North East Galway Environmental Protection CLG

An Coimisiún Pleanála case reference: PAX07.323761

Address: located within Cloondahamper, Cloonascragh, Elmhill, Cooloo, Lecarrow, Dangan Eighter, Lissavally and Slievegorm, Co. Galway

Description: Construction of wind energy development and all associated works

Name: North East Galway Environmental Protection CLG
Postal Address: Gurranebawn, Lavally, Tuam, Galway, Ireland

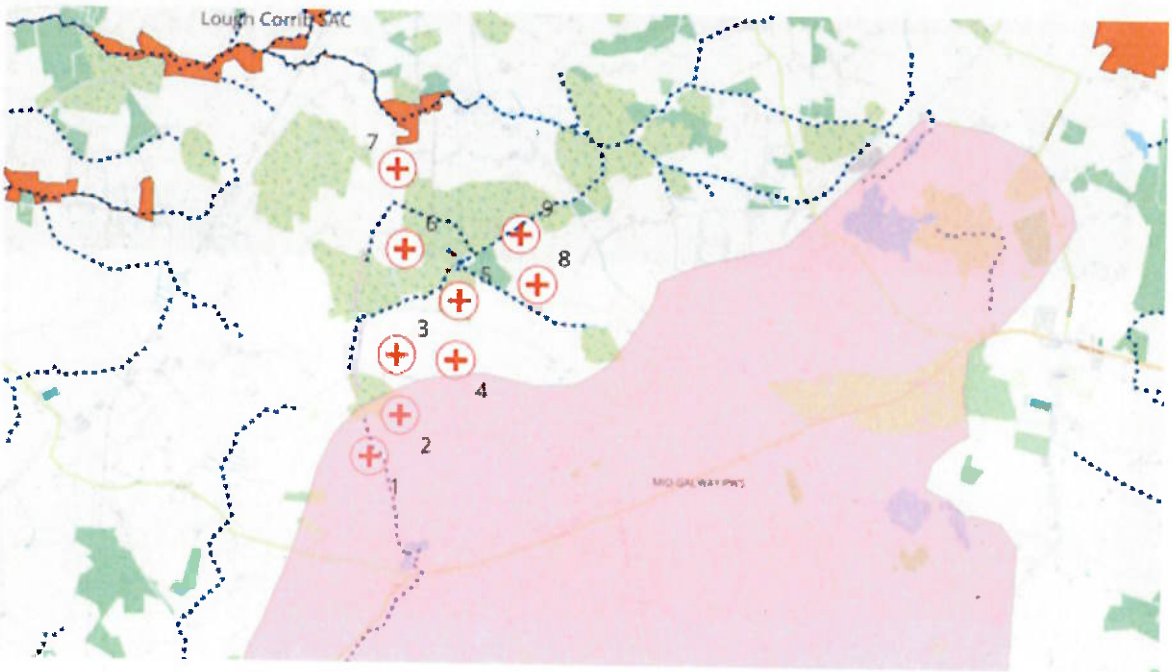
20 November 2025

Observation

NEGEP CLG welcomes the opportunity to make a submission on this proposed renewable development in the North East Galway area. We have a number of issues with this proposed development and we hope you will take the time to carefully assess each of these issues.

Water related Issues

The location of two proposed wind turbine foundations within the Source Protection Area (SPA) of the Mid-Galway Public Water Supply (PWS) poses an extreme contamination risk due to the underlying karst limestone hydrogeology, which facilitates the rapid, unfiltered transport of pollutants such and hydrocarbons directly to the abstraction point. The construction activity, particularly excavation and dewatering, directly impacts a primary groundwater recharge zone, requiring stringent protective measures to adhere to the Water Supplies Act, 1942. This zone is also legally protected by the Water Framework Directive (WFD), which mandates a commitment of no deterioration to water body status.

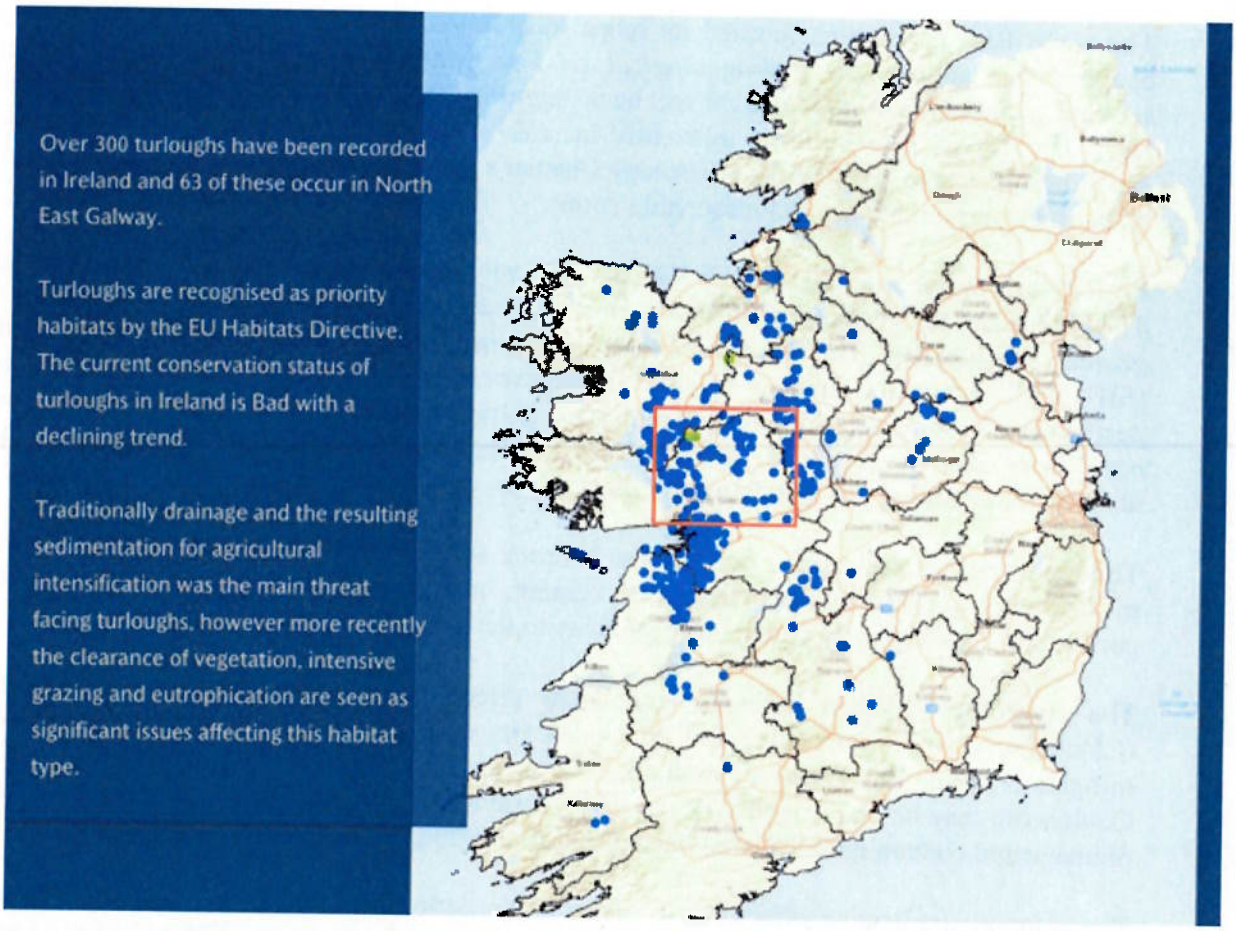


Wetlands of Ireland

This part of North East Galway and into South Roscommon is regarded as the wetlands of Ireland. Note the recent and well deserved discussions on wetlands and major international climate summits such as the recent one in Brazil. Also please note the various wetlands publications and materials from Galway County Council that focus entirely on this area.

Reference: https://storymaps.arcgis.com/stories/58bc707cf84d4ce5908e437071019361

It would be a crime to change the underlying hydrology in such a sensitive interconnected area.



Karst Issues

A topographic depression in karst which is intermittently inundated on an annual basis, mainly from groundwater, and which has a substrate and/or ecological communities characteristic of wetlands.

Karstic groundwater bodies have particular characteristics with respect to hydrological flow regime and thus, so do the terrestrial ecosystems associated with them. The hydrology is characterized by relatively high groundwater velocities and relatively low porosities but flows are concentrated in solutional fissures or groups of fissures. Those ecosystems associated with karst and typically having protected status under the Water Framework (EU,2000) and Habitats (EU 1992) Directives are unique to Ireland in their defined form as 'turloughs'. Turloughs have characteristic hydrological dynamics which give rise to their peculiar vegetation and fauna. A turlough is currently defined as 'A topographic depression in karst which is intermittently inundated on an annual basis, mainly from groundwater, and which has a substrate and/or ecological communities characteristic of wetlands'

DS8-Final-Report - Dr Paul Johnstone

Appendix 8-2 Karst risk assessment

The Karat Risk Assessment limited its scope to only *geotechnical* risk and the Hydrology chapter must address the *hydrogeological* risks to water. While the Hydrology chapter concludes that with mitigation, there will be no significant effect, the KRA's findings of "High Karst Hazard" at T4 (within) inherently increase the risk of contamination entering the groundwater system, making the Hydrology Chapter's "no significant effect" conclusion more difficult to substantiate beyond reasonable doubt

Both reports suffer from the same weakness: they rely on preliminary ground investigations. The KRA states that the design must be "*further refined following a more detailed confirmatory ground investigation*". This is a major planning flaw in a Strategic Infrastructure Development (SID) application. An Coimisiún Pleanála should expect an EIA to be based on final, definitive design data. Submitting an application with a key geotechnical report that says, in essence, "*we need more data to finish the design*" leaves the planning authority with unacceptable uncertainty regarding the foundations of the turbines, especially .

The report correctly classifies portions the bedrock aquifer as "Extremely Vulnerable." This means that any contamination (from fuel, cement, or peat spoil) entering the ground at the construction site has a direct and rapid pathway to the sensitive Turlough habitats.

The Hydrology Chapter assesses cumulative effects with other proposed wind farms (Clonberne, Laurclavagh, etc.) and concludes "no cumulative effects" with the proposed mitigation. While this is the required conclusion, the high concentration of karst risk at the Cooloo site may be challenged. The cumulative impact of multiple large wind farms altering drainage and contaminating shared karst groundwater bodies must be impossible to dismiss.

The planning application effectively contains a non-definitive detail in its foundation design data. For a Strategic Infrastructure Development (SID), ABP expects the EIA to be based on a final, definitive design. Stating that the fundamental design for the riskiest turbine (T4) is still pending a future investigation.

The reliance on meteorological data extracted from a station 47 km away to inform site-specific conditions for 16 days in spring represents a fundamental deficiency that undermines the scientific validity of multiple technical chapters within the Environmental Impact Assessment Report (EIAR). See section 3.7 of the Bat Report.

While this issue is immediately apparent in the Bat Survey Report (Appendix 6-2), where bat activity and collision risk models are critically dependent on highly localized wind speed, temperature, and precipitation, the impact is systemic.

Wider Implications for the EIAR

Weather conditions are highly heterogeneous over large distances, particularly in areas with varied topography. Assuming uniform conditions over a 47 km radius compromises the foundational data for several key technical assessments:

1. Hydrology and Hydrogeology (e.g., Chapter 9): Accurate precipitation data is essential for determining existing flood risk, calculating runoff volumes for drainage design, and modelling potential impacts on local watercourses. Inaccurate or distant rainfall measurements directly lead to questionable hydrological models and potentially inadequate mitigation measures for construction-phase runoff.

2. Wind speed and wind direction are critical input parameters for environmental modelling, specifically in predicting noise propagation and the dispersion of construction-related dust and air pollutants. A 47 km separation introduces high uncertainty into these models, rendering the resulting impact predictions less reliable.
3. Survey results, such as those derived from resistivity methods, are highly sensitive to soil moisture content, which is dictated by recent local weather (precipitation/evapotranspiration). Without on-site weather data for the survey period, the interpretation of subsurface features may be compromised.

In summary, the use of remote meteorological data violates the principle of site-specificity required for a robust EIA. The conclusions drawn in any chapter dependent on weather—including, but not limited to, Ecology, Hydrology, and Noise—must therefore be treated with caution, as the underlying environmental parameters are based on surrogate data that is too distant to be scientifically representative of the Proposed Development site.

Issues with home and farm boreholes

How can anyone know if private boreholes will not become polluted in an area with a Karst and highly fractured limestone bedrock? There is no definite way to tell exactly what direction water flows underground in such an area.

As in Kelly v. An Bord Pleanála [2014] IEHC 400:

There is a risk that the construction of the wind farm will impact on groundwater flow paths within the karst landscape which may in turn affect the hydrology/hydrogeology of the network of designated wetland systems (notably turloughs) in the vicinity of the site and their associated habitats and species.

If permitted as proposed, the development has the potential to adversely affect the water quality of this area and of any private wells in the area and would materially contravene strategic policy objectives WS 7 of the Galway County Development Plan 2022-2028 and the requirements of the Water Framework Directive.

For consideration also is WR 1 of the Galway County Development Plan 2022-2028.

Protect the water resources in the plan area, including rivers, streams, lakes, wetlands, springs, turloughs, surface water and groundwater quality, as well as surface waters, aquatic and wetland habitats and freshwater and water dependant species in accordance with the requirements and guidance in the EU Water Framework Directive 2000 (2000/60/EC), the European Union (Water Policy) Regulations 2003 (as amended), the River Basin District Management Plan 2018 – 2021 and other relevant EU Directives, including associated national legislation and policy guidance (including any superseding versions of same) and also have regard to the Freshwater Pearl Mussel Sub-Basin Management Plans.

Through a range of new strategies and policies, the European Green Deal (EC 2019) has reiterated the need to manage water resources sustainably, and tackle chemical pollution and water stress, to ensure sufficient, good-quality water for the environment and people. The EU biodiversity strategy (EC 2020b) and the climate change adaptation strategy (EC 2021a) emphasise the need to preserve ecological flows and regulate groundwater abstraction.

The Crisis of Ireland's Atlantic Salmon: A Near Threatened Icon

The Atlantic Salmon (*Salmo salar*) is an iconic species deeply embedded in Ireland's heritage, but it is currently facing a severe, multi-faceted decline. Once a common sight, the salmon's future is now highly precarious. The species is globally classified as Near Threatened by the IUCN Red List. The situation in Ireland's rivers requires urgent conservation and emergency fishery management due to persistent threats impacting the salmon across its entire life cycle.

The Catastrophic Decline in Survival

The most alarming indicator of this crisis is the collapse of marine survival rates. Historically, a significant percentage of juvenile salmon (smolts) returned as adults after migrating to the North Atlantic feeding grounds. Today, these survival rates have plummeted drastically in many populations. This massive loss is primarily attributed to rapid changes in the marine environment, including altered ocean currents and shifts in the distribution of prey. Additionally, localized threats like sea lice infestations, particularly those originating near salmon farms, pose a major risk to migrating smolts along the Irish coast.

Degradation of Freshwater Habitats

The quality of Irish freshwater habitats is non-negotiable for successful reproduction and the early life stages of the salmon. A river's spawning bed, or *redd*, is essential for successful reproduction, and these areas are increasingly threatened by habitat degradation from sediment and pollution.

Sedimentation

The primary freshwater threat comes from siltation—the process where fine sediment is washed into rivers and smothers the spawning gravel. This siltation is mainly driven by human activities such as:

- Poorly managed commercial forestry, agricultural runoff from tilled land, and arterial drainage schemes increase the volume of loose soil entering the water.
- When this fine sediment settles, it fills the gaps in the gravel beds where female salmon deposit their eggs. This severely restricts the flow of oxygenated water crucial for egg survival and suffocates the newly hatched embryos (*alevins*), causing widespread mortality for the next generation.

Chemical and Nutrient Pollution

Pollution further compromises the entire freshwater ecosystem:

- Excess nutrients from agricultural fertilizers and poorly treated sewage promote algal blooms. The subsequent decay of this organic matter depletes the dissolved oxygen necessary for salmon survival, stressing the fish and making them vulnerable to disease.
- The presence of pesticides, herbicides, and pharmaceuticals in waterways can directly affect the development, immune systems, and migratory instincts of juvenile salmon. Furthermore, man-made barriers like weirs and dams prevent adult fish from accessing viable spawning areas.

Onshore Wind Farms on Salmon Tributaries

As Ireland expands its onshore wind capacity, developments are often sited in remote, elevated areas—precisely the locations of the headwaters and primary spawning tributaries of salmon rivers. When a wind farm is sited directly adjacent to these vital tributaries, the construction phase creates an acute, localized threat to the salmon's reproductive success.

Siltation Risk

The construction of onshore wind farms requires extensive groundwork for access roads, turbine bases, and cable trenches, often involving deep excavation and drainage across sensitive peatland or steep terrain. This activity leads to massive, peatland disturbance and erosion. Heavy rainfall washes the exposed, destabilized peat and soil directly into the adjacent tributaries. This rapid influx of siltation can catastrophically destroy established spawning beds, wiping out thousands of eggs and *alevins* in a single event.

Altering Critical Hydrology

Associated drainage and mitigation schemes for these upland developments are designed to manage water flow, but can lead to unintended ecological consequences:

- Altering the natural flow regime can disrupt the precise water temperature and volume required for both adult fish to spawn and for juvenile salmon (*parr*) to thrive.
- Disturbance of deep peat layers can increase the runoff of highly acidic water, which is toxic to salmon eggs and juvenile fish.

Inadequate Mitigation

While environmental plans mandate measures like robust settlement ponds, comprehensive peat management plans, and construction timing restrictions, research shows that these standard mitigation techniques are often unsatisfactory and ineffective in the face of major peatland disturbance. Studies have proven that mechanisms intended to trap sediment, such as silt fences or sediment barriers, frequently fail to prevent the escape of the fine, suspended particles that cause the most damage to spawning gravel. These fine particles are notoriously difficult to settle and remain suspended long enough to be washed into the tributaries, overwhelming the delicate salmon eggs and alevins. Consequently, relying on conventional environmental protection measures where upland development intersects with vital salmon tributaries poses an unacceptable and immediate danger to the future of the species.

The proposed development is situated across the headwaters of two significant surface water systems, the Abbert River and the Dalgan River. The primary hydrological concern is that runoff from the construction and operation phases of the project will enter these river networks, creating a pathway for impact on those rivers and all downstream waterbodies such as the Lough Corrib Special Area of Conservation (SAC).

Status of Protected Fish Species

The aquatic survey confirmed the presence of protected fish species listed under the EU Habitats Directive within the wider catchment, as well as evidence of their use within the immediate project area:

- **Atlantic Salmon (*Salmo salar*):** The entire Clare River catchment is designated as highly valuable for salmon and it's on objective of the same Lough Corrib SAC. The desktop review confirmed spawning activity and nursery habitat for both salmon and trout throughout the tributaries associated with the wind farm site. This makes the construction area highly sensitive for the successful early life stages of the salmon.

