



# Triton Knoll Offshore Wind Farm Limited Triton Knoll Electrical System



**Appendix 10: Written  
Representation Response to  
North Kesteven District Council**

**Date: October 2015**

**Appendix 10 of the Applicant's  
Response to Deadline 2**

Triton Knoll Offshore Wind Farm Limited

## Triton Knoll Electrical System

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Response to North Kesteven District Council

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Deadline 2

Date: October 2015

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## 1. North Kesteven District Council

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1.1 North Kesteven District Council (NKDC) submitted a Written Representation for Deadline 1 (5 October 2015). The representation raised a number of specific concerns, the proposed development and made a number of minor comments:

1. Site selection and alternatives
2. Landscape and visual impacts
3. Flood risk
4. Historic environment
5. Residential visual amenity
6. Noise and vibration
7. Traffic and transport
8. Cumulative impacts
9. Draft DCO requirements

1.2 The Applicant's response to the matters raised in each of the categories is below, and broadly follows the structure of the questions posed within the Representation.

1.3 The ExA should note that NKDC's comments are expressly stated to be limited to the site of the proposed substation within the wider proposed development (see paragraph 1.2 of the WR), being the closest part of the development to NKDC's administrative area. This response therefore focusses on the substation.

### Site Selection and Alternatives

1.4 The Applicant welcomes NKDC's comments concerning the detailed evidence provided to justify the selection of the proposed substation site.

1.5 NKDC's concern is that it considers that additional information could have been provided relating to the internal site layout of the proposed substation. Whilst noting that a worst case scenario has been modelled for the Applicant's noise assessment,

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the Council's concern is that the scale of the substation means additional information could have been provided.

- 1.6 The approach of finalising the detailed design of onshore infrastructure related to offshore wind farms post-consent, has been authorised and accepted as an appropriate approach in the development consent orders granted for many offshore wind farms, including for example Dogger Bank Teesside A & B, Dogger Bank Creyke Beck A & B.
- 1.7 To assist the local planning authorities in determining the appropriateness of the final design of these elements of the proposed TKES, a design principles document (document reference 8.6) has been produced that sets out the key design parameters established through the pre-application consultation undertaken.
- 1.8 Maintaining flexibility extends to keeping the option for either air insulated switchgear (AIS) or gas insulated switchgear (GIS) to be used at the substation, therefore the Application (and the draft DCO (document reference 3.1)) allows both. Although this option is a key part of the required flexibility, it does not in itself drive the need for flexibility.
- 1.9 The Applicant also refers the ExA to its response to questions **CA 1.6** and **LV 1.4** of the ExA's first written questions which state that as is common within the industry, the detailed design will be undertaken after development consent has been granted, during the pre-construction phase. Undertaking detailed design during the pre-construction phase, facilitates the best access to the most up to date and efficient technologies available to market when procuring the principal contractors to deliver the proposed development. This also allows the appointed principal contractor to influence the final design and therefore provides greater scope to minimise environmental impacts, including land take, prior to discharge of conditions. The final design will also be influenced by the results of the pre-construction surveys to be undertaken in accordance with the Requirements of the DCO. To provide a detailed design prior to consent would therefore be premature and would not be cost efficient. Furthermore, a fixed detailed design at this stage could constrain the ability to deliver the proposed development by prejudicing the ability to overcome as yet undiscovered constraints, some of which could arise during construction.
- 1.10 Additionally, the Applicant refers the ExA to Question DCO 1.37 of the ExA's first written questions which states that as described in Volume 3, Chapter 1, *Onshore Project Description* of the ES (Document reference 6.2.3.1), the Triton Knoll Substation design envelope allows for either an air insulated switchgear (AIS) or gas-insulated switchgear (GIS) layout depending on the ultimate electrical system design. The Applicant must notify the relevant planning authority whether AIS or GIS is to be installed in accordance with Requirement 5(3)(b) of the draft DCO prior to commencing

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works. In addition, no part of the works may commence until the details have been approved by the relevant planning authority (Requirement 5(3)(a)). The approved details must accord with the parameters as identified in Requirement 5(9) for AIS or GIS respectively.

