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12th March 2026

Our reference: 6460/400/405/AOG

An Bord Pleanála,
64 Marlborough Street,
Dublin 1,
D01 V902.

RE: First Party Appeal (ACP Ref: ABP-322743-25 and Cork County Council Ref: P25/00142) for an eight turbine wind farm, met mast and associated infrastructure at An tSeithe Beag (Shehy Beg), Gortloughra, Cloghboola and Inchinroe, Co. Cork

Consideration of Request for Further Information (RFI) – Soils and Geology Point 1

Dear Sir/Madam,

On behalf of our client, Gortloughra Wind Farm Limited, we submitted an application to Cork County Council on 20th March 2025 (Cork County Council Ref: P25/00142) for an eight turbine wind farm, met mast and all associated infrastructure, located in the townlands of An tSeithe Beag (Shehy Beg), Gortloughra, Cloghboola and Inchinroe, Co. Cork.

Cork County Council issued a decision to refuse planning permission on 14th May 2025. We therefore made a first party appeal on behalf of our client on 10th June 2025 to An Coimisiún Pleanála (ACP). We received an RFI dated 5th October 2025 from ACP.

The purpose of this letter is to request ACP consideration of our response to Point 1 under the Soils and Geology heading in advance of the submission of the remainder of the RFI. The aforementioned point states the following:

Notwithstanding the site investigations undertaken as part of the Peat Stability Risk Assessment (PSRA) (i.e. peat probes, gouge cores etc.), the Commission has concerns regarding the adequacy of the geotechnical investigations carried out on site. Trial pits should be excavated at turbine locations and other key locations (i.e. borrow pit etc.) to investigate the underlying mineral soil lithology and subsoil/bedrock interface. Noting that the turbine foundations will likely require rock breaking and dewatering, groundwater level monitoring and sampling should also be undertaken to fully establish a conceptual site model for flow regimes (both groundwater and surface water} within the site. Both the Water Framework Directive (WFD) Assessment and the PSRA should be updated to have regard to the further site investigations.

To this end, please find enclosed the response to the above point from EcoQuest Environmental Limited who carried out the Soils and Geology assessment, including geotechnical surveys, in the EIAR. The submission of this information for consideration in advance of the main submission for all the RFI responses was agreed with ACP in a phone call on 27th January 2026.

Responses to the other points raised will follow in a separate submission by 5th May (unless an extension is otherwise agreed with ACP).

In the event that this is not acceptable to ACP, we would appreciate confirmation of same and clarification that the additional geotechnical surveys mentioned in Point 1 outlined above are necessary at this stage. We look forward to a response to this clarification in due course.

Should you have any queries please do not hesitate to contact me on 071 9161 416 or by email aogrady@jodireland.com.

Yours sincerely,

Andrew O'Grady

Andrew O'Grady BSc., MSc., AIEMA
Jennings O'Donovan and Partners Limited

Encl./

c.c. Ms. Crystal Leiker, Gortloughra Wind Farm Limited, C/O Statkraft Ireland Ltd., Building 3400, Cork Airport Business Park, Cork, T12 AE76.

Soils and Geology

1. **Notwithstanding the site investigations undertaken as part of the Peat Stability Risk Assessment (PSRA) (i.e. peat probes, gouge cores etc.), the Commission has concerns regarding the adequacy of the geotechnical investigations carried out on site. Trial pits should be excavated at turbine locations and other key locations (i.e. borrow pit etc.) to investigate the underlying mineral soil lithology and subsoil/bedrock interface. Noting that the turbine foundations will likely require rock breaking and dewatering, groundwater level monitoring and sampling should also be undertaken to fully establish a conceptual site model for flow regimes (both groundwater and surface water} within the site. Both the Water Framework Directive (WFD) Assessment and the PSRA should be updated to have regard to the further site investigations.**

Response:

An initial desk study of the site was undertaken during the proposal preparation for the EIA and PSRA assessments. Consideration was given to various methods of initial ground investigations including trial pits undertaken at turbine locations and other key infrastructure locations. Given the expected shallow bedrock and the likely absence of mineral soils determined by the desk study, it was decided that the benefits of undertaking trial pits would be outweighed by the ability to safely access many of the locations with an excavator. During the peat probing and gouge coring assessment, it was confirmed that many of the turbine locations would be accessible with an excavator only after construction of access tracks, given the steep slopes over many parts of the site. Construction of such tracks would cause unnecessary environmental damage at the planning phase. Our extensive experience of similar rock types throughout Co. Cork suggests that rock breaking may be required locally but blasting will not be required. This recommendation would not change if trial pits were undertaken as it is very unlikely that the size of excavator used for the trial pits would be comparable to the size of excavator used during construction. The usual method of determining rock excavatability would be to obtain rock cores from rotary core drilling undertaken at the pre-construction, detailed ground investigation phase of the project. By examining a combination of rock strength and fracture spacing, anticipated excavatability of the rock can be assessed.

