An Bord Pleanála

64 Marlborough Street,

Dublin 1,

D01V902

24.05.2026

Scor More

Elphin

Co. Roscommon

F45 RF70

Re: Proposed Carrigeen Renewable Energy Development including 11 wind turbines and other associated works

An Coimisiún Pleanála - Case reference: PAX20.324167

Dear Sir/Madam,

Attached please find observations on the above application for your consideration.

Yours faithfully

_____

Florence Kearney

Case reference: PAX20.324167

Proposed Carrigeen Renewable Energy Development including 11 wind turbines and other associated works located in various townlands in County Roscommon.

Submission by Florence Kearney on behalf of the Concerned Residents as listed on the attached sheet

1.0 Legislative Background

Article 6.3 of the Habitats Directive is clear that if the Board determines that an appropriate assessment (AA) is required then it must carry out the appropriate assessment.

This was considered by the High Court (Finlay Geoghan J.) in ***Kelly v. An Bord Pleanála*** **[2014] IEHC 400**, the leading High Court judgement in this area.

The four distinct requirements identified in the judgment of Finlay Geoghegan J which must be satisfied for a valid AA decision which is a necessary pre-condition to a planning consent where an AA is required.

1. First, the AA must identify, in the light of the best scientific knowledge in the field, all aspects of the development project which can, by itself or in combination with other plans or projects, affect the European site in the light of its conservation objectives.

2. Second, there must be complete, precise and definitive findings and conclusions regarding the previously identified potential effects on any relevant European site.

3. Third, on the basis of those findings and conclusions, the Board must be able to determine that no scientific doubt remains as to the absence of the identified potential effects.

4. Fourth and finally, where the preceding requirements are satisfied, the Board may determine that the proposed development will not adversely affect the integrity of any relevant European site.

Kelly was discussed in detail and approved by the Supreme Court in ***Connelly v. An Bord Pleanála*** **[2018] IESC 31**

Both the High Court in Kelly and the Supreme Court in Connelly made clear that the Board does not have jurisdiction to grant permission for developments unless the appropriate assessments provisions are correctly applied.

2.0 The Proposed Project

The proposed project is a enormous civil engineering project located in multiple townlands. The EIAR Boundary covers an area of approximately 1040ha. The non-technical summary alone is over forty pages. Over one hundred drawings accompany the application, fifty two of which address drainage.

The proposed project is located in an extremely complex and challenging geological and hydrogeological environment. This is evidenced by the extensive documentation submitted on these topics in support of the application. This extensive documentation has been prepared by individuals who possesses deep, authoritative knowledge and specialized skills in these fields – subject matter experts (SME)

2.1 Soils and Geology

EIAR Section 10 Soils and Geology (eighty pages) supported by three appendices (10.1 to 10.3 incl.) Appendix 10.1 Main Ground Investigation (one hundred and seventy pages).

EIAR Section 10 was prepared by Mr. John Whiteford BSc (Hons) Geophys AMIOSH MEAGE FGS. Mr. Whiteford credentials as a SME are stated as

> *more than 25 years of experience in the field of earth sciences, geotechnical engineering and management. His academic qualifications are a BSc with Honours in Geophysics from Edinburgh University, with memberships of The European Association of Geoscientists and Engineers and The Institute of Safety and Health.*

2.2 Hydrology and Hydrogeology

EIAR Section 11 Hydrology and Hydrogeology (ninety pages) supported by three appendices (11.1 to 11.3 incl.). Appendix 11.2 Surface Water Management Plan (ninety pages). Appendix 11.3 Water Framework Directive Assessment (seventy pages)

EIAR Section 11 was prepared by McCloy Consulting Ltd.; "*an independent environmental consultancy specialising in the water environment, with specialist knowledge of hydrological and hydrogeological assessments."*

The SMEs responsible for EIAR Section 11 include a Chartered Environmentalist "*specialising in the water environment for major infrastructure projects in the UK and Ireland across a 10-year career to date"* plus *"an honours engineering graduate with 20 years' experience in the fields of hydrology, surface water management, and groundwater screening assessments for onshore wind farm developments and other renewable energy and grid infrastructure projects in the UK and Ireland."*

When conducting the EIA the Commission will need to be satisfied that it has the necessary experience and expertise to correctly understand and assess the information provided by the SMEs. Likewise when carrying out the AA The Commission will need to be satisfied that it has the necessary experience and expertise to fulfil the four distinct requirements identified in the judgment of Finlay Geoghegan J

Absent such experience and expertise the Commissions approach would be illogical and unreasonable.

