Report (Appendix 8-6) as part of the EIAR documentation. This document outlines the potential impacts on the surface water body and identifies mitigation measures required to prevent any deterioration in quantity or quality status.
- 4.2.7. The data submitted in the EIAR when considered along with the EPA's surface water status data demonstrated no significant impact on surface water quality on the Gortnana_010 waterbody from the quarrying activities at the site in question.

5.0 Conclusion

- 5.1. Following review and examination of the material submitted as part of the application for substitute consent for the quarry at Aghnaskew, Scotshouse, Co. Monaghan my findings and recommendations are as follows:

Remedial EIA: water resources, hydrology and aquatic environment.

I consider that the information and assessment provided by the applicant in the EIAR is adequate and that the Board can be confident that a finding of no significant effects on the water resource as part of the EIA can be reached.

Signed:

A handwritten signature in blue ink, reading "Finbarr Quigley". The signature is fluid and cursive, with the first name "Finbarr" and the last name "Quigley" clearly distinguishable.

Finbarr Quigley BSc. M.Sc.
Inspectorate Scientist

19th March 2025