A total of 354 peat probes, 8 gouge cores, 9 hand-dug trial holes and 98 hand-held shear vane tests were undertaken, predominantly at turbine foundations, turbine hardstands, the proposed onsite substation and control building location, and along proposed access tracks at nominal 100 m centres. A further 1,112 probes were undertaken outside the current EIAR boundary and along the proposed grid connection route options 1 and 2.

The desk study on soils included a detailed review of published literature and relevant datasets pertaining to soils, subsoils and mineral geology at the Site. Based on information obtained from Geological Survey Ireland (GSI) and Environmental Protection Agency (EPA) datasets, the following soil conditions are understood to occur across the Site:

- Shallow rock covers most of the Site, with minor areas of blanket peat and glacial till. Peat is absent from most of the Site and from the vast majority of the Grid Connection and Turbine Delivery Routes.
- Glacial till derived from the underlying sandstone and shale covers approximately 10% or less of the main Site area and around 50% of the Grid Connection and Turbine Delivery Routes.
- Approximately 50% or more of the main Site comprises very shallow or exposed bedrock and therefore has little or no superficial geology cover.

These conclusions are based on both GSI/EPA mapping datasets and site-specific field measurements, including hand-dug trial pits, gouge cores, extensive peat probing and hand-held shear vane testing undertaken at turbine foundations, turbine hardstands and the proposed onsite substation and control building.

The locations of the hand-dug trial pits, together with the recorded peat depths and bedrock levels at all turbine locations and at the proposed substation and control building, are known and fully documented in Appendix 8.1 of the EIAR. It can therefore be stated with confidence that the underlying mineral soil lithology and the subsoil–bedrock interface at the Site have been well characterised.
In summary, given the steep topography of the proposed site, the associated dangers of mobilising excavators on steep slopes where existing access roads are largely absent, in addition to the potential for unnecessary environmental impacts at the planning phase; it is considered that the most appropriate, safest and least environmentally damaging method of ground investigations were carried out. Furthermore, it is considered that the ground investigation approach which has been adopted is consistent with the Institute of Geologists of Ireland (IGI) Guidelines (2013) for preparing geology/hydrogeology chapters in EIAs, which advocate a for a tiered approach.

The proposed Site is in an upland location characterised generally by shallow bedrock and minor peat cover. Section 9.3.18 of Chapter 9 on hydrology and hydrogeology confirms an absence of drinking water receptors in the immediate vicinity of key design elements that could be significantly affected by rock breaking or dewatering during turbine foundation works. Furthermore, no designated Groundwater Dependent Terrestrial Ecosystems (GWDTEs) are identified within the windfarm footprint. In some areas, the site is covered by blanket peat and heath, which are sustained by direct rainfall rather than groundwater.

The site is located at the headwaters of three catchments. Only minor streams and drains traverse the site, and a self-imposed 50m buffer from any streams is included in the design wherever feasible. There are no large rivers or lakes located at the site itself. The nearest salmonid-designated river is located approximately 620 m downslope from the closest turbine. Given the intervening distance and the implementation of robust drainage controls, there is negligible risk that foundation excavations would harm downstream fisheries or surface water bodies.

According to the Geological Survey Ireland (GSI) database, the bedrock located beneath the proposed Site primarily consists of sandstone (Old Head Sandstone Formation, see EIAR Figure 8.1), which is classified by the GSI as a Poor to Locally Important aquifer with generally low to moderate permeability. There are no karstic limestone formations underlying the turbine locations, and indeed no known karst features are recorded within approximately 25 km of the Site, confirming that the site is not in a karst aquifer setting. Groundwater vulnerability at the site is high in places due to thin soils/peat, this is mitigated by the low aquifer productivity, infiltration rapidly re-emerges as surface flow. In summary, the site does not overlay a regionally important or particularly sensitive aquifer system, there is no karst network that could transmit construction effects over long distances, and groundwater rapidly discharges to the surface water network over an approximate distance of between 10 to 300m.

The baseline studies demonstrate that the proposed Site is a typical upland, fractured bedrock environment with no sensitive groundwater abstractions, no identified GWDTE wetlands, and no karst conduits that could be significantly impacted by foundation rock breaking or temporary dewatering. The primary water receptors are the local streams, which are already addressed by standard drainage and sediment control measures. These findings set a context that any groundwater perturbation from construction will be localised and short-term.

