Contents

Appendix 8.1 Statement of Expertise

8.1.1 The evaluation of the Water (hydrological and hydrogeological) environment and the assessment of Effects and Potential Impacts, with Mitigation Measures and Remedial Impacts, was completed by Dr. Pamela Bartley (Hydro-G) who is considered a karst groundwater specialist with quarry, Section 4 Discharge Licencing and Public Water Supply expertise.

8.1.2 Hydro-G holds the required Professional Indemnity Insurance, Employers and Public Liability Insurance.

8.1.3 Pamela is a member of Engineers Ireland and the International Association of Hydrogeologists (Irish Group).

8.1.4 Pamela is a water focussed civil engineer with almost 30 years of practical experience in field-based groundwater investigations, drilling, instrumentation, surface water sampling, flow gauging and impact assessments, public water supply from groundwater boreholes, quarry assessments, Section 4 Discharge Licensing and wastewater treatment using Nature Based Systems.

8.1.5 Pamela completed her primary training in the RTC system. She completed a Certificate in Civil Engineering in Letterkenny RTC and a Diploma in Water and Wastewater Engineering at Sligo RTC in the early 1990's. Her Bachelor of Engineering degree was completed in the school of Civil Engineering at Queen's University, Belfast, and her postgraduate education at the School of Civil Engineering at Trinity College, Dublin (TCD). She completed an MSc. in Environmental Engineering at the School of Civil Engineering at TCD, which had geotechnical, hydrology, hydrogeology and legislation specialities and later a hydrogeologically focussed Ph.D at TCD.

8.1.6 Pamela is considered an Expert Service Provider to Uisce Eireann, she is a panel hydrogeologist, PSCS and PSDP approved and Supplier Number 1855 applies.

8.1.7 With respect to the extractive industry, Pamela is conserved an EIA specialist with discharge licensing competency in the context of the Water Pollution Act, enacted Irish Regulation and EU Directives.

8.1.8 She has completed impact assessments and assisted in successful permission attainment for many regionally important quarries in SAC settings.

8.1.9 Pamela's quarry assessments, successful EIARs gaining planning and associated Section 4 Discharge Licences include, as follows:

(i) Bennettsbridge Limestone, Co. Kilkenny consent to continue at an existing site following previous refusals at Board level and successful review update of the Section 4 Discharge Licence (ENV/W/78, 2017) permitting a range of 22,000m3/d as the annual average with maximums up to 70,000m3/d throughout the rainfall season. The discharge is to a drain that discharges to the River Nore. The large range is because it is a diffuse karst aquifer and during high rainfall there is a large volume of water on the floor carried through the epikarst of the walls.

(ii) Mc Grath Limestone Works Ltd, Cong, Co. Galway (W391/05_R1, 2019) permitting a discharge of 10,000m3/d to the Cong Canal upstream of Lough Corrib (SAC, SPA, proposed NHA & Public Water Supply for Galway City and environs).

(iii) Churchill Stone Ltd. (Cassidys), Keeloges, Churchill, Letterkenny, Co. Donegal. Section 4 Discharge (Lwat65) permitting discharge to a headwater and upstream of the commencement of mapping for a Pearl Mussel River.

(iv) Harrington Concrete and Quarries, Ardgaineen, Co. Galway (W_502_22) permitting a discharge of 1,435m3/d to a grassed vegetation area, following an oil interceptor, and subsequent discharge to groundwater *via* a Nature Based System in a conduit karst aquifer in a Hydrometric Area of Lough Corrib SAC and SPA.

(v) MC Group, Castleisland (W214), Co. Kerry, permitting a discharge of 540m3/d to surface water.

Each of these quarries operates within SAC catchments or in proximity to NHA Bogs and they have successfully managed their discharge, under licence, for many years.

Appendix 8.2 Guidance Documents & Legislative Instruments

1) Department of Environment, Heritage and Local Government (2004) Quarries and Ancillary Activities – Guidelines for Planning Authorities.

2) Department of Housing, Planning and Local Government (2013) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment.

3) Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. Official Journal L 327, 22.12.2000, p. 1–73.

4) Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (EIA Directive).

5) EPA (1999) WWT systems for small communities and businesses.

6) EPA (2006) Environmental Management Guidelines for the Extractive Industry (Non-Scheduled Minerals).

7) EPA (2009) Code of Practice WW treatment for single houses.

8) EPA (2011) Guidance on the Authorisation of Discharges to Groundwater. Version 1 - December 2011.

9) EPA (2018) 30_13 Clare[Galway]_SC_060 Subcatchment Assessment WFD Cycle 2.

10) EPA (2021) Code of Practice Domestic Waste Water Treatment Systems (Population Equivalent ≤ 10). Published by the Environmental Protection Agency, Ireland. March 2021.

11) EPA (2022) Guidelines on the information to be contained in Environmental Impact Statements. ISBN 978-1-80009-005-7. May 2022.

12) European Communities (Quality of Salmonid Waters) Regulations, 1988. S.I. No. 293/1988.

13) European Union Environmental Objectives (Groundwater) Regulations 2010, S.I. No. 9/2010.

14) European Communities Environmental Objectives (Groundwater) Regulations, S.I. No. 9 of 2010.

15) European Communities Environmental Objectives (Groundwater) (Amendment) Regulations 2011, S.I. No. 389 of 2011.

16) European Communities Environmental Objectives (Groundwater) (Amendment) Regulations 2012, S.I. No. 149 of 2012.

17) European Communities Environmental Objectives (Groundwater) (Amendment) Regulations, 2016. S.I. No. 366 of 2016.

18) European Communities Environmental Objectives (Groundwater) (Amendment) Regulations, 2019 as S.I. No. 366 of 2019.

19) European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2025, S.I. No. 51/2025.

20) European Communities (Conservation Of Wild Birds (Lough Corrib Special Protection Area 004042)) Regulations 2012. S.I. No. 455 Of 2012.

21) European Communities (Birds and Natural Habitats) Regulations, 2011. S.I. No. 477 of 2011, as amended 2021 as S.I. No. 293 of 2021.

22) European Communities Environmental Objectives (Surface Waters) Regulations 2009 Statutory Instruments S.I. No. 272 of 2009.

23) European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2012 (S.I. No. 327 of 2012),

24) European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (S.I. No. 386 of 2015)

25) European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 (S.I. No. 77 of 2019).

26) European Union (2017) Environmental Impact, Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU). Accessed through the Europa server (http://ec.europa.eu). Paper ISBN 978-92-7974373-3 KH-04-17-939-EN-C doi:10.2779/8247. PDF ISBN 978-92-7974374-0 KH-04-17-939-EN-N doi:10.2779/41362.

27) European Union Habitats (Cloughmoyne Special Area Of Conservation 000479) Regulations 2017. Statutory Instrument (S.I. No. 222 of 2017).

28) European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018. S.I. No. 296/2018.

29) European Union (Environmental Impact Assessment) (Environmental Protection Agency Act 1992) (Amendment) Regulations 2020. S.I. No. 191/2020.

30) European Union (Drinking Water) Regulations 2023 (S.I. No. 99 of 2023).

31) European Union Habitats (Lough Corrib Special Area of Conservation 000297) Regulations 2022. S.I. No. 384/2022.

32) Ferguson & Leask (1988) The export of nutrients from surface coal mines. Environment Canada conservation and protection environmental protection pacific and Yukon region west Vancouver, British Columbia.

33) Institute of Geologists of Ireland (IGI, 2002) Geology in Environmental Impact Statements: A Guide

34) Institute of Geologists of Ireland (IGI, 2013). Guidelines for the Preparation of Soils, Geology & Hydrogeology Chapters of Environmental Impact Statements.

35) NRA (2008) Environmental Impact Assessment of National Road Schemes – A Practical Guide.

36) NRA (2009) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes. @ https://www.tii.ie/technical-services/environment/planning/Guidelines-on-Procedures-for-Assessment-and-Treatment-of-Geology-Hydrology-and-Hydrogeology-for-National-Road-Schemes.pdf.

37) Office of Public Works and Department of Environment, Heritage and Local Government (2009) The Planning System and Flood Risk Management: Guidelines for Planning Authorities.

38) SNH (2018) Scottish National Heritage A handbook on environmental impact assessment: Guidance for Competent Authorities, Consultees and others involved in the Environmental Impact Assessment Process in Scotland, Scottish Natural Heritage, 5th Edition, 2018. Section C8.

Appendix 8.3 Desk Study Resources, Data & Maps

The following Desk Study Resources, Books, Data & Mapping information were used in the compilation of this assessment:

- Arup (2018) Establishment of Groundwater Zones of Contribution Cluide - Cahermorris Group Water Scheme, Co. Galway June 2018 Geological Survey Ireland Prepared by: Laura McGrath, Alison Orr and Les Brown, Arup Geological Survey Ireland (Monica Lee, Caoimhe Hickey, Taly Hunter Williams, Sophie O'Connor) And with assistance from: Cluide - Cahermorris Group Water Scheme.
- Boak, et al. (2007) Using Science to Create a Better Place: Hydrogeological Impact Appraisal for Dewatering Abstractions. Environment Agency, Science Report – SC40020/SR1. Bristol, UK.
- Boycott, T., Drew, D., Mullan, G., Podesta, J., Simms, M., Wilson, L. (2019) Caves of Mid-West Ireland. Counties Clare, Galway, Mayo and Roscommon. The University of Bristol Speleological Society ISBN 978-0-954850-1-3.
- Bradford, R., McCormack, T., Campanya, J., Naughton, O. (2019) Groundwater Flooding in Ireland: New Methods for Flood Monitoring And Mapping. IAH Irish Group Conference Tullamore, April 2019.
- Conroy, P. (2015a) Establishment of Groundwater Zones of Contribution Anbally & District Group Water Scheme. Prepared by: Peter Conroy and Geological Survey of Ireland, Groundwater Programme (Monica Lee, Caoimhe Hickey and Taly Hunter Williams) And with assistance from: Anbally & District GW. The National Federation of Group Water Schemes.
- Conroy, P. (2015b) Establishment of Groundwater Zones of Contribution Rusheens Group Water Scheme Prepared by: Peter Conroy and Geological Survey of Ireland, Groundwater Programme (Monica Lee, Caoimhe Hickey and Taly Hunter Williams) And with assistance from: Rusheens GWS The National Federation of Group Water Schemes.
- Conroy, P. (2015c) Establishment of Groundwater Zones of Contribution Belclare Group Water Scheme Prepared by: Peter Conroy and Geological Survey of Ireland, Groundwater Programme (Monica Lee, Caoimhe Hickey and Taly Hunter Williams) And with assistance from: Belclare GWS The National Federation of Group Water Schemes.
- Coxon, C., and Drew, D.P. (1986) Groundwater flow in the lowland limestone aquifer of eastern Co. Galway and eastern Co. Mayo, western Ireland. In: Paterson, K & Sweeting M. (eds), New Directions in Karst.
- Daly, D. (1985) Groundwater in County Galway with particular reference to its Protection from Pollution. Geological Survey of Ireland report for Galway County Council. 98pp.
- Department of Housing, Local Government and Heritage (2024). Water Action Plan 2024: A River Basin Management Plan for Ireland. Plus associated Appendices: *e.g.,* Appendix 2: Programme of Measures - List of Measures; https://www.gov.ie/en/policy-information/8da54-river-basin-management-plan-2022-2027/.
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- Drew, D.P. (1973a) Hydrogeology of the north Co. Galway – south Co. Mayo lowland karst area, Western Ireland. International Speleology 1973, III, Sub –section Ca.
- Drew, D.P. (1973b). Ballyglunin Cave Co. Galway and the hydrology of the surrounding area. Irish Geography Vol. 6, No. 5. pp 610-617.
- Drew, D.P. (2003) The hydrology of the Burren and of the Clare and Galway Lowlands. In G. Mullan (ed.), Caves of County Clare and South Galway, 31–43. Bristol. University of Bristol Speleological Society.
- Drew, D.P., Doerfliger, N. and Formentin, K. (1997) The use of bacteriophages for multi-tracing in a lowland karst aquifer in western Ireland. In A. Kranjc (ed.) Tracer Hydrology, 33–8. Rotterdam, Balkema.
- EPA (2018) Corrib Catchment Assessment 2010-2015 (HA 30). Catchment Science & Management Unit Environmental Protection Agency December 2018 Version no. 3.
- EPA (2024) WFD Cycle 3 HA 30 Clare Corrib Catchment Report, May 2024. Catchment Science & Management Unit Environmental Protection Agency. May 2024.
- EPA Envision System (https://gis.epa.ie/EPAMaps/).
- Galway County Council: Water Quality, Group water schemes. http://gccapps.galwaycoco.ie/waterquality/.
- GSI On-line Groundwater database. Aquifer Classification, Aquifer Vulnerability, Teagasc Soil Classification, Subsoils, Karst features, groundwater recharge.– online mapping resources (www.gsi.ie).
- Gill, L. (2010) 'Modelling a network of turloughs', [thesis], Trinity College (Dublin, Ireland). Department of Civil, Structural and Environmental Engineering, 2010, pp 397.
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- GSI (2003, 2005) Bedrock Geology Sheets 11, 14 & 15, 1:100,000 Map Series. Geological Survey of Ireland.
- GSI (2004) 1st Draft Clare Corrib GWB Description June. Summary of Initial Characterisation.
- GWP Consultants and David Jarvis Associates Limited, UK (2014) A Quarry Design Handbook. 2014 Edition.
- Irish Group. Karst Field Trip October (2001) Unpublished IAH Report.
- Kimberley, S., Naughton O., Regan, S. (2014) Assessing significant damage to selected Irish Groundwater Dependent Terrestrial Ecosystem (GWDTE) types as part of groundwater body classification under the EU Water Framework Directive. International Association of Hydrogeologists (IAH) Irish Group, Tullamore, Ireland. In: Water Resource Management: The role
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- Meehan et al., 2019 Knockmaa (GY082) Geological Survey of Ireland.
- Meehan et al., 2019 Pollnahallia (GY116) Geological Survey of Ireland.
- Meehan et al., 2019 Knockmaa Quarries (GY083) Geological Survey of Ireland.
- Meehan et al., 2019 Ballybanagher M17 Road Cut (GY010) Geological Survey of Ireland.
- Meehan et al., 2019 Ballyglunin Cave (GY013) Geological Survey of Ireland.
- Meehan et al., 2019 Lough Corrib (GY093) Geological Survey of Ireland.

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- National Parks & Wildlife Services Public Map Viewer (www.npws.ie) (NPWS) (2013, 2015, 2025) Database of Special Areas of Conservation, National Heritage Areas, National Parks, Special Protection Areas including Site Synopsis & Conservation Objective Reports.
- NPWS (2017) Conservation Objectives: Lough Corrib SAC 000297. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
- NPWS (2019) Conservation Objectives: Cloughmoyne SAC 000479. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. ISSN 2009-4086.
- NPWS (2020) Conservation Objectives: Levally Lough SAC 000295. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.
- O'Reilly, C. (2015a) Establishment of Groundwater Zones of Contribution Balrobuckbeg Group Water Scheme March 2015 Prepared by: Colin Envirologic Ltd. and Geological Survey of Ireland, Groundwater Programme (Caoimhe Hickey, Monica Lee and Taly Hunter Williams) And with assistance from: Balrobuckbeg GWS The National Federation of Group Water Schemes.
- O'Reilly, C. (2015b) Establishment of Groundwater Zones of Contribution Caherlea Group Water Scheme April 2015 Prepared by: Colin O'Reilly, Envirologic Ltd. and Geological Survey of Ireland, Groundwater Programme (Caoimhe Hickey, Monica Lee and Taly Hunter Williams) And with assistance from: Caherlea GWS The National Federation of Group Water Schemes.
- O'Reilly, C. (2015c) Establishment of Groundwater Zones of Contribution Cahermorris – Glenreevagh Group Water Scheme April 2015 Prepared by: Colin O'Reilly, Envirologic Ltd. and Geological Survey of Ireland, Groundwater Programme (Caoimhe Hickey, Monica Lee and Taly Hunter Williams) And with assistance from: Cahermorris Glenreevagh GWS The National Federation of Group Water Schemes.
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- Water Framework Directive Reports and "Watermaps" Map Viewer (www.wfdireland.ie).
- WFD Working Group (2004a) Guidance document no. GW3: THE CALCAREOUS/ NON-CALCAREOUS ("SILICEOUS") CLASSIFICATION OF BEDROCK AQUIFERS IN THE REPUBLIC OF IRELAND.
- WFD Working Group (2004b) Guidance Document no. GW5: Guidance on the Assessment of the Impact of Groundwater Abstractions.
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Appendix 8.4 Scoping Responses of Relevance to Water

In this Appendix, the full Text of each Scoping Response are presented. The Impact Tables at the end of the EIAR Water Chapter incorporate all Risk information.

In summary, Hydro-G offers:

- All GSI data and mapping resources have been employed, as requested in the Scoping Response by the GSI and other Geoheritage sites such as Pollnahallia, which is part of the plain of land to the west of Knockmaa, and Lough Corrib have also been included.

- With respect to the HSE's **USUAL** request for assessment of the site's sanitary services, they were sanctioned and approved under historic planning permissions. Impact on all wells has been considered and assessed as per **USUAL** requests of the HSE. This is detailed in the EIAR Water Chapter.

- There was no specific response by Uisce Éireann to Quarry Consulting's issue of Scoping on behalf of Mortimer's Quarry. Often, Uisce Éireann replies that the organisation does not always have the capacity to advise on the scoping of individual projects. However, Quarry Consulting and Hydro-G have received scoping responses from Uisce Éireann for other limestone bedrock quarries and it is usual for the similar aspects of Water Services to be considered by Uisce Eireann in the scope of an EIA. Therefore in this Appendix, Hydro-G has provided a 5 page detailed summary in relation to **USUAL** items raised by Uisce Eireann.

- Quantitative Assessment: Although Lough Corrib is a source for Public Water Supply with Uisce Eireann WTP and associated intakes at Luimnagh and at Terryland, the application site's water balance component is miniscule compared to the volume of waters entering Lough Corrib from the Corrib catchment. This is presented in Table 8.8 of the Water Chapter. The significance of the water balance information presented in Table 8.8 is that the groundwater abstracted from the site's well, when related to groundwater volume in the underlying GWB, would represent only 0.001 % of groundwater flowing through the GWB. This is a miniscule proportion of the groundwater resource. Therefore, the data in Table 8.8 provides further verification that the site essentially has no groundwater component. WFD Working Group Guidance GW5 (2004b) assigns a rating of 'No Potential for Impact' for a <1% result and the quarry itself is three orders of magnitude lower than 'No Potential for Impact'.

- Qualitative Assessment: Table 8.7 of the Water Chapter presents a qualitative and quantitative (hydrochemical) calculation to inform the impact assessment of the use of explosives to blast the bedrock at Mortimer's Belclare Quarry. The calculation assumes that 100% of residual N is dissolved in all waters arising at the site and will be available to the water environment. The results of calculations presented in Table 8.7 clearly show that the residual N compounds would have low concentrations. Specifically, resultant concentrations in waters within the quarry, if impacted by explosives within the entire quarry site area, would be: 7.69 mg/l NO3, 0.12 mg/l NH4 (or 120 ug/l) and 0.2 mg/l NO2 (or 200 ug/l). Overall, the residual concentrations meet the requirements of the Threshold Values (TVs) of the Groundwater Regulations (2010), which prescribe TVs of 37.5 mg/l of NO3, 65 to 175 ug/l as Ammonium and 375 ug/l as Nitrite. Therefore, the residuals calculated for all N Species are a fraction of the TVs defined in the Groundwater Regulations. The calculated resultant concentrations also comply with the

requirements of the Drinking Water Regulations (2023). The calculated masses are lower than the concentrations in the site's monitoring, which are currently X to Y mg/l NO3. There is no expected exceedance for Regulatory Threshold Values specified in the Groundwater Regulations (2010, as amended) or the Drinking Water Regulations (2023). Neither are exceedances predicted for the likely ultimate receiving environment of regional groundwater, which is Lough Corrib. The calculated residual for Ammonia is compliant, in itself, with the Good Status (95%tile) Environmental Quality Objective specified in the Surface Water Regulations (2009, as amended).

- Overall, there is Zero Risk to Uisce Eireann sources presented by the site to groundwater for reasons expanded upon in the EIAR. The most significant points are that the site operates above the groundwater flow system and there are no direct links to any surface water or terrestrial water systems.

- As stated in the Water Chapter of the EIAR, whilst there are no surface water features in the immediate vicinity of the site, there are Uisce Eireann and GWS Reservoir and Mains Assets in the vicinity. This Water Chapter dealt with GWS Supply Wells in a distinct section. No impact potential was concluded.

- With respect to the Uisce Eireann mains that runs under the access road to the quarry and the reservoirs at Knockacarigeen, 1km to the northeast of the site (Figure 8.4), Hydro-G consulted directly with Uisce Eireann personnel for the region in Assets (Eoin Hughes) and Operations (Ronan Mannion). Details relating to the infrastructure assets are presented in Scoping Responses Appendix 8.4 in a discussion section dealing with Hydro-G's responses to the usual matters of importance to Uisce Eireann. The applicant has provided information that this specific issue was addressed in the 2007 Grant of Permission (PL 062275 & ABP Reference PL 07.222783) and that Blast Monitoring data ensures that there are no vibration impacts that could affect the mains or reservoir. The site has operated for almost 20 years and there is no communication from either Galway County Council or Uisce Eireann suggesting any impacts on the 1995 constructed mains and reservoir.

- In overall summary, the 'Source > Pathway > Model' and the population of the UK EA Dewatering Impact Appraisal Process enables a conclusion of no residual risk to Lough Corrib as a source of public water supply. Applying the Conventional Source > Pathway > Receptor Model concept suggests, as follows:

    - Source = Bedrock Excavation above the groundwater system. Potential Sources of Contamination are Hydrocarbons from Quarry Machinery and Quarry Vehicular movement.

    - Pathway = Solid competent Limestone Bedrock, unsaturated for at least 8m beneath the 33m OD elevation of the quarry floor, and possibly 20m unsaturated depth: regional discharge elevations are Bunatober (13m OD), Aughcloggeen (10m OD) and Lough Corrib at 5m OD and the regional expression of groundwater pressure head elevation is 25 – 28m OD at multiple turloughs to the north of the quarry.

    - Receptor = Groundwater (Clare Corrib GWB) indirectly through solid unsaturated bedrock that has no primary porosity. Surface Water is not a Receptor because there is no direct hydrological link and the indirect link through the limestone, of no primary porosity, is extremely unlikely.

Hydro-G's Addressing of Uisce Eireann's USUAL Responses to Scoping A Quarry On the Eastern Shores of Lough Corrib

There was no specific response by Uisce Éireann to Quarry Consulting's issue of Scoping on behalf of Mortimer's Quarry. Often, Uisce Éireann replies that the organisation does not always have the capacity to advise on the scoping of individual projects. However, Quarry Consulting and Hydro-G have received scoping responses from Uisce Éireann for other limestone bedrock quarries and it is usual for the similar aspects of Water Services to be considered by Uisce Eireann in the scope of an EIA, as follows:

***(A) Uisce Éireann can often specify that** where the development proposal has the potential to impact an Uisce Éireann Drinking Water Source(s), the applicant shall provide details of measures to be taken to ensure that there will be no negative impact to Uisce Éireann's Drinking Water Source(s) during the construction and operational phases of the development. Hydrological / hydrogeological pathways between the applicant's site and receiving waters should be identified as part of the report.*

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:

(i) The development does not have the potential to impact on an Uisce Éireann Drinking Water Source(s). The site is operational for over 20 years and no impact has been observed. No intensity of operations are proposed, just continuance.

(ii) There is no direct hydrological connection to any Uisce Eireann source and the quarry sits elevated above the groundwater flow system. All reviewers are asked to review Cross Sections A-A' to K-K', after the Figure Series of the Water Chapter.

(iii) Qualitative Assessment: Table 8.7 of the Water Chapter presents a qualitative and quantitative (hydrochemical) calculation to inform the impact assessment of the use of explosives to blast the bedrock at Mortimer's Belclare Quarry. The calculation assumes that 100% of residual N is dissolved in all waters arising at the site and will be available to the water environment. The results of calculations presented in Table 8.7 clearly show that the residual N compounds would have low concentrations. Specifically, resultant concentrations in waters within the quarry, if impacted by explosives within the entire quarry site area, would be: 7.69 mg/l NO3, 0.12 mg/l NH4 (or 120 ug/l) and 0.2 mg/l NO2 (or 200 ug/l). Overall, the residual concentrations meet the requirements of the Threshold Values (TVs) of the Groundwater Regulations (2010), which prescribe TVs of 37.5 mg/l of NO3, 65 to 175 ug/l as Ammonium and 375 ug/l as Nitrite. Therefore, the residuals calculated for all N Species are a fraction of the TVs defined in the Groundwater Regulations. The calculated resultant concentrations also comply with the requirements of the Drinking Water Regulations (2023). The calculated masses are lower than the concentrations in the site's monitoring, which are currently X to Y mg/l NO3. There is no expected exceedance for Regulatory Threshold Values specified in the Groundwater Regulations (2010, as amended)

or the Drinking Water Regulations (2023). Neither are exceedances predicted for the likely ultimate receiving environment of regional groundwater, which is Lough Corrib. The calculated residual for Ammonia is compliant, in itself, with the Good Status (95%tile) Environmental Quality Objective specified in the Surface Water Regulations (2009, as amended).

(iv) Quantitative Assessment: Although Lough Corrib is a source for Public Water Supply with Uisce Eireann WTP and associated intakes at Luimnagh and at Terryland, the application site's water balance component is miniscule compared to the volume of waters entering Lough Corrib from the Corrib catchment. This is presented in Table 8.8 of the Water Chapter. The significance of the water balance information presented in Table 8.8 is that the groundwater abstracted from the site's well, when related to groundwater volume in the underlying GWB, would represent only 0.001 % of groundwater flowing through the GWB. This is a miniscule proportion of the groundwater resource. Therefore, the data in Table 8.8 provides further verification that the site essentially has no groundwater component. WFD Working Group Guidance GW5 (2004b) assigns a rating of 'No Potential for Impact' for a <1% result and the quarry itself is three orders of magnitude lower than 'No Potential for Impact'.

With reference to the EPA (December 2024) Register of Abstractions there are many other groundwater abstractions in the GWB and **the cumulative abstraction** registered is an additional 48,942 m3/d. When the Mortimer Quarries abstraction and other abstractions are added the total volume abstracted relative to the calculated available groundwater recharge flow through value the cumulative resultant Impact Potential is 2.49%. Values in the < 5% or 2 to 10% range present 'Low Potential for Impact' on the basis of WFD Working Group Guidance GW5 on Abstraction Impact (2004b).

(v) Applying the Conventional Source > Pathway > Receptor Model concept suggests, as follows:

- Source = Bedrock Excavation above the groundwater system. Potential Sources of Contamination are Hydrocarbons from Quarry Machinery and Quarry Vehicular movement. There is concurrent infill under Waste Facility Permit (WFP-G-21-0007-02, granted 29/09/2022), which allows for the importation of permitted and controlled material for the purpose of progressive infilling and restoration of the bedrock void.
- Pathway = Solid competent Limestone Bedrock, unsaturated for **at least** 8m beneath the 33m OD elevation of the quarry floor, and possibly 20m unsaturated depth: regional discharge elevations are Bunatober (13m OD), Aughcloggeen (10m OD) and Lough Corrib at 5m OD and the regional expression of groundwater **pressure head** elevation is 25 – 28m OD at multiple turloughs to the north of the quarry. The solidity of the bedrock and the safe nature of the infill practice are demonstrated by exceptionally high water quality in the floor waters sampled and the on-site groundwater well's results.
- Receptor = Groundwater (Clare Corrib GWB) indirectly through solid unsaturated bedrock that has no primary porosity. Surface Water is not a Receptor because there is no direct hydrological link and the indirect link through the limestone, of no primary

porosity, is extremely unlikely. Both the Clare Corrib GWB and Lough Corrib Lower are reported by the EPA as Good Status (2016 – 2021) and 3rd Cycle Not at Risk.

(B) Uisce Éireann can often require information *where the development proposes the backfilling of materials, the applicant is required to include a waste sampling strategy to ensure the material is inert.*

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:
The site is regulated by Galway County Council in the Waste Permit (Number WFP-G-21-0007-02, 29/9/22). Routine and quarterly monitoring of the groundwater and surface water on site is completed. Results for the Groundwater Site Supply Well and the central settlement sump suggest excellent water quality and no impact arising from the infill.

(C) Uisce Éireann *can often require specific information relating to mitigation proposals for any potential negative impacts on any water source(s) which may be in proximity and included in the environmental management plan and incident response.*

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:
As above, the site is regulated by Galway County Council in the Waste Permit (Number WFP-G-21-0007-02, 29/9/22). Routine and quarterly monitoring of the groundwater and surface water on site is completed. Results for the Groundwater Site Supply Well and the central settlement sump suggest excellent water quality and no impact arising from the infill.

(D) Uisce Éireann can often require specific information relating to *any and all potential impacts on the nearby reservoir as public water supply water source(s) and request that they are assessed, including any impact on hydrogeology and any groundwater/surface water interactions.*

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:
Refer to Figure 8.4. There are Uisce Eireann and GWS Reservoir and Mains Assets in the vicinity. This Water Chapter dealt with GWS Supply Wells in a distinct section. No impact potential was concluded for the GWS Assets, and a similar conclusion is made for the reservoir at Knockacarigeen, 1km to the northeast of the site (Figure 8.4). Hydro-G consulted directly with Uisce Eireann personnel for the region in Assets (Eoin Hughes) and Operations (Ronan Mannion). The site has operated for almost 20 years and there is no communication from either Galway County Council or Uisce Eireann suggesting any impacts on the 1995 constructed mains and reservoir. There are 2 major water mains crossing that area (along the same trench), as follows:

1. 600mm diameter rising mains from Luimnagh carrying 1200m3/hr
2. 400mm diameter truckmains towards Headford and Shrule.

NOTE All houses in the area are supplied by the GWS.

In addition, the applicant has provided information that this specific issue was addressed in the 2007 Grant of Permission (PL 062275 & ABP Reference PL 07.222783). Refer to a Copy of

the RFI Response from Biospheric Engineering, dated 22nd January 2007, which is presented at the end of this Appendix 8.4.

Finally, Blast Monitoring data ensures that there are no vibration impacts that could affect the mains or reservoir. Hydro-G and Quarry Consulting have reviewed the site's monitoring results in the collated spreadsheet containing all blast results in last 5 years and the hardcopy results dating back to 1990's and they all show the same results: Monitoring location of 99% of these blasts was at the 2 houses located at the head of the quarry access road which is double the distance away from the quarry that the pipe line is. It is clearly observed that there is no vibration at these locations and therefore it is not possible to reach the vibration levels which could cause damage to a pipeline.

The EIA process has been completed and the EIAR has concluded no potentials for impact.

(E) *Uisce Éireann can often require specific information relating to* *Impacts of the development on the capacity of water services (i.e., do existing water services have the capacity to cater for the new development).*

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:
This is not applicable to the application site. With respect to water supply, the site has its own onsite water supply well.

(F) *Uisce Éireann can often require specific information relating to any* *upgrading of water services infrastructure that would be required to accommodate the proposed development.*

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:
This is not applicable to the application site. No upgrading of water services infrastructure is required. No increase in water usage is envisaged.

(G) *Uisce Éireann can often require specific information relating to* *any development that would discharge trade effluent. Upstream treatment or attenuation of discharges is usually required prior to discharging to an Uisce Éireann collection network.*

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:
The applicant does not and will not need to discharge to any Uisce Éireann collection network. The site is self-sufficient with respect to wastewater arisings and the treatment and discharge have the benefit of Planning. The site's staff are serviced by the wastewater treatment system and discharge zone that was granted permission in the parent permission for the site. The grant of permission (PL 17512) to replace the existing office and staff facilities building included for the use of the existing wastewater treatment and discharge facilities (PL 17512).

(H) *Uisce Éireann can often require specific information relating to* *In relation to the management of surface water; the potential impact of surface water discharges to combined sewer networks and potential measures to minimise and or / stop surface waters from combined sewers.*

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:

This is not applicable to the site. The area is not serviced by an *Uisce Éireann collection network of any form of sewer.*

(I) ***Uisce Éireann can often require specific information relating to*** *any physical impact on Uisce Éireann assets – reservoir, drinking water source, treatment works, pipes, pumping stations, discharges outfalls etc. including any relocation of assets.*

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:
No interference or impact on Uisce Éireann assets will occur. The reasoning being that there are no Uisce Éireann assets within the application site. In addition, the Uisce Eireann Drinking Water Source and abstraction intakes on Lough Corrib are not in hydrological or hydrogeological connection with the site.

With respect to the mains that runs from Lough Corrib's Luimnagh Intake, travelling under the access route to the quarry, to the reservoir at Knockacarigeen, 1km to the northeast of the site (Figure 8.4): Hydro-G consulted directly with Uisce Eireann personnel for the region in Assets (Eoin Hughes) and Operations (Ronan Mannion). The site has operated for almost 20 years and there is no communication from either Galway County Council or Uisce Eireann suggesting any impacts on the 1995 constructed mains and reservoir. In addition, The applicant has provided information that this specific issue was addressed in the 2007 Grant of Permission (PL 062275 & ABP Reference PL 07.222783) and that Blast Monitoring data ensures that there are no vibration impacts that could affect the mains or reservoir.

(J) ***Uisce Éireann can often require specific information relating*** *the location of public water services assets, possible connection points from the applicant's site / lands to the public network and any drinking water abstraction catchments to ensure these are included and fully assessed in any pre-planning proposals. [Note - Details, where known, can be obtained by emailing an Ordnance Survey map identifying the proposed location of the applicant's intended development to datarequests@water.ie].*

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:
The site is existing development and all asset locations are known and no impact is envisaged. The application site is an established working quarry that has been in operation for a long time and there has never been an incident with respect to The Uisce Eireann mains or local reservoir at Knockacarigeen, 1km to the northeast of the site (Figure 8.4). Refer to the detail of the Hydro-G response to Item (D), above.

As outlined in the detail of the EAR's Water Chapter, the application site sits in the Corrib Hydrometric Area [30], the catchment of Lough Corrib and overlies the Clare Corrib Groundwater Body feeding Lough Corrib. The application site is therefore in the overall drinking water abstraction catchment of Lough Corrib. However, the application of the 'Source > Pathway > Receptor' pathway model, enabled a conclusion of no potential for impact of the proposed development. The application site is an established working quarry that has been in operation for a long time and there has never been an incident with respect to EPA WFD compliance or any water contamination.

(K) ***Uisce Éireann can often require specific information relating to*** *other indicators or methodologies for identifying infrastructure located within the applicant's lands are the*

presence of registered wayleave agreements, visible manholes, vent stacks, valve chambers, marker posts etc. within the proposed site.

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:

This is not applicable to the application site. There is no potential for mains network **within** the application site because there are no roads and no connected dwellings using services that would require mains.

(L) ***Uisce Éireann can often require specific information relating to*** *any potential impacts on the assimilative capacity of receiving waters in relation to Uisce Éireann discharge outfalls including changes in dispersion / circulation characterises. Hydrological / hydrogeological pathways between the applicant's site and receiving waters should be identified within the report.*

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:

There is no direct discharge from the application site. Assimilation capacity does not apply. The site sits above the local and regional groundwater regime and therefore there is unsaturated limestone bedrock beneath the quarry. Limestone has no primary porosity and water cannot travel through rock with no porosity. Therefore, rain falling on the site will travel over the top of bedrock through the base of the subsoil system. Natural processes will ensure surface water system's protection.

(M) ***Uisce Éireann can often require specific information relating to*** *any potential impact on the contributing catchment of water sources either in terms of water abstraction for the development (and resultant potential impact on the capacity of the source) or the potential of the development to influence / present a risk to the quality of the water abstracted by Uisce Éireann for public supply should be identified within the report.*

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:

Refer to the Hydro-G response to (A), above, in the sub headings (iii) Qualitative Assessment and (iv) Quantitative Assessment. It has been mathematically demonstrated that there is no risk to the Lough Corrib catchment. In addition, the development has no discharge, there is no direct hydrological connection and the quarry sits elevated above the groundwater flow system. All reviewers are asked to review Cross Sections A-A' to K-K', after the Figure Series of the Water Chapter.

(N) ***Uisce Éireann can often require specific information relating to*** *Where a development proposes to connect to an Uisce Éireann network and that network either abstracts water from or discharges wastewater to a "protected"/ sensitive area, consideration as to whether the integrity of the site / conservation objectives of the site would be compromised should be identified within the report.*

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:

The applicant does not have a service connection that is fed by Uisce Eireann's Lough Corrib source. Therefore, there is no potential for the quarry to affect any change on Lough Corrib SAC and SPA. The recent upgrade to Terryland's WTP intake and the operation of Luimnagh

WTP and intake on Lough Corrib would have been subjected to robust assessment by Uisce Éireann. The applicant is of no significance in the scale of the total volumes of abstractions sent to the public in Tuam, Galway city and the towns and private dwellings served by Uisce Eireann's abstractions from any source, whether they be Lough Corrib or other.

***(O) Uisce Éireann can often require specific information relating to** mitigation measures in relation to any of the above ensuring a zero risk to any Uisce Éireann drinking water sources (Surface and Ground water).*

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:
There is zero residual risk presented to Uisce Éireann drinking water sources (Surface and Ground water). This is how the Environmental Impact process is governed by Europe: Identification of Risk, Mitigation measure design, Residual Risk Assessment. This has been completed for the application site. On Site Management Controls and compliance with the Conditions of the multiple valid and current Planning Permissions and with the Galway County Council issued Waste Permit (Number WFP-G-21-0007-02, 29/9/22) enables a zero residual risk conclusion.
Overall, the EIAR has assessed the Total Environment and concluded that it is reasonable and justified to lodge an application for Planning Consent.

***(I) Uisce Éireann can often specify that w**here connection(s) to the public network is required as part of the development proposal, applicants are advised to complete the Pre-Connection Enquiry process and have received a Confirmation of Feasibility letter from Uisce Éireann ahead of any planning application.*

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:
Not applicable to this application.

***(J) Uisce Éireann can often specify that** Uisce Éireann will not accept new surface water discharges to combined sewer networks.*

Hydro-G's Offering with respect to Mortimer's Belclare Quarry:
Acknowledged and the applicant does not propose any *surface water discharges to combined sewer networks.*

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Ms. Maeve Walsh,
RPS Consulting Engineers,
Lyrr Building,
Mervue Industrial Estate,
Galway.

22nd January 2007

Re: Mortimer Quarries Request for Further Information

A Cara,

Please find attached our response to the items 11 and 12 of the request.

Le Meas,

Eugene P. McKeon.

Eugene McKeown
Chartered Engineer

Item 11

Requested to carry out an assessment and submit a report in relation to the likelihood and significance of the effects of blasting on the watermain running adjacent to the site.

Item 12

It is noted that many submissions received in relation to the quarry refer to structural damage to dwelling houses. Please clarify if you are aware of any such damage/s and what measures if any are being taken to minimize/eliminate the occurrence of same.

Item 13

Please carry out an assessment of the effects of blasting on birds and on protected bat species in adjacent designated areas.

Response

As the above items are similar in nature it is proposed to provide a composite answer to questions 11 and 12, with a brief comment on question 13. Our response is set out below.

Qualifications

I am a Chartered Engineer, working as a self-employed environmental consultant, specialising in noise and vibration control issues. I hold Bachelor of Engineering and Bachelor of Laws Degrees in addition to a Master of Science Degree in Applied Acoustics. I am a member of the Institute of Acoustics and serve on the Irish Branch Committee of the organisation.

I have over 25 years experience in vibration measurement having worked as an engineer for multinational companies prior to setting up my own company in 1999. I have previously carried out vibration assessments, such as this one, on behalf of Mayo County Council and Roscommon County Council in addition to several private sector clients. I have also carried out vibration measurements and recommended remedial measures for several other local authorities where the local authority itself was causing the vibration.

Vibrations due to Blasting

The Mortimer quarry is a “pre-63” quarry and as such there is no planning requirement to either monitor or control vibration due to blasting. The quarry does however comply on a voluntary basis with the Irish Concrete Federation (ICF) Environmental Code and the Department of Environment, Heritage and Local Government Guidelines for Planning Authorities for Quarries and Ancillary Activities. A self-imposed limit of 12mm/s peak particle velocity at all monitoring locations is imposed for all blasting at the quarry.

The human body is highly sensitive to vibration levels, particularly in the vertical direction, and most humans can detect vibration amplitudes as low as 0.2mm/s. British Standard BS 6472 *Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80Hz)* sets out suitable criteria for human comfort from blasting vibration at 12.5mm/s with up to three blasts per day.

The Department of Environment, Heritage and Local Government, the Environmental Protection Agency and the Irish Concrete Federation all accept this criterion for human exposure. Limits for blasting vibration are set using this criterion, which is much lower than the vibration level required causing damage to property.

Vibration Causing Property Damage

There are comprehensive international standards in place regarding pipelines, the most relevant to this situation being

CP 2010-2 *Design and construction of steel pipelines in land*

The attached report prepared by Irish Industrial Explosives (IIE) outlines the situation regarding ground vibrations generally and in particular for pipelines. The US Bureau of Mines (part of the United States Government Department of the Interior) has carried out extensive research on the effects of blasting. The IIE criterion of 125mm/s peak particle velocity for steel and PVC pipelines is taken from a US Bureau of Mines Report *RI-9523 Surface Mine Blasting near Pressurised Transmission Pipelines.* The 125mm/s criterion has an inbuilt factor of safety.

IIE have carried out vibration monitoring on three blasts at the pipeline location in 2006. The peak particle velocity measurements are provided in the following table:

Date	Horizontal mm/s	Vertical mm/s	Transverse mm/s
26th May 2006	1.9	5.5	1.7
4th Dec 2006	0.6	1.1	0.5
20th Dec 2006	2.5	1.8	2.5

As is evident from the above blasting operations at the quarry cannot cause physical damage to the watermain.

Above Ground Structures

ISO 4886 *Evaluation and measurement for vibration in buildings Part 1. Guide for measurement of vibrations and evaluation of their effects on buildings.*

ISO 4886 *Evaluation and measurement for vibration in buildings Part 2. Guide to damage levels from groundborne vibration.*

These standards provide guidance on the situation regarding structures generally. Table 1 and Figure 1 of BS 7385 Part 2 provides guidance on the vibration guide values for cosmetic damage. It is important to note that we are addressing “cosmetic” damage i.e. plaster cracks etc. The standard indicates that “minor” damage may occur at twice these values and structural damage may occur at four times these values. The standard notes that *“There are insufficient cases where continuous vibration has caused damage to buildings to substantiate these guide values but they are based on common practice.”*

The values quoted in Table 1 for light framed structures and residential buildings are 15mm/s at 4 Hz increasing to 20mm/s at 15 Hz, 20mm/s at 15 Hz increasing to 50mm/s at 40 Hz and above. The values are indicated graphically below.

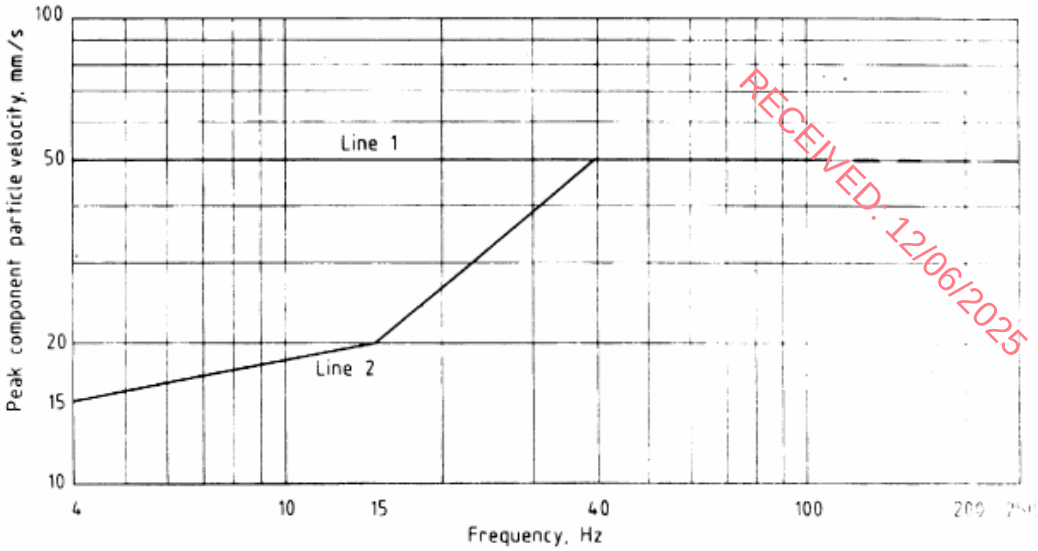


Figure 1 — Transient vibration guide values for cosmetic damage

The vibration levels required to cause property damage are therefore:

Cosmetic Damage mm/s	Minor Damage mm/s	Structural Damage mm/s
15 to 50	30 to 100	60 to 200

The vibration levels monitored over the past 5 years and reported in the original submission indicate that the worst case vibration levels at any property (excluding the watermain, which is located much closer to the quarry) were as follows:

Horizontal mm/s	Vertical mm/s	Transverse mm/s
2.3	1.8	1.8

The average vibration levels are below 1mm/s in all axes.

It is evident from these values that blasting at the quarry cannot cause damage to existing residences located in the vicinity of the quarry.

Submissions relating to Property Damage

While some of the submissions refer to property damage there is no evidence that blasting at the Mortimer Quarry has caused any damage, in fact the evidence is that no damage is caused. I understand from Mr. Trevor Mortimer that Mr. Killalea took an action against the quarry for damage to his property. After hearing Mr. Killalea's evidence the case against the quarry was dismissed with no award as to costs. The letter from Gleeson & Kean Solicitors (attached) outlines the situation.

The quarry operators are unaware of any other case of property damage arising from the operation of the Mortimer Quarry.

Measures to Eliminate Potential Damage to Property

The following measures continue to operate at the quarry:

- Use of IIE explosives for consistent blasting practice
- Use of delayed detonation technique to minimise vibration
- Blast design and triggering by qualified personnel
- Stemming of blast holes with aggregate to minimise air overpressure
- Monitoring of each blast at neighbouring properties

The implementation of these measures is outlined in the blasting control procedure attached.

Blasting effects on birds and bats

I understand that the designated areas referred to are some considerable distance from the quarry so that vibration levels cannot be an issue. Airborne noise is similarly attenuated to the point that it has no impact.

With regard to air overpressure the low frequency nature of blasting air overpressure (below 20 Hz) is considerably below the hearing threshold of birds (100 Hz to 10,000 Hz) and bats (5,000 Hz to 210,000 Hz). The hearing mechanism of both species is such that air overpressure is effectively inaudible.

I trust the above adequately addresses the issues raised, if you have any queries please do not hesitate to contact me directly at 087-2660177.

IRISH INDUSRIAL EXPLOSIVES REPORT

Appendix 8.5 Impact Effect Assessment Methodologies & Detail

This appendix provides a logical work through of the procedure for determining likely Effects and completing the Impacts Section of the EIAR's Water Chapter so that all activities are listed from the enabling, operational and restoration phases and for each activity the potential Effects on the water environment are listed and mitigation measures applied to each. For each mitigation measure, residual impacts are then evaluated following consideration of application of the mitigation measure.

1. Legislation and Guidance

As previously stated, the complete list of Guidance and Legislation employed in the completion of this work was presented in Appendix 8.3.