POINT 1:

In the Carrigeen Renewable Energy Development Screening Report for Appropriate Assessment they stated the following:

'In order to identify European Sites that could potentially be located within the zone of influence of the Project, the current digital mapping (shapefile) of European Sites in Ireland , as published by the NPWS, was reviewed to identify the European Sites that could conceivably be connected to the Wind Farm Site via pathways. During this review, the Study Area boundary of the Project was identified as occurring within one European Site, namely the Cloonashanville Bog SAC. …**Given that this European Site overlaps with/adjoins the Project** it is considered to occur within its zone of influence'.

https://carrigeenplanning.com/wp-content/uploads/2026/03/2026.03.22-Carrigeen-WF-Screening-for-AA_-Final.pdf p.50/51

Other Natura 2000 sites near to this proposed project are:

Bellanagare Bog Special Protection Area (SPA) (Site Code: 004105) and Bellanagare Bog Special Area of Conservation (SAC) (Site Code: 000592) are located 2.1 km to the southwest of the site.

The National Parks and Wildlife Service (NPWS) is an Irish government organization within the Department of Housing, Local Government and Heritage responsible for conserving Ireland's biodiversity, habitats, and species. They manage state-owned National Parks and Nature Reserves, designate protected areas (SACs, SPAs, NHAs), and enforce wildlife legislation.

As stated on their website - 'The role of National Parks and Wildlife Service (NPWS) is:

- To secure the conservation of a representative range of ecosystems to maintain and enhance populations of flora and fauna in Ireland.
- To designate and advise on the protection of habitats and species identified for nature conservation (Natural Heritage Areas (NHA), Special Areas of Conservation (SAC) and Special Protection Areas (SPA) having particular regard to the need to consult with interested parties.
- To make the necessary arrangements for the implementation of National and EU legislation and policies for nature conservation and biodiversity including the EU Habitats and Birds Directives, and for the ratification and implementation of the range of international Conventions and Agreements relating to the natural heritage.
- To manage, maintain and develop State-owned National Parks and Nature Reserves.
- To promote awareness of natural heritage and biodiversity issues through education, outreach to schools and engaging with stakeholders.

Please refer to the following information by NPWS regarding the importance on Cloonshanville Bog.

https://www.npws.ie/sites/default/files/publications/pdf/Cloonshanville%20Bog%20SAC%20(000614)%20Conservation%20objectives%20supporting%20document%20-%20Raised%20Bog%20habitats%20[Version%201].pdf

Four habitat types listed on **Annex I** of the EU Habitats Directive are typically associated with raised bogs in Ireland, two of which are priority habitats (*):

- 7110 Active raised bogs (ARB)*
- 7120 Degraded raised bogs still capable of natural regeneration (DRB)
- 7150 Depressions on peat substrates of the Rhynchosporion
- 91D0 Bog woodland*

Cloonshanville Bog has been selected for FOUR Annex 1 habitats as follows:

- [7110] Active raised bogs*
- [7120] Degraded raised bogs still capable of natural regeneration
- [7150] Depressions on peat substrates of the Rhynchosporion
- [91D0] Bog woodland

Please Note - Properly managed, healthy bogs act as **important carbon sinks.**

Overlap poses significant threats to protected fauna, particulary with birds or Annex 1 listed habitats.

How can this proposed windfarm be compatible with any of the above?

POINT 2

PLEASE NOTE: Cloonshanville SAC is also a 'Degraded raised bogs still capable of natural regeneration (DRB). '

How will 'natural regeneration' happen in if this proposed windfarm is allowed?

