From:	Dominika Phillips
To:	Hornsea Project Three; Kay Sully; KJ Johansson
Cc:	Andrew Guyton; Stuart Livesey
Subject:	Hornsea Project Three (UK) Ltd response to Deadline 3 (Part1)
Date:	14 December 2018 20:45:56
Attachments:	image003.png D3_HOW03_Cover_Letter.pdf D3_HOW03_IP_WR.pdf D3_HOW03_ISH1.pdf D3_HOW03_ISH2.pdf D3_HOW03_ISH3.pdf D3_HOW03_ISH4.pdf D3_HOW03_SoCG_RSPB_Dec_signed.pdf D3_HOW03_SoComm.pdf HOW03 Guide to the application.pdf

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Dear Kay, K-J

We are pleased to enclose Ørsted Hornsea Project Three (UK) Ltd ("the Applicant") response to Deadline 3, Friday 14 December 2018. These documents have been prepared by the Applicant and have been produced in response to the Examining Authority's (ExA) letter of 9 October 2018 ("the Rule 8 letter") as well as the Hearings (03-07 December 2018). The documents are pursuant to Rules 10(1) and (2) of the Infrastructure Planning (Examination Procedure) Rules 2010 and are in connection with the Development Consent Order application for the proposed Hornsea Project Three Offshore Wind Farm (hereafter referred to as "Hornsea Three").

These documents are being issued over a series of emails, each email containing a pdf file or files. The **last** email to be issued by the Applicant will contain a supporting file tracking sheet – to help the ExA ensure that it has received each email transmission.

Please acknowledge safe receipt of these documents. If we can be of any assistance in that regard, please do not hesitate to contact myself or Andrew Guyton.

Best regards,
Dr Dominika Chalder PIEMA
Environment and Consent Manager

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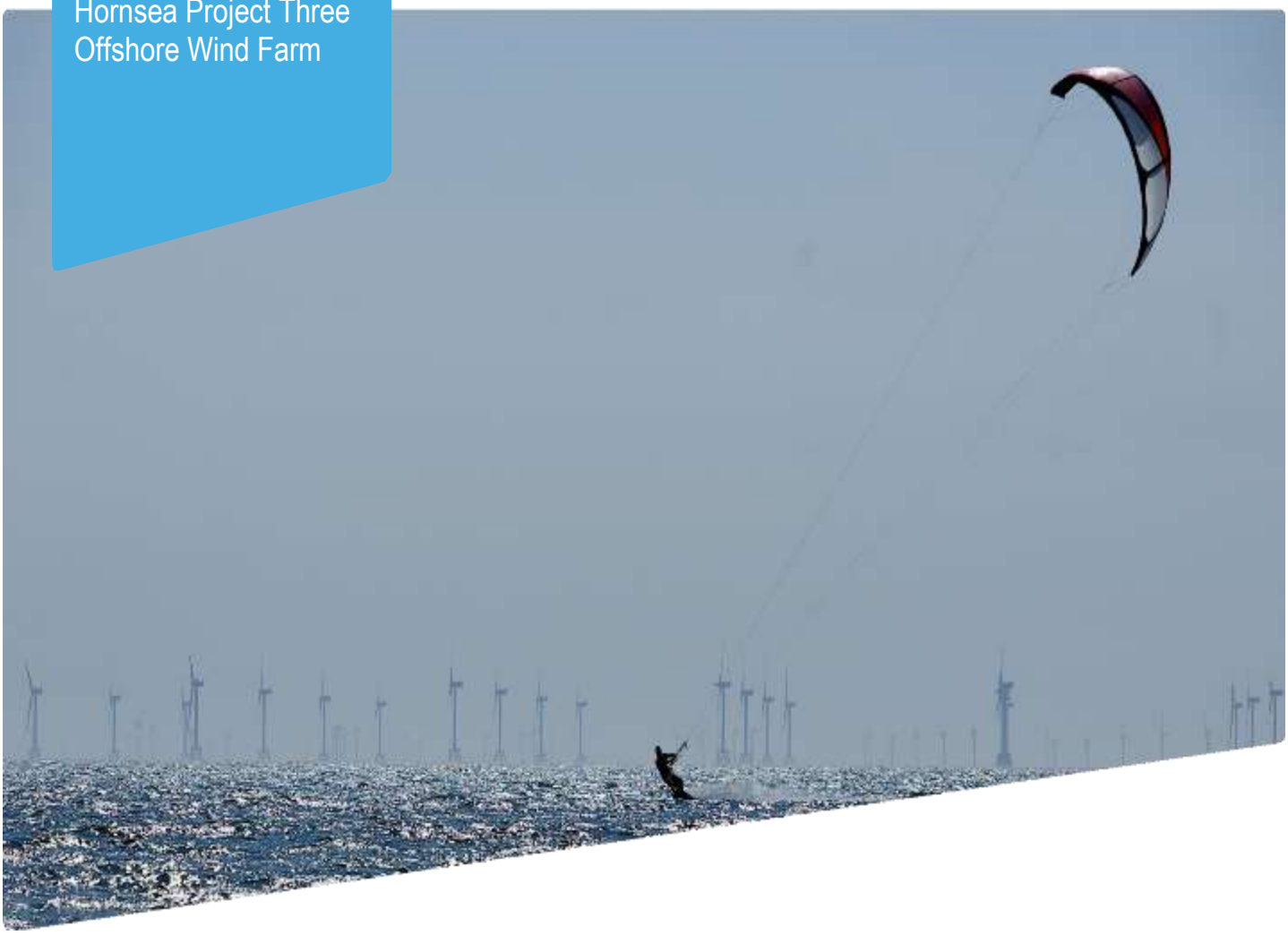
Hornsea Project Three
Offshore Wind Farm



Hornsea Project Three

Offshore Wind Farm

Written summary of Applicant's oral case put at Issue Specific Hearing 1 (4th Dec 2018)

Date: 14th December 2018

Hornsea 3
Offshore Wind Farm

Ørsted

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Front cover picture: Kite surfer near a UK offshore wind farm © Ørsted Hornsea Project Three (UK) Ltd., 2018.