- This EIA was completed in accordance with enacted EU and Irish legislation pertaining to Environmental Impact Assessment (Directive 2014/52/EU, meaning the EIA Directive and Irish EIA Regulations (2018, as amended 2020).
- The Impact Assessment was completed with reference to Guidance relating to EIA and the preparation of EIA Reports, which includes the EU (2017); Department of Housing, Planning and Local Government (2018) and EPA (2022) on Guidelines on the information to be contained in Environmental Impact Assessment Reports.
- Criteria for assessing importance of site attributes and their magnitude of importance were taken from the NRA Guidelines (NRA, 2008) and 'Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements' (IGI, 2013).

The tools and structure of Impact Assessment are presented here. Industry Standard Tables for rating of the Importance of Criteria, Potential Impacts, Mitigation Measure, Residual Impacts are now presented.

2. Significance of Impact

Unless otherwise stated, the EPA's method (2022) of determining the significance of impacts has been applied. There are three components to Table 3.4 of EPA (2022) and they relate to Effects under headings as follows:

I. **Quality, Significance, Extent and Context of Effects**
II. **Probability & Duration of Effects**
III. **Types of Effects**

Each of the components **of EPA (2022)'s Table 3.4** is presented here labelled as Table 1 (a), (b) and (c).

Table 1 (a) - Criteria and Terminology to be Used in Description of Effects: Quality, Significance, Extent and Context of Effects (EPA, 2022, Table 3.4)

Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Describing the Significance of Effects ''Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see *Determining Significance* below.).	**Imperceptible** An effect capable of measurement but without significant consequences.
	Not significant An effect which causes noticeable[2] changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics
Describing the Extent and Context of Effects Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.	**Extent** Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)

As described in Table 1 (a), above.

- The Quality of Effects can be **Positive, Neutral** or **Negative/Adverse.**

- The Significance of Effects are described in Table 1 (a), above, under seven generalised degrees, which are described in EPA (2022) Table 3.4 as follows:
  1) **Imperceptible:** An impact capable of measurement but without noticeable consequences.
  2) **Not Significant:** An effect which causes noticeable changes in the character of the environment but without significant consequences.

3) **Slight:** An impact which causes noticeable changes in the character of the environment without affecting its sensitivities.
4) **Moderate:** An impact that alters the character of the environment in a manner consistent with existing and emerging trends.
5) **Significant:** An impact, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
6) **Very Significant:** An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
7) **Profound:** An impact which obliterates sensitive characteristics.

- As shown in Table 1 (a), the Extent and Context of the Effect must also be described.

Table 1 (b) - Criteria and Terminology to be Used in Description of Effects: Probability & Duration of Effects (EPA, 2022, Table 3.4 continued)

Describing the Probability of Effects Descriptions of effects should establish how likely it is that the predicted effects will occur so that the CA can take a view of the balance of risk over advantage when making a decision.	**Likely Effects** The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing the Duration and Frequency of Effects 'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	**Momentary Effects** Effects lasting from seconds to minutes.
	Brief Effects Effects lasting less than a day.
	Temporary Effects Effects lasting less than a year.
	Short-term Effects Effects lasting one to seven years.
	Medium-term Effects Effects lasting seven to fifteen years.
	Long-term Effects Effects lasting fifteen to sixty years.
	Permanent Effects Effects lasting over sixty years.
	Reversible Effects Effects that can be undone, for example through remediation or restoration.
	Frequency of Effects Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).

As described in Table 1 (b), above, EPA (2022) requires statements on the Probability, Duration and Frequency of Effects.

Table 1 (c) - Criteria and Terminology to be Used in Description of Effects: Types of Effects (EPA, 2022, Table 3.4 continued)

Describing the Types of Effects	**Indirect Effects (a.k.a. Secondary or Off-site Effects)** Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative Effects The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
	'Do-nothing Effects' The environment as it would be in the future should the subject project not be carried out.
	'Worst-case' Effects The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable Effects When the full consequences of a change in the environment cannot be described.
	Irreversible Effects When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SOx and NOx to produce smog).

As described in Table 1 (c), above, EPA (2022) requires a professional interpretation Describing the Types of Effects. Examples of the Types of Effects include, as follows:

- Indirect
- Cumulative
- Do Nothing
- Worst Case
- Indeterminable
- Irreversible
- Residual
- Synergistic

3. Significance of Effects

Using the definitions for the degree of impact significance outlined above, the methodology for combining project information was presented in EPA (2022), after SNH (2018), as their Figure 3.5 and is reproduced here as **Plate 1**.

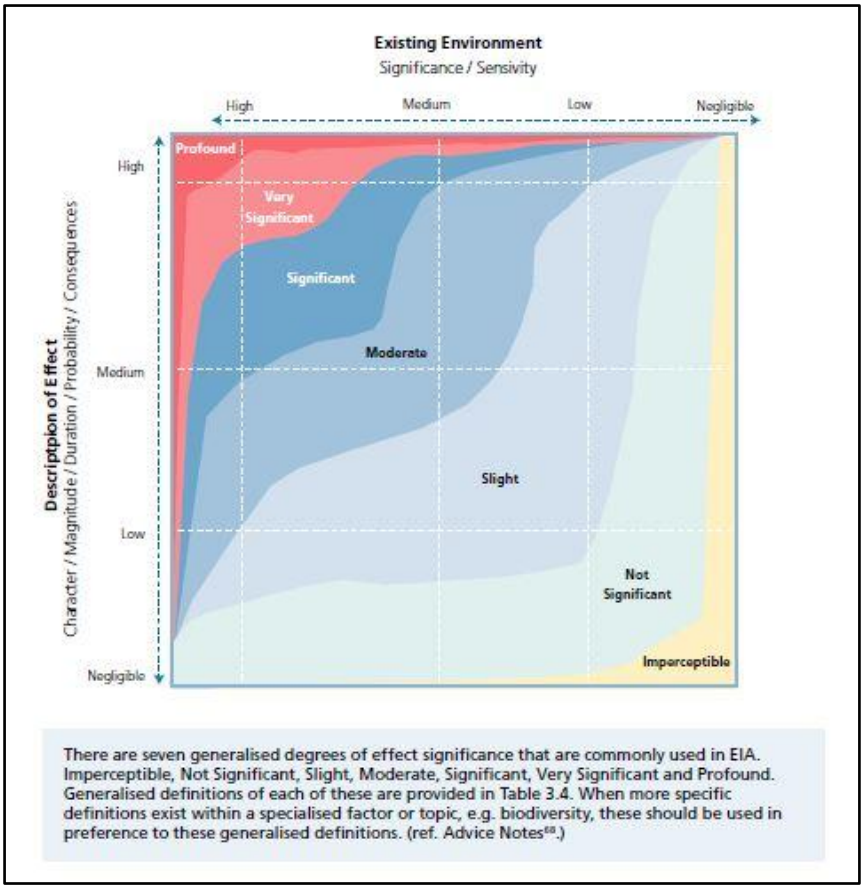


Plate 1 - EPA's Chart Showing 'Indicative' Typical Classifications of the Significance of Effects (EPA, 2022) as adapted from SNH (2018).

4. Hydrological and Hydrogeological Impact Assessment

The assessment of impacts within this chapter is carried out with respect to the hydrogeological and hydrological environment. Within this chapter, potential impacts are considered to be effects of the proposed development's resultant changes to the environment.

Criteria for assessing importance of site attributes and their magnitude of importance were evaluated using NRA Guidelines (NRA, 2008) [as prescribed in 'Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements' (IGI, 2013)]. NRA rating criteria uses the same significance terminology as the EPA. However, the NRA & IGI Guidance suggest intermediate steps to justify using that terminology, as follows:

- **Step 1:** Quantify the Importance of a feature for hydrology and hydrogeology.
- **Step 2:** Estimate the Magnitude of the impact on the feature from the proposed development.
- **Step 3:** Determine the Significance of the impact on the feature from the matrix based on the Importance of the feature and the Magnitude of the impact.

IGI (2013) and NRA (2008) tables of significance to this study are presented here as Table 2These frameworks for assessment have been applied in the EIA relating to Water and Geology.

STEP 1:

The Criteria for Rating Site Importance of Hydrological Features (NRA, 2008) is presented in Table 2.

Table 2 Criteria for Rating Site Importance of Hydrological Features (NRA, 2008)

Importance of Attribute	Criteria	Example
Extremely High	Attribute has a high quality, or value on an international scale.	• River, wetland or surface water body ecosystem protected by EU legislation, e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations
Very High	Attribute has a high quality or value on a regional or national scale.	• River, wetland or surface water body ecosystem protected by national legislation – NHA status • Regionally important potable water source supplying > 2,500 homes • Quality Class A (Biotic Index Q4, Q5) • Floodplain protecting more than 50 residential or commercial properties from flooding • Nationally important amenity site for wide range of leisure activities
High	**Attribute has a high quality or value on a local scale.**	• Salmon fishery • Locally important potable water source supplying > 1000 homes • **Quality Class B (Biotic Index Q3-Q4)** • Floodplain protecting between 5 and 50 residential or commercial properties from flooding • Locally important amenity site for wide range of leisure activities
Medium	Attribute has a medium quality or value on a local scale.	• Coarse fishery • Local potable water source supplying >50 homes • Quality Class C (Biotic Index Q3, Q2-3) • Floodplain protecting between 1 and 5 residential or commercial properties from flooding
Low	Attribute has a low quality or value on a local scale.	• Locally important amenity site for small range of leisure activities • Local potable water source supplying <50 homes • Quality Class D (Biotic Index Q2, Q1) • Floodplain protecting 1 residential or commercial property from flooding • Amenity site used by small numbers of local people

The application of the NRA's (2008) criteria (Table 2) to the site under consideration enables an 'Importance Attribute' conclusion, as follows:

- With reference to hydrology, there are no direct links to any surface water system.

The Criteria for Rating Site Importance of Hydrogeological Features (IGI, 2013) is presented in Table 3.

Table 3 Criteria for Rating Site Importance of Hydrogeological Features (IGI, 2013, Table C3)

Importance of Attribute	Criteria	Example
Extremely High	Attribute has a high quality, significance or value on an international scale.	• Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation, e.g. SAC or SPA status
Very High	Attribute has a high quality, significance or value on a regional or national scale.	• Regionally important aquifer with multiple wellfields. Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – NHA status
High	**Attribute has a high quality, significance or value on a local scale.**	• **Regionally important aquifer.** Groundwater provides large proportion of base flow to local rivers Locally important potable water source supplying >1000 homes Outer source protection area for regionally important water source Inner source protection area for locally important water source
Medium	Attribute has a medium quality, significance or value on a local scale.	• Locally important aquifer. Potable water source supplying >50 homes
Low	Attribute has a low quality, significance or value on a local scale.	• Poor bedrock aquifer. Potable water source supplying < 50 homes

The application of the IGI's (2013) criteria (Table 3) to the site under consideration enables an 'Importance Attribute' conclusion, as follows:

- With reference to hydrogeology, the site and the aquifer within which it lies is deemed to be an attribute of '**Extremely High' importance rating** because it is mapped as a Regionally Important Karst Aquifer and, by virtue of base flow contributions, it is associated with Conservation Objective Waters.

STEP 2:

Using the Importance Criteria ratings of Table 3, the Criteria for Estimating the Magnitude of Impact on a Hydrogeology Attribute is provided in the IGI (2013) Guidance as shown in Table 4.

Table 4 Criteria for Estimating Magnitude of Impact on Hydrogeology Attribute (IGI, 2013, Table C5)

Impact Type	Magnitude	Example
Adverse	Negligible	• No measurable changes in attribute
	Small	• **Removal of small proportion of aquifer** • Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems. Potential low risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >0.5% annually.
	Moderate	• Removal of moderate proportion of aquifer • Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems Potential medium risk of pollution to groundwater from routine runoff Calculated risk of serious pollution incident >1% annually
	Large	• Removal of large proportion of aquifer

		• Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems Potential high risk of pollution to groundwater from routine runoff Calculated risk of serious pollution incident >2% annually
Beneficial	Minor	Minor enhancement of aquifer
	Moderate	Moderate enhancement of aquifer
	Major	Major enhancement of aquifer

With respect to Baseline Information and the detail of Table 4:

- The Regionally Important Karst Aquifer is mapped by the GSI as having an area of 7,062.74 km^2, which is broadly equivalent to 7,062,740,000 m^2.
- The total area of the quarry site is 15ha, which is equivalent to 15,000 m2.
- The area of the site relative to the area of the aquifer is 0.0002%.

The use of criteria listed in Table 4 suggests that the proposed development may have a Potential Impact of **'Adverse'**, rather than 'Beneficial' and the Magnitude of Impact on the HYDROGEOLOGY Attribute (**Regionally Important Aquifer**), could be concluded, as **'Small' b**ased on the potential for removal of a **'small proportion of aquifer'**, **'minor changes to water supply springs and wells and river baseflow**' and a **'Potential Low Risk of Pollution to Groundwater from routine runoff'.** The conclusion on the potential Magnitude of Impact on Hydrogeology is **'Small, Adverse'**.

STEP 3:
Using the IGI's (2013) Assessment Tables, the outcomes of Tables 3 and 4 are used to rate the potential Significance of the impact on the Aquifer.

Table 5 Criteria for Rating of Significant Environmental Impacts (IGI, 2013, Table C6)

Importance of Attribute	Magnitude of Impact			
	Negligible	**Small**	Moderate	Large
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant/Moderate	Profound/Significant	Profound
High	Imperceptible	Moderate/Slight	Significant/Moderate	Severe/Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight/Moderate

Using Table 5, the overall potential outcome on hydrogeological receptors, in the absence of Mitigation Measures, could be '**SIGNIFICANT**'.

The application of criteria, as outlined in Tables 1 to 5, above, to the specifics of the study area provides a framework for general screening of the likely impact to the hydrological and hydrogeological environment. The methodology involves the identification of all the potential receptors within the site boundary and surrounding environment. This information is gathered during the desk study, site walkover, site investigation and monitoring phases of the study.

Upon collation and consideration of all project information for the site and macro scale, an Impact Assessment is completed and reported under headings, as follows:

- Potential Impacts
- Mitigation Measures
- Residual Impacts
- Do Nothing
- Cumulative Impacts
- Transboundary Impacts
- Dewatering Impact Appraisal (UK Environment Agency)
- SAC Protection Measures

Refer to the Main Body of the EIAR for the detail of the Impact Assessment specific to the site under consideration.

A description of the UK Environment Agency's Dewatering Impact Appraisal is provided separately in the next Appendix.

Appendix 8.6 Dewatering Impact Appraisal Methodology (UK EA)

In addition to the application of Irish Guidelines as outlined in EPA (2022) and NRA (2008), and in the absence of Irish Guidance specifically focussed on quarries and hydrogeology, the work presented in this EIAR Section has also applied UK practical guidance as published by the UK Environment Agency (the public body equivalent of the Irish EPA). The UK Guidance provides a 'Hydrogeological impact appraisal for dewatering abstractions' (Boak, R. et. al. (2007) and the approach is succinctly outlined by the EA as follows:

> "The methodology for hydrogeological impact appraisal (HIA) is designed to fit into the Environment Agency's abstraction licensing process. It is also designed to operate within the Environment Agency's approach to environmental risk assessment, so that the effort involved in undertaking HIA in a given situation can be matched to the risk of environmental impact associated with the dewatering. The HIA methodology can be summarised in terms of the following 14 steps:
>
> - Step 1: Establish the regional water resource status.
> - Step 2: Develop a conceptual model for the abstraction and the surrounding area.
> - Step 3: Identify all potential water features that are susceptible to flow impacts.
> - Step 4: Apportion the likely flow impacts to the water features.
> - Step 5: Allow for the mitigating effects of any discharges, to arrive at net flow impacts.
> - Step 6: Assess the significance of the net flow impacts.
> - Step 7: Define the search area for drawdown impacts.
> - Step 8: Identify all features in the search area that could be impacted by drawdown.
> - Step 9: For all these features, predict the likely drawdown impacts.
> - Step 10: Allow for the effects of measures taken to mitigate the drawdown impacts.
> - Step 11: Assess the significance of the net drawdown impacts.
> - Step 12: Assess the water quality impacts.
> - Step 13: If necessary, redesign the mitigation measures to minimise the impacts.
> - Step 14: Develop a monitoring strategy.
>
> The steps are not intended to be prescriptive, and the level of effort expended on each step can be matched to the situation. Some steps will be a formality for many applications, but it is important that the same thought-process occurs every time, to ensure consistency. The methodology depends heavily on the development of a good conceptual model of the dewatering operation and the surrounding aquifer. The steps of the methodology are followed iteratively, within a structure with three tiers, and the procedure continues until the required level of confidence is achieved. Advice is also given on how to undertake HIA in karstic aquifers and fractured crystalline rocks." Boak, R. et. al. (2007).

Hydro-G has applied the UK Environment Agency's step wise process in order to present a Step Wise assessment of the potential for impact that might arise in response to the proposed development and its interaction with the water environment and Conservation Objective sites of the region.

Appendix 8.7 GSI Descriptor Sheets, EPA (2024) Reports & Register of Abstractions Data (EPA December 2024) & EPA WQ

Clare-Corrib GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km^2)
30 Galway, Mayo Roscommon Co.Co's	**Rivers**: Abbert River, Black River, Cregg River, Dalgan River, Grange River, Killaclogher River, Kilshanvy River, River Clare, River Nanny, Sinking River, Togher River, Waterdale River **Lakes**: Corrib	000296 LISNAGEERAGH BOG AND BALLINASTACK TURLOUGH 000247 SLIEVE BOG 001237 BOYOUNAGH TURLOUGH 000224 ALTORE LAKE 000301 LOUGH LURGEEN BOG/GLENAMADDY TURLOUGH 000215 RATHBAUN TURLOUGH 001282 KILTULLAGH LOUGH 000263 DRUMBULCAUN BOG 000297 LOUGH CORRIB 000323 RICHMOND ESKER NATURE RESERVE 000289 KNOCKAVANNY TURLOUGH 000295 LEVALLY LOUGH 001254 DERRINLOUGH BOG 001255 DERRYNAGRAN BOG AND ESKER 000282 KILLOWER TURLOUGH 000331 TURLOUGH O'GALL 000234 BELCLARE TURLOUGH 001319 SUMMERVILLE LOUGH 001294 LOUGH HACKET 001288 KNOCKMAA HILL 000385 ROSTAFF TURLOUGH 002038 CASTLE HACKETT SOUTERRAIN 001322 TURLOUGH MONAGHAN 001788 TURLOUGHCOR 001280 KILLACLOGHER BOG 000307 LOUGH TEE BOG 001709 TIAQUIN BOG 000311 MONIVEA BOG 000287 KILTULLAGH TURLOUGH	~1422

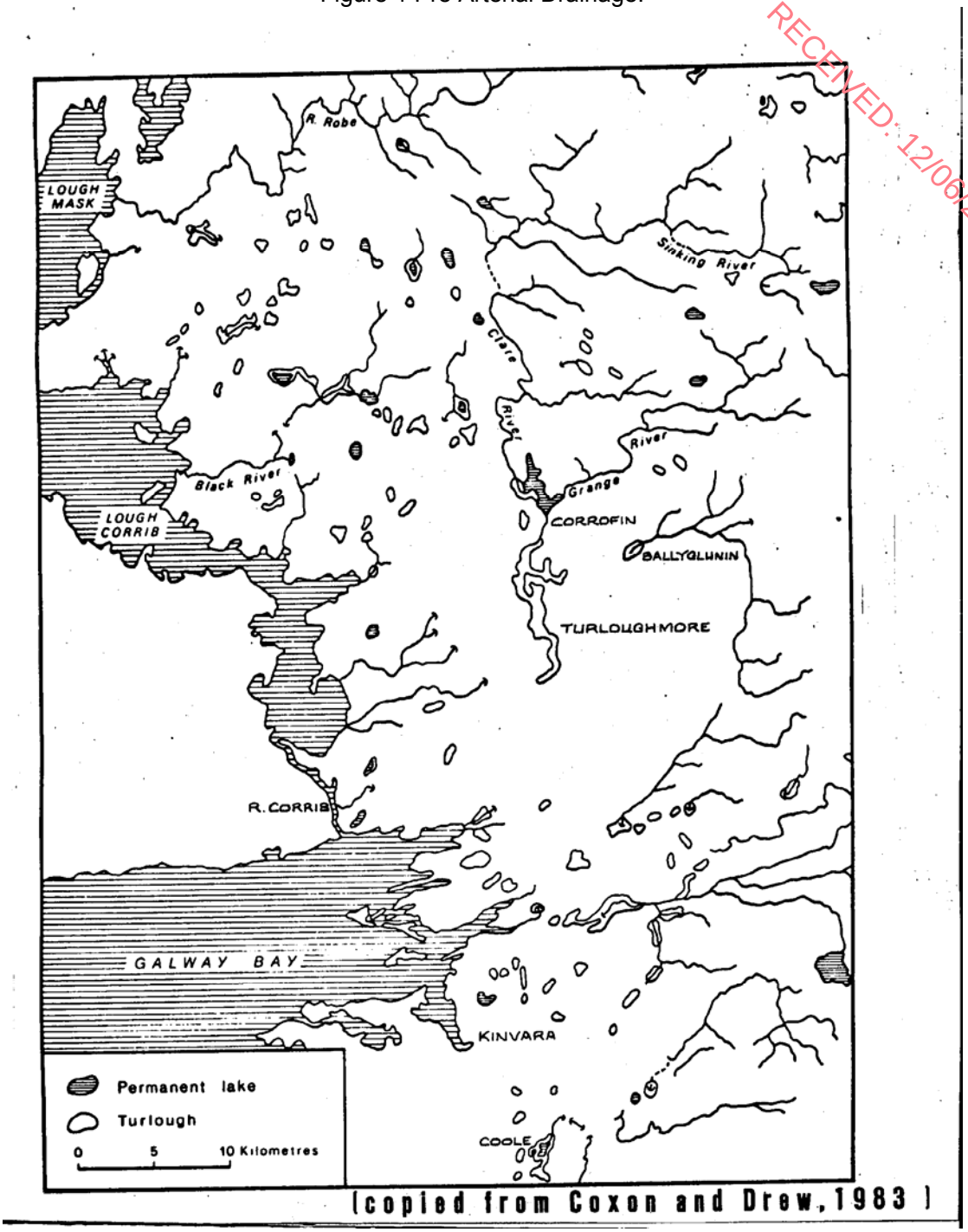
Topography		The land surface is characterised by small hills and low ridges, with ground elevations ranging from 10-160 mAOD. The topographic surface slopes gently westwards. Elevations are highest (100-160 mAOD) in the north (south of Ballyhaunis, west of Ballinlough) and south (just north of Monivea). To the west of a line running north-south from Claremorris to Athenry the elevation is 10-40 mAOD, and to the east of this line, the elevation is 40-70 mAOD.
Geology and Aquifers	**Aquifer categories**	The main aquifer category in this GWB is: **Rk^c:** Regionally important karstified aquifer dominated by conduit flow. There are some small areas (in the vicinity of Headford) with an aquifer category of: **Ll**: Locally important aquifer which is moderately productive only in local zones.
	Main aquifer lithologies	This GWB is composed primarily of Dinantian Pure Bedded Limestones. There are some small areas (in the vicinity of Headford) of Dinantian Pure Unbedded Limestones.
	Key structures	Few faults are mapped in this area; this may reflect the lack of major variation in the rock lithology. The dips over the GWB area are generally less than 10^o, except near faults, where steeper dips result from fault drag. Shallow synclines aligned with the axes in an E-W direction cross the GWB.
	Key properties	**Karstification** is widespread in this GWB. Recorded karst features number 219, but are considered to represent only a fraction of existing features. A histogram showing the different types of karst features currently in the database is provided in Figure 3. **Transmissivity and Storativity:** Well yields are variable, being distributed through all the well yield categories. Using 60 wells located in the GWB, 59% are either "excellent" (>400 m^3/d) or "good" (100-400 m^3/d), and 23% are either "poor" (<40 m^3/d) or "failed", with the remainder "moderate" (40-100 m^3/d). The median yield is 131 m^3/d. Histograms showing the distribution of well yields and productivity are given in Figures 4 and 5. Note: productivity is an index relating specific capacity to yield - the higher the productivity the higher the transmissivity. Productivity values are distributed throughout all the productivity categories, indicating the variability of the aquifer properties throughout the GWB. Analysis of the areal distribution of the data suggests that it is difficult to predict the aquifer properties in any particular place, with a few possible exceptions. For instance, in the vicinity of Tuam the well yields that are "excellent" are accompanied by several large springs, and just north of Monivea there is a cluster of "failed" wells (also due in part to silting up of the boreholes) which suggests that there may be an increase in yield from south to north across the GWB. Water table levels have high annual variations, which indicates that the storage is low - approximately 0.01-0.02 (Daly, 1985). The springs in the GWB also reflect the low storativity as many of the spring flows rise and fall quickly in response to rainfall events. Furthermore during prolonged drought many springs cease to flow and well yields drop significantly.
	Continues next page	**Groundwater velocity:** Tracer tests indicate variable groundwater velocities. Furthermore, tracer test data illustrates anisotropy in the transmissivity, with higher east-west transmissivity. Groundwater velocities in the E-W domain are in the order of 100-450 m/hr, as evidenced by the following tests: Lassanny Swallow hole to Ballyhaunis spring (440m/hr); Ballyglunin Cave to Aucloggeen Spring (200m/hr). Groundwater velocities in the N-S domain are in the order of 6-35m/hr, as evidenced by the following tests: L.Hackett to Kilcoona spring (35m/hr); Pollnahallia to Bunatober spring (6m/hr). Extensive conduit systems exist, as exemplified by the Ballyglunin Cave system. The mapping of this system indicates conduit development along the N-S and W-E joint sets, with an overall dip to the west (Drew and Daly, 1993).

		Groundwater flow directions and gradients: Overall, flow directions are to the southwest, with all groundwater discharging to L. Corrib. Although, there are six surface water catchments within the GWB, a *key* aspect is that groundwater can flow across the surface water divides and beneath surface water channels, as evidenced by the tracer test data. Examples of this key property are listed as follows: 1) water that sinks at Ballyglunin Cave emerges at Aucloggeen Spring, which crosses two surface water catchments. 2) water sinking along an losing stretch of the River Clare remerges as the headwater of the Black River. 3) recent tracing tests in the Ballinlough area of Roscommon indicate a link across the Shannon RBD into the Western RBD, from Coolcam (Roscommon) to Meeltraun (Mayo). 4) water along an losing stretch of the Sinking River flows about 10 km underground to join the River Clare. Drew (1976 (a)) suggests that groundwater flow is concentrated along the axes of shallow synclines. Gradients are variable, irregular due to the uneven distribution of transmissivity and are in the order of 0.01-0.002 (Drew and Daly, 1993; Daly, 1985)).
	Thickness	The Dinantian Pure Bedded Limestones are generally over 100 m thick. Most groundwater flows in an epikarstic layer a couple of metres thick and in a zone of interconnected solutionally-enlarged fissures and conduits that extends approximately 30 m below this. Deeper inflows can occur in areas associated with faults or dolomitisation.
Overlying Strata	**Lithologies**	Till is the dominant subsoil type, covering approximately 65% of the GWB. Cutover Peat comprises 23% of the area, sand/gravel covers approximately 3% and alluvium 2%. A full breakdown of the subsoil lithology is given in Table 1. A large proportion of the sand/gravel forms a random hummocky topography, although long sinuous, braided ridges of sand/gravel (eskers) have also been deposited especially in the east. A small portion of the north eastern area of the GWB around Cloonfad is described under the Roscommon Groundwater Protection Scheme (Lee and Daly, 2003) The till in this area is described as "SILT" (BS 5930), and is classed as "Moderate" permeability. There are also areas of "clayey" till, often underlying areas of raised bog (Drew and Daly, 1993). The thin till cover over much of the west part of the area is generally free draining (Daly, 1985).
	Thickness	East of a line linking Athenry – Tuam – Dunmore, the subsoil is "generally thicker" (Daly, 1985; Drew and Daly, 1993). This is supported by the occurrence of rock at or near surface, which is generally restricted to the western and southwestern part of the GWB. Analysis of the available depth to bedrock borehole data is limited as most of the data are clustered in three main areas: western, northeastern and central (area around Tuam) parts of the GWB. Nevertheless the data show a *general* increase in subsoil thickness in an easterly direction: average depth to bedrock increases from 4 m to 9 m from the west to east. In addition, there are instances of depth to bedrock greater than 20 m around Dunmore (northeast of GWB). However, there are also pockets of deeper till in the southwestern part of the GWB.
	% area aquifer near surface	50% of the GWB to the west of the line Athenry – Tuam – Dunmore is only covered by shallow till. 4% of the total GWB area has rock at or near surface.
	Vulnerability	The vulnerability for a small portion of the north eastern area of the GWB around the area of Cloonfad is described in the County Roscommon Groundwater Protection Scheme (Lee and Daly, 2003). In this area the vulnerability classification is variable dependent on the depth to bedrock. For the rest of the area. *[Information to be added at a later date]*
Recharge	**Main recharge mechanisms**	Both point and diffuse recharge occur in this GWB. Diffuse recharge occurs over the GWB via rainfall percolating through the permeable subsoil. Despite the presence of peat and till, point recharge to the underlying aquifer occurs by means of swallow holes and collapse features/dolines. Dolines have been recorded even in areas of thick peat deposits (Hickey et al, 2002). Point recharge occurs via many small sinks that are present in the low permeability till areas where the subsoil is breached. Recharge also occurs along 'losing' sections of streams. There are well defined stretches of the River Clare, Sinking River and Abbert River that are losing (Daly, 1985; Drew and Daly, 1993).
	Est. recharge rates	*[Information to be added at a later date]*
Discharge	**Large springs and large known abstractions (m^3/d)**	Large Springs: Corrandulla GWS (6764 m^3/d), Kilbannon GWS (5995 m^3/d), Mullacultra GWS (3270 m^3/d), Barnaderg Group Scheme (5000 m^3/d), Ballyhaunis WSS (12000 m^3/d), Tobernanny, Gortgarrow, Lettera Large known borehole abstractions: Gallagh GWS (523 m^3/d), Rusheens Tuam GWS (114 m^3/d) Roadstone Ltd (227 m^3/d), Belclare (114 m^3/d). *[Information to be added to and checked]*
	Main discharge mechanisms	The main groundwater discharges are to the streams, rivers and large springs found within the body. The large springs at Kilcoona, Bunatober and Aucloggeen and others issue from the bottom of a limestone scarp that is thought to represent an ancient shoreline of L. Corrib. Further these springs are likely to represent overflow springs and deeper groundwater flow discharges to outlets beneath the present day L. Corrib (Drew, 1993). In winter groundwater will fill the turloughs found in the area and partly discharge via the artificial channels that were installed to alleviate flooding.

Hydrochemical Signature	The groundwater has a calcium bicarbonate signature. Two groundwater provinces are suggested by Drew and Daly (1993). Firstly, there is a shallow groundwater component that is characterised by high suspended solids and relatively low electrical conductivities (300-400 µS/cm). Springs that are fed by this component typically have a "flashy" throughput and often cease to flow during prolonged drought. Secondly, there is a deeper groundwater component that is characterised by relatively non-turbid groundwater with higher electrical conductivities (>450 µS /cm). Springs fed by this deeper component often have smoother hydrographs where there is a gradual change in discharge. Several large springs comprise both flow components, examples are Lettera, Tobernanny and Bunatober springs.
Groundwater Flow Paths	These rocks are generally devoid of intergranular permeability. Groundwater flows through fissures, faults, joints and bedding planes. In pure bedded limestones these openings are enlarged by karstification which significantly enhances the permeability of the rock. Karstification can be accentuated along structural features such as fold axes and faults. Groundwater flow through karst areas is extremely complex and difficult to predict. As flow pathways are often determined by discrete conduits, actual flow directions will not necessarily be perpendicular to the assumed water table contours, as shown by several tracing studies (Drew and Daly, 1993). The tracer tests show that groundwater can flow across surface water catchment divides and beneath surface water channels. Flow velocities can be rapid and variable, both spatially and temporally. Rapid groundwater flow velocities indicate that a large proportion of groundwater flow occurs in enlarged conduit systems. Groundwater flow in highly permeable karstified limestones is of a regional scale. Flow path lengths can be up to a several kilometres, for example 9.6 km from Ballyglunin Cave to Aucloggeen Spring. Overall, groundwater flow will be towards the River Clare and L. Corrib, but the highly karstified nature of the bedrock means that locally groundwater flow directions can be highly variable.
Groundwater & Surface water interactions	The area is drained by the River Clare and its tributaries, however the present day drainage network has been changed significantly by arterial drainage that took place early in the nineteenth century. Figures 1 and 2 show the pre/post arterial drainage network. According to Coxon and Drew (1983), much of the current stream network is a storm runoff system that is inactive during summer months. Thus, prior to drainage, streams sank underground via the turloughs present in the GWB. Many of the streams have well defined losing stretches where they lose water to the underground system (Daly, 1985). There is a high degree of interconnection between groundwater and surface water in karstified limestone areas such as in this GWB. Even though large areas of peat and tills overlie the body, collapse features in these areas provide a direct connection between the surface and the groundwater systems. The close interaction between surface water and groundwater in karstified aquifers is reflected in their closely linked water quality. Any contamination of surface water is rapidly transported into the groundwater system, and vice versa. Furthermore, there are a number of terrestrial ecosystems within this GWB with varying dependence on groundwater.

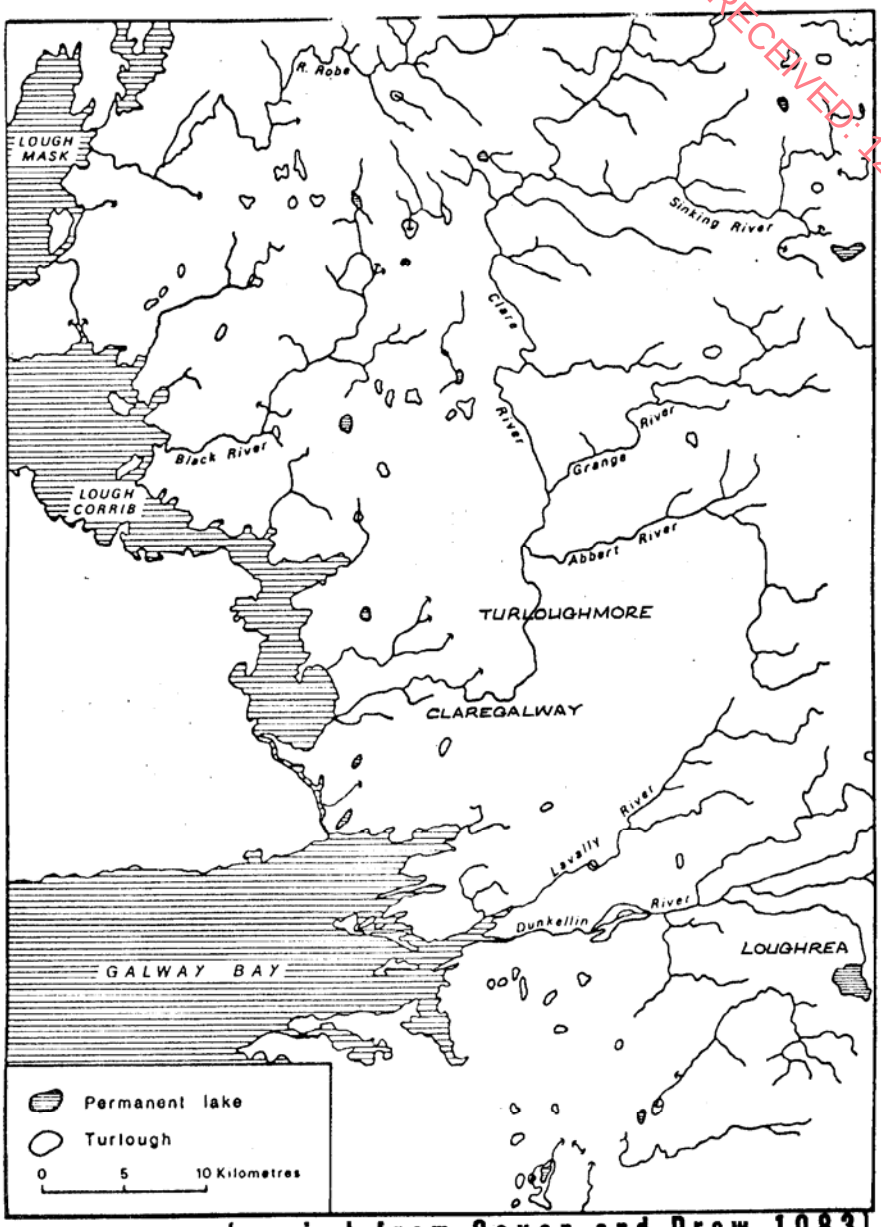
Conceptual model	• The north, south and west groundwater divides of this GWB are topographic highs that coincide with surface water catchment boundaries. It is bounded to the east by Lough Corrib. • The topography is undulating with ground elevations ranging from 10-160 mAOD. A large proportion of the body is overlain by till, which thickens in an easterly direction. • The area is principally drained by the River Clare and its tributaries, however the present day drainage network has been changed significantly by arterial drainage that took place early in the nineteenth century. Much of the current stream network is a storm runoff system and is inactive during summer months. Prior to artificial drainage, streams sank underground via a few turlough sinks in the GWB. • Within the GWB, surface water catchments are often bypassed by groundwater flowing beneath surface water channels and across surface water catchment divides. • A large number of karst features occur within the body. These include turloughs, caves, dolines, swallow holes and springs. • The GWB is composed primarily of high transmissivity karstified limestone (**Rk^{c}**). Transmissivity and well yields are variable. Storage in the GWB is low. • Groundwater flows through a network of solutionally enlarged bedding planes, fissures and conduits. • Rapid groundwater flow velocities have been recorded through groundwater tracing. The tracing indicates an anisotropy in the transmissivity, with faster groundwater flow velocities and higher transmissivity in an E-W direction, which may be linked to shallow E-W trending synclinal axes and steeper E-W hydraulic gradients. • Recharge in this GWB occurs via losing streams, point and diffuse mechanisms. Despite the presence of peat and till, point recharge to the underlying aquifer occurs by means of swallow holes and collapse features/dolines. • The groundwater in this body is generally unconfined but may become locally confined beneath thick, low permeability subsoil. Most of the groundwater flow occurs in the upper epikarstic layer and in a zone of interconnected solutionally enlarge bedding planes and fissures, generally extending to a depth of 30 m. • In general, the degree of interconnection in karstic systems is high and they support regional scale flow systems. Flow paths have been measured up to 10 kilometres in length. • Some areas in this GWB are of extreme vulnerability due to the thin nature of the subsoil, as well as the frequency of karst features, allowing point recharge. Groundwater storage in karstified bedrock is low and the potential for contaminant attenuation in such aquifers is limited. • The main discharges are to the rivers, large springs and L. Corrib. In winter groundwater discharges to the many turloughs and transmitted via the artificial channels that were installed to alleviate flooding. • There is a high degree of interaction between surface water and groundwater in this GWB. There are a number of terrestrial ecosystems within this GWB which have varying dependence on groundwater. • There are potentially two groundwater provinces within the GWB but this is uncertain. The groundwater has a calcium bicarbonate signature.
Attachments	Figures 1, 2, 3, 4 and 5.
Instrumentation	**Stream gauges:** 30002, 30003, 30004, 30006, 30007, 30010, 30011, 30012, 30013, 30014, 30015, 30020, 30022, 30023, 30024, 30025, 30026, 30029, 30030, 30032, 30040, 30045, 30053, 30055, 30071, 30101, 30103. **EPA Water Level Monitoring boreholes:** Lackagh, GAL287, Tuam (Coca Cola), GAL291, Shrule, MAY085 **EPA Representative Monitoring points:**
Information Sources	Daly, D. (1995) *A report on the Flooding in the Glenamaddy area.* Groundwater Section Report File 2.2.7. 34pp. Daly, D. (1992) *A report on the Flooding in the Claregalway area.* Groundwater Section Report File 2.2.7. 12pp. Daly, D. (1985) *Groundwater in County Galway with particular reference to its Protection from Pollution.* Geological Survey of Ireland report for Galway County Council. 98pp. Drew D.P. and Daly D. (1993) *Groundwater and Karstification in Mid-Galway, South Mayo and North Clare.* A Joint Report: Department of Geography, Trinity College Dublin and Groundwater Section, Geological Survey of Ireland. Geological Survey of Ireland Report Series 93/3 (Groundwater), 86 pp Drew, D.P. (1973a) *Hydrogeology of the north Co. Galway – south Co. Mayo lowland karst area, Western Ireland*. International Speleology 1973, III, Sub –section Ca. Drew, D.P. (1973b). *Ballyglunin core Co. Galway and the hydrology of the surrounding area.* Irish Geography Vol. 6, No. 5. pp 610-617. Doak, M. (1995) *The Vulnerability to Pollution and Hydrochemical Variation of Eleven Springs (Catchments) in the Karst Lowlands of the West of Ireland*. Unpublished M.Sc. thesis, Sligo Regional Technical College. Hickey, C., Lee, M., Drew, D., Meehan, R. and Daly D. (2002) *Lowland Karst of North Roscommon and Westmeath*. International Association of Hydrogeologists Irish Group. Karst Field Trip October 2002. Unpublished IAH Report. Lee, M. & Daly D. (2003) *County Roscommon Groundwater Protection Scheme*. Main Report. Roscommon County Council & Geological Survey of Ireland, 54pp. Hickey, C., Lee, M., Drew, D., Meehan, R. and Daly D. (2002) Lowland Karst of North Roscommon and Westmeath. International Association of Hydrogeologists Irish Group. Karst Field Trip October 2002. Unpublished IAH Report.
Disclaimer	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae.

Figure 1 Pre Arterial Drainage.



(copied from Coxon and Drew, 1983)

Figure 2 Post Arterial Drainage



[copied from Coxon and Drew, 1983]

Figure 3 Histogram of Karst features in Clare-Corrib GWB

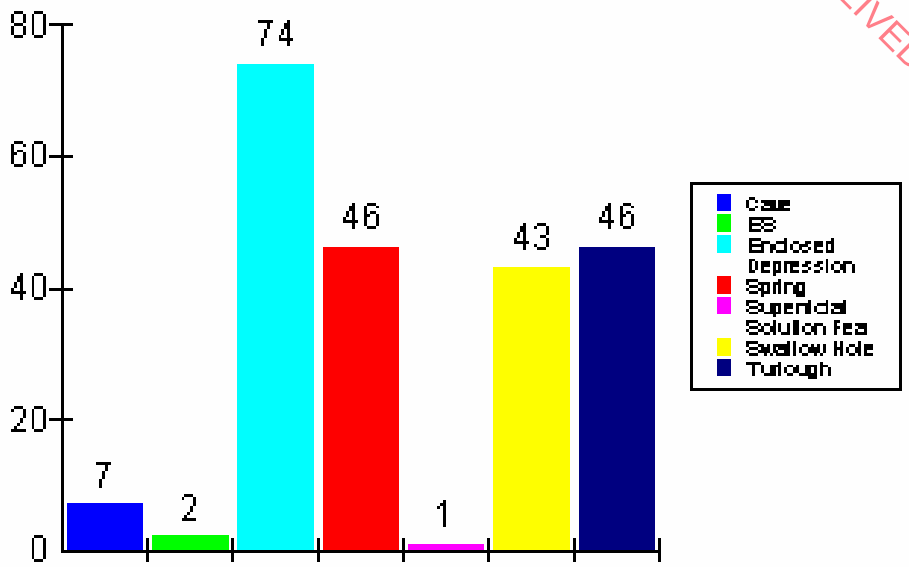


Figure 4 Histogram of Well Yields in Clare-Corrib GWB

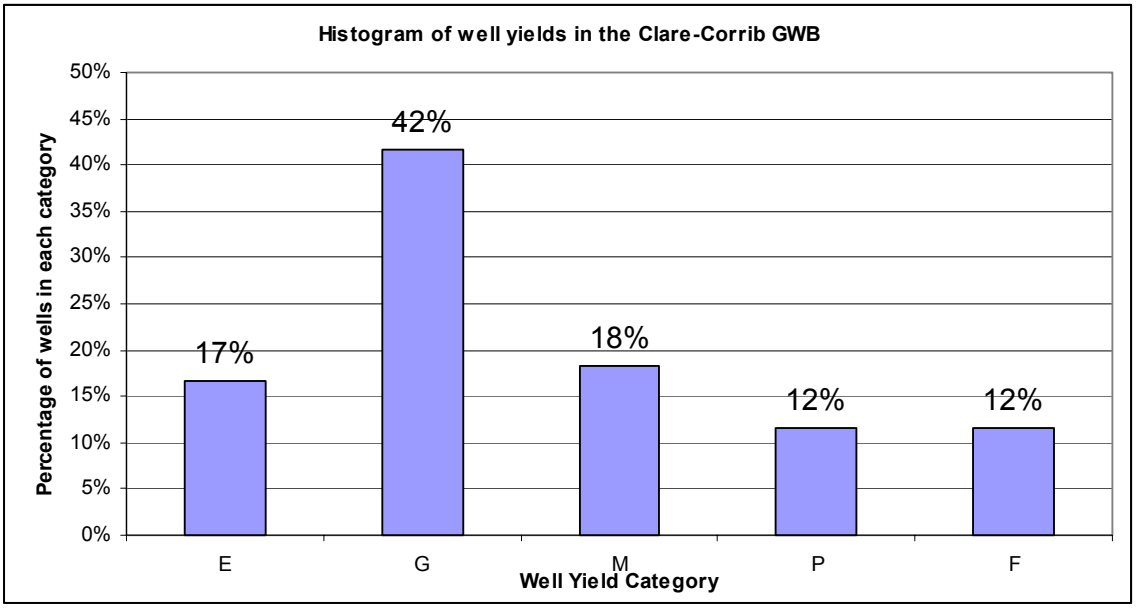


Figure 5 Histogram of Well Productivities in Clare-Corrib GWB

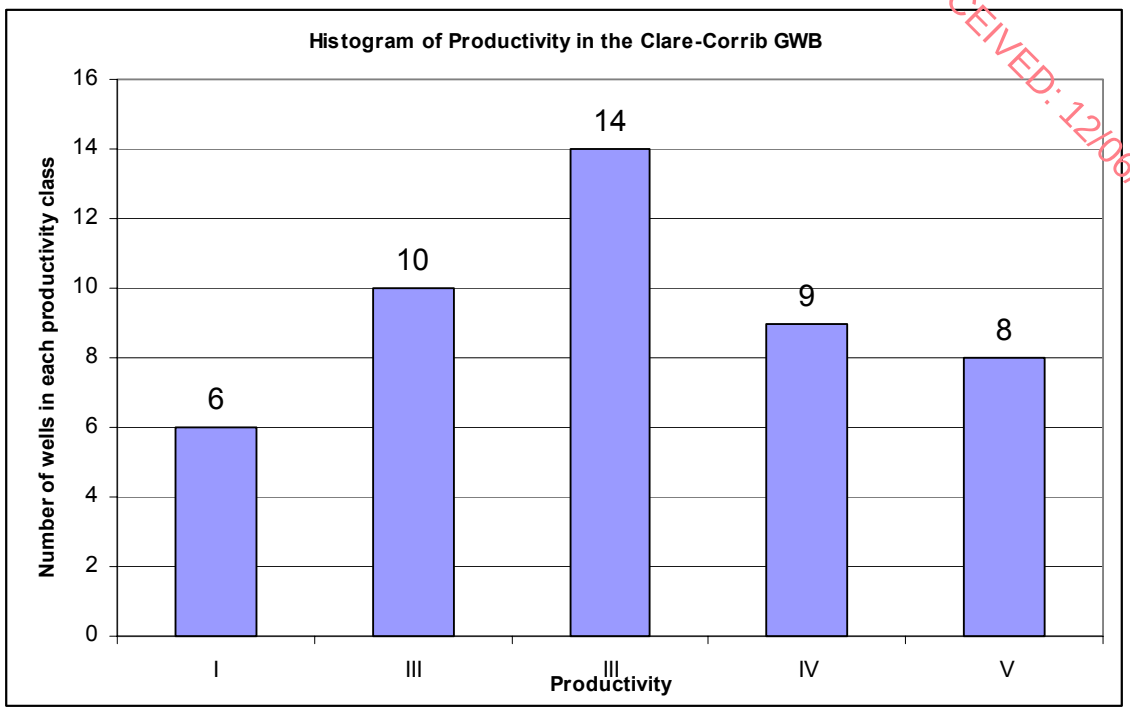
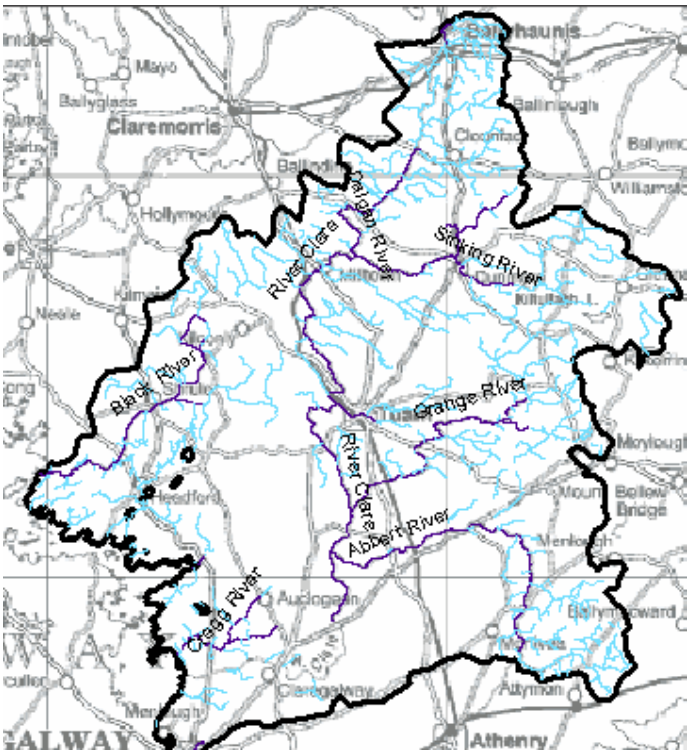


Table 1. Subsoil types in Clare-Corrib Groundwater.