- **Brown Trout (*Salmo trutta*):** Brown Trout were confirmed to be present, and the tributaries provide important nursery and spawning habitat for local trout populations. Trout are particularly sensitive to the same stressors as salmon (siltation, altered flow).

Key Issues and Environmental Threats

The primary issues for these protected fish stem from the interaction between the upland construction works and the sensitive freshwater habitats:

- Siltation and Smothering: This is the single greatest threat. The proposed works on the elevated, often peat-covered terrain require major ground disturbance (access roads, turbine bases). When this exposed material washes into the tributaries, the fine sediment smothers the gravel spawning beds (*redds*), suffocating the deposited eggs and newly hatched fish (*alevins*), leading to high mortality.
- Altered Water Chemistry (Acidic Runoff): Disturbing deep peat layers and soils can release acidic and iron-rich water into the tributaries. Salmon and trout eggs and juveniles are highly vulnerable to changes in and water chemistry, which can be toxic.
- Habitat Fragmentation: The construction of roads and other infrastructure requires multiple water crossings. While crossings are planned with mitigation, poor design or execution can create temporary barriers or changes in flow that disrupt the ability of adult fish to access spawning grounds or hinder the downstream movement of juveniles.

The ecological evaluation concludes that the tributaries within the wind farm site are an integral and sensitive component of the overall fish population dynamics for the Clare River catchment, making the construction phase a period of high environmental risk.

The NIS identifies that the Lough Corrib system is already under conservation pressure. The SAC and its associated river network are already vulnerable to eutrophication and existing water quality issues from agriculture and other sources. The legal obligation is to ensure the project does not contribute to the *deterioration* of the site's status. The single greatest issue is the potential for uncontrolled sediment and pollutant runoff from groundworks, excavation, and the construction of roads and turbine bases, specifically: Mobilisation of peat and subsoil leading to increased suspended solids downstream. Accidental release of oils, fuels, lubricants, cement fines, and contaminated water.

I ask ACP to please have these issues assessed with a trained export\ecologist in this area as it's a matter of grave concern.

Peatland issues

In respect of developments on peatlands, the Scottish Government (2017) provides guidance as to the definition of peat in their Peat Survey Guidance document 'The Joint Nature Conservation Committee (JNCC) Report 445, Towards an Assessment of the State of UK Peatlands'.

A Scottish definition of peat has been used. By selecting a foreign definition, the developers risk using a standard that is less stringent, or less appropriate for the specific characteristics of Irish peat soils, than that typically required by Irish regulators (like the EPA or NPWS). This matters greatly because the definition dictates the level of environmental scrutiny required for

the site, potentially leading to a smaller area being classified as high-risk sensitive peatland, which could reduce the perceived risks related to carbon release and hydrological impacts (like water pollution and sediment runoff)

The Scottish Government (2017) Guidelines for peatland development do not have legal standing in Ireland. Instead, Ireland relies on its own national policies, Irish and EU law, and specific legislation for peatland development and conservation. Irish law includes protections for peatlands designated as Special Areas of Conservation (SACs) and Natural Heritage Areas (NHAs), which are legally enforceable. The only legally binding regulations for peatland development in Ireland are those created under Irish national law and the EU's legal framework, which Ireland is a member of. The Scottish Guidelines were used in the application for planning for Meenbog windfarm and the ensuing environmental disaster is still being felt costing the taxpayer millions of euros.

The UN declared 2021–2030 as a 'Decade of Ecosystem Restoration', with peatland restoration as a central target of the initiative. The new EU Nature Restoration Law, enacted in 2024, set legally binding targets for EU nations to restore degraded ecosystems, especially those with the most potential to store carbon and reduce the impact of natural disasters.

High peat depth. Up to 6.2m recorded at one location. 5m is inherently high-risk. While the plan states a Low Peat Slide Risk (PSR) for all proposed infrastructure following the Peat Instability Risk Assessment (PIRA), the significant depth makes this rating less conservative than for a shallow peat site.

Reliability of Silt and Sediment Control. Peat fines (silt) are notoriously difficult to settle out of water because they are extremely light and sometimes colloidal (suspended). While filter socks are good for gross sediment, they often have limited long-term effectiveness against the fine particles characteristic of peat runoff, especially during heavy or prolonged rainfall. Run-off from peat storage and construction areas will be managed using silt traps, filter socks, and/or constructed wetlands before discharge.

he plan establishes the *location* and *management* of PPS areas, but a clear, quantified figure for the estimated total volume of surplus peat is not prominently detailed in the report.

The ***Convention on Wetlands | Global Wetland Outlook: Special Edition 2021*** states… "*The degradation, fragmentation, and loss of wetland connectivity across landscapes contributes to the further loss of biodiversity as dispersal mechanisms are removed.*" The **Citizen's Assembly Final Report on Biodiversity Loss 2023** states… *"Ireland has witnessed a 77% loss in peatland habitat. Peatlands are home to a high proportion of Ireland's biodiversity. While only 10% of Ireland's biodiversity has been assessed we do know that 15% of the original flora of Ireland are peatland plants. 14% (59 species) bird species have been recorded on peatland. 49% of all endangered birds in Ireland occur on peatlands, most as breeding species. 26% of Ireland's animal species are dependent on peatlands in some phase of their life cycle. 23 of the 35 butterfly species found in Ireland are found on peatlands…*"
The SEA Environmental Report for the Galway County Development Plan 2022-2028 page 51 states

...Raised bogs and cutaway raised bogs are found mainly in the eastern areas of the County with blanket bog common to the west of the Corrib. Active blanket bogs and active raised bogs are priority habitats, listed on Annex I of the EU Habitats Directive. Ombrotrophic (rain-fed) and minerotrophic (groundwater fed) peat soils are often indicative of areas that are the most sensitive to development due to ecological sensitivities and impeded drainage issues. Many of these peat areas are also subject to ecological designations.

In relation to the windfarm application a total 314 peat probes were carried out, of which 125 recorded a depth of 0m, so it can be assumed these were on non-peat areas.
Of the remaining 189

- 32 (or 17%) recorded a depth of .5m or less.
- 27 (or14%) recorded a depth of between .5m and 1m
- 130(or 69%) recorded a depth greater than 1m (deep peat)

The planners state... *Laterally extensive regions of >3m in depth were encountered in raised bog settings, particularly to the north of T5 (approx. 30m), to the southeast of T7 (approx. 120m from the hardstand), to the west of T9 (approx. 200m) and to the north of T2 (approx. 100m).*

The statement '*An increased density of GI was carried out in the areas of proposed infrastructure. However, some areas had limited or no access and so GI is limited. A conservative estimate of peat volumes has been taken into account. Access track construction types have been considered based on a threshold of a minimum 1m peat depth for floated access tracks.*

Building wind farms on deep peat is generally discouraged due to significant environmental risks, including large-scale carbon dioxide releases from peat disturbance, damage to rare habitats, and impacts on water quality and drainage. While wind farms may provide some income, developing on near-natural peatlands risks undermining the green energy transition, as the carbon lost during construction can offset the carbon saved by the wind farm.

Appendix 3 of the planning application states a raster map was created in GIS software presenting the interpolated peat depth across a site from the peat probe points using the Inverse Distance Weighted (IDW) method. The disadvantages of an IDW raster map for peat depth are that it cannot produce values outside the range of the sampled points, it may create "bullseye" patterns around probe points, and it is not ridge-preserving, meaning it can smooth over features like small ridges or valleys that may be present in the real landscape. The accuracy of the map heavily relies on the density and distribution of the probe points; sparse or uneven sampling can lead to a map that doesn't accurately represent the area.

Disadvantages of IDW peat depth maps

- Value limitations: The output values are constrained by the maximum and minimum values from the input data. This means the map cannot represent a depth greater than

the deepest probe or less than the shallowest probe, even if such depths are likely to exist between points.

- "Bullseye" effect: When the power value is high, the map can show circular patterns (bullseyes) centred on the probe points, which can misrepresent the true, more gradual spatial variation of peat depth.
- Lack of ridge preservation: IDW does not preserve ridges, so it can smooth over smaller, real-world features that might be important for understanding peatland hydrology and stability.
- Sensitivity to data distribution: The accuracy of the final map is highly dependent on the input data. If the probe points are clustered or unevenly spaced, the interpolated surface will not be a good representation of the peat depth across the entire area.
- Assumes local influence: IDW assumes that points closest to the interpolation cell have the most influence, but this assumption may not hold true in all peatland environments where other factors (like topography) might play a more significant role.

Peat probes along the proposed access tracks were not evenly distributed and omitted in the forested area as reported in the planning application. The planner report states in relation to Site Reconnaissance

> *The walkover inspections and peat probe campaign were carried out across the Proposed Wind Farm and in some areas outside of the EIAR boundary, to assess peat stability risk across the local area immediately adjacent to the Proposed Wind Farm...* ***Access was limited to some areas, limiting the number of peat probes taken in areas of extremely dense forestry (such as the area between T5 and T8).***

Lindsay and Bragg (2004) provide a detailed review of the potential destabilising effects of forestry activities on a peatland in Ireland in association with the Derrybrien failure. In preparing assessments of peat stability, developers should give afforested peatlands (which are often hydrologically disrupted and physically degraded) the same scrutiny as peatlands without forest, even if this may be more arduous in practice (due to concealment of the ground surface by tree cover and associated access difficulties). This was not done by the planners.

The extraction of 39,530m3 of peat

According to *The National Peatlands Strategy* peat extraction can cause water pollution. Associated disturbance of land releases substances which may reach watercourses, including iron - and even mercury (absorbed from the atmosphere). The water table is also lowered by peat extraction, leading to higher concentrations of the polluting substances in the reduced water volume. Peat drainage releases the following pollutants:

• Turbidity, suspended solids and phosphorous from erosion of the excavation areas and ditches. Cloudy water can lead to the death of some fish species and other aquatic life, including waterfowl and other fauna and flora. They can also reduce the availability of dissolved oxygen

as they decompose. Phosphorous is a nutrient that leads to excessive algal growth, exacerbating the pollution problem.

• Acidity (low pH): Drainage aerates the peat and releases acids (often nitric acid and sulphuric acid). Acid waters can kill fish and aquatic life, and limit egg production and hatching.

• Aluminium: Acid waters in peat drainage help to dissolve aluminium from the peat and carry it downstream. Aluminium can be highly toxic to fish and other aquatic life.

• Ammonia: Peat drainage causes decomposition of much of the soil to release ammonia. Certain forms of ammonia are very toxic to fish and other aquatic life.

• Iron: Acid waters in peat drainage also dissolve iron. Iron also can be released when attached to suspended solids. Iron deposits can clog fish gills and deposit harmful scums on stream, lake and wetland bottoms.

• Mercury: Mercury can be released during peat drainage. It is very toxic to fish, and accumulates through the food chain. Mercury in watercourses, in particular, is classified as a Priority Hazardous Substance under the WFD. It is absorbed in peatlands from the atmosphere. Elemental mercury can be converted to methyl mercury, a toxic form, by aquatic bacteria in lake sediments and wetlands. Methyl mercury is concentrated as it moves up the aquatic food chain, with large game fish having the highest concentrations.

Peat Landslides

The nature and signs of instability often differ depending on the type and scale of failure. Some critical features which are indicative of potential failure in peat environments include:

1. Presence of subsurface drainage networks or water bodies;
   Enclosed depressions in a karst landscape strongly indicate the presence of subsurface drainage, as they are the surface expression of processes where water dissolves and moves through the bedrock. These depressions, such as sinkholes, funnel surface water downward into the underground drainage system, which can include caves, conduits, and fissures. There are a large number of karst features recorded on/close to the site.

   - *GSI mapping (2025) indicates that the groundwater vulnerability is extreme/Rock at or near surface or karst in localised areas along watercourses in the centre of the Proposed Wind Farm site, and along the southern access track as far as the temporary construction compound. T1 is mapped in an area of high vulnerability adjacent to an area classified as having extreme vulnerability, suggesting that the bedrock is relatively close to the surface in this location.*

2. Presence of seeps and springs;
   - The rapid ingress of water at TP06 (beside T5) may indicate a spring
   - Trial Pit 7 (close to Turbine 9) was terminated due to very rapid water ingress.
   - A possible turlough was identified as one Karst feature
   - The GSI karst database notes the presence of turloughs in the area surrounding the Proposed Wind Farm site.

- The Minerex survey noted that potential occurrence of karst features further west cannot be excluded

3. Presence of soft clay with organic staining at the peat and (weathered) bedrock interface;
    - TP 13 (on road between T1 and T2) terminated due to possible bedrock. No groundwater encountered but Stability: Very poor - Collapse from 1m
    - TP04 (beside T1 found) Weathered grey LIMESTONE. Heavily fractured limestone.
    - TP08 grey angular gravel and cobbles (possibly weathered limestone)
    - Weak to strong dark grey LIMESTONE with occasional shaley mudstone layers. Weathered profile is occasionally observed in trial pits.
    - Minerex survey interpreted Layer 1 and 2 as sandy gravelly clay and silt overlying well-consolidated glacial till/weathered bedrock. TP 11, carried out by GDG in February 2025, approximately 10m north of ERT line R4 along the R2 line, logged rockhead at 2.35m bgl. This indicates that Layer 2, interpreted by Minerex as very stiff glacial till/weathered bedrock, may most likely consist of weathered bedrock.

Landslides can be triggered by a number of factors including
Triggers associated with human activities include:

- Alteration to natural drainage patterns focussing drainage and generating high pore-water pressures along pre-existing or potential rupture surfaces (e.g. at the discontinuity between peat and substrate);
- Rapid ground accelerations (blasting or mechanical vibrations) causing an increase in shear stresses;
- Unloading of the peat mass by cutting of peat at the toe of a slope reducing support to the upslope material (e.g. during track construction);
- Loading of the peat mass by heavy plant, structures or overburden causing an increase in shear stress; and
- Digging and tipping, which may be associated with building, engineering, farming or mining (including subsidence).

Piled foundations and pressure grouting are recommended by the planners. Which have the potential for negative consequences for contamination and pollution of the aquifer. Slope angles across the site range from 0-16° however, most of the Proposed Wind Farm site has a slope angle of <2°, but Boylan et al., 2008 note that failures on raised bogs occur on slopes of less than 2°.

The statement... *Further inspection will be required during the detailed design and construction stage to inspect for peat instabilities, including bog burst features*... indicates the report has gaps and lacks complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the works proposed on the Lough Corrib Sac and protected habitats. The underlying limestone karst geology of the region makes

the area's hydrology and ecosystems exceptionally sensitive to disturbance, raising the risk of irreversible damage from construction and operational activities.

Irish peatlands are unique in a global context due to their exceptional ecological and cultural significance. They host diverse habitats that include raised bogs, upland and lowland blanket bogs, and fens, which not only support rare species but are critical for climate regulation, water management, and carbon storage. To reverse biodiversity loss, it is essential that the water table is effectively managed, and peatlands are protected and restored. This is vital not only for the biodiversity peatlands support or should support (from genetic to landscape scale), but also for their role as habitat connectors and their significant contribution to global climatic and hydrological processes.

It is proposed in the application that Turbine foundations: T2-T3 and T9, Crane hardstands associated with T2-T3, T6-T7, and T9 and the Substation and BESS compounds will be built on areas of peat. Of the proposed new access tracks, 7.2km (78%) are expected to comprise founded construction, with the remaining 2.1km (22%) expected to comprise floated track proposed. A total of 1.25km of existing access track is proposed for upgrade.

Case C-258/11 of the CJEU ruled "a plan or project not directly connected with or necessary to the management of a site will adversely affect the integrity of that site if it is liable to prevent the lasting preservation of the constitutive characteristics of the site that are connected to the presence of a priority natural habitat whose conservation was the objective justifying the designation of the site in the list of SCIs, in accordance with the directive. The precautionary principle should be applied for the purposes of that appraisal."

Scoping responses

Ambiguous Responses from Non-Statutory Bodies

The response from An Taisce (The National Trust for Ireland) is a major red flag for a regulator, even though they are a non-statutory body in this context. The email from An Taisce explicitly states, "resources are very limited... we are unfortunately unable to respond to every query," and suggests the developer review frequently asked questions.

Lack of Specificity on the Grid Connection Route

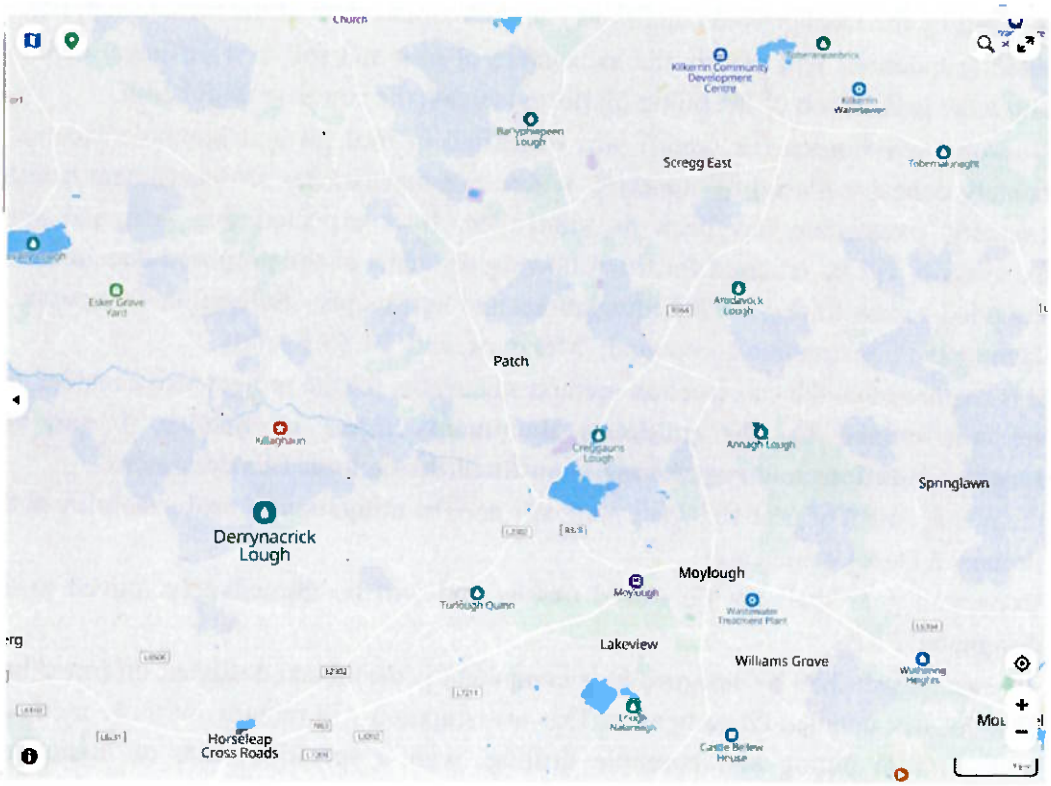
The scope of the project includes both the wind farm site and the grid connection route, which can cover many kilometres through different planning jurisdictions.