Table of Contents

1. INTRODUCTORY REMARKS

1.1 Issue Specific Hearing 1 ("**ISH**") was held at 09:30am on 4 December 2018 at the Mercure Norwich Hotel, 121-131 Boundary Road, Norwich, NR3 2BA.

1.2 The ISH took the form of running through items listed in the agenda published by the Examining Authority (**ExA**) on 27 November 2018 (the "**Agenda**"). The format of this note follows that of the Agenda and refers to the Applicant's Response to the first written questions ("**FWQ**") (the "**Response to First Written Questions**") [REP1-122] numbers where relevant. The Applicant's substantive oral submissions commenced at item 3 of the Agenda, therefore this note does not cover items 1 and 2 which were procedural and administrative in nature.

2. AGENDA ITEM 1 – INTRODUCTION OF THE PARTICIPATING PARTIES

2.1 The ExA: - David Prentis (Lead Panel Member), Guy Rigby, David Cliff and Dr Roger Catchpole.

2.2 The Applicant:

2.2.1 Speaking on behalf of the Applicant: - Gareth Phillips (Partner at Pinsent Masons LLP).

2.2.2 Present from the Applicant: - Stuart Livesey (Hornsea Project Three Development Manager), Andrew Guyton (Hornsea Project Three Consents Manager), Gareth Parker (Hornsea Project Three Electrical Project Manager), Oliver Palasmith (Hornsea Project Three Commercial Manager), Celestia Godbehere (Hornsea Project Three Onshore Environmental Manager) and Meltem Duran (Hornsea Project Three Concept and Layout Manager).

2.2.3 The Applicant's legal advisors:- Claire Brodrick (Pinsent Masons LLP) and Peter Cole (Pinsent Masons LLP).

2.2.4 The Applicant's consultants (listed alongside their relevant environmental topic area):

(a) Onshore Ecology – Robin Ward (Senior Ornithologist at NIRAS Consulting Ltd);

(b) Navigation and other offshore operations:

(i) Samantha Westwood (Principal Risk Analyst at Anatec Limited);

(ii) Mark Prior (Aviation Consultant at Anatec Limited);

(iii) Richie Hinchcliffe (Team Leader - Instrument Flight Procedure Design at Osprey Consulting Services Ltd);

(iv) Dr Emily Wood (Project Director, RPS);

(v) Ali MacDonald (Principal Risk Analyst. Anatec Ltd); and

(vi) Fiona Nimmo (Director, Poseidon Aquatic Resource Management).

2.3 The following parties participated in the ISH:

2.3.1 Norfolk County Council ("**NCC**");

2.3.2 North Norfolk District Council ("**NNDC**") represented by Estelle Dehon;

2.3.3 South Norfolk Council ("**SNC**") represented by Jane Linley;

2.3.4 Broadlands District Council ("**BDC**");

2.3.5 Natural England ("**NE**") represented by Charles Forrest;

2.3.6 Marine Management Organisation ("**MMO**");

2.3.7 Land Interest Group (represented by Louise Staples of the National Farmers Union ("**NFU**"));

2.3.8 No 2 Relay Stations;

2.3.9 CPRE Norfolk;

2.3.10 Spirit Energy represented by:

(a) Christiaan Zwaart (Barrister, 39 Essex Street);

(b) Max Rowe; (Senior Commercial Manager, Spirit Energy)

(c) Robert Sinclair (Marine Consultant, Noble Denton Marine Services);

(d) Alan Miller;

(e) Neil McKay (Aviation Advisor, AviateQ International Limited); and

(f) Karen Hamilton (Partner, Brodies).

2.3.11 National Federation of Fisherman (represented by Dale Rodmell).

3. AGENDA ITEM 3 – ALTERNATIVES AND DESIGN FLEXIBILITY

3.1 **Justification for promoting HVAC and/or HVDC, including comparisons with other offshore wind projects:**

3.2 The ExA explained that most Interested Parties (**IPs**) felt that a HVDC transmission system would be preferable to a HVAC transmission system. The ExA confirmed that it does not have a view at this stage but it is clear that design flexibility is a live issue.

3.3 The ExA noted that all offshore windfarms in the UK use a HVAC transmission system but that the Applicant has no bias in favour of one transmission system. The ExA understood that it was anticipated that HVDC will become the preferred system in the future and asked when the Applicant expected this to happen.

3.4 Gareth Parker referred to Appendix 22: Transmission System (HVAC/HVDC) Briefing Note submitted at Deadline 1 [REP1-164] which identified HVDC as a maturing technology. Mr Parker explained that there was currently no specific date when HVDC could be considered to be mature with regards to offshore wind farm developments. Mr Parker added that the choice of transmission system will be dependent on procurement with a HVDC supplier and this won't take place until after consent has been granted. Mr Parker explained that he has seen movement in the development of onshore HVDC transmission systems over last couple of decades. He would therefore expect similar development to take place offshore. However, as there is only limited examples of the use of HVDC transmission systems for offshore wind farms (in Germany), Mr Parker considered that there is currently insufficient experience in the market to consider the technology to be mature.

3.5 The ExA queried why none of the consented offshore windfarms with HVDC transmission systems have moved into construction. Mr Parker explained that whilst he couldn't comment on individual projects, there were a number of different factors affecting implementation which related to capacity, transmission distance to shore, views on maturity of technology, availability of components and deliverability within project timescales.