PAR_MAT	Full name	Area sq m	% of GWB
TLs	Limestone Till	881175858	59.9%
TGr	Granitic Till	355611	0.0%
TDSs	Devonian Sandstone Till	72907274	5.0%
RsPt	Raised Peat	15612	0.0%
Rck	Rock	7076384	0.5%
nodata	nada	6512889	0.4%
Mrl	Marl	781353	0.1%
Made	Made Ground	7776478	0.5%
Lk_isle		513	0.0%
Lake		3857021	0.3%
L	Lake sediments undifferentiated	10777977	0.7%
KaRck	Karstified limestone bedrock at surface	53547458	3.6%
GLs	Limestone sands and gravels (Carboniferous)	45700893	3.1%
Esk	Eskers	1989472	0.1%
Cut	Cutover Peat	343496766	23.4%
BktPt	Blanket Peat	2558408	0.2%
BasEsk	Basic esker sands and gravels	5158629	0.4%
A	Undifferentiated alluvium	26211636	1.8%

Clare-Corrib GWB (For reference only)



List of Rock units in Clare-Corrib GWB

Unit Name	Code	Description	Rock Unit
Ardnasillagh Formation	AS	Dark cherty limestone, thin shale	Dinantian Pure Bedded Limestones
Aughnanure Oolite Formation	AU	Cross-bedded massive oolitic limestone	Dinantian Pure Bedded Limestones
Ballysteen Formation	BA	Dark muddy limestone, shale	Dinantian Lower Impure Limestones
~~Boyle Sandstone Formation~~	~~BO~~	~~Sandstone, siltstone, black mudstone~~	~~Dinantian Mixed Sandstones, Shales and Limestones~~
~~Cloonfad Felsite~~	~~CfFe~~	~~Felsite~~	~~Granites & other Igneous Intrusive rocks~~
Cong Canal Formation	NL	Medium to thick-bedded pure limestone	Dinantian Pure Bedded Limestones
Cong Limestone Formation	CO	Thick-bedded pure limestone	Dinantian Pure Bedded Limestones
Coranellistrum Formation	CT	Medium to thick-bedded pure limestone	Dinantian Pure Bedded Limestones
Illaunagappul Formation	IL	Limestone, thin shale partings	Dinantian Pure Bedded Limestones
Kilbryan Limestone Formation	KL	Dark nodular calcarenite & shale	Dinantian Lower Impure Limestones
Knockmaa Formation	KA	Thick-bedded pure limestone	Dinantian Pure Bedded Limestones
Lucan Formation	LU	Dark limestone & shale (Calp") "	Dinantian Upper Impure Limestones
Oakport Limestone Formation	OK	Pale grey massive limestone	Dinantian Pure Bedded Limestones
Oldchapel Limestone Formation	OC	Dark fine limestone & calcareous shale	Dinantian Pure Bedded Limestones
~~Owenriff Member~~	~~OUor~~	~~Dark limestone with thin shales~~	~~Dinantian Lower Impure Limestones~~
Two Mile Ditch Member	KAtm	Thick-bedded limestone, clay wayboards	Dinantian Pure Bedded Limestones
Visean Limestones (undifferentiated)	VIS	Undifferentiated limestone	Dinantian Pure Bedded Limestones
Waulsortian Limestones	WA	Massive unbedded lime-mudstone	Dinantian Pure Unbedded Limestones

Corrib Catchment Assessment 2010-2015 (HA 30)

Catchment Science & Management Unit

Environmental Protection Agency

December 2018

Version no. 3

epaCatchments
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Preface

This document provides a summary of the characterisation outcomes for the water resources of the Corrib Catchment, which have been compiled and assessed by the EPA, with the assistance of local authorities and RPS consultants. The information presented includes status and risk categories of all water bodies, details on protected areas, significant issues, significant pressures, load reduction assessments, recommendations on future investigative assessments, areas for actions and environmental objectives. The characterisation assessments are based on information available to the end of 2015. Additional, more detailed characterisation information is available to public bodies on the EPA WFD Application via the EDEN portal, and more widely on the catchments.ie website. The purpose of this document is to provide an overview of the situation in the catchment and help inform further action and analysis of appropriate measures and management strategies.

This document is supported by, and can be read in conjunction with, a series of other documents which provide explanations of the elements it contains:

1. An explanatory document setting out the full characterisation process, including water body, subcatchment and catchment characterisation.

2. The Final River Basin Management Plan, which can be accessed on: www.catchments.ie.
3. A published paper on Source Load Apportionment Modelling, which can be accessed at: http://www.jstor.org/stable/10.3318/bioe.2016.22
4. A published paper on the role of pathways in transferring nutrients to streams and the relevance to water quality management strategies, which can be accessed at: http://www.jstor.org/stable/pdf/10.3318/bioe.2016.19.pdf
5. An article on Investigative Assessments which can be accessed at: https://www.catchments.ie/download/catchments-newsletter-sharing-science-stories-june-2016/

Table of contents

1 Introduction

This catchment includes the area drained by the River Corrib and all streams entering tidal water between Renmore Point and Nimmo's Pier, Galway, a total area of 3,112 km². The largest urban centre in the catchment is Galway City. The other main urban centres are Tuam, Ballinrobe, Claremorris and Ballyhaunis. The total population of the catchment is approximately 116,900 with a population density of 38 people per km².

This catchment is characterised by a wide, relatively flat, limestone plain occupying the eastern two-thirds of the catchment which terminates in the large lakes of Corrib and Mask that abut against the granites of west Galway and the metamorphic uplands of southwest Mayo. The entire area of this catchment east of these lakes is karstified limestone with groundwater and surface water highly interconnected in this region.

The upper part of the catchment drains into Lough Mask. The Aille River flows into the northern end of Lough Mask. Lough Carra and its tributaries drain much of the area northeast of Lough Mask and drain into the lough via a surface channel and underground through the limestone aquifer. The Glensaul, Owenbrin, Srahnalong and Finny Rivers, all flow into the western side of Lough Mask.

The Robe River crosses a landscape marked by the presence of numerous turloughs (temporary lakes), swallow holes and springs. It then flows through Ballinrobe and finally discharges into the eastern side of Lough Mask. Lough Mask drains into Lough Corrib via an artificial canal channel that passes through the town of Cong, and naturally via underground caverns in the karstic limestone bedrock aquifer.

The Bealnabrack River flows southeast down Maum Valley and into Lough Corrib and the Oweniff River flows through Oughterard and into the western side of Lough Corrib. The area to the south is drained by the Drimeen River and the remaining area west of Lough Corrib is drained by the Ballycuirke Lough Stream, which flows through Moycullen and into the southwestern side of Lough Corrib. In contrast to the area east of Lough Corrib, there is a dense surface drainage network on the poorly permeable granite and metamorphic rocks that underlie the area.

The area to the east of Lough Corrib is dominated by karstic type drainage and there are numerous springs, swallow holes and turloughs in this area. The Kilmaine River rises near Kilmaine as a karst spring, flowing southwest and into Lough Corrib near Cross. The Black (Shrule) River drains flows through Shrule before entering Lough Corrib near Inchiquin Island. The area around Headford is drained by the Headford Stream, which flows into the southeastern shore of Lough Corrib.

The eastern side of the catchment is drained by the Clare River and its tributaries. The Dalgan River rises near Ballyhaunis flowing south before meeting the Sinking River at Dalgin Bridge. The Sinking River, loses 80-85% of its flow over a 400-m long reach in summer low flow conditions. At the confluence of the 2 rivers, the system become the Clare River. The Clare continues south and is joined by the Nanny River, Grange River and the Abbert River, which drains the southeastern part of the catchment.

The Clare River passes though Claregalway before entering the southern end of Lough Corrib. Three large scale drainage schemes were completed in this catchment by the OPW between 1951 and 1986 consist of the Corrib-Clare scheme (1951 to 1959), the Corrib-Headford scheme (1967 to 1973) and the Corrib Mask scheme (1979 to 1986). Flood relief works were completed at Belclare on the Clare River during 1995 and in the Maam Valley during 2001.

The Corrib River flows out of the southern tip of the Lough, passing through the northern suburbs of Galway City before passing over a large weir near Galway Cathedral, where the river becomes tidal and flowing out to sea at Galway Bay past the Claddagh.

There are two particularly distinguishing and unusual features of the catchment in the karstic limestone east side of Lough Corrib:

- The River Clare is not a natural river; it is an aqueduct linking a series of pre-existing lakes, turloughs and reaches of stream. For instance, prior to arterial drainage in the 19th century, the River Abbert sank underground at Ballyglunin and the River Clare sank underground at Turloughmore.
- A significant proportion of the river flow in the River Clare sinks underground and flows westwards beneath the topographic catchment divide with Lough Corrib, re-emerging as springs, such as Bunatober and Aughcloggeen on the eastern side of Lough Corrib.

The Corrib catchment comprises 19 subcatchments (Table 1, Figure 1) with 97 river water bodies, 31 lakes, one transitional water body, and 21 groundwater bodies. There are no heavily modified or artificial water bodies in the Corrib Catchment.

Table 1. List of subcatchments in the Corrib catchment

Subcatchment ID	Subcatchment Name
30_1	Clare[Galway]_SC_020
30_2	Kilmaine_SC_010
30_3	Aghinish_SC_010
30_4	Clare[Galway]_SC_070
30_5	Clare[Galway]_SC_030
30_6	Robe_SC_020
30_7	Aille[Mayo]_SC_010
30_8	Sinking_SC_010
30_9	Robe_SC_010
30_10	Clare[Galway]_SC_010
30_11	Black[Shrule]_SC_010
30_12	Clare[Galway]_SC_050
30_13	Clare[Galway]_SC_060
30_14	BallycuirkeLoughStream_SC_010
30_15	Joyce's_SC_010
30_16	Glensaul_SC_010
30_17	Cong[Canal]_SC_010
30_18	Corrib_SC_010
30_19	Clare[Galway]_SC_040

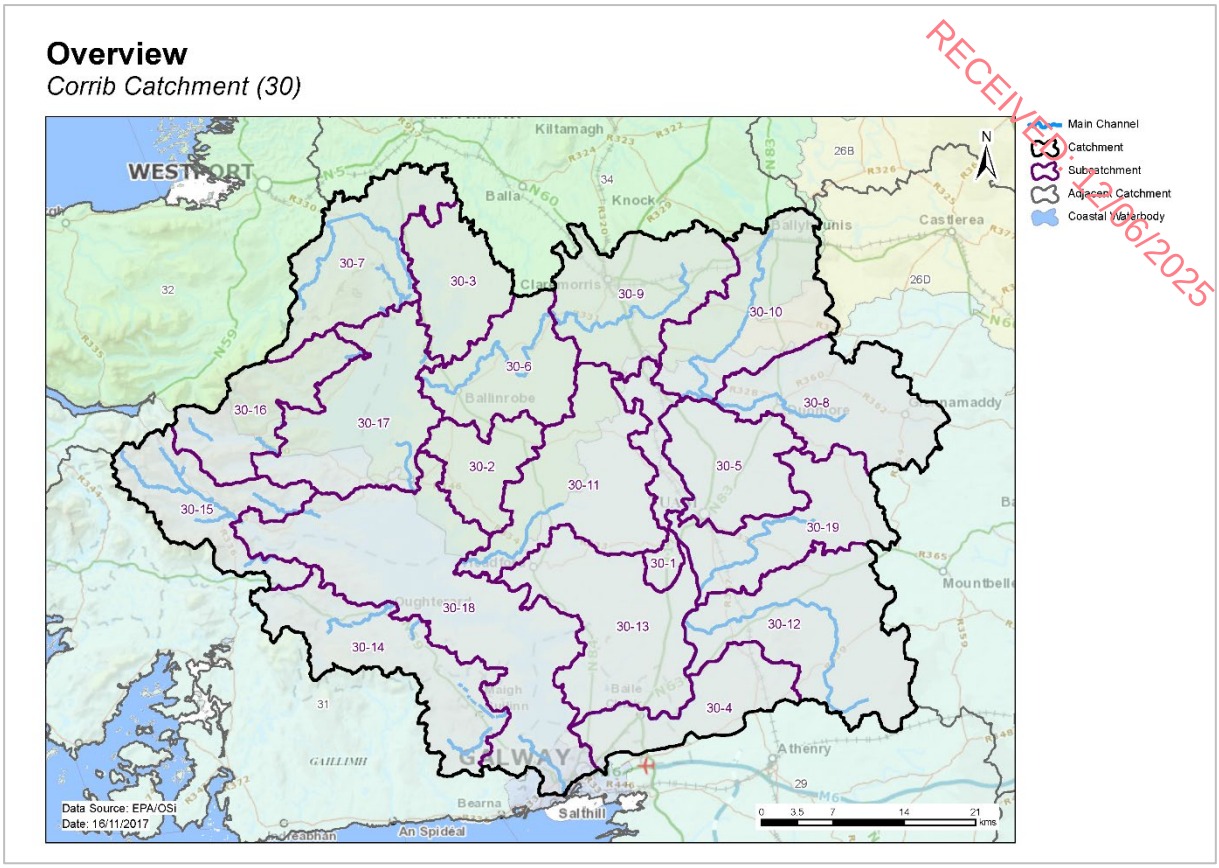


Figure 1. Subcatchments in the Corrib catchment

2 Water body status and risk of not meeting environmental objectives

2.1 Surface water ecological status

2.1.1 Rivers and lakes

- There were 55 (43%) river and lake water bodies at Good or High status, and 35 (26%) at less than Good status in 2015 (Table 2, Figure 2). Thirty-eight (30%) river and lake water bodies are unassigned.
- Seven river water bodies and sites and four lakes have a high ecological status objective. In 2015, three of these water bodies were at High status, and eight were at Good (Figure 3, Appendix 1).
- The number of water bodies at each status class in 2007-09 and 2010-15 are shown in Figure 4 (rivers) and 5 (lakes).
- Since 2007-09 when WFD monitoring began, 15 water bodies have an improved status whereas 21 have deteriorated (Figure 6).
- The variation in nutrient concentrations and loads in the Corrib main channel is illustrated in Appendix 2.

2.1.2 Transitional and coastal (TraC)

- There is one TraC, transitional water body the Corrib Estuary IE_WE_170_0700 and it is at Good status in 2015 (Table 2, Figure 2). This water body does not have a high ecological status objective.

- There was no change in the status class for the TraC water bodies in 2007-09 and 2010-15. Corrib Estuary is *Not At Risk*.

Table 2. Summary of water body status and risk categories

	Number of water bodies	2010-15						Risk Categories		
		High	Good	Mod	Poor	Bad	Unassigned	*Not at Risk*	*Review*	*At Risk*
Rivers	97	3	44	24	6	1	19	53	8	36
Lakes	31	1	7	3	1	0	19	14	10	7
TraC	1	0	1	0	0	0	0	1	0	0

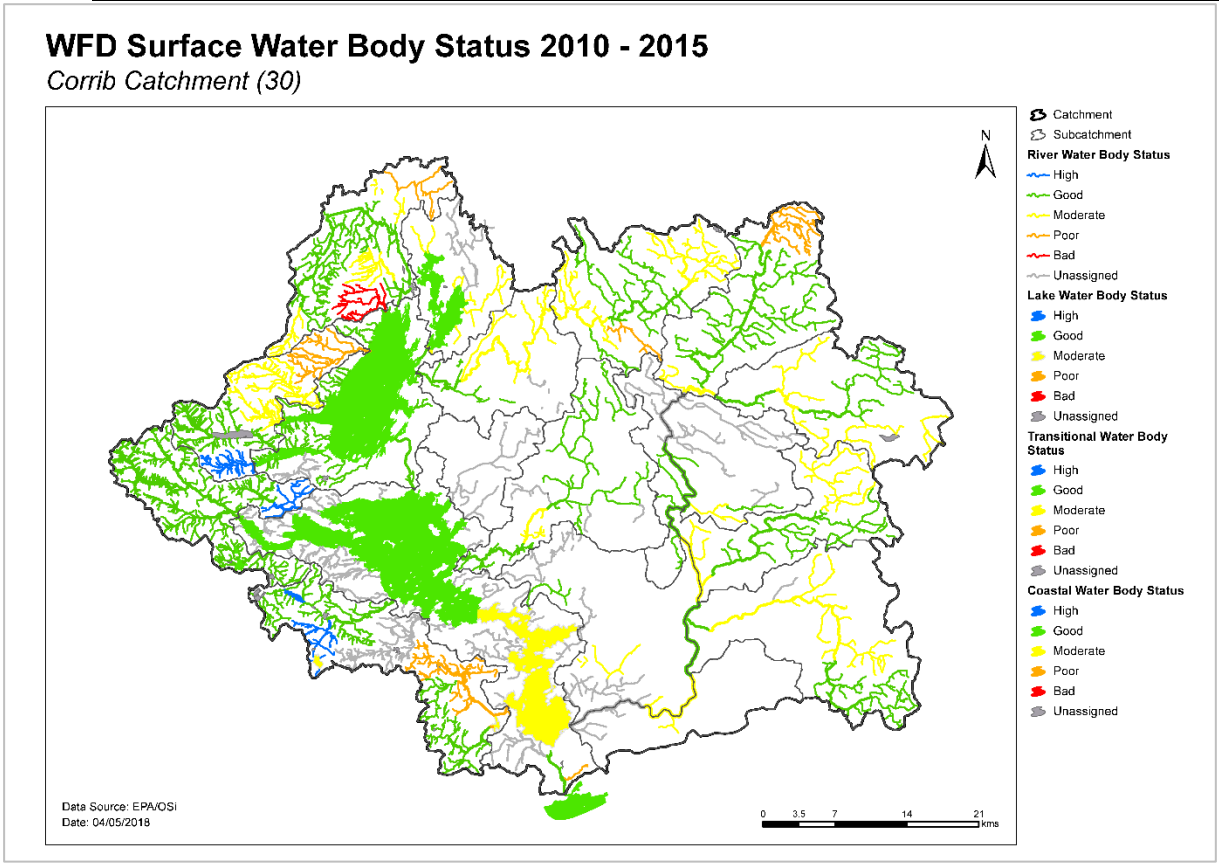


Figure 2. Surface water ecological status

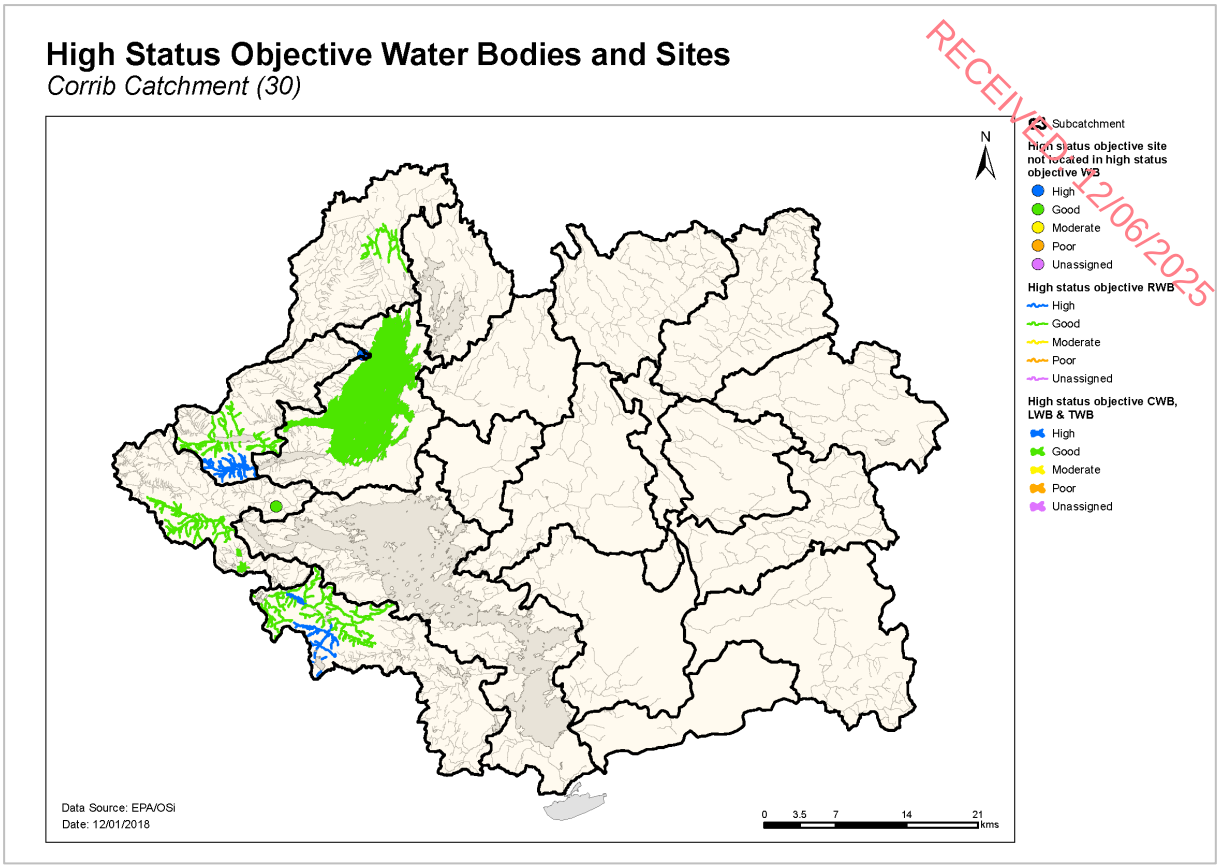


Figure 3. High ecological status objective water bodies and sites

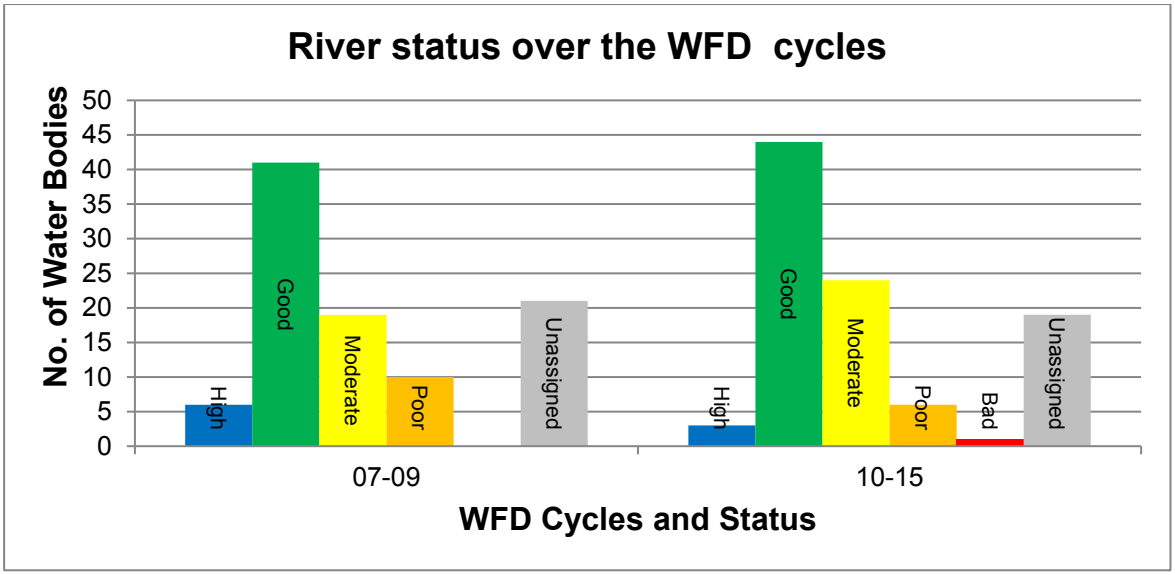


Figure 4. Net change in number of rivers at each status class in 2007-09 and 2010-15

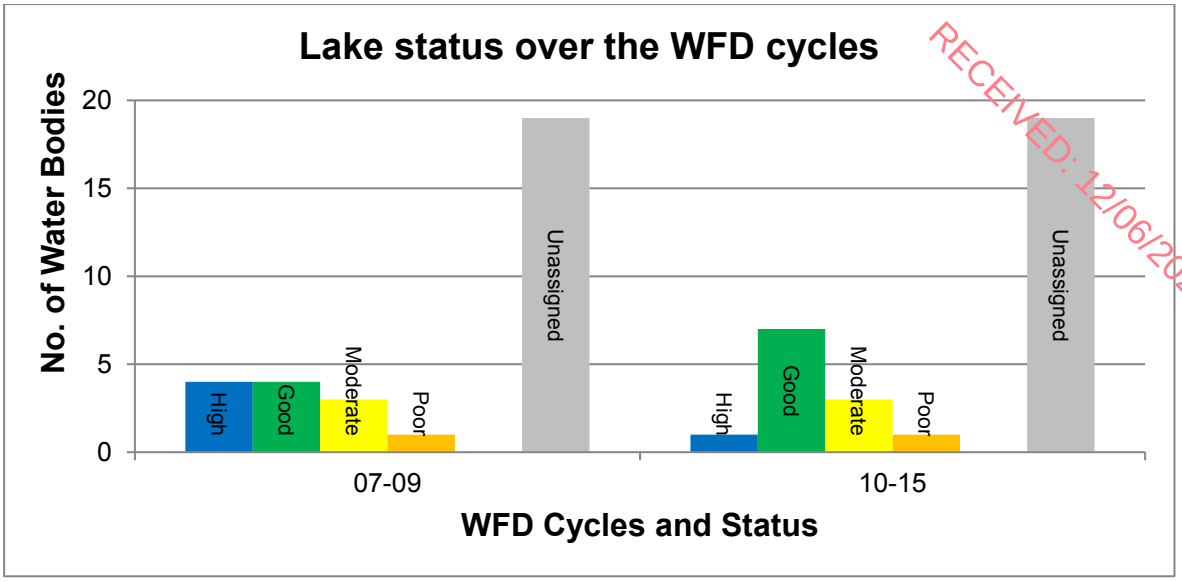


Figure 5. Net change in number of lakes at each status class in 2007-09 and 2010-15

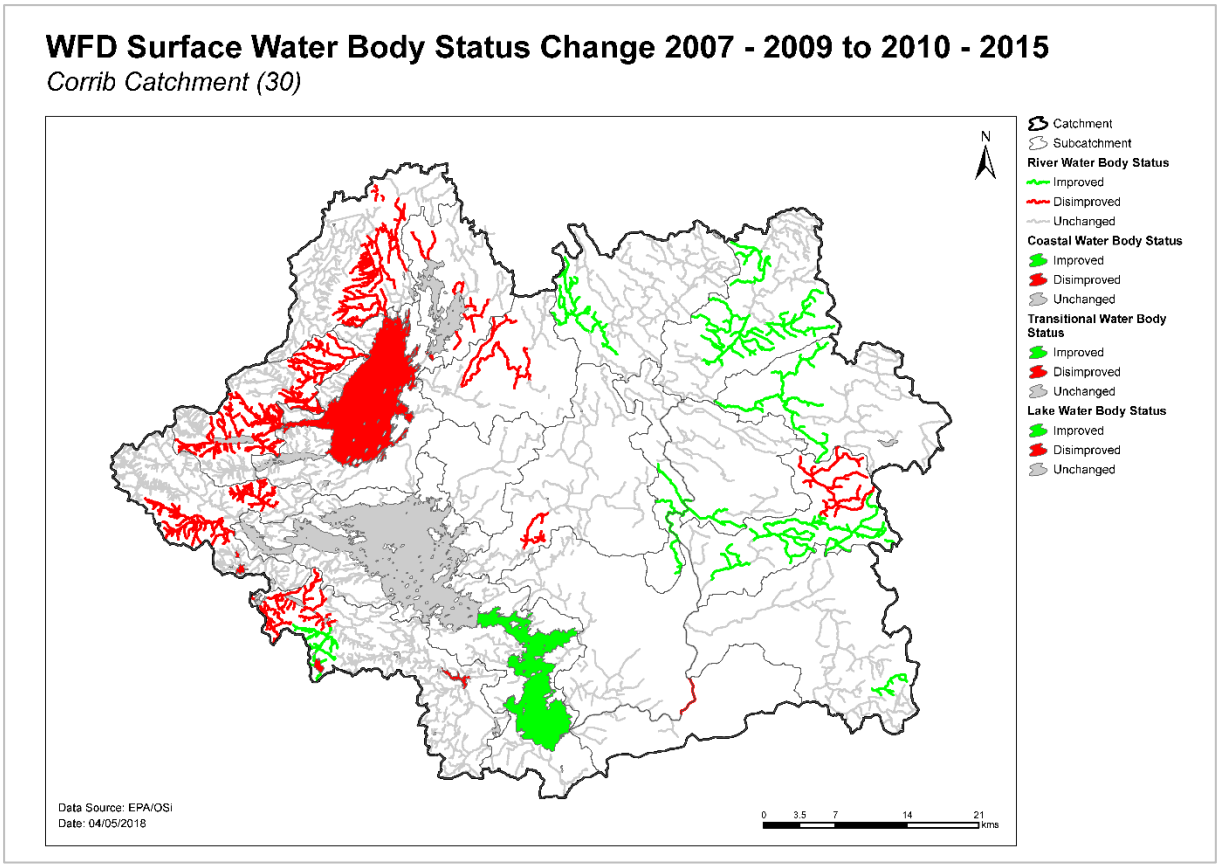


Figure 6. Surface water body status change from 2007-09 to 2010-15

2.2 Groundwater status

- There were 20 groundwater bodies at Good status and one at Poor status in 2015 (Table 3).
- Twenty of the water bodies remained at Good status, and the water body (IE_WE_G_0084) that was classified at Poor status was due to improved information being available and the development of technical assessment approaches, rather than there being deterioration in water quality in this water body between 2007-12 and 2010-15

Table 3. Summary of groundwater body status and risk categories

	Number of water bodies	2010-15		Risk Categories		
		Good	Poor	*Not at Risk*	*Review*	*At Risk*
Groundwater	21	20	1	12	6	3

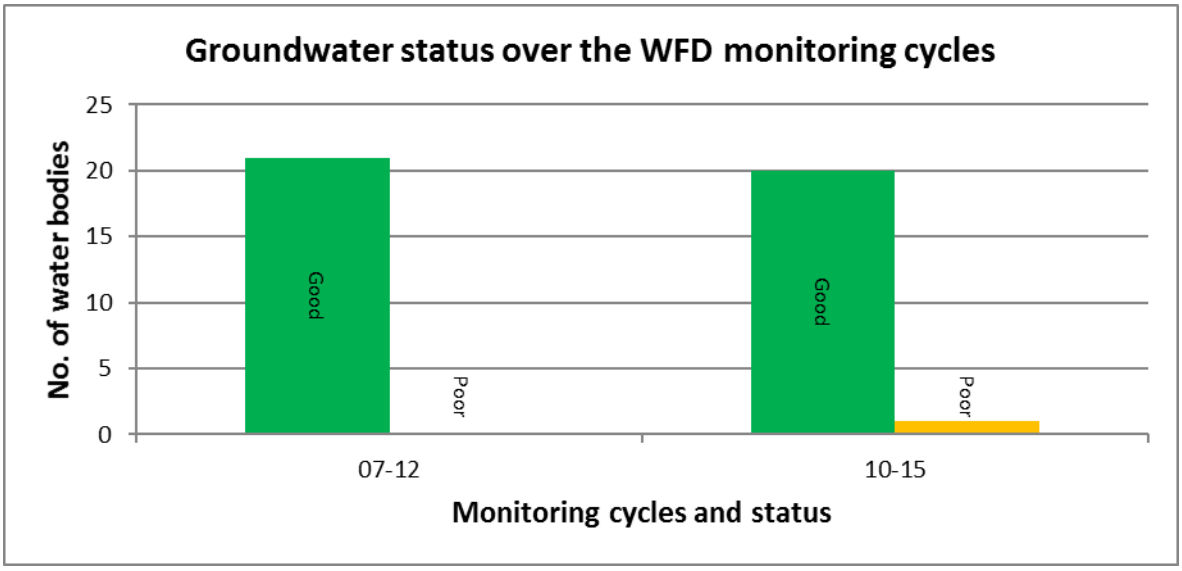


Figure 7. Net change in number of groundwater bodies at each status class in 2007-12 and 2010-15

Groundwater Body Status 2010 - 2015
Corrib Catchment (30)

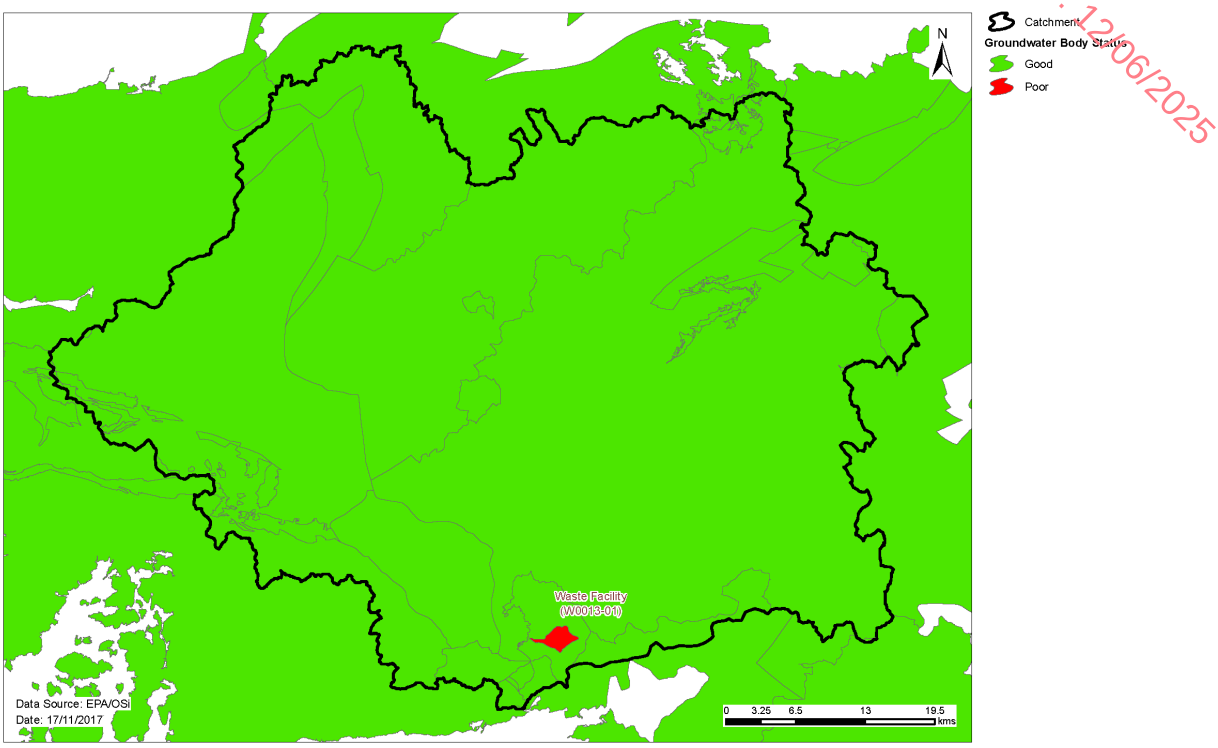


Figure 7a. Groundwater body status

2.3 Risk of not meeting surface water environmental objectives

2.3.1 Rivers and lakes

- There are 53 river and 14 lake water bodies that are *Not at Risk* (Figure 8, Table 2) and require no additional investigative assessment or measures to be applied, other than those measures that are already in place.
- There are eight river and ten lake water bodies in *Review*. This includes 11 water bodies where more information is required and seven water bodies where measures have recently been implemented and improvements have not yet been realised.
- Thirty-six river and seven lake water bodies in the catchment are *At Risk* of not meeting their water quality objectives. Measures will be needed in these water bodies to improve the water quality outcomes. Summary information for the *At Risk* water bodies is given in Appendix 3.

2.3.2 Transitional and coastal (TraC)

- There is one TraC water body (Corrib Estuary IE_WE_170_0700) and it is *Not at Risk* (Table 2, Figure 8) and therefore requires no additional assessment or measures to be applied, other than those measures that are already in place.

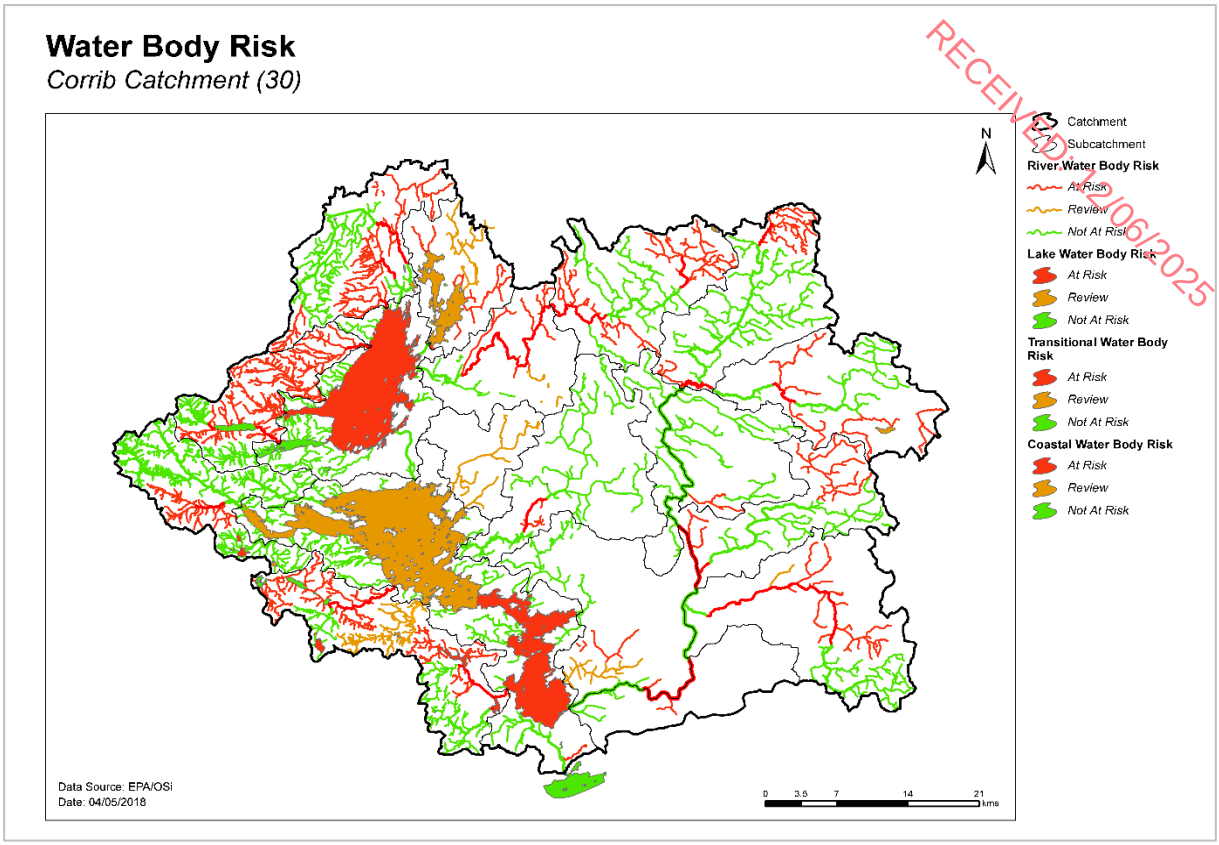


Figure 8. Surface water body risk

2.4 Risk of not meeting groundwater environmental objectives

- Twelve groundwater bodies are *Not at Risk* (Table 3, Figure 9) and require no additional investigative assessment or measures to be applied, other than those measures that are already in place.
- Six groundwater bodies are in *Review.* Suck South, Clarinbridge, Cong-Robe and Ballyhean are hydrologically linked to surface waters that are not meeting water quality objectives where it is considered likely that groundwater is a contributing source of phosphorus (Figure 9).
- There are three groundwater bodies *At Risk,* Waste Facility (W0013-01) (IE_WE_G_0084), Clarinbridge and Clare-Corrib (Figure 9). Clarinbridge and Clare-Corrib are *At Risk* as they are hydrologically linked to surface waters that are not meeting water quality objectives where it is considered likely that groundwater is a contributing source of phosphorus. (Table 4). Measures will be needed in Waste Facility (W0013-01) to improve water quality outcomes.

Table 4. Summary of At Risk surface water bodies where phosphate from groundwater may contribute to an impact.

Groundwater body name	Receiving water body code	Receiving water body name
Clarinbridge	IE_WE_29C020500	Clarinbridge_050
Clarinbridge	IE_WE_29C050400	Carrowmoneash (Oranmore) _010
Clarinbridge	IE_WE_29K010600	Kilcolgan_040
Clare-Corrib	IE_WE_30A010500	Abbert_040
Clare-Corrib	IE_WE_30B020300	Black (Shrule)_020
Clare-Corrib	IE_WE_30C010100	Clare (Galway)_010
Clare-Corrib	IE_WE_30L070100	Levally stream_010

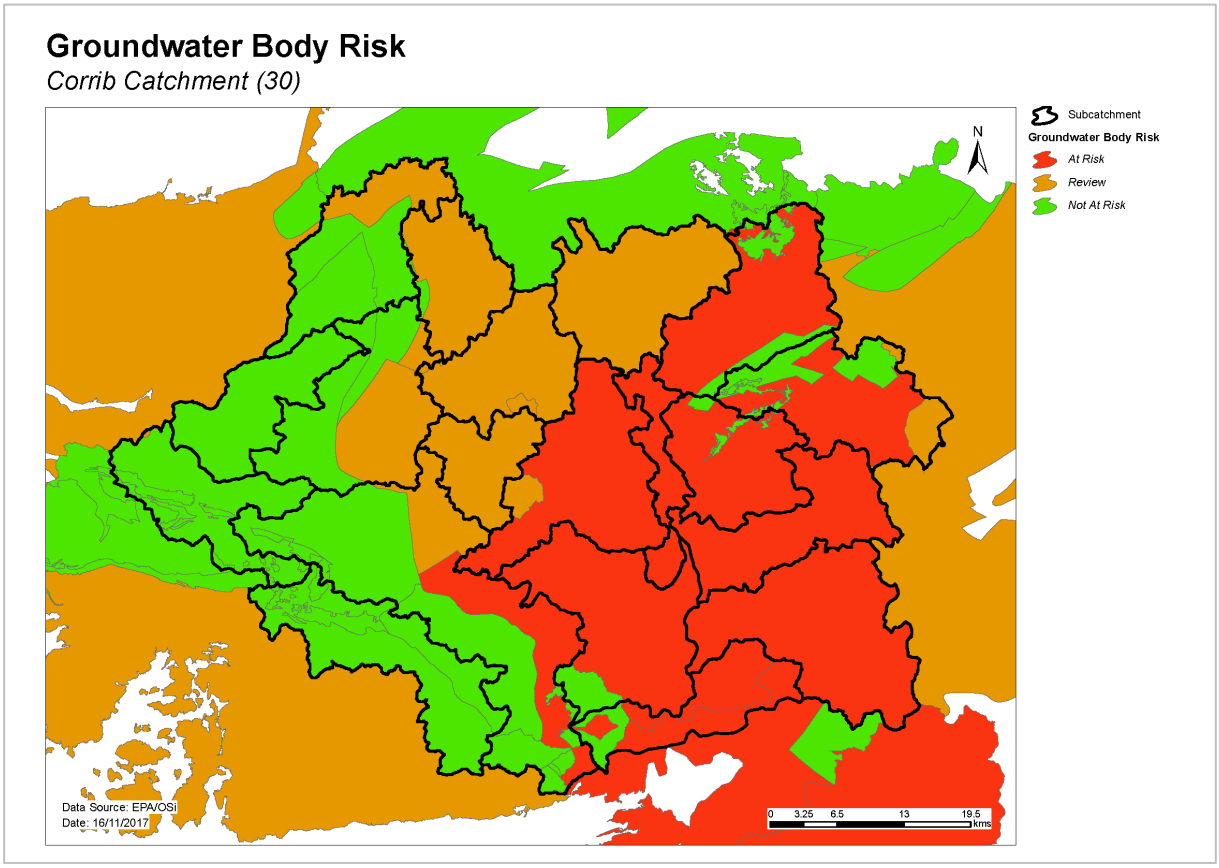


Figure 9. Groundwater body risk

2.5 Protected areas

2.5.1 Drinking water protected areas

- There are 58 abstractions in the Corrib Catchment comprising 35 group water schemes, 11 public supply schemes and 3 other schemes (Kilkeeran, Knockatubber and Kinnuary) (Appendix 4).
- Forty-two of the abstractions are from five groundwater bodies (Clare-Corrib; Dunmore; Cong-Robe; Corrib Gravels; Maam-Clonbur); ten are from four lakes (Corrib Lower; Corrib Upper; Mask; Carra; Buffy), and six are from six river water bodies (Aille (Mayo)_020; Aghinish_010; Black

(Shrule)_010; Corrib_020; Corrib_010; Mocorha_010). The list of the public supplies and the associated water bodies is provided in Appendix 4.

