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**Our ref:** AE/2019/124761/08-L01  
20024916, 20024911

**Your ref:** EN010078, EN010077

**Date:** 7 June 2021

Dear Sir/Madam

**Application by East Anglia ONE North Limited for an Order Granting Development Consent for the East Anglia ONE North (EA1N) Offshore Windfarm project; and  
Application by East Anglia TWO Limited for an Order Granting Development Consent for the East Anglia TWO (EA2) Offshore Windfarm project**

Please find below comments for Deadline 11 in respect of: the Applicants previously submitted Landfall Hydrogeological Risk Assessment; the Examining Authorities' Commentaries on the draft Development Consent Orders (dDCOs) (May Version); and comments in respect of Issue Specific Hearing 16: The proposed substations site.

**Landfall Hydrogeological Risk Assessment**

We are aware of the continuing correspondence in respect of the previously submitted Landfall Hydrogeological Risk Assessment (REP6-021), and concerns raised regarding the potential for impacts on groundwater and abstractors. This has included further comments submitted at Deadline 10, and responses from the Applicant at Deadline 10 to submissions made at Deadline 9.

We also note Examining Authorities' written questions issued 20 May 2021, and specifically questions **ExQ3.7.1 & ExQ3.7.2** addressed to the Applicant in relation to this matter.

We felt that it may therefore assist the Examination if we were to assess and provide comment on the submitted Landfall Hydrogeological Risk Assessment (HRA) for the Horizontal Directional Drilling (HDD) activities proposed at the landfall location. The comments below initially address the potential for wider effects on the aquifer and

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also consider the abstraction at Ness House. Whilst we have no objection to the work completed to date, further study and explanation regarding protection of water supplies will be required prior to the commencement of construction. We note that additional detail is proposed to be submitted by the Applicant following further ground investigations, prior to construction activities commencing.

Horizontal Directional Drilling (HDD) is a fairly widely used technique, and may be proposed to avoid disruption to surface water features or designated ecological sites.

The HRA proposes the use of environmentally friendly drilling fluids and stop-loss additives during the HDD operation. This means that there should not be any significant adverse water quality impacts.

The proposed monitoring of the drilling fluid and use of stop-loss additives will seal the HDD bore where necessary. This should preclude significant losses of groundwater from the aquifer to the borehole; such losses would be confined to the period between drilling and sealing.

Prior to the commencement of the works, the Applicant will need to provide further information on how sea water entry will be precluded and to indicate whether the inflow of saline water would in any way reduce the capacity to seal the HDD bore. It would also be useful for the Applicant to provide an assessment of the impact on the aquifer should saline water enter the bore and move into the surrounding aquifer. Given that the bore will not be pumped the impact of any saline intrusion should be minimal and localised.

The potential for the HDD bore to affect groundwater flow within the sand & gravel or Crag aquifer will be highly localised. This is due to a number of factors:

- The constructed bore will only form a barrier to flow immediately around it. The size of the barrier will be limited to the bore itself plus any areas around it where drilling fluids and stop-loss additives plug the aquifer along its length. These sealed areas should not be significant.
- There will be no barrier to flow above or below the HDD bore such that flow in the aquifer will not be affected throughout its entire thickness. The Applicant should assess what proportion of the local saturated aquifer depth the HDD bore diameter will comprise, providing details of the dimensions of the HDD bore along with the depth along the route, and compare these with the depth of the Ness house well and the horizons from which it draws water (see later point on expanded HRA).
- The direction of groundwater flow within the shallow sand & gravel and Crag aquifers is likely to be controlled by the topography such that it is likely to be from west to east in the area of the Ness House well. Given the distance from the Ness House well, any barrier caused by the HDD bore should not have any significant adverse impact.
- While it is possible that the HDD bore will act as preferential flow pathway, this will be a localised effect and will not exert a significant influence on the direction or rate of groundwater flow in the wider aquifer. Furthermore, if the HDD bore is orientated east-west it will have no potential to influence groundwater flow to the north or south of it in terms of either a barrier or a preferential pathway.

The HRA should be refreshed and expanded prior to the commencement of construction. At present it focuses on the HDD works, but it would be useful to look

more directly at the potential for impacts at the Ness House well. This would involve including an assessment of the area from which the well draws water, which can then be compared with the distance to the HDD bore and its depth. Given that the Ness House well is unlicensed, the owner(s) may only pump a maximum of 20 m<sup>3</sup>/day. This is a very low rate, being taken from a granular aquifer with high storage, albeit with a low saturated thickness (based on the information provided in the public representations). The fact that the saturated thickness is low does not necessarily make the well any more vulnerable: if the supply is resistant to natural extremes of groundwater level such as drought then that implies that it is robust; this is as would be expected given that it is located towards the discharge area of the aquifer. Groundwater abstractions from granular aquifers with high storage typically draw water from a very localised area; at the very low abstraction rate the area of drawdown on pumping is likely to be within 1- 200 m, and may be significantly less. Therefore no changes to groundwater flow in the area from which the water supply is taken would be expected due to the HDD drilling at a minimum distance of 400 m away. We would recommend that the applicant substantiates this overview assessment with available data from the literature and local logs and the use of appropriate groundwater flow equations. A more detailed description of the physical characteristics of the Red Crag and Coralline Crag (with references) may also help allay the concerns of the local residents in due course.

Regarding the potential for land contamination to be present across the landfall site; historically, old pits were often filled with waste from communities and/builders etc. before regulations on landfill existed. This means that there were no controls on what was put in them and typically no records. As a result sometimes such infilled pits have been found to contain polluting materials. It is therefore precautionary for the Applicant to assess infilled pits as potentially containing contaminated waste in order to avoid increasing pollutant transport. This is the approach we would require to be protective of water resources.

As highlighted above, further work is required in due course to inform the detailed design, and we are satisfied that we will have the opportunity to review this when it comes forward. The Outline Landfall Construction Method Statement (REP08-054) confirms that we are to be consulted during the preparation of the final Landfall Construction Method Statement. The Outline Code of Construction Practice (REP8-018) confirms that we will be consulted on the findings of all HRAs undertaken, prior to the relevant works commencing.

## **The Examining Authorities' Commentaries on the draft Development Consent Orders (dDCOs)**

### **Arts 16 – Discharge of water**

We can confirm that we have no further comments on Article 16.

### **Issue Specific Hearing 16: The proposed substations site.**

We note the discussion held in respect of Item 3c concerning the positive discharge to Friston watercourse. We are fully supportive of the commitment from the Applicant to fund the delivery of any required de-silting works within the channel, to ensure that any piped outfall remains able to discharge. However, in this instance we would not wish to be under a legal obligation to carry out such works. We will discuss further with the Applicant the most appropriate way to secure the delivery of that commitment.

We hope that this advice is useful.

Yours faithfully



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