3.6 In response to a question from the ExA regarding when Dogger Bank Teesside A & B and Dogger Bank Creyke Beck is anticipated to progress, Andrew Guyton explained that this will likely be dependent on the funding mechanism. The Applicant assumed that Dogger Bank would submit a bid (or bids) in the next

Contract for Difference (**CfD**) round in May 2019 and the project would be taken forward if the bid is successful. Mr Guyton confirmed that the Applicant had no knowledge as to whether Dogger Bank had made bids in previous CfD auctions.

3.7 The ExA referred to the fact that Hornsea Project One and Hornsea Project Two had been consented for both HVAC and HVDC transmission systems but both projects will be constructed using a HVAC transmission system. Mr Parker confirmed that once Hornsea Project One is constructed, it will be the longest submarine HVAC transmission system in the world.

3.8 Mr Guyton confirmed that Hornsea Project One is a similar distance offshore to Hornsea Project Three and Hornsea Project Two has a shorter route.

3.9 The ExA asked whether HVAC, in light of the distance involved, should be considered to be an emerging technology and queried whether it was any more tried and tested than HVDC.

3.10 Mr Parker explained that the individual components of an HVAC transmission system had a well proven track record both onshore and offshore over long distances. Mr Parker considered that there was a great deal of experience of the capability of HVAC and the distances involved were well within reach of the technological solutions available.

3.11 The ExA requested further details regarding the challenges faced in Germany relating to the use of HVDC technology. Mr Parker reiterated that Germany is currently the only jurisdiction to use HVDC technology for offshore wind. The Applicant is aware of a 400MW project that experienced significant delays to commissioning. Whilst Mr Parker couldn't say with certainty the precise reasons for the delays, in his opinion it was likely to be due to a lack of experience of using HVDC technology in offshore wind applications. Mr Parker added that there have also been delays to subsequent projects including those of Ørsted and a number of reliability issues to date.

3.12 In response to a question from the ExA regarding how much longer the lead in time for HVDC is than for HVAC, Mr Parker explained that the primary driver is design lead in time. HVDC is a complex system and the design expertise lies with manufacturers. Mr Parker added that it is necessary for the design of the system to be completed before the design of offshore structure can commence. Due to the scale, the design lead time for the structure can be up to a year. Mr Parker confirmed it can take 4 to 5 years from design to delivery for a HVDC transmission system.

3.13 In comparison, Mr Parker explained that a HVAC transmission system can be designed and delivered in approximately 3 years as there is a greater understanding of the individual components. Due to experience of the use of HVAC technology, a number of assumptions can be made at the design stage so that components can be designed simultaneously.

3.14 In response to a question from the ExA regarding how the CfD process informs discussions with suppliers, Mr Guyton confirmed that there are a number of different components to preparing a CfD bid. For example, securing a DCO. The bid preparation process requires the Applicant to ascertain the end price and the Applicant will therefore need to undertake design development of some components to inform that process and engagement with suppliers will commence. The Applicant will then submit a bid(s) based on its understanding of the parameters in terms of timing and capacity. The scale and lead in times for construction of Hornsea Project Three will be informed by the Applicant's success in the CfD auction. The Applicant will then progress with the detailed design within the parameters of CfD bid and DCO.

3.15 Mr Guyton confirmed that at the point the DCO is decided, the Applicant will not know the type of transmission system that will be taken forward. The Applicant may have developed a business case for a particular transmission system but it will not be definite.

3.16 The ExA queried how the Applicant can make the cost assumptions required to submit a bid before deciding on the type of transmission. Mr Guyton explained that the bid or bids were based on assumptions and there would be an element of risk to the Applicant. Mr Guyton confirmed that the Applicant could put forward a range of bids for different designs and could submit bids for both HVDC and HVAC transmission systems and for a range of different capacities. Mr Guyton explained that the requirement is for the bid to be fully compliant in line with Government guidelines and then the Applicant

is free to offer alternatives. Mr Guyton confirmed that the number of bids the Applicant was intending to submit, and the make up of those bids, was not known at this stage. However, at the time of submitting any bid, certain assumptions would be made about the transmission system in order to inform the bid.

3.17 The ExA queried why a HVDC transmission system is only considered to be viable for very large windfarms and referred to Appendix 22: Transmission System (HVAC/HVDC) Briefing Note [REP1-164] where it explained that this was due to fixed costs whereas HVAC is more modular and scalable. Mr Parker confirmed that for HVAC, the cable is the smallest unit and this can be approximately 400MW. In contrast, an HVDC transmission system has large fixed structures such as converters. For a smaller HVDC transmission system the converters are still required and the costs do not scale. The smallest unit for a HVDC transmission system consists of a pair of converters with a cable between them. Therefore it is difficult to make an economic case for projects significantly under 1000MW using a HVDC transmission system. Mr Parker confirmed that HVDC is being considered as a viable option for Hornsea Project Three, even if delivered in two equal phases.

3.18 Mr Parker confirmed that if Hornsea Project Three is delivered in two phases it wouldn't rule out the use of a HVDC transmission system. In the event that the first phase used an HVAC transmission system, the use of a HVDC transmission system for the second phase would still be possible, depending on the capacity.

3.19 The ExA referred to the supply chain limitations set out in Appendix 22: Transmission System (HVAC/HVDC) Briefing Note [REP1-164]. The ExA asked whether the market would develop if more projects commit to using a HVDC transmission system. Mr Parker explained that there are currently only two major suppliers for HVDC transmission systems with a third supplier having more recently entered the market. The Applicant has been keenly observing the market but cannot currently say with certainty that the components for a HVDC transmission system would be available within the delivery timescale for Hornsea Project Three. Mr Parker confirmed that, as far as the Applicant is aware, there are no immediate market entrants waiting in the wings.

