APPENDIX 5

HYDRO-ENVIRONMENTAL SERVICES RESPONSE

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co.Waterford
Ireland

tel: +353 (0)58 44122
fax: +353 (0)58 44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Date:6th November 2025
Our Ref: P1508-1-0001

MKO
Tuam Road,
Galway, Ireland,
H91 VW84

F.A.O. Mr Alan Clancy

Dear Mr Clancy

Re: An Coimisiún Pleanála Third Party Submissions Response regarding Clonberne WF Grid Connection Co. Galway (ABP Ref: ABP-320087-24)

---

1 INTRODUCTION

Hydro-Environmental Services (HES) were requested by MKO to respond to third party submissions made to An Coimisiún Pleanála (ACP) regarding the proposed Clonberne WF Grid Connection, Co. Galway (ACP Planning ABP-320087-24).

The Proposed Project (Wind Farm site and Grid Connection) is described in full in Chapter 4 of this EIAR.

This response letter relates only to the Grid Connection element of the Proposed Project. The Wind Farm submission response is dealt with in a separate response letter.

2 STATEMENT OF EXPERIENCE

Hydro-Environmental Services ("HES") are a specialist geological, hydrological, hydrogeological and environmental practice that delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland and Northern Ireland. HES was established in 2005, and our office is located in Dungarvan, County Waterford.

Hydro-Environmental Services (HES) has extensive wind farm drainage and hydrogeological experience relevant to this project. Wind farm environmental impact assessment in respect of geology, hydrology, and hydrogeology has and is a core business area for HES presently and also over the past 18 years. Wind farm drainage design/management requires experience both as a civil/drainage engineer, a hydrologist, and as a hydrogeological specialist. HES has these combined experiences and expertise. HES has worked on over 100 wind farm projects in Ireland and Northern Ireland. Many of these required assessments of geological conditions, existing drainage features, and streams and water quality data. HES work at all stages of wind farm developments including feasibility stage, layout design & preliminary drainage design/planning stage, FRAs, and also at construction management stage.

HES's experience also covers the key area of water quality and drainage controls and mitigation during the construction phase of wind farm developments. HES work at EIAR/planning stage to assist with the development of the optimal site layout which involves the development of hydrological constraints maps and interaction with geotechnical and ecological specialists and with site designers.

HES also specialises in wetland and peatland eco-hydrology. We are very familiar with all type of peatland sites (i.e. blanket, fen, raised bogs, and other types of wetlands).

Relevant to the Clonberne Wind Farm project, HES has completed over 30 Source Protection Assessments for the GSI/NFGWSs, and for Irish Water, and for private developments across the country in a wide variety of hydrogeological settings.

HES has also been involved in over 50 Uisce Éireann sites to date in Counties Tipperary, Wicklow Waterford, Kilkenny, Wexford, Cork, Limerick, and Carlow. HES have prepared hydrogeological audit reports for these sites, with follow-on works including water level monitoring, water quality monitoring, camera surveys, and borehole maintenance and remediation works. HES has also completed specification and tendering, and follow-on supervision and management of trial well and production well drilling works and pumping tests works.

All these experiences are particularly relevant to this project, and they have been applied through the project development phase, the constraints mapping phase, and EIAR preparation work, including the cumulative impact assessment.

This response submission has been prepared by Michael Gill and David Broderick. Michael and David prepared the Land Soil and Geology and Water Chapters of the submitted EIAR, and their qualifications, competencies, and experience are already presented in the EIAR (Section 9.1.2).

3 RESPONSE LAYOUT

A response is provided below to the following submissions:

- Galway County Council
- North East Galway Environmental Protection CLG
- Other Third Parties

4 GALWAY COUNTY COUNCIL

All comments in the Galway County Council submission were positive with regard potential effects on land, soils, geology and water (hydrology and Hydrogeology), including flood risk.