- 1.11 This design envelope approach is well tested with nationally significant energy projects as established by the Advice Note 9, published by the Planning Inspectorate (<http://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/>).
- 1.12 The flexibility necessary at this stage for the overall project design is reflected in the Rochdale envelope approach adopted for the Environmental Impact Assessment as set out in Volume 1, Chapter 3 Approach to EIA of the ES.

## Landscape and Visual Impact

- 1.13 Section 3 of NKDC's Written Representation records its concerns regarding:
- the accuracy of the minor adverse assessment of impact from Viewpoint (VP) 11 from Little Hale Fen, 0.8 km to the west of the substation site (defined in Table 2-9 of Volume 3, Chapter 2, Landscape and Visual of the ES) due to the uncertainty over the final design of the substation;
  - the assessment of a neutral landscape impact once the proposed screening takes effect.
- 1.14 In respect of the impacts at VP11, the Applicant refers the ExA to its response to Question LV 1.5 of the ExA's first written questions which states that the design principles document (DPD) (document reference 8.6) is intended to secure a further level of information regarding the final design of the above ground works at the IEC and substation for both the local authorities and the public. A draft DPD was used as part of the statutory consultation carried out in October/November 2014 to encourage engagement and discussion with both the local authorities and the public on the final design and landscaping of the IEC and substation.
- 1.15 The draft DCO (document reference 3.1) sets out in Requirement 5 (Detailed design onshore) the key Rochdale Envelope parameters for the IEC, substation and unlicensed works and, at 5(4) that the final design of the buildings is to be approved by the relevant planning authority and should "accord with the design principles document". The parameters set out in Requirement 5 are those used in the ES assessments and are carried over into the DPD. (See section 4).
- 1.16 The Applicant can confirm that the design parameters set out in paragraph 4.2 – 4.9 of the Design Principles (document reference 8.6) are consistent with the maximum
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adverse scenarios set out in Table 2-10 in Volume 3, Chapter 3 *Landscape and Visual* of the ES (document reference 6.2.3.3).

- 1.17 Paragraph 2.128 of Volume 3, Chapter 3 of the ES sets out the design envelope assessed “establishes the realistic maximum adverse scenario for each category of impact as a basis for the subsequent impact assessment. This involves both a consideration of the relative timing and phasing of the project as well as the design parameters of the project that defined the ‘Rochdale Envelope’ for this assessment.” NKDC should therefore be reassured that despite the flexibility retained within the DCO around the design of the proposed substation, for the reasons explained in detail in response to the Council’s comments on site selection, the LVIA carried out by the Applicant represents a robust assessment of likely effects, particularly concerning landscape impacts from VP11.
- 1.18 In addition, the Applicant refers the ExA to Question Alt 1.40 of the ExA’s first written questions which states that, as noted in Table 2-14 (Embedded mitigation relating to potential landscape and visual effects) of Volume 3, Chapter 2 *Landscape and Visual* of the ES, the location of the Substation has been selected to take advantage of its position close to the South Forty Foot Drain embankment which provides a partial screen to views of the AGEI from the west.
- 1.19 With regards to landscape and visual effects, the proximity of the substation to the South Forty Foot Drain embankment would screen the majority of views of the proposed development from the west. This has the resulting consequence of avoiding significant effects on visual receptors and landscape character areas to the west of the site. NKDC acknowledges the screening effect at paragraph 6.2 of its WR in relation to visual amenity.
- 1.20 In so far as NKDC’s query regarding whether or not a new block of landscaped screening around the proposed substation site would lead to a neutral landscape effect, the ExA is directed to the EIA Evidence Plan (document reference 8.16) which shows that the appropriateness of a woodland block for screening the substation has previously been consulted on with the relevant statutory consultees.
- 1.21 The Applicant would not suggest that the views of other local authorities are binding on NKDC, but the ExA may wish to take account of Boston Borough Council’s views on these matters recorded in the Statement of Common Ground (SoCG) which are presented at Appendix 19 of the Applicant’s Response to Deadline 2 (see paragraphs 6.22 to 6.24) and Lincolnshire County Council’s (LCC) views on these matters recorded in its Statement of Common Ground (Appendix 30 of the Applicant’s Response to Deadline 1 - see paragraphs 4.50 to 4.52). . Both authorities accept the Applicant’s assessment of landscape effects of the substation.