3.20 The ExA sought further clarification as to why Appendix 22: Transmission System (HVAC/HVDC) Briefing Note [REP1-164] states that if Hornsea Project Three had to commit to HVDC it could prevent the project from being delivered. Mr Parker explained that there are a number of technical aspects, for example there are currently only two suppliers with limited capacity to design and develop solutions. A number of other windfarm projects have been consented for HVDC only and therefore the Applicant would be competing for supply chain capacity with other interconnector and offshore windfarm projects. Mr Parker added that it was not clear now how many other projects will be coming forward and which projects the suppliers will decide to work with.

3.21 Mr Guyton referred the ExA to Table 2 of Appendix 22: Transmission System (HVAC/HVDC) Briefing Note [REP1-164]. Mr Guyton commented that all projects under construction are using a HVAC transmission system. Some projects have committed to using a HVDC transmission system, however this could change. For example, East Anglia Project One obtained consent for only HVDC but following the design process it submitted an application for an amendment to the DCO to use HVAC. Noting that the Applicant only has access to documents in public domain, Mr Guyton added that this demonstrates the difficulties of including only HVDC in the design envelope and the subsequent ability to build out the project. Mr Guyton clarified that the Applicant is not trying to dismiss HVDC but requires the option to use HVAC to ensure deliverability.

3.22 Gareth Phillips added that East Anglia Project One's application to switch to HVAC involved a 6 month process, plus pre application consultation, therefore resulting in a 9 month delay in making the consent fit for purpose. If East Anglia Project One had included HVAC in its original consent it wouldn't have needed to make such an application. This is why Hornsea Project Three is applying for alternatives, which is in line with the approach taken for Hornsea Project One and Hornsea Project Two.

3.23 The ExA referred to the current DCO application for Norfolk Vanguard, the ExA considered it to be a fair comparison and queried why Vattenfall can commit to HVDC in light of the similar geography and timeframe.

3.24 Mr Phillips commented that East Anglia Project One and the other projects listed in Table 2 of Appendix 22: Transmission System (HVAC/HVDC) Briefing Note [REP1-164] were also fair comparisons. Mr

Phillips explained that the Applicant was not aware of the precise reasons why Norfolk Vanguard was applying for only HVDC, and could not comment directly upon anther developer, but the Applicant assumed that there might be environmental or technical factors influencing that decision. Mr Phillips added that Norfolk Vanguard may also be adopting a less cautious process to risk. However, Ørsted is a leading offshore windfarm developer and has considerable experience to draw on. Mr Phillips reiterated that the Applicant's position is that there is a need for flexibility in order to deliver Hornsea Project Three.

3.25 Mr Phillips noted that East Anglia Project One had to apply to change from HVDC to HVAC post consent. Norfolk Vanguard could be seen as the anomaly in the industry and Table 2 in Table 2 of Appendix 22: Transmission System (HVAC/HVDC) Briefing Note [REP1-164] sets out all of the projects that have used HVAC to date. Mr Phillips commented that had Vattenfall not made a decision to commit only to HVDC it is unlikely that this discussion on transmission systems would be taking place. Mr Phillips explained that until Dogger Bank started construction, it would be difficult to say whether applying for only HVDC was the correct option for that project. Due to the supply chain difficulties, it is possible that applications will be made to change Dogger Bank and other projects in the future. Mr Phillips reiterated that the Applicant's approach was tried and tested, and the prudent approach to take.

3.26 Mr Parker referred the ExA to section 9 of Appendix 22: Transmission System (HVAC/HVDC) Briefing Note [REP1-164] which sets out the reasons for and considerations which could be expected to be taken into account when making a decision regarding the transmission system.

3.27 The Applicant noted that NCC and NNDC expressed a preference for the use of a HVDC transmission system, accepted the need for flexibility in the DCO, did not object to the inclusion of a HVAC transmission system in the application, and confirmed that it's case was not that the DCO should only be granted for a HVDC transmission system.

3.28 The Applicant notes that SNC expressed a strong preference for a HVAC transmission system due to the impacts associated with the maximum height of the HVDC converter station on heritage assets, in particular Keswick Hall and its setting, and landscape and visual impacts. However, SNC accepted that the harm caused to Keswick Hall and its setting would be less than substantial and appreciated the arguments made by the Applicant for flexibility. SNC confirmed that its case was not that the DCO should only be granted for a HVAC transmission system.

3.29 The Applicant notes that NE expressed support for the need for flexibility and the inclusion of both HVDC and HVAC transmission systems. However, NE expressed a strong preference, from an environmental perspective, for a HVDC transmission system as it would reduce the number of cables in designated sites offshore. NE confirmed that its case was not that the DCO should only be granted for a HVDC transmission system.

3.30 The Applicant notes that N2RS, the NFU and CPRE Norfolk also expressed a preference for a HVDC transmission system but also confirmed that its case was not that the DCO should only be granted for a HVDC transmission system.

3.31 **Implications of the choice of HVAC/HVDC for the onshore infrastructure, including the cable corridor, booster station and converter station/substation:**

3.32 The ExA referred to Figure 3.32 in Chapter 3 – Project Description of the Environmental Statement (**ES**) [APP-058]. The ExA also referred to Table 6 in Appendix 22: Transmission System (HVAC/HVDC) Briefing Note [REP1-164] and requested further information regarding the number of circuits required for a HVDC transmission system.

3.33 Mr Parker explained that Table 6 included a specific type of topology that had not yet been deployed to date for an offshore system. This type of topology was considered to constitute the maximum parameters and had been included in envelope in case it offers advantages in terms of efficiency.