- All drinking water sources were compliant with the standards for nitrate and pesticides in 2015.

2.5.2 Bathing waters

- There are no designated bathing waters in the catchment.

2.5.3 Shellfish areas

- There are no designated shellfish areas in the catchment.

2.5.4 Nutrient sensitive areas

- There are no nutrient sensitive areas in the catchment.

2.5.5 Natura 2000 sites

- There are 25 Special Areas of Conservation (SACs) in the catchment (Appendix 5), not all of which have water quality and/or quantity conservation objectives for their qualifying interests.
- Fourteen water bodies (10 rivers, 4 lakes) have been prioritised for action as the water conservation objectives for their habitats and/or species are not being supported by ecological status (Appendix 5).
- There are three Special Protected Areas (SPAs) in the catchment:
    - Lough Carra SPA
    - Lough Corrib SPA
    - Lough Mask SPA

  As there are no specific water quality and quantity supporting conditions identified in the site-specific conservation objectives for these SPAs, the intersecting water bodies are not assigned priority action for WFD protected area purposes in the second cycle.

2.6 Heavily modified water bodies

- There are no designated heavily modified water bodies (HMWB) in the Corrib catchment.
- There are no artificially modified water bodies (AWB) in the Corrib catchment.

3 Significant issues in *At Risk* water bodies

- Alteration of hydromorphological (or physical) conditions are the dominant issue in rivers and lakes in Corrib Catchment. This includes inputs of excess fine sediment and alteration of the morphology of the river channel, which in turn alter habitat conditions. This can occur because of, for example, implementing river and field drainage schemes, forestry activities, animal access, and discharge from quarries.
- Excess phosphate leading to eutrophication is also a concern in several water bodies. While excess ammonia is also of concern, it is only for a limited number of water bodies.
- There are no significant issues for the TraC water body in the Corrib catchment.
- Of the 21 groundwater bodies three are *At Risk*. Ammonia from a waste site and phosphate from two other groundwater bodies have the potential to impact *At Risk* surface water bodies via groundwater.

4 Significant pressures

4.1 Water bodies

- Where water bodies have been classed as *At Risk*, by water quality or survey data, significant pressures have been identified.
- Figure 10 shows a breakdown of the number of *At Risk* water bodies in each significant pressure category.
- The significant pressure affecting the greatest number of water bodies is hydromorphological, followed by agriculture, forestry, other, urban waste water, domestic waste water, peat, diffuse urban, industry and mines and quarries (Figures 10).

4.1.1 Rivers, lakes, transitional and coastal (TraC)

- Significant pressures have been identified through the initial characterisation process in 43 water bodies, 19 of which have multiple pressures. The significant pressures will be refined as further characterisation is carried out.
- There are no significant pressures affecting the Corrib estuary.

4.1.2 Groundwater

- The significant pressure affecting the Waste Facility (W0013-01) (IE_WE_G_0084) groundwater body is a waste disposal facility W0013-01. The key parameter of concern is ammonia. Clarinbridge is impacted by agriculture and septic tanks while Clare-Corrib is impacted by agriculture (Figure 10).

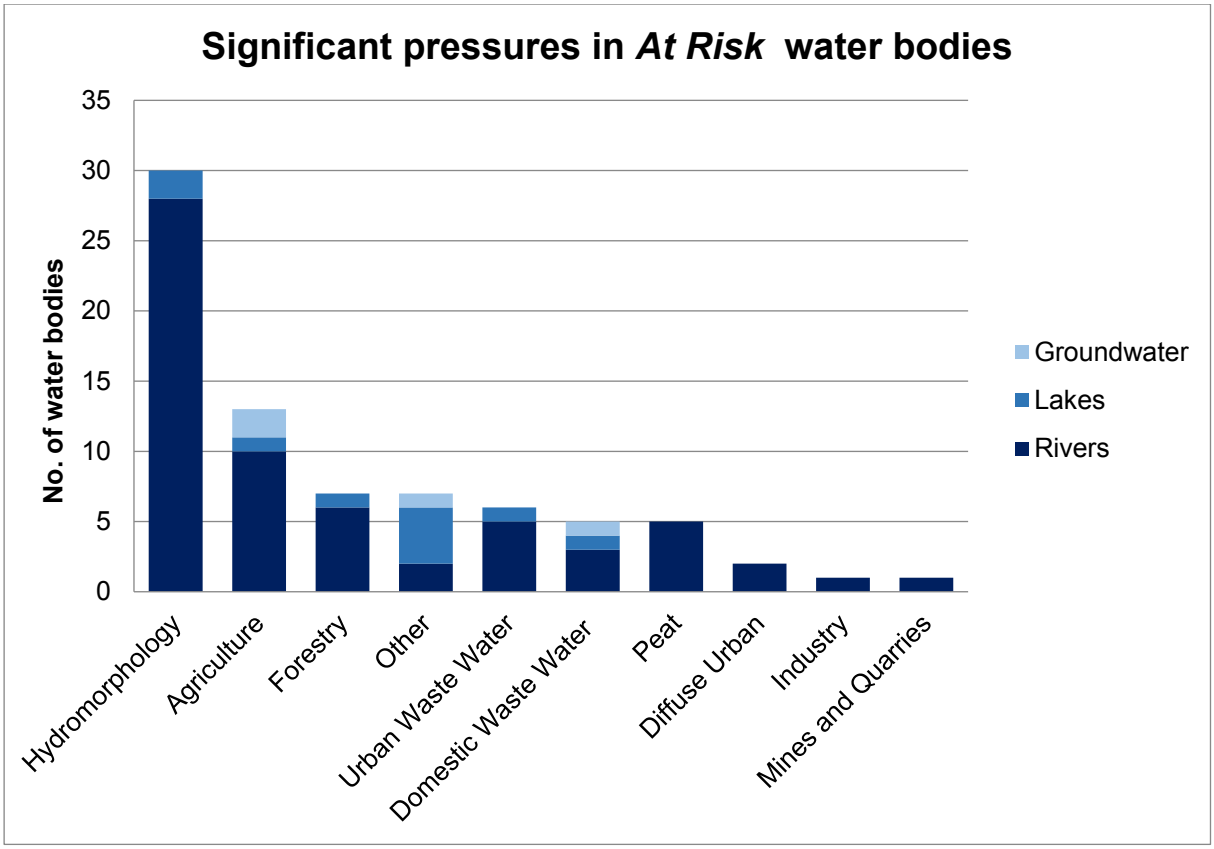


Figure 10. Significant pressures impacting on *At Risk* river water bodies

4.2 Pressure type

4.2.1 Hydromorphology

- Several river water bodies within the catchment are subject to extensive modification due to the presence of drainage schemes. These schemes have led to a significant amount of siltation, especially on the Clare and Sinking subcatchments (Figure 11).
- Water bodies in the Joyce's and Glensaul subcatchments have contributed to the excessive release of sediment, allied to animal access which would appear to be a contributing factor. See Appendix 3 for information on these water bodies (Figure 11).

Table 4a. – Hydromorphological pressures

Pressure	Sub-Catchment	Water body Code
Modification due to Drainage Schemes (Channelisation)	Aghinish_010	Aghinish_010
	Aghinish_010	Cloondaver Stream (N)_010
	Clare (Galway)_070/060	Clare(Galway)_080
	Clare (Galway)_070/060	Clare (Galway)_090
	Clare (Galway)_030	Nanny(Tuam)_030
	Robe_020	Robe_040
	Robe_020	Robe_050
	Aille (Mayo)_010	Claureen_010
	Aille (Mayo)_010	Claureen_020
	Aille (Mayo)_010	Lough Nacorralea Stream) _010
	Sinking_010	Sinking_020
	Robe_010	Ballindine_010
	Robe_010	Robe_010
	Clare(Galway)_010	Clare(Galway)_010
	Black(Shrule)_010	Black(Shrule)_020
	Clare(Galway)_050	Abbert_030
	Clare(Galway)_050	Abbert_040
	Clare(Galway)_060	Clare(Galway)_060
	Clare(Galway)_060	Clare(Galway)_080
	Clare(Galway)_060	Clare(Galway)_090
	Clare(Galway)_060	Cregg_010
	Ballycuirke Lough Stream_010	Ballycuirke_010
	Ballycuirke Lough Stream_010	Owenriff_010
	Ballycuirke Lough Stream_010	Owenriff_020
	Joyces's_010	Loughanillaun Maam Cross
	Joyces's_010	Failmore_010
	Glensaul_010	Finny_010
	Corrib_010	Terryland_010
Land Drainage	Joyce's_010	Maumwee
Bank Erosion (over-grazing)	Joyce's_010	Failmore_010
	Glensaul_010	Owenbrin_010
	Glensaul_010	Owenbrin_020

4.2.2 Agriculture

- Agriculture is a significant pressure in ten river water bodies, one lake and two groundwater bodies (Figure 12). The issues related to farming in this catchment are diffuse phosphorus loss to surface waters due mainly for example, to direct discharges; or runoff from yards, roadways or other compacted surfaces, or runoff from poorly draining soils. Sediment can also be a problem from land drainage works, bank erosion from animal access or stream crossings. The pollution impact potential map showing areas of relative risk for phosphorus loss from agriculture to surface water is given in Appendix 6.

4.2.3 Forestry

- Forestry has been identified as a significant pressure in six river water bodies and one lake water body (Figure 13). The impacts are a combination of forestry taking place on peat soils and extensive felling, which have resulted in heavy siltation and excess nutrients in surface water bodies.

4.2.4 Other significant pressures

- *Invasive Species*
  Four of the lake water bodies (Ballyquirke, Ross GY, Corrib Lower and Mask) have zebra mussels present, which have been identified as a significant pressure (Figure 14).
- *Unknown Anthropogenic*
  Two *At Risk* river water bodies Aille (Mayo)_010 and Gortgarrow Stream_010 have unknown anthropogenic pressures (Figure 15).
- *Waste*
  One *At Risk* Groundwater IE_WE_G_0084 has a Waste Facility (W0013-01), identified as the significant pressure.

4.2.5 Urban waste water treatment plants

- Urban Waste Water Treatment Plants (WWTPs) have been identified as a significant pressure in five *At Risk* water bodies; details are given in Table 5 and Figure 16. Ballyhaunis WWTP, which impacts Dalgan_010, is scheduled to be upgraded in 2024.

Table 5. Waste Water Treatment Plants identified as Significant Pressures in *At Risk* water bodies and expected completion dates for associated upgrade works, where applicable

Facility name	Facility Type	Water Body	2010-15 Ecological Status	Expected Completion Date
Ballyhaunis D0069	2,001 to 10,000 p.e.	Dalgan_010	Poor	2024
Moycullen D0191	2,001 to 10,000 p.e.	Ballyquirke	Moderate	*NA* [1]
Moycullen D0191	2,001 to 10,000 p.e.	Ballycuirke_010	Poor	*NA* [1]
Hollymount A0011	< 500 p.e.	Robe_040	Moderate	*NA* [1]
Ballindine D0355	500 to 1,000 p.e.	Ballindine_010	Poor	*NA* [1]

[1] *Currently not specified in improvement plans.*

4.2.6 Domestic waste water

- Domestic waste water has been identified as a significant pressure in four water bodies – (Black (Shrule)_020, Abbert_040, Ballycuirke_010 and Mask lake). The issue is excess nutrients entering surface waters. Furthermore, a concentration of domestic waste water treatment plants is located on shallow soils overlying karst meaning a pathway can exist between the groundwater and surface water (Figure 17). There is one groundwater body Clarinbridge that is also impacted by domestic waste water.

4.2.7 Extractive industry

- *Peat*

  Peat drainage and extraction has been identified as a significant pressure in five water bodies – (Clare (Galway)_010, Failmore_010, Lough Nacorralea Stream_010, Sinking_020, and Robe_030). Elevated nutrient concentrations and increased sedimentation are the significant impacts (Figure 19).

- *Quarry*

  A quarry has been identified as a significant pressure in Claureen (Mayo)_010, impacting on habitat morphology (Figure 18).

4.2.8 Diffuse urban

- Diffuse urban pressures, caused by misconnections, leaking sewers and runoff from paved and unpaved areas, have been identified as a significant pressure in two river water bodies – Dalgan_010 and Terryland_010 (Figure 19). Elevated concentrations of phosphates and ammonia are the significant impacts.

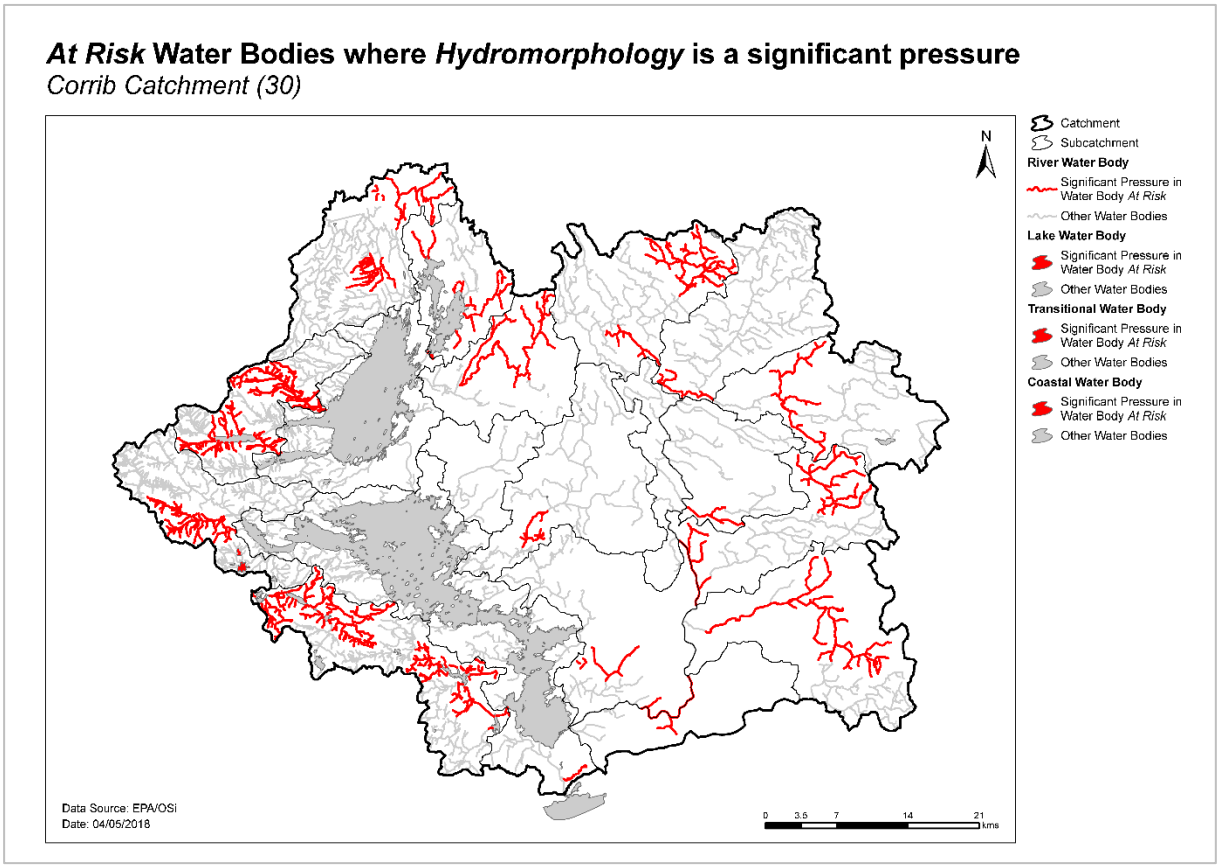


Figure 11. Water bodies that are *At Risk* and are impacted by hydromorphological pressures

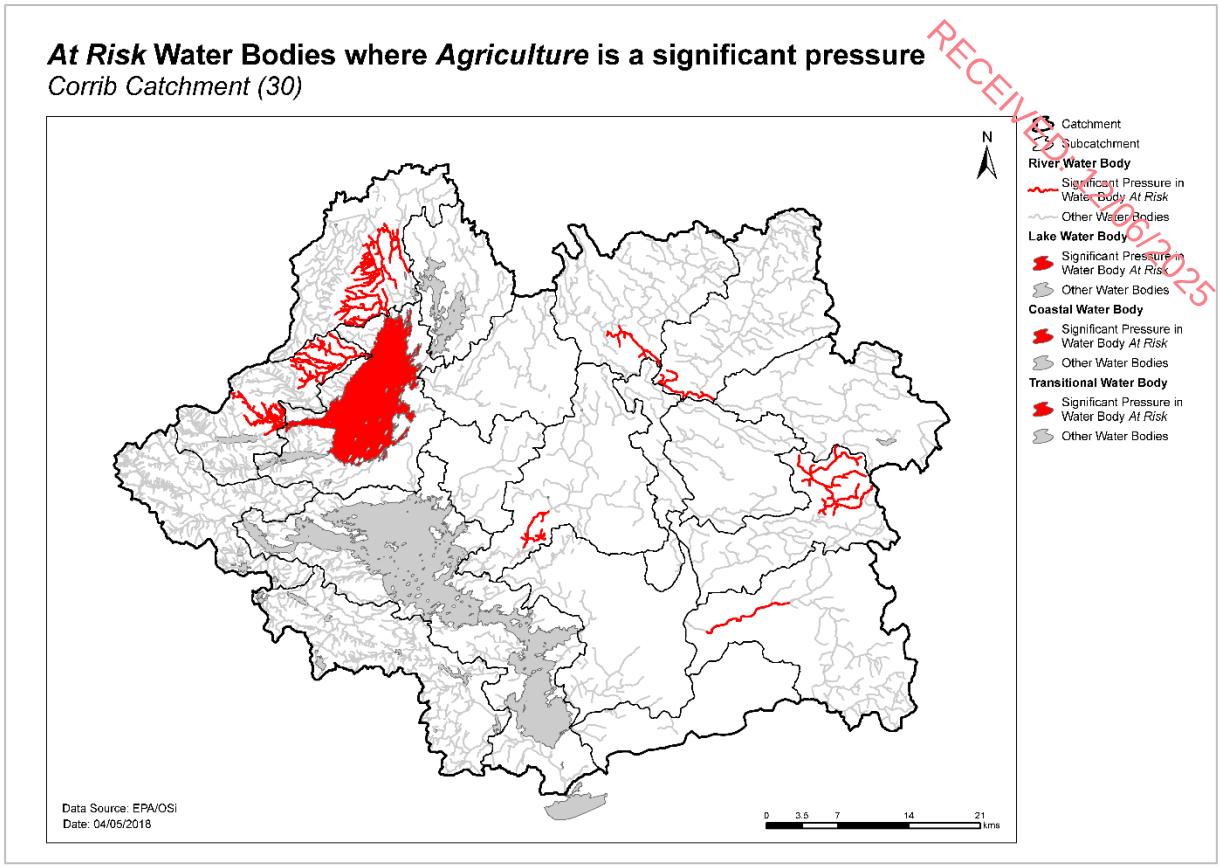


Figure 12. Water bodies that are *At Risk* and are impacted by agricultural activities

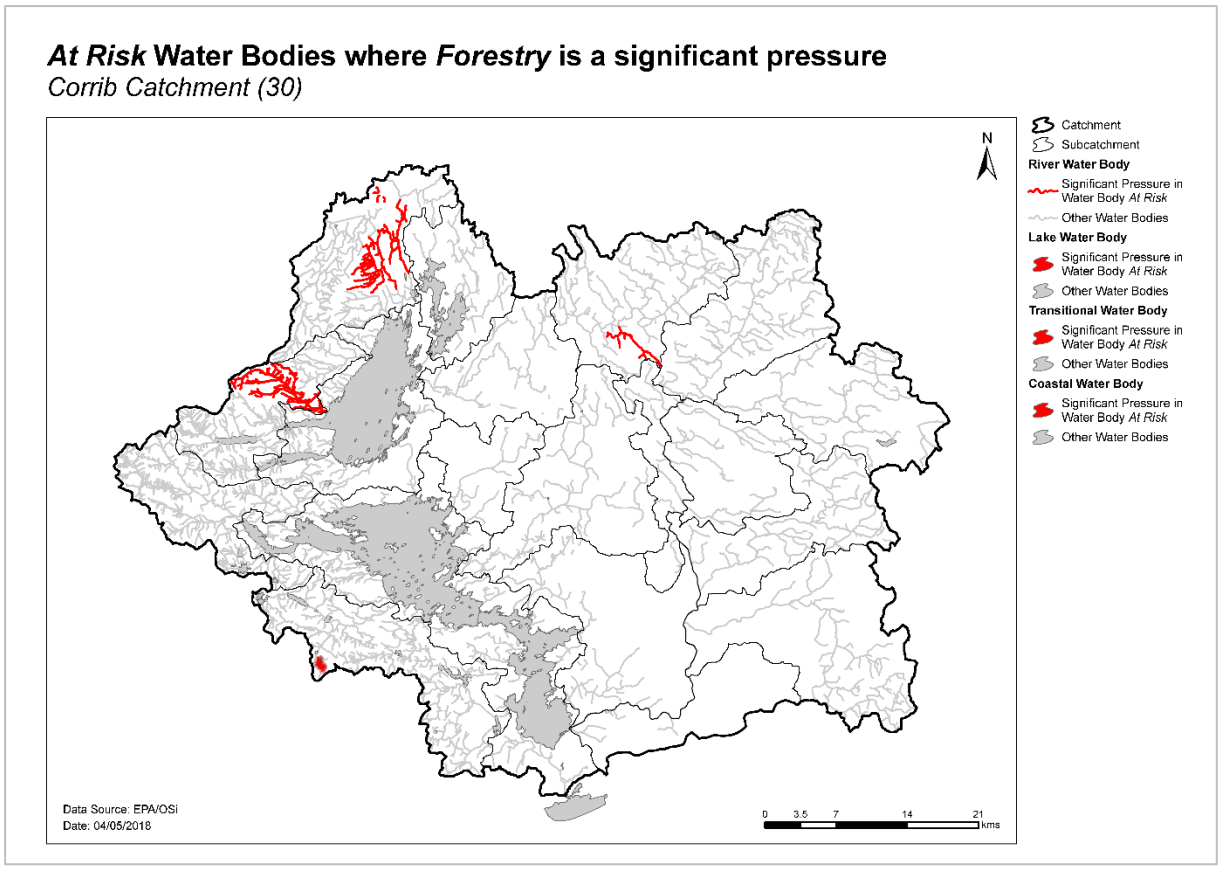


Figure 13. Water bodies that are *At Risk* and are impacted by forestry activities

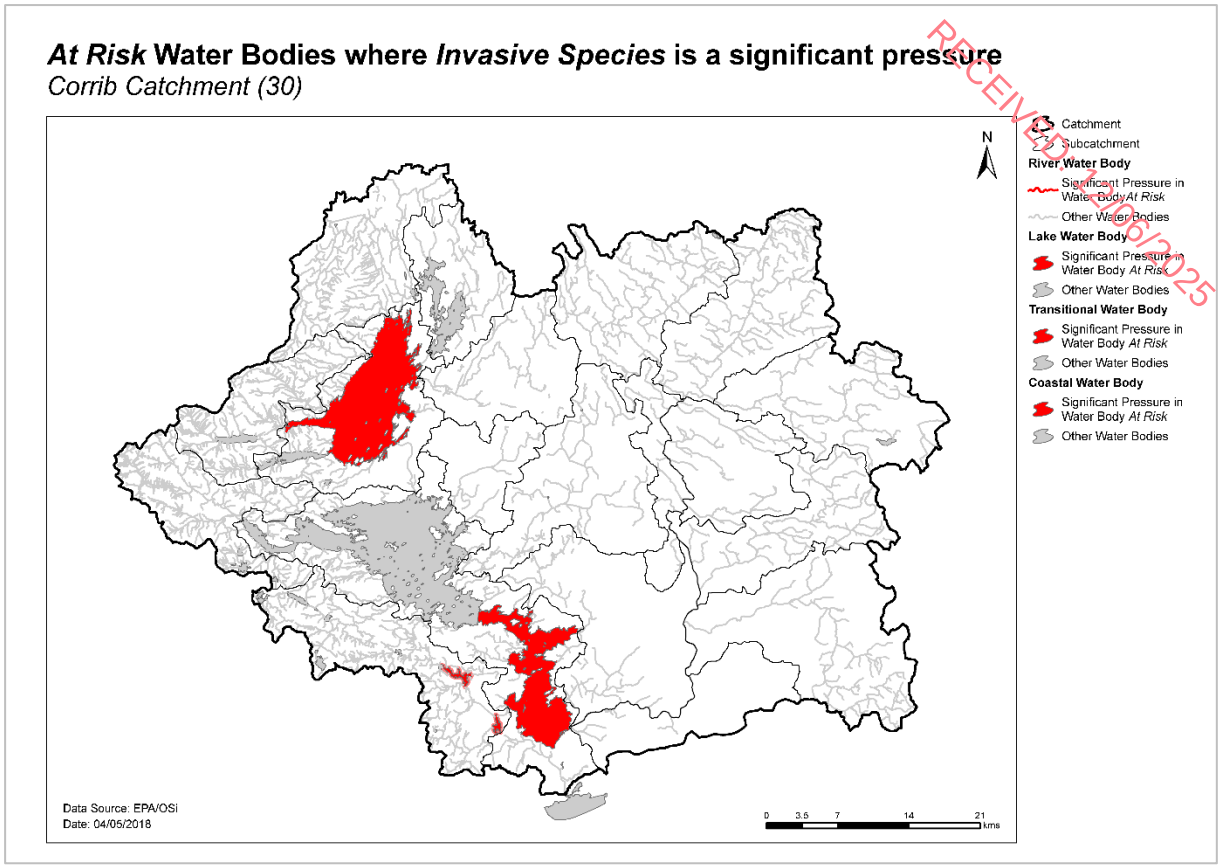


Figure 14. Water bodies that are *At Risk* and are impacted by Invasive Species

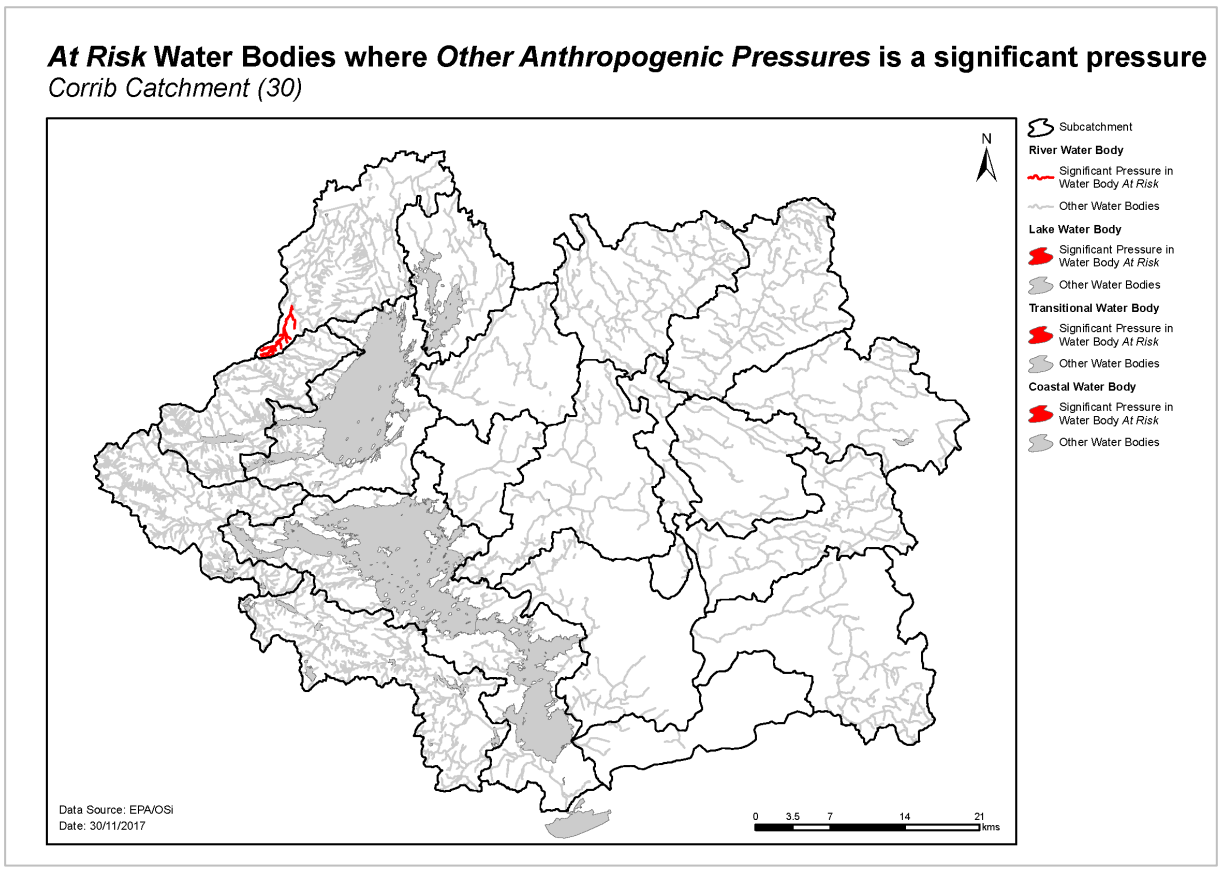


Figure 15. Water bodies that are *At Risk* and are impacted by other anthropogenic pressure

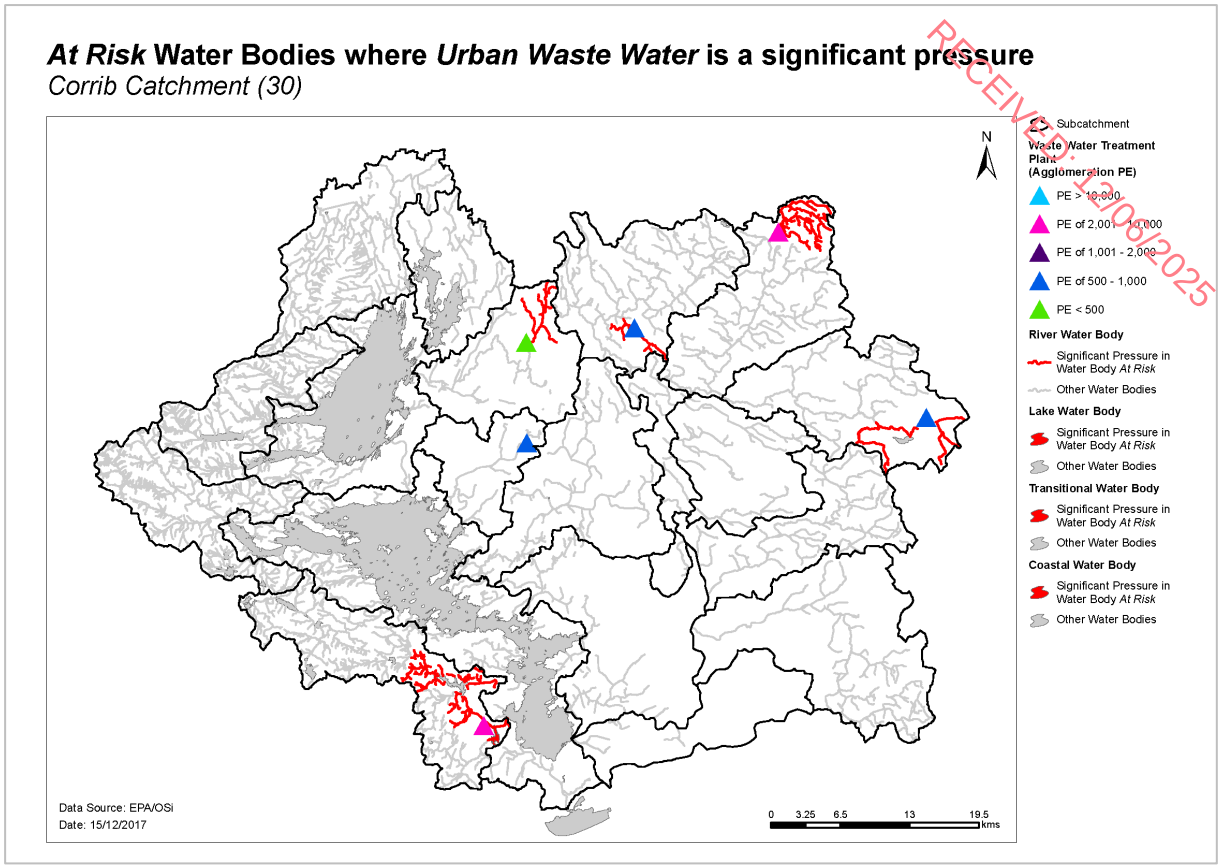


Figure 16. Water bodies that are *At Risk* and are impacted by urban waste water

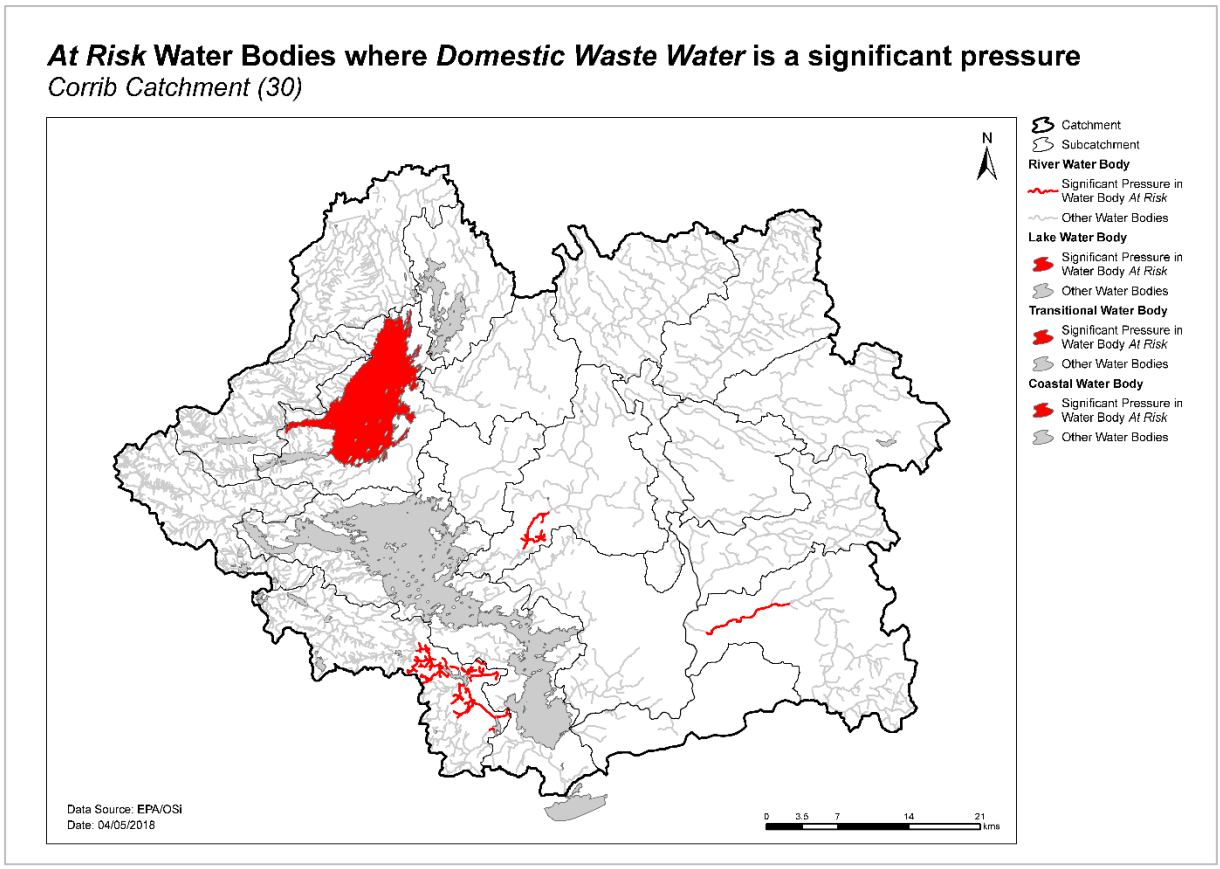


Figure 17. Water bodies that are *At Risk* and are impacted by domestic waste water

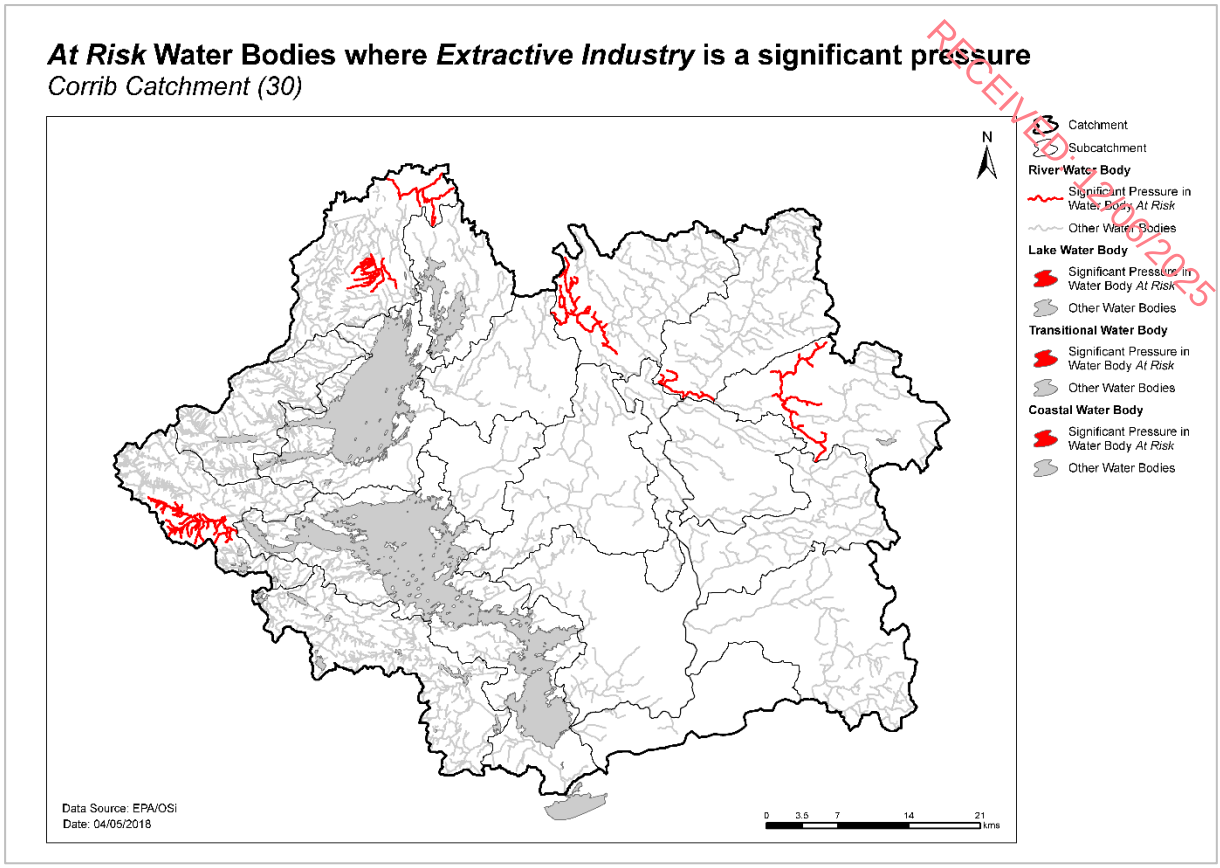


Figure 18. Water bodies that are *At Risk* and are impacted by the Extractive industry

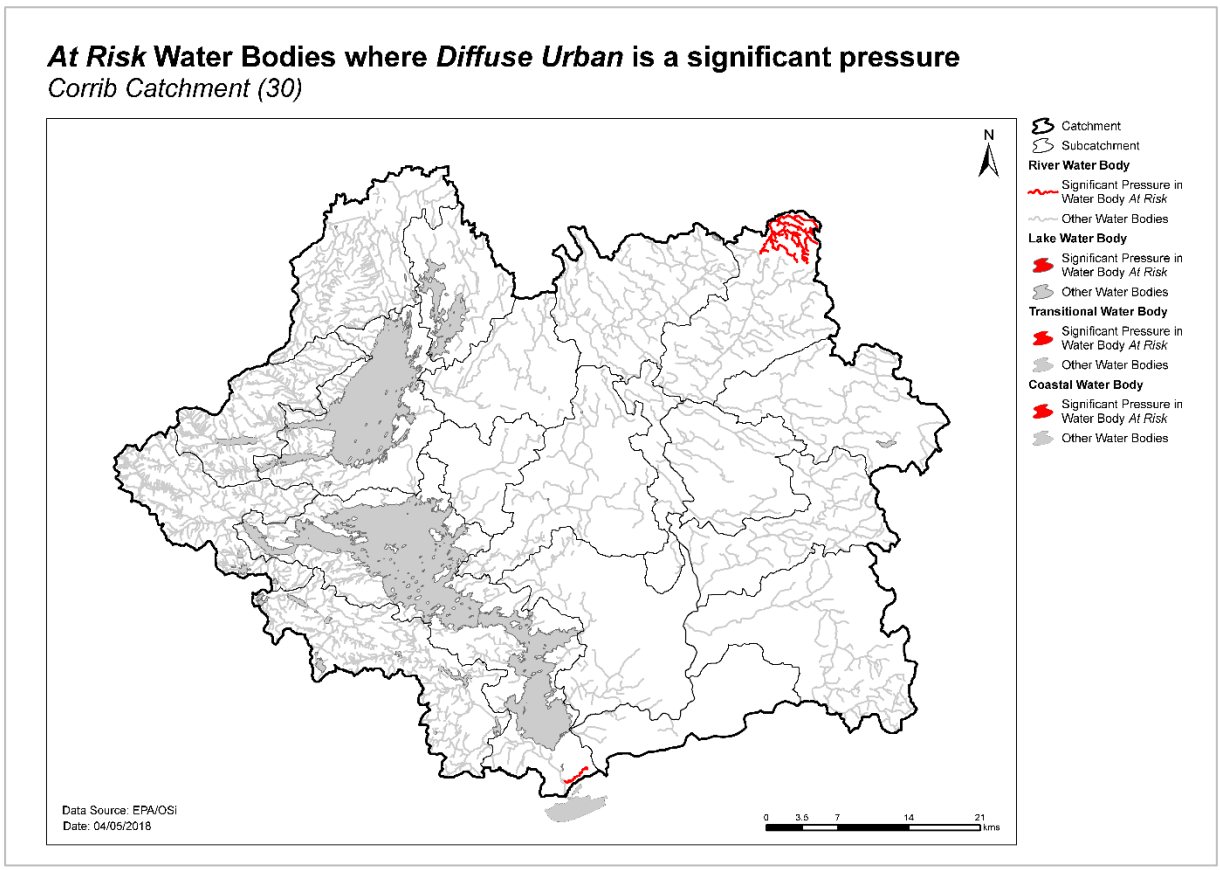


Figure 19. Water bodies that are *At Risk* and are impacted by diffuse urban impacts

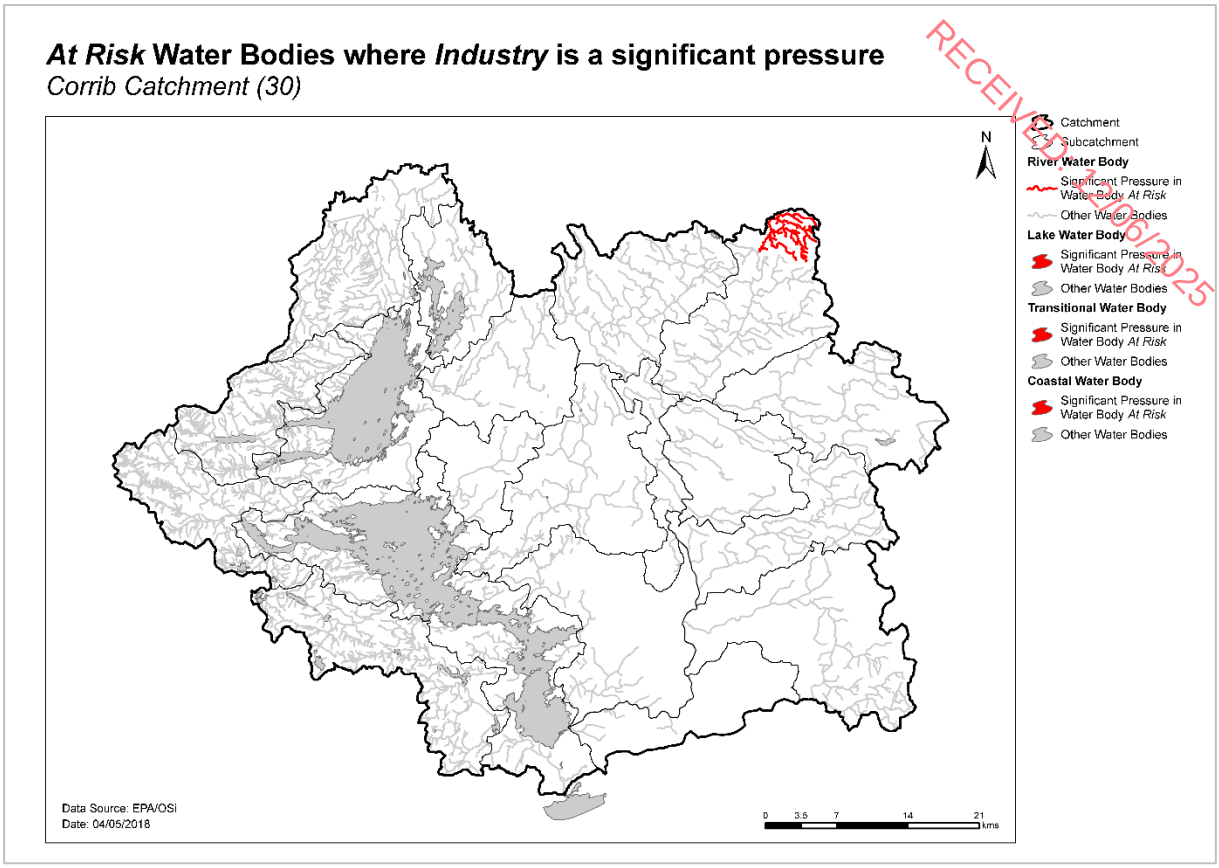


Figure 20. Water bodies that are *At Risk* and are impacted by industry

5 Load reduction assessment

5.1 River water body load reductions

- The results of the main channel assessment for both the Corrib and Clare (Galway) rivers indicate that orthophosphate, ammonia and TON concentrations are consistently low (Appendix 2).
- For water bodies where phosphorus monitoring data are available, the reduction in P load that would be required to bring the mean concentration back to the EQS of 0.035 mg/l as P, can be estimated using a simple method based on the average 2013 to 2015 concentration and the average flow, or the estimated 30th percentile flow (Q30) where flow data are not available. The relative load reductions are ranked on a national scale from Very High (>1 kg/Ha/y), to High (0.5-1 kg/Ha/y), to Medium (0.25-0.5 kg/Ha/y) to Low (<0.25 kg/Ha/y). Note that P load reductions may also be required in other water bodies, but without chemistry monitoring data a quantitative estimate cannot be calculated.
- In the Corrib catchment, water chemistry data are available for 47 of the 98 water bodies monitoring stations. The available data indicate that load reduction is required in one river water body (Table 7).