In Ireland's 'NATIONAL RAISED BOG SPECIAL AREAS OF CONSERVATION MANAGEMENT PLAN 2017-2022' (Department of Culture , Heritage and Gaeltacht) https://www.npws.ie/sites/default/files/general/national-raised-bog-sac-management-plan-en.pdf p.6

it states that

- 'its aim is to provide clarity to all parties regarding how Ireland's network of raised bog SACs will be managed, conserved and restored into the future. This will be done in co-operation with landowners, turf-cutters and local communities and in keeping with legal obligations and commitments such as under the European Union (EU) Habitats Directive (Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC). The plan sets national restoration targets for raised bog habitats that require the restoration of the national network of raised bog SACs and Natural Heritage Areas (NHAs)'.

It also states that:

- 'There is growing global interest in ending non-sustainable uses of peat and bringing back 'sustainable' services and benefits that peatlands provide to society as a whole through restoration. Positive results have already been demonstrated in Germany, for example, where a suite of ecosystem services was brought back 10 years after rewetting a degraded peatland (Zerbe et al., 2013). Together with remnants of primeval forests, **Ireland's raised bogs form part of our oldest surviving ecosystems. They are a key part of Ireland's natural heritage and an important part of Ireland's "natural capital**". Natural capital is the term used to describe the "elements of nature that produce value – directly and indirectly – to people, such as the stocks of forests, rivers, soil, minerals and oceans" (DEFRA, 2013). These stocks work together to deliver ecosystem goods and services that in turn provide benefits to society.' (p.78)

Please read the following:

National Parks & Wildlife Service Cloonshanville Bog SAC (Site code 000614) Raised Bog Restoration Plan (Report) Version 2 March 2023 (https://www.raisedbogs.ie/wp-content/uploads/2023/04/0402_RBSB13_Cloonshanville_Bog_SAC_Restoration_Plan_20230330.pdf)

Cloonshanville Bog is ONLY 235m from a turbine(while the boundary of this project overlaps this SAC) - How can this proposed windfarm be compatible with the above plans for Cloonshanville Bog?

The Map of Irish Wetlands team have created an exciting new on-line story map 'The Raised Bogs of Ireland' . The Map of Irish Wetlands has been created by Dr Peter Foss and Dr Patrick Crushell and shows the location of more than 12,700 wetland sites in Ireland.

It states that

- 'Ireland has a high proportion of the total EU resource of raised bog (over 50%) and so has a special responsibility for their conservation at an international level'.

The story map brings you on an informative tour of 53 raised bog Special Areas of Conservation (SAC) and the 75 raised bog Natural Heritage Areas (NHA) where you can learn more about these fascinating peatland habitats. The story map includes and introduction to the SAC and NHA raised bog network, map location information for these raised bogs; the designated site boundary; a brief summary of the habitat and species of interest on the site; restoration work which has been undertaken on the sites under EU LIFE projects; and NPWS site code. The raised bogs which are open to the public and include information signs and a boardwalk are also highlighted.

Included on the new raised bog story map are peatlands such as Clara Bog, Girley Bog, Scohaboy Bog, Carn Park Bog, **Cloonshanville Bog,** all of which have visitor access, together with the other sites being conserved throughout the country.'

The primary conservation targets of Cloonshanville Bog SAC are Active Raised Bogs (7110) and Bog Woodland (91D0). Both priority habitats are hyper-sensitive to any alterations in regional hydrology.

Dewatering and Groundwater Pressures: The deep excavation required for 11 turbine foundations, substation structures, and borrow pits risks creating a localized cone of depression. Any alteration to sub-surface aquifer dynamics could siphon critical groundwater pressure away from the SAC high bog, triggering subsidence and the drying out of rare Sphagnum moss matrices.

This project poses a major threat to Active Raised Bog and Bog Woodland Conservation Status

Can the Applicant prove beyond reasonable scientific doubt that this proposed project will not create significant environmental risks and threaten the status of Cloonshanvile Bog(SAC) and its surrounding area?