3.34 Mr Parker confirmed that a HVDC transmission system will have up to 4 circuits and the design will depend on the capacity of the final design. Mr Parker explained that the AC circuit was to enable energisation of the HVDC system. The ExA sought further explanation for the option to have 4 HVDC cables and one HVAC cable. The Applicant subsequently confirms that the specific and emergent HVDC topology in question uses Diode Rectifier Units (DRU) in the offshore DC converter station which are

passive devices that cannot control the voltage or stability of the offshore network. This function, therefore, must be performed by the offshore wind turbines, and the additional HVAC cable (or 'umbilical') enables the wind turbines to be energised in advance of the HVDC link. The umbilical cable may be disconnected once the HVDC link is operational and the offshore turbines are controlling the stability of the offshore grid. The applicant would refer the ExA to Appendix 18 to Deadline 3 submissions where further information can be obtained.

3.35 The ExA queried why this was required if the windfarm generated electricity in AC. Mr Phillips confirmed that the Applicant would respond in writing and further details are set out in Appendix [1] to this Written Summary.

3.36 Mr Parker confirmed that the same number of circuits would be required onshore and offshore.

3.37 The ExA referred to paragraph 10.9 of Appendix 22: Transmission System (HVAC/HVDC) Briefing Note [REP1-164] which states that the maximum number of HVAC cable circuits is 6 and the maximum number of HVDC cable circuits is 4. The ExA queried how the additional AC circuit in the HVDC transmission system fitted into this.

3.38 Mr Parker confirmed that should it be required, the additional AC circuit would be designed within the existing trenches and maximum design envelope. However, Mr Parker reiterated that the additional AC circuit was not a mandatory requirement and just one type of HVDC system that could be deployed.

3.39 In respect of Table 8 of Appendix 22: Transmission System (HVAC/HVDC) Briefing Note [REP1-164], Mr Parker confirmed that the maximum number of transition joint bays for a HVDC transmission system is 4 bays including the additional AC circuit if required.

3.40 In response to a query from the ExA regarding the number of link boxes referred to in Table 10 of Appendix 22: Transmission System (HVAC/HVDC) Briefing Note [REP1-164], Mr Parker explained that a link box is needed to balance standing voltages (as well as system earthing) and this need does not occur in a HVDC transmission system. However, link boxes are still required for earthing a HVDC transmission system. Mr Parker confirmed that this meant that significantly less link boxes are required for a HVDC transmission system compared to a HVAC transmission system.

3.41 The ExA referred to Figure 3.32 in Chapter 3 – Project Description of the ES [APP-058] which stated that a HVAC transmission system would have a permanent corridor of 60m in width and a temporary corridor of 80m in width. Mr Guyton referenced Figure 3.36 in Chapter 3 – Project Description of the ES [APP-058] which shows grid connection export cable corridor indicative layout. This layout would be similar to that applied to a HVDC transmission system which would have a permanent corridor of 40m in width and a temporary corridor of 68m in width. These parameters are set out in Appendix 22: Transmission System (HVAC/HVDC) Briefing Note [REP1-164]. In response to a query from the ExA as to how the corridor width has been calculated, Mr Guyton confirmed that the width was derived from the total number of cables, the width of each trench, the spacing between cables, soil storage and the haul road. For a HVAC transmission system, Mr Guyton confirmed that the typical permanent width is 60m and the temporary width is typically 80m for a HVAC transmission system. Mr Guyton emphasised that this was the worst case scenario as set out in Table 7 of Appendix 22: Transmission System (HVAC/HVDC) Briefing Note [REP1-164]. My Guyton confirmed that approximately 10m was required per cable and agreed to provide an indicative diagram for a HVDC layout. An indicative diagram is set out in Appendix 2 to the Applicant's Deadline 3 submission, which shows the 68m wide HVDC corridor.

3.42 The ExA referred to the HVAC booster station and understood that a HVAC transmission system requires reactive compensation referred to by the applicant in documents to date as a booster station at the midpoint and the booster station could be located offshore, onshore or subsea. The ExA queried whether the midpoint is offshore and whether there is an option for only an offshore booster station.

3.43 Mr Parker confirmed that the "midpoint" in this context could be anywhere between the offshore and onshore connection point. The detailed design phase will determine the location of the booster station and will be based on cable system design. Mr Parker confirmed that the booster station could be located offshore, onshore or a combination of the two, noting that the provisional onshore and/or offshore locations have been stipulated in the application.

3.44 The ExA queried whether a HVDC transmission system may be preferable for long distances. Mr Parker explained that it has been economically possible to extend the length of cables for HVAC beyond the capability previously thought as demonstrated by the systems designed for Hornsea Project One and Hornsea Project Two. Mr Parker was therefore hesitant to put figure on the maximum length for a HVAC transmission system.

3.45 Mr Guyton confirmed that in the event that a HVDC transmission system was selected and the onshore HVAC booster station was not required, new connection rights as opposed to the freehold acquisition would be sought over plot 9--012 and it would be a different shape. The ExA commented that it would explore this issue further at the compulsory acquisition hearings.

3.46 My Guyton confirmed that the same parameters and landscaping would be required for the HVDC converter station and the HVAC substation and therefore the land take remains the same for both options.

3.47 **Approach to phasing, including the effect of the Contract for Difference process on the delivery of the project; whether the approach assessed in the ES is adequately secured in the draft DCO:**

3.48 The ExA referred to the next round of CfD auctions taking place in May 2019, then in 2021 and then every 2 years with 4GW per auction (with up to 2GW per delivery year). The ExA queried whether the CfD process is the main driver for phasing or whether it was due to other factors such as funding or the supply chain.