With regard land, soils and geology, the submission states:

> *"The planning authority consider that a detailed assessment has been provided in the application details with respect land, soils and geology, however, it is considered clarity should be provided on whether blasting is necessary for the site to provide a more robust assessment".*

HES Response:

As stated in Chapter 4 of the EIAR, rock from the proposed borrow pit will be removed principally by rock breaking (excavator or hydraulic hammer), but where rock strengths are high, blasting with explosives may be employed. The extraction of rock from the borrow pit will be a temporary operation run over a short period of time relative to the duration of the entire project construction phase.

Blasting using explosives is typically used at quarries for removal of rock as it is very fast and effective with minimal off-site noise or vibration effects. Whether blasting or rock breaking is used at the proposed borrow pit, the effects on land, soils and geology will be same (i.e. direct effects on bedrock integrity within the footprint of the borrow pit location). Potential indirect, off-site physical effects of blasting such as vibration are dealt with in Chapter 12 of the EIAR.

With regard hydrology and hydrogeology, the submission states:

> *"The planning authority consider that a detailed assessment has been provided in the application details with respect hydrology and hydrogeology, however, it is considered clarity should be provided on whether blasting is necessary for the site to provide a more robust assessment".*

As stated in Chapter 4 of the EIAR, rock from the proposed borrow pit will be removed principally by rock breaking (excavator or hydraulic hammer), but where rock strengths are high, blasting with explosives may be employed.

Management and treatment of pumped water from the borrow pit (surface water / groundwater inflows) is a key factor with regard the operation of the proposed borrow pit and prevention of surface water (i.e. in the Levally Stream) and groundwater quality effects.

Suspended sediment and fines in any pumped water will be main potential contaminant with regard downstream surface water quality effects (i.e. in the Levally Stream). However, the potential generation of sediment in pumped water from the borrow pit will be same whether rock breaking or blasting method is used.

The mitigation as proposed in Section 9.5.2.5 of the EIAR to deal with pumped water; will be same no matter what method is used:

- *"The pumped water volumes will be discharged via volume and sediment attenuation ponds adjacent to excavation areas, or via specialist treatment systems such as a silt bags or silt buster;*
- *There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur;*
- *Daily monitoring of excavations by a suitably qualified person will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped and a geotechnical assessment undertaken;*
- *At the borrow pit adequately sized settlement ponds will be constructed to treat pumped water prior to discharge into a local manmade drain;*
- *A mobile 'Siltbuster' or similar equivalent specialist treatment system will be made available at the borrow pit location for emergencies in order to treat sediment polluted waters from settlement ponds or excavations should they occur. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction-sites. They will be used as final line of defence if needed".*

Important to note is that inflows to the proposed borrow pit will dominantly be rainfall and therefore the water volumes pumped from the borrow pit will be relatively small and intermittent. This is explained in Section 9.5.2.4 of the EIAR:

- *"The groundwater level monitoring carried out in the area of the borrow pit show steep groundwater gradients across the footprint of the borrow pit location, indicating competent low permeability bedrock with localised groundwater flow patterns. Groundwater flows in the bedrock of the borrow will be limited to localised flows in the upper weathered bedrock layers or localised weaknesses. No regional groundwater flows will be intercepted during the operation of the borrow pit.*
- *Any dewatering/pumping required at the borrow pit will likely be associated with rainfall input/surface water runoff rather than groundwater inflows".*

As stated above, the extraction of rock from the borrow pit will be a temporary operation run over a short period of time relative to the duration of the entire project. Therefore, pumped water discharges from the borrow pit will only be in a short-term basis.