We all have a responsibility to mitigate environmental degradation and harm to our built heritage. How can this proposed windfarm be compatible with conserving the status of Cloonshanville Bog?

POINT 3

In relation to SITE SELECTION the Applicant stated that:

"During the pre-application stage (section 37B), the applicant should engage with the local authority to identify any constraints, such as those within the County Development Plan, and address how the project aligns with or justifies departure from it. "

Our local authority Roscommon County Council has designated this proposed area as an area LESS FAVOURED for wind farm development.

In the initial stage of site selection, the Applicant prioritised areas designated as “Most Favoured” for wind energy development. However, following detailed analysis the applicant concluded that these areas were deemed not feasible for the Project due to a combination of factors, including:

• Existing or proposed wind energy developments, resulting in cumulative visual and environmental impacts. • Limitations in national grid infrastructure and capacity, restricting connection feasibility; • Proximity to residential dwellings and businesses, triggering setback requirements that limited viable Wind Turbines locations. • Presence of sensitive habitats and flight paths of protected species, particularly airborne species. • Presence of archaeological sites and protected structures, imposing statutory development restrictions. • Aviation flight paths and low-flying aircraft considerations, creating safety and regulatory constraints. • Telecommunication systems interference (avoiding disruption to TV, radio, and wireless networks). • Landownership consent agreements (lack of agreement with landowners posed significant barriers to any proposed Wind Farm Site assembly and Project viability).

Given the constraints identified within “Most Favoured” areas, the Applicant undertook a robust assessment of “LESS FAVOURED” areas to identify a proposed Wind Farm Site that meets technical, and environmental criteria. Through this comprehensive selection process, the Wind Farm Site emerged as feasible and appropriate for development from a planning policy perspective

Is the Applicant suggesting that Roscommon County Council review their Wind Energy Strategy considering that following detailed analysis, the Applicant found lots of reasons to DISMISS the areas considered most favoured by RCC for wind energy development?

Is the Applicant suggesting that wind energy companies should be allowed to decide where they think it is best to build proposed wind farms ?. (i.e. Companies that will benefit financially from the proposed projects).

POINT 4

https://carrigeenplanning.com/wp-content/uploads/2026/03/Chapter-15-Archaeology-and-Cultural-Heritage_Final.pdf p.6 states that

> ‘The determination of Study Areas is based on professional judgement, given there are no national guidelines available with regards to how the development of wind farms may impact on the archaeological, architectural and cultural heritage resource. The Study Area for the Wind Farm Site is large, due to the potential indirect effects that may occur in the relation to the setting of archaeological, architectural and cultural heritage sites’.

This is concerning as professional judgements can vary. Is this an impartial judgement?

There is a growing awareness of a need to robustly assess the cumulative effects and impacts when several proposed wind farms and their associated structures are proposed within an area, as often these impacts can be transboundary – effects and impacts are beyond county boundaries i.e. development proposals need a case-by-case approach along with a cumulative impact approach.(https://www.heritagecouncil.ie/content/files/Onshore-Wind-Farm-Sector-In-Ireland-Planning-in-Harmony-with-Heritage.pdf)

The Rathcroghan Archaeological Complex (Royal Sites of Ireland) is a well-preserved prehistoric and medieval archaeological landscape located within 10km of the proposed windfarm. **It is on Ireland's tentative list for UNESCO World Heritage Status as part of the transnational "Royal Sites of Ireland.** Part of it lies within 5km of the site. The closest section of the RMP boundary for Rathcroghan is located c.3.2km southeast of Turbine 7.

In a recent pilot scheme (March 2026) which aims to assist owners and custodians in a UNESCO World Heritage Property or in Tentative List Site to enhance, protect and conserve attributes (and potential attributes) of Outstanding Universal Value (OUV), Rathcroghan was awarded €58,000. OUV means the natural or cultural significance of a site that is so exceptional that it deserves to be recognized as part of the humanity's common heritage.

We note Roscommon Co. Co. cannot endorse the proposed development on the basis of the detail, analysis and justifications presented to date.