The submitted EIAR chapters (Hydrology & Hydrogeology – Chapter 9, and Soils & Geology – Chapter 8) provide a conceptual hydrogeological model of the site rather than detailed numerical modelling. This conceptual approach is common for wind farms in such terrain and is supported by site-specific and regional data. Key aspects addressed in the reports include:

1. Hydrogeological Characterisation

Chapter 9 describes the bedrock aquifer as an unconfined, fractured rock system with short groundwater flow paths on the order of tens to a few hundred meters. Since the site has steep slopes and generally low permeability bedrock, most rainfall runs off or interflows near the surface, and "*a high proportion of the recharge will discharge rapidly to surface watercourses via the upper layers of the aquifer*". Groundwater flow is concentrated in the upper ~15 m of rock, decreasing with depth. In essence, water that infiltrates the thin soil/peat rapidly emerges in nearby streams or seepage zones downslope, rather than traveling long distances through deep bedrock. This conceptual model was informed by GSI's groundwater body reports for the area and provides a sound basis for anticipating construction effects.

2. Baseline Groundwater Levels

No long-term monitoring wells were installed on site, which the EIAR justifies by the nature of the terrain. In upland catchments, the water table is expected to strongly mimic the topography, being shallow under valleys and much deeper under hilltops. The reports note that the water table can vary from a few meters to over 10m below ground surface depending on local topography. Instead of point measurements, the team relied on observable indicators such as peat wetness, spring occurrences and regional data to infer groundwater depth. Given that bedrock outcrops at surface in parts of the site and peat depth is generally shallow, mostly <1m outside of a few deeper pockets, any perched water is likely near the surface in peat only after heavy rain. Thus, the baseline groundwater regime is dynamic and near-surface, and it was considered adequately understood through conceptual modelling. While direct groundwater level measurements were not carried out, this is considered a reasonable approach for the Site since a spatially variable, fracture-controlled water table would offer little value for predictive modelling. The EIAR instead focused on ensuring robust mitigation for any eventuality of encountering water.

3. Potential Dewatering Impacts

Chapters 8, 9 and their associated appendices recognise that excavating turbine foundations, and the single proposed borrow pit, may intersect the water table locally and require pumping out of water during construction. However, these dewatering effects are expected to be very limited in extent and duration. Any groundwater removed from an excavation will be released as clean water to the surface drainage system in a controlled manner, after sediment treatment, not causing a net loss of water in the catchment. The EIAR explicitly commits that "*direct discharges to surface waters of dewatered loads will not be permitted*". Instead, water will be filtered through settlement ponds or diffused over land, preventing erosion or contamination. Since groundwater flow paths on the Site are very short, drawing down water in a foundation pit would influence only a small area (tens of meters) before the cone of depression reaches a stream or break in slope where groundwater naturally daylights. Chapter 9 concluded that any water table drawdown will be highly localised and quickly reversible when pumping stops, with negligible risk to distant receptors. This judgment is backed by the GSI hydrogeology data, which indicate "*flow path lengths are generally short, ranging from 30–300 m*" and "*groundwater discharges to the numerous streams and small springs and seeps*" in the area. In other words, any groundwater pumped out will simply hasten its flow to a stream by a short distance, rather than permanently altering the subsurface flow regime.

The EIAR did not employ numerical groundwater flow modelling, nor did it undertake site-wide aquifer testing, and it provides reasoning for this. Given the poor to low-productivity nature of the bedrock aquifer and the absence of large groundwater users or sensitive ecosystems, the potential impacts were assessed qualitatively as minimal. The reports rely on a Source–Pathway–Receptor risk assessment framework, wherein no viable pathway to a critical receptor was identified for groundwater impacts. The EIAR notes that the available resource is limited, much of the infiltrating water is effectively reduced as groundwater resource because it quickly becomes surface runoff. Therefore, a detailed groundwater model, which in fractured rock would be highly uncertain, was not deemed necessary to conclude that potential impacts are negligible. This is in line with professional guidance that extensive investigation is not required in low-risk settings. By classifying the site's geology in line with a "*Type A – Passive geological/hydrogeological environment*" as defined by the Institute of Geologists of Ireland (IGI), i.e. poor aquifer, low permeability setting, the team treated it as a scenario where extensive mitigation is sufficient and further groundwater analysis would not meaningfully change the environmental outcome. The EIAR did, however, include a preliminary water balance calculation and considered extreme rainfall and drainage scenarios as a precaution. Overall, the existing reports present a consistent picture that groundwater plays a minor role in the site hydrology, and this was adequately addressed through a robust qualitative assessment rather than quantitative modelling.