With regard flood risk, the Galway County Council submission states:

> *"The overall conclusion of the flood risk assessment is that the Proposed Project is appropriate from a flood risk perspective; and that the Flood Risk Assessment fulfils the requirements for a site-specific flood risk assessment and is consistent with the recommendations made in the Galway County Development Plan 2022 – 2028. The planning authority consider flood risk has been adequately addressed".*

5 NORTH EAST GALWAY ENVIRONMENTAL PROTECTION CLG

This part of the submission response addresses points raised under the headings of Grid Connection Infrastructure (Section 3.5.1), Substation Infrastructure (Section 3.5.2) and Horizontal Directional Drilling (Section 3.5.3). The section number relates to the heading number in the submission document.

The points raised in the submission are directly referenced in italics and then a response is provided underneath.

Grid Connection Infrastructure (Section 3.5.1)

The submission states:

> *"The grid connection infrastructure which connects to the national electricity gid via a loop-in connection into the existing 220kV Cashla – Flagford overhead line in the townland of Laughhil is a major hydrological concern. The 220 kV transmission line will be broken between tower 87 and 88 and the two loop-in towers shall be built to turn the existing transmission line into two gantries within the two cable compounds and two new steel masts".*
>
> *"Both gantries, both masts are being constructed in an area of somewhat extreme and high groundwater vulnerability. No additional boreholes were drilled in this area. Take note of the proximity to the Levally Stream which borders this area on almost all sides. This area is hydrologically connected to Lough Corrib SAC and is a regionally important aquifer".*
>
> *"There is no mention of this area in the hydrology report. No section was provided to outline the potential groundwater effects associated with four infrastructural elements in this sensitive area each with deep concrete foundations".*

HES Response:

Firstly, a 220kV overhead line already exits at the proposed loop-in location, including two existing large lattice towers which are constructed very close (with the same ground conditions) to the proposed Grid Connection end mast locations. The construction method used for the existing lattice towers will be very similar to the proposed end masts (i.e. localised earthworks and foundation construction over a very short period).

Overhead line supporting structures, such as the Grid Connection proposed end masts, can be constructed at this location without causing significant environmental effects as proven by the presence of the existing towers.

The GSI mapped subsoil geology at the proposed end mast locations is limestone glacial tills as was confirmed by walkover surveys and carrying out soil cores (refer to Table 8-6 of the EIAR).

As stated in the Section 8.3.4.1 of the EIAR, there are no GSI karst features mapped in the area nor were there any observed during walkover surveys.

In addition, the mitigation proposed in the EIAR regarding earthworks (Section 9.5.2.3), excavation dewatering (Section 9.5.2.5), hydrocarbons (9.5.2.6) and cement-based compounds (Section 9.5.2.8) also apply to the Grid Connection element of the Proposed Project including the end mast works. All potential effects associated with the end mast construction have been considered and mitigation has been provided in the EIAR.

Also, the proposed drainage control measures which are described in Section 9.4.1 will also be applied to the end mast location as shown on drainage plan drawing P1508-0-0624-A1-D101_GC-00C (Appendix 4-5 of EIAR).

With regard the comment on the proximity of the Levally Stream, it needs to be pointed out that the Levally Stream is located ~1.2km to the southwest of the end mast location and does not '*borders this area on almost all sides'* as stated in the submission.

Finally, the end mast locations are at a ground elevation of approximately 83m OD with the elevation of the Levally Stream (Lough Corrib SAC) being much lower, close to 68m OD. Therefore, the proposed ground works at the end mast location will have very low potential to effect groundwater flow paths towards the Levally Stream due to the large elevation difference and indeed setback distance.

Substation Infrastructure (Section 3.5.2)

The submission states:

> *"As mentioned in the numerous parts of this observation there has been a lack of trial holes drilled across this whole site, and the vicinity of the substation is no different. This area has numerous proposed foundations and is clearly a sensitive area with an important hydrological receptor approx 150m from this location. In general, I want to draw your attention to the fact that there are a number of foundations in the area of the substation that lack detailed specifications and to me that is a big issue. Groundwater issues in this substation area can have significant effects far beyond the (sic) that of the substation".*

HES Response:

The proposed location of the substation considers all the potential geological, hydrological and hydrogeological constraints at the site, including the Levally Stream which is Located 150m from the proposed location.