- The scoping responses focus heavily on the wind farm site itself (peat, turbines, birds) but provide little to no specific detail on the grid infrastructure.
- The grid cable route often runs through areas with high potential for undocumented archaeology (e.g., field boundaries, ringforts) or sensitive road drainage networks. The responses may not have requested:
    - Geophysical Survey along the entire cable route.
    - A commitment to the micro-siting of cable trenches to avoid specific features.
    - A specific Traffic Management Plan for the haulage of cable materials outside the main site boundary.

Turloughs

There are numerous turloughs both mapped and unmapped in this area of northeast Galway which are frequented by whooper swans, tufted duck and other migratory species. This fact has been omitted by the planners who only refer to the turlough at Horseleap Cross. In the Karst investigations K32 and K33 are identified as turlough/ spring. In fact, K33 is Derrynacrick Lough which contains whooper swans and Tufted Duck and provides a suitable foraging area for same. The first sentence of Article 4(4) of the Birds Directive provides that, within SPAs, Member States are required to take appropriate measures 'to avoid pollution or deterioration of habitats or any disturbances affecting the birds, in so far as these would be significant having regard to the objectives of that article'. Furthermore, the water requirements of groundwater-dependent terrestrial ecosystems (GWDTEs). Turloughs must be protected under the WFD; to be achieved through the groundwater body classification process.

Article 4(2) of the Birds Directive provides as follows: Member States shall take similar measures for regularly occurring migratory species not listed in Annex I, bearing in mind their need for protection in the geographical sea and land area where this Directive applies, as regards their breeding, moulting and wintering areas and staging posts along their migration routes. To this end, Member States shall pay particular attention to the protection of wetlands and particularly to wetlands of international importance. The first sentence of Article 4(4) requires Member States to take appropriate steps to avoid, inter alia, deterioration of habitats, not only in areas classed as special protection areas in accordance with Article 4(1), but also in areas which are the most suitable for the conservation of wild birds, even if they have not been classified as special protection areas, provided that they merit such classification Case C-96/98,



In Case C-508/04, the Court confirmed that the condition on favourable conservation status was a 'necessary precondition' in order for derogations to be granted under Article 16(1). According to the NPWS turloughs are considered to be in poor / inadequate conservation status. According to Ireland's Environmental Protection Agency (EPA), 85% of the 59 Irish habitats listed under the EU Habitats Directive, covering marine, freshwater, peatland, grassland and woodland habitats, were reported as having "unfavourable status"
C-293/17, PAS, states... *Logically, where the conservation status of a natural habitat is unfavourable, 'the possibility of authorising activities which may subsequently affect the ecological situation of the sites concerned seems necessarily limited'.*

Two overarching conditions apply to the process of granting derogations under Article 16, and they have to be met cumulatively: first, there must be no satisfactory alternative to the derogation and, second, the derogation must not be detrimental to the maintenance of the populations of the species concerned in a favourable conservation status in their natural range. The derogation decision must be duly motivated as regards the lack of a satisfactory alternative. As this part of northeast Galway amounts to a tiny fraction of the overall land space available there is no lack of suitable alternative locations

According to the planning application, a lot of areas require further investigations including but not confined to the following:

- The design of the WTG foundations is subject to confirmatory ground investigation and analysis. Each WTG will require a spread foundation of reinforced concrete (RC) foundation comprising a base slab bearing onto rock or other competent substrata with a central upstand to support the tower
- Turbine bases of 25m in diameter are proposed, with detailed foundation design dictated by the local ground conditions and the requirements of the turbine supplier.
- Piled foundations will require the excavation of peat and soil to a sufficient depth to allow the installation of the piling platform beneath the concrete foundation.
- Non-peat overburden (i.e. spoil) was identified in trial pit and borehole locations, namely cohesive glacial till material. Where this material has an insufficient bearing capacity, excavation has been recommended. It is expected that peat and spoil excavation will be required for the following elements of the proposed development: Founded access tracks; WTG foundations and hardstands; Substation Compound; • Temporary Construction compound; Met mast; and BESS Facility.
- It is required that the construction method statements for the project also consider, but are not limited to, **the guidance documents listed in Section 1 and the recommendations and requirements outlined throughout this document.**
- the management of peat and spoil materials and the mitigation of peat instability at the Proposed Development are:
- Excavated peat shall not be stored on-site and will be immediately moved to the designated PRAs
- All earthworks shall be designed by a competent geotechnical designer, informed by a post consent detailed GI campaign. This investigation will include intrusive methods, such as trial pitting and borehole drilling, with a specified suite of in-situ and

geotechnical laboratory testing to further assess the engineering and geotechnical characteristics of the infrastructure locations;

- In relation to inadequate peat reinstatement volumes the mitigation proposed is : It is assumed that a suitable construction methodology and project timeline can be developed by the construction stage contractor and design team to manage peat excavations and placement areas effectively.

This application appears to be more of a guidance document for decisions, which highlights risks and provides suggestions in order to resolve problems, rather than a precise measurement of the impact' which the proposed works will have on the environment. This was found insufficient by the Court because of the preliminary nature of its findings and the lack of definitive conclusions in Case C-304/05.

Aquatic Baseline Report Issues

States: The Proposed Project boundary ***overlapped with the Lough Corrib SAC (000297)*** *and a number of survey sites were located within this site, which is designated for a range of aquatic qualifying interests (NPWS, 2017).*

At– Dangan Eighter Stream, Cooloo a regular **otter** spraint, containing abundant crayfish and diving beetle remains, was recorded on a boulder at the pipe culvert (ITM 556006, 749326). Given the presence of **white-clawed crayfish** and utilisation by otter, the aquatic ecological evaluation of site A1 was of local importance (higher value) (Table 4.4).

Site A2 was located on an unnamed Danagan Eighter Stream tributary at a proposed access track crossing. The stream (FW2) had been extensively straightened and deepened along field boundaries **adjacent to a coniferous plantation** was 2-2.5m wide with stagnant water of 0.05-0.15m deep. **The substrata comprised deep anoxic silt (peat) with no hard substrata.**

Site A3 – unnamed stream, Cooloo
Site A3 was located on an unnamed Danagan Eighter Stream tributary adjoining the Site boundary. The stream was 2m wide and 0.05m deep at the time of survey with near imperceptible flows in glide habitat. Instream peat dams caused frequent impediments to flow. The substrata were comprised entirely of deep, soft humic sediments (peat). The site was bordered by degraded raised bog (PB1) and cutover bog (PB4).

Site A4 – unmapped channel, Cooloo
Site A4 was located on an unnamed (unmapped) channel approximately 100m upstream of Derrynacrick Lough (west). The substrata were comprised entirely of deep humic sediment (peat) with high peat staining at the time of survey. The site was heavily vegetated with frequent bottle sedge and locally abundant common reed (Phragmites australis) and bulrush. Aquatic bryophytes were not recorded. The open banks supported gorse, heather, rushes (Juncus sp.)

and scattered downy birch (Betula pubescens). The sitewas bordered by degraded raised bog (PB1) and cutover bog (PB4).

Site A5 – Dangan Eighter Stream, Elmhill

Site A5 was located on the Dangan Eighter Stream (30D35) at a proposed access track crossing (an existing clearspan masonry bridge). The steep banks had been excavated to the clay layer in many areas. The heavily modified channel was of some suitability for coarse fish species in addition to European eel but was of poor suitability for lamprey and salmonids given poor flows, poor hydromorphology and a predominance of soft substrata. The steep cay banks were of suitability for white-clawed crayfish burrowing. While none were recorded during the current survey, the species is known downstream (site D2). No otter signs were recorded in vicinity of the site. This in conjunction with information from Site AI suggests the presence of white-clawed crayfish in other streams.

At Site A7 – Grange River, Cloondahamper, Atlantic salmon (Salmo salar), brown trout, pike (Esox lucius) and stone loach (Barbatula barbatula) were recorded via electro-fishing at site A7 (Appendix A). Despite historical drainage works, the site was a good quality salmonid nursery, supporting relatively high numbers of mixed cohort juveniles, with good flow diversity and abundant instream refugia. Good quality salmonid and lamprey spawning habitat was present in glide and pool tailings despite some compaction and siltation. Given the location of the site within the Lough Corrib SAC (000297), the aquatic ecological evaluation of site A7 **was of international importance**

Site A8 – Grange River, Grange Bridge

Site A8 was located on the Grange River (30G02) at Grange Bridge, approximately 10km downstream of site A7. Given the presence of several indicator species (EC, 2013), the aquatic vegetation community was representative of the **Annex I habitat 'W**ater courses of plain to montane levels, with submerged or floating vegetation of the Ranunculion fluitantis and Callitricho-Batrachion (low water level during summer) or aquatic mosses [3260]' (aka floating river vegetation). Atlantic salmon, brown trout, pike and stone loach were recorded via electro-fishing at site A8 (Appendix A). The site was an excellent salmonid nursery despite historical drainage works, with abundant instream refugia supporting high densities of juvenile salmonids. Good quality salmonid spawning habitat was present locally in glide and pool tailings despite compaction and siltation of substrata. The site was also of value as a holding habitat for adult salmonids with localised deep pool and glide. Given the location of the site within the Lough Corrib SAC (000297), the aquatic ecological evaluation of site A8 **was of international importance (T**able 4.4).

3.1.22 Site L1 – Derrynacrick Lough (west)

Site L1 was located at Derrynacrick Lough (west), a small broadly circular 0.7ha mesotrophic lake in the centre of the Proposed Wind Farm site. Site L1 was of moderate suitability for brown trout which were observed during the site visit. The lake also had some **good suitability for European eel given suitable depths, good quality foraging habitat and connectivity to the Dangan Eighter Stream.**

Site L2 was a **small wetland a**nd pond basin of c.0.02ha adjoining the Proposed Wind Farm site, adjacent to the Dangan Eighter Stream.

The Abbert and Grange rivers are known to be the most important salmonid spawning and nursery habitats in the Clare River catchment (Gordon et al., 2021; O'Briain et al., 2019a) and contribute significantly to the adult brown trout population of Lough Corrib **(Delanty et al., 2021; Massa-Gallucci et al., 2010).** This information clearly depicts an area of high biodiversity value which is critical to the achievement of the conservation objectives of Lough Corrib SAC.

While the importance of wind energy developments can be appreciated by all it is imperative that they are not advanced at the expense of biodiversity. The following Directives must be kept in mind:

Directive (EU) 2023/2413 of The European Parliament and of the Council of Europe states that it will help to achieve the objectives of Decision (EU) 2022/591 of the European Parliament and of the Council (5), **which also aims to protect, restore and improve the state of the environment by, inter alia, halting and reversing biodiversity loss.**

Decision (EU) 2022/591 of the European Parliament and of the Council of Europe on a General Union Environment Action Programme to 2030. The priority objectives of the 8th EAP set out a direction for Union policymaking, building on, but not limited to, the commitments of the strategies and initiatives of the European Green Deal, such as the EU Biodiversity Strategy for 2030. The **8th EAP aims to accelerate the green transition to a climate-neutral, sustainable, non-toxic, resource-efficient, renewable energy-based**, resilient and competitive circular economy in a **just, equitable and inclusive way, and to protect, restore and improve the state of the environment by, inter alia, halting and reversing biodiversity loss.** The 8th EAP is **based on the precautionary principle, the principles of preventive action** and of rectification of pollution at source and the polluter pays principle. **A priority objective of the 8th EAP is protecting, preserving and restoring marine and terrestrial biodiversity and the biodiversity of inland waters inside and outside protected areas.**

Protective Measures Cannot Be Compensatory Measures in Disguise

In relation to the Biodiversity enhancement management plan see the following judgement which makes such a plan illegal.

C-521/12, Briels

It should further be noted that, as a rule, any positive effects of a future creation of new habitat which is aimed at compensating for the loss of area and the quality of that same habitat type on a protected site, even where the new area will be bigger and of higher quality, are highly difficult to forecast with any degree of certainty and, in any event, will be visible only several years in the future.

The court maintained the line taken in Case C-521/12, Briels that protective measures which aim at compensating for the negative effects of a plan or project on a Natura 2000 site cannot be taken into account in the Article 6(3) assessment. Such measures should be categorised as 'compensatory measures', within the meaning of Article 6(4), and if the conditions laid down therein are satisfied. With regard to the circumstances of Cases C-387/15 and C-388/15, Orleans, the Court observed that the adverse effects on the Natura 2000 site in question were certain (since the referring court was able to quantify them), while the benefits resulting from the creation of the nature reserves were uncertain (since it was not complete). The circumstances were thus similar to those in Briels. Both involved, at the time of assessing the implications of the plan or project, the identical premise that future benefits will mitigate the significant adverse effects on that site, even though the development measures in question had not been completed.

The proposed Cooloo Wind Farm, involves extensive peat excavation for 9 turbines, access roads, grid connection, and ancillary works. Chapter 8 reports peat depths of 0–7.1 m (median 0.4 m in probed areas, Figure 8-2), classified as raised bog (basin peat) of "Low" importance due to degradation from cutting and drainage. Estimated excavations include ~39,530 m^3 of peat and ~75,300 m^3 of spoil (Table 8-15) and the of excavated peat relocated to storage repositories.

This disrupts degraded peatlands, conflicting with the EU Nature Restoration Law (Regulation (EU) 2024/1672), which requires peatland restoration for carbon storage, biodiversity, and hydrology.

"By 2030, Member States shall put in place the measures necessary to restore at least 30 % of the area of drained peatlands in their territory to a condition where they support their long-term hydrological stability and climate and biodiversity functions." (Article 4(1)(a))

Ireland's drained peatlands (~85% degraded) emit ~20% of national GHG; Cooloo's removal (e.g., to bedrock for foundations, Section 8.5.2.2) prevents rewetting, increasing emissions (~0.5–1 t CO_2/m^3 disturbed peat).

"By 2050, all degraded and drained peatlands in their territory shall be restored to the condition referred to in the first subparagraph." (Article 4(1)(b))

The management plan (Appendix 3/4-2) focuses on short-term stability (e.g., 1m stockpiles, Section 8.3.10.5) but not full restoration, risking non-compliance amid Ireland's 2030 targets.

"Measures shall ensure that there is no net loss of rewetted peatland area and that rewetted peatlands remain in a rewetted condition." (Article 4(3))

Cooloo's surplus storage (44,380 m^3 peat capacity) implies no export but permanent disruption, not functional habitats.

The EU Nature Restoration Law (Regulation (EU) 2024/1672) does NOT specifically allow rewetting within the same project to justify large-scale peat destruction.

Lough Corrib SAC

The Wildlife Amendment Act 2023 require public bodies to consider biodiversity in their plans, their policies their actions and their decisions. This means that public bodies must now begin to monitor their activities to consider whether they have any impact on biodiversity and comply with these new statutory duties. Ireland must comply with and have regard to the EU Nature Restoration Law. As an EU member state, Ireland is legally obliged to meet the binding targets set by the Regulation, which came into force in August 2024. Ireland is required to comply with the Habitats Directive, as it is an EU member state. The Habitats Directive requires Ireland, along with other EU countries, to protect important habitats and species by designating and managing a network of sites called Natura 2000 sites. Regarding specific habitats covered by the Nature Restoration Law, Member States are required to restore 30% of habitats, including forests, grasslands, wetlands, rivers, lakes and coral beds from poor to good condition by 2030. This target will increase to 60% of those habitats by 2040, and 90% by 2050. It is the state – not individuals – who is bound by the obligations set out in the NRL.

Northeast Galway contains a high number of designated **Special Areas of Conservation (SACs)**, **Special Protection Areas (SPAs)**, and **Natural Heritage Areas (NHAs)**. The presence of these sites indicates their national and European significance for biodiversity. Furthermore, the area is defined by its extensive network of **wetlands**, **bogs**, and internationally significant **turloughs**. Under the **EU Habitats Directive** and the **European Communities (Birds and Natural Habitats) Regulations**, these habitats are afforded specific legal protection, placing a clear obligation on the state to conserve them. The underlying **limestone karst** geology presents a high degree of vulnerability to large-scale construction, with a direct risk of damaging critical subterranean ecosystems and hydrological systems.

The EU Habitats Directive (92/43/EEC), transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations, is the cornerstone of legal protection for a range of habitats and species across Europe. Its core objective is to conserve biodiversity by requiring member states to maintain or restore natural habitats and wild species at a "favourable conservation status." Bogs are a central focus of this directive, with several types listed in **Annex I**, a list of habitats whose conservation requires the designation of **Special Areas of Conservation (SACs)**.