One of their concerns is the impact it could have on the Rathcroghan Archaeological Complex in Tulsk, in the context of landscape and visual impacts, and impacts on the cultural heritage and tourism value of the Rathcroghan complex.

Most significantly, the council is worried it could have had adverse impact on its bid to become a UNESCO World Heritage Site.

Considering the recent financial investment in the future of Rathcroghan (Royal sites of Ireland) why put its future at risk by building a windfarm in its vicinity???

Can the Applicant <u>prove with certainty</u> or <u>without reasonable scientific doubt</u> that this proposed project will not impact on the Outstanding Universal Value(OUV) of the Rathcroghan Archaeological Complex?

Can the Applicant prove that this proposed windfarm will not pose a threat to the potential UNESCO World Heritage status of Rathcroghan?

<u>POINT 5</u>

The Hen Harrier

In 'The 2022 National Survey of breeding Hen Harrier in Ireland' https://www.npws.ie/sites/default/files/publications/pdf/IWM147.pdf - p.37 it stated that –

- There are a number of potential impacts on hen harrier from wind energy development (NPWS 2021). A range of negative interactions can occur with wind energy development, including displacement from foraging habitats, avoidance, disturbance at nesting or roosting sites, lower breeding success and mortality (e.g. Pearce-Higgins et al., 2009; 2012; Wilson et al., 2015; 2016; Fernandez-Bellon et al., 2015; 2018; O'Donoghue et al., 2020) surveyors across various regional areas reported widespread breeding season construction works for wind energy developments, and an increasing number of solar energy installations, both during the survey year and increased numbers of developments over recent years since the last national survey. Many surveyors reported that there is poor spatial planning around extant sites and there is persistent loss of suitable hen harrier habitats during wind energy development projects, but particularly in regions of Co. Donegal, Co. Clare, Co. Limerick and Co. Kerry. An increasing number of hen harrier collision IWM 147 (2024) Hen Harrier National Survey 2022 38 strikes have been reported since the last national survey (NPWS, 2022) and a number of well used winter roost sites have had turbines constructed within and/or immediately adjacent and resulted in displacement effects on the birds at the roost sites (O'Donoghue, 2021)

In Ireland's 'Hen Harrier Threat Response Plan 2024-2028'

,https://assets.gov.ie/static/documents/hen-harrier-threat-response-plan-final.pdf p.7) it states that:

- 'Along with a number of other species and habitats, the Hen Harrier's decline is due to a number of factors, but primarily the loss of suitable habitat through afforestation/forest maturation, agricultural reclamation and intensification, and **wind energy development**. Some of these land-use changes may also cause unsustainable rates of nest loss, due to increased levels of associated predation.'

It is our duty to protect and preserve this habitat for our hen harrier!

The Applicants 'Screening Report for Appropriate Assessment' states that:

- '**A total of three Annex I species were recorded as part of the baseline bird data compilation and/or as part of the baseline ornithological surveys completed for the project.** These three species comprise: Greenland white-fronted geese, **Hen Harrier** and **Whooper Swan**. Historical records are held for Greenland White-fronted Geese. This species, which was historically associated with the Bellanagare Bog and is the qualifying interest for which this bog is designated as an SPA, was not recorded during baseline ornithological surveys. Greenland White-fronted Geese have not been recorded at Bellanagare Bog SPA or the wider surrounding area in the recent past. **Historical records for Hen Harrier and Whooper Swan are held for the wider area surrounding the Wind Farm Site and both of these species were observed during baseline ornithological surveys'.**

How can the Applicant prove <u>beyond reasonable scientific doubt</u> that this proposed project will not affect An Annex 1 species - (Hen Harrier/WhooperSwan) and its habitat?