The EIAR and its technical appendices adequately characterise the groundwater and surface water flow regimes in a manner proportional to the site's risk profile. Since conditions were described using available data; potential impacts (e.g. slight lowering of water table around excavations, or increased surface runoff) were identified and judged to be of slight or imperceptible significance with standard mitigation. The decision to omit elaborate groundwater investigations was backed by the lack of receptors and the inherent limitations of modelling fractured bedrock flow. This approach is consistent with industry norms for upland wind farms.
The site hydrogeological setting, steep, rain-dominated catchments in fractured rock inherently limits the value of intensive groundwater monitoring or modelling. Groundwater flow in such terrains is often highly heterogeneous and transient. Even if monitoring wells were installed, the water levels would most likely fluctuate rapidly with rainfall events and are unlikely to represent a regionally coherent aquifer potentiometric surface. Any small-scale pumping tests or models would be very difficult to interpret, because the flow is dominated by superficial pathways and short, discontinuous fracture networks. In other words, the groundwater system does not behave like a uniform, laterally extensive aquifer where drawdown impacts can be readily predicted, it behaves more like "*spongey*" hillside drainage. Attempting to produce a detailed model in this context is unlikely to yield actionable insights beyond what the conceptual understanding already provides. This sentiment is reflected in GSI's own characterisation of local aquifers "*permeability is highest in the upper few metres… groundwater flow is concentrated in the upper 15 m… flow path lengths are generally short*". Given such conditions, the request for formal groundwater level monitoring and advanced modelling appears disproportionate to the likely impact.

Risk-based assessments support a proportional approach. Best-practice guidance emphasises that additional investigation should be commensurate with risk. The Scottish Environmental Protection Agency (SEPA), for instance, has a tiered risk assessment for wind farms which clearly states that if no vulnerable receptors, such as water supplies or GWDTEs, are present, then extensive further assessment or monitoring can be avoided. In this case, the developer has already demonstrated avoidance of any known receptors and implemented a robust drainage design to manage potential water quality impacts. The potential impacts identified, such as slight, localised water table changes, and minor sediment runoff, are well within the capacity of standard mitigation measures.

Technically, the Commission’s queries on groundwater flow regimes and dewatering effects have been addressed conceptually and mitigated via design. The EIAR even notes that a 50m buffer from watercourses will be implemented whenever possible and forbids direct discharge of pumped water. Monitoring groundwater levels around each turbine during construction would likely show only small, temporary drawdowns, which the EIAR already predicts and mitigates such as by managing pump-out water. Requiring extensive monitoring in a scenario where effects are “*neutral to imperceptible*” and highly localised is not consistent with a risk-based assessment approach.

In mountainous catchments such as at the Site, surface water and shallow groundwater are essentially a single integrated system. Dewatering a foundation excavation in peat or weathered rock is akin to temporarily draining a very small, perched aquifer unit, the effects of which will be quickly reversed when pumping stops and natural flows resume. The Commission’s request implies a need for a Conceptual Site Model (CSM) with more empirical support. However, the CSM presented in the EIAR is already grounded in standard hydrological science for uplands. It recognises that most water travels overland or near surface and that deeper groundwater plays a limited role. Additional water level data might refine the CSM slightly, such as pinpointing the exact depth to water at a few locations during a particular season, but it is most unlikely to alter the fundamental understanding or the outcome of the impact assessment. There is no indication of anomalous hydrogeological features such as a laterally extensive confined aquifer or a deep karst conduit, that would warrant caution beyond what has been considered.

Rock breaking and excavation could potentially increase localised turbidity or preferential drainage along fracture lines, but the EIAR’s extensive mitigation, such as using silt traps, avoiding wet conditions for major excavations, etc. accounts for these contingencies. If a concern is that breaking rock might unexpectedly drain a hillside or divert a stream, the conceptual model and site geology suggest this is highly improbable. Any fractures opened would tend to discharge water to the surface quickly downslope. Moreover, the volumes of water involved in dewatering a foundation pit are very small relative to the catchment scale. Continuous groundwater level monitoring is more typical where large-scale dewatering, such as for quarries or deep mines could have regional effects, which is not the case here.

In our professional opinion, the Commission’s request seems technically not fully justified given the low-risk, upland setting and the extensive mitigations already planned. The EIAR has characterised the site as a low-yield aquifer system with negligible groundwater-dependent receptors, and this was done in line with accepted guidelines. Requiring additional groundwater monitoring/modelling would likely confirm the obvious, that water levels drop slightly when pumped and recover soon after, without changing the mitigation strategy or impact significance.