Lough Corrib SAC Site Code: 000297site synopsis states… ***A number of rivers are included within the SAC as they are important for Atlantic Salmon. These rivers include the Clare, Grange, Abbert,*** *…In addition to the rivers and lake basin,* ***adjoining areas of conservation interest, including raised bog, woodland, grassland and limestone pavement, have been incorporated into the site.***

Lough Corrib **Special Areas of Conservation (SACs)** and **Special Protection Areas (SPAs)**, Lough Corrib SAC holds 14 Annex 1 habitats of the EU Habitats Directive (6 of these are priority including Raised Bog (Active)* [7120] Degraded Raised Bog [7150], Limestone Pavement* [91A0], Pearl Mussel (Margaritifera margaritifera) [1092] White-clawed Crayfish (Austropotamobius pallipes), Sea Lamprey (Petromyzon marinus) [1096] Brook Lamprey

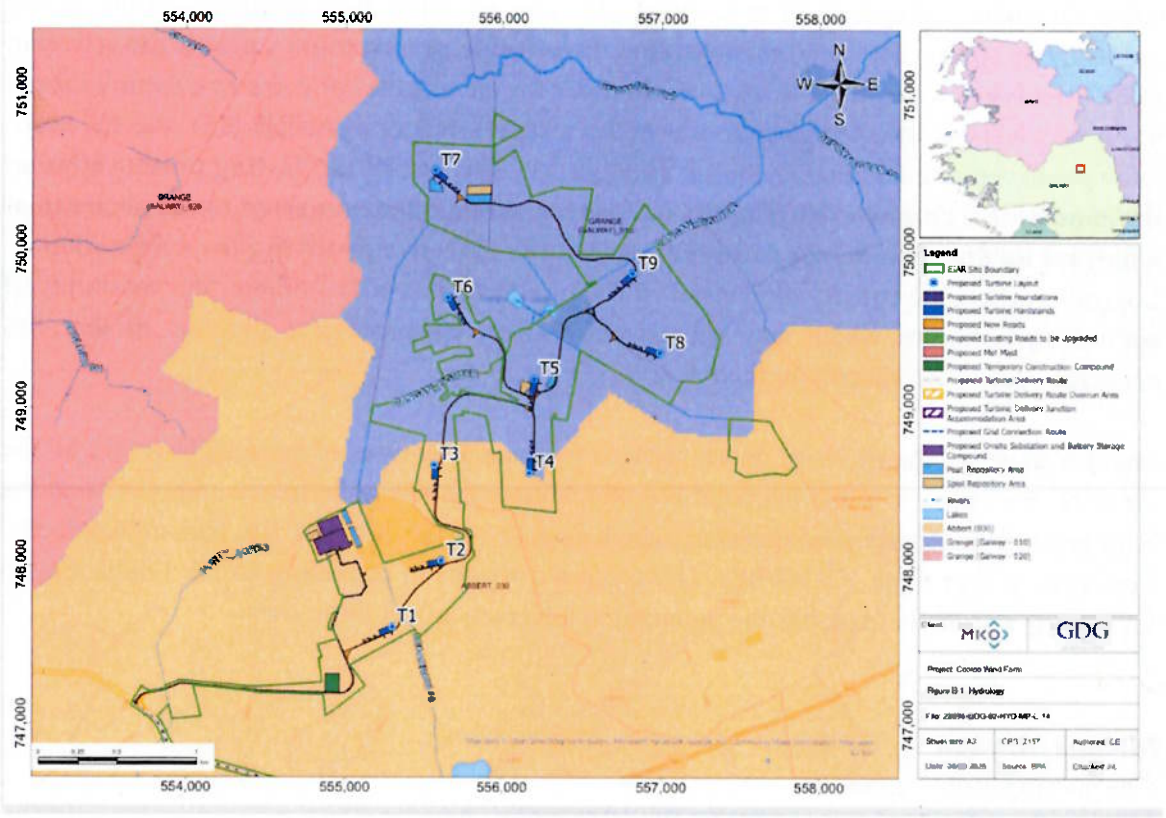
(Lampetra planeri) [1106] Atlantic Salmon (Salmo salar) [1303] Lesser Horseshoe Bat (Rhinolophus hipposideros) [1355] Otter (Lutra lutra) [1833].

The planners, state

> *The Proposed Wind Farm site* ***is located within the watershed of two catchments: Grange (Galway - 010) and Abbert (030). T9 is located 80m from a minor watercourse labelled as Dangan Eighter,*** *which flows northeast through the northern part of the Proposed Wind Farm site. This* ***watercourse forms part of the Grange catchment, which flows eventually to the Clare River, and eventually the Corrib.***

Both the River Abbert and the Dalgan flow through the windfarm site as well as a number of smaller tributaries so the site overlaps with Lough Corrib SAC. Seven water crossings in total are proposed and therefore it cannot be proven beyond reasonable scientific doubt that the integrity of the SAC will not be impacted. The planning application states … *The Proposed Wind Farm layout avoids all areas of FoS <1.3 in all scenarios, with the* ***exception of one localised section of the access track between T5 and T6 (AL5b). This access track interacts with a very small area of 1< FoS <1.3 at a minor water crossing.***

Activities associated with wind farm construction, such as blasting, infilling, and the building of access roads, are explicitly listed in regulations as activities requiring ministerial consent within an SAC. These activities can cause irreversible damage to the bog's hydrology, leading to the release of carbon and the destruction of the ecosystem, directly counteracting the climate benefits of the development. The plan or project in question may be granted authorisation only on the condition that the competent national authorities are convinced that it will not adversely affect the integrity of the site concerned. Where doubt remains as to the absence of adverse effects on the integrity of the site linked to the plan or project being considered, the competent authority will have to refuse authorisation." CaseC-127/02



The application states

> *Therefore, based on Relevé 2 and 3 data done as part of the Botanical Assessment, identified as corresponding to High Sphagnum communities as per IWM 1283, the location of the proposed new floating road between T7 and T9 (approximately 285m of the proposed new floating access road) correspond to the Annex 1 habitat Degraded raised bogs still capable of natural regeneration (7120). This is a Priority habitat under the Habitats Directive. However, the loss of this area will constitute only 0.18ha (0.54%) of the total raised bog habitat area within the Proposed Project.*

Derogations from the directive in relation to sites containing priority natural habitat types and/or a priority species are only permitted for reasons of human health or safety. The decision of the European Court of Justice in Case 258/11 held that: "If, after an appropriate assessment of a plan or project's implications for a site … the competent national authority concludes that that plan or project will lead to the lasting and irreparable loss of the whole or part of a priority natural habitat type whose conservation was the objective that justified the designation of the site concerned as an SCI, the view should be taken that such a plan or project will adversely affect the integrity of that site."

Also relevant is The NPWS 2019 report states in relation to Active Raised bog "The Overall Status of the habitat is Bad and deteriorating…" (*Conservation Status in Ireland of Habitats and Species listed on the European Council Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC*). The overall goal of Habitats Directive is to **maintain** or restore the

natural habitats and species of wild fauna and flora of Community interest, at a favourable conservation status. **The need to maintain a favourable conservation status is the criterion to be used when assessing the impacts.** In order for the integrity of a site as a natural habitat not to be adversely affected for purposes of the second sentence of Article 6(3), 'the site needs to be preserved at a favourable conservation status'. This entails the **'lasting preservation of the constitutive characteristics of the site concerned that are connected to the presence of a natural habitat type whose preservation was the objective justifying the designation'.** Logically, where the conservation status of a natural habitat is unfavourable, 'the possibility of authorising activities which may subsequently affect the ecological situation of the sites concerned seems necessarily limited'(C-293/17).

Member States of the EU must, in accordance with the provisions of national law, take all the measures necessary to avoid interventions which incur the risk of seriously compromising the ecological characteristics of the sites which appear on the national list transmitted to the Commission (see Case C-244/05). The proposed windfarm proximity to the Lough Corrib SAC along a stretch of bog has the potential to adversely affect these sites.

Molinia Meadow

Site investigations found:

Molinia Caerulea 20% cover at PRA4 Peat Repository Area 4

Molinia Caerulea 40% cover at SRA1 Spoil Repository Area 1

*MS3*_Molinia caerulea was also found

- along Proposed Road between T7 and T9
- at T5 22% coverage

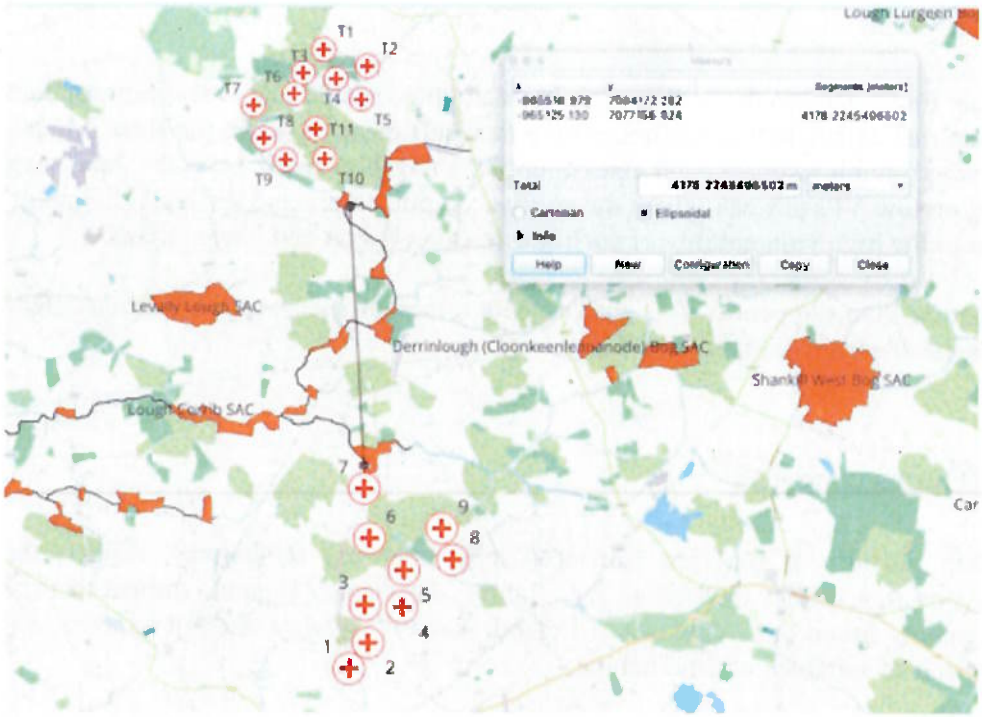
"Molinia meadow" is the common term for the habitat type, while Molinia caerulea (purple moor-grass) is the dominant plant species that defines it. Molinia meadows are a qualifying interest for the Lough Corrib SAC. The specific type listed is Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae), which is a European habitat type.

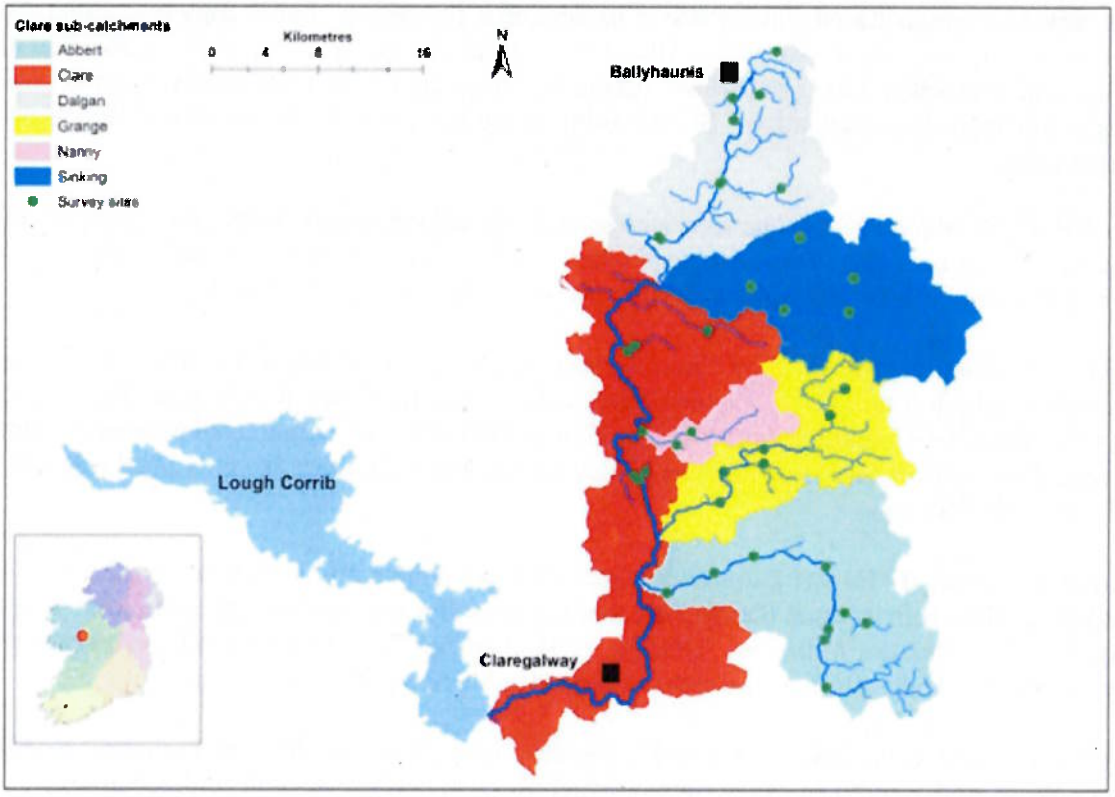
Cumulative Issues

9.5.7.5 Cumulative Effects with Other Wind Farms

The total area of the River Clare catchment is c. 1,000km2 which equates to 1 no. turbine per approximately 42km2 which is considered not significant in terms of likely cumulative hydrological effects on the River Clare.

This statement is misleading. When you consider in the close area across Clonberne and Cooloo that 20 of those turbines are proposed to be located.





Compare that small area to the large area of the Clare river catchment.

Ornithology issues

A very significant flaw relates to the justification for excluding specific high-value raptors from the final collision risk calculation or the underlying data sufficiency used in the Band Model. The precautionary principle requires a *full* assessment for a flagship Annex I species. Justifying exclusion based on low VPs is weak, given the species' cryptic nature and difficult surveying. Particularly due to the high vulnerability of such species to collision and blade strikes.

The Bird Mitigation Plan (Appendix 7-7) suffers from a lack of species-specific, mandatory measures for the most sensitive raptors.

Hen Harrier (Circus cyaneus)

The conservation position of the Hen Harrier (Circus cyaneus) in Galway, reflects the challenges faced by this species throughout the country. Birdwatch Ireland confirm that the Hen Harrier is mainly found in 11 counties of Ireland. County Galway offers it a haven as it has a wide covering of suitable peatland habitat.

The Hen Harrier is in decline across Ireland, and the bird survey conducted by MKO, and its servants has demonstrated that the rate of its decline is increasing. I am happy to say that three roosts on or near the construction site were identified and an assumption made that the individuals recorded during the winter season are associated with a Nationally/Internationally important wintering population. So, we bring some hope for the future of our Hen Harrier population.

Hen Harriers require large, open landscapes such as upland moors, bogs, and young conifer plantations for breeding. They also need extensive foraging areas with a good supply of small mammals and birds as identified to be present on site in MKO's EIAR findings.

"Factors influencing Hen Harrier Circus cyaneus territory site selection and breeding success", a study to which John Lusby, Raptor Conservation Officer, of Bird Watch Ireland contributed in December 2019, concluded that the Hen Harrier territories were associated with heath/shrub, bog and pre-thicket coniferous forests. They undoubtedly therefore have an ideal territory in Cooloo , Co.Galway.

An article entitled "Expert knowledge assessment of threats and conservation strategies for breeding Hen Harrier and Short-eared Owl across Europe" on which John Lusby again collaborated cites the following "changes in land use (habitat loss and indirect persecution (accident nest destruction) as the greatest threats to breeding for the Hen Harrier.

In Co. Galway, these habitats are under pressure from land use changes, including forestry, agriculture, and Windfarm development, which leads to habitat loss and fragmentation.

Thankfully our government and EU laws offers protection to our birds through the following

1. **Wildlife Act 1976 (as amended by the Wildlife (Amendment) Act 2000 and other subsequent amendments)**:
2. **European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011)**:

3. **Planning and Development Acts 2000-2021**

The Hen Harrier (Circus Cyaneus) is a territorial ground-nesting bird of prey, that typically breeds in open bog and heather moorland, and their associated habitats. The fifth national survey of Hen Harriers in 2022 published by the National Parks and Wildlife Service, reveals a shocking decline in this iconic bird of prey. The survey recorded only 85 pairs of Hen Harriers throughout the country, representing the most severe decline of any national survey to date.

The Hen Harrier is an endangered species, listed in Annex 1 of the European Bird Directive 2009/147/EC. Despite conservation efforts, the Hen Harrier has been pushed closer to the brink of extinction. At the current rate of decline, population extinction could be expected within 25 years and there could be fewer than fifty breeding pairs of Hen Harrier remaining within the next 10 years. John Lusby, who coordinated the survey alongside project partners said: "We have reached crisis point at this stage, the situation could not be more serious, and we need to act accordingly if we are to stand any chance of ensuring Hen Harriers don't become extinct within our lifetimes". He continued: "Hen Harriers are one of the best studied bird species in Ireland. We know the main reasons why their populations have declined to such low levels, which has been primarily driven by land-use changes, resulting in the loss of habitat for Hen Harrier in our uplands, due to afforestation on important habitats for Hen Harriers and other wildlife inside and outside the Special Protection Area network, as well as associated disturbances from forest management activities and other pressures including wind energy developments. These pressures in combination have affected the integrity of our uplands, which are some of our most important areas for biodiversity and we are now seeing the very real effects of poor spatial planning and management of our uplands on Hen Harrier populations."

Irish case law enforcing the protection of Hen Harriers primarily stems from the European Union's Directive. Cases include:

Edel Grace & Peter Sweetman v An Bord Pleanála C-164/17
The facts of C-164/17 involved a wind farm project in a Special Protection Area designated for the hen harrier under the Birds Directive and incorporated into the Habitats Directive by Article 7 thereof. The development would result in the permanent loss of 9 hectares of habitat and the temporary loss of 1.7 hectares of habitat. The proposal included a Species and Habitat Management Plan, with measures to address the potential effects of the windfarm on the hen harrier's foraging habitat, including the restoration of areas of plantation back to blanket bog. The issue that arose was whether the proposed measures were mitigation measures that could be taken account of under Article 6(3) or compensatory measures appropriate for Article 6(4). The CJEU found that the measures in question were not appropriate for satisfying the test in Article 6(3) ruling as follows:

"Article 6 ... must be interpreted as meaning that, where it is intended to carry out a project on a site designated for the protection and conservation of certain species, of which the area suitable for providing for the needs of a protected species fluctuates over time, and the temporary or permanent effect of that project will be that some parts of the site will no longer be able to provide a suitable habitat for the species in question, the fact that the project includes measures to ensure that, after an appropriate assessment of the implications of the project has been carried out and throughout the lifetime of the project, the part of the site that is in fact likely to provide a suitable habitat will not be reduced and indeed may be enhanced may not be taken into account for the purpose of the assessment that must be carried out in accordance with Article 6(3) of the directive to ensure that the project in question will not adversely affect

the integrity of the site concerned; that fact falls to be considered, if need be, under Article 6(4) of the directive"

Commission versus Ireland (C-418/04): This case highlighted Irelands failure to adequately classify Special Protection Areas (SPAs) for Hen Harriers, violating Article 4 of the Birds Directive and **Hen Harrier Threat Response Plan (2024-2028)**: This plan aims to address threats to Hen Harrier habitats and ensure compliance with EU directives, reinforcing the need for habitat conservation measures.

The decline in the Hen Harrier populations in Ireland has significant impacts on local ecosystems. As a top predator, Hen Harriers play a key role in regulating populations of small mammals and birds. Their decline is leading to imbalances in prey species and is having cascading effects on the food chain. Hen Harriers are an indicator species; their decline reflects broader biodiversity loss and habitat deterioration across the landscape. this includes declines in other species like breeding waders and the Freshwater mussel. The loss of Hen Harriers reduces ecosystem services that communities rely on, such as the production of food and water. As a charismatic species their decline also impacts ecotourism and environmental education. Hen Harriers are an important part of the cultural heritage and identity of Cooloo/Barndearg community. Their decline represents a loss of natural and cultural diversity. The decline of the Hen Harrier has cumulative effects and is symptomatic of wider environmental degradation with far reaching consequences for the ecological, economic and cultural fabric of our ecosystems.