3.49 Stuart Livesey explained that the requirement for phasing was due to a number different variations and CfD is one factor that may influence how Hornsea Project Three is built out. Mr Livesey referred to the recent announcements (20th November 2018) from the Department of Business, Energy and Industrial Strategy (**BEIS**) that confirmed that there would be a 6GW capacity cap across all technologies in the May 2019 CfD auction round. Assuming the Applicant is unable to submit a bid in May 2019, the Applicant's success in future auction rounds will depend on the capacity cap available and competition at that stage from other developers. Mr Livesey explained that other factors that may result in the need to phase the construction of Hornsea Project Three relate to the supply chain constraints for a HVDC transmission system and wind turbines. Mr Livesey confirmed that there are currently two main turbine suppliers and therefore limitations on the quantity of turbines that can be produced for each project. In addition, constraints on cable manufacture and installation vessels will limit how and when projects can be taken forward.

3.50 In response to a query from the ExA relating to how the CfD timeline fits with the consenting process, financial investment decision and construction start date, Mr Livesey confirmed that the Applicant would be unable to bid in the next auction round if held in May 2019 (as the DCO would not have been granted) and therefore the Applicant anticipated being ready to submit a bid in the 2021 auction round.

3.51 In response to a query relating to alternative means of funding, Mr Livesey explained that alternative funding is relatively new for an offshore windfarm of this scale, however, it would be possible through either divestment or a power purchase agreement. For example, power purchase agreements were in place for Hornsea Project One. Alternatively, Mr Livesey confirmed that Ørsted may decide to fund Hornsea Project Three internally.

3.52 Oliver Palasmith explained that a power purchase agreement works in a similar way to a CfD through guaranteeing a fixed price for electricity, but the counterparty is not the UK Government but another party such as a utility or a corporate entity. Mr Palasmith confirmed that an offshore wind developer could alternatively sell electricity on the wholesale market at the market rate. This would involve more risk for the offshore wind developer but still constituted a viable alternative.

3.53 In light of the discussions on the CfD process, the ExA queried the expected start date on site. My Guyton confirmed that the Applicant anticipated starting on site in 2023 if the Applicant was successful in the 2021 CfD auction round. However, it was possible that construction could start construction from 2022 for some parts of the project.

3.54 **Approach to laying the onshore export cables in ducting, including a scenario in which the project may be delivered in phases:**

3.55 The ExA referred to the Applicant's commitment to install ducting for Phase 2 at the same time as installing ducting for Phase 1 set out in the Applicant's Response to First Written Question Q1.1.6 and Q1.9.7.

3.56 Mr Guyton explained that the ability to direct lay the cables was originally included in the envelope for Hornsea Project Three. In response to concerns raised by stakeholders and landowners relating to direct lay, the Applicant agreed to remove direct lay and committed to duct the onshore cables as it will reduce the time trenches are open and allows for drainage to be restored quicker.

3.57 Mr Guyton explained that the Applicant was not committing to pre-duct for the second phase. As set out in paragraph 1.1.1.6 of the Outline Code of Construction Practice (**CoCP**) (Revision 1) [REP1–142], the Applicant would install the ducts for Phase 2 as part of the Phase 1 works in the event that both phases have been awarded a CfD in the same auction round. The Applicant would also install ducts for Phase 2 as part of Phase 1 if Phase 2 secures a Final Investment Decision.

3.58 The ExA queried what circumstances would result in the Applicant constructing Phase 1 without installing the ducts for Phase 2. The ExA noted that given compulsory acquisition powers are being sought for the whole scheme then the Applicant must be confident that the whole scheme can be delivered.

3.59 Mr Guyton confirmed that it would not be possible to install the ducts for Phase 2 if the cable design was not yet known. Mr Livesey added that the design of the ducts would be dependent on whether a HVAC or HVDC transmission system was being used and the HVAC cable width could be wider or thinner depending on the capacity. Mr Livesey explained that pre-empting the design of the ducts could limit delivery and capacity.

3.60 The ExA queried whether ducts could be installed for Phase 2 that would be suitable for a range of possible specifications, for example installing ducts for the upper range in terms of widths or spacing. Mr Livesey explained that whilst a number of assumptions could be made, the Applicant would need to build in a degree of contingency which could limit voltage due to the installation method and size.

3.61 Mr Parker added that the duct design is determined by the size of the conductor, range of voltage and length of cable in a single drum. In addition, there is no guarantee that the jointing bays would be in the correct location depending on the final design of Phase 2.

3.62 In response to a number of hypothetical scenarios proposed by the ExA, Mr Guyton confirmed that if a HVAC system for half the capacity was installed for Phase 1 then all options would be available for Phase 2. However, there may be a preference for consistency across both phases.

3.63 In response to comments made on behalf of the NFU, N2RS, MMO, NE and NNDC in respect of phasing and ducting, Mr Livesey reiterated that if Hornsea Project Three was delivered in one phase then all the ducts would be installed. If Hornsea Project Three was delivered in two phases, then the Applicant would install the ducts for Phase 2 at the same time as installing the ducts for Phase 1 if there was a CfD or financial investment decision for Phase 2. However, in the absence of a CfD or financial investment decision then the Applicant would not know the capacity of Phase 2. Mr Livesey confirmed that whilst it might be possible to make certain assumptions there was a risk that the ducts might not be suitable or efficient for the final design of Phase 2 as the capacity determines the cable design.

3.64 Mr Phillips explained how certainty in respect of funding influences the conditionality of the Applicant's commitment to pre-duct Phase 2. If that if funding is in place then the Applicant knows the size of each phase. In light of future CfD auction rounds having a capped capacity, the final capacity of Phase 2 will not be known until the funding process is complete. Once the capacity is known, the Applicant can complete the design of the various elements of the transmission system. If funding is only obtained for Phase 1 in the 2021 CfD auction then at that point in time the size of Phase 2 will be unknown and cannot be accurately predicted. As the Applicant cannot predict the size, it will not be able to fix the type of transmission system or specification.