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1.22 Finally, the Applicant welcomes NKDC's agreement at paragraphs 3.8 and 3.9 of its WR to the approach taken to the cumulative assessment of the Heckington Fen Wind Farm and the lighting controls for the proposed substation.

### **Flood Risk**

1.23 The Applicant welcomes NKDC's comments on the issues of flood risk and its acknowledgment that it will defer to the Environment Agency (EA), Internal Drainage Boards (IDBs) or LCC in respect of flood risk in relation to each of their respective specialties.

1.24 In that regard, the Applicant directs the ExA to the following SoCG with those bodies where confirmation is provided that the Flood Risk Assessment carried out by the Applicant is appropriate:

- SoCG with the Environment Agency (EA) - Appendix 29 to the Applicant's Response to Deadline 1, see paragraph 4.33 in particular;

- SOCG with Internal Drainage Boards (IDBs) - Appendix 32 to the Applicant's Response to Deadline 1, see paragraph 4.15 in particular;

- SoCG with LCC – Appendix 30 to the Applicant's Response to Deadline 1, see paragraph 4.141 in particular.

1.25 The particular concern raised by NKDC in relation to flood risk is whether or not its Strategic Flood Risk Assessment has been reviewed or taken into account in the preparation of the ES. In this regard, the ExA is directed towards the EA's approval of the Applicant's Flood Risk Assessment through its EIA Evidence Plan process at Appendix I of Annex D of the EIA Evidence Plan document (document reference 8.16).

1.26 NKDC's comments about any uncertainty caused by the flexibility retained for the layout of the substation site (see paragraph 4.4) should be through the commentary on the assessment of such matters set out in response to the site selection concerns addressed previously within this response to its WR.

### **Historic Environment**

1.27 The Applicant notes NKDC's comments on Historic Environment in Section 5 of the written representation.

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## Residential Visual Amenity

- 1.28 The Applicant notes NKDC's comments on Residential Visual Amenity Environment in Section 6 of the written representation and welcomes its confirmation that the proposed development will not have an unacceptable impact on local residents' visual amenity..

## Noise

- 1.29 NKDC's principal concern is that it cannot agree with the finding concerning the operational noise impacts of the substation on the residential property known as Grove Farm. The Applicant understands that concern to be founded on the level of confidence that NKDC accords to the 5 dB reduction in noise levels that it has used for assessing internal noise measurements at that property.
- 1.30 The Applicant refers the ExA to Volume 5, Annex 11.3 *Onshore Substation Noise Modelling Report* (document reference 6.2.5.11.3) of the ES which details that noise levels that are expected to be generated by the operation of the Substation and experienced at Drove Farm have been calculated by means of a noise modelling exercise.
- 1.31 This exercise has provided predicted external noise levels at the identified noise sensitive receptor locations, as is usual with environmental noise modelling. The method of assessing low frequency noise impacts, which was agreed with East Lindsey District Council (ELDC) and Boston Borough Council (BBC) during the consultation stage was the DEFRA / University of Salford proposed criteria for the assessment of low frequency noise disturbance (University of Salford on behalf of DEFRA, NANR45, 2005). These criteria are set in terms of internal noise levels therefore in order to compare the predicted noise levels at any given property with these criteria, some allowance has to be made for the reduction between internal and external noise levels.
- 1.32 As highlighted by NKDC, it is not possible to accurately identify the sound insulation that will be provided by any given property (without testing each property individually) due to the variation in construction materials, methods, building condition etc. that will exist. For this reason, a reasonable allowance for external to internal attenuation has to be made, based on professional judgement. In this case, a 5 dB allowance was made, given that this is likely to be a conservative estimate of the actual sound insulation that is provided by common building material at a frequency of 100 Hz. To illustrate this, Table 1 below gives the typical sound insulation at a frequency of 100 Hz of typical building materials that could be used in the external building envelope of a residential property.