The proposed location is therefore significantly outside the self-imposed 50m watercourse buffer zones that was used in the EIAR for constraints mapping. Investigations at the proposed substation location included trial pits and peat probing which were sufficient to characterise the baseline geology of the area.

As stated in Section 9.5.2.4 of the EIAR no significant groundwater effects are expected due to the nature of the Grid Connection works:

> *"No groundwater level impacts are predicted from the construction of the Proposed Grid Connection (including substation and 2 no. end masts) infrastructure due to the shallow nature of the excavations (i.e. 0 -~3m). The deepest excavations will be required at the substation, 3m, but these excavations will progress in a more horizontal manner rather than vertical deepening".*

Horizontal Directional Drilling (Section 3.5.3)

The submission states:

> *"HDD [Horizontal Directional Drilling] gets no mention in the hydrology report and as a result no mitigation was provided. No borehole was drilled in that area to assess the impacts from HDD. Surely a construction technique as invasive as deep in such an environmentally sensitive area needs an AA and needs to be part of the screening process".*

HES Response:

The submission statement is incorrect on both accounts, HDD is mentioned in the hydrology report (EIAR Chapter 9) and mitigation is provided.

The requirement for HDD is stated in Section 9.4 of the EIAR and HDD specific mitigation measures are provided in Section 9.5.2.15 of the EIAR:

- *The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e. Clear Bore Drilling Fluid or similar will be used);*
- *The area around the drilling fluid batching, pumping and recycling plants will be bunded using terram and/or sandbags to contain any potential spillage;*
- *One or more lines of silt fencing will be placed between the works area and the adjacent river;*
- *Spills of drilling fluid will be cleaned up immediately and transported off-site for disposal at a licensed facility;*
- *Adequately sized skips will be used where temporary storage of arisings are required;*
- *The drilling process / pressure will be constantly monitored to detect any possible leaks or breakouts into the surrounding geology or local watercourse;*
- *This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur then drilling will be immediately stopped;*
- *Any frac-out material will be contained and removed off-site;*
- *The drilling location will be reviewed, before re-commencing with a higher viscosity drilling fluid mix; and,*
- *If the risk of further frac-out is high, a new drilling alignment will be sought at the crossing location.*

HDD drilling is commonly used for the installation of underground pipes/services where features such as watercourses or bridge structures need to be avoided. It is used extensively by water companies to install underground pipes, gas companies to install gas lines and electrical companies to put cables and ducting underground.

The contractors that provide HDD services have the experience and technology to sure that any environmental effects are minimal. Investigation drilling at proposed HDD locations is not standard procedure.

6 OTHER THIRD PARTIES

One third party observer states:

"Our domestic water supply is from a borehole drilled at our residence which is extremely close to both the wind farm site, and particularly close to the grid connection infrastructure.

Our residence is approximately 100m from the proposed grid connection, 700m from the proposed substation, 330m from the 39kV cable end masts, 440m from the horizontal directional drilling at the bridge

Figure 1 [in the submission] *shows our property's proximity to various infrastructural elements (blue lines). The substation is of grave concern to us and for a few reasons. The communications mast has foundations that from sparse information provided in the EIAR could be up to 3m deep.*

There is no indication if pile driving will be required at that mast or substation. We believe there was no borehole testing in the area, and we a very concerned our water supply will be contaminated.

We are also very concerned that the substation contains a battery storage compound. This is a concern not just for pollution to our water supply but also a fire hazard".

HES Response:

Potential effects on local private wells are assessed in Section 9.5.2.4 of the EIAR.

For the robust reasons provided in Section 9.5.2.4 (repeated below for ease off reference), we are satisfied that the Proposed Project site will not impact in any significant way on any potential down-gradient private wells.