POINT 6:

The NIS p.16 states :

*Confirmatory site investigations will be undertaken **post consent** to confirm that conditions do not vary from those encountered when initial investigations took place. **This will confirm that the mitigation measures to be implemented remain accurate in protecting the environment**. All proposed Wind Turbines, with the exception of T1 and T3, **are expected to be** traditional gravity foundations. These are concrete structures that depend on their own weight to achieve sufficient stability against overturning and sliding. Turbine Foundations will need to be taken down to a level where the underlying soil or rock can bear the weight of a structure without shifting or compressing. This will be done by excavating through the peat / soil, subsoil and rock where necessary (depending on the various geological locations). The proposed Wind Turbines T1 & T3 **will likely** require piled foundations**,** comprising rotary bored piles into bedrock supporting the concrete base slab with a central upstand to support the tower. A typical piled foundation for turbines such as that proposed use approximately 20 No. 10m long piles bored at least 3m into intact limestone bedrock. Piled foundation bases will be **approximately** 21m in diameter with detailed foundation design being dictated by the local ground conditions.* (emphasis added)

(https://www.pleanala.ie/publicaccess/Case%20Documentation/324167/Applicant%20Documents/Application%20Documents/6.%20Volume%20VI%20-%20Natura%20Impact%20Statement/NIS/2026.03.22%20Carrigeen%20WF%20NIS_Final.pdf?r=063418162826)

This structural foundation strategy introduces specific civil engineering risks and localized environmental vulnerabilities for the proposed development, particularly regarding T1 and T3:

Relying on post-consent "confirmatory site investigations" indicates that the current design lacks definitive, localized borehole profiles for T1 and T3. If underlying bedrock layers are more highly fractured or heavily weathered than anticipated, the 10-meter pile depth will prove structurally inadequate to prevent long-term shifting or tilting. Deferring definitive site investigations until after planning consent is granted means the baseline environmental mitigation measures outlined in the current Natura Impact Statement are based on generalized assumptions. If post-consent drilling reveals highly unstable, water-bearing gravels or deeper peat pockets, the assumed environmental protections may prove entirely inadequate. This also contravenes requirements for establishing a definitive environmental baseline. Furthermore, geotechnical assumptions for piling depths in karstified limestone and the risks associated with gravity foundations near protected bogs represent significant engineering and environmental flaws.

The proposed project , by the applicant's own admission , requires post consent "*confirmatory site investigations".* The requirement for such post consent information makes it impossible for the Commission to carry out a valid AA at this point.

The terms "*are expected to b*e" , "*will likely*" and "*approximately"* are proof of significant deficits in both the EIAR and the NIS submitted with the application.

When these deficits are addressed the Commission will then be in a position to carry out a valid AA

POINT 7

Grid Connection

The overall length of the Grid Connection between the substation and the existing Flagford 220kV AIS substation is c.17.5km which is located primarily within the public road corridor. It is proposed that the Grid Connection route will exit the Onsite Substation east onto the Local Road L-1217 travelling for approximately 3.7km before turning north onto the L-5650. While travelling along the L-5650 the route crosses the N61, the route then continues in a north easterly direction along the L-5650, L-6019, L-600, R368 and L-1034 for 11.5km before reaching Flagford 220kV Substation. Precast concrete cable joint bays will be installed within the excavated trench at set intervals. There are 8 no. watercourse crossings along the Grid Connection route, 3 of which will be HDD crossings.

PLEASE NOTE: Many local roads in West Roscommon lack the structural depth, turning radii, and width needed for such a large-scale energy infrastructure. They were built for light agricultural use and have weak roadside verges and ditches. The scale of the civil engineering works required for this project is completely disproportionate to the small local road network's capacity. The Applicant has not proven beyond reasonable scientific doubt the physical capacity of the road edges to withstand a 110kV trench without collapsing the road boundary walls.

The installing of precast concrete joint bays along the route introduces a new set of severe engineering, environmental, and structural risks. The Applicant's Jennings O'Donovan Engineering Drawings indicate that joint bay stability relies heavily on ground bearing pressures.
The applicant has failed to provide a comprehensive, site-specific geotechnical assessment for the joint bays located adjacent to the public road. Excavating deep chambers in soft rural verges poses an unacceptable risk of removing lateral support from the public roads, threatens to permanently disrupt the local agricultural drainage network, and creates a significant risk of road-edge collapse under heavy vehicular loads.