Table 7. Relative load reductions required in monitored water bodies that are *At Risk*

Water body	P Load Reduction Required
Ballindine_010	Low

5.2 TraC load reductions

Some 18 estuaries in Ireland have been monitored on a continual basis since 1990 as part of Ireland's commitment under the Convention for the Protection of the Marine Environment of the North-East Atlantic (the Ospar Convention). This has shown that generally over the long term, nutrients have decreased but further reduction will be required in many cases to support Good Ecological Status. However, many estuaries have not been monitored to the same degree, and where monitoring data in insufficient, an ongoing programme of modelling has been undertaken to estimate potential nutrient load removal from contributing sub-catchments.

Different estuaries may require reductions in different nutrients. Further modelling work is required to determine precisely what load reductions are required, but in the interim, further monitoring will be carried out to assess the improvements resulting from various planned measures, and to confirm the nature of the issues.

- The TraC water body in the Corrib Catchment is not N or P limited.
- As part of the Irelands commitment to the Ospar Convention, nutrient flux or load monitoring has been carried out on the Corrib Estuary since 1990 (Figure 20a and 20b). Further analysis of these nutrient load trends is available at http://dx.doi.org/10.3318/BIOE.2016.23.

Figure 20a – Total Nitrogen Load (Tonnes/year) 1990-2015

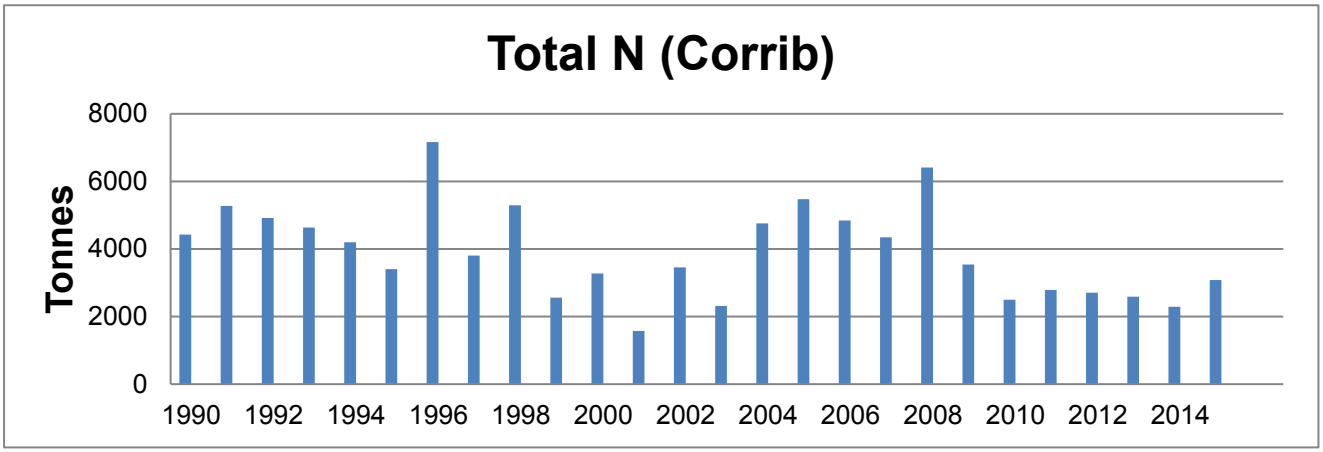
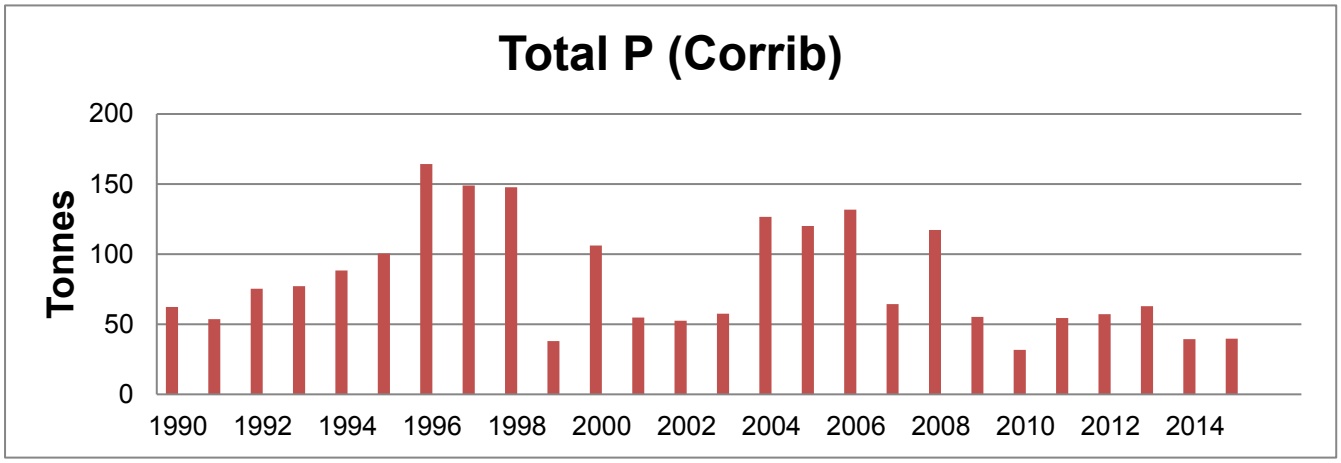


Figure 20b – Total Phosphorus Load (Tonnes/year) 1990-2015



6 Further characterisation and local catchment assessments

- Further characterisation through local catchment assessments is needed in 43 of the *At Risk* water bodies to refine the understanding of the significant pressures at the site/field scale so that specific and targeted measures can be identified (Table 8).
- Further characterisation through Investigative Assessments is needed in 18 of the *Review* water bodies to refine the understanding of the significant pressures at the site/field scale so that specific and targeted measures can be identified.
- Brief definitions on the 10 IA assessment scenarios are given in Appendix 7.

Table 8. Local Catchment Assessment Allocation for *At Risk* and *Review* River and Lake Water Bodies in the Catchment

Risk	IA 1	IA 2	IA 3	IA 4	IA 5	IA 6	IA 7	IA 8	IA 9	IA 10	Total
At Risk	19	1	2	0	4	2	22	9	2	0	61
Review	8	0	9	0	0	0	0	0	2	0	19
Note water bodies may have multiple categories of Local Catchment Assessments											

7 Catchment summary

- Of the 97 river water bodies, 36 are *At Risk* of not meeting their WFD objectives.
- Seven of 31 lake water bodies are *At Risk* of not meeting their WFD objectives.
- Hydromorphological (or physical) conditions (including the input of high levels of fine sediment) and poor habitat quality are major issues for a high proportion of *At Risk* surface water bodies.
- Excess phosphorus leading to eutrophication is also a concern in several water bodies. While excess ammonium is also of concern, it is only for a limited number of water bodies.
- There is one transitional water body, the Corrib estuary, and it is *Not at Risk*.
- There are three groundwater bodies which is *At Risk* - IE_WE_G_0084, Waste Facility (W0013-01) due to ammonia and, Clarinbridge and Clare-Corrib due to phosphate, which have the potential to impact on associated *At Risk* surface water bodies.

8 Areas for Action

The characterisation outcomes described above have highlighted that there is significant work to do in the catchment to protect and restore water quality, and meet the objectives of the WFD. During the development of the draft river basin management plan it became apparent that there would be a need to prioritise areas for collective action so that the best return on investment could be achieved. 190 Areas for action have been selected nationally in a process as described below. There are three areas for action in the Corrib catchment.

8.1 Process of Selection

Following the publication of the draft river basin management plan in early 2017, the EPA and the Local Authority Waters and Communities Office (LAWCO) jointly led a collaborative regional workshop process to determine where, from a technical and scientific perspective, actions should be prioritised in the second cycle. The prioritisation process was based on the priorities in the draft river basin management plan, the evidence from the characterisation process, and the expertise, data and knowledge of public body staff with responsibilities for water and the different pressure types. The recommended areas for action selected during the workshops were then agreed by the Water and Environmental Regional Committees.

The recommended areas for action are an initial list of areas where action will be carried out in the second cycle. All water bodies that are *At Risk* still however, need to be addressed. As issues are resolved, areas for action will be removed from the list and new areas will be added. If additional monitoring shows that new issues have arisen, new areas may become a priority and may need to be added to the work programme.

The initial list of areas for action is not therefore considered as a closed or finite list; it simply represents the initial areas where work will be carried out during the second WFD planning cycle from 2018 to 2021.

8.2 Outcomes of process

The outcomes for the Corrib catchment are summarised below.

- Three recommended areas for actions (Table 9, Figure 21) were selected.
- These are the Owenriff, Failmore and LoughMask/Carra.
- These include 25 *At Risk* and 10 *Review* river and lake water bodies.
- Two groundwater bodies, which are in *Review* due to groundwater contribution of nutrients to surface water bodies, intersect with one of the recommended areas for action, see Table 10. Actions taken to improve surface water will need to take account of the groundwater contribution to surface water.

A remaining 26 *At Risk* and *Review* surface water bodies were not included in the recommended areas for action for the second cycle. The distribution of these is presented in Figure 22. These include:

- twenty-six river and lake water bodies – 18 *At Risk* and 8 *Review.*

Table 9. Recommended Areas for Action in the Corrib Catchment

Recommended area for action	Number of water bodies	SCs	Local authority	Reason for Selection
Owenriff	10	30_14	Galway	• Three *At Risk* water bodies: top 8 Freshwater Pearl Mussel water bodies. • Two *At Risk* High Ecological Status objective water bodies. • One deteriorated water body. • Headwaters flowing into the Corrib.
Failmore	5	30_15	Galway	• Test case for examining deteriorated water bodies in areas of low human activity. • One deteriorated High Ecological Status objective river water body. • Two deteriorated High Ecological Status lake water bodies but low confidence deteriorations. • Headwaters flowing into the Corrib.
Lough Mask and Carra	20	30_16, 30_17, 30_7, 30_3, 30_6	Mayo	• Carra habitat - unique to Europe. Research project to happen on Lough Cara (2019). Tourism area. • Eleven deteriorated water bodies. • Three At Risk High Ecological Status objective water bodies. • Lough Mask is an important drinking water source.

Table 10. Groundwater bodies intersecting with surface water bodies in recommended areas for action

Groundwater bodies			Intersecting surface water body		Recommended area for action
Code	Name	Risk	Code	Name	
IE_WE_G_0019	Cong-Robe	Review	IE_WE_30R010400	ROBE_040	Lough Mask and Carra
			IE_WE_30R010600	ROBE_050	
			IE_WE_30R220540	RATHMALIKEEN_010	
			IE_WE_30_665a	Mask	
IE_WE_G_0022	Ballyhean	Review	IE_WE_30A030100	AGHINISH_010	
			IE_WE_30A340980	ANNIES_30_010	
			IE_WE_30C090100	CLOONDAVER STREAM (NORTH)_010	
			IE_WE_30C120400	CLAUREEN (MAYO)_010	
			IE_WE_30C120700	CLAUREEN (MAYO)_020	
			IE_WE_30_347	Carra	
			IE_WE_30_665a	Mask	

9 Environmental Objectives

The environmental objectives are the target status for each *At Risk* or *Review* water body and the date by which that status is expected to be achieved (Appendix 3). Where a water body is *Not at Risk* and is already at its target status, the environmental objective is deemed to have been met.

9.1 Surface Water

- Assuming resources are available and actions are taken in the recommended areas for action, of the 25 *At Risk* river water bodies, it is predicted that 6 (24%) will improve by 2021 and 18 (76%) will achieve their objective by 2027. For the ten *Review* river water bodies, the absence of information means that there is no scientific basis to quantify an environmental objective date, and therefore a 2027 date is set for these water bodies, see Table 11.

Table 11. Environmental objective dates for water bodies in the Areas for Action

Risk Category	No. of Water Bodies	No. of WBs for 2021 Improvement	No. of WBs for 2027 Status Improvement
At Risk	25	6	19
Review	10	0	10
Not at Risk	0	0	0
Total	35	6	29

- Sixty-eight water bodies have met their 2015 environmental objective.
- As action is not yet planned to be taken in the remaining 18 *At Risk* surface water bodies, a 2027 date is applied to all 18 water bodies.
- For the eight *Review* surface water bodies, the absence of information on these water bodies means that there is no scientific basis to quantify an environmental objective date and therefore a 2027 date is applied, see Table 12.

Table 12. Environmental objectives dates in the *At Risk* and *Review* surface water bodies not included in Areas for Action

Risk Category	No. of Water Bodies	No. of WBs for 2021 Improvement	No. of WBs for 2027 Status Improvement
Rivers			
At Risk	17	0	17
Review	5	0	5
Lakes			
At Risk	1	0	1
Review	3	0	3
Total	26	0	26

9.2 Groundwater

- Twenty of the 21 groundwater bodies are currently Good status and, therefore, have met their environmental objectives.
- The one groundwater body, Waste Facility (W0013-01), in the Corrib catchment that is less than Good status has an environmental objective date of 2027.

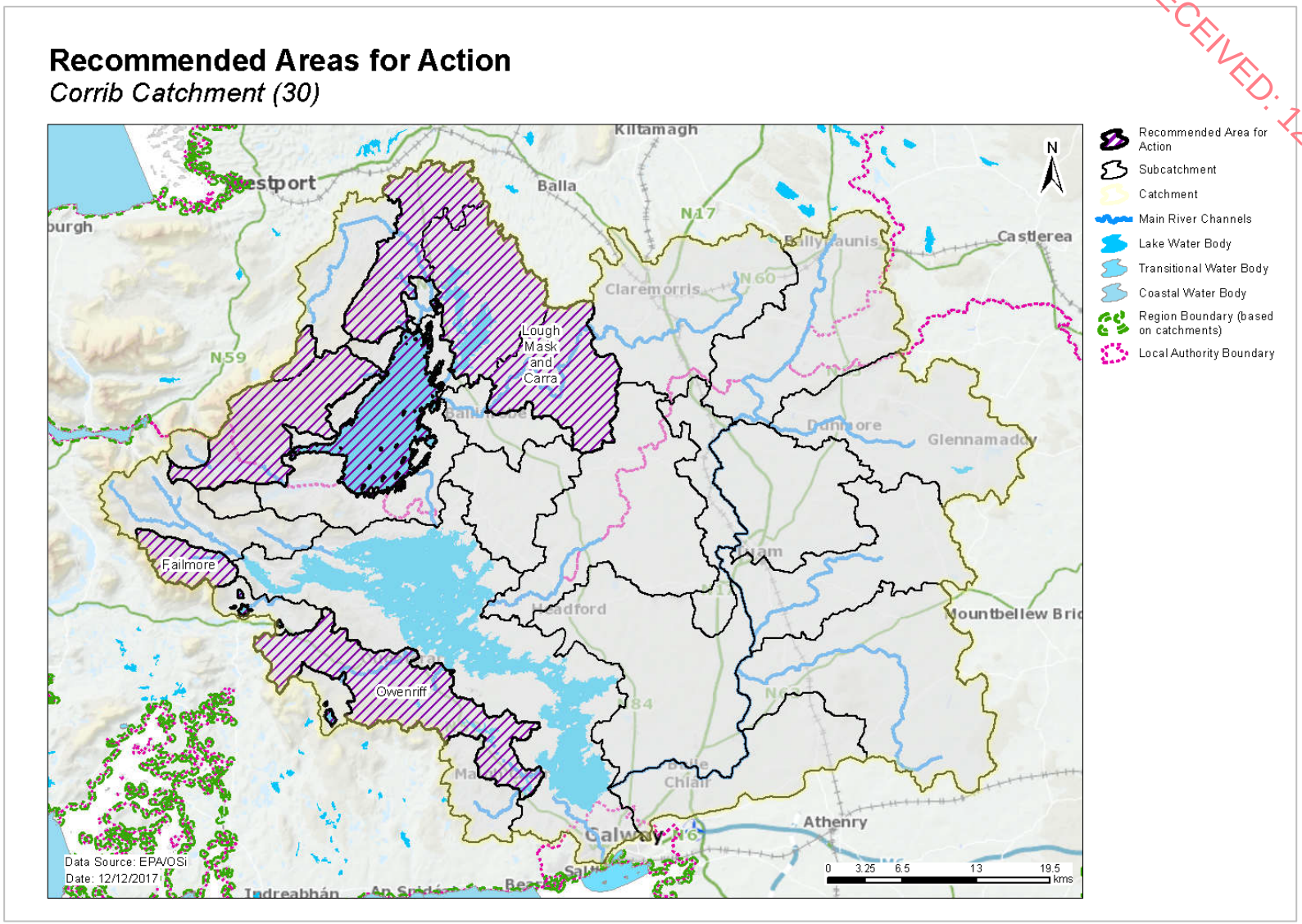


Figure 21. Location of Recommended Areas for Action in the Corrib Catchment

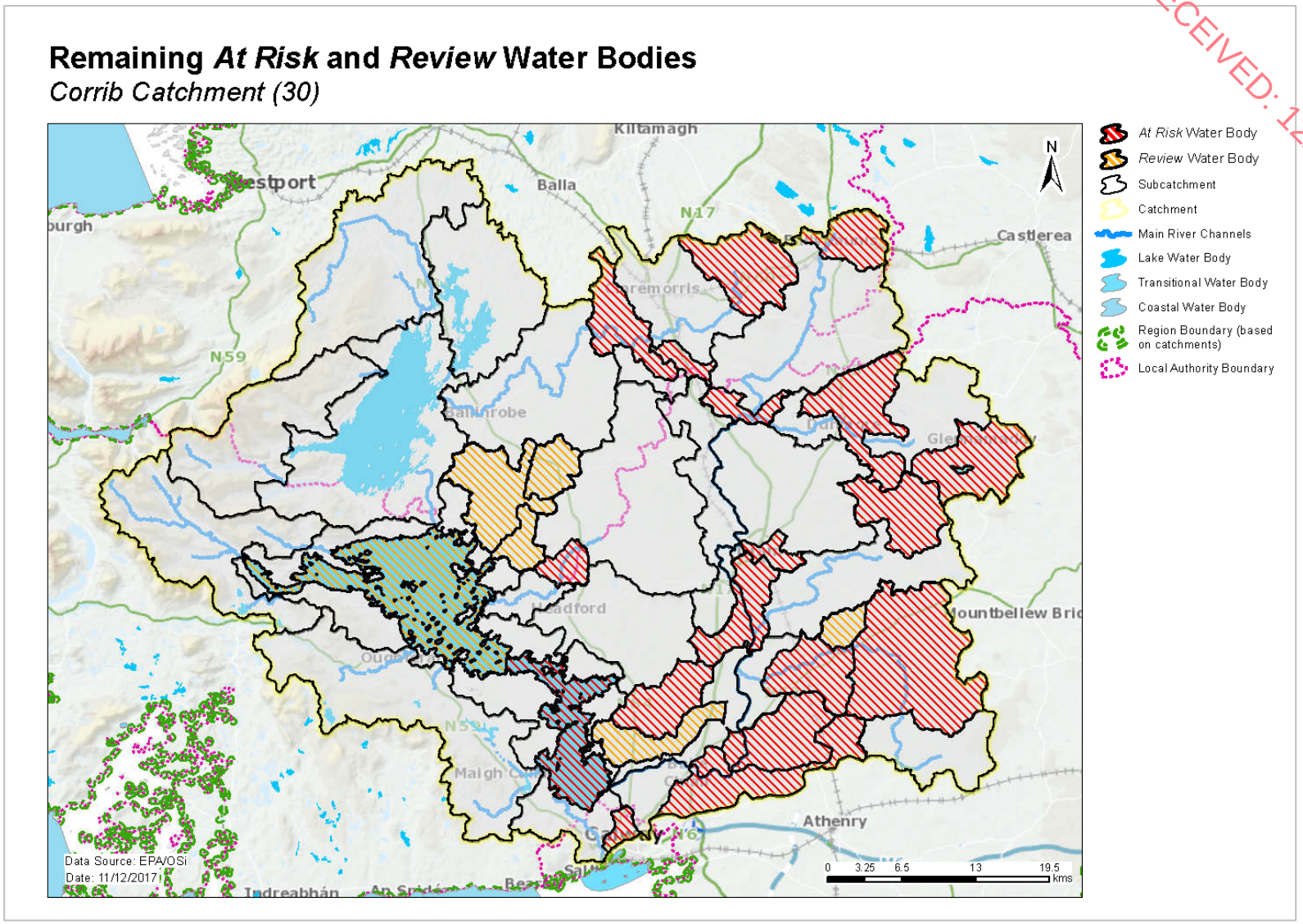


Figure 22. Location of *At Risk* and *Review* water bodies located outside Recommended Areas for Action in the Corrib Catchment

10 Acknowledgements

This Corrib Catchment (Version 3) has been produced by the Catchment Science & Management Unit, EPA, with the assistance of the following:

- Galway County Council
- Mayo County Council.
- Roscommon County Council.
- Inland Fisheries Ireland.
- Local Authorities Waters & Communities Office.
- Irish Water.
- RPS Group.
- Ecological Monitoring & Assessment Unit, EPA.
- Hydrometric & Groundwater Section, EPA.
- Informatics Section, EPA.
- Laboratories, EPA.
- Office of Environmental Enforcement, EPA.
- DAFM Agriculture.
- DAFM Forest Service.
- Coillte.
- Teagasc.
- Geological Survey Ireland.
- National Parks and Wildlife Service.
- Marine Institute.

Appendix 1 High ecological status objective water bodies

Water body/ Site	Type	Codes	2015 Status
Bofin GY	Lake	IE_WE_30_335	High
GLENGAWBEG_010	River	IE_WE_30G060100	High
OWENRIFF (CORRIB)_010	River	IE_WE_30O020070	Good
OWENRIFF (CORRIB)_020	River	IE_WE_30O020200	Good
Maumwee	Lake	IE_WE_30_343	Good
Loughanillaun Maam Cross	Lake	IE_WE_30_348	Good
FAILMORE_010	River	IE_WE_30F010100	Good
Mask	Lake	IE_WE_30_665a	Good
CAMMANAGH_010	River	IE_WE_30C040100	High
FINNY_010	River	IE_WE_30F030100	Good
AILLE (MAYO)_030	River	IE_WE_30A020250	Good

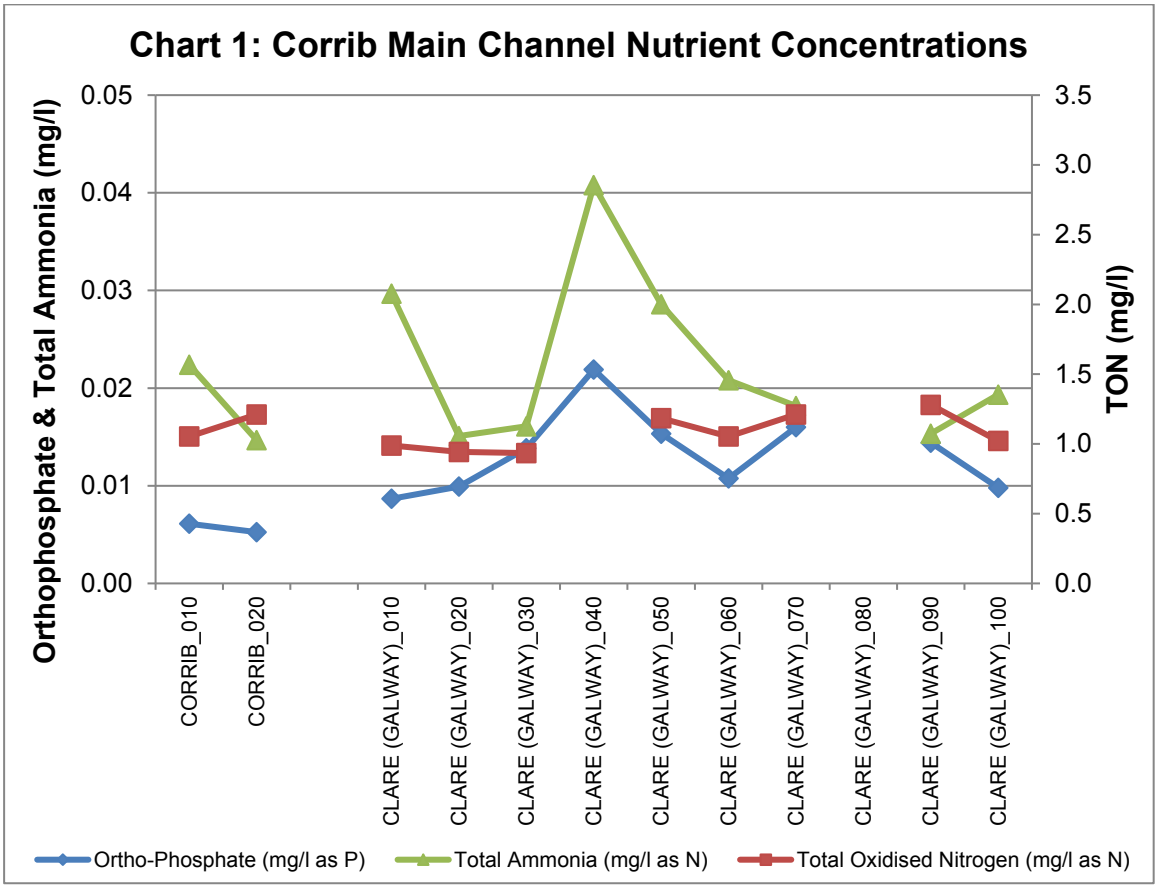
Appendix 2 Catchment scale nutrient concentrations and in-stream loads

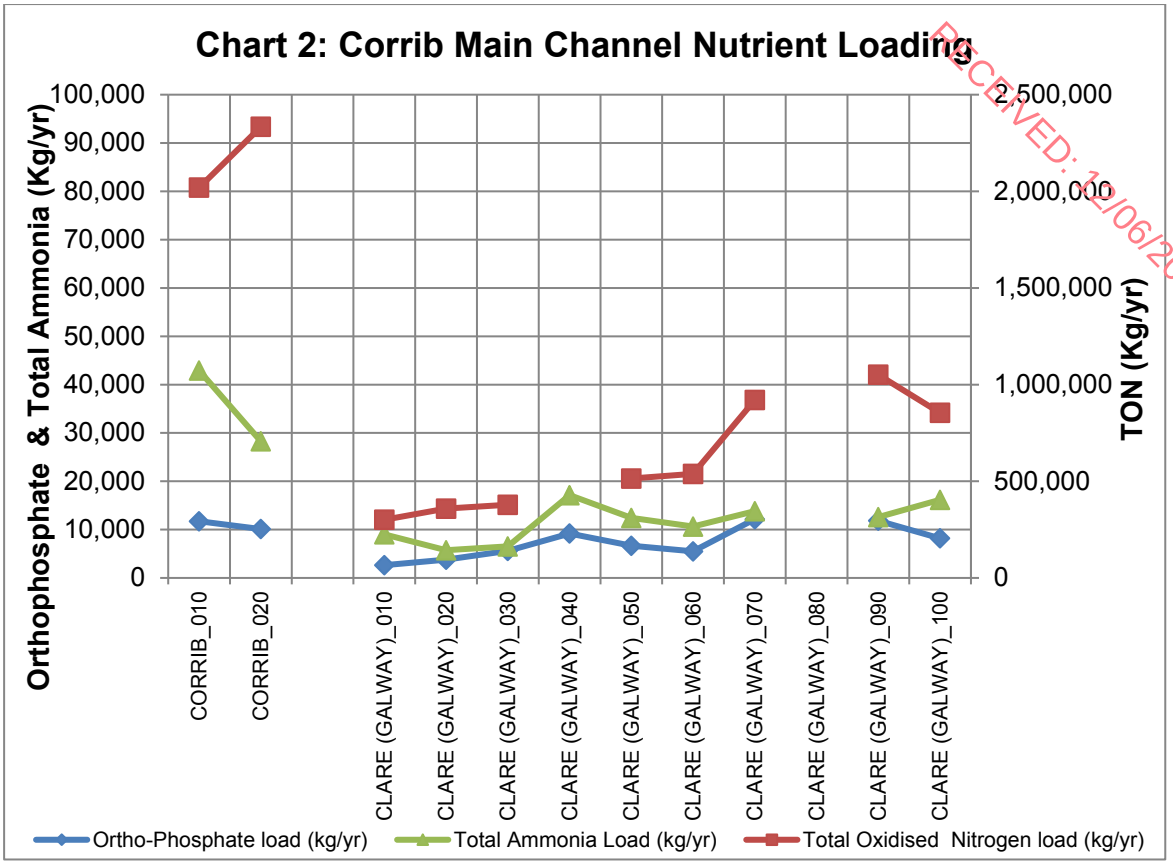
The results of the instream water quality assessment for the Corrib catchment main channels are illustrated in Chart 1 and Chart 2.

Average orthophosphate concentrations along the Corrib River are low with values of 0.006 and 0.005mg/l at CORRIB_010 and CORRIB_020. The Environmental Quality Standard (EQS) of 0.035mg/l is not exceeded at either of the main channel monitoring points. Total oxidised nitrogen (TON) concentrations increase from CORRIB_010 to CORRIB_020, but remain below the 2.6mg/l threshold. Ammonia concentrations decrease from 0.022 to 0.014mg/l along the main channel, and remain below the EQS for good status (0.065mg/l).

Average orthophosphate concentrations along the Clare (Galway) river ranged from 0.009 to 0.022mg/l. The EQS is not exceeded at any of the main channel sampling locations. TON concentrations are relatively uniform throughout the river, ranging from 0.93 to 1.28mg/l, and remain below the 2.6mg/l threshold value. Ammonia concentrations are consistently below the EQS, with a peak in concentration (0.041mg/l) at CLARE (GALWAY)_040.

Orthophosphate, TON and ammonia loads in both the Corrib and Clare (Galway) rivers typically mirrored the concentration profiles (Chart 2).





Appendix 3 Summary information on *At Risk* and *Review* surface water bodies

Subcatchment code	Water body code	Water body name	Water body type	Risk	Ecological Status 07-09	Ecological Status 10-15	High Ecological Status Objective Water Body Y/N	Significant Pressures	Date to Meet Environmental Objective	Recommended Area for Action Name
30_2	IE_WE_30K010220	Kilmaine_010	River	Review	Unassigned	Unassigned	N		2027	
30_2	IE_WE_30K010300	Kilmaine_020	River	Review	Unassigned	Unassigned	N		2027	
30_2	IE_WE_30K220930	Knocknageeha 30_010	River	Review	Unassigned	Unassigned	N		2027	
30_3	IE_WE_30_347	Carra	Lake	Review	Good	Good	N		2027	Lough Mask and Carra
30_3	IE_WE_30A030100	Aghinish_010	River	At Risk	Good	Moderate	N	Hymo	2027	Lough Mask and Carra
30_3	IE_WE_30A340980	Annies_30_010	River	Review	Unassigned	Unassigned	N		2027	Lough Mask and Carra
30_3	IE_WE_30C090100	Cloondaver Stream (North)_010	River	At Risk	Moderate	Moderate	N	Hymo	2027	Lough Mask and Carra
30_5	IE_WE_30N010300	Nanny (Tuam)_030	River	At Risk	Poor	Moderate	N	Hymo	2027	
30_6	IE_WE_30R010400	Robe_040	River	At Risk	Moderate	Moderate	N	Hymo,UWW	2027	Lough Mask and Carra
30_6	IE_WE_30R010600	Robe_050	River	At Risk	Good	Moderate	N	Hymo	2027	Lough Mask and Carra
30_6	IE_WE_30R220540	Rathmalikeen_010	River	Review	Unassigned	Unassigned	N		2027	Lough Mask and Carra
30_7	IE_WE_30_328	Cloon MO	Lake	Review	Unassigned	Unassigned	N		2027	Lough Mask and Carra
30_7	IE_WE_30A020010	Aille (Mayo)_010	River	At Risk	Moderate	Moderate	N	Other	2027	Lough Mask and Carra
30_7	IE_WE_30A020250	Aille (Mayo)_030	River	At Risk	High	Good	Y	Ag,For	2021	Lough Mask and Carra
30_7	IE_WE_30C120400	Claureen (Mayo)_010	River	At Risk	Poor	Poor	N	Hymo,M+Q	2027	Lough Mask and Carra
30_7	IE_WE_30C120700	Claureen (Mayo)_020	River	At Risk	Good	Moderate	N	For,Hymo	2027	Lough Mask and Carra
30_7	IE_WE_30L030400	Lough Nacorralea Stream_010	River	At Risk	Good	Moderate	N	Ag,For,Hymo,Peat	2027	Lough Mask and Carra
30_7	IE_WE_30S020400	Srah Stream_010	River	At Risk	Good	Bad	N	Ag	2027	Lough Mask and Carra
30_8	IE_WE_30_308	Kiltullagh	Lake	Review	Unassigned	Unassigned	N		2027	
30_8	IE_WE_30G050025	Gortgarrow Stream_010	River	At Risk	Moderate	Moderate	N	Other	2027	
30_8	IE_WE_30S010300	Sinking_020	River	At Risk	Poor	Moderate	N	Hymo,Peat	2027	
30_9	IE_WE_30_341	Bekan	Lake	Review	Moderate	Unassigned	N		2027	
30_9	IE_WE_30B030200	Ballindine_010	River	At Risk	Poor	Poor	N	Ag,For,Hymo,UWW	2027	
30_9	IE_WE_30R010030	Robe_010	River	At Risk	Moderate	Moderate	N	Hymo	2027	
30_9	IE_WE_30R010310	Robe_030	River	At Risk	Poor	Moderate	N	Peat	2027	
30_10	IE_WE_30C010100	Clare (Galway)_010	River	At Risk	Moderate	Moderate	N	Ag,Hymo,Peat	2027	
30_10	IE_WE_30D010200	Dalgan_010	River	At Risk	Poor	Poor	N	DU,Ind,UWW	2027	
30_11	IE_WE_30B020300	Black (Shrule)_020	River	At Risk	Good	Moderate	N	Ag,DWW,Hymo	2027	
30_12	IE_WE_30A010300	Abbert_030	River	At Risk	Moderate	Moderate	N	Hymo	2027	
30_12	IE_WE_30A010500	Abbert_040	River	At Risk	Moderate	Moderate	N	Ag,DWW,Hymo	2027	

Subcatchment code	Water body code	Water body name	Water body type	Risk	Ecological Status 07-09	Ecological Status 10-15	High Ecological Status Objective Water Body Y/N	Significant Pressures	Date to Meet Environmental Objective	Recommended Area for Action Name
30_12	IE_WE_30F170810	Feagh_East_010	River	Review	Unassigned	Unassigned	N		2027	
30_13	IE_WE_30C010800	Clare (Galway)_060	River	At Risk	Moderate	Moderate	N	Hymo	2027	
30_13	IE_WE_30C011100	Clare (Galway)_080	River	At Risk	Good	Moderate	N	Hymo	2027	
30_13	IE_WE_30C011200	Clare (Galway)_090	River	At Risk	Unassigned	Moderate	N	Hymo	2027	
30_13	IE_WE_30C030150	Cregg_010	River	At Risk	Moderate	Moderate	N	Hymo	2027	
30_13	IE_WE_30C030200	Cregg_020	River	Review	Unassigned	Unassigned	N		2027	
30_14	IE_WE_30_315	Buffy	Lake	Review	Unassigned	Unassigned	N		2027	Owenriff
30_14	IE_WE_30_325	Acogga	Lake	Review	Unassigned	Unassigned	N		2027	Owenriff
30_14	IE_WE_30_336	Parkyflaherty	Lake	Review	Unassigned	Unassigned	N		2027	Owenriff
30_14	IE_WE_30_340	Ballyquirke	Lake	At Risk	Moderate	Moderate	N	Other,UWW	2027	Owenriff
30_14	IE_WE_30_344	Lettercraffroe	Lake	At Risk	Good	Moderate	N	For	2021	Owenriff
30_14	IE_WE_30_345	Ross GY	Lake	At Risk	Moderate	Poor	N	Other	2027	Owenriff
30_14	IE_WE_30B140100	Ballycuirke_010	River	At Risk	Poor	Poor	N	DWW,Hymo,UWW	2027	Owenriff
30_14	IE_WE_30D030600	Drimneen_010	River	Review	Good	Unassigned	N		2027	Owenriff
30_14	IE_WE_30O020070	Owenriff (Corrib)_010	River	At Risk	High	Good	Y	Hymo	2027	Owenriff
30_14	IE_WE_30O020200	Owenriff (Corrib)_020	River	At Risk	Good	Good	Y	Hymo	2027	Owenriff
30_15	IE_WE_30_313	Loughaunieran Maam Cross	Lake	Review	Unassigned	Unassigned	N		2027	Failmore
30_15	IE_WE_30_326	Shannagrena	Lake	Review	Unassigned	Unassigned	N		2027	Failmore
30_15	IE_WE_30_343	Maumwee	Lake	At Risk	High	Good	Y	Hymo	2021	Failmore
30_15	IE_WE_30_348	Loughanillaun Maam Cross	Lake	At Risk	High	Good	Y	Hymo	2027	Failmore
30_15	IE_WE_30F010100	Failmore_010	River	At Risk	High	Good	Y	Hymo,Peat	2027	Failmore
30_16	IE_WE_30_665a	Mask	Lake	At Risk	High	Good	Y	Ag,DWW,Other	2027	Lough Mask and Carra
30_16	IE_WE_30F030100	Finny_010	River	At Risk	High	Good	Y	Hymo	2021	Lough Mask and Carra
30_16	IE_WE_30G010250	Glensaul_010	River	At Risk	Good	Poor	N	Ag	2021	Lough Mask and Carra
30_16	IE_WE_30O010050	Owenbrin_010	River	At Risk	Moderate	Moderate	N	For,Hymo	2027	Lough Mask and Carra
30_16	IE_WE_30O010200	Owenbrin_020	River	At Risk	Good	Moderate	N	For,Hymo	2027	Lough Mask and Carra
30_16	IE_WE_30S030100	Srahnalong_010	River	At Risk	Good	Moderate	N	Ag	2021	Lough Mask and Carra

Subcatchment code	Water body code	Water body name	Water body type	Risk	Ecological Status 07-09	Ecological Status 10-15	High Ecological Status Objective Water Body Y/N	Significant Pressures	Date to Meet Environmental Objective	Recommended Area for Action Name
30_18	IE_WE_30_666a	Corrib Lower	Lake	At Risk	Poor	Moderate	N	Other	2027	
30_18	IE_WE_30_666b	Corrib Upper	Lake	Review	Good	Good	N		2027	
30_18	IE_WE_30T010500	Terryland_010	River	At Risk	Poor	Poor	N	DU,Hymo	2027	
30_19	IE_WE_30L070100	Levally Stream_010	River	At Risk	Good	Moderate	N	Ag,Hymo	2027	

Ag: Agriculture

DWW: Domestic Waste Water

For: Forestry

Hymo: Hydromorphology

Ind: Industry

M+Q: Mines and Quarries

Peat: Peat Drainage and Extraction

DU: Diffuse Urban

UWW: Urban Waste Water

Note: Significant Pressures for Review water bodies have not been included as they will need to be confirmed as part of an Investigative Assessment.

Protected Area: If a water body is one or more of the following: Drinking Water Protected Area; Bathing Water; Shellfish Area; Nutrient Sensitive Area or; a Natura 2000 site with a water dependent qualifying interest with a water quality and/or quantity conservation objective, then it has been highlighted as a protected area in this table.

Appendix 4 Drinking water supplies in the catchment

Scheme Code	Scheme Name	Water Body	Water Body Code	Objective met? Yes /No	Reason why not met
1200PRI0145	Balroebuckbeg	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PRI0147	Barnaderg Gortbeg GWS Well	Clare-Corrib	IE_WE_G_0020	Yes	N/A
	Barnaderg Gortbeg GWS Spring	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PRI0445	Corohan	Dunmore	IE_WE_G_0005	Yes	N/A
1200PRI0445	Rusheens	Clare-Corrib	IE_WE_G_0020	Yes	N/A
2200PRI2088	Milford GWS	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PRI0104	Anbally and District	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PRI0151	Belclare	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PRI0152	Belmont (Kilconly)	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PRI0159	Boyounagh/Ballyedmond Spring	Clare-Corrib	IE_WE_G_0020	Yes	N/A
	Boyounagh/Ballyedmond Borehole no 1	Dunmore	IE_WE_G_0005	Yes	N/A
	Boyounagh/Ballyedmond Borehole no 2 (Back up)	Dunmore	IE_WE_G_0005	Yes	N/A
	Boyounagh/Ballyedmond Borehole no 3	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PRI0161	Brierfield No 1, Ballinasloe	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PRI0175	Cahereenlea,Athenry	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PRI0286	Clough/Cummer	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PRI0318	Feigh East and West	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PRI0323	Gallagh/Brownsgrove	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PRI0337	Gurteen/Cloonmore	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PRI0385	Kiltevna and Toberowen schemes	Dunmore	IE_WE_G_0005	Yes	N/A
1200PRI0415	Lisananey/Liskeavy	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PRI0444	Milltown Community Group Scheme	Clare-Corrib	IE_WE_G_0020	Yes	N/A
2200PRI2011	Barnacarroll GWS	Cong-Robe	IE_WE_G_0019	Yes	N/A
2200PRI2037	Cregduff Group Water Scheme	Cong-Robe	IE_WE_G_0019	Yes	N/A
2200PRI2060	Gurteen GWS	Corrib Gravels	IE_WE_G_0063	Yes	N/A
2200PRI2064	Irishtown GWS No. 1	Clare-Corrib	IE_WE_G_0020	Yes	N/A
	Irishtown GWS No. 2	Clare-Corrib	IE_WE_G_0020	Yes	N/A
	Irishtown GWS Kilvine Well	Clare-Corrib	IE_WE_G_0020	Yes	N/A
2200PRI2065	Johnstown GWS	Clare-Corrib	IE_WE_G_0020	Yes	N/A
2200PRI2136	Loughanemon	Cong-Robe	IE_WE_G_0019	Yes	N/A
2200PRI2153	Shraheen/Aughgower	Maam-Clonbur	IE_WE_G_0006	Yes	N/A
1200PRI0179	Cahermorris (Glenrevagh), Corandulla	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PRI0216	Claren/Knocklehard	Corrib Upper	IE_WE_30_666b	Yes	N/A
2200PRI2056	Glencorrib GWS	Corrib Upper	IE_WE_30_666b	Yes	N/A

Scheme Code	Scheme Name	Water Body	Water Body Code	Objective met? Yes /No	Reason why not met
2200PRI2083	Lough Mask Creevagh GWS	Lough Mask	IE_WE_30_665a	Yes	N/A
2200PRI2147	Funchona/Cross	Corrib Upper	IE_WE_30_666b	Yes	N/A
2200PRI2668	Lough Carra GWS	Lough Carra	IE_WE_30_347	Yes	N/A
1200PRI0178	Kilcoona Caherlistrane	Lough Corrib	IE_WE_30_666a	Yes	N/A
2200PRI2004	Ayle GWS	Lough Aille/ Aille (Mayo)_020	IE_WE_30A020100	Yes	N/A
2200PRI2100	Robeen GWS	Aghinish_010	IE_WE_30A030100	Yes	N/A
2200PRI2138	Pulbawn/Killenrevagh	Black (Shrule)_010	IE_WE_30B020200	Yes	N/A
1200PUB1018	Dunmore Glenamaddy	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PUB1021	Glenamaddy	Clare-Corrib	IE_WE_G_0020	Yes	N/A
1200PUB1038	Mid Galway Spring	Clare-Corrib	IE_WE_G_0020	Yes	N/A
	Mid Galway Spring	Clare-Corrib	IE_WE_G_0020	Yes	N/A
	Mid Galway Borehole	Clare-Corrib	IE_WE_G_0020	Yes	N/A
2200PUB1016	Kilmaine WSS Tubber Padraig	Cong-Robe	IE_WE_G_0019	Yes	N/A
	Kilmaine WSS Fountain Hill	Cong-Robe	IE_WE_G_0019	Yes	N/A
1200PUB1047	Tuam	Corrib Lower	IE_WE_30_666a	Yes	N/A
1200PUB1013	Clonbur	Corrib Upper	IE_WE_30_666b	Yes	N/A
1200PUB1041	Oughterard	Lough Buffy	IE_WE_30_315	Yes	N/A
2200PUB1019	Lough Mask RWSS	Lough Mask	IE_WE_30_665a	Yes	N/A
1100PUB1001	Terryland WTP	Corrib_020	IE_WE_30C020600	Yes	N/A
2200PUB1012	Cong WSS	Corrib_010	IE_WE_30C020300	Yes	N/A
2200PUB1023	Shrule WSS	Mocorha_010	IE_WE_30M330920	Yes	N/A
2200PRI2148	Kilkeeran	Cong-Robe	IE_WE_G_0019[2]	Yes	N/A
2200PRI2149	Knockatubber	Cong-Robe	IE_WE_G_0019*	Yes	N/A
2200PRI2158	Kinnuary	Maam-Clonbur	IE_WE_G_0006	Yes	N/A

[2] These final 3 listed do not have any description of scheme type in spreadsheet*

Appendix 5 Prioritisation of water bodies with Natura 2000 site qualifying interests

Note that additional water dependent species have been added that are not qualifying interests within the SACs (i.e. White-clawed Crayfish (Austropotamobius pallipes; 1192) and Arctic char (Salvelinus alpinus) have been added to Lough Carra/Mask Complex SAC).