The assessment on private wells is supported by extensive site investigations and follow-up groundwater level monitoring:

- *The large set back distances between turbine locations and downstream potential well locations (>0.85km);*
- *The proposed project will involve relatively shallow excavations (3 – 3.5mbgl), other than at borrow pit;*
- *The low permeability of the glacial deposits in which the turbine gravity base foundations will be constructed;*
- *The large depths of peat and glacial deposits that protect the underlying limestone bedrock aquifer (i.e. the majority of the Site has a low groundwater vulnerability rating);*
- *Localised groundwater flow patterns in the glacial deposits which is towards local streams that flow through the Site;*
- *The Levally Stream acting as a hydraulic boundary between the Site and the dwellings to the southwest and south;*
- *The absence of dwelling houses at down-gradient or up-gradient locations with regard the proposed borrow pit location;*
- *The competent nature of the bedrock in the area of the proposed borrow pit with only shallow localised groundwater flowpaths; and,*
- *The shallow excavation depths required for Grid Connection cable and End Masts.*

With regard to the observers well, which is located on the southeast of the Wind Farm site, approximately 100m to the south of the Grid Connection cable route.

Based on the measured groundwater flow directions at the site (refer to Figure 9-10 and Figure 9-11 of the EIAR), which is to the south/southwest, only the Grid Connection underground cable

route is potentially located up-gradient of the well location. The proposed substation and BESS compound (located westerly); HDD and end masts (located easterly) locations are not located up-gradient of the well with regard the measured groundwater flow direction.

Finally, due to the shallow nature of the underground Grid Connection cabling (~1.2), the setback distance to the well (~100m) and the low permeability nature of the subsoil in which the cabling trenching will be place, no effects on this well source are expected.

7 OVERALL SUBMISSION RESPONSE SUMMARY

In summary and in response to ACP's submission response request:

- A comprehensive site investigation dataset, comprising of trial pits, boreholes, long-term groundwater level monitoring, surface water flow monitoring and water sampling was accrued as part of the baseline characterisation of the Proposed Project in the EIAR. This site-specific dataset informed the robust impact assessment which was presented in the EIAR;
- All comments in the Galway County Council submission were positive with regard potential effects on land, soils, geology and water (hydrology and Hydrogeology), including flood risk and this reflects the level of detail of investigations carried out at the site;
- Robust scientific reasoning and mitigation has been provided in the EIAR to support the lack of significant residual effects for elements of the Grid Connection (substation, underground cable route and end masts) as well as the borrow pit;
- Robust scientific reasoning and mitigation has been also provided in the EIAR to support the lack of potential effects on Levally Lough SAC and local private wells; and, and,
- With the implementation of the tried and tested, best practice drainage control mitigation measures there will be no potential for significant effects on surface or groundwater quality/quantity.

HES has responded to all matters raised in the ACP 3rd party submissions.

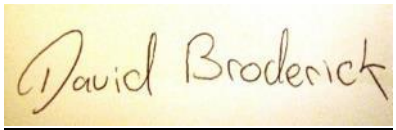
We respectfully submit to An Coimisiún Pleanála that this letter response reiterates the conclusions of the robust and comprehensive impact assessments presented in EIAR Chapter 8 (Land, Soils and Geology), EIAR Chapter 9 (Hydrology and Hydrogeology), the associated Flood Risk Assessment (Appendix 9-1) and WFD Compliance Assessment Report (Appendix 9-3).

The impact assessments presented in the EIAR are informed by a comprehensive site investigation dataset and rely upon the tried and tested, best practice mitigation measures which ensure the protection of the receiving environment. Similar mitigation measures have been successfully applied during the construction of countless Wind Farm and Grid Connection developments across the country and were also presented in the EIARs for several recently permitted wind farm developments.

8 CLOSURE

We trust the above response meets your requirements. Please contact the undersigned if you have any questions regarding the above.

Yours sincerely,



David Broderick
Hydrogeologist

B.Sc., H. Dip Env Eng. MSc, P. Geo