3.65 Mr Phillips noted that improvements in offshore wind technology are rapid. The law requires the Applicant to sell the transmission assets to an Offshore Transmission Owner (**OFTO**) and the price that is paid is determined by OFGEM. The costs incurred for Phase 2 as part of Phase 1 may not be recoverable

through this process and ultimately that will go against the Government's aim of reducing energy costs for consumers.

3.66 In respect of the case for compulsory acquisition powers for Phase 2, Mr Phillips explained that compulsory acquisition powers are being sought to deliver the whole project and the Applicant intends, and believes it will be able, to do so. Uncertainty in respect of CfD and the timing of Phase 2 does not undermine the compelling case for the inclusion of those powers for Phase 2 in the DCO.

3.67 In response to comments made on behalf of the NFU, Mr Phillips explained that the ES has assessed a maximum three[1] year "gap" between phases. This "gap" was linked to CfD auction rounds and lead in periods for different components. The length of time that agricultural land would be out of production was a compensation matter. Mr Phillips confirmed that if landowners are unable to produce crops then they will be compensated by the Applicant.

3.68 In response to comments made on behalf of NNDC in relation to NPS EN3 and flexibility, Mr Phillips explained that paragraphs 2.6.42 and 2.6.43 of NPS EN3 do not set out any criteria for flexibility, or the degree to which aspects of an NSIP must be unknown in order to take the benefit of that policy support for flexibility. NPS EN3 is not expressed in such restrictive terms. The policy is simply that a DCO may provide for flexibility in respect of unknown or uncertain aspects of a project. This must be correct because one needs to know the parameters of uncertainty in order to form the Rochdale Envelope for the ES and carry out EIA. If the support for flexibility in EN3 only related to entirely unknown aspects of a project, that policy would rendered ineffective because one couldn't carry out the necessary assessments. Mr Phillips added that just because the Applicant knows the types of technologies it may deploy, that does not mean that the Applicant knows all of the individual elements. Mr Phillips referred to the different HVDC types mentioned by Mr Parker and reiterated that the Applicant does not know what the final design will consist of. Paragraphs 2.6.42 and 2.6.43 of NPS EN3 envisage the need for flexibility due to long lead in times. It states that flexibility can be provided for in a DCO provided that the flexibility has been taken into account in ES. Mr Phillips confirmed that that is what the Applicant has done in this case.

3.69 Mr Phillips added that the Applicant is not disputing that Norfolk Vanguard is a comparator project, as are all the other projects listed in Table 2 of Appendix 22: Transmission System (HVAC/HVDC) Briefing Note [REP1-164]. However, the Applicant has concerns over the availability and reliability of HVDC technology.

3.70 Mr Phillips summarised that each of the Interested Parties present had expressed a preference in respect of the type of transmission system and that not all were in favour of HVDC. Mr Phillips added that all of the Interested Parties had recognised the need for flexibility in the DCO and all had confirmed that neither technology should be excluded from the DCO. Mr Phillips reiterated that it would not be a cautious or prudent approach for the Applicant to commit to only one type of transmission system at this stage.

3.71 In response to comments raised by SNC in respect of impacts on heritage assets, Mr Phillips commented that there was a difference in professional opinion as to significance of the heritage assets and setting. However, whichever opinion is taken, both the Applicant and SNC have assessed the impacts of Hornsea Project Three to be "less than substantial harm" in policy terms. SNC agreed with that position. As set out in Section 5.8 of NPS – EN1, the Secretary of State must therefore balance the public benefits of Hornsea Project Three against any harm caused to the heritage assets. Mr Phillips confirmed that the Applicant's position is that Hornsea Project Three meets the urgent national need for renewable energy and the public benefits therefore outweigh the less than substantial harm to heritage assets. None of the IPs challenged that position.

4. AGENDA ITEM 4 – ONSHORE ECOLOGY

4.1 **Effects on pink-footed geese, including alternative approaches to mitigation; how any mitigation would be secured:**

[1] Mr Phillips originally referred to a two year gap but this was corrected to three years later in the hearing.

4.2 The ExA asked whether there was an update on the mitigation plan for pink-footed geese. NE stated that it was waiting for a draft mitigation plan from the Applicant.

4.3 Celestia Godbehere explained that the Applicant has committed to providing a mitigation plan for pink-footed geese in the 12 months preceding commencement of construction and the Applicant was not intending to produce a draft mitigation plan now. Ms Godbehere explained that the type of mitigation would be dependent on the final design of Hornsea Project Three and whether sugar beet is being grown in the fields on which the onshore cable corridor is located within the range and timing pink-footed geese are predicted to forage.

4.4 In response to a query from the ExA as to how the Applicant can be confident that there will be no adverse affects on pink-footed geese, Robin Ward explained that the pink-footed geese population was increasing, including the population wintering in Norfolk, the latter increase mainly due to the availability of food resources during winter. In particular, the availability of post-harvest sugar beet, a food resource until ploughed back into the field. Mr Ward explained that the Applicant's understanding from survey work is that there is a lot of post-harvest sugar beet available from November to January. Mr Ward also noted that the area utilised for feeding by pink-footed geese in North Norfolk has been extending eastwards accompanied by the establishment of a new roost.

4.5 Mr Ward confirmed that in his opinion removing the cable corridor as a food resource would not be an issue. The pink-footed geese in this location have access to a huge food resource and are taking advantage of this. The population is not reducing and thinning out. Mr Ward added that through cultural learning the pink-footed geese population is realising that further food resources are available.