**Table 1: Typical Sound Reduction Index values at a frequency of 100 Hz of various building materials**

Material Description	Sound insulation at 100 Hz
Single glazed glass, 4 mm thick	10 to 15 dB
Double glazed unit, 2 x 4 mm panes separated by 12 mm cavity	15 to 20 dB
100 mm thick lightweight concrete block	20 to 30 dB
100 mm thick single leaf brick	30 to 40 dB
100 mm thick heavyweight concrete block	35 to 40 dB
Insulated cavity wall, 2 x 100 mm brick leaves separated by a 50 mm cavity, 50 mm insulation in cavity	30 to 60 dB
Roofing slates or roofing tiles	15 to 20 dB

- 1.33 As can be seen from the above, even the minimum sound insulation at 100 Hz that would be expected from any building element (i.e. that of a single glazed window) would be 5 dB greater than that assumed in the low frequency noise assessment presented in paragraph 11.130 and Table 11-18 of Volume 3, Chapter 11 of the ES. It can therefore be seen that the assumption made in Volume 3, Chapter 11 of the ES with regard to the likely low frequency sound insulation of buildings in the vicinity of the substation was intentionally conservative, and leads to higher predicted internal noise levels than are likely to be experienced in practice, resulting in a conservative assessment of the likely impact of low frequency noise.
- 1.34 Clearly, the above sound insulation values do not consider the effects of, for instance, opening windows for ventilation. Whilst it is very likely that, at all properties, windows may be open for some of the time, this is unlikely to significantly affect internal noise levels within properties. The reason for this is that in order for sound to pass through an opening or aperture without being significantly attenuated, the dimensions of that opening need to be similar to the wavelength of the sound. As the frequency of sound decreases, wavelength increase in proportion, so sound at a frequency of 100 Hz has a wavelength of approximately 3.4 m. It is highly unlikely that an open window would have dimensions this large, therefore open windows, ventilation openings etc. are not

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likely to significantly affect the sound insulation of a building at a frequency of 100 Hz and so need not be considered in this context.

- 1.35 It is also informative to consider the level of sound insulation that would need to be provided by the construction of a residential building in order for the DEFRA / University of Salford low frequency noise criteria to be exceeded. The predicted external noise level at 100 Hz is 3 dB above the Defra / University of Salford internal criterion at Drove Farm, at a level of 41 dB as compared to the 38 dB criterion (as reported in Table 11-18 of Volume 3, Chapter 11 of the ES). In order for internal noise levels, against which the DEFRA / University of Salford criterion would be compared, to be higher than 38 dB, the construction of Drove Farm would therefore need to provide less than 3 dB reduction in noise levels from outside to inside at a frequency of 100 Hz. Comparison of this figure with the figures outlined in Table X-1 above demonstrates that this is highly unlikely; the lowest sound insulation that would be expected of any building element is of the order of 10 dB.
- 1.36 The ExA may also wish to take account of Boston Borough Council's views on these matters recorded in its SoCG which is presented at Appendix 19 of the Applicant's Response to Deadline 2 (see paragraph 12.11). BBC accepts the Applicant's assessment of the likely noise effects of the proposed development.
- 1.37 NKDC's Written Representation helpfully acknowledges that in any event draft Requirement 17 of the DCO would oblige the Applicant to secure compliance with the relevant noise limits.

## **Traffic and Transport**

- 1.38 The Applicant welcomes NKDC's comments on these matters.

## **Cumulative Impacts**

- 1.39 The Applicant welcomes NKDC's comments on these matters.

## **Draft DCO Requirements**

- 1.40 Relevant parts of Section 10 of NKDC's written representation are set out below;

*“Draft Requirement 14 and 18 – the District Council considers that either draft Requirement 14 or 18 should include reference to construction traffic routing and any prohibited routes, along with the means by which such restrictions may be enforced.”*

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1.41 These matters are set out in the Outline Traffic Management Plan (TMP) (document reference 8.9) and in particular paragraphs 4.1 – 4.4 set out the details of proposed routes and Figure 4.1 shows the road network that will be used by HGVs. On the basis that the construction TMP secured under Requirement 18 must accord with the Outline TMP, changes to this Requirement are not considered necessary or appropriate. Amendments to Requirement 14 are not appropriate as construction traffic is dealt with by Requirement 18.

*“Draft Requirement 15 – whilst the District Council notes that the wording of the draft Requirement may give sufficient scope, it considers that details of the hours of illumination, and the means of their control, should be provided.”*

1.42 Details of the hours of illumination and their means of control will be provided within the written schemes approved by the relevant planning authorities under Requirement 15. Neither Boston Borough Council nor East Lindsay District Council (in respect of the IEC), as the relevant planning authorities in whose area the relevant works will be located have requested this information to be included within this Requirement.