Galway County Development Plan

The Adopted Galway County Development Plan 2022-2028 states clearly that we should:
"Protect and where possible enhance the natural heritage sites designated under EU Legislation and National Legislation (Habitats Directive, Birds Directive, European Communities (Birds and Natural Habitats) Regulations 2011 and Wildlife Acts) and extend to any additions or alterations to sites that may occur during the lifetime of this plan. Protect and, where possible, enhance the plant and animal species and their habitats that have been identified under European legislation (Habitats and Birds Directive) and protected under national Legislation (European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), Wildlife Acts 1976-2010 and the Flora Protection Order (SI 94 of 1999). Support the protection, conservation and enhancement of natural heritage and biodiversity, including the protection of the integrity of European sites, that form part of the Natura 2000 network, the protection of Natural Heritage Areas, proposed Natural Heritage Areas, Ramsar Sites, Nature Reserves, Wild Fowl Sanctuaries (and other designated sites including any future designations) and the promotion of the development of a green/ ecological network."

https://consult.galway.ie/en/consultation/adopted-galway-county-development-plan-2022-2028/chapter/chapter-10-natural-heritage-biodiversity-and-greenblue-infrastructure

A NWPS Document:
The Hen Harrier Conservation and the Wind Energy Sector in Ireland' (2022)
describes the following regarding the Impacts of Turbine construction on the Hen Harrier

1) Direct mortality due to collisions with the turbine blades and/ or other parts of the wind energy
infrastructure (e.g. towers, nacelles, overhead power lines and meteorological masts)

2) Loss of breeding and/or foraging habitats extent and quality/condition, due to the impacts caused by construction, and operation or fragmentation of breeding, wintering or foraging habitats and
3) Displacement of birds as a result of increased disturbance and/ or loss of suitable habitat, and barrier effects caused by turbine arrays.

The WINDHARRIER project assessed wind energy interactions with hen harriers examining the population trends in relation to wind energy developments, the effects of wind energy developments on hen harriers, by their changes in foraging etc..

In its review, it was found that:

- Bird densities were lower within 100m of wind turbines compared to control areas, particularly forest bird species
- Differences in bird densities (within 100m) were related to habitat changes caused by wind energy development construction and operation
- The extent of differences in bird densities depends on the extent of areas affected by changes in habitat during wind energy development construction and operation
- The species of birds affected by these differences depends on which habitats are modified during wind energy development construction and
- Open-country bird species' densities were lower at wind energy development sites.
- The WINDHARRIER project concluded that although the relationship between hen harrier nest success rates and wind energy developments is not statistically significant, the lower nest success rates of pairs within a 1km distance of a wind turbine is of biological relevance, particularly given the highly dispersed nature of hen harrier.

We would ask the Inspector to read the following publications and to take note of the information within as the NIS provides *no Harrier-specific mitigation* at all

- The Hen Harrier Threat Response Plan 2024-2028
- NPWS (2015a). Hen Harrier Conservation and the Forestry Sector in Ireland
- NPWS (2015b). Hen Harrier Conservation and the Agricultural Sector in Ireland
- NPWS (2022). Hen Harrier Conservation and the Wind Energy Sector in Ireland

Northern Lapwing

The Northern Lapwing (Vanellus vanellus), a bird species found across Europe, is subject to various conservation measures under EU law, primarily through the Birds Directive (Directive 2009/147/EC), which aims to protect all wild bird species naturally occurring in the European Union. The Directive outlines the following key protections for the Lapwing:

1. **Habitat Conservation**:
    - Article 3 of the Birds Directive requires Member States to preserve, maintain, or re-establish a sufficient diversity and area of habitats for all bird species, including the Lapwing. This includes creating protected areas, managing

habitats both inside and outside protected areas, and re-establishing destroyed biotopes.

2. **Special Protection Areas (SPAs)**:
    - Under Article 4, Member States are obliged to classify the most suitable territories for species listed in Annex I of the Directive as Special Protection Areas (SPAs). Although the Lapwing is not listed in Annex I, its habitats often overlap with those of Annex I species, indirectly benefiting from these designations.
3. **Prohibition of Deliberate Killing or Disturbance**:
    - Article 5 prohibits the deliberate killing, capture, or disturbance of wild birds, the destruction of their nests, and the taking of their eggs. This general protection applies to the Lapwing.
4. **Regulation of Hunting**:
    - Article 7 sets out conditions under which hunting of certain bird species can be permitted, ensuring it does not jeopardize the conservation efforts. The Lapwing is listed in Annex II, meaning it can be hunted under strict national regulations that ensure sustainable populations.

EU Case Law Related to the Lapwing
Several cases in the Court of Justice of the European Union (CJEU) have clarified and enforced these protections:

1. **Case C-57/89 Commission v Germany (Leybucht Dykes)**:
    - This case emphasized the strict criteria for allowing projects that might affect SPAs. The court ruled that any reduction in the size of SPAs must be justified by imperative reasons of overriding public interest, and all compensatory measures must be taken to ensure the overall coherence of the Natura 2000 network.
2. **Case C-96/98 Commission v France**:
    - The CJEU found France in breach of the Birds Directive for failing to adequately designate and protect SPAs. This case underscored the obligation of Member States to ensure appropriate habitat protection measures for species like the Lapwing.
3. **Case C-79/03 Commission v Spain (Ebro Delta)**:
    - The court ruled that Spain failed to implement sufficient protective measures for birds in the Ebro Delta, highlighting the importance of active management and conservation measures in SPAs to protect bird species, including those not specifically listed in Annex I, like the Lapwing.

These cases illustrate the judicial enforcement of habitat protection and proper management practices, which are essential for the conservation of the Lapwing and other bird species within the EU. Through these measures, the EU aims to ensure the long-term survival of the Lapwing by maintaining suitable habitats and regulating activities that could negatively impact its populations.

The NIS provides *no Lapwing-specific mitigation* at all.

Passerine and birds of prey

We note that the NIS has the following shortcomings

1 **No explicit treatment of passerines as receptors**
- The Stage 2 assessment of "SCI Bird Species" is solely about SPA qualifying birds; passerines are not identified, valued, or assessed as a group at any point.
- This is legally acceptable for Appropriate Assessment, but ecologically it leaves a gap if you want clarity on songbirds.

2 **No species-specific mitigation for general breeding birds**
- In the NIS text I've reviewed, there is no explicit commitment such as:
    - Avoiding hedgerow / tree removal in the core bird nesting season (March–August).
    - Pre-construction nest checks by an ornithologist before vegetation clearance.
- These measures might exist in the EIAR/CEMP, but they are not clearly set out in the NIS itself, so from an AA standpoint they are not clearly "relied on" to protect passerines.

3 **Raptors other than Hen harrier**
- The NIS methodology notes breeding raptor and owl surveys, but in the Stage 2 assessment the only raptor actually treated as an SCI is Hen harrier, and this is dismissed largely by distance to the SPA and foraging ranges.
- Other Irish birds of prey (buzzard, kestrel, sparrowhawk, peregrine, red kite, owls, etc.) are not individually considered in the NIS appropriate assessment, even though they may breed or forage on site. That assessment sits in the EIAR, not here.

4 **Collision and displacement for non-SCI birds**
- Collision and disturbance are assessed only insofar as they might affect SPA SCI birds.
- There is no explicit discussion of local passerine populations, their conservation status, or whether the project could contribute to declines, despite national concerns for many farmland / hedgerow birds.

5 **Spatial mismatch for replanting**
- Replanting of commercial forestry may occur "on any lands within the State" under Forest Service approval, not necessarily within or near the current wind farm lands.

Natura Impact Statement
- From a local passerine perspective, that means some lost habitat locally may be replaced far away; the NIS does not address whether local bird communities will experience a net gain or loss in the short–medium term.

While the Natura Impact Statement (NIS) appropriately addresses the Qualifying Interests of the Lough Corrib SPA, it does not provide an adequate assessment of the wider bird community recorded on and adjacent to the site—including the numerous passerine species, farmland and hedgerow birds, and non-SCI raptors identified during the EIAR surveys. These species are not considered as receptors within the Stage 2 Appropriate Assessment and no specific mitigation is secured to protect breeding passerines or local raptor populations. In particular, the NIS does not incorporate enforceable measures such as seasonal restrictions on vegetation clearance (March–August), pre-construction nest surveys by a qualified ornithologist, or species-specific avoidance protocols. The document also does not assess likely impacts from the proposed removal of over 11 ha of conifer plantation and 3.7 km of hedgerow on local breeding birds, nor does it evaluate short-term displacement effects before new hedgerows and replanting mature. As a result, the protection of the wider Irish passerine and raptor assemblage is left to documents outside the NIS (EIAR chapters, CEMP commitments), meaning the Appropriate Assessment does not transparently demonstrate that these species will be safeguarded. On this basis, further information should be requested to provide a clear, evidence-based and enforceable mitigation framework that secures the protection of all bird species present on the site, not only those qualifying for SPA designation

Whooper Swans (Cygnus cygnus)

This part of Northeast Galway is often described as the Wetlands of Ireland as it was named by the Wetland survey on behalf of Galway County Council in 2022. See link in the references section.

Turloughs, sometimes referred to as vanishing lakes, are almost exclusively found in Ireland. They are associated with porous limestone areas and are characterised by large seasonal fluctuations in water level. Many turloughs have an inflow spring and a swallow hole where the water drains away. The fact that the water flows in and out of cracks and fissures in the limestone bedrock is one of the distinctive characteristics of turloughs. Typically, turloughs flood in winter and dry out in summer, but there can be other fluctuations linked with heavy rainfall. When flooded, some turloughs are known to host internationally important numbers of migratory water birds which visit Ireland in the winter. One such migratory bird is the Whooper Swan.

The Whooper Swan is listed under Annex I of the EU Birds Directive (Directive 2009/147/EC). This directive requires EU member states to designate Special Protection Areas (SPAs) for the conservation of listed bird species and to take measures to ensure their protection, including the regulation of hunting and habitat conservation. Annex I lists bird species that are considered vulnerable, rare, endangered, or in need of particular conservation efforts.

The Whooper Swan is also listed in the Amber list of Birds of Conservation Concern in Ireland 2022-2026.

This part of Northeast Galway is likely to have the highest number of Whooper Swans compared to anywhere else. The reasons for this are partly because of habitat such as the largest density of turloughs in the world, the wet climate and a long history of such suitable habitat and climate for this great native Irish species to exist here for millennia.

Above photo taken quite close to the proposed site and it shows over 200 Whooper swans in a field.

It is clear from the survey data that Whoopers will be regularly traversing this site if you look at the locations where they have been recorded. The collision risk assessment does not cover all the potential traversal lines over this site of you consider all the known sites where Whoopers regularly nest and feed at.

> *1% of the National population of Whooper Swans is 144. Therefore, as per NRA 2009, a regularly occurring population of 144 Whooper Swans is required for classification as Nationally Important'.*

Look at the above photo and you will see that there are over 200 Whooper Swans in that field, this is clear evidence that a flock of national importance is in this area. Actually this is only one of many such photos from around the North East Galway area.

Article 4(1) of the Birds Directive reads as follows:
The species mentioned in Annex I shall be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution.

In this connection, account shall be taken of:
(a) species in danger of extinction;
(b) species vulnerable to specific ***changes in their habitat;***
(c) species considered rare because of small populations or restricted local distribution;
d) other species requiring particular attention for reasons of the specific nature of their habitat.

Article 4(2) of the Birds Directive provides as follows: Member States shall take similar measures for regularly occurring migratory species not listed in Annex I, bearing in mind their need for protection in the geographical sea and land area where this Directive applies, as regards their breeding, moulting and wintering areas and staging posts along their migration routes. **To this end, Member States shall pay particular attention to the protection of wetlands and particularly to wetlands of international importance.** Wetlands and waterbirds: the wetlands of northwest Europe are a vital resource for millions of northern and

boreal nesting waterbird species that overwinter on these wetlands or visit them when migrating further south. To acknowledge the importance of Ireland's wetlands to wintering waterbirds the term Wetland & Waterbirds can be included as a Special Conservation Interest for a Special Protection Area that has been designated for wintering waterbirds, and is or contains a wetland site of significant importance to one or more of the species of Special Conservation Interest. Wetlands are a qualifying interest of Lough Corrib SAC and waterbirds are a major focus of the associated Lough Corrib SPA (Special Protection Area). The SAC's qualifying interests include various wetland habitats like oligotrophic and hard oligo-mesotrophic standing waters, water courses, and calcareous fens. The SPA specifically protects waterbird species, both resident and migratory, that depend on the wetlands.
Sites are considered internationally important for Whooper Swans if they regularly support 1% or more of the Icelandic breeding population, i.e. 1% or more of 20,900 (Delany & Scott 2006). Also, sites are considered nationally important for Whooper Swans if they regularly support 1% or more of the Irish wintering population of Whooper Swans, i.e. 1% or more of 12,700 (Crowe 2005). The 8th International Swan Census took place in January 2020 as part of the Irish Wetland Bird Survey (I-WeBS) under contract to the National Parks and Wildlife Service (NPWS) of the Department of Housing, Local Government and Heritage. A total of 19,111 Whooper Swans were recorded, 14,467 in the Republic of Ireland (ROI) and 4,644 in Northern Ireland (NI). This is the highest total ever recorded in Ireland and represents a 27% increase in the Whooper Swan population since the previous census in 2015. Given the large numbers seen at our local turloughs we feel that this area is of national importance for whooper swans which are Annex 1 species under the Habitats Directive.

The Greenland White-fronted Geese are a high collision risk species. The number of these visiting Ireland has decreased in recent years, so it is of utmost importance that their foraging and roosting habitats are protected. The objective of Article 2(2) and Article 3(1) of the Habitats Directive is *restoring natural habitats and species of wild fauna and flora of Community interest at a favourable conservation status. If existing occurrences of habitat types or species are not sufficient to guarantee a favourable conservation status, such occurrences must be restored* (C-281/16). This may be the case in terms of declining numbers of Greenland White-fronted Geese, so our Planning Authorities are obliged to restore a natural habitat suited to these geese by not allowing further deterioration.

The area under consideration for the windfarm is nestled among a number of turloughs frequented by whooper swans and other protected birds. The distance and direction that protected species may travel outside the SACs was inadequately assessed in the Bird Survey. There are numerous turloughs both mapped and unmapped in proximity to the proposed windfarm site, which are frequented by whooper swans, tufted duck and other migratory species that roost and feed at these sites during the winter. there is a danger of collision when flying at dusk, and when landing and taking off. These flight paths traverse the proposed windfarm and these have not been properly investigated in the bird survey.

Article 4 covers SPA-designated birds under Annex I of the Birds Directive. Outside those areas, planning authorities must strive to avoid pollution or deterioration of habitats, and this

obligation is not confined to Article 4/Annex I. It applies generally to the habitats of birds, outside of SPAs.
Furthermore, the first sentence of Article 4(4) of the Birds Directive provides that, within SPAs, Member States are required to take appropriate measures *'to avoid pollution or deterioration of habitats or any disturbances affecting the birds, in so far as these would be significant having regard to the objectives of that article'.*

Golden Plover

Golden Plover is a qualifying interest for the Lough Corrib Special Protection Area (SPA) which forms part of the Lough Corrib SAC. The planners state:

> *Surveys conducted in the study area between September 2019 and March 2025 indicate that wintering golden plover numbers of County Importance*

Proposed mitigation is *the management prescriptions have been explained to the individual landowners prior to inclusion in the application and are acceptable to each consenting landowner.* The ruling in C-323/17 confirmed that proposed mitigation measures cannot be taken into account for the purposes of screening.

Curlew

The *Prioritised Action Framework (PAF) For Natura 2000 in Ireland on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) for the Multiannual Financial Framework period 2021 – 2027* **in section** E.3. in relation to the Curlew states:

> *Recent surveys (2015-2017) have confirmed that 71% of breeding pairs were on peatlands and heather moorland, while the remaining 29% were mainly found on rushy pasture and wet grassland.*

Curlews have been recorded on the site by persons who live in the area. The second sentence of Article 4(4) contains an obligation that applies outside of SPAs, which reads as follows: *Outside these protection areas, Member States shall also strive to avoid pollution or deterioration of habitats.*

Mitigation Issues

Below is an assessment of the developer's methodology in the Bird Mitigation Plan (Cooloo Wind Farm, Appendix 7-7)

The plan assumes bird control kites are sufficient to reduce collision risk but does not provide modelling of expected collision reduction. Should the developer have provided quantitative mitigation effectiveness analysis, not qualitative assumptions.

The developer identifies Golden Plover (Annex I species) as the key receptor, whilst the mitigation proposed is preventative we point out the following issues:

- There is no assessment of potential habituation: Raptors-shaped kites may lose effectiveness over time; and will they be effective over large fields and tracts of bogland, should the board not query long-term reliability of kites.
- No contingency or adaptive management thresholds (e.g., what if collision monitoring shows no reduction?).
- No critical analysis of whether displacement may shift birds into other hazardous areas, a point often required under AA or EcIA guidelines.

The EPA expects:

• Clear linkage between baseline data → impact prediction → mitigation → monitoring
• Evidence-based justification for mitigation measures.

The developer has only cited study (O'Shea et al., 2020) concerns woodpigeons at airfields—not comparable species ecology, not comparable behavioural drivers, and not comparable landscape context.

EPA guidance requires species-specific or ecologically analogous justification, which is somewhat lacking. Searching through recent Board decisions, be they rejections or conditions (2020–2024) relating to bird impacts indicate:

The Board has increasingly expected:

1. Mitigation with demonstrated, not assumed, effectiveness
2. Post-construction adaptative triggers (e.g., if >X collisions/year, mitigation escalates)
3. Alternatives analysis (e.g., micro-siting of turbines)
4. Habitat-based mitigation rather than artificial deterrence, where feasible

The methodology falls short in areas 1, 2 and 4.
Bird control kites are novel in Irish wind farm mitigation and lack empirical evidence for plovers. Planners may seek:

• Why no buffer/micro-siting was considered
• Why habitat modification (e.g., increasing sward height) was not preferred
• Why turbine shut down-on-demand was not explored

I submit that the Mitigation relies on behavioural deterrence with weak evidence for Golden Plover. There is no quantified prediction of collision reduction post-mitigation, no adaptive triggers or escalation measures (now standard in bird-sensitive wind farm cases). It does not explore or justify exclusion of alternative mitigation types (buffering, micro-siting, landscape management), and crucially the potential long-term effectiveness and habituation not addressed. There is no evidence that the developer attempted avoidance through layout design. No demonstration that turbine placement could not have been altered to reduce plover use. The guidelines expect monitoring to feed into adaptive management, yet no thresholds or escalation measures are defined. Habituation risk is not addressed and there is no analysis of

whether deterrence might push flocks into areas of increased risk (e.g., nearer turbines, public roads, or sensitive habitats).