SAC Name	Relevant Qualifying interests	Target status	Water body type	Water bodies	Status (risk)	Prioritise?	Code	Survey data?
Ardkill Turlough SAC 000461	3180	Good GW level/quality	Groundwater	Cong-Robe GWB	Good (R)	No	IE_WE_G_0019	No
Ballymaglancy Cave, Cong SAC 000474	none							
Carrowkeel Turlough SAC 000475	3180	Good GW level/quality	Groundwater	Cong-Robe GWB	Good (R)	No	IE_WE_G_0019	No
Cloughmoyne SAC 000479	none							
Clyard Kettle-Holes SAC 000480	3180	Good GW level/quality	Groundwater	Cong-Robe GWB	Good (R)	No	IE_WE_G_0019	No
Connemara Bog Complex SAC 002034	3130	At least Good	Lake	Bofin GY	High (NAR-HES obj)	No	IE_WE_30_335	Yes
	Potential 3110/Potential 3130	At least Good	Lake	Adrehid	Unassigned (NAR)	No	IE_WE_30_ 215	Yes
			Lake	Agraffard	Unassigned (NAR)	No	IE_WE_30_334	Yes
	Potential 3110	At least Good	Lake	Acogga	Unassigned (R)	Yes	IE_WE_30_325	Yes
			Lake	Lettercraffroe	Moderate (AT RISK)	Yes	IE_WE_30_344	Yes
	1029 (8 priority catchments)	High	River	Owenriff (Corrib)_010	Good (AT RISK-HES obj)	Yes	IE_WE_30O020070	Yes
			River	Glengawbeg_010	High (NAR-HES obj)	No	IE_WE_30G060100	Yes
	7230	Good GW level	Groundwater	Maam-Clonbur GWB	Good (NAR)	No	IE_WE_G_0006	Yes
			Groundwater	Oughterard Marbles GWB	Good (NAR)	No	IE_WE_G_0009	No
Gortnandarragh Limestone Pavement SAC 001271	none							
Greaghans Turlough SAC 000503	3180	Good GW level/quality	Groundwater	Cong-Robe GWB	Good (R)	No	IE_WE_G_0019	No
Kildun Souterrain SAC 002320	none							

SAC Name	Relevant Qualifying interests	Target status	Water body type	Water bodies	Status (risk)	Prioritise?	Code	Survey data?
Kilglassan/Caheravoostia Turlough Complex SAC 000504	3180	Good GW level/quality	Groundwater	Cong-Robe GWB	Good (R)	No	IE_WE_G_0019	No
Levally Lough SAC 000295	3180	Good GW level/quality	Groundwater	Clare-Corrib GWB	Good (R)	No	IE_WE_G_0020	No
Lisnageeragh Bog and Ballinastack Turlough SAC 000296	3180	Good GW level/quality	Groundwater	Suck South GWB	Good (R)	No	IE_WE_G_225	Yes
Lough Carra/Mask Complex SAC 001774	3110	At least Good	Lake	Mask	Good (AT RISK-HES obj)	No	IE_WE_30_665a	No
			Lake	Upper Mask	Good (NAR)	No	IE_WE_30_665b	No
	3130	At least Good	Lake	Mask	Good (AT RISK-HES obj)	No	IE_WE_30_665a	No
			Lake	Upper Mask	Good (NAR)	No	IE_WE_30_665b	No
	3140	At least Good	Lake	Carra	Good (R)	No	IE_WE_30_347	No
	7230	Good GW level	Groundwater	Ballyhean GWB	Good (R)	No	IE_WE_G_0022	No
			Groundwater	Cong-Robe GWB	Good (R)	No	IE_WE_G_0019	No
	Arctic char	Good	Lake	Mask	Good (AT RISK-HES obj)	No	IE_WE_30_665a	No
			Lake	Upper Mask	Good (NAR)	No	IE_WE_30_665b	No
	1092 (not listed)	Moderate	Lake	Carra	Good (R)	No	IE_WE_30_347	No
Lough Corrib SAC 000297	3110	At least Good	Lake	Corrib Upper	Good (R)	No	IE_WE_30_666b	No
	3130	At least Good	Lake	Corrib Upper	Good (R)	No	IE_WE_30_666b	No
	3140	At least Good	Lake	Corrib Lower	Moderate (AT RISK)	Yes	IE_WE_30_666a	No
	7220	Good GW level	Groundwater	Lough Corrib Fens 3 & 4 (SAC000297)	Good (NAR)	No	IE_WE_G_0106	No
			Groundwater	Lough Corrib Fen 2 (SAC000297)	Good (NAR)	No	IE_WE_G_0109	No
			Groundwater	Clare-Corrib GWB	Good (AT RISK)	No	IE_WE_G_0020	No
			Groundwater	Waste facility (W0013-01)	Poor (AT RISK)	No	IE_WE_G_0084	No
			Groundwater	Ross Lake GWB	Good (NAR)	No	IE_WE_G_0010	No
			Groundwater	Maam-Clonbur GWB	Good (NAR)	No	IE_WE_G_0006	No
			Groundwater	Oughterard Marbles GWB	Good (NAR)	No	IE_WE_G_0009	No
			Groundwater	Cong-Robe GWB	Good (R)	No	IE_WE_G_0019	No
	7230	Good GW level	Groundwater	Lough Corrib Fens 3 & 4 (SAC000297)	Good (NAR)	No	IE_WE_G_0106	No
			Groundwater	Lough Corrib Fen 2 (SAC000297)	Good (NAR)	No	IE_WE_G_0109	No

SAC Name	Relevant Qualifying interests	Target status	Water body type	Water bodies	Status (risk)	Prioritise?	Code	Survey data?
Lough Corrib SAC 000297	7230	Good GW level	Groundwater	Clare-Corrib GWB	Good (AT RISK)	No	IE_WE_G_0020	No
			Groundwater	Waste facility (W0013-01)	Poor (AT RISK)	No	IE_WE_G_0084	No
			Groundwater	Ross Lake GWB	Good (NAR)	No	IE_WE_G_0010	No
			Groundwater	Maam-Clonbur GWB	Good (NAR)	No	IE_WE_G_0006	No
			Groundwater	Oughterard Marbles GWB	Good (NAR)	No	IE_WE_G_0009	No
			Groundwater	Cong-Robe GWB	Good (R)	No	IE_WE_G_0019	No
	1029 (8 priority catchments)	High	River	Owenriff (Corrib)_020	Good (AT RISK-HES obj)	Yes	IE_WE_30O020200	Yes
	1092	At least Moderate	Lake	Corrib Upper	Good (R)	No	IE_WE_30_666b	No
			Lake	Corrib Lower	Moderate (AT RISK)	No	IE_WE_30_666a	No
			River	Corrib_010	Unassigned (NAR)	No	IE_WE_30C020300	No
			River	Cregg_020	Unassigned (R)	No	IE_WE_30C030200	No
			River	Clare (Galway)_100	Unassigned (NAR)	No	IE_WE_30C011300	No
			River	Clare (Galway)_090	Moderate (AT RISK)	No	IE_WE_30C011200	No
			River	Clare (Galway)_080	Moderate (AT RISK)	No	IE_WE_30C011100	No
			River	Clare (Galway)_070	Good (NAR)	No	IE_WE_30C011000	No
			River	Clare (Galway)_060	Moderate (AT RISK)	No	IE_WE_30C010800	No
			River	Clare (Galway)_050	Good (NAR)	No	IE_WE_30C010700	No
			River	Clare (Galway)_040	Good (NAR)	No	IE_WE_30C010670	No
			River	Clare (Galway)_030	Good (NAR)	No	IE_WE_30C010500	No
			River	Clare (Galway)_020	Unassigned (NAR)	No	IE_WE_30C010300	No
			River	Clare (Galway)_010	Moderate (AT RISK)	No	IE_WE_30C010100	No
			River	Cnocnagur_30_010	Unassigned (NAR)	No	IE_WE_30C070900	No
			River	Cloonfad_010	Unassigned (NAR)	No	IE_WE_30C110300	No
			River	Dalgan_030	Good (NAR)	No	IE_WE_30D010400	No
			River	Dalgan_040	Good (NAR)	No	IE_WE_30D010500	No
			River	Dalgan_050	Good (NAR)	No	IE_WE_30D010600	No
			River	Sinking_010	Good (NAR)	No	IE_WE_30S010100	No
			River	Sinking_020	Moderate (AT RISK)	No	IE_WE_30S010300	No
			River	Sinking_030	Good (NAR)	No	IE_WE_30S010400	No
			River	Yellow (Sinking)_010	Good (NAR)	No	IE_WE_30Y010055	No
			River	Gortgarrow Stream_010	Moderate (AT RISK)	No	IE_WE_30G050025	No

SAC Name	Relevant Qualifying interests	Target status	Water body type	Water bodies	Status (risk)	Prioritise?	Code	Survey data?
Lough Corrib SAC 000297	1092	At least Moderate	River	Levally Stream_010	Moderate (AT RISK)	No	IE_WE_30L070100	No
			River	Grange (Galway)_010	Good (NAR)	No	IE_WE_30G020200	No
			River	Grange (Galway)_020	Good (NAR)	No	IE_WE_30G020400	No
			River	Grange (Galway)_030	Good (NAR)	No	IE_WE_30G020500	No
			River	Grange (Galway)_040	Good (NAR)	No	IE_WE_30G020700	No
			River	Abbert_020	Good (NAR)	No	IE_WE_30A010100	No
			River	Abbert_030	Moderate (AT RISK)	No	IE_WE_30A010300	No
			River	Abbert_040	Moderate (AT RISK)	No	IE_WE_30A010500	No
	1106	Good	Lake	Corrib Upper	Good (R)	No	IE_WE_30_666b	No
			Lake	Corrib Lower	Moderate (AT RISK)	Yes	IE_WE_30_666a	No
			River	Clare (Galway)_100	Unassigned (NAR)	No	IE_WE_30C011300	No
			River	Clare (Galway)_090	Moderate (AT RISK)	Yes	IE_WE_30C011200	No
			River	Clare (Galway)_080	Moderate (AT RISK)	Yes	IE_WE_30C011100	No
			River	Clare (Galway)_070	Good (NAR)	No	IE_WE_30C011000	No
			River	Clare (Galway)_060	Moderate (AT RISK)	Yes	IE_WE_30C010800	No
			River	Clare (Galway)_050	Good (NAR)	No	IE_WE_30C010700	No
			River	Clare (Galway)_040	Good (NAR)	No	IE_WE_30C010670	No
			River	Clare (Galway)_030	Good (NAR)	No	IE_WE_30C010500	No
			River	Clare (Galway)_020	Unassigned (NAR)	No	IE_WE_30C010300	No
			River	Clare (Galway)_010	Moderate (AT RISK)	Yes	IE_WE_30C010100	No
			River	Grange (Galway)_010	Good (NAR)	No	IE_WE_30G020200	No
			River	Grange (Galway)_020	Good (NAR)	No	IE_WE_30G020400	No
			River	Grange (Galway)_030	Good (NAR)	No	IE_WE_30G020500	No
			River	Grange (Galway)_040	Good (NAR)	No	IE_WE_30G020700	No
			River	Abbert_020	Good (NAR)	No	IE_WE_30A010100	No
			River	Abbert_030	Moderate (AT RISK)	Yes	IE_WE_30A010300	No
			River	Abbert_040	Moderate (AT RISK)	Yes	IE_WE_30A010500	No
			River	Sinking_010	Good (NAR)	No	IE_WE_30S010100	No
			River	Sinking_020	Moderate (AT RISK)	Yes	IE_WE_30S010300	No
			River	Sinking_030	Good (NAR)	No	IE_WE_30S010400	No
			River	Dalgan_030	Good (NAR)	No	IE_WE_30D010400	No
			River	Dalgan_040	Good (NAR)	No	IE_WE_30D010500	No
			River	Dalgan_050	Good (NAR)	No	IE_WE_30D010600	No

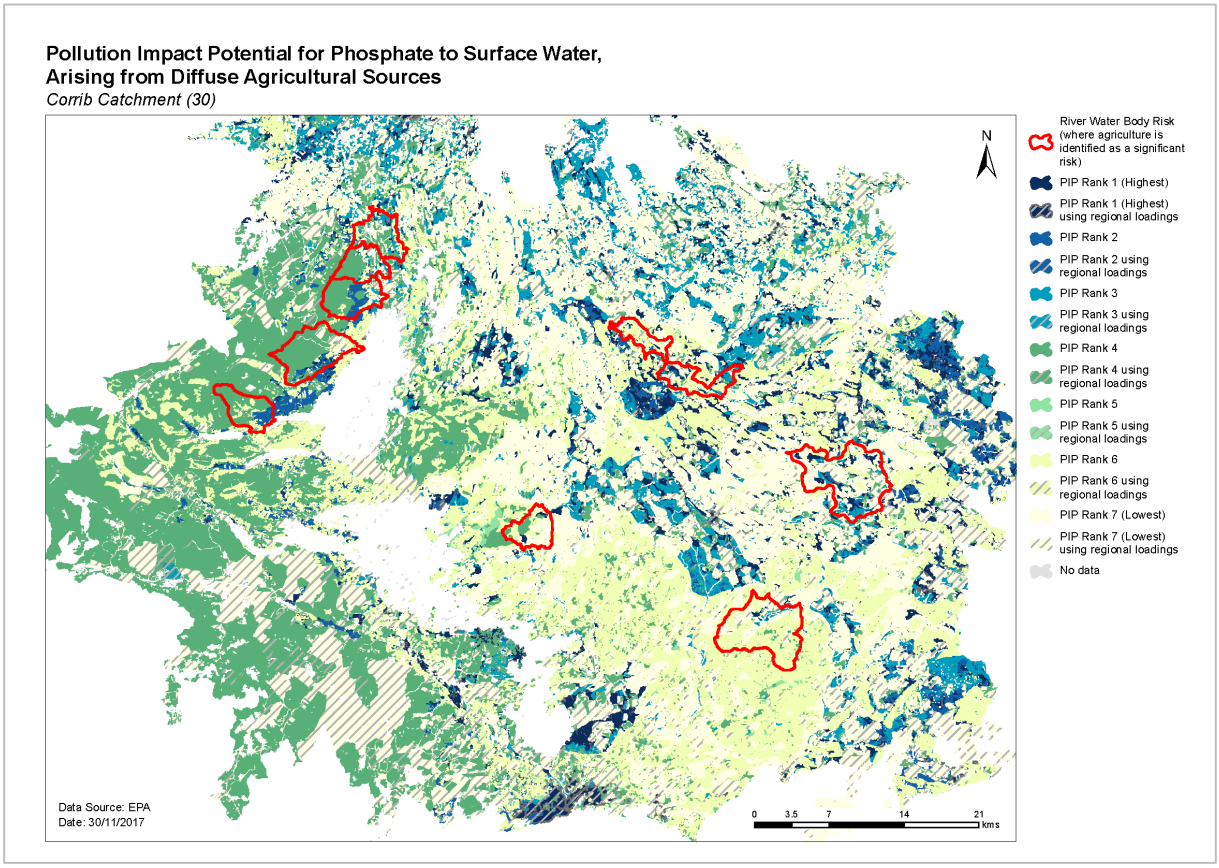
SAC Name	Relevant Qualifying interests	Target status	Water body type	Water bodies	Status (risk)	Prioritise?	Code	Survey data?
Lough Corrib SAC 000297	1106	Good	River	Black (Shrule)_020	Moderate (AT RISK)	Yes	IE_WE_30B020300	No
			River	Black (Shrule)_030	Good (NAR)	No	IE_WE_30B020600	No
			River	Owenriff (Corrib)_010	Good (AT RISK-HES obj)	No	IE_WE_30O020070	No
			River	Owenriff (Corrib)_020	Good (AT RISK-HES obj)	No	IE_WE_30O020200	No
			River	Drimneen_010	Unassigned (R)	No	IE_WE_30D030600	No
			River	Corrib_010	Unassigned (NAR)	No	IE_WE_30C020300	No
			River	Dooghta_010	Good (NAR)	No	IE_WE_30D020100	No
			River	Dooghta_020	High (NAR)	No	IE_WE_30D0201200	No
			River	Failmore_010	Good (AT RISK-HES obj)	No	IE_WE_30F010100	No
			River	Bealanabrack_010	Good (NAR)	No	IE_WE_30B010050	No
			River	Bealanabrack_020	Good (NAR)	No	IE_WE_30B010200	No
			River	Cong Canal_010	Good (NAR)	No	IE_WE_30C060300	No
	1833	At least Good	Lake	Corrib Upper	Good (R)	No	IE_WE_30_666b	No
Lough Lurgeen Bog/Glenamaddy Turlough SAC 000301	3180	Good GW level/quality	Groundwater	GWDTE-Glenamaddy Turlough (SAC000301)	Good (R)	No	IE_WE_G_0094	No
Maumturk Mountains SAC 002008	3110	At least Good	Lake	Maumwee	Good (AT RISK-HES obj)	No	IE_WE_30_343	No
			Lake	Loughanillaun Maam Cross	Good (AT RISK-HES obj)	No	IE_WE_30_348	No
			Lake	Shannagrena	Unassigned (R)	No	IE_WE_30_326	No
	1106	Good	River	Bealnabrack_010	Good (NAR)	No	IE_WE_30B010050	No
			River	Bealnabrack_020	Good (NAR)	No	IE_WE_30B010200	No
Mocorha Lough SAC 001536	none							
Monivea Bog SAC 002352	none							
Moore Hall (Lough Carra) SAC 000527	none							
Mweelrea/Sheeffry/Erriff Complex SAC 001932	none							
Ross Lake and Woods SAC 001312	3140	At least Good	Lake	Ross GY	Poor (AT RISK)	Yes	IE_WE_30_345	No
Shrule Turlough SAC 000525	3180	Good GW level/quality	Groundwater	GWDTE-Shrule Turlough (SAC000525)	Good (R)	No	IE_WE_G_0102	No
Skealoghan Turlough SAC 000541	3180	Good GW level/quality	Groundwater	GWDTE-Skealoughan Turlough (SAC000541)	Good (R)	No	IE_WE_G_0103	No

SAC Name	Relevant Qualifying interests	Target status	Water body type	Water bodies	Status (risk)	Prioritise?	Code	Survey data?
Towerhill House SAC 002179	none							
Williamstown Turloughs SAC 002296	3180	Good GW level/quality	Groundwater	Clare-Corrib GWB	Good (AT RISK)	No	IE_WE_G_0020	No

Natura Codes of Qualifying interests with water conservation objectives			
3110	Oligotrophic waters containing very few minerals of sandy plains	**1106**	Salmon (Salmo salar)
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea	**1029, 1990**	Freshwater pearl mussel (Margaritifer margaratifera)
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp	**1092**	White-clawed Crayfish
3150	Natural eutrophic lakes with Magnopotamin or Hydrocharition type vegetation	**21A0**	Machairs (in Ireland)
3160	Natural dystrophic lakes and ponds.	**2190**	Humid dune slacks
3180	Turloughs	**7220**	Petrifying springs with tufa deposits
1833	Slender Naiad (Najas flexilis)	**7230**	Alkaline fens
1150	Coastal Lagoons	**Arctic char**	Arctic Char has no Natura Code

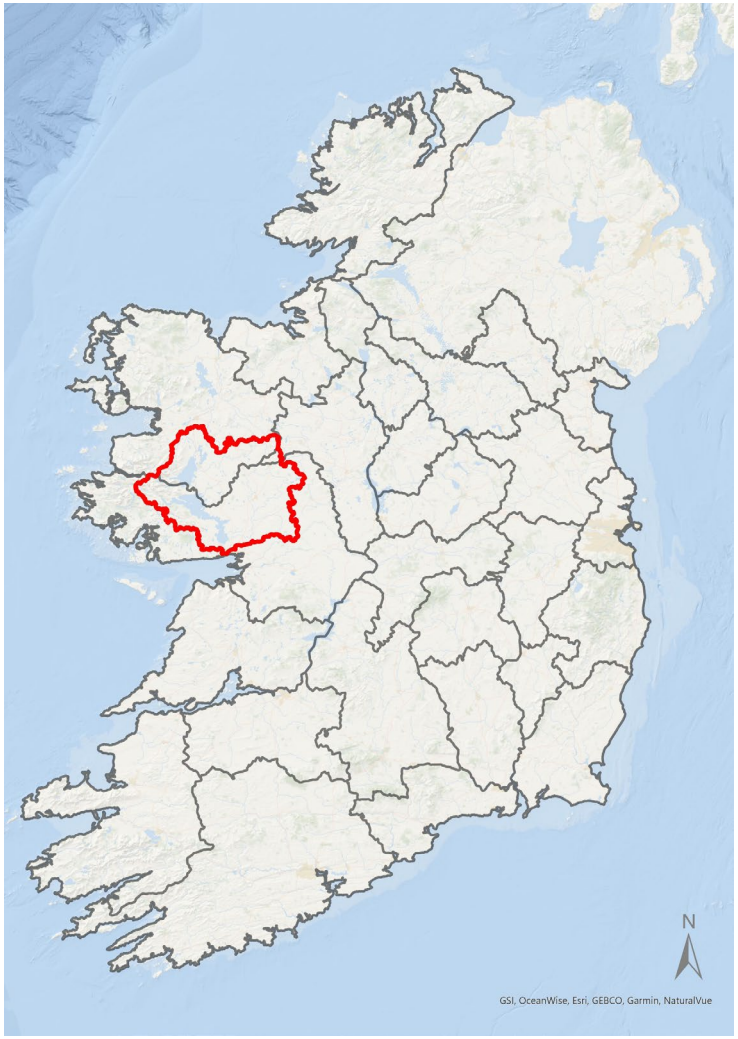
Appendix 6 Pollution Impact Potential (PIP) Map for Phosphorus

For areas where agriculture is deemed as the significant pressure, areas of high risk to surface water can be targeted. The map below shows relative risk of loss of phosphorus to surface water. The risk of phosphorus losses is strongly correlated on whether the land is poorly draining or free draining and the loadings applied i.e. significant loadings applied on poorly draining areas result in a high potential risk to surface water. However, this figure does not imply that actual losses from these areas are occurring but is a useful tool for informing where resources should be focused (i.e. by allowing high risk areas to be identified and prioritised for further investigation). PIP maps are available online at a scale of 1:20,000 and can be accessed by public bodies via the EDEN process.



Appendix 7 Local catchment Assessment Categories

Category	Assessment & Measures Evaluation Details
IA1	Further information provision (e.g. from IFI, LAs, EPA)
IA2	Point source desk-based assessment
IA3	Assessment of unassigned status water bodies, requiring field visit(s)
IA4	Regulated point sources, requiring field visit/s
IA5	Stream (catchment) walk to evaluate multiple sources in a defined (1 km) river stretch (used as the basis for estimating resource requirements)
IA6	Stream (catchment) walk in urban areas
IA7	Stream (catchment) walk along >1 km river stretches
IA8	Stream (catchment) walk along high ecological status (HES) objective rivers
IA9	Lakes assessment, requiring field visits
IA10	Groundwater assessments, requiring field visits



Cycle 3

HA 30 Corrib Catchment Report, May 2024

Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

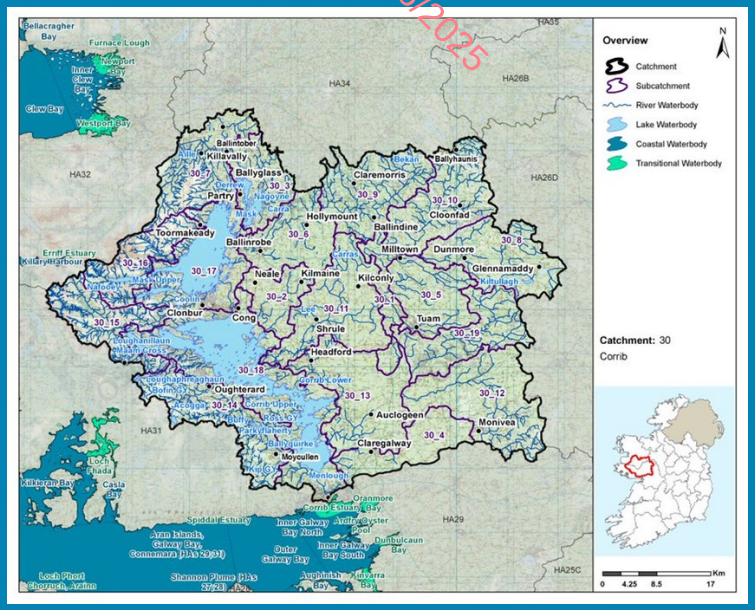
Introduction

This report provides an overview of the water quality in the Corrib Catchment and the pressures impacting on water quality. This report is based on data up to 2021. The latest water quality data, dashboards and maps throughout this report are available on catchments.ie and EPA Water Map.

The Corrib Catchment includes the area drained by the River Corrib and all streams entering tidal water between Renmore Point and Nimmo's Pier, Galway, draining a total area of 3,112km². The largest urban centre in the catchment is Galway City. The other main urban centres in this catchment are Tuam, Ballinrobe, Claremorris and Ballyhaunis.

The Corrib catchment is divided into 19 subcatchments and has 97 river waterbodies, 30 lake waterbodies, one transitional waterbody, no coastal waterbodies and 31 groundwater bodies.

View the Corrib Catchment on the EPA Water Map



Overview of Subcatchments in the Corrib Catchment

Previous Catchment Assessments

Previous catchment assessments, which provide additional historic context and information, are archived on catchments.ie:

- Cycle 2 Catchment Assessments – published September 2018
- Cycle 3 Draft Catchment Assessments – published September 2021

Online Dashboards

Links to online dashboards are provided in this report – these numbers may vary from those in this document as time progress and the online dashboards are updated based on the latest data and scientific assessments.

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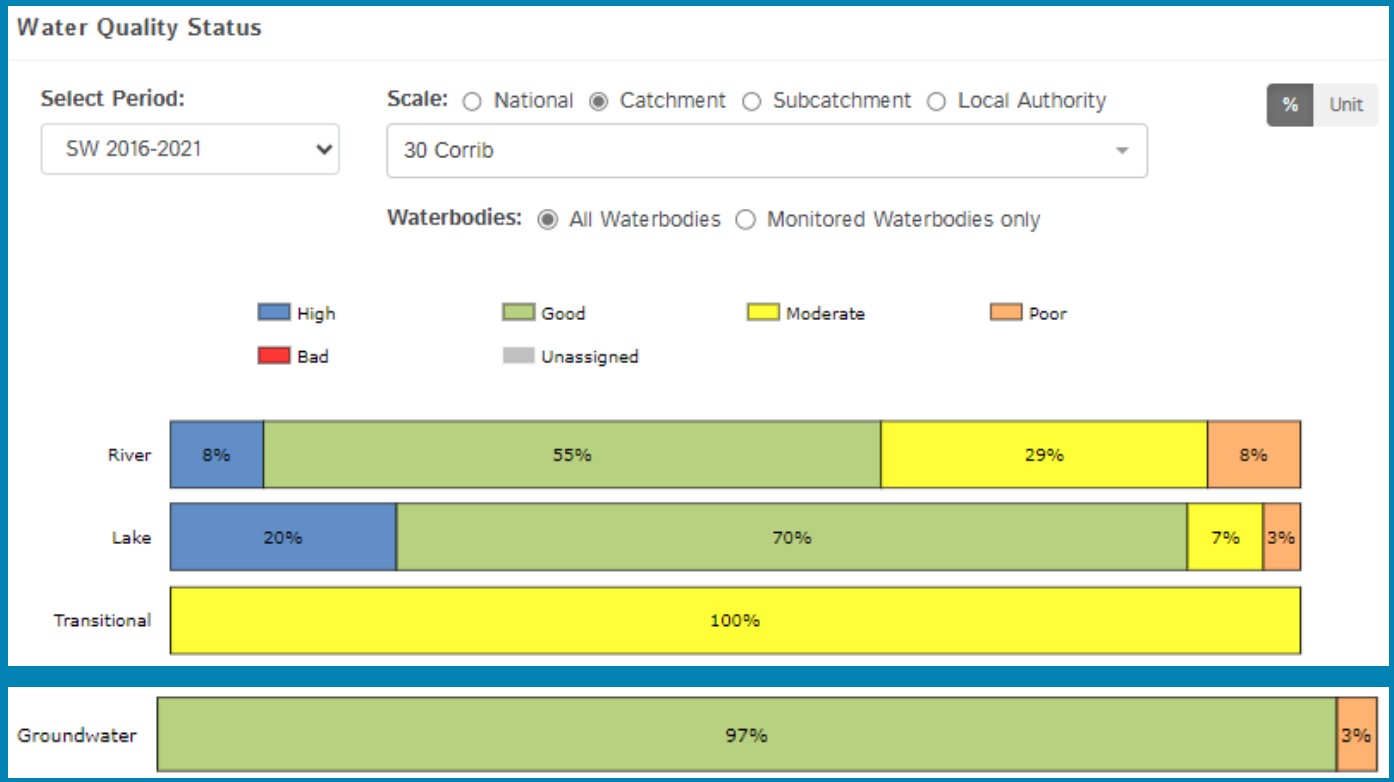
Water Quality Summary

The dashboard below provides a breakdown of water quality status for surface and groundwater bodies in the Corrib Catchment.

A total of 69% of surface waterbodies were at Good or High Ecological Status in the 2016-2021 monitoring period. Ninety-seven percent of groundwater bodies were at Good status.

Go to EPA Water Maps for WFD Status

EPA Water Map



Water quality status 2016-2021 for the Corrib Catchment. ***View Online Dashboard:***
https://www.catchments.ie/data/#/dashboard/waterquality

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High Status Objective Waterbodies

High status waters are prioritised for protection and action.

There are 12 waterbodies with a **High Ecological Status Objective** (HSO) in the Corrib Catchment, with seven currently not meeting their environmental objective of High.

Grants for septic tank upgrades may be available in high status objective catchment areas - you can learn more and check your Eircode for eligibility here: https://www.gov.ie/en/publication/6cc1e-domestic-waste-water-treatment-systems-septic-tanks

The EPA Water Map shows the locations of HSO waterbodies. See *Status and Risk / High Status Objectives.*

	SW 2007-2009	SW 2010-2012	SW 2010-2015	SW 2013-2018	SW 2016-2021
AILLE (MAYO)_030 (River)	High	Unassigned	Good	Good	Good
Bofin GY (Lake)	High	High	High	High	High
CAMMANAGH_010 (River)	High	High	High	Good	Good
DOOGHTA_020 (River)	Unassigned	Unassigned	High	High	High
FAILMORE_010 (River)	High	Good	Good	High	High
FINNY_010 (River)	High	High	Good	Good	High
GLENGAWBEG_010 (River)	Good	Good	High	Good	Good
Loughanillaun Maam Cross (Lake)	High	Good	Good	Good	Good
Mask (Lake)	High	Good	Good	Good	Good
Maumwee (Lake)	High	High	Good	Good	Good
OWENRIFF (CORRIB)_010 (River)	High	Good	Good	Good	High
OWENRIFF (CORRIB)_020 (River)	Good	Good	Good	Bad	Poor

Water quality status for High Ecological Status Objective waterbodies.
View Online Dashboard: https://www.catchments.ie/data/#/dashboard/waterquality

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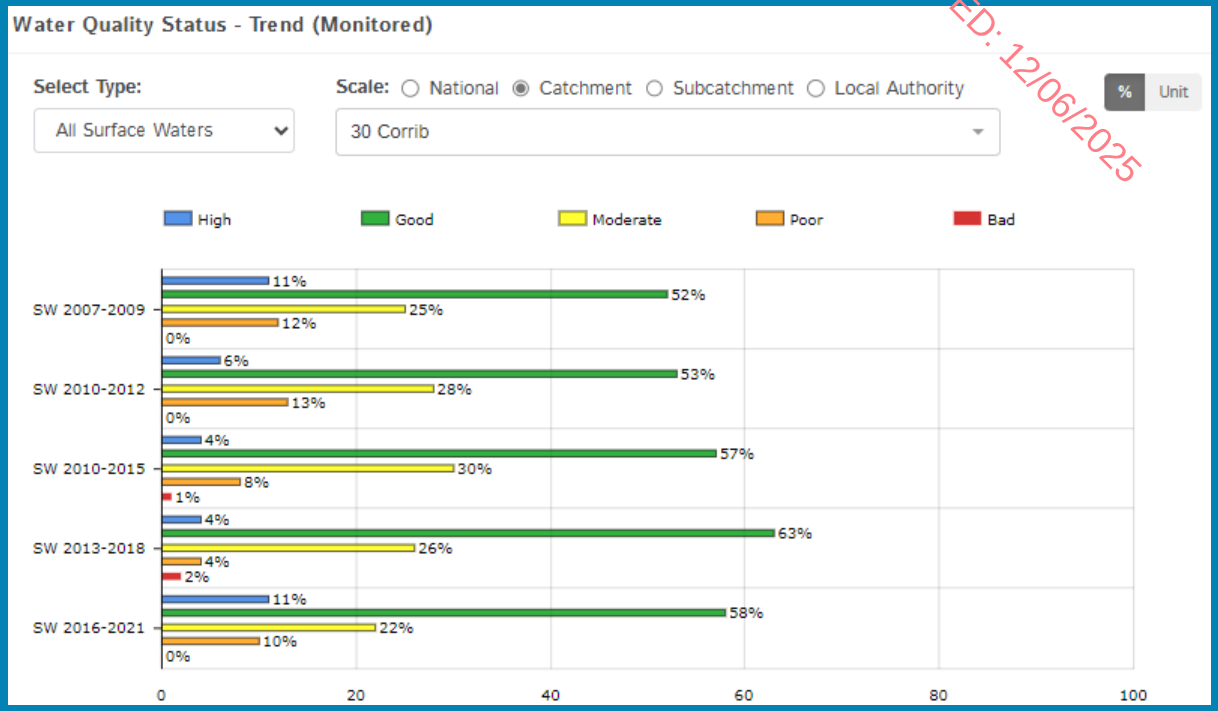
Water Quality Changes

Below illustrates the changes in ecological status in monitored surface waterbodies over the last five monitoring cycles in the Corrib Catchment. Nationally while there have been improvements in some waterbodies, these have been offset by declines elsewhere.



Ecological status trends for monitored surface waterbodies over the last five monitoring cycles in the Corrib Catchment.

View online dashboard: https://www.catchments.ie/data/#/dashboard/waterquality

A total of 112 (70%) waterbodies are currently meeting their environmental objective of Good or High Ecological Status.

	Total	Achieving Environmental Objectives (2016-2021)	High Status Environmental Objectives Waterbodies	Achieving High Status Environmental Objectives (2016-2021)
Rivers	97	58 *(60%)*	8	4 (*50%*)
Canals	-	-	-	-
Lakes	30	24 *(80%)*	4	1 (*25%*)
Transitional	1	0 *(0%)*	0	0 (*0%*)
Coastal	-	-	-	-
Groundwater	31	30 (*97%*)	0	0 (*0%*)

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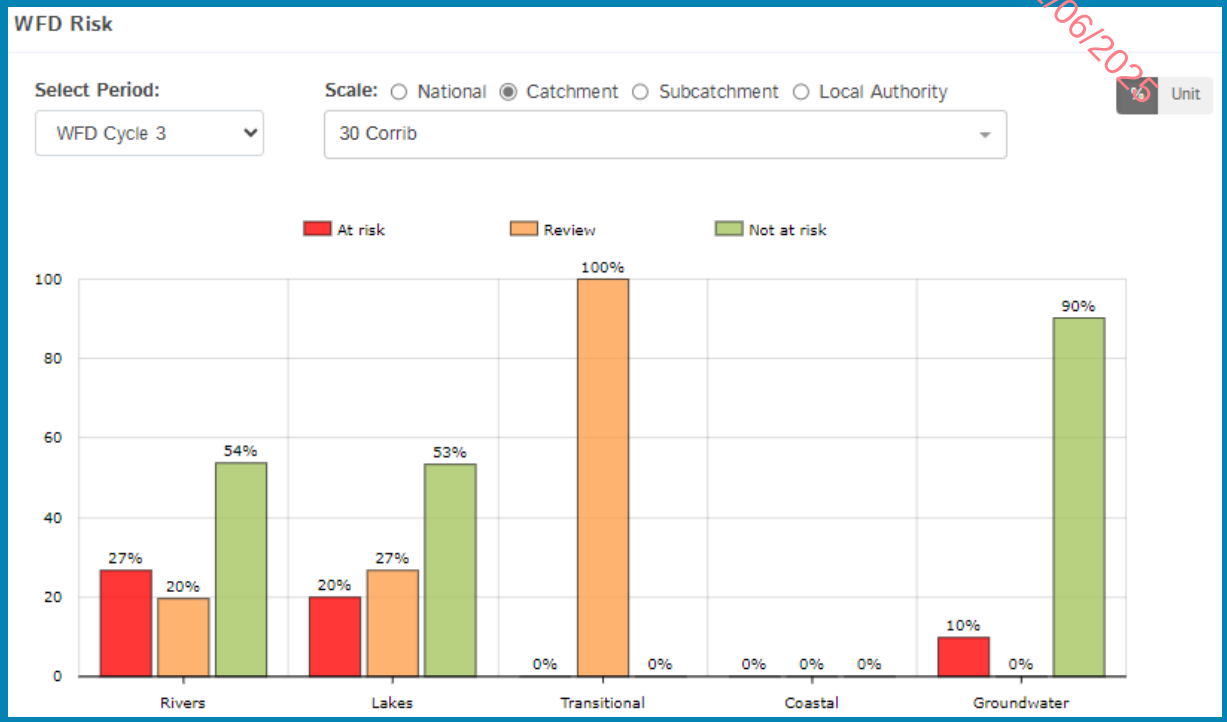
WFD Risk

A total of 35 (22%) waterbodies are *At Risk* of not meeting their environmental objective in the Corrib Catchment, while 28 (18%) are under *Review* and 96 (60%) are *Not At Risk.*

Go to EPA Water Map to see WFD Risk for this catchment



WFD Risk for the Corrib Catchment based on 2016-2021 data.
View Online Dashboard: https://www.catchments.ie/data/#/dashboard/waterquality

There are currently no heavily modified water bodies (HMWBs) in the Corrib catchment.

There are no artificial waterbodies in the Corrib Catchment.

The EPA's characterisation outcome report has more information on WFD Risk

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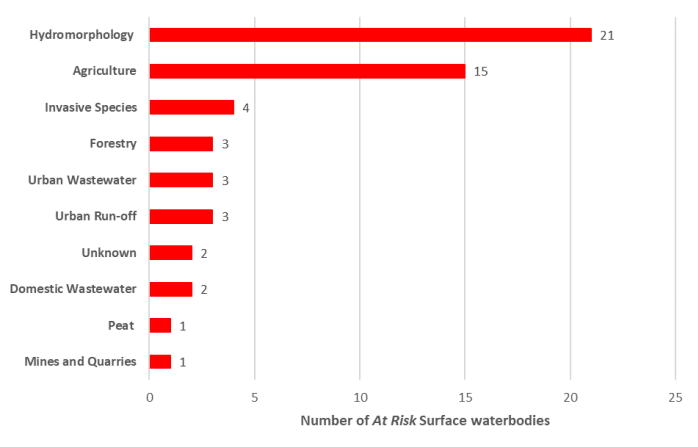
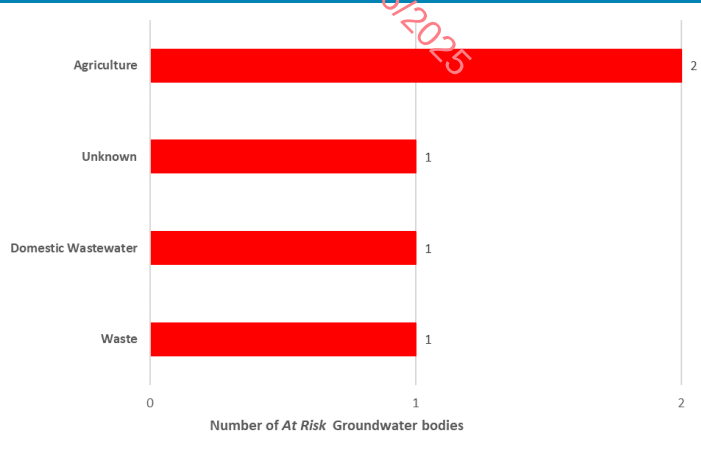
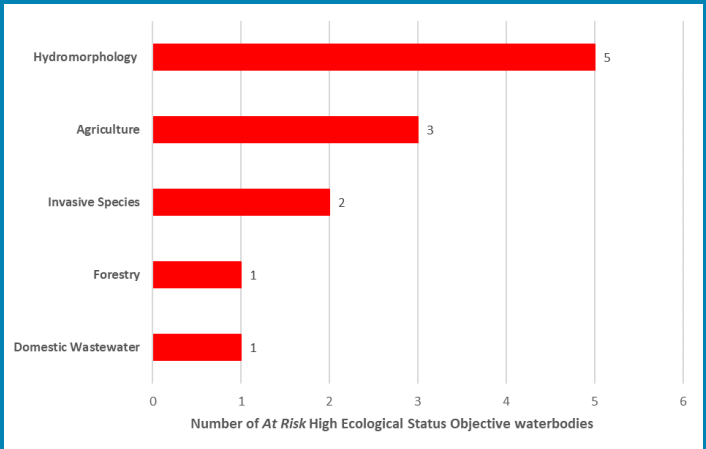
Significant Pressures driving risk

Click here for more information on significant pressures

Significant pressure types impacting the 32 *At Risk* surface waterbodies and three groundwater bodies are broken down in the figures below, including significant pressure information for the seven *At Risk* High Ecological Status Objective waterbodies.







The issues driven by these pressures are mainly altered morphological condition (habitat), nutrient pollution and altered hydrological condition (flow/level) impacts for surface water, and chemical quality diminution for surface water and nutrient pollution for groundwaters. For more information, see https://www.catchments.ie/data/#/dashboard/pressure?_k=i351zs.

Go to the Summary Information section to get significant pressure and issue data for At Risk waterbodies within the Corrib Catchment.

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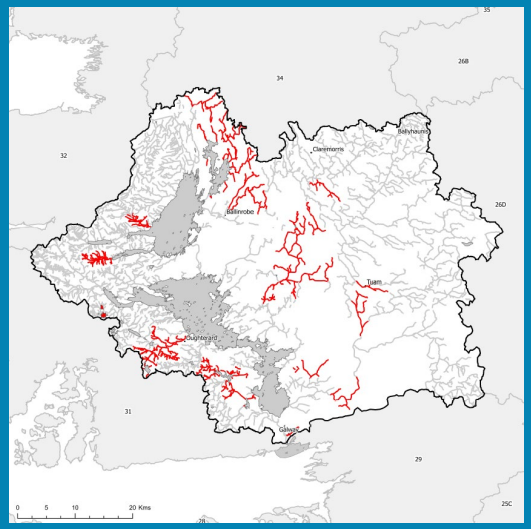
Significant Pressures

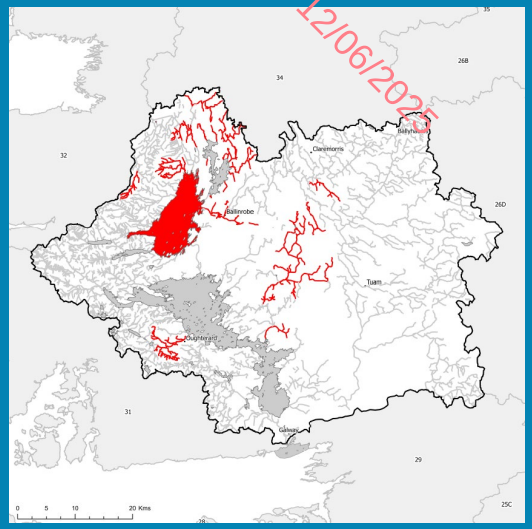
Hydromorphological pressures is the top significant pressure impacting 60% of the 35 *At Risk* waterbodies within the Corrib Catchment, followed by 49% impacted by agriculture and 11% by invasive species.

River Waterbody
Significant Pressure in Waterbody *At Risk*
Other Waterbodies
Lake, Coastal and Transitional Waterbody
Significant Pressure in Waterbody *At Risk*
Other Waterbodies

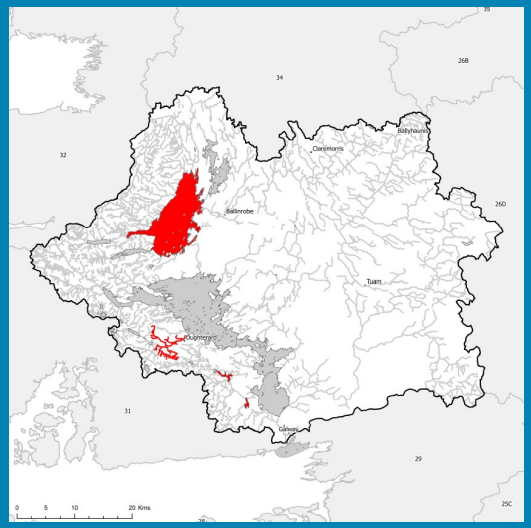
i



ii



iii



The catchments.ie dashboards will show all significant pressures identified for this catchment.

www.catchments.ie/data/#/dashboard/pressure

Go to the EPA Water Maps for the locations of all significant pressure types identified for this catchment

Locations of At Risk surface waterbodies impacted by i) Hydromorphological Pressures, ii) Agriculture and iii) Invasive Species.

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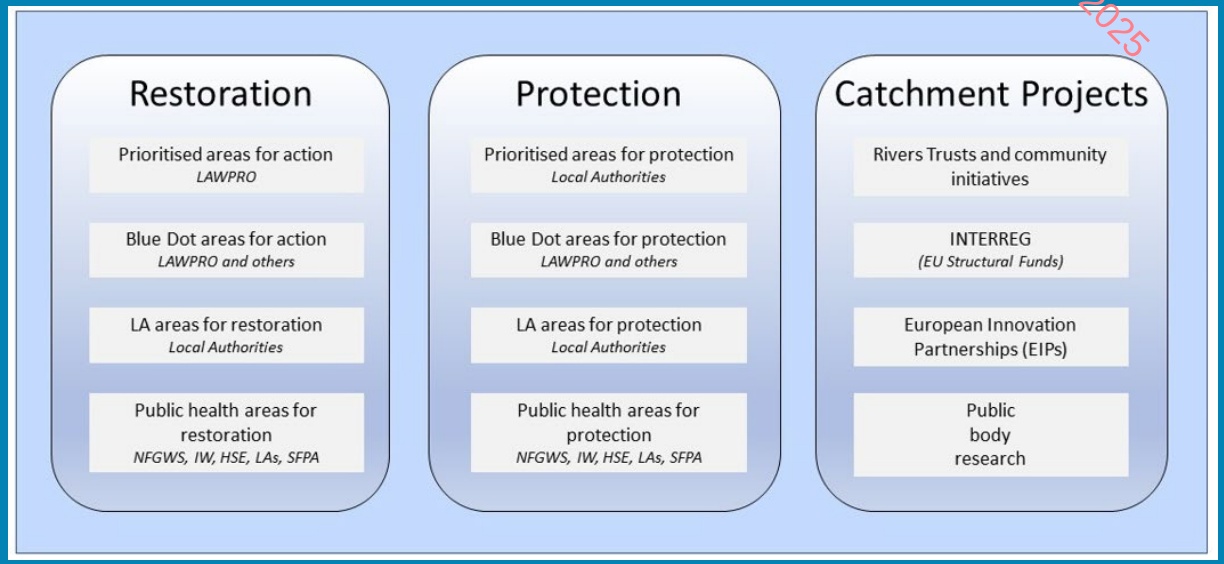
Priority Areas for Action

A number of waterbodies have been prioritised through the selection of Areas for Action. There were three Priority Areas for Action identified for the second river basin management planning cycle in the Corrib Catchment. This has increased to a total of 10 Areas for Restoration, nine Areas for Protection and three Catchment Projects for the third cycle. ***Go to the summary information section to get Area for Action information for waterbodies within the Corrib Catchment.***



Types of Areas for Action under the third cycle River Basin Management Plan

- View the current progress of Areas for Action and Summary Reports completed by LAWPRO, on catchments.ie and the EPA Water Map:
  - https://www.catchments.ie/data/#/areaforaction
  - https://gis.epa.ie/EPAMaps/default?easting=?&northing=?&lid=EPA:WFD_AreasForAction
- LAWPRO have also published detailed desktop studies on Prioritised Areas for Action (PAAs) which are available their website: https://lawaters.ie/desktop-studies/
- Information on Areas for Action for the second cycle is available in Cycle 2 Catchment Assessments which have been archived on catchments.ie: https://www.catchments.ie/download/cycle-2-catchment-assessments-published-september-2018/

Summary information for all waterbodies in the Corrib Catchment

The next page provides a table with a breakdown of key information for all waterbodies in this catchment. The key is provided below. Additional information for each waterbody is available on https://www.catchments.ie/data, including a breakdown of status, a monitoring schedule for monitored waterbodies and downloadable chemistry results, where available.