*“Draft Requirement 16 – the District Council’s default guideline construction hours of operation (for noise generating works) are 07.30am to 18.00pm Monday to Friday and 08.00am to 13.00pm on Saturdays with no Sunday or Bank Holiday working and we would request that the Examining Authority have regard to this in the consideration of this Requirement.”*

1.43 The Application would refer the ExA to its response to Question DCO 1.47 of the ExA’s first written questions which explains the reasons for the construction hours set out in the draft DCO.

*“Draft Requirement 17 – as noted above, the requirement suggests that overall operational noise emissions from the substation should be limited to 35dB, to include any relevant penalties for tonal or impulsive noise. Whilst the Council would in principle support such a limit being imposed, on the basis of its concerns highlighted in paragraphs 7.3 and 7.4 above it is unclear as to how this limit would be met, in the absence of any further information and confidence on the actual external to internal transmission reductions that would be applied at Drove Farm.”*

1.44 The Applicant highlights that the noise limit proposed in Requirement 17 of the Draft DCO is based on the guidance set out in BS 4142: 1997, as was agreed with ELDC and BBC during the Evidence Plan process (please see Reference N015 of the Evidence Plan log, document reference 8.16 The Triton Knoll EIA Evidence Plan) and therefore relates to external noise levels in the vicinity of any residential property. Since the proposed limit is set in terms of external noise levels, the construction of the

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residential building does not have a bearing on determining whether or not the limit can be achieved.

- 1.45 The Applicant refers the ExA to paragraph 11.44 of Volume 3, Chapter 11 of the ES, where it clarifies that, as discussed in during the assessment process for the proposed development, BS 4142 was revised, with the current version being BS 4142: 2014. The 1997 version of BS 4142 is, however, generally consistent with the 2014 version, and in particular both versions of BS 4142 require that noise levels be assessed external to residential buildings. Whilst it might superficially seem that this may result in internal noise levels being uncontrolled, this is not the case in reality. Specifically considering noise from the proposed substation, Table 11-18 of Volume 3, Chapter 11 of the ES demonstrates that the majority of operational noise generated by the substation is expected to be generated in the 100 Hz frequency band. Table 11-18 of the of Volume 3, Chapter 11 of the ES also demonstrates that if the envelope of a residential building provides 5 dB of sound insulation at 100 Hz, internal noise levels will be acceptable when compared with the DEFRA / University of Salford low frequency noise criteria. As discussed above, this is highly likely to be provided by any building construction.
- 1.46 Considering internal noise levels across all frequencies, it becomes important to take account of ventilation openings, open windows etc. As a worst case, the sound insulation of a façade containing open windows can be considered. Table 5.1 of Volume 5, Annex 11.3 of the ES and paragraph 11.129 of Volume 3, Chapter 11 of the ES give the predicted overall A-weighted level of noise from the Substation outside Drove Farm as 28 dB(A). The sound insulation of a façade containing an open window is generally taken to be 10 to 15 dB. For instance, Table 4.1 of the World Health Organization Guidelines for Community Noise, 2000, gives a 15 dB difference from outside to inside a building, assuming open windows, and the same document states, on page 34, that if window openings make up 10% of the area of a wall, the combined sound insulation of the wall and window cannot exceed 10 dB. Taking the lowest of these values, the predicted worst-case overall internal noise level within Drove Farm would be 18 dB(A). This is significantly lower than the lowest internal noise criterion of 30 dB(A) that is given in the WHO Guidelines, which is quoted as being the level below which sleep disturbance would not be expected to occur during night-time.
- 1.47 Given the above, it can be seen that compliance with the external operational noise limits that are proposed in the Draft DCO will necessarily result in acceptable internal noise levels.

*“The District Council has no comments on the remaining draft Requirements, however would wish to be consulted upon details that may be submitted in relation to draft Requirements 5 (3)a, 6 (1) and (2)a and (2)b, 14 (2)f and 2(i), 15, 17 and 18.”*

1.48 The Applicant notes the Council's request and considers it a matter for the relevant planning authority as to which bodies, including neighbouring authorities, it consults in relation to the discharge of the Requirements.