Good practice requires mitigation to be supported by evidence from similar species or ecosystems. The plan cites only one source: a study on woodpigeons.

Golden plover:

- are a wader species
- have different flight ecology
- do not respond the same way to raptor silhouettes, this is a major gap.

Other species

Otter and Irish Hare have been recorded within this site. Both of these species are listed in the Red Data Book and are legally protected by the Wildlife Act, 1976. Otter is also listed on Annex II of the E.U. Habitats Directive.

White-clawed Crayfish (Austropotamobius pallipes), listed on Annex II, is well distributed throughout Lough Corrib and its in-flowing rivers over limestone.

In Case, C-461/17, the Court held that all the habitats and species for which the site is protected must be catalogued and drew a presumption of non-compliance with Article 6(3) if the assessment had not identified 'the entirety of the habitats and species for which the site has been listed' as this 'would not be sufficient to dispel all reasonable scientific doubt as to the absence of adverse effects on the integrity of the protected site'.

The presence of these Annex I bog habitats in an area, whether they are officially designated as SACs or not, presents a fundamental conflict with the purpose of a large-scale development. The legal framework exists to prevent the very type of environmental damage that such a project would cause. The placing of windfarms and associated infrastructure has the potential to destroy and interfere with nesting and breeding grounds, of a number of red listed bird species present on the site. CaseC-404/09,

There can be no reasonable scientific doubt as to the lack of adverse effects on the integrity of the site if this development goes ahead. Under Article 6. measures may need to be adopted, intended to avoid external man-caused impairment and disturbance and measures to prevent natural developments that may cause the conservation status of species and habitats in SACs to deteriorate Case C-6/04). Construction activity would fragment the remaining habitats, isolating plant and animal populations and reducing the overall ecological health and resilience of the area.

Article 6.4 of the Habitats Directive states… "If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions a plan or project must

nevertheless be carried out for imperative reasons of overriding public interest," There is no necessity to build this windfarm on this site which will have a negative effect on the Natura Site and Species.

The CJEU has previously ruled that the measures provided for in a project which are aimed at compensating for the negative effects of the project cannot be taken into account in the assessment of the implications of the project provided for in Article 6(3) of the Habitats Directive (judgments of 15 May 2014, Briels and Others, C-521/12, EU:C:2014:330, paragraph 29, and of 21 July 2016, Orleans and Others, C-387/15 and C-388/15, EU:C:2016:583, It is only when it is sufficiently certain that a measure will make an effective contribution to avoiding harm, guaranteeing beyond all reasonable doubt that the project will not adversely affect the integrity of the area, that such a measure may be taken into consideration when the appropriate assessment is carried out (see, to that effect, **C-142/16)**

Project Assumptions in the EIAR

Statement from the Non-Technical Summary concerning the wind turbine's capacity is as follows:

"For the purposes of this application, it is assumed that the wind turbine model installed as part of the Proposed Project will have a generating capacity of between 6 and 7.2 MW. Therefore, on this basis, the proposed 9 no. wind turbines would have a combined generating capacity of between 54 to 64.8 MW. The actual turbine procured as part of a competitive tender process may have a generating potential that is lower or greater than the turbines described in the EIAR. Irrespective of the power output of the actual turbine procured, the conclusions of the EIAR will not be materially affected."

The key issue with this statement under Irish and EU planning law (EIA Directive 2014/52/EU) lies in the use of an assumption about the final project details, specifically the power output and turbine model, while asserting that a potentially *greater* output will not materially affect the Environmental Impact Assessment Report's (EIAR) conclusions. The EIA Directive requires an EIAR to be full, accurate, and specific, allowing the competent authority and the public to assess the true likely significant environmental effects. In Ireland, the Planning and Development Act 2000 (as amended) transposes this requirement. Relying on an assumption about a final component, and placing the burden on the developer to assert that any changes will not be "material," can be legally precarious. The concern is whether the EIAR has genuinely assessed the worst-case scenario (a principle known as the "Rochdale Envelope" or planning design envelope in planning law), or if the uncertainty leaves the assessment legally deficient. If the actual turbine procured exceeds the parameters assessed for sensitive impacts—such as noise, shadow flicker, or avian collision risk that can be classified as an inadequate assessment.

Telecommunication Issues

If mitigation is required for the Three Ireland radio link, a possible solution would be to relay the PTP radio link via an existing Telecoms Mast (e.g. telecoms mast at Creevagh). This mitigation measure is described in Section 7.2 of this report. The associated mitigation measure costs of remediating the impacts on the Three Ireland radio link are presented below.
From: Telecommunications Assessment

How does this work with the also proposed P2P relay for the proposed Clonberne windfarm also at the Creevagh mast for a different p2p link. That should be assessed as part of this report and is also significant cumulative effect under the EU EIA Directive (2014/52/EU).

Unmitigated Technical Impact on ESB Links

The analysis confirmed that the proposed wind farm's layout, specifically **Turbine T07**, would directly interfere with the ESB's infrastructure.

- Turbine T07 is calculated to cause an Interference Condition by obstructing the critical 0.6 Fresnel Zone of two ESB Point-to-Point (PMP) UHF telemetry radio links:
  - Abbeyknockmoy to Glenamaddy 38kV: Obstruction by 11.4 metres.
  - Abbeyknockmoy to Castlerea 38kV: Obstruction by 4.5 metres.
- Although the report notes the links are already "significantly impeded by existing terrain," the turbine's obstruction is a calculated adverse impact requiring mitigation

Procedural Issue: Lack of Agreement with ESB Network

The most significant procedural issue is the unresolved consultation with ESB Services (the electricity infrastructure operator):

- The report explicitly states that Ai Bridges Ltd. (the consultant) has received *"no response has been received from ESB in response to the multiple consultation attempts"* regarding mitigation measures.
- While the developer proposes several potential solutions—including micro-siting T07 or using a relay mast—these measures are not yet agreed or confirmed with ESB.
- The failure to secure formal agreement from a statutory body (ESB) on the technical assessment and required mitigation for its critical infrastructure creates a deficient element in the planning application, as the potential impact remains technically unmitigated and unresolved.

Secondary Impact on Three Ireland's Network

The primary solution proposed to mitigate the ESB issue creates a new potential conflict with a second operator, Three Ireland:

- The proposed solution to resolve the ESB issue—micro-siting T07—would reduce the clearance distance between T07 and the Three Ireland Point-to-Point (PTP) microwave radio link to 11.38 metres.

- This reduced clearance necessitates "Additional consultations" with Three Ireland to confirm that the new reduced distance is acceptable to them.
- This leaves the assessment in a state where solving one operator's problem immediately raises a new unconfirmed issue with another.

The proposed micro-siting of Turbine T07 in the Cooloo Wind Farm application would have potential cascading and significant effects across several chapters of the Environmental Impact Assessment Report (EIAR), requiring a full re-assessment of all affected environmental factors.

Health issues

Bisphenol A (BPA)

Bisphenol A (BPA) is a chemical produced in large quantities for use primarily in the production of polycarbonate plastics and epoxy resins.

"Bisphenol A is the most toxic substance we know' - Swedish Environmental Protection Agency

Wind turbine blades are constructed using fiberglass reinforced with epoxy resins, which contain 30-40% bisphenol A.

Bisphenol A and similar substances are among the most troublesome substances that are now finding their way into drinking water, watercourses, and our sea areas in larger and larger quantities. Quite small concentrations of Bisphenol A damages the fertility of humans and all organisms, and despite this fact, the quantity and use of this dangerous chemical increases quite significantly. One of the biggest problem areas is the huge increase in epoxy compounds in the turbine blades in wind turbines.
Article : Business and Human Rights Resource Center

Bisphenol A (BPA) can be released from wind turbine blades primarily through the erosion of their composite materials, particularly the epoxy resin that binds the carbon or glass fibers. As the blades are exposed to environmental factors like wind, rain, and sunlight over time, the protective coatings on the leading edges wear down, causing the release of microplastic particles that contain BPA. This erosion is accelerated by high rainfall and the high rotational speeds of the blades, with the tip of the blade experiencing the greatest wear due to its high velocity, potentially reaching up to 300 km/h.

1 kg of Bisphenol A makes 10 billion litres of water unusable.

Agriculture is badly affected by Bisphenol A through contamination. This contamination arises when aging blades degrade or are processed during decommissioning and disposal, allowing BPA to leach into the local soil and water systems. This known endocrine disruptor can then enter the food chain, impacting multiple sectors, including dairy farming, sheep farming, and crops. For crop farmers, there is a risk of chemical uptake directly by the plants from

contaminated soil or irrigation water. For livestock farming, the ingestion of contaminated drinking water by herds, whether dairy cows or sheep, raises concerns about chemical bioaccumulation in animal products such like milk and meat, potentially jeopardizing product safety and the farm's market viability.

LVIA methodology failings

We wish to highlight some failings in the proposed Cooloo Wind Farm on the basis that the Landscape & Visual Impact Assessment (LVIA) submitted in the EIAR is inadequate, unreliable, and materially understates impacts on the receiving environment. The LVIA contains fundamental methodological and interpretive flaws which prevent An Coimisiún Pleanála from relying on it as an accurate assessment of effects.

1. Systematic Understatement of Effects Using Subjective Judgement
The LVIA explicitly allows significance ratings to be overridden using undefined "professional judgement." The EIAR states that matrix outcomes may "misrepresent significance," and ultimate ratings are determined by expert discretion rather than objective criteria.
This removes transparency, violates GLVIA3 best practice, and results in significant effects being downgraded without evidence.

2. Landscape Sensitivity Downgraded to "Low" Across the Entire Study Area

The LVIA assigns Low sensitivity to every Landscape Character Unit within 15 km. This is wholly inconsistent with the Galway County Development Plan, which identifies higher-value landscapes throughout North Galway, including bogs, turlough areas, eskers, and rural settlements. This blanket downgrading produces artificial "low impact" conclusions.

3. Restricted Study Areas Underestimate Real Visibility

The LVIA limits assessment to:

- 15 km (landscape)
- 20 km (visual)

and declines to examine views beyond 20 km. Modern turbines of 180–200 m are widely visible from over 25–35 km, especially in bogland and flat terrain. This restriction is arbitrary and leads to under-assessment of scenic views.

4. Viewpoint Selection is Not Representative

Many receptors were excluded based on "limited theoretical visibility," even though the ZTV indicates potential exposure. Only 15 viewpoints were assessed for a wind farm of this scale. The LVIA also claims there are "no scenic routes" in the study area, ignoring undulating rural roads where residents and visitors will experience prominent views. This creates an incomplete and biased visual baseline.

5. ZTV Limitations Not Addressed; Reliance on Non-standard RSA Method

The LVIA admits ZTVs miss micro-topography, cannot show scale, and are only worst-case tools. Instead of compensating by adding more viewpoints, it relies on Route Screening

Analysis, a proprietary, non-transparent method not recognised by GLVIA3 or SNH. This technique is used to exclude large areas from assessment and lacks independent validation.

6. No Night-Time or Aviation Lighting Assessment

The LVIA contains no analysis of aviation lights, nighttime visibility, or loss of dark skies. This is a major omission, as night-time impacts can exceed daytime impacts in rural Galway.

7. Cumulative Assessment Limited Only to Wind Farms

The LVIA excludes other tall infrastructure (masts, substations, grid upgrades). This contradicts GLVIA3 and the Galway Renewable Energy Strategy, both of which require multi-technology cumulative assessment. Cumulative effects are therefore materially understated.

8. Moderate Effects Incorrectly Declared "Not Significant"

The LVIA repeatedly labels Moderate effects—defined in EPA and GLVIA as significant—as "not significant" based on policy acceptance of wind energy. This is improper and contrary to EPA significance definitions.

Conclusion

For the reasons above, the LVIA:

- Fails to meet accepted LVIA standards (GLVIA3, EPA Guidelines),
- Conflicts with the Galway County Development Plan's landscape protection policies,
- Materially understates real effects, and
- Does not provide a safe basis for decision-making.

I respectfully request that An Coimisiún Pleanála give little or no weight to the submitted LVIA and either:

1. Require a full, independent LVIA, including night-time analysis, expanded study areas, and transparent cumulative assessment; or
2. Refuse permission on grounds that the applicant has failed to demonstrate that the development will not significantly harm landscape character and visual amenity, contrary to the proper planning and sustainable development of the area.

I ask An Coimisiún Pleanála to please take the time to investigate the effects of BRA on agriculture and human health. Particularly because of the high amount of agricultural enterprises in and around this proposed site.

Yours Faithfully

Kathleen Connolly

Kathleen Connolly

Enda Mannion

Enda Mannion

Appendix I – Karst

Based on geology alone, the entire area of East Galway is totally unsuitable for the myriad of industrial scale wind farms which are planned for this and surrounding areas. The risk such developments pose to our ground water system and by extension the water supply to our homes and businesses is massive. Factor in the bogland and its unsuitability for turbine construction and the risk rises exponentially. Any pollution or contamination during or after the construction of these turbines poses a risk not only to our ground water but that of the wider area stretching to the Lough Corrib SAC. The construction of mammoth wind turbines on this landscape is a recipe for an ecological disaster. As per usual the developers of these proposed windfarms would have you believe that they can by some miracle avoid any environmental impact to this area and are disingenuous in the usage of their favorite buzzword – "mitigation." That in our view is used cover everything from endangered species to our water sources. Once the damage is done it cannot be "mitigated" much less undone.

Meanwhile they propose to erect 2 turbines within the shared source protection area of the Brierfield Group Water Scheme, the Barnaderg Group Water Scheme and the Mid Galway Public Water Scheme; which alone supplies water to 10,000 homes. The area covered by the 3 schemes in question encompasses an area that stretches from Horseleap Cross to the outskirts of Tuam, Ballyglunin to Athenry, Kiltullagh and Abbeyknockmoy. Meanwhile the Geological Survey of Ireland states very clearly that lowland karst is geologically complex and little understood. It is completely illogical to consider erecting turbines on any site with such a sensitive ecosystem; especially one which is the water source for an extensive area of the county.

Most karst landforms in Ireland are found in the West of Ireland. The nature of the limestone strongly influences its susceptibility to karstification. Pure bedded limestones are more susceptible to karstification and contain more karst landforms than impure (or mud or shale-rich) limestones. Geological structure also has a major influence on the development of karstification: bedding, folding and fracturing of the limestone gives rise to more openings for the water to penetrate and begin to dissolve the rock. The degree of karstification is significantly reduced where there are inter-bedded shale layers which restrict water movement and where very strong deformation causes re-sealing of fractures with crystalline calcite.

The following is taken from the Geological Survey Ireland website and helps explain the importance of karst landscapes and the geological complexity of the East Galway: -

The importance of Karst in Ireland

1. **Karst limestones are important sources of water**
2. **Karst groundwater supports river and lake systems**
3. **Karst aquifers give rise to important ecosystems**
4. **Karst landscapes are important for geo-heritage and tourism**
5. **Karst regions contain sites of archaeological and scientific importance**
6. **Karst limestone is often encountered in civil engineering projects**
7. **Karst limestones are vulnerable to pollution and need special protection measures**

Lowland karsts are the more extensive: approximately 80% of the outcrop of Carboniferous limestone lies at an altitude of less than 100m O.D. and approximately 95% at an altitude of less than 150m O.D. East Galway is lowland karst. The upland, or

plateau, karsts (the Burren and the uplands of Sligo, Leitrim, Cavan and Fermanagh) are located at the margin of the lowland karsts.

The lowlands, particularly west of the River Shannon, are blanked by Quaternary and earlier deposits over much of their extent, with the cover thinning westwards. **Lowland karsts are probably the most developed and complex karst regions of Ireland. Despite the fact that lowland karst underlies many of the most economically significant areas of the country. Areas with the most developed agriculture and the highest demands for water. Its hydrogeology is apparently complicated and is less than fully understood.**

Characteristic of the lowland karsts are:

- **Low hydraulic gradients but with flow rates, typically 50-100 m/h**
- **Numerous springs with discharges of 10-100 l/s and with contributing areas, not always easy to delimit, of tens of km^2**
- **Flow paths from recharge to discharge areas of hundreds of metres, to tens of kilometres**
- **Complicated interactions with surface drainage systems, lakes and rivers**

https://www.gsi.ie/en-ie/programmes-and-projects/groundwater/activities/understanding-irish-karst/karst-in-ireland/Pages/default.aspx

Environmental, Ecological and Economic Significance of Lowland Karst

Lowland karst areas are unique and ecologically significant landscapes that provide a wide array of environmental, economic, and cultural benefits. Their protection is essential for several key reasons: -

Water Supply and Quality

Karst aquifers are important sources of fresh water, serving as vital water supply systems for local communities, agriculture and ecosystems. The unique hydrological properties of karst landscapes allow for high permeability and rapid water movement, making them efficient in capturing and storing groundwater. **An aquifer is a geological formation that can store, transmit and yield water, making it a vital component of the hydrological cycle.** Aquifers are typically composed of permeable materials, such as gravel, sand, silt or fractured rock that allow water to flow through them. They are essential sources of groundwater, which is extracted for various uses, including drinking water, irrigation, etc.
Protection of lowland karst ecosystems helps maintain the quality and quantity of freshwater resources essential for both human and ecological needs.

Key Characteristics of Aquifers

Porosity: this refers to the amount of empty space in the material which can be filled with water. High porosity allows for more water storage.
Permeability: this indicates how easily water can flow through the aquifer material. Highly permeable materials (sand and gravel) allow for rapid water movement, while low-permeability materials (clay) restrict flow

Recharge: Aquifers are replenished through a process called "recharge" which occurs when precipitation, surface water or other sources infiltrate the ground and percolate down into the aquifer.
Water Table: The upper surface of the saturated zone in an aquifer is termed the water table. It fluctuates based on factors such as rainfall, withdrawal rates and seasonal variations.

Confined vs. Unconfined Aquifers

Unconfined Aquifer: This type of aquifer has a water table that is exposed to the atmosphere, allowing water to move freely between the surface and the aquifer. They are typically recharged by rainwater and surface water.
Confined Aquifer: This type of aquifer is sandwiched between layers of impermeable rock or clay which creates pressure within the aquifer. Water in a confined aquifer is often under pressure, which can result in artesian wells where water flows to the surface without pumping.

Importance of Aquifers

Water Supply: Aquifers provide a crucial source of freshwater for drinking water, irrigation and commercial use. In many areas aquifers can be the primary water source.
Ecosystem Support: Ground water from aquifers contributes to the health of rivers, lakes, wetlands and other ecosystems, especially during dry periods, helping to maintain ecological balance.
Drought Resilience: Aquifers serve as natural reservoirs that can be tapped during droughts, providing a buffer against fluctuations in surface water availability.
Economic Value: Sustainable management of aquifers is vital for agriculture, tourism and local economies. Large scale construction projects on karst risk altering the water flow, affecting the hydrology of the karst system and the quality and supply of water.