Protected Area categories	BW: Bathing Water DW: Drinking Water Fish: Salmonid Waters NSA: Nutrient Sensitive Areas SAC: Special Area of Conservation, Natura 2000 (water dependent habitats and species) SF: Shellfish Area SPA: Special Area of Protection, Natura 2000 (water dependent habitat and species)
Significant pressure* types categories ** For At Risk waterbodies only*	Ab: Abstractions Ag: Agriculture Aq: Aquaculture At: Atmospheric DWW: Domestic Wastewater For: Forestry HPS: Historically polluted sites HYMO: Hydromorphology Ind: Industry IS: Invasive Species M+Q: Mines and Quarries Peat: Peat Drainage and Extraction UR: Urban Run-Off UWW: Urban Wastewater Was: Waste WT: Water Treatment

Catchment Code	Waterbody (WB) Code	WB Name	WB Type	Local Authority	Protected Area	Status 10-15	Status 13-18	Status 16-21	Environmental Objective	Environmental Objective Date	WFD Risk 16-21	Significant Issue(s)	Significant Pressure(s)	Area for Action (AFA)	AFA (lead, type)	Link to WB page on catchments.ie	Link to WB on EPA Water Map
26B, 26D, 30	IE_SH_G_053	Castlerea	Groundwater	Roscommon County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
26B, 26D, 30, 34	IE_SH_G_224	Suck North	Groundwater	Roscommon County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
26B, 26C, 26D, 26E, 26G, 29, 30	IE_SH_G_225	Suck South	Groundwater	Galway County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30, 31, 32	IE_WE_G_0004	Spiddal	Groundwater	Galway County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
26D, 30	IE_WE_G_0005	Dunmore	Groundwater	Galway County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
29, 30, 31, 32	IE_WE_G_0006	Maam-Clonbur	Groundwater	Galway County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
29, 30	IE_WE_G_0007	Loughrea	Groundwater	Galway County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
29, 30	IE_WE_G_0008	Clarinbridge	Groundwater	Galway County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30, 31	IE_WE_G_0009	Oughterard Marbles	Groundwater	Galway County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_G_0010	Ross Lake	Groundwater	Galway County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30, 31, 32	IE_WE_G_0011	Recess	Groundwater	Galway County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30, 31, 32	IE_WE_G_0012	Recess Marbles	Groundwater	Galway County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30, 31	IE_WE_G_0014	Maamturks East Marbles	Groundwater	Galway County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30, 31, 32	IE_WE_G_0016	Maamturks West Marbles	Groundwater	Galway County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30, 31, 32, 34	IE_WE_G_0017	Clifden Castlebar	Groundwater	Mayo County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30, 32	IE_WE_G_0018	Killavally	Groundwater	Mayo County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30, 34	IE_WE_G_0019	Cong-Robe	Groundwater	Mayo County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	At risk	ChemicalQualityDiminutionForSW, Nutrients	Unknown, Ag			View WB Page	View WB on EPA Water Map
26D, 29, 30, 34	IE_WE_G_0020	Clare-Corrib	Groundwater	Galway County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30, 32, 34	IE_WE_G_0021	Aghagower	Groundwater	Mayo County Council	DWPA	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30, 32, 34	IE_WE_G_0022	Ballyhean	Groundwater	Mayo County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
26B, 26D, 30, 32, 34, 35	IE_WE_G_0033	Swinford	Groundwater	Mayo County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
26B, 30, 34	IE_WE_G_0063	Corrib Gravels	Groundwater	Mayo County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_G_0084	Waste Facility (W0013-01)	Groundwater	Galway County Council	DWPA; SAC	Poor	Poor	Poor	Good	2022-2027	At risk	ChemicalQualityDiminutionForSW, Nutrients	Was			View WB Page	View WB on EPA Water Map
26D, 30	IE_WE_G_0094	GWDTE-Glenamaddy Turlough (SAC000301)	Groundwater	Galway County Council	DWPA; SAC (GWDTE)	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
25C, 26D, 29, 30	IE_WE_G_0100	GWDTE-Rahasane Turlough (SAC000322)	Groundwater	Galway County Council	DWPA; SAC (GWDTE)	Good	Good	Good	Good	2021 or earlier	At risk	ChemicalQualityDiminutionForSW, Nutrients	DWTS, Ag			View WB Page	View WB on EPA Water Map
30	IE_WE_G_0102	GWDTE-Shrule Turlough (SAC000525)	Groundwater	Mayo County Council	DWPA; SAC (GWDTE)	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_G_0103	GWDTE-Skealoughan Turlough (SAC000541)	Groundwater	Mayo County Council	DWPA; SAC (GWDTE)	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
29, 30	IE_WE_G_0106	GWDTE-Lough Corrib Fens 3 & 4 (SAC000297)	Groundwater	Galway County Council	DWPA; SAC (GWDTE)	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30, 31	IE_WE_G_0109	GWDTE-Lough Corrib Fen 2 (SAC000297)	Groundwater	Galway County Council	DWPA; SAC (GWDTE)	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_G_0114	Dunmore Gravels	Groundwater	Galway County Council	DWPA; SAC	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_G_0119	GWDTE-Lough Corrib Fen 1 (Menlough) (SAC000297)	Groundwater	Galway City Council	DWPA; SAC (GWDTE)	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30_215	Adrehid	Lake	Galway County Council	SAC;	Unassigned	Good	Good	Good	2021 or earlier	Not at risk			Owenriff (Oughterard)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30_250	Derrew	Lake	Mayo County Council	SAC;	Unassigned	Unassigned	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30_260	Nagoyne	Lake	Mayo County Council	SAC;	Unassigned	Unassigned	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30_290	Menlough	Lake	Galway City Council	SAC;	Unassigned	Unassigned	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30_301	Carras	Lake	Mayo County Council		Unassigned	Unassigned	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30_303	Kip GY	Lake	Galway County Council	SAC;	Unassigned	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30_308	Kiltullagh	Lake	Galway County Council		Unassigned	High	Good	Good	2021 or earlier	Review			Sinking and Upper Clare (Galway)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map

30	IE_WE_30_313	Loughaunieran Maam Cross	Lake	Galway County Council		Unassigned	Good	High	Good	2021 or earlier	Review			Failmore	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30_315	Buffy	Lake	Galway County Council		Unassigned	Moderate	Good	Good	2021 or earlier	Review			Owenriff (Oughterard)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30_322	Lee	Lake	Mayo County Council		Unassigned	Unassigned	High	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30_325	Acogga	Lake	Galway County Council	SAC;	Unassigned	Good	Good	Good	2021 or earlier	Review			Owenriff (Oughterard)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30_326	Shannagrena	Lake	Galway County Council	SAC;	Unassigned	High	High	Good	2021 or earlier	Review			Failmore	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30_332	Coolin	Lake	Galway County Council	DWPA;	Unassigned	High	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30_334	Agraffard	Lake	Galway County Council	SAC;	Unassigned	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30_335	Bofin GY	Lake	Galway County Council	SAC;	High	High	High	High	2021 or earlier	Not at risk			Owenriff (Oughterard)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30_336	Parkyflaherty	Lake	Galway County Council	SAC;	Unassigned	High	Good	Good	2021 or earlier	Review			Owenriff (Oughterard)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30_340	Ballyquirke	Lake	Galway County Council	SAC;	Moderate	Bad	Moderate	Good	2022-2027	At risk	Nutrients, OtherSignificantImpacts	IS, UWW	Owenriff (Oughterard)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30_341	Bekan	Lake	Mayo County Council		Unassigned	Unassigned	Good	Good	2021 or earlier	Review					View WB Page	View WB on EPA Water Map
30	IE_WE_30_342	Nafooey	Lake	Galway County Council		Unassigned	Good	High	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30_343	Maumwee	Lake	Galway County Council	SAC;	Good	Good	Good	High	2022-2027	At risk	Morphological	HYMO	Failmore	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30_344	Lettercraffroe	Lake	Galway County Council	SAC;	Moderate	Good	Good	Good	2021 or earlier	Review			Owenriff (Oughterard)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30_345	Ross GY	Lake	Galway County Council	SAC;	Poor	Poor	Poor	Good	2022-2027	At risk	UnknownImpactType	IS	Owenriff (Oughterard)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30_346	Loughaphreaghaun	Lake	Galway County Council	SAC;	Unassigned	High	Good	Good	2021 or earlier	Not at risk			Owenriff (Oughterard)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30_347	Carra	Lake	Mayo County Council	SAC; SPA;	Good	Good	Good	Good	2021 or earlier	Not at risk			Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30_348	Loughanillaun Maam Cross	Lake	Galway County Council	SAC;	Good	Good	Good	High	2022-2027	At risk	Morphological	HYMO	Failmore	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30_532	Aille	Lake	Mayo County Council		Good	Good	Moderate	Good	2022-2027	At risk	Nutrients	Ag	Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30_665a	Mask	Lake	Mayo County Council	DWPA; SAC; SPA;	Good	Good	Good	High	2022-2027	At risk	Nutrients	Ag, DWTS, IS	Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30_665b	Mask Upper	Lake	Galway County Council	SAC; SPA;	Good	High	High	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30_666a	Corrib Lower	Lake	Galway County Council	DWPA; SAC; SPA;	Moderate	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30_666b	Corrib Upper	Lake	Galway County Council	DWPA; SAC; SPA;	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30A010028	ABBERT_010	River	Galway County Council		Good	Moderate	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30A010100	ABBERT_020	River	Galway County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30A010300	ABBERT_030	River	Galway County Council	SAC;	Moderate	Good	Good	Good	2021 or earlier	Not at risk			Coolourty Brierfield GWS. Brierfield and District GWS	LAWPRO, Protection	View WB Page	View WB on EPA Water Map
30	IE_WE_30A010500	ABBERT_040	River	Galway County Council	SAC;	Moderate	Moderate	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30A020010	AILLE (MAYO)_010	River	Mayo County Council	SAC;	Moderate	Moderate	Moderate	Good	2022-2027	At risk	Chemical, UnknownImpactType	Unknown, Ag	Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30A020100	AILLE (MAYO)_020	River	Mayo County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk			Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30A020250	AILLE (MAYO)_030	River	Mayo County Council		Good	Good	Good	High	2022-2027	At risk	Hydrological, Morphological	Ag, For	Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30A020400	AILLE (MAYO)_040	River	Mayo County Council	SAC; SPA;	Good	Good	Good	Good	2021 or earlier	Not at risk			Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30A030100	AGHINISH_010	River	Mayo County Council	SAC; SPA;	Moderate	Moderate	Moderate	Good	2022-2027	At risk	Hydrological, Morphological, Organic	Ag, HYMO	Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30A340980	ANNIES_010	River	Mayo County Council	SAC; SPA;	Unassigned	Moderate	Moderate	Good	2022-2027	At risk	Sediment, Hydrological, Morphological, Nutrients	Ag, HYMO	Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30B010050	BEALANABRACK_010	River	Galway County Council	SAC;	Good	Good	High	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30B010200	BEALANABRACK_020	River	Galway County Council	SAC; SPA;	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30B020200	BLACK (SHRULE)_010	River	Galway County Council	SAC;	Good	Good	Poor	Good	2022-2027	At risk	Sediment, Morphological, Nutrients	HYMO, Ag, Peat	Belmont GWS	NFGWS, Protection	View WB Page	View WB on EPA Water Map
30	IE_WE_30B020300	BLACK (SHRULE)_020	River	Mayo County Council	SAC;	Moderate	Good	Moderate	Good	2022-2027	At risk	Sediment, Morphological, Nutrients	DWTS, Ag, HYMO			View WB Page	View WB on EPA Water Map
30	IE_WE_30B020600	BLACK (SHRULE)_030	River	Galway County Council	SAC; SPA;	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30B030200	BALLINDINE_010	River	Mayo County Council		Poor	Poor	Poor	Good	2022-2027	At risk	Hydrological, Morphological, Nutrients, Organic	UWW, Ag, HYMO, For	Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30B040300	BEAGH BEG_010	River	Galway County Council		Unassigned	Good	Moderate	Good	2022-2027	Review					View WB Page	View WB on EPA Water Map

30	IE_WE_30B050100	BALLINDUFF STREAM_010	River	Galway County Council	DWPA; SAC; SPA;	Unassigned	Good	Good	Good	2021 or earlier	Not at risk			Cluide and Cahermorris GWS. Cahermorris and Glenrevagh GWS. Balroebuckbeg GWS.	NFGWS, Protection	View WB Page	View WB on EPA Water Map
30	IE_WE_30B140100	BALLYCUIRKE_010	River	Galway County Council	SAC; SPA;	Poor	Moderate	Moderate	Good	2022-2027	At risk	Oxygetion, Morphological, Nutrients, Organic	UR, HYMO	Owenriff (Oughterard)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30B870900	BOADAUN_010	River	Galway County Council		Unassigned	Good	Moderate	Good	2022-2027	Review			Rusheens GWS. Clarenham GWS. Belclare GWS.	NFGWS, Protection	View WB Page	View WB on EPA Water Map
30	IE_WE_30C010100	CLARE (GALWAY)_010	River	Galway County Council	SAC;	Moderate	Moderate	Good	Good	2021 or earlier	Not at risk			Sinking and Upper Clare (Galway)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30C010300	CLARE (GALWAY)_020	River	Galway County Council	DWPA; SAC;	Unassigned	Good	Good	Good	2021 or earlier	Not at risk			Sinking and Upper Clare (Galway)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30C010500	CLARE (GALWAY)_030	River	Galway County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30C010670	CLARE (GALWAY)_040	River	Galway County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30C010700	CLARE (GALWAY)_050	River	Galway County Council	SAC;	Good	Good	Moderate	Good	2022-2027	Review			Caherlea Gurrane GWS	NFGWS, Protection	View WB Page	View WB on EPA Water Map
30	IE_WE_30C010800	CLARE (GALWAY)_060	River	Galway County Council	SAC;	Moderate	Moderate	Poor	Good	2022-2027	At risk	Morphological	HYMO	Clough Cummer GWS	NFGWS, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30C011000	CLARE (GALWAY)_070	River	Galway County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk			Anbally GWS Carheenlea GWS. Currandrum GWS	NFGWS, Protection	View WB Page	View WB on EPA Water Map
30	IE_WE_30C011100	CLARE (GALWAY)_080	River	Galway County Council	SAC;	Moderate	Moderate	Moderate	Good	2022-2027	At risk	Hydrological, Morphological	HYMO	Carheenlea GWS	NFGWS, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30C011200	CLARE (GALWAY)_090	River	Galway County Council	SAC;	Moderate	Moderate	Moderate	Good	2022-2027	At risk	Hydrological, Morphological	HYMO			View WB Page	View WB on EPA Water Map
30	IE_WE_30C011300	CLARE (GALWAY)_100	River	Galway County Council	SAC; SPA;	Unassigned	Moderate	Moderate	Good	2022-2027	Review					View WB Page	View WB on EPA Water Map
30	IE_WE_30C020300	CORRIB_010	River	Galway County Council	SAC; Fish; SPA;	Unassigned	Unassigned	Good	Good	2021 or earlier	Not at risk			Kilcoona GWS	NFGWS, Protection	View WB Page	View WB on EPA Water Map
30	IE_WE_30C020600	CORRIB_020	River	Galway City Council	DWPA; SAC; Fish; SPA;	Good	Good	Good	Good	2021 or earlier	Not at risk			Corrib	Galway City Council, Protection	View WB Page	View WB on EPA Water Map
30	IE_WE_30C030150	CREGG_010	River	Galway County Council		Moderate	Moderate	Poor	Good	2022-2027	At risk	Morphological	HYMO	Cregg River and Headford Stream	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30C030200	CREGG_020	River	Galway County Council	SAC; SPA;	Unassigned	Moderate	Moderate	Good	2022-2027	Review			Cregg River and Headford Stream	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30C040100	CAMMANAGH_010	River	Galway County Council	SAC; SPA;	High	Good	Good	High	2022-2027	At risk	Morphological	HYMO	Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30C050100	CLOGHBRACK STREAM_010	River	Galway County Council	SAC; SPA;	Unassigned	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30C060300	CONG CANAL_010	River	Mayo County Council	SAC; SPA;	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30C070900	CNOCNAGUR_30_010	River	Galway County Council	SAC;	Unassigned	Good	Moderate	Good	2022-2027	Review					View WB Page	View WB on EPA Water Map
30	IE_WE_30C090100	CLOONDAVER STREAM (NORTH)_010	River	Mayo County Council		Moderate	Good	Moderate	Good	2022-2027	At risk	Sediment, Hydrological, Morphological, Nutrients	Ag, HYMO	Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30C110300	CLOONFAD_010	River	Roscommon County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30C120400	CLAUREEN (MAYO)_010	River	Mayo County Council		Poor	Poor	Poor	Good	2022-2027	At risk	Hydrological, Morphological, Nutrients	Ag, HYMO, M+Q	Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30C120700	CLAUREEN (MAYO)_020	River	Mayo County Council		Moderate	Moderate	Good	Good	2021 or earlier	Review			Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30D010200	DALGAN_010	River	Mayo County Council	DWPA;	Poor	Poor	Poor	Good	2022-2027	At risk	Organic	UR, UWW	Dalgan	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30D010300	DALGAN_020	River	Mayo County Council		Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30D010400	DALGAN_030	River	Mayo County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30D010500	DALGAN_040	River	Mayo County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30D010600	DALGAN_050	River	Mayo County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30D020100	DOOGHTA_010	River	Galway County Council	SAC;	Good	Good	High	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30D020200	DOOGHTA_020	River	Galway County Council	SAC;	High	High	High	High	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30D030600	DRIMNEEN_010	River	Galway County Council	DWPA; SAC; SPA;	Unassigned	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30F010100	FAILMORE_010	River	Galway County Council	SAC;	Good	High	High	High	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30F020100	FOOEY_010	River	Galway County Council		Good	Good	Good	Good	2021 or earlier	Not at risk			Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30F030100	FINNY_010	River	Galway County Council	SAC; SPA;	Good	Good	High	High	2021 or earlier	Not at risk			Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30F170810	FEAGH_EAST_010	River	Galway County Council		Unassigned	Good	Moderate	Good	2022-2027	Review			Feigh East and West GWS	LAWPRO, Protection	View WB Page	View WB on EPA Water Map
30	IE_WE_30G010250	GLENSAUL_010	River	Mayo County Council	SAC; SPA;	Poor	Moderate	Moderate	Good	2022-2027	Review			Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30G020200	GRANGE (GALWAY)_010	River	Galway County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30G020400	GRANGE (GALWAY)_020	River	Galway County Council	SAC;	Good	Moderate	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map

30	IE_WE_30G020500	GRANGE (GALWAY)_030	River	Galway County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30G020700	GRANGE (GALWAY)_040	River	Galway County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30G040015	GLENNAMUCKA STREAM_010	River	Galway County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30G050025	GORTGARROW STREAM_010	River	Galway County Council	SAC;	Moderate	Moderate	Moderate	Good	2022-2027	At risk	UnknownImpactType	Unknown	Sinking and Upper Clare (Galway)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30G060100	GLENGAWBEG_010	River	Galway County Council	SAC;	High	Good	Good	High	2022-2027	At risk	Morphological	HYMO	Owenriff (Oughterard)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30H010200	HEADFORD STREAM_010	River	Galway County Council		Unassigned	High	Moderate	Good	2022-2027	Review			Cregg River and Headford Stream	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30H010300	HEADFORD STREAM_020	River	Galway County Council	SAC; SPA;	Good	Moderate	Moderate	Good	2022-2027	At risk	Nutrients	Ag	Cregg River and Headford Stream	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30J010100	JOYCE'S_010	River	Galway County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30K010220	KILMAINE_010	River	Mayo County Council		Unassigned	Good	Moderate	Good	2022-2027	Review					View WB Page	View WB on EPA Water Map
30	IE_WE_30K010300	KILMAINE_020	River	Mayo County Council	SAC;	Unassigned	Good	Good	Good	2021 or earlier	Review					View WB Page	View WB on EPA Water Map
30	IE_WE_30K020200	KNOCKAUNRANNY STREAM_010	River	Galway County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk			Owenriff (Oughterard)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30K220930	KNOCKNAGEEHA_010	River	Mayo County Council	SAC; SPA;	Unassigned	Good	Moderate	Good	2022-2027	Review					View WB Page	View WB on EPA Water Map
30	IE_WE_30L010200	LOUGHKIP_010	River	Galway County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk			Owenriff (Oughterard)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30L030400	LOUGH NACORRALEA STREAM_010	River	Mayo County Council		Moderate	Good	High	Good	2021 or earlier	Not at risk			Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30L070100	LEVALLY STREAM_010	River	Galway County Council	SAC;	Moderate	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30M330920	MOCORHA_010	River	Mayo County Council	SAC;	Unassigned	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30N010050	NANNY (TUAM)_010	River	Galway County Council		Unassigned	Good	Moderate	Good	2022-2027	Review			Nanny Galway	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30N010100	NANNY (TUAM)_020	River	Galway County Council		Good	Good	Moderate	Good	2022-2027	Review			Nanny Galway	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30N010300	NANNY (TUAM)_030	River	Galway County Council	SAC;	Moderate	Moderate	Poor	Good	2022-2027	At risk	Hydrological, Morphological	HYMO	Nanny Galway	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30O010050	OWENBRIN_010	River	Mayo County Council		Moderate	Good	Good	Good	2021 or earlier	Review			Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30O010200	OWENBRIN_020	River	Mayo County Council	SAC; SPA;	Moderate	Moderate	Moderate	Good	2022-2027	At risk	Morphological	HYMO, For	Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30O020070	OWENRIFF (CORRIB)_010	River	Galway County Council	SAC;	Good	Good	High	High	2021 or earlier	Not at risk			Owenriff (Oughterard)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30O020200	OWENRIFF (CORRIB)_020	River	Galway County Council	SAC; SPA;	Good	Bad	Poor	High	2022-2027	At risk	Morphological, Nutrients, Organic, OtherSignificantImpacts	Ag, HYMO, IS	Owenriff (Oughterard)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30O030180	OWENWEE (CORRIB)_010	River	Galway County Council	SAC; SPA;	Good	Good	Good	Good	2021 or earlier	Not at risk			Failmore	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30R010030	ROBE_010	River	Mayo County Council		Moderate	Good	Good	Good	2021 or earlier	Review			Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30R010200	ROBE_020	River	Mayo County Council		Good	Good	Good	Good	2021 or earlier	Not at risk			Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30R010310	ROBE_030	River	Mayo County Council		Moderate	Moderate	Good	Good	2021 or earlier	Not at risk			Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30R010400	ROBE_040	River	Mayo County Council		Moderate	Moderate	Good	Good	2021 or earlier	Review			Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30R010600	ROBE_050	River	Mayo County Council		Moderate	Moderate	Moderate	Good	2022-2027	At risk	Morphological	HYMO	Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30R010950	ROBE_060	River	Mayo County Council	SAC;	Good	Good	Moderate	Good	2022-2027	At risk	Nutrients	Ag	Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30R220540	RATHMALIKEEN_010	River	Mayo County Council	SAC;	Unassigned	Good	Good	Good	2021 or earlier	Review			Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30S010100	SINKING_010	River	Galway County Council	SAC;	Good	Moderate	Good	Good	2021 or earlier	Not at risk			Sinking and Upper Clare (Galway)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30S010300	SINKING_020	River	Galway County Council	SAC;	Moderate	Good	Good	Good	2021 or earlier	Not at risk			Sinking and Upper Clare (Galway)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30S010400	SINKING_030	River	Galway County Council	SAC;	Good	Moderate	Good	Good	2021 or earlier	Not at risk			Sinking and Upper Clare (Galway)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30S020400	SRAH STREAM_010	River	Mayo County Council	SAC;	Bad	Good	Moderate	Good	2022-2027	At risk	Chemical, UnknownImpactType	Ag	Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30S030100	SRAHNALONG_010	River	Mayo County Council	SAC; SPA;	Moderate	Good	High	Good	2021 or earlier	Not at risk			Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30S040100	SCARDAUN_010	River	Mayo County Council		Good	Good	Good	Good	2021 or earlier	Not at risk			Lough Mask and Lough Carra	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30T010500	TERRYLAND_010	River	Galway City Council		Poor	Moderate	Moderate	Good	2022-2027	At risk	Morphological, Organic	HYMO, UR	Terryland	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
30	IE_WE_30T030300	TULLAGHAUN_010	River	Mayo County Council		Good	Good	Good	Good	2021 or earlier	Not at risk					View WB Page	View WB on EPA Water Map
30	IE_WE_30Y010055	YELLOW (SINKING)_010	River	Galway County Council	SAC;	Good	Good	Good	Good	2021 or earlier	Not at risk			Sinking and Upper Clare (Galway)	LAWPRO, Restoration	View WB Page	View WB on EPA Water Map
29, 30, 31	IE_WE_170_0700	Corrib Estuary	Transitional	Galway City Council	BW; SAC; SPA;	Good	Good	Moderate	Good	2022-2027	Review			Corrib	Galway City Council, Protection	View WB Page	View WB on EPA Water Map

Clare - Corrib GWB Registered Abstractions (subset of information)

All details are contained in the EPA December 2024 Register of Abstractions.
https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/epa-water-abstraction-register---december-2024.php

Part 1 – Abstraction Details & Names

Reg No	Abstraction Point Code	Organisation Name	Site Location	Abstraction Point Name	Licence Code	Primary Use	Abstraction Type
R00033-01	APR000096	5299R	Ballynalty Bay, Lough Corrib	Ballynalty Bay, Lough Corrib	2200PRI2056	Group Water Scheme Supply	Lake
R00079-01	APR000164	National Federation of Group Water Schemes	Feigh East & West GWS	Feigh East & West GWS	1200PRI0318	Group Water Scheme Supply	Groundwater well / borehole
R00177-01	APR000316	liskeavy/lisananey gws	Liskeavy/Lisananey gws	Liskeavy/Lisnaney Borehole	1200PRI0415	Group Water Scheme Supply	Groundwater well / borehole
R00195-01	APR000313	Cahermorris/Glenrevagh Group Water Scheme	Cahermorris/Glenrevagh Group Water Scheme	Cahermorris/Glenrevagh Group Wat	1200PRI0179	Group Water Scheme Supply	Groundwater well / borehole
R00240-01	APR000427	Belclare Group Water Scheme Society Ltd.	Belclare Pumphouse	Belclare Pumphouse	1200PRI0151	Group Water Scheme Supply	Groundwater well / borehole
R00243-01	APR000430	5069R	Claran Group Water Scheme Society Ltd	Annaghkeen Bay	1200PRI0216	Group Water Scheme Supply	Lake
R00254-01	APR000778	Roadstone Limited	Two Mile Ditch Quarry	Block Plant Well	N/A	Industrial other manufacturing	Groundwater well / borehole
R00300-01	APR000542	Kilcoona/Caherlistrane Group Water Scheme Co-operative Society Limited	Spring at Luimnagh	Spring at Luimnagh	1200PRI0178	Group Water Scheme Supply	Groundwater well / borehole
R00304-01	APR000545	Barnaderg Gortbeg Group Water Scheme Co-op Society Ltd	Danganbeg	Danganbeg	1200PRI1061	Group Water Scheme Supply	Groundwater well / borehole
R00307-01	APR000557	Galway Race Committee	Galway Racecourse	Drinking Water Well		Horse Racing	Groundwater well / borehole
R00328-01	APR000591	Balrobuck Group water scheme Co -op	Borehole at Balroebuck	Borehole at Balroebuck	1200PRI0145	Group Water Scheme Supply	Groundwater well / borehole
R00396-01	APR000700	Boyounagh Ballyedmond Group Water Scheme	Boyounagh Ballyedmond GWS	Borehole at Woodfield	1200PRI1081	Group Water Scheme Supply	Groundwater well / borehole
R00446-01	APR000774	Anbally & District Group Water Scheme Co-operative Society Limited	Anbally & District GWS Borehole	Anbally & District GWS Borehole	1200PRI0104	Group Water Scheme Supply	Groundwater well / borehole
R00465-01	APR000791	Harrington Concrete & Quarries UC	Galway Quarry	Galway Quarry Sump		Quarrying	Groundwater well / borehole
R00537-01	APR000879	Clough Cummer GWS	Clough Cummer GWS	Clough Cummer GWS	1200PRI0286	Group Water Scheme Supply	Groundwater well / borehole
R00550-01	APR000898	Carheenlea Group Water Scheme	Carheenlea GWS	Carheenlea GWS	1200PRI0175	Group Water Scheme Supply	Groundwater well / borehole
R00596-01	APR001059	Uisce Éireann	Tuam RWSS	WAB0001947,L124765	1200PUB1047	Public Water Scheme Supply	Lake
R00918-01	APR001575	Uisce Éireann	Glenamaddy	WAB0001552,L124094	1200PUB1021	Public Water Scheme Supply	Groundwater well / borehole
R01364-01	APR002247	Transitions Optical Ltd	Transitions Optical Ltd	Transitions Well		Other (please specify in additional n	Groundwater well / borehole
R01379-01	APR002265	Brierfield and District Group Water Scheme Society Limited	Brierfield and District Group Water Scheme	Brierfield and District GWS	1200PRI0161	Group Water Scheme Supply	Groundwater well / borehole
R01381-01	APR002267	Kilconieron GWS Co-Operative Society Ltd	Kilconieron GWS	kilconieron GWS	1200PRI1029	Group Water Scheme Supply	Groundwater well / borehole
R01412-01	APR002302	Rusheens Caherhugh GWS	Rusheens Caherhugh GWS	Rusheens Caherhugh GWS	1200PRI0503	Group Water Scheme Supply	Groundwater well / borehole
R01523-01	APR002476	Corrib Farming Limited	Rinkippen	Rinkippen		Agriculture (Drinking consumption, p	Groundwater well / borehole
R01588-01	APR002604	Baswal Limited	Lough Corrib	Lough Corrib		Agriculture (irrigation)	Lake
R01610-01	APR002627	Clada Mineral Water Company Limited	CLADA	CLADA		Commercial – Beverages	Groundwater well / borehole
R02557-01	APR002929	carrowmoreknock group water scheme	Carrowmoreknock Group Water Scheme	Carrowmoreknock Group Water Sche		Group Water Scheme Supply	Lake
R02569-01	APR002942	Cross Group Water Scheme Co-operative Society Ltd	Castletown Intake	Castletown		Group Water Scheme Supply	Lake

Clare Corrib GWB Registered Abstractions (subset of information)

All details are contained in the EPA December 2024 Register of Abstractions.

https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/epa-water-abstraction-register---december-2024.php

PART 2 = All Registered from ALL Waters (including LAKES – note UE Tuam RWSS

Reg No	Maximum Daily Volume Estimate for Abstraction (m^3/d)	Cumulative Max. Daily Vol. Est. for Registration (m^3/d)	Total Annual Volume (m^3/yr)	No. of Abstraction Points	County	Townland Name	Townland ID	Waterbody or Water Feature	Waterbody Code	Do Restrictions Exist?	Further info on Restrictions	Registration Status
R00033-01	642	642	234,330	1	Mayo			Corrib Upper	IE_WE_30_666b	No		Active
R00079-01	25	25	9,125	1	Galway	FEAGH WEST	26522	Clare-Corrib	IE_WE_G_0020	No		Active
R00177-01	38	38	456	1	Galway	LISKEEVY	25890	Clare-Corrib	IE_WE_G_0020	No		Active
R00195-01	107	107	39,055	1	Galway	CAHERMORRIS	27773	Clare-Corrib	IE_WE_G_0020	No		Active
R00240-01	175	175	54,750	1	Galway	POLLDARRAGH	24813	Clare-Corrib	IE_WE_G_0020	No		Active
R00243-01	133	133	48,545	1	Galway	ANNAGHKEEN	27786	Corrib Upper	IE_WE_30_666b	No		Active
R00254-01	400	8,681	146,000	2	Galway	POLLKEEN	24618	GWDTE-Lough Corr	IE_WE_G_0106	No		Active
R00300-01	1,142	1,142	324,850	1	Galway	LUIMNAGH EAST	24495	Clare-Corrib	IE_WE_G_0020	No		Active
R00304-01	900	900	270,000	1	Galway	DANGANBEG	26471	Clare-Corrib	IE_WE_G_0020	No		Active
R00307-01	260	830	1,000	2	Galway	Galway City	51205	GWDTE-Lough Corr	IE_WE_G_0106	No		Active
R00328-01	120	120	43,800	1	Galway	BALROBUCK BEG	27769	Clare-Corrib	IE_WE_G_0020	No		Active
R00396-01	168	384	35,040	3	Galway	WOODFIELD (BALLYMOE BY)	25397	Clare-Corrib	IE_WE_G_0020	No		Active
R00446-01	67	67	18,250	1	Galway	TAWNAGHMORE (CLARE BY)	26313	Clare-Corrib	IE_WE_G_0020	No		Active
R00465-01	365	365	91,615	1	Galway	ARDGAINEEN	26317	Clare-Corrib	IE_WE_G_0020	No		Active
R00537-01	61	61	20,075	1	Galway	POLLACOSSAUN EIGHTER	26310	Clare-Corrib	IE_WE_G_0020	No		Active
R00550-01	43	43	15,695	1	Galway	CAHERATEEMORE NORTH	26499	Clare-Corrib	IE_WE_G_0020	No		Active
R00596-01	44,121	44,121	14,179,754	1	Galway			Corrib Lower	IE_WE_30_666a	No		Active
R00918-01	628	628	192,294	1	Galway			Clare-Corrib	IE_WE_G_0020	No		Active
R01364-01	70	70	8,000	1	Galway	DEMESNE	30668	Clare-Corrib	IE_WE_G_0020	No		Active
R01379-01	91	91	28,888	1	Galway	WINDFIELD DEMESNE	26558	Clare-Corrib	IE_WE_G_0020	No		Active
R01381-01	110	110	26,280	1	Galway			Clare-Corrib	IE_WE_G_0020	No		Active
R01412-01	100	100	36,500	1	Galway	CULLEEN	26290	Clare-Corrib	IE_WE_G_0020	No		Active
R01523-01	65	65	21,000	1	Galway	BARNACURRAGH	26435	Clare-Corrib	IE_WE_G_0020	No		Active
R01588-01	40	40	1,120	1	Galway			Corrib Lower	IE_WE_30_666a	No		Active
R01610-01	50	50	18,000	1	Galway	Galway City	51205	Clare-Corrib	IE_WE_G_0020	No		Active
R02557-01	35	35	12,903	1	Galway	CORRANELLISTRUM	24486	Corrib Upper	IE_WE_30_666b	No		Active
R02569-01	340	580	124,100	2	Mayo	CASTLETOWN (ED Houndswo	24710	Corrib Upper	IE_WE_30_666b	No		Active
	50,296	59,603	16,001,425									
		m3/d	m3/year									

Clare Corrib GWB Registered Abstractions (subset of information)

All details are contained in the EPA December 2024 Register of Abstractions.
https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/epa-water-abstraction-register---december-2024.php

PART 3 = GROUNDWATER ONLY - NO LAKES

Reg No	Abstraction Point Code	Maximum Daily Volume Estimate for Abstraction (m^3/d)		Cumulative Max. Daily Vol. Est. for Registration (m^3/d)	Total Annual Volume (m^3/yr)	No. of Abstraction Points	County	Townland Name	Townland ID	Waterbody or Water Feature	Waterbody Code	Do Restrictions Exist?	Further info on Restrictions	Registration Status
R00079-01	APR000164	25		25	9,125	1	Galway	FEAGH WEST	26522	Clare-Corrib	IE_WE_G_0020	No		Active
R00177-01	APR000316	38		38	456	1	Galway	LISKEEVY	25890	Clare-Corrib	IE_WE_G_0020	No		Active
R00195-01	APR000313	107		107	39,055	1	Galway	CAHERMORRIS	27773	Clare-Corrib	IE_WE_G_0020	No		Active
R00240-01	APR000427	175		175	54,750	1	Galway	POLLDARRAGH	24813	Clare-Corrib	IE_WE_G_0020	No		Active
R00254-01	APR000778	400		8,681	146,000	2	Galway	POLLKEEN	24618	GWDTE-Lough Corr	IE_WE_G_0106	No		Active
R00300-01	APR000542	1,142		1,142	324,850	1	Galway	LUIMNAGH EAST	24495	Clare-Corrib	IE_WE_G_0020	No		Active
R00304-01	APR000545	900		900	270,000	1	Galway	DANGANBEG	26471	Clare-Corrib	IE_WE_G_0020	No		Active
R00307-01	APR000557	260		830	1,000	2	Galway	Galway City	51205	GWDTE-Lough Corr	IE_WE_G_0106	No		Active
R00328-01	APR000591	120		120	43,800	1	Galway	BALROBUCK BEG	27769	Clare-Corrib	IE_WE_G_0020	No		Active
R00396-01	APR000700	168		384	35,040	3	Galway	WOODFIELD (BALLYMOE BY)	25397	Clare-Corrib	IE_WE_G_0020	No		Active
R00446-01	APR000774	67		67	18,250	1	Galway	TAWNAGHMORE (CLARE BY)	26313	Clare-Corrib	IE_WE_G_0020	No		Active
R00465-01	APR000791	365		365	91,615	1	Galway	ARDGAINEEN	26317	Clare-Corrib	IE_WE_G_0020	No		Active
R00537-01	APR000879	61		61	20,075	1	Galway	POLLACOSSAUN EIGHTER	26310	Clare-Corrib	IE_WE_G_0020	No		Active
R00550-01	APR000898	43		43	15,695	1	Galway	CAHERATEEMORE NORTH	26499	Clare-Corrib	IE_WE_G_0020	No		Active
R00918-01	APR001575	628		628	192,294	1	Galway			Clare-Corrib	IE_WE_G_0020	No		Active
R01364-01	APR002247	70		70	8,000	1	Galway	DEMESNE	30668	Clare-Corrib	IE_WE_G_0020	No		Active
R01379-01	APR002265	91		91	28,888	1	Galway	WINDFIELD DEMESNE	26558	Clare-Corrib	IE_WE_G_0020	No		Active
R01381-01	APR002267	110		110	26,280	1	Galway			Clare-Corrib	IE_WE_G_0020	No		Active
R01412-01	APR002302	100		100	36,500	1	Galway	CULLEEN	26290	Clare-Corrib	IE_WE_G_0020	No		Active
R01523-01	APR002476	65		65	21,000	1	Galway	BARNACURRAGH	26435	Clare-Corrib	IE_WE_G_0020	No		Active
R01610-01	APR002627	50		50	18,000	1	Galway	Galway City	51205	Clare-Corrib	IE_WE_G_0020	No		Active
		4,985		14,052	1,400,673									
				m3/d	m3/year									

National Water Monitoring StationsGWIE_WE_G_002012000004

Data Downloaded at https://www.catchments.ie/data/#/subcatchment/30/30_13

GROUNDWATER BUNATUBBER SPRING = FOUND

StationID	GWIE_WE_G_002012000004
StationName	Bunatubber
StationType	GROUNDWATER_STATION
WFDWISECODE	IEMGGWIE_WE_G_002012000004
EntityCode	IE_WE_G_0020
EntityName	Clare-Corrib
WBWFDWISECODE	IE_WE_G_0020
TypeofWaterMonitored	Groundwater body code but there is no corresponding code in Eden MDS for the moment
LocalAuthority	GALWAY COUNTY COUNCIL
RiverBasinDistrict	Western
EPAStationTypeWFDs	SurveillanceAndOperational
CreatedByOrganisation	EPA
EPALink	N/A
Easting	132711.6
Northing	242122.7

= Quarry

= WQ Monitoring Site

Data Downloaded at https://www.catchments.ie/data/#/subcatchment/30/30_13

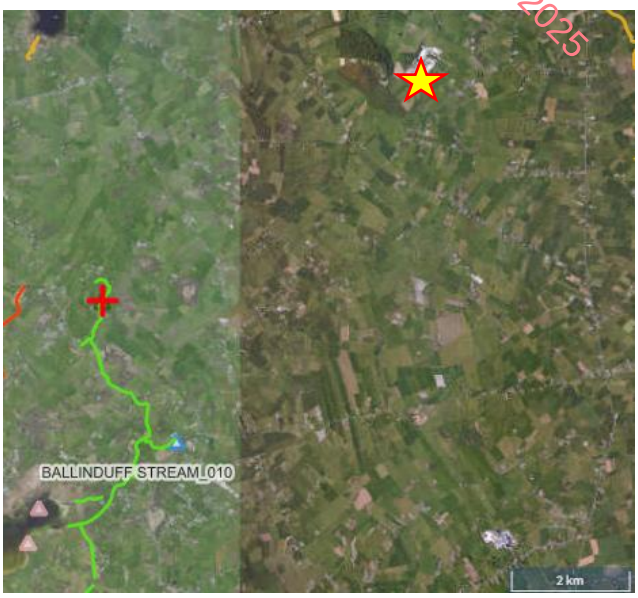
Selected Results overleaf

Bunatubber [GWIE_WE_G_0020 12000004] GROUNDWATER EPA	Alkalinity-total (mg/l as CaCO3)	Ammonia-Total (as N) mg/l	Chloride (mg/l)	Conductivity [Field] uS/cm	Nitrate as N (mg/l)	Nitrate as NO3 (mg/l)	Nitrite as N (ug/l)	Nitrite ug/l	Orthophosphate (as P) -filtered	pH [Field]	Potassium [K] (mg/l)	Sodium [Na] (mg/l)	Temperature oC	Total Organic Carbon (mg/l)
21/07/2020	317	0.01	22.9	675	1.9	8.4	2	6.56	0.017	7	2	10	10.7	2.4
03/11/2020	356	0.01	22	693	2.3	10.2	2	6.56	0.017	6.9	2.8	11	10.9	2.5
22/03/2021	326	0.01	17.1	616	1.1	4.9	2	6.56	0.015	7	2.1	9.4	9.9	2.3
14/06/2021	351	0.01	19.1	692	1.7	7.5	2	6.56	0.018	6.9	1.7	11	10.4	1.7
04/10/2021	369	0.01	16.6	671	1.9	8.4	2	6.56		6.9	2.3	9.3	10.5	2.5
08/06/2022	366	0.01	21.2	704	1.8	8.0	2	6.56	0.016	6.9	1.9	10	10	2
02/08/2022	365	0.01	20	703	2.3	10.2	2	6.56	0.017	7	1.8	11	10.8	1.8
01/11/2022	330	0.01	23.2	653	2.6	11.5	2	6.56	0.018	7	2.4	8.4	11.1	2.6
03/04/2023	306	0.01	20.3	607	1.4	6.2	2	6.56	0.014	7	1.69	9.93	10.4	1.7
31/07/2023	338	0.01	16.9	674	2	8.8	2	6.56	0.024	6.8	1.8	9.9	11	2.2
09/10/2023	363	0.01	13.6	670	2	8.8	2	6.56	0.018	6.7	2.4	9.1	11.2	2.9
27/03/2024	315	0.021	17.1	595	1.7	7.5	2	6.56	0.016	6.8	1.9	8.3	10.3	2.7
24/07/2024	361	0.01	18.9	697	1.9	8.4	2	6.56	0.019	6.8	1.3	11	10.9	1.9
16/10/2024	356	0.01	18.1	674	2.1	9.3	2	6.56	0.017	6.8	1.8	11	11	2.4
MAX	**369**	**0.021**	**23.2**	**704**	**2.6**	**11.5**	**2**	6.56	**0.024**	**7**	**2.8**	**11**	**11.2**	**2.9**
MIN	**306**	**0.01**	**13.6**	**595**	**1.1**	**4.9**	**2**	6.56	**0.014**	**6.7**	**1.3**	**8.3**	**9.9**	**1.7**
Average	**344**	**0.01**	**19**	**666**	**2**	**8**	**2**	6.56	**0.017**	**7**	**2**	**10**	**11**	**2**
Groundwater Regulation (S.I. No. 9 of 2010 & Amended) Threshold Value	not specified	0.065 - 0.175	24 - 187.5	800 - 1875 uS/cm	-	37.5	-	375	0.035	not specified	not specified	150	not specified	not specified
Hydro-G Comment	**Hard Water**	**Compliant**	**Compliant**	**Compliant**	**Compliant**		**Compliant**		**Compliant**	**NEUTRAL Results**	**used by Hydrogeol**	**Compliant**	**NEUTRAL Results**	**GROUNDWATER SIGNATURE**

National Water Monitoring Stations RS 30B050100 BALLINDUFF STREAM - Bridge u/s Lough Corrib

CANNOT FIND THIS DATA – email sent to EPA and GCC

StationID	RS30B050100	★ = Quarry = WQ Monitoring Site	
StationName	BALLINDUFF STREAM - Bridge u/s Lough Corrib		
StationType	RIVER_STATION		
WFDWISECODE	IEMRRS30B050100		
EntityCode	30B05		
EntityName	BALLINDUFF STREAM		
WBWFDWISECODE	IE_WE_30B050100	**EPALink**	30B050100
TypeofWaterMonitored	River Water	**Easting**	131496
LocalAuthority	GALWAY COUNTY COUNCIL	**Northing**	244488
RiverBasinDistrict	Western		
EPAStationTypeWFDs	PreWfd		
CreatedByOrganisation	EPA		



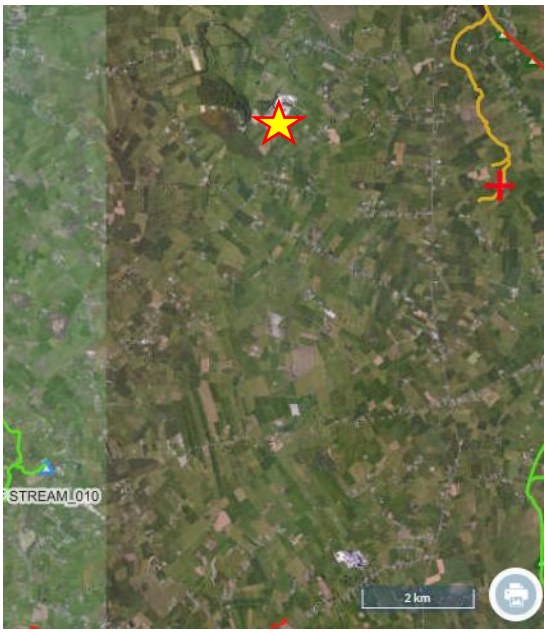
National Water Monitoring StationsGWIE_WE_G_002012000021