Both Irish and UK/EU guidance support the approach taken in the EIAR and can be cited to argue that detailed groundwater flow modelling or prolonged monitoring is not typically necessary in upland, hard-rock environments unless special circumstances apply. The Institute of Geologists of Ireland (IGI) Guidelines (2013) for preparing geology/hydrogeology chapters in EIAs advocate a tiered, conceptual approach. Practitioners are advised to classify the hydrogeological environment into categories. A "*Type A – Passive geological/hydrogeological environment*" is defined as an area of thick low-permeability subsoil or poor bedrock aquifer with little dynamic groundwater flow. The proposed Site clearly fits this category as it has a poor, shallow aquifer with high runoff. For such passive settings, the IGI suggests that a qualitative assessment focusing on identification of sources, pathways, and receptors may suffice, with "*regular iterative reviews of the Conceptual Site Model (CSM)*" as new information arises. In practice, this means one should develop a robust conceptual model (which the EIAR has done) and only escalate to detailed modelling if that conceptual model indicates significant risk. The guidelines do not mandate drilling wells or doing numerical models for every project. Instead, they encourage professional judgment and the "*precautionary principle*" where there is doubt. Since no high-risk receptor was identified at the Site, staying at the conceptual model stage is consistent with IGI's recommended practice.

Furthermore, the Scottish Environment Protection Agency (SEPA) Guidance (LUPS-GU31, 2014): SEPA's guidance "*Assessing the Impacts of Windfarm Development on Groundwater Abstractions and GWDTE*" explicitly calls for a "*consistent, proportional and streamlined approach based on tiered risk assessment*". It notes that turbine foundations, roads, and borrow pits "*can disrupt groundwater flow and impact upon these sensitive receptors*", but crucially, "*impacts will vary depending on the scale and location of the development*". The guidance lays out that if a wind farm is sited to avoid sensitive receptors, such as water supply wells or important wetlands, then extensive further analysis can often be scoped out. Specifically, SEPA states that mapping and avoiding such receptors "*removes the need for further assessment, mitigation, monitoring and potential remediation*" in many cases. At the proposed Site, this avoidance has been achieved (no receptors nearby), aligning with the scenario where detailed follow-up, such as extensive groundwater monitoring programmes is not typically required. SEPA would instead focus on ensuring the design includes pollution prevention measures, which it does. Furthermore, SEPA's guidance is clear that deep dewatering operations, such as large quarries or long-term groundwater pumping are a different category of concern, whereas wind farms do not pose a major risk to groundwater if constructed in line with pollution best practice".

The *EPA (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* emphasise focusing on likely significant effects and taking a proportionate approach to assessment. They allow that if an aspect of the environment is not significantly affected by a project, it can be described succinctly and not overly analysed. In an upland wind farm context, surface water management is often of greater importance than deep groundwater, a fact reflected in many Irish wind farm EIARs that devote more attention to drainage design and peat stability than to aquifer modelling. The EPA guidelines encourage use of existing data such as GSI maps, and to avoid information overload by concentrating on key issues. In the case of the proposed Site, the key hydrological issues were surface water quality, drinking water quality and erosion, which were rightly the focus. By following the IGI and NRA guidelines cited in the EIAR, the team followed EPA's proportionality principle.

The Irish Wind Energy Association (2012) and NatureScot's "*Good Practice During Wind Farm Construction*", which are considered to be best practice, both underline practical measures over theoretical studies. These documents stress robust design, such as not blocking natural drainage, avoiding sensitive habitats, proper site investigation for peat and implementing mitigation on the ground, such as the use of silt fences and controlled drainage etc. Neither of these guidelines calls for routine groundwater monitoring in upland sites, because generally, potential issues are prevented by sound design principles. For instance, good practice is to schedule excavation in drier periods to minimise water ingress and to have standby pumps/filters, all of which is accounted for under the project's Construction Environmental Management Plan. These sector guidelines reinforce that focusing on engineering controls and monitoring construction activities, such as checking settlement ponds and peat stability etc. is more relevant in uplands than trying to track every groundwater fluctuation.

In summary, both Irish and UK guidance supports the view that a qualitative, mitigation-focused assessment is sufficient for upland wind farms, without resorting to complex groundwater models, unless there's a unique risk factor at play. In light of the above guidance, it is evident that the approach taken at the Site, a focus on conceptual understanding and mitigation, without detailed groundwater modelling is consistent with accepted guidance for upland, fractured bedrock sites. Requiring a more elaborate groundwater investigation would be atypical unless there was clear evidence of a sensitive groundwater resource that could be impacted, which there is not in this case. The guidance supports using a risk-based, proportional response, which in this scenario means the existing measures are likely sufficient.