Biodiversity Conservation

Lowland karst regions often host diverse ecosystems with numerous plant and animal species, some of which are endemic or specialised to these environments. The complex habitat formed by limestone formations, sinkholes and caves can support unique communities of flora and fauna, including rare and threatened species. Turloughs are a unique type of temporary wetland found primarily in karst limestone regions, particularly in Ireland. Turloughs are characterized by their seasonal nature, filling with water during rainy periods and drying out in drier seasons. This dynamic environment allows for the growth of different plant communities at different times, which enhances biodiversity. Turloughs support a diverse range of flora and fauna, including many species that are specially adapted to the fluctuating water levels. These wetlands provide habitats for various birds, amphibians, invertebrates, and aquatic plants. The seasonal flooding and drying of turloughs play a crucial role in nutrient cycling. During wet periods, organic matter is broken down, and nutrients are released into the water, supporting aquatic life. Wetlands associated with karst depressions (such as turloughs in Europe or seasonal karst wetlands globally) act as natural floodplains. They slow, spread, and absorb water, further reducing flood intensity while supporting unique biodiversity.
Turloughs act as natural water management systems. They can absorb excess rainfall, helping to reduce flooding in adjacent areas. During dry spells, they help to recharge local groundwater supplies. In limestone regions, turloughs contribute to the replenishment of underground aquifers by allowing water to percolate through the soil and rock layers. Research by the EPA shows that turloughs in Ireland act as natural flood attenuation systems; temporarily storing

water during wet seasons and draining later via karst conduits. Disturbing them may reduce their capacity to buffer floods, with knock-on effects for downstream hydrology. By their very nature these systems are extremely vulnerable to contamination and pollution.
Many turloughs are located in agricultural areas. The unique wetlands can provide natural grazing grounds for livestock during certain times of the year. Overall, turloughs are critical components of the karst limestone landscapes, contributing to ecological diversity, managing water resources, and offering cultural and economic benefits. Their conservation is essential for maintaining the health of these unique environments. Protecting lowland karst areas helps to conserve biodiversity, which is crucial for the overall health and resilience of the ecosystem.

Geological Heritage

Lowland karst areas often boast striking geological formations, including caves, sinkholes, turloughs and underground rivers. These landscapes reflect both the history of the Earth and the process that shape our environment. They provide opportunities for scientific research, education and geological studies, enhancing our understanding and knowledge of the geological processes that helped form our world.

Ecosystem Services

Karst regions provide numerous ecosystem services, such as carbon sequestration, nutrient cycling and soil formation. Vegetation in these areas contributes to carbon storage thereby mitigating climate change impacts. Additionally healthy karst ecosystems help filter pollutants and manage water flow, reducing the risk of flooding and enhancing watershed protection.

Cultural and Historical Significance

Many lowland kart areas are steeped in cultural and historical significance, with archaeological sites, traditional practices and local folklore tied to the landscape. Protecting these areas can help preserve cultural heritage and promote local identity thus contributing to community well-being and pride.

Tourism and Recreation

Karst landscapes often attract tourists for their natural beauty and recreational opportunities, e.g. hiking, caving and sightseeing. Responsible tourism can provide economic benefits for local communities. There is huge untapped potential in East Galway with regard to this, both from a tourism and educational perspective. This is especially so given that the vast majority of people are unaware of the existence of lowland karst and its importance in our daily lives. The protection of lowland karst regions would ensure that these natural attractions remain viable for future generations.

Research and Education

Lowland karst areas are invaluable for scientific research and education, particularly in fields such as geology, hydrology, biology and environmental science. Studying these landscapes can yield important insights into ecosystem function and biodiversity conservation.

Mitigation Measures proposed by the developers and the ensuing risks of same

1) Choking

Well preserved karst ecosystems can serve as important buffers against climate change impacts. Their ability to regulate water flow and storage makes them critical for maintaining hydrological stability, especially in the face of extreme weather events. The infilling of sinkholes and damage or collapse due construction on karst landscapes drastically reduces infiltration capacity. When sinkholes are blocked or modified, storm water resurfaces elsewhere—often unpredictably and violently. ***Among the actions mentioned by MKO in its planning documents is "choking" the throat of sinkholes i.e. blocking or infilling them with stones or other materials. "Choking with coarse granular fill, and progressive backfilling upwards with progressively finer granular fill. All backfill is to be placed in layers 150mm deep and compacted. Soil around the sinkhole is to be excavated to a radius of 3-5m, before being replaced and compacted".***
Choking is one method by which the destruction of the karst ecosystem is proposed.

I ask you to seriously consider the impact and risks involved in such actions on an environment and ecosystem that relies on permeability to function and to please take in account the impacts that will occur for the communities who depend on this complex system for their water supply.

Choking or blocking sinkholes in a karst ecosystem can lead to **increased groundwater contamination**, as surface pollutants are prevented from naturally filtering through the system and can instead accumulate. It also disrupts the natural **hydrological cycle**, potentially causing **localized flooding** and altering downstream water supplies, while impacting the natural **geomorphology** and **biodiversity** that rely on these features.

Environmental consequences

- **Groundwater pollution:** Blocking sinkholes prevents natural filtration, causing pollutants like fertilizers, pesticides, and waste to become concentrated at the surface and seep directly into the aquifer. This can contaminate drinking water sources for humans and livestock.
- **Disrupted hydrological cycle:** Sinkholes are natural conduits for water to enter the subsurface. Blocking them can lead to a build-up of surface water, causing localised flooding in areas that would normally drain naturally. This can also disrupt the flow of water to downstream springs and rivers, **affecting water supply for communities and agriculture.**
- **Damage to ecosystems:** Many unique species and habitats are specifically adapted to karst environments and rely on the features provided by sinkholes and caves. Blocking these features can destroy these specialized ecosystems.
- **Increased instability:** While it might seem counterintuitive, filling sinkholes can create more instability. It can lead to an uneven distribution of weight and pressure on the underlying rock, potentially increasing the risk of sudden, catastrophic collapses elsewhere.

Consequences for humans and infrastructure

- **Risk to infrastructure:** Blocking a sinkhole can force surface water to find a new path, which could include flowing into a nearby building's foundation or other infrastructure causing damage or flooding.

- **Economic impacts:** A disruption to the water supply can severely impact the agricultural economy in areas heavily reliant on a consistent water source, as seen in some regions dependent on a specific stream that feeds into a sinkhole system.
- **Long-term hazards:** The practice can mask the true extent of the karst system, leading to the development of buildings and infrastructure in areas that are still unstable. When the blockage fails, it can lead to sudden and catastrophic subsidence, potentially causing property damage and injury.

2) Grouting

MKO & Neon also propose "grouting" as a way to deal with the inconvenient karst that lies beneath all of East Galway. Grouting in karst terrains consists of the pressurised injection of mortar and grouting suspensions into the rock through drilled holes to alter the physical characteristics of the karst formation. **The ingredients used in this procedure include cements, bentonite, clay, sand, additives i.e. chemicals. Polyurethane foam grouting or grouting with asphalt or hot bitumen are other methods that may be employed under the term "grouting**."

"Injection of different kinds of grout materials very often means the rapid and massive introduction of possible pollutants, which can cause terrible and long-lasting pollution of the karst subterranean environment. Grout is injected under high pressure, and for this reason, it is not possible to control its spread through the karst underground." *Negative impacts of grouting on the underground karst environment, Dec 2000 Ognjen Bonacci, University of Split, Tanja Roje-Bonacci, University of Split and Sanja Gottstein University of Zagreb.*

Consider if you will the turning on of your household taps and the prospect of said chemical pollutants having leached into your water supply. By their own admission MKO/Neon state there is potential for contamination and pollution of the aquifer.

"Pressure grouting can be employed to stiffen soil over limestone and prevent its suffusion into fissures, to fill localised fissures, and to stabilise fractured rock. It is worth noting that the injection Geotechnical Karst Risk Assessment GDG | Cooloo Wind Farm | 22098-R-03-02 Page 46 of 118 of ***a fluid grout can result in significant losses into adjacent caves before sealing karstic fissures.*** *The detailed designer/contractor shall consider which grouting method would be most appropriate and the* ***potential negative consequences for contamination and pollution of the aquifer."***

They however will of course state that they can "mitigate" the consequences. They will not be drinking the water from either of the Group Water Schemes or Mid Galway Water Supply.

Underground Habitat and Ecosystems

"Underground karst features provide a habitat for many protected groundwater-dependent ecosystems. All anthropogenic activities, especially massif grouting, could be extremely detrimental for the ecosystems. Speleothems will not grow and are not formed when grouting forms an unconsolidated layer.
Underground karst features provide a habitat for many protected groundwater-dependent ecosystems. All anthropogenic activities, especially massif grouting, could be extremely detrimental for the ecosystems. Speleothems will not grow and are not formed when grouting forms an unconsolidated layer.

Grouting may have deleterious effects on karst areas, and alter the vegetation understorey. Watson *et al.* (1997) emphasised that timescales for karst revegetation are extremely long compared with other systems, and in practice may be impossible.
Mangin (1973) defines "epikarst" as a surface aquifer within a karst massif, implying that it is a perched aquifer capable of some storage of percolated water. It is a fundamental ecotonal area (Vervier and Gibert, 1991; Gibert *et al.*, 1997; Zambo, 2004; Williams 2008; Bonacci *et al.*, 2009 etc.) An unsaturated or vadose zone separates it from the deeper karst aquifer.
Epikarst plays a particularly important role in the transport and storage of water, and its biological importance is crucial for the karst system as a whole, especially in subterranean areas. Pipan (2005) and Pipan and Culver (2007) show that there is an exceptionally rich aquatic fauna within and a high level of ecological specialisation.
During grouting works, very often the first step is the removal of the epikarst and the highly organic surface soil, causing isolation of the subterranean environment and a drop in the essential energy input rate." *Negative impacts of grouting on the underground karst environment, Dec 2000 Ognjen Bonacci, University of Split, Tanja Roje-Bonacci, University of Split and Sanja Gottstein University of Zagreb.*

''Learning to understand the systematics of karst terrain and how to deal with it safely requires serious effort—often a lifetime of study.'' This means, in other words, that man must make a strong effort to learn to live ''in harmony with'' karst, rather than to live ''on'' karst. Many problems we face when interacting with karst environments are best solved through changes in human systems rather than through alterations of karst environments. This is because subtle changes in fragile karst systems change them significantly. Because karst covers 10 to 20% of the earth's surface and provides 40 to 50% of the world's drinking water (Ford and Williams, 2007), it requires a specific approach to mitigate negative human impacts and allow sustainable development. In this sense, protection of karst groundwater is essential in many countries. Karst hydrologic systems are highly vulnerable to pollution, water withdrawals, and changes in land use (Bakalowicz, 2005; Calo` & Parise, 2009). In addition, the dissolution of limestone creates voids in the subsurface that can lead to collapses that directly affect the built environment by inducing severe damage, property loss, and disruptions to daily life. Management of karst environments is a very delicate matter, and how to manage pollution, karst hazards, and human impacts on karst landscapes is a question worthy of discussion (White, 1990; Parise and Pascali, 2003). Many populated areas of the world obtain drinking water from karst aquifers, and numerous urban areas are underlain by karstified bedrock. Consequently, karst systems pose a number of engineering and environmental problems (Calembert, 1975; Legrand, 1984; Ford, 1993; Williams, 1993; Johnson and Neal, 2003) that are continuously increasing as development extends over these areas. Building on cavernous bedrock and sinkhole-prone areas is a challenging issue for geoscientists and engineers (Waltham et al., 2005; Del Prete et al., 2010); appropriate management of karst areas has to carefully take into account the possibility of the presence of underground voids of both natural and anthropogenic origin."
Karst Environments: Problems, Management, Human Impacts, And Sustainability An Introduction To The Special Issue
Robert Brinkmann 1 and Mario Parise 2

Irish karst systems support various life forms, including specialized invertebrates that are unique to these environments, as well as species that use the caves for temporary shelter. These life forms range from creatures that spend their entire lives underground to those that use the karst landscape for part of their life cycle.

Examples of life forms found in Irish karst systems

- **Invertebrates:**

- Cave crickets, centipedes, and spiders are common in these habitats.
- Some specialized invertebrates, like the small-eyed crab, can be found in the deeper parts of the systems.

- **Vertebrates:**
  - **Bats:** Many species use karst caves for roosting or hibernating, using the stable environment to their advantage.
  - **Eels:** These are abundant in the aquatic karst systems.
- **Surface-dwelling animals:**
  - Some surface animals, such as deer, may use sinkholes or cave entrances for shelter from extreme temperatures.

Ecosystem classification

- **Troglobites:** Creatures that spend their entire lives underground and are highly specialized to the karst environment.
- **Troglophiles:** Species that can live and reproduce in the cave environment, but are also capable of living outside of it.
- **Trogloxenes:** Animals that use the caves for specific purposes, such as shelter or hibernation, but live most of their lives on the surface.
-

Research and future studies

- While the presence of life is evident, a lot more is still to be learned about the biodiversity within these systems.
- Future research may help better understand the factors that influence the differences in invertebrate fauna within different turloughs.

This is evidence of the rich and often overlooked ecological environment existing within a karstic area. We are constantly told of the importance of biodiversity to the overall health of the planet. Why then are we allowing its indiscriminate ruination by companies whose only interest is monetary gain?

3) Drainage

Drainage control is identified by Waltham (2009) as the single most important mitigation measure. *Surface and subsurface drainage systems will be designed to prevent water ingress into karst features, reducing the potential for solutional enlargement and subsidence. This includes the installation of sub-drainage systems, the use of impermeable liners or membranes, and pumping and dewatering during construction. Uncontrolled lowering of the water table during construction can lead to sinkhole collapse or the initiation of new sinkholes (Waltham et al., 2005).*

MKO/Neon also propose drainage as one of their "mitigation" methods or should I say destruction methods. Following on back of their previous 2 propositions this I assert will be the final nail in the coffin of the karst ecosystem; having choked it, grouted and poisoned it with the chemicals used in the grouting process; they then resolve to drain the system; thereby irrevocably altering the water flow and damaging the water table. At what point are we going to call halt to the destruction of this precious, highly sensitive and vulnerable environment? At what point do we decided that healthy, thriving communities and ecosystems are of more importance than the latent greed of these developers?

Rather than the ensuing decimation of the environment and ecology that will occur should this windfarm be granted planning permission it is my contention that protecting these areas is an essential part of building climate change resilience for both natural ecosystems and human communities. I would also point out that said developers have not a shred of care for either,

for them this is purely an exercise in monetary gain. Rest assured they will not be the ones living with the resultant consequences.

Potential Impacts of Windfarm Construction

The construction of gargantuan wind turbines and vast number windfarms now being proposed for various areas in East Galway are a major source of apprehension. Large-scale industrial wind turbines are being promoted as clean, renewable energy solutions with scant regard for the irrevocable environmental damage resulting from their construction. Their construction on or near sensitive lowland karst regions (limestone terrain characterized by caves, sinkholes, turloughs, and subterranean drainage) will produce significant and irreparable environmental damage. The substantial land clearing required will disturb sensitive local ecosystems and disrupt habitats for wildlife. This is of particular concern in lowland karst regions where sensitive species may rely on specific habitats that will be fragmented and/or destroyed.

Land modification for turbine placement and access roads will disrupt natural water pathways, leading to changes in surface runoff and flooding in sinkholes and other drainage points. This alteration will affect the hydrology of karst systems resulting in the degradation of water quality and quantity. Karst terrains have highly interconnected underground conduits, swallow holes (estavelles), and fissures. Constructing turbine foundations, access roads, and infrastructure can disrupt these flow-paths, changing the way water moves through the karst aquifer. Such disturbance may lead to degradation of water quality, loss of spring flows, or even destabilization of subterranean voids.

The use of heavy machinery during the construction phase will lead to soil compaction and increased erosion. In karst regions overlaid by soft soils like peat, heavy infrastructure may destabilize the ground. While most high-profile peat-slide cases in Ireland (e.g., the Derrybrien landslide in 2003) are peat rather than karst in the strictest sense, they illustrate the risk when building large turbines on complex, unstable ground. Compacted soils will restrict groundwater recharge, harm vegetation, destabilise slopes and reduce the land's ability to absorb water, exacerbating runoff and erosion problems. Construction activities and maintenance of wind turbines introduces further pollution risks, including fuel spills, lubricants and other hazardous materials that will contaminate soil and water supplies in karst regions. These are particularly vulnerable due to their unique and complex hydrology. Karst systems are extremely vulnerable to contamination because pollutants enter aquifers rapidly. This links directly to environmental law because poor water quality management in karst regions undermines both public health and ecosystem function.

Environmental Law and the Protection of Lowland Karst

Environmental law plays an essential role in preserving the flood-mitigation capacity of karst systems. Several legal frameworks—international, regional, and national—support their protection either directly or indirectly.

1. Water Management and Flood-Risk Legislation

- The EU Floods Directive (2007/60/EC) requires Member States to assess and manage flood risks using natural retention measures. The Directive explicitly encourages

integrated catchment-based planning, which includes the protection of natural infiltration and storage zones typical of lowland karst.

- The EU Water Framework Directive (2000/60/EC) promotes the protection of groundwater bodies—including karst aquifers—by requiring states to maintain or improve water quality and hydrological function.

2. Wetlands and Habitat Protection

The Ramsar Convention on Wetlands recognizes certain karst wetlands (e.g., turloughs) as priority conservation areas, indirectly protecting their hydrological flood-control function. **The Ramsar Convention** is an international treaty for the conservation and wise use of wetlands, adopted in 1971 in Ramsar, Iran. Its main goals are to halt the worldwide loss of wetlands and conserve remaining ones through national actions and international cooperation. Key commitments include designating "Ramsar Sites" of international importance and ensuring their effective management, and cooperating internationally on shared wetlands. The convention defines wetlands broadly to include a wide range of ecosystems, such as **lakes and rivers, underground aquifers, swamps, marshes, wet grasslands and peatlands. As Ireland is a signatory to the Ramsar Convention and has been a contracting party since it entered into force in the country on March 15, 1985; it is our contention that rather than allow development of windfarms on the lowland karst of East Galway our government should instead declare these unique, fragile and vitally important ecosystems protected under the Ramsar Convention. By not doing so our government is failing in its obligations as a signatory to the said convention.**

National habitat laws—such as the EU Habitats Directive (92/43/EEC), and various biodiversity protection statutes safeguard karst ecosystems because of the rare and sensitive species they host.