POINT 8:

Hydrological Connectivity and Source-Pathway-Receptor Risks

The proposed development site sits within the upland catchment that drains directly into the headwaters and tributaries of the Breedoge River (Waterbody ID: IE_SH_26B040100). According to the National Parks and Wildlife Service (NPWS) Conservation Objectives, Cloonshanville Bog is a geomorphic "Ridge River Bog" whose active eastern boundary is defined, sustained, and hydraulically balanced by the River Breedoge. Therefore, a direct, uninterrupted Source-Pathway-

Receptor model exists between the construction footprint of the Carrigeen Wind Farm and this strictly protected Natura 2000 site. Please Note that there is also a hydrological connection between this site and Lough Gara in Co. Sligo.

Can the Applicant prove <u>beyond reasonable scientific doubt</u> that there will be <u>no risk</u> to the Natura 2000 site and the water supply of the wider vicinity ?

<u>Point 9</u>

2.2 Defining 'Karst'

The following is a simple definition of what is meant by 'karst':

> *A terrain with distinctive hydrology and landforms due to the high solubility of the rock and the high degree of development of secondary permeability in the aquifer.*

A more sophisticated and hydrogeologically oriented definition is that of Klimchouk and Ford (2000):

> *An integrated mass transfer system in soluble rocks with a permeability structure dominated by conduits dissolved from the rock and organised to facilitate the circulation of fluids.*

Palaeokarst (sometimes called fossil karst) is karst that has lost its mass transport function and, therefore, does not gain or lose material. It may be rendered inert by burial (for example the ancient karstified surfaces infilled by clay deposits called 'wayboards' in Ireland) or by isolation from karstic processes.

Not all buried karst is palaeokarst however. **<u>For example, in the lowland karst of Ireland there is little surface expression of karst because of the blanket of Quaternary deposits overlying the limestone, but karst processes still operate to varying degrees; the presence of active karst hydrogeological systems does not necessarily mean that surface karst landforms are present.</u>**

(emphasis added)

Drew, D. 2018. Karst of Ireland: Landscape Hydrogeology Methods. Published by Geological Survey Ireland.- Page 5

EIAR Chapter 10 – Soils and Geology

EIAR Chapter 10 – Soils and Geology, Section 10.3.4 Bedrock Geology states

> *According to the GSI online database, the Wind Farm Site and Grid Connection footprint is immediately underlain by the following rock formations (Refer to Figures A1 and A1-1)*
>
> - *Ballymore Limestone Formation – Unbedded limestones with shale partings.*
> - *Boyle Sandstone Formation – quartz-rich sandstone with subordinate finer units.*
> - *Croghan Limestone Formation – Thick-bedded limestones with shale and chert partings.*
> - *Bricklieve Formation – Interbedded Limestones and calcareous shales.*
>
> *The above-mentioned rock formations are soluble and are somewhat susceptible to the formation of karst features, with the risk being low to medium. Karst landscapes can be problematic for construction, as the underlying rock formations tends to be both deeply weathered and may dissolve under the action of groundwater. Resulting in features such as sinkholes, subterranean drainage systems and other potential sources of instability.*
>
> *Such conditions have significance for foundation design and the stability of wind farm infrastructure. That being said, no dissolution /karst features such as sinkholes, subterranean watercourses or significant springs were recorded by GSI within the Wind Farm Site and* ***limited evidence was observed during the site walkover surveys***
>
> *Geophysical investigation carried out to screen for the presence of karst at the main infrastructure, observed significant weathering at the original location for the T6 Wind Turbine, resulting in its relocation. Refer to Figures in Appendix 10.1.* ***None of the other locations recorded such features.***
> *Following the geophysical surveys and adjustment of the wind farm layout, the risk relating to karst features was re-assessed to be low.* (emphasis added)

As per Drew "the presence of active karst hydrogeological systems does not necessarily mean that surface karst landforms are present."

