East Anglia ONE North and East Anglia TWO Offshore Windfarms

Applicants' Responses to Examining Authority's Written Questions 3

Volume 5 – 3.7 Flood Risk, Water Quality and Resources

Applicants: East Anglia ONE North Limited and East Anglia TWO Limited
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Applicable to East Anglia ONE North and East Anglia TWO

Revision Summary				
Rev	**Date**	**Prepared by**	**Checked by**	**Approved by**
001	07/06/2021	Paolo Pizzolla	Brian McGrellis	Rich Morris

Description of Revisions			
Rev	**Page**	**Section**	**Description**
001	n/a	n/a	Final for Submission

Glossary of Acronyms

ExA	Examination Authority
HDD	Horizontal Directional Drilling

Glossary of Terminology

Applicants	East Anglia TWO Limited / East Anglia ONE North Limited
East Anglia ONE North project	The proposed project consisting of up to 67 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia TWO project	The proposed project consisting of up to 75 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
Horizontal directional drilling (HDD)	A method of cable installation where the cable is drilled beneath a feature without the need for trenching.
HDD temporary working area	Temporary compounds which will contain laydown, storage and work areas for HDD drilling works.
Landfall	The area (from Mean Low Water Springs) where the offshore export cables would make contact with land, and connect to the onshore cables.

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
3.7 Flood Risk, Water Quality and Resources					
3.7.1	The Applicants			**HDD and groundwater** Paragraph 15 of [REP6-021] notes that any drilling fluid losses using HDD would be confined to a very limited area around the drill and that the drilling fluid will fill in and stabilise fractures created during the drilling process so that there would not be an impact on the wider aquifer or the groundwater it contains. a) Please define what is considered a very limited area. b) Please explain in full how this and the filling in of fractures created during the drilling process will ensure that there will not be an impact on the wider aquifer or the groundwater it contains.	It should be noted that the ***Landfall Hydrogeological Risk Assessment*** (REP6-021) is based on the more detailed information set out in the ***Horizontal Directional Drilling (HDD) Verification Clarification Note*** (REP6-024). Hydrofracture modelling is used to manage the risk of drilling fluid breakout or losses into the ground. Section 2.7 of the ***HDD Verification Clarification Note*** (REP6-024) presents an initial hydrofracture analysis adopting conservative input parameters. This identifies that drilling fluid losses to the ground are not expected until 1,150m onward and where ground investigations confirm the current understanding of ground conditions, would not be expected until 1,500m onward. Note that both of these locations in the bores are offshore. The use of environmentally friendly drilling fluids (such as bentonite) and drilling with a minimum practical flow rate of the drilling fluid are the main mitigation methods for drilling fluid loses. Drilling fluids are designed to seal permeable ground. Naturally occurring bentonite clay is commonly used as the base for drilling fluid and this lines the borehole wall, preventing fluid loss and groundwater ingress. The permeability of the Coralline Crag appears to be from interstitial flow (flow through the pores or spaces between the sand grains), rather than from flow along fractures. If the ground investigations indicate that flow is through fractures in the ground, the mitigation will be to add stop-loss materials to the drilling fluid to seal the fractures. There are a wide range

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					of environmentally inert stop-loss additives available. As the drill bit passes through fractures the drilling fluid will gel to seal them. Furthermore, following completion of pre-construction ground investigations, the hydrofracture modelling will be updated and used to refine design of the HDD. For instance, the HDD contractor will have the option to utilise a larger diameter drill bit to further reduce the annular pressure and increase the margin of safety against drilling fluid losses and breakouts at the surface. The extent to which any bentonite loss or breakout occurs will be a function of the monitoring and controls in place during HDD activities. Real time annular pressure monitoring will be used to ensure drilling fluid pressures do not exceed ground strength when drilling beneath the coastal cliffs and the intertidal areas. Regarding Paragraph 15 of the ***Landfall Hydrogeological Risk Assessment*** (REP6-021), this states that drilling fluid losses would be confined to a 'limited area' around the drill. The 'limited area' is considered to be within the walls of the bore. As noted above, mitigation measures would ensure that should losses occur, they would be contained within the bore.
3.7.2	The Applicants			**Water supply at Ness House well** Please provide more detailed information on the proposed water quality and levels monitoring regime at Ness House well and the temporary potable water supply that is	Subject to the voluntary agreement of the landowner at Ness House, the Applicants propose to undertake regular monthly monitoring of the well at Ness House during the HDD boring operations at landfall. This will include monitoring around one month prior to HDD boring operations at landfall

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				proposed to be tied into the well for the duration of HDD activities.	commencing, and extent two months following completion of HDD boring operations at landfall. Subject to the voluntary agreement of the landowner at Ness House, to reassure users of the water supply at Ness House, the Applicants will provide a temporary water supply to the Ness House. A temporary potable water tank will be placed at a location to be agreed with the landowner and will be tied into the existing pipe work from the well at an agreed location with the landowner. The Applicants will monitor the level of the temporary potable water supply to ensure it is replenished as required. Users of the well supply will see no difference in the use of their water supply as the connection of the temporary supply will be upstream of their taps.
3.7.3	Suffolk County Council			**Need for Land Drainage Act 1991 Consents** What, if any, specific issues would require determination of individual consents under the Land Drainage Act 1991? Can those matters be addressed with an appropriate form of consent provided under the dDCOs (dDCOs Commentaries on Arts 16 refers)?	See Applicants' comments at ID14 of the Applicants' responses to the ExA's Commentary on the Draft DCO (document reference ExA.dDCO.D11.V1).