3. Groundwater Protection Laws

Many national and EU water acts regulate discharges that might pollute or alter karst groundwater e.g. the Water Frame Work Directive 2000/60/EC, the Groundwater Directive 2006/118/EC, the Environmental Quality Standards Directive 2008/105/EC and the Nitrates Directive 9/676/EC Because karst is hydrologically sensitive, regulators often impose stricter controls, which also support the integrity of flood-management functions.

4. Land-Use Planning and Environmental Impact Assessment

Environmental Impact Assessment (EIA) requirements in most jurisdictions (e.g., under the EU EIA Directive or national planning acts) compel developers to evaluate the hydrological consequences of building on karst. **These assessments frequently highlight the increased flood risk caused by blocking sinkholes or altering karst drainage.**

Toward Better Governance of Lowland Karst

To maximize the natural flood-management value of karst systems, governments and planners can adopt several policy strategies:

- Integrate karst mapping into national flood-risk assessments.
- Designate key karst recharge zones as protected areas or "no-build" zones.
- Ban the construction of large industrial scale windfarms on both lowland and upland karst areas.
- Restore degraded karst wetlands and reopen blocked sinkholes.
- Incorporate nature-based solutions into flood-management infrastructure.
- Strengthen groundwater protection standards in karst basins.

These actions align closely with existing environmental law principles, such as the precautionary principle, sustainable development, and ecosystem-based management.

Conclusion

Lowland karst landscapes are indispensable natural infrastructures for flood management. Their ability to absorb, store, and regulate water flow reduces flood risks and enhances climate resilience. Environmental law through water protection statutes, flood-risk directives, wetland treaties, and land-use regulations provides essential mechanisms for safeguarding these sensitive terrains. As climate change intensifies, recognising and legally protecting the hydrological functions of lowland karst is not merely an environmental priority but a societal necessity. The protection of lowland karst areas is crucial for the preservation of biodiversity, ensuring water supply, maintaining ecological integrity and safeguarding cultural heritage. The value of lowland karst transcends immediate economic benefits, contributing to the broader health and biodiversity of our country and the planet. Karst landscapes cover approximately 10-13% of the Earth's land surface, and about a quarter of the world's population depends on them for their water supply. Despite their relatively small global footprint, karst aquifers are a crucial source of freshwater for a large percentage of people.
Karst landscape coverage: Karst topography covers an estimated 10–13% of the Earth's land surface.

Dependence on karst water: Around 25% of the world's population relies on karst water sources for their drinking water.

Importance: Karst aquifers are a vital source of freshwater for millions of people, though they are particularly vulnerable to pollution because water can flow through them quickly and with little natural filtration.

Investing in the protection of these areas, rather than allowing their destruction through industrial-scale windfarm construction, will ultimately support resilience, sustainability and the inter-connectedness of human and natural systems.

I would also point out that East Galway is home to thriving communities and these turbines of monumental proportions are being driven through the heart of our communities. It is common practice for these developers to paint our areas as barren with poor quality land and sparsely populated while nothing could be further from the truth. They rely on the readers of these submissions being unfamiliar with the areas in question. I would also point out that the planning regulation with regard to turbine height and proximity to dwelling houses has NOT been upgraded to take account of the height and rotor span of those now being proposed. The turbines now being proposed for construction in this area and others are of a scale that more recently was only seen off the coast. Nothing comparable to them exists anywhere on this island. Consider that this rush to cover East Galway in turbines is more to do with their fear of those regulations being updated. At the moment there are 17 windfarms of gargantuan scale and size proposed for this general area, consider the impact of that on a rural area. We will be living encircled by a palisade of mammoth turbines. Would you the reader wish to live in this manner? At the very minimum all construction should be paused until the regulations pertaining to the construction of windfarms are thoroughly updated in consultation with the people directly affected. Also consider the vast numbers of homes, schools; nursing homes and businesses whose water supply is dependent on karst aquifers. Everyone takes it for granted that the water issuing from our taps is safe to use and drink. Clean safe drinking water

is a basic human right and one that we have become increasingly blasé about. Can you countenance the slightest risk of toxic chemicals entering our water supply?

Appendix II – Battery Energy Storage System (BESS)

What the Cooloo Windfarm NIS currently says about battery storage
Section 2.2.1.10 describes the BESS as:

- 15 steel containers + 6 power supply units adjacent to the 110 kV substation.
- Containers housing *"the batteries, inverters, transformers, fire suppression equipment and associated electrical components"*.
- Containers on concrete plinths and spaced to allow airflow for climate control.
- Compound with security fence, lightning protection poles, and continuous remote monitoring in tandem with the overall development.

Natura Impact Statement
Elsewhere the NIS has detailed mitigation for hydrology/pollution (sediment, hydrocarbons, cement, wastewater, drainage design, etc.), but nothing specific to BESS firewater or electrolyte – it treats "hydrocarbons" and concrete as the key chemical risks, not battery-related fire products.
So in short:

- Fire suppression is *acknowledged* (there is equipment),
- But the nature of the fire risk and extinguishing strategy is not actually described.

We must ask ourselves if the criteria on fire risk and extinguishing "correct" / sufficient?
1. Fire risk identification
For a modern grid-scale BESS, you'd normally expect, at minimum:

- Identification of battery chemistry (e.g. lithium-ion) and key hazards (thermal runaway, toxic/flammable gases, explosion overpressure).
- A basic scenario description: internal cell failure, propagation between racks/containers, impact on adjacent containers and substation equipment.
- Reference to relevant fire safety design standards (e.g. separation distances, fire resistance of enclosures, access for fire service).

The NIS does not set out any of this – it only mentions:

- Fire suppression equipment is present in the containers.
- Containers are spaced for airflow and climate control.
- Lightning protection and general remote monitoring.

Natura Impact Statement
From a fire safety / risk criteria perspective, that's very high-level and would not, on its own, be considered a complete treatment of BESS fire risk. You'd expect the detailed criteria to sit

in a Fire Safety Strategy or BESS-specific design report – but they're not even summarised or cross-referenced here.

2. Extinguishing approach and environmental protection
For Natura / hydrological impact, the *critical* issue in a BESS fire is what happens to firewater and contaminated runoff, not just that "fire suppression equipment" exists.
You would normally expect the document to state things like:

- What extinguishing media are expected (e.g. water, water mist, foam, inert gas, aerosol, or a strategy of controlled burn with containment).
- That the BESS compound is on an impermeable surface with:
    - Bunds or kerbs around the compound, and
    - Dedicated drainage/containment (sump or tank) isolated from the general site drainage, sized for worst-case firewater/electrolyte release.
- That any captured firewater will be tankered off-site as hazardous waste, with no direct discharge to drains, watercourses, or ground.
- How these measures protect downstream receptors (in this case, hydrological connections to Lough Corrib SAC/SPA).

In this NIS:

- There is no discussion at all of:
    - Firewater or electrolyte runoff from a BESS fire,
    - Whether suppression systems are water-based or otherwise,
    - Any special containment or isolation of BESS drainage from the wider site system.
- All the hydrology mitigation is framed around sediment, hydrocarbons, cement products, and construction drainage, not BESS fire events.

So from the point of view of "correct criteria regarding fire risks and extinguishing of a fire", we believe the current text is not sufficient. It acknowledges the presence of fire suppression but does not specify criteria that show how a fire (and its extinguishing) will be managed to protect the environment / European sites.

What we would recommend adding or requiring
You don't necessarily need all the engineering detail in the NIS itself, but you *do* need to show that appropriate criteria exist and that they protect the Natura interests. Practically, I'd look for something along these lines:

1. Explicit recognition of BESS fire hazard
    - The battery type and main fire characteristics (thermal runaway, toxic gases, contaminated runoff).

- Confirm that BESS design complies with relevant fire safety codes and guidance (e.g. international BESS standards and Irish fire authority requirements).

2. Design / layout criteria for fire safety
   - Minimum separation distances between containers and between the BESS and:
     - Substation equipment,
     - Site boundary and public access,
     - Sensitive habitats / drainage features.
   - Confirmation of non-combustible construction of containers and hardstand.
   - Provision of adequate emergency access for the fire service (access routes, turning, clearances).
3. Fire suppression / firefighting criteria
   - Description of the fire detection and alarm (multi-stage detection, remote monitoring, automatic trip/isolation).
   - High-level description of the suppression concept:
     - Is it container-internal (e.g. gas/aerosol) with the aim to limit water use?
     - What is the expected role of the local fire service (active water cooling vs defensive approach)?
   - Confirmation that the design has been, or will be, agreed with the local fire authority.
4. Environmental protection during a fire
   - Statement that the BESS compound is fully bunded / kerbed and surfaced with impermeable pavement.
   - A dedicated drainage and containment system for the BESS area:
     - Normally closed valves,
     - Sumps/tanks sized for a defined worst-case volume of firewater + electrolyte,
     - No uncontrolled overflows into site drains or watercourses.
   - Commitment that all contaminated firewater and residues will be collected and removed off-site, not discharged to groundwater or surface water.
   - Brief linkage back to the hydrology/Natura assessment, stating that these measures ensure that a BESS fire will not lead to significant effects on Lough Corrib SAC/SPA.
5. Emergency response planning
   - Reference to a site-specific Emergency Response Plan covering:

- BESS fire scenarios,
- Notification and coordination with the fire service,
- Procedures for isolating drainage and protecting nearby drains/watercourses.

Bottom line

- The current Battery Storage section only states that fire suppression equipment will be present and that the site is monitored.

Natura Impact Statement

- It does not set out meaningful criteria for:
  - How BESS fire risks are managed, or
  - How extinction of a fire (and the resulting runoff) is controlled to protect hydrology and Natura sites.

So as it stands, I'd say the criteria around fire risk and firefighting are incomplete, and the bord should push for either:

- Additional text in the NIS itself, or
- A clear cross-reference to a Fire Safety / BESS design document that includes the kind of points listed above, with a short Natura-focused summary inserted here to close the loop.

One point of note, I found *no publicly available evidence* that the Galway fire service has specialist training or equipment explicitly for large-scale lithium-ion BESS fires, such as remote cooling systems, large foam/insulating agents, special drainage/firewater containment strategies, or suppression strategies tailored to BESS.
Could the board ask Galway Fire Service to confirm that GFRS has been consulted about the BESS (site, container layout, battery chemistry) and that there is a site-specific Fire Safety Strategy / BESS Fire Response Plan.
Could the board also ask whether GFRS has been provided the plan of the battery storage facility, access routes, water supply, hydrants, containment of firewater and hazardous runoff.

Human health effect of a battery storage fire

1. Public-health dangers from a battery storage fire

Although the NIS does not discuss BESS fire risks, we have identified the accepted scientific / industry-recognised public-health hazards of a large-scale lithium-ion battery fire:

A. Toxic and corrosive gases
A BESS thermal-runaway fire can release:

- Hydrogen fluoride (HF)
- Carbon monoxide
- Hydrocarbons / volatile organic compounds
- Dense particulates and smoke

Hydrogen fluoride (HF) is particularly dangerous because inhalation, even at low concentrations, can cause severe respiratory injury, eye damage, and long-term pulmonary effects.

B. Explosion / overpressure
Battery containers can release flammable gases before ignition. If unvented, these can explode, producing:

- Blast overpressure
- Flying debris
- Sudden ignition fireball

This presents danger to nearby workers, the public, and emergency responders.

C. Toxic firewater runoff
Water used to cool battery fires becomes contaminated with:

- Electrolyte (organic solvents)
- Heavy metals
- Fluoride salts and HF derivatives

Uncontained firewater entering streams or groundwater is both an environmental hazard and a public-health hazard (via drinking-water pathways, livestock exposure, etc.).

D. Secondary fires
BESS fires can spread to:

- Adjacent battery containers
- Substation transformers
- Cables / inverters

Secondary fires can escalate the incident and increase public exposure to smoke, fumes and environmental contamination.

E. Long-duration events
Battery fires can burn for hours to days, depending on container size and chemistry. Long-duration smoke plume exposure increases public-health risk for nearby residents.

2. What the NIS says about protecting public health
Important conclusion:
The NIS contains no assessment at all of BESS fire-related public-health risks, and it provides no public-health mitigation measures relating to battery fires.
Here is what the document does include:
What the NIS *does* mention
The only reference to the BESS is a physical description:

- 15 steel containers, power supply units, climate-control, fire suppression equipment, concrete plinths, spacing, fencing, security, and monitoring.

Natura Impact Statement
It contains:

- No reference to toxic gas release

- No reference to explosion hazard
- No reference to firewater containment for BESS
- No emergency-response coordination with fire services
- No measures addressing risk to nearby homes, public roads, or sensitive receptors

What is *missing*: Public-health protection

A. No assessment of BESS fire emissions
There is no discussion of toxic gases, smoke, HF, or particulates from a BESS fire, even though these are the primary public-health hazards.

B. No firewater containment for the BESS
The NIS has extensive mitigation for:

- Sediments
- Hydrocarbons
- Cement
- Drainage
- Wastewater

But the NIS contains no measures whatsoever for containing or treating contaminated firewater from a battery fire.

C. No buffer zones or separation distances to protect people
There is no stated separation distance or blast / smoke hazard standoff between the BESS and:

- Public access routes
- Homes
- Sensitive external receptors

This would normally form part of a public-health safety strategy.

D. No emergency planning relating to BESS fire
The NIS includes emergency plans only in relation to:

- Hydrocarbon spills
- Construction hazards

Natura Impact Statement
There is no emergency plan for a BESS thermal-runaway event, nor for protecting:

- Firefighters
- Local residents
- Workers on site

E. No assessment of air-quality impacts from a BESS fire
The NIS focuses entirely on water quality and ecological impacts, not on air quality at all.

There is no modelling of:

- Smoke plume
- Toxic gases
- Acute exposure risk

F. No human receptors analysis

The NIS is an ecological assessment. It does not consider:

- Human health
- Public safety
- Vulnerable groups

This is a significant omission given that BESS fires are well known to pose very serious human-health risks.

Case C-461/17 Holohan v. An Bord Pleanála

The Holohan case, decided by the Court of Justice of the European Union (CJEU), confirms that the assessment required under the Habitats Directive (known as Appropriate Assessment, or AA) must be complete, precise, and definitive. If the BESS component, due to its lack of detail, introduces an unassessed or unmitigated risk (e.g., chemical run-off, firewater contamination) that could affect a nearby Natura 2000 site (like a Special Protection Area (SPA) or Special Area of Conservation (SAC)), then the AA/NIS would be deemed legally deficient under the principles of the Holohan judgment.

The planning authority cannot lawfully grant permission based on an incomplete assessment.

Appendix III – Silt Fencing Research

water

MDPI

Article

Performance Evaluations of Three Silt Fence Practices Using a Full-Scale Testing Apparatus

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Abstract: Erosion and sediment controls on construction sites minimize environmental impacts from sediment-laden stormwater runoff. Silt fence, a widely specified perimeter control practice on construction projects used to retain sediment on-site, has limited performance-based testing data. Silt fence failures and resultant sediment losses are often the result of structural failure. To better understand silt fence performance, researchers at the Auburn University-Erosion and Sediment Control Testing Facility (AU-ESCTF) have evaluated three silt fence options to determine possible shortcomings using standardized full-scale testing methods. These methods subject silt fence practices to simulated, in-field conditions typically experienced on-site without the variability of field testing or the limited application of small-scale testing. Three different silt fence practices were tested to evaluate performance, which included: (1) *Alabama Department of Transportation (ALDOT) Trenched Silt Fence*, (2) *ALDOT Sliced Silt Fence*, and (3) *Alabama Soil and Water Conservation Committee (AL-SWCC) Trenched Silt Fence*. This study indicates that the structural performance of a silt fence perimeter control is the most important performance factor in retaining sediment. The sediment retention performance of these silt fence practices was 82.7%, 66.9% and 90.5%, respectively. When exposed to large impoundment conditions, both *ALDOT Trench* and *Sliced Silt Fence* practices failed structurally, while the *AL-SWCC Trenched Silt Fence* did not experience structural failure.

Keywords: construction; erosion; full-scale testing; sediment barrier; sediment control; silt fence; water quality

1. Introduction

Impairments caused by off-site discharges of sediment-laden stormwater from construction sites is one of the most critical environmental problems faced by nearby waterbodies due to increases in turbidity and sedimentation [1]. Sedimentation occurring in waterways and storm sewers decreases flow capacity which can result in localized flooding, retardation of vegetative growth, and decimation of fish spawning areas [2]. The United States (US) Federal Government recognized the detrimental effects caused by stormwater runoff in general, and sediment discharge specifically, from construction sites. The US Congress passed the Clean Water Act in 1972 and the Water Quality Act of 1987 in response to these concerns resulting in significant change regarding environmental management methods used in the construction industry [3,4].

Erosion and sediment control (ESC) practices (i.e., diversion swales, erosion control blankets, sediment basins, perimeter controls, etc.) are routinely specified by designers to minimize stormwater runoff-related pollution. Construction site boundaries are typically enveloped by perimeter control

Appendix IV - Silt Fencing research paper 2

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Review

On the apparent failure of silt fences to protect freshwater ecosystems from sedimentation: A call for improvements in science, technology, training and compliance monitoring

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ABSTRACT

Excessive sedimentation derived from anthropogenic activities is a main factor in habitat and biodiversity loss in freshwater ecosystems. To prevent offsite movement of soil particles many environmental regulatory agencies mandate the use of perimeter silt fences. However, research regarding the efficiency of these devices in applied settings is lacking, and fences are often ineffective due to poor installation and maintenance. Here, we provide an overview of the current state of research regarding silt fences, address the current culture surrounding silt fence installation and maintenance, and provide several recommendations for improving the knowledge base related to silt fence effectiveness. It is clear that there is a need for integrated long-term (i.e., extending from prior to fence installation to well after fence removal) multi disciplinary research with appropriate controls that evaluates the effectiveness of silt control fences. Through laboratory experiments, *in silico* modelling and field studies there are many factors that can be experimentally manipulated such as soil types (and sediment feed rate), precipitation regimes (and flow rate), season, slope, level of site disturbance, fence installation method, type of fence material, depth of toe, type and spacing of support structures, time since installation, level of inspection and maintenance, among others, that all require systematic evaluation. Doing so will inform the practice, as well as identify specific technical research needs, related to silt fence design and use. Moreover, what constitutes "proper" installation and maintenance is unclear, especially given regional- and site-level variation in precipitation, slope, and soil characteristics. Educating and empowering construction crews to be proactive in maintenance of silt fencing is needed given an apparent lack of compliance monitoring by regulatory agencies and the realities that the damage is almost instantaneous when silt fences fail. Our goal is not to dismiss silt fences as a potentially useful tool. Instead, we question the way they are currently being used and call for better science to determine what factors (in terms of fence design, installation and site-characteristics) influence effectiveness as well as better training for those that install, maintain and inspect such devices. We also encourage efforts to "look beyond the fence" to consider how silt fences can be combined with other sediment control strategies as part of an integrated sediment control program.

Contents

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