The absence of proof is not proof of absence[1]

The geophysical investigation carried out to screen for the presence of karst at the main infrastructure records

> "***Probable Weathered Sandstone"*** at T1,T2, T3, T4and T5
>
> " ***Probable Weathered Limestone****"* at T7 and T8.

The Commission will need to be satisfied that it has the necessary experience and expertise to correctly understand and assess the information provided by the applicant's SME and come to its own conclusion regarding the level of risk relating to karst features.

[1] Sagan C. 1977 The Dragons of Eden Published by Random House

Absent such experience and expertise the Commission's assessment would be illogical and unreasonable.

Point 10

> Karst groundwater systems still present hydrogeologists with particular problems, both scientific and economic. Increased karstification commonly means increased uncertainty in groundwater resource assessment:
> In highly karstified aquifers, flow rates are often highly dependent on stage conditions with velocities varying by at least an order of magnitude over short time periods Catchment areas for springs can also expand and contract according to potentiometric conditions.
>
> There is usually a water table of sorts in karstic aquifers but it may be a semi-discontinuous surface as evidenced by the considerable variations in standing water levels recorded in adjacent boreholes in many karst areas. The significance of the water table is also less than in conventional groundwater hydrology as so much of the groundwater is in localised conduits rather than being evenly distributed through the aquifer. For example, cave streams may be perched above the regional water table. There is some evidence to suggest that the zone of maximum permeability in karst aquifers may be in the water table zone, where dissolution of the rock is theoretically greater than deeper in the aquifer.
>
> Drew, D. 2018. Karst of Ireland: Landscape Hydrogeology Methods. Published by Geological Survey Ireland.- Page 33

EIAR Chapter 11– HYDROLOGY & HYDROGEOLOGY page 35

11.4.16.4 Aquifer Classifications

A review of the available online GSI data indicates the bedrock aquifer underlying the majority of the Project is classified as a 'Regionally Important Aquifer - Karstified (conduit)' with the bedrock noted to be Ballymore Limestone Formation, Croghan Limestone Formation, and Bricklieve Limestone Formation.

11.4.16.5 Groundwater Vulnerability

Groundwater vulnerability is a measure of the inherent geological and hydrogeological characteristics which determine the ease at which groundwater may potentially become contaminated via human activities at the surface. The vulnerability of groundwater is dependent upon multiple factors. These include the intrinsic toxicity of the contaminants in question, the quantity of contaminants that can reach the groundwater, the rate at which contaminants can flow to the groundwater and the attenuating capacity of the subsoils and bedrock through which the water travels.

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The Project layout has evolved so that the design avoids environmental constraints pertinent to the water environment, per the following sections.

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The associated impact significance of these effects on the receptors affected (following the implementation of avoidance and design measures proposed) has been determined in accordance with the rationale described previously and the results are presented in summary Table 11.16, Table 11.17, and Table 11.18

The Commission will need to be satisfied that it has the necessary experience and expertise to correctly understand and assess the information provided by the applicant's SME and come to its own conclusion regarding the proposed developments potential effects on the groundwater and the significance of said effects

Absent such experience and expertise the Commission's assessment would be illogical and unreasonable.

Concerned Residents of Leggatinty, Carrigeenacreeha, Ballynahowna, Caranlea, Killummod, Culleenatreen or Flagford, Cartroncaran, Lodge, Carrigeen, Ballaghcullia, Ballindrehid, Corbally East, Peak, Gortnacloy, Tonaknick, Ballysundrivan, Caran, Cloonkerin, Carrowntogher, Corbally Middle, Ballyroddy, Cloonshanville, Skeanavart, Dacklin, Kinclare, Erriblagh, Lisgarve, Loughbally, Rathardeagher, Carrigeenynaghtan, Brackloon, Edenan and Kinclare, Kilnamryall, Corbally West, Cartroncarrarowntogher, Carrowncaran. County Roscommon

Kevin Fallon

Orla Fallon

Joe Murtagh

Phil Murtagh

Shane Murtagh

Bernadette Giblin

Martina Giblin

William Taylor

Barbara Taylor

Breda Enright

Conor Taylor

Dave Kearney

Florence Kearney