Data Downloaded at https://www.catchments.ie/data/#/subcatchment/30/30_13

ONLY ONE SAMPLE TAKEN 2/12/14 – Investigative = not long term data

= Quarry

= WQ Monitoring Site



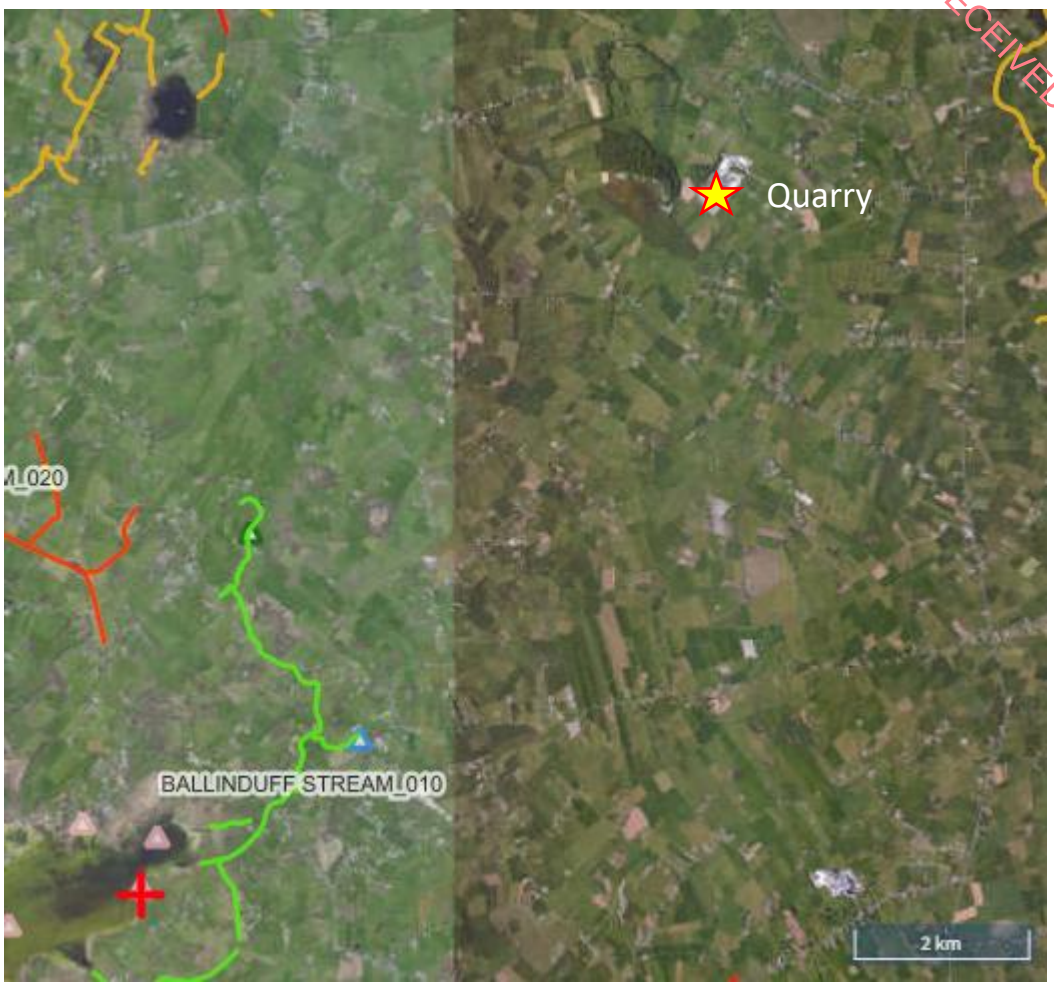
StationID	GWIE_WE_G_002012000021		
StationName	Lackagh	**EPAStationTypeWFDs**	Investigative
StationType	GROUNDWATER_STATION	**CreatedByOrganisation**	EPA
WFDWISECODE	IEMGGWIE_WE_G_002012000021	**EPALink**	N/A
EntityCode	IE_WE_G_0020	**Easting**	140900
EntityName	Clare-Corrib	**Northing**	247100
WBWFDWISECODE	IE_WE_G_0020		
TypeofWaterMonitored	Groundwater body code but there is no corresponding code in Eden MDS for the moment		
LocalAuthority	GALWAY COUNTY COUNCIL		
RiverBasinDistrict	Western		

National Water Monitoring StationsLS300014303900450

StationID	LS300014303900450
StationName	M_6
StationType	LAKE_STATION
WFDWISECODE	IEMLWE_30_666a_0450_Op
EntityCode	30001430390

EntityName	Corrib Lower	**EPAStationTypeWFDs**	SurveillanceAndOperational
WBWFDWISECODE	IE_WE_30_666a	**CreatedByOrganisation**	EPA
TypeofWaterMonitored	Lake Water	**EPALink**	N/A
LocalAuthority	GALWAY COUNTY COUNCIL	**Easting**	130381.72
RiverBasinDistrict	Western	**Northing**	241046.33

National Water Monitoring StationsLS300014303900540



StationID	LS300014303900540		
StationName	M_7		
StationType	LAKE_STATION		
WFDWISECODE	IEMLWE_30_666a_0540_S	**RiverBasinDistrict**	Western
EntityCode	30001430390	**EPAStationTypeWFDs**	SurveillanceAndOperational
EntityName	Corrib Lower	**CreatedByOrganisation**	EPA
WBWFDWISECODE	IE_WE_30_666a	**EPALink**	N/A
TypeofWaterMonitored	Lake Water	**Easting**	130188.89
LocalAuthority	GALWAY COUNTY COUNCIL	**Northing**	240464.31

National Water Monitoring StationsLS300014303900140

StationID	LS300014303900140		
StationName	Corrib Lwr Surrogate Shore Site 4a		
StationType	LAKE_STATION		
WFDWISECODE	IEMLWE_30_666a_0140_S	**RiverBasinDistrict**	Western
EntityCode	30001430390	**EPAStationTypeWFDs**	SurveillanceAndOperational
EntityName	Corrib Lower	**CreatedByOrganisation**	EPA
WBWFDWISECODE	IE_WE_30_666a	**EPALink**	N/A
TypeofWaterMonitored	Lake Water	**Easting**	129536.93
LocalAuthority	GALWAY COUNTY COUNCIL	**Northing**	241213.99

Q Rating = Latest = 1993

Latest River Q ValuesRS30B050100

StationCode	RS30B050100
StationName	BALLINDUFF STREAM - Bridge u/s Lough Corrib
StationTypeEDEN	RIVER_STATION
RiverWaterbodyName	BALLINDUFF STREAM_010
EntityName	BALLINDUFF STREAM
EntityCode	30B05
Year	1993
QValueScore	4
QValueStatus	Good
WFDWISECODE	IEMRRS30B050100
WBWFDWISECODE	IE_WE_30B050100
LocalAuthority	GALWAY COUNTY COUNCIL
EPAStationTypeWFD	PreWfd
Typeofwatermonitored	River Water
RiverBasinDistrict	Western
SegCd	30_2308
Media	WATER
DataSource	FCT
URL	View the Data Page
Easting	131496
Northing	244488

= Quarry

= Q Rating Site on the Ballinduff Stream (1993)

Appendix 8.8 Site Long Term Monitoring Data Summary Tables & Laboratory Certificates of Analysis

Table (A) Summary Results – On Site Water Well

Groundwater Well On Site		Year 2020	Year 2021	Year 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023	Q1 2024	Q2 2024	Q3 2024	Q4 2024	Q1 2025	Groundwater Regulation (S.I. No. 9 of 2010 & Amended) Threshold Value	Hydro-G Comment
Test	Units	Results (July)	Results (April)	Results (September)	Results (January)	Results (May)	Results (July)	Results (October)	Results (January)	Results (May)	Results (July)	Results (October)	Results (January)		
B.O.D.	mg/L	0.1	<0.1	0.5	0.1	0.2	<0.1	0.3	<0.1	<0.1	0.2	0.5	0.50	not GW Reg Specified	
Chloride (as Cl^-)	mg/L	60	17	20	17	18	20	14	11	13	18	18	14	24 - 187.5	Compliant
C.O.D.	mg/L	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	not GW Reg Specified	
Nitrate (as NO_3)	mg/L	<0.5	4.8	1.0	<2	7.7	8.9	<0.5	6.8	6.4	5.9	7.1	5.6	37.5	Compliant
Nitrite (as NO_2) CALCULATED	ug/l	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	375	Compliant
pH - Field	pH Units	8.30	7.37	7.20	6.76	6.80	7.11	6.98	7.27	7.19	7.15	7.39	7.06	neutral	
Total Suspended Solids	mg/L	<10	<10	<10	<5	<10	<10	<10	<5	<5	<10	<10	<10	not GW Reg Specified	
Dissolved Oxygen	mg/L	6.99	8.44	3.47	9.86	8.08	7.74	8.87	8.93	8.30	7.21	7.88	8.65	not GW Reg Specified	
Conductivity (25°C) - Field	µS/cm	957	651	693	660	680	607	671	666	695	660	682	727	800 - 1875	Compliant
Ammonia (as NH_3-N)	mg/L	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.0004	0.0004	<.00002	<0.0002	0.065 - 0.175	Compliant
Total Petroleum Hydrocarbons (>C_6-C_{40})	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<.01	<0.01	<LOD	Compliant
OrthoPhosphate (as P)	mg/L	<0.065	<0.01	<0.065	<0.01	0.29	<0.065	<0.065	<0.065	<0.065	<0.065	<.065	<0.065	0.035	Compliant
Aluminium (Total as Al) Calculated	ug/l	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	150	Compliant
Boron (Total as B) CALCULATED	ug/l	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	750	Compliant
Cadmium (Total as Cd) CALCULATED	ug/l	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	3.75	Compliant
Chromium (Total as Cr)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<.005	<0.005	not GW Reg Specified	
Copper (Total as Cu) Calculated	ug/l	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	44	1500	Compliant
Sodium (Total as Na)	mg/L	<10	<10	11	44	<10	<10	<10	<10	<10	12	13	<10	150	Compliant
Arsenic (Total as As) Calculated	ug/l	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	2.5	7.5	Compliant
Total Phosphorus as P	mg/L	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<.5	<0.5	not GW Reg Specified	
Oils, Fats & Grease	mg/L	<0.60	<0.6	<3	<3	<3	<3	<3	<3	2.0	<3	<3	<3	not GW Reg Specified	
OrthoPhosphate (as PO_4)	mg/L									<3	<0.2	<.02	<0.2	not GW Reg Specified	
Total Ammonia (as N)	mg/L									<0.2	0.073	<.05	<0.05	not GW Reg Specified	
Total Nitrogen (as N)	mg/L	<0.75	1.4	1.9	2.2	2.0	2.1	1.3	1.8	<0.1	1.3	<2	4.1	not GW Reg Specified	

Table (B) Summary Results – Floor Settlement Waters

Central Sump = Site's Surface Water Results														
Test	Units	Year 2020	Year 2021	Year 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023	Q1 2024	Q2 2024	Q3 2024	Q4 2024	Q1 2025	Hydro-G Comment
		Results (July)	Results (April)	Results (September)	Results (January)	Results (May)	Results (July)	Results (October)	Results (January)	Results (May)	Results (July)	Results (October)	Results (January)	
B.O.D.	mg/L	0.3	1.7	1.2	0.4	1.0	0.3	1.2	<0.1	0.6	0.5	0.8	0.10	SW Regs Compliant
Chloride (as Cl^-)	mg/L	60	36	20	31	37	45	51	54	47	49	46	47	GW Regs Compliant
C.O.D.	mg/L	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	Low COD
Nitrate (as NO_3)	mg/L	0.70	0.99	7.4	<2	5.6	4.3	4.8	5.5	3.8	2.0	1.2	4.6	GW Regs Compliant
Nitrite (as NO_2)	mg/L	<0.05	<0.05	<0.5	<0.16	<0.05	<0.05	0.087	<0.05	<0.05	<0.05	<0.05	0.065	GW Regs Compliant
pH - Field	pH Units	8.21	8.25	8.10	7.50	8.25	8.13	7.80	7.66	8.18	8.30	8.05	7.91	DW Regs Compliant
Total Suspended Solids	mg/L	<10	<5	<5	5.6	<10	<5	<10	<5	<10	<25	<10	<10	Salmonid Regs Compliant
Dissolved Oxygen	mg/L	9.90	11.17	9.05	4.52	10.17	9.83	9.83	10.55	10.13	10.71	9.41	10.56	not specified in Regs
Conductivity (25°C) - Field	µS/cm	752	615	656	638	605	606	655	625	554	579	563	572	GW Regs Compliant
Unionised Ammonia (as NH3-N)	mg/L	<0.01	<0.01	0.046	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0004	<0.0002	0.003	0.0037	VERY Low
Total Petroleum Hydrocarbons (>C_6-C_{40})	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	< LOD = Compliant
OrthoPhosphate (as P)	mg/L	<0.065	<0.065	<0.065	<0.01	<0.065	<0.065	<0.065	<0.065	<0.065	<0.065	<0.065	<0.065	GW Regs Compliant
Aluminium (Total as Al)	mg/L	<0.05	<0.05	<0.05	<0.05	0.092	<0.05	0.13	0.10	0.069	<0.05	0.21	0.087	GW Regs Compliant
Boron (Total as B)	mg/L	0.069	0.047	0.053	<0.025	0.054	0.046	0.067	0.042	0.031	0.035	0.044	0.026	GW Regs Compliant
Cadmium (Total as Cd)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	GW Regs Compliant
Chromium (Total as Cr)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	GW Regs Compliant
Copper (Total as Cu)	mg/L	<0.025	<0.025	<0.025	0.095	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<.025	<0.025	GW Regs Compliant
Sodium (Total as Na)	mg/L	41	20	24	<10	30	26	41	35	31	35	35	25	GW Regs Compliant
Arsenic (Total as As)	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<.0025	<0.0025	GW Regs Compliant
Total Phosphorus as P	mg/L	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<.5	<0.5	not specified in Regs
Oils, Fats & Grease	mg/L	<0.60	<0.6	<3	<3	<3	<3	<3	3.2	<3	<3	16	<3	not specified in Regs
OrthoPhosphate (as PO_4)										<0.2	<0.2	<0.2	<0.2	SW Regs Compliant
Total Ammonia (as N)										<0.1	<0.05	0.071	0.12	GW Regs Compliant
Total Nitrogen (as N)	mg/L	<0.75	<1	<1	1.3	1.5	1.4	1.3	1.5	1.3	0.65	<2	<2	not specified in Regs

TEST REPORT NO: 304320

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 25/01/0875
Quote Ref: QC009402
Order No: Not Required
Sales Order: 239176
Date Received: 13/01/2025
Date Sampled: 13/01/2025
Date Completed: 31/01/2025
Sample Type: Bore

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Bore
Client Ref: GW

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

Test	Units	Results	Customer Limits	Date Analysed	Method
B.O.D. Acc.	mg/L	0.50	Not Given	15/01/2025	BHP AC 005
Chloride (as Cl^-)	mg/L	14	Not Given	16/01/2025	BHP AC 095
C.O.D.	mg/L	<15	Not Given	14/01/2025	BHP AC 006
Nitrate (as NO_3)	mg/L	5.6	Not Given	13/01/2025	BHP AC 019
Nitrite (as NO_2)	mg/L	<0.05	Not Given	13/01/2025	BHP AC 019
pH - Field	pH Units	7.06	Not Given	13/01/2025	BHP AC 067
Total Suspended Solids	mg/L	<10	Not Given	15/01/2025	BHP AC 012
Dissolved Oxygen	mg/L	8.65	Not Given	13/01/2025	BHP AC 067
Conductivity (25°C) - Field	µS/cm	727	Not Given	13/01/2025	BHP AC 067
Unionised Ammonia (as NH_3-N)	mg/L	<0.0002	Not Given	20/01/2025	BHP AC 095
Total Petroleum Hydrocarbons (>C_6-C_{40}) *	mg/L	<0.01	Not Given	20/01/2025	1670
OrthoPhosphate (as P)	mg/L	<0.065	Not Given	13/01/2025	BHP AC 019
Aluminium (Total as Al)	mg/L	<0.05	Not Given	16/01/2025	BHP AC 224
Boron (Total as B)	mg/L	<0.025	Not Given	16/01/2025	BHP AC 224

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 31/01/2025

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
* Subcontracted to an approved accredited laboratory
** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

~ : Sample Condition : ACCEPTABLE

BHP/AC/F115v3

TEST REPORT NO: 304320

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 25/01/0875
Quote Ref: QC009402
Order No: Not Required
Sales Order: 239176
Date Received: 13/01/2025
Date Sampled: 13/01/2025
Date Completed: 31/01/2025
Sample Type: Bore

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Bore
Client Ref: GW

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

Test	Units	Results	Customer Limits	Date Analysed	Method
Cadmium (Total as Cd)	mg/L	<0.005	Not Given	16/01/2025	BHP AC 224
Chromium (Total as Cr)	mg/L	<0.005	Not Given	16/01/2025	BHP AC 224
Copper (Total as Cu)	mg/L	0.044	Not Given	16/01/2025	BHP AC 224
Sodium (Total as Na)	mg/L	<10	Not Given	16/01/2025	BHP AC 224
Arsenic (Total as As)	mg/L	<0.0025	Not Given	16/01/2025	BHP AC 136
Total Phosphorus as P	mg/L	<0.5	Not Given	16/01/2025	BHP AC 224
Oils, Fats & Grease	mg/L	<3	Not Given	31/01/2025	BHP AC 110
OrthoPhosphate (as PO_4)	mg/L	<0.2	Not Given	13/01/2025	BHP AC 019
Total Ammonia (as N)	mg/L	<0.05	Not Given	20/01/2025	BHP AC 095
Total Nitrogen (as N)	mg/L	4.1	Not Given	21/01/2025	BHP AC 095

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 31/01/2025

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
***** Subcontracted to an approved accredited laboratory
****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

~ : Sample Condition : ACCEPTABLE

BHP/AC/F115v3

TEST REPORT NO: 298390

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 24/10/1826
Quote Ref: QC009402
Order No: Not Required
Sales Order: 231250
Date Received: 08/10/2024
Date Sampled: 08/10/2024
Date Completed: 24/10/2024
Sample Type: Bore

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Bore
Client Ref: GW

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

Test	Units	Results	Customer Limits	Date Analysed	Method
B.O.D. Acc.	mg/L	0.50	Not Given	09/10/2024	BHP AC 005
Chloride (as Cl^-)	mg/L	18	Not Given	10/10/2024	BHP AC 095
C.O.D.	mg/L	<15	Not Given	15/10/2024	BHP AC 006
Nitrate (as NO_3)	mg/L	7.1	Not Given	10/10/2024	BHP AC 019
Nitrite (as NO_2)	mg/L	<0.05	Not Given	10/10/2024	BHP AC 019
pH - Field	pH Units	7.39	Not Given	08/10/2024	BHP AC 067
Total Suspended Solids	mg/L	<10	Not Given	10/10/2024	BHP AC 012
Dissolved Oxygen	mg/L	7.88	Not Given	08/10/2024	BHP AC 067
Conductivity (25°C) - Field	µS/cm	682	Not Given	08/10/2024	BHP AC 067
Unionised Ammonia (as NH_3-N)	mg/L	<0.0002	Not Given	14/10/2024	BHP AC 095
Total Petroleum Hydrocarbons (>C_6-C_{40}) *	mg/L	<0.01	Not Given	15/10/2024	1670
OrthoPhosphate (as P)	mg/L	<0.065	Not Given	10/10/2024	BHP AC 019
Aluminium (Total as Al)	mg/L	<0.05	Not Given	10/10/2024	BHP AC 129
Boron (Total as B)	mg/L	<0.025	Not Given	10/10/2024	BHP AC 129

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 28/10/2024

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
* Subcontracted to an approved accredited laboratory
** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

~ : Sample Condition : ACCEPTABLE

TEST REPORT NO: 298390

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 24/10/1826
Quote Ref: QC009402
Order No: Not Required
Sales Order: 231250
Date Received: 08/10/2024
Date Sampled: 08/10/2024
Date Completed: 24/10/2024
Sample Type: Bore

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Bore
Client Ref: GW

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

Test	Units	Results	Customer Limits	Date Analysed	Method
Cadmium (Total as Cd)	mg/L	<0.005	Not Given	10/10/2024	BHP AC 129
Chromium (Total as Cr)	mg/L	<0.005	Not Given	10/10/2024	BHP AC 129
Copper (Total as Cu)	mg/L	0.052	Not Given	10/10/2024	BHP AC 129
Sodium (Total as Na)	mg/L	13	Not Given	10/10/2024	BHP AC 129
Arsenic (Total as As)	mg/L	<0.0025	Not Given	10/10/2024	BHP AC 136
Total Phosphorus as P	mg/L	<0.5	Not Given	24/10/2024	BHP AC 142
Oils, Fats & Grease	mg/L	<3	Not Given	15/10/2024	BHP AC 110
OrthoPhosphate (as PO_4)	mg/L	<0.2	Not Given	10/10/2024	BHP AC 019
Total Ammonia (as N)	mg/L	<0.05	Not Given	14/10/2024	BHP AC 095
Total Nitrogen (as N)	mg/L	<2	Not Given	15/10/2024	BHP AC 095

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 28/10/2024

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
***** Subcontracted to an approved accredited laboratory
****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

~ : Sample Condition : ACCEPTABLE

BHP/AC/F115v3

TEST REPORT NO: 290895

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 24/07/2393
Quote Ref: QC009402
Order No: Not Required
Sales Order: 221210
Date Received: 09/07/2024
Date Sampled: 09/07/2024
Date Completed: 31/07/2024
Sample Type: Bore

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Bore
Client Ref: GW

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

Test	Units	Results	Customer Limits	Date Analysed	Method
B.O.D. Acc.	mg/L	0.2	Not Given	11/07/2024	BHP AC 005
Chloride (as Cl^-)	mg/L	18	Not Given	12/07/2024	BHP AC 095
C.O.D.	mg/L	<15	Not Given	10/07/2024	BHP AC 006
Nitrate (as NO_3)	mg/L	5.9	Not Given	10/07/2024	BHP AC 019
Nitrite (as NO_2)	mg/L	<0.05	Not Given	10/07/2024	BHP AC 019
pH - Field	pH Units	7.15	Not Given	09/07/2024	BHP AC 067
Total Suspended Solids	mg/L	<10	Not Given	11/07/2024	BHP AC 012
Dissolved Oxygen	mg/L	7.21	Not Given	10/07/2024	BHP AC 067
Conductivity (25°C) - Field	µS/cm	660	Not Given	09/07/2024	BHP AC 067
Unionised Ammonia (as NH_3-N)	mg/L	0.0004	Not Given	15/07/2024	BHP AC 095
Total Petroleum Hydrocarbons (>C_6-C_{40}) *	mg/L	<0.01	Not Given	18/07/2024	1670
OrthoPhosphate (as P)	mg/L	<0.065	Not Given	11/07/2024	BHP AC 019
Aluminium (Total as Al)	mg/L	<0.05	Not Given	11/07/2024	BHP AC 129
Boron (Total as B)	mg/L	<0.025	Not Given	31/07/2024	BHP AC 129

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 11/08/2024

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
***** Subcontracted to an approved accredited laboratory
****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

~ : Sample Condition : ACCEPTABLE

TEST REPORT NO: 290895

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 24/07/2393
Quote Ref: QC009402
Order No: Not Required
Sales Order: 221210
Date Received: 09/07/2024
Date Sampled: 09/07/2024
Date Completed: 31/07/2024
Sample Type: Bore

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Bore
Client Ref: GW

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

Test	Units	Results	Customer Limits	Date Analysed	Method
Cadmium (Total as Cd)	mg/L	<0.005	Not Given	11/07/2024	BHP AC 129
Chromium (Total as Cr)	mg/L	<0.005	Not Given	11/07/2024	BHP AC 129
Copper (Total as Cu)	mg/L	0.049	Not Given	31/07/2024	BHP AC 129
Sodium (Total as Na)	mg/L	12	Not Given	11/07/2024	BHP AC 129
Arsenic (Total as As)	mg/L	<0.0025	Not Given	11/07/2024	BHP AC 136
Total Phosphorus as P	mg/L	<0.5	Not Given	17/07/2024	BHP AC 142
Oils, Fats & Grease	mg/L	<3	Not Given	15/07/2024	BHP AC 110
OrthoPhosphate (as PO_4)	mg/L	<0.2	Not Given	11/07/2024	BHP AC 019
Total Ammonia (as N)	mg/L	0.073	Not Given	15/07/2024	BHP AC 095
Total Nitrogen (as N)	mg/L	1.3	Not Given	16/07/2024	BHP AC 095

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 11/08/2024

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
* Subcontracted to an approved accredited laboratory
** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

~ : Sample Condition : ACCEPTABLE

BHP/AC/F115v3

TEST REPORT NO: 284893

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 24/04/6903
Quote Ref: QC009104
Order No: Not Required
Sales Order: 213121
Date Received: 30/04/2024
Date Sampled: 30/04/2024
Date Completed: 15/05/2024
Sample Type: Bore

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Bore
Client Ref: GW

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

Test		Units	Results	Customer Limits	Date Analysed	Method
B.O.D.	Acc.	mg/L	<0.1	Not Given	02/05/2024	BHP AC 005
Chloride (as Cl^-)	Acc.	mg/L	13	Not Given	01/05/2024	BHP AC 095
C.O.D.		mg/L	<15	Not Given	01/05/2024	BHP AC 006
Nitrate (as NO_3)	Acc.	mg/L	6.4	Not Given	30/04/2024	BHP AC 019
Nitrite (as NO_2)	Acc.	mg/L	<0.05	Not Given	30/04/2024	BHP AC 019
pH - Field		pH Units	7.19	Not Given	30/04/2024	BHP AC 067
Total Suspended Solids		mg/L	<5	Not Given	02/05/2024	BHP AC 012
Dissolved Oxygen		mg/L	8.30	Not Given	30/04/2024	BHP AC 067
Conductivity (25°C) - Field		µS/cm	695	Not Given	30/04/2024	BHP AC 067
Unionised Ammonia (as NH3-N)		mg/L	<0.0004	Not Given	07/05/2024	BHP AC 095
Total Petroleum Hydrocarbons (>C_6-C_{40})	*	mg/L	<0.01	Not Given	12/05/2024	1670
OrthoPhosphate (as P)		mg/L	<0.065	Not Given	30/04/2024	BHP AC 019
Aluminium (Total as Al)		mg/L	<0.05	Not Given	03/05/2024	BHP AC 129
Boron (Total as B)		mg/L	<0.025	Not Given	03/05/2024	BHP AC 129

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 19/05/2024

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
***** Subcontracted to an approved accredited laboratory
****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

~ : Sample Condition : ACCEPTABLE

TEST REPORT NO: 284893

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 24/04/6903
Quote Ref: QC009104
Order No: Not Required
Sales Order: 213121
Date Received: 30/04/2024
Date Sampled: 30/04/2024
Date Completed: 15/05/2024
Sample Type: Bore

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BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Bore
Client Ref: GW

Test	Units	Results	Customer Limits	Date Analysed	Method
Cadmium (Total as Cd)	mg/L	<0.005	Not Given	03/05/2024	BHP AC 129
Chromium (Total as Cr)	mg/L	<0.005	Not Given	03/05/2024	BHP AC 129
Copper (Total as Cu)	mg/L	0.043	Not Given	03/05/2024	BHP AC 129
Sodium (Total as Na)	mg/L	<10	Not Given	03/05/2024	BHP AC 129
Arsenic (Total as As)	mg/L	<0.0025	Not Given	03/05/2024	BHP AC 136
Total Phosphorus as P	mg/L	<0.5	Not Given	15/05/2024	BHP AC 142
Total Nitrogen (as N)	mg/L	2.0	Not Given	08/05/2024	BHP AC 151
Oils, Fats & Grease	mg/L	<3	Not Given	07/05/2024	BHP AC 110
OrthoPhosphate (as PO_4)	mg/L	<0.2	Not Given	30/04/2024	BHP AC 019
Total Ammonia (as N) Acc.	mg/L	<0.1	Not Given	07/05/2024	BHP AC 095

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 19/05/2024

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
***** Subcontracted to an approved accredited laboratory
****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

~ : Sample Condition : ACCEPTABLE

BHP/AC/F115v3

TEST REPORT NO: 275566

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 24/01/2114
Quote Ref: QC007497
Order No: Not Required
Sales Order: 201803
Date Received: 16/01/2024
Date Sampled: 16/01/2024
Date Completed: 30/01/2024
Sample Type: Bore

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Bore
Client Ref: GW

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

Test		Units	Results	Customer Limits	Date Analysed	Method
B.O.D.	Acc.	mg/L	<0.1	Not Given	18/01/2024	BHP AC 005
Chloride (as Cl^-)	Acc.	mg/L	11	Not Given	17/01/2024	BHP AC 095
C.O.D.		mg/L	<15	Not Given	17/01/2024	BHP AC 006
Nitrate (as NO_3)	Acc.	mg/L	6.8	Not Given	18/01/2024	BHP AC 019
Nitrite (as NO_2)	Acc.	mg/L	<0.05	Not Given	18/01/2024	BHP AC 019
pH - Field		pH Units	7.27	Not Given	16/01/2024	BHP AC 067
Total Suspended Solids		mg/L	<5	Not Given	17/01/2024	BHP AC 012
Dissolved Oxygen		mg/L	8.93	Not Given	16/01/2024	BHP AC 067
Conductivity (25°C) - Field		µS/cm	666	Not Given	16/01/2024	BHP AC 067
Ammonia (as NH_3-N)		mg/L	<0.01	Not Given	29/01/2024	BHP AC 095
Total Petroleum Hydrocarbons (>C_6-C_{40})	*	mg/L	<0.01	Not Given	30/01/2024	1670
OrthoPhosphate (as P)		mg/L	<0.065	Not Given	18/01/2024	BHP AC 019
Aluminium (Total as Al)		mg/L	<0.05	Not Given	24/01/2024	BHP AC 129
Boron (Total as B)		mg/L	<0.025	Not Given	24/01/2024	BHP AC 129

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 31/01/2024

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
***** Subcontracted to an approved accredited laboratory
****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

~ : Sample Condition : ACCEPTABLE

BHP/AC/F115v3

TEST REPORT NO: 284893

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 24/04/6896
Quote Ref: QC009104
Order No: Not Required
Sales Order: 213120
Date Received: 30/04/2024
Date Sampled: 30/04/2024
Date Completed: 15/05/2024
Sample Type: Surface Water

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Surface Water
Client Ref: SW

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

Test		Units	Results	Customer Limits	Date Analysed	Method
B.O.D.	Acc.	mg/L	0.6	Not Given	02/05/2024	BHP AC 005
Chloride (as Cl^-)	Acc.	mg/L	47	Not Given	01/05/2024	BHP AC 095
C.O.D.	Acc.	mg/L	<15	Not Given	01/05/2024	BHP AC 006
Nitrate (as NO_3)	Acc.	mg/L	3.8	Not Given	30/04/2024	BHP AC 019
Nitrite (as NO_2)	Acc.	mg/L	<0.05	Not Given	30/04/2024	BHP AC 019
pH - Field		pH Units	8.18	Not Given	30/04/2024	BHP AC 067
Total Suspended Solids	Acc.	mg/L	<10	Not Given	02/05/2024	BHP AC 012
Dissolved Oxygen		mg/L	10.13	Not Given	30/04/2024	BHP AC 067
Conductivity (25°C) - Field		µS/cm	554	Not Given	30/04/2024	BHP AC 067
Unionised Ammonia (as NH3-N)		mg/L	<0.0004	Not Given	07/05/2024	BHP AC 095
Total Petroleum Hydrocarbons (>C_6-C_{40})	*	mg/L	<0.01	Not Given	12/05/2024	1670
OrthoPhosphate (as P)		mg/L	<0.065	Not Given	30/04/2024	BHP AC 019
Aluminium (Total as Al)	Acc.	mg/L	0.069	Not Given	03/05/2024	BHP AC 129
Boron (Total as B)	Acc.	mg/L	0.031	Not Given	03/05/2024	BHP AC 129

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 19/05/2024

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
***** Subcontracted to an approved accredited laboratory
****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

~ : Sample Condition : ACCEPTABLE

BHP/AC/F115v3

TEST REPORT NO: 304320

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 25/01/0874
Quote Ref: QC009402
Order No: Not Required
Sales Order: 239175
Date Received: 13/01/2025
Date Sampled: 13/01/2025
Date Completed: 31/01/2025
Sample Type: Surface Water

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Surface Water
Client Ref: SW

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

Test		Units	Results	Customer Limits	Date Analysed	Method
B.O.D.	Acc.	mg/L	0.10	Not Given	15/01/2025	BHP AC 005
Chloride (as Cl^-)		mg/L	47	Not Given	16/01/2025	BHP AC 095
C.O.D.	Acc.	mg/L	<15	Not Given	14/01/2025	BHP AC 006
Nitrate (as NO_3)		mg/L	4.6	Not Given	13/01/2025	BHP AC 019
Nitrite (as NO_2)		mg/L	0.065	Not Given	13/01/2025	BHP AC 019
pH - Field		pH Units	7.91	Not Given	13/01/2025	BHP AC 067
Total Suspended Solids	Acc.	mg/L	<10	Not Given	15/01/2025	BHP AC 012
Dissolved Oxygen		mg/L	10.56	Not Given	13/01/2025	BHP AC 067
Conductivity (25°C) - Field		µS/cm	572	Not Given	13/01/2025	BHP AC 067
Unionised Ammonia (as NH_3-N)		mg/L	0.0037	Not Given	20/01/2025	BHP AC 095
Total Petroleum Hydrocarbons (>C_6-C_{40})	*	mg/L	<0.01	Not Given	20/01/2025	1670
OrthoPhosphate (as P)		mg/L	<0.065	Not Given	13/01/2025	BHP AC 019
Aluminium (Total as Al)	Acc.	mg/L	0.087	Not Given	16/01/2025	BHP AC 224
Boron (Total as B)	Acc.	mg/L	0.026	Not Given	16/01/2025	BHP AC 224

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 31/01/2025

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
* Subcontracted to an approved accredited laboratory
** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

~ : Sample Condition : ACCEPTABLE

TEST REPORT NO: 304320

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 25/01/0874
Quote Ref: QC009402
Order No: Not Required
Sales Order: 239175
Date Received: 13/01/2025
Date Sampled: 13/01/2025
Date Completed: 31/01/2025
Sample Type: Surface Water

Testing
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BHP Laboratories
New Road
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Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Surface Water
Client Ref: SW

Test		Units	Results	Customer Limits	Date Analysed	Method
Cadmium (Total as Cd)	Acc.	mg/L	<0.005	Not Given	16/01/2025	BHP AC 224
Chromium (Total as Cr)	Acc.	mg/L	<0.005	Not Given	16/01/2025	BHP AC 224
Copper (Total as Cu)	Acc.	mg/L	<0.025	Not Given	16/01/2025	BHP AC 224
Sodium (Total as Na)	Acc.	mg/L	25	Not Given	16/01/2025	BHP AC 224
Arsenic (Total as As)		mg/L	<0.0025	Not Given	16/01/2025	BHP AC 136
Total Phosphorus as P		mg/L	<0.5	Not Given	16/01/2025	BHP AC 224
Oils, Fats & Grease		mg/L	<3	Not Given	31/01/2025	BHP AC 110
OrthoPhosphate (as PO_4)		mg/L	<0.2	Not Given	13/01/2025	BHP AC 019
Total Ammonia (as N)		mg/L	0.12	Not Given	20/01/2025	BHP AC 095
Total Nitrogen (as N)		mg/L	<2	Not Given	21/01/2025	BHP AC 095

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 31/01/2025

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
***** Subcontracted to an approved accredited laboratory
****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

~ : Sample Condition : ACCEPTABLE

TEST REPORT NO: 275566

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 24/01/2113
Quote Ref: QC007497
Order No: Not Required
Sales Order: 201802
Date Received: 16/01/2024
Date Sampled: 16/01/2024
Date Completed: 30/01/2024
Sample Type: Surface Water

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Surface Water
Client Ref: SW

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

Test		Units	Results	Customer Limits	Date Analysed	Method
Cadmium (Total as Cd)	Acc.	mg/L	<0.005	Not Given	24/01/2024	BHP AC 129
Chromium (Total as Cr)	Acc.	mg/L	<0.005	Not Given	24/01/2024	BHP AC 129
Copper (Total as Cu)	Acc.	mg/L	<0.025	Not Given	24/01/2024	BHP AC 129
Sodium (Total as Na)	Acc.	mg/L	35	Not Given	24/01/2024	BHP AC 129
Arsenic (Total as As)		mg/L	<0.0025	Not Given	24/01/2024	BHP AC 136
Total Phosphorus as P		mg/L	<0.5	Not Given	18/01/2024	BHP AC 142
Total Nitrogen (as N)	Acc.	mg/L	1.5	Not Given	18/01/2024	BHP AC 151
Oils, Fats & Grease		mg/L	3.2	Not Given	29/01/2024	BHP AC 110

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 31/01/2024

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
***** Subcontracted to an approved accredited laboratory
****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

~ : Sample Condition : ACCEPTABLE

TEST REPORT NO: 275566

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 24/01/2114
Quote Ref: QC007497
Order No: Not Required
Sales Order: 201803
Date Received: 16/01/2024
Date Sampled: 16/01/2024
Date Completed: 30/01/2024
Sample Type: Bore

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Bore
Client Ref: GW

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

Test	Units	Results	Customer Limits	Date Analysed	Method
Cadmium (Total as Cd)	mg/L	<0.005	Not Given	24/01/2024	BHP AC 129
Chromium (Total as Cr)	mg/L	<0.005	Not Given	24/01/2024	BHP AC 129
Copper (Total as Cu)	mg/L	0.046	Not Given	24/01/2024	BHP AC 129
Sodium (Total as Na)	mg/L	<10	Not Given	24/01/2024	BHP AC 129
Arsenic (Total as As)	mg/L	<0.0025	Not Given	24/01/2024	BHP AC 136
Total Phosphorus as P	mg/L	<0.5	Not Given	18/01/2024	BHP AC 142
Total Nitrogen (as N)	mg/L	1.8	Not Given	18/01/2024	BHP AC 151
Oils, Fats & Grease	mg/L	<3	Not Given	29/01/2024	BHP AC 110

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 31/01/2024

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
***** Subcontracted to an approved accredited laboratory
****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

~ : Sample Condition : ACCEPTABLE

BHP/AC/F115v3

TEST REPORT NO: 298390

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 24/10/1825
Quote Ref: QC009402
Order No: Not Required
Sales Order: 231249
Date Received: 08/10/2024
Date Sampled: 08/10/2024
Date Completed: 24/10/2024
Sample Type: Surface Water

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Surface Water
Client Ref: SW

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

Test		Units	Results	Customer Limits	Date Analysed	Method
B.O.D.	Acc.	mg/L	0.80	Not Given	09/10/2024	BHP AC 005
Chloride (as Cl^-)		mg/L	46	Not Given	10/10/2024	BHP AC 095
C.O.D.	Acc.	mg/L	<15	Not Given	15/10/2024	BHP AC 006
Nitrate (as NO_3)		mg/L	1.2	Not Given	10/10/2024	BHP AC 019
Nitrite (as NO_2)		mg/L	<0.05	Not Given	10/10/2024	BHP AC 019
pH - Field		pH Units	8.05	Not Given	08/10/2024	BHP AC 067
Total Suspended Solids	Acc.	mg/L	<10	Not Given	10/10/2024	BHP AC 012
Dissolved Oxygen		mg/L	9.41	Not Given	08/10/2024	BHP AC 067
Conductivity (25°C) - Field		µS/cm	563	Not Given	08/10/2024	BHP AC 067
Unionised Ammonia (as NH_3-N)		mg/L	0.003	Not Given	14/10/2024	BHP AC 095
Total Petroleum Hydrocarbons (>C_6-C_{40})	*	mg/L	<0.01	Not Given	16/10/2024	1670
OrthoPhosphate (as P)		mg/L	<0.065	Not Given	10/10/2024	BHP AC 019
Aluminium (Total as Al)	Acc.	mg/L	0.21	Not Given	10/10/2024	BHP AC 129
Boron (Total as B)	Acc.	mg/L	0.044	Not Given	10/10/2024	BHP AC 129

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 28/10/2024

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
* Subcontracted to an approved accredited laboratory
** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

~ : Sample Condition : ACCEPTABLE

TEST REPORT NO: 298390

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 24/10/1825
Quote Ref: QC009402
Order No: Not Required
Sales Order: 231249
Date Received: 08/10/2024
Date Sampled: 08/10/2024
Date Completed: 24/10/2024
Sample Type: Surface Water

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Surface Water
Client Ref: SW

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

Test		Units	Results	Customer Limits	Date Analysed	Method
Cadmium (Total as Cd)	Acc.	mg/L	<0.005	Not Given	10/10/2024	BHP AC 129
Chromium (Total as Cr)	Acc.	mg/L	<0.005	Not Given	10/10/2024	BHP AC 129
Copper (Total as Cu)	Acc.	mg/L	<0.025	Not Given	10/10/2024	BHP AC 129
Sodium (Total as Na)	Acc.	mg/L	35	Not Given	10/10/2024	BHP AC 129
Arsenic (Total as As)		mg/L	<0.0025	Not Given	10/10/2024	BHP AC 136
Total Phosphorus as P		mg/L	<0.5	Not Given	24/10/2024	BHP AC 142
Oils, Fats & Grease		mg/L	16	Not Given	15/10/2024	BHP AC 110
OrthoPhosphate (as PO_4)		mg/L	<0.2	Not Given	10/10/2024	BHP AC 019
Total Ammonia (as N)		mg/L	0.071	Not Given	14/10/2024	BHP AC 095
Total Nitrogen (as N)		mg/L	<2	Not Given	15/10/2024	BHP AC 095

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 28/10/2024

Additional Information:(Opinions, where stated, are not covered by accreditation)
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ND: None detected in volume analysed
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~ : Sample Condition : ACCEPTABLE

TEST REPORT NO: 284893

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 24/04/6896
Quote Ref: QC009104
Order No: Not Required
Sales Order: 213120
Date Received: 30/04/2024
Date Sampled: 30/04/2024
Date Completed: 15/05/2024
Sample Type: Surface Water

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Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Surface Water
Client Ref: SW

Test		Units	Results	Customer Limits	Date Analysed	Method
Cadmium (Total as Cd)	Acc.	mg/L	<0.005	Not Given	03/05/2024	BHP AC 129
Chromium (Total as Cr)	Acc.	mg/L	<0.005	Not Given	03/05/2024	BHP AC 129
Copper (Total as Cu)	Acc.	mg/L	<0.025	Not Given	03/05/2024	BHP AC 129
Sodium (Total as Na)	Acc.	mg/L	31	Not Given	03/05/2024	BHP AC 129
Arsenic (Total as As)		mg/L	<0.0025	Not Given	03/05/2024	BHP AC 136
Total Phosphorus as P		mg/L	<0.5	Not Given	15/05/2024	BHP AC 142
Total Nitrogen (as N)	Acc.	mg/L	1.3	Not Given	08/05/2024	BHP AC 151
Oils, Fats & Grease		mg/L	<3	Not Given	07/05/2024	BHP AC 110
OrthoPhosphate (as PO_4)		mg/L	<0.2	Not Given	30/04/2024	BHP AC 019
Total Ammonia (as N)	Acc.	mg/L	<0.1	Not Given	07/05/2024	BHP AC 095

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 19/05/2024

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
***** Subcontracted to an approved accredited laboratory
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~ : Sample Condition : ACCEPTABLE

BHP/AC/F115v3

TEST REPORT NO: 290895

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 24/07/2392
Quote Ref: QC009402
Order No: Not Required
Sales Order: 221209
Date Received: 09/07/2024
Date Sampled: 09/07/2024
Date Completed: 31/07/2024
Sample Type: Surface Water

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Surface Water
Client Ref: SW

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BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

Test		Units	Results	Customer Limits	Date Analysed	Method
B.O.D.	Acc.	mg/L	0.5	Not Given	11/07/2024	BHP AC 005
Chloride (as Cl^-)		mg/L	49	Not Given	12/07/2024	BHP AC 095
C.O.D.	Acc.	mg/L	<15	Not Given	10/07/2024	BHP AC 006
Nitrate (as NO_3)		mg/L	2.0	Not Given	10/07/2024	BHP AC 019
Nitrite (as NO_2)		mg/L	<0.05	Not Given	10/07/2024	BHP AC 019
pH - Field		pH Units	8.30	Not Given	09/07/2024	BHP AC 067
Total Suspended Solids	Acc.	mg/L	<25	Not Given	11/07/2024	BHP AC 012
Dissolved Oxygen		mg/L	10.71	Not Given	10/07/2024	BHP AC 067
Conductivity (25°C) - Field		µS/cm	579	Not Given	09/07/2024	BHP AC 067
Unionised Ammonia (as NH_3-N)		mg/L	<0.0002	Not Given	15/07/2024	BHP AC 095
Total Petroleum Hydrocarbons (>C_6-C_{40})	*	mg/L	<0.01	Not Given	18/07/2024	1670
OrthoPhosphate (as P)		mg/L	<0.065	Not Given	11/07/2024	BHP AC 019
Aluminium (Total as Al)	Acc.	mg/L	<0.05	Not Given	31/07/2024	BHP AC 129
Boron (Total as B)	Acc.	mg/L	0.035	Not Given	31/07/2024	BHP AC 129

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 11/08/2024

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
***** Subcontracted to an approved accredited laboratory
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~ : Sample Condition : ACCEPTABLE

TEST REPORT NO: 290895

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 24/07/2392
Quote Ref: QC009402
Order No: Not Required
Sales Order: 221209
Date Received: 09/07/2024
Date Sampled: 09/07/2024
Date Completed: 31/07/2024
Sample Type: Surface Water

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Surface Water
Client Ref: SW

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Limerick
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EMail:dervlapurcell@bhp.ie

Test		Units	Results	Customer Limits	Date Analysed	Method
Cadmium (Total as Cd)	Acc.	mg/L	<0.005	Not Given	31/07/2024	BHP AC 129
Chromium (Total as Cr)	Acc.	mg/L	<0.005	Not Given	31/07/2024	BHP AC 129
Copper (Total as Cu)	Acc.	mg/L	<0.025	Not Given	31/07/2024	BHP AC 129
Sodium (Total as Na)	Acc.	mg/L	35	Not Given	31/07/2024	BHP AC 129
Arsenic (Total as As)		mg/L	<0.0025	Not Given	11/07/2024	BHP AC 136
Total Phosphorus as P		mg/L	<0.5	Not Given	17/07/2024	BHP AC 142
Oils, Fats & Grease		mg/L	<3	Not Given	15/07/2024	BHP AC 110
OrthoPhosphate (as PO_4)		mg/L	<0.2	Not Given	11/07/2024	BHP AC 019
Total Ammonia (as N)		mg/L	<0.05	Not Given	15/07/2024	BHP AC 095
Total Nitrogen (as N)		mg/L	0.65	Not Given	16/07/2024	BHP AC 095

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 11/08/2024

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
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~ : Sample Condition : ACCEPTABLE

BHP/AC/F115v3

TEST REPORT NO: 275566

Client: Mortimer Quarries
Belcare
Tuam
Co. Galway

BHP Ref. No: 24/01/2113
Quote Ref: QC007497
Order No: Not Required
Sales Order: 201802
Date Received: 16/01/2024
Date Sampled: 16/01/2024
Date Completed: 30/01/2024
Sample Type: Surface Water

FTAO: Trevor Mortimer
Site: Mortimer Quarries
BHP Ref: Quarterly Surface Water
Client Ref: SW

Testing
Analysing
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BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail:dervlapurcell@bhp.ie

Test		Units	Results	Customer Limits	Date Analysed	Method
B.O.D.	Acc.	mg/L	<0.1	Not Given	18/01/2024	BHP AC 005
Chloride (as Cl^-)	Acc.	mg/L	54	Not Given	17/01/2024	BHP AC 095
C.O.D.	Acc.	mg/L	<15	Not Given	17/01/2024	BHP AC 006
Nitrate (as NO_3)	Acc.	mg/L	5.5	Not Given	18/01/2024	BHP AC 019
Nitrite (as NO_2)	Acc.	mg/L	<0.05	Not Given	18/01/2024	BHP AC 019
pH - Field		pH Units	7.66	Not Given	16/01/2024	BHP AC 067
Total Suspended Solids	Acc.	mg/L	<5	Not Given	17/01/2024	BHP AC 012
Dissolved Oxygen		mg/L	10.55	Not Given	16/01/2024	BHP AC 067
Conductivity (25°C) - Field		µS/cm	625	Not Given	16/01/2024	BHP AC 067
Ammonia (as NH_3-N)		mg/L	<0.01	Not Given	29/01/2024	BHP AC 095
Total Petroleum Hydrocarbons (>C_6-C_{40})	*	mg/L	<0.01	Not Given	30/01/2024	1670
OrthoPhosphate (as P)		mg/L	<0.065	Not Given	18/01/2024	BHP AC 019
Aluminium (Total as Al)	Acc.	mg/L	0.10	Not Given	24/01/2024	BHP AC 129
Boron (Total as B)	Acc.	mg/L	0.042	Not Given	24/01/2024	BHP AC 129

Authorised by: Dervla Purcell
Laboratory Manager

Date Authorised: 31/01/2024

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
ND: None detected in volume analysed
***** Subcontracted to an approved accredited laboratory
****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

~ : Sample Condition : ACCEPTABLE