4.6 Ms Godbehere explained that the pink-footed geese mitigation plan strategy, which has been discussed with the RSPB, aims at reducing potential disturbance to pink-footed geese instead of creating additional food resources. The Applicant's aim, should mitigation be deemed necessary, is to reduce intrusive works within the cable corridor between November and January inclusive as opposed to planting alternative foraging habitat or preventing sugar beet being planted in the cable corridor. For example, works relating to fencing and trenching may be restricted as a potential mitigation measure, as these travel gradually along the cable corridor and therefore have the greatest potential for disturbance. Additionally, contractors working within the affected area and time periods will be given toolbox talks so that they are fully aware of the potential impacts on pink-footed geese. Ms Godbehere confirmed that cable installation, due to the commitment to a ducted installation, will be undertaken on a point to point basis which reduces the potential for disturbance, and a decision to proceed will be made at the time based on the sensitivity of the geese to the proposed works. If required, the Applicant will stop works.

4.7 The ExA sought clarification as to whether this meant that the Applicant would essentially be reacting to the situation on the ground. Ms Godbehere clarified that the pink-footed geese mitigation plan would clearly set out the restrictions. The Applicant is intending to insert further wording into the Outline CoCP to clarify the principles ot the Pink Footed Geese Mitigation Plan and is discussing this with the RSPB.

4.8 The ExA referred to the geese refuge plan suggested by RSPB and how this would interact with landowners and necessitate a change to crop rotation cycles.

4.9 Ms Godbehere explained that discussions with the RSPB have moved on since the RSPB submitted written representations and the RSPB is now happy with the proposed mitigation as long as it deals with all potential impacts on the pink-footed geese. Ms Godbehere added that pink-footed geese aren't exclusively feeding on sugar beet and the Applicant's mitigation plan will take into account all scenarios where Hornsea Project Three would encounter the pink-footed geese. Ms Godbehere confirmed that the RSPB was supportive of the pink-footed geese mitigation plan being annexed to the final CoCP. Ms Godbehere explained that the pink-footed geese mitigation plan will be approved by NE before it is included in the final CoCP that is submitted to the relevant planning authorities for approval.

4.10 In response to a query from the ExA as to whether an outline mitigation plan could be provided, Ms Godbehere explained that the Applicant does not have any more details than the principles set out in paragraph 6.5.1.40 of the Outline CoCP [REP1–142]. Ms Godbehere reiterated that the final design of Hornsea Project Three will determine the impact on pink footed geese and the type of mitigation measures required. Therefore, the Applicant does not consider that it would be appropriate at this stage to provide an outline mitigation plan due to the need for more certainty regarding project design.

4.11 The ExA sought further clarification on the type of restrictions to works within this section of the cable corridor. Ms Godbehere confirmed that details of the potential restricted works would be added to the next revision of the Outline CoCP to be submitted at Deadline 4. Compliance with the Outline CoCP is secured through Requirement 17 of the DCO [REP1-127].

4.12 The Applicant notes that NE would prefer an outline mitigation plan to be submitted into Examination and that NE's position is that whilst adverse effects cannot be ruled out they are unlikely. Mr Ward confirmed the Applicant's position that no significant adverse effects are predicted in relation to pink-footed geese. On that basis, a mitigation plan is not strictly necessary, but nonetheless has been offered to allay the concerns of IPs.

4.13 Mr Ward noted that the area of the cable corridor that the pink-footed geese are foraging within is "functionally linked habitat" and not within the SPA. NE confirmed that this was correct.

4.14 In response to comments made by NE regarding the approach taken on East Anglia One and East Anglia Three for other Annex 1 geese, Mr Ward explained that for pink-footed geese the issue on Hornsea Project Three relates to feeding not roosting. Mr Ward confirmed that the area of available food resources within the vicinity of the SPA is large and that pink-footed geese are known to forage across this "functionally-linked habitat" out to 10.4 km from the nearest roost (in the SPA). According to Scottish Natural Heritage (2013) Guidance. Assessing Connectivity with Special Protection Areas (SPAs)., pink-footed geese have a foraging range of up to 20 km from roost. Mr Ward concluded that no constraints on food supply are anticipated. The pink-footed geese use several fields at the same time and also feed on cereals. Mr Ward added that based on his experience of catching pink footed geese for GPS tracking in North Norfolk, birds following such a disturbance event soon return to the field in which the capture event occurred.

4.15 In response to a query from the ExA regarding the other foraging sites available, Mr Ward confirmed that currently 50% of the post-harvest sugar beet fields available within 10.4 km of the roosts (and within the area surveyed by the applicant along the cable corridor) were not (at the time of a survey) being used. Mr Ward added that the expansion of the feeding range of the pink footed geese was ongoing.

4.16 **Any other matters:**

4.17 The Applicant notes that NE confirmed that there are no outstanding points of concern relating to bats.

4.18 In response to a query from the ExA relating to why some hedges with high levels of bat activity qualified for HDD, Ms Godbehere explained that the decision was not based entirely on ecology. Mr Guyton added that the HDD locations were driven by obstacles such as roads, woodland and rivers and not specifically related to the quality of hedges. The crossing schedule annexed to the Outline CoCP [REP1-142], co-locates different items so if there was a need to HDD a road and a hedge was located adjacent to the road then that might be a reason to extend the HDD under hedge. In circumstances where there is a hedge alone, that didn't necessarily warrant a HDD.

4.19 In response to a query from the ExA regarding hedge removal and mitigation in respect of the commuting route for bat species, Ms Godbehere explained that where high bat activity is identified then there will be mitigation measures put in place but the Applicant's assessment does not require HDD in that location. Ms Godbehere confirmed that the temporary measures would include artificial hedgerows during construction and afterwards.

4.20 The Applicant notes that NE was satisfied that suitable mitigation for bats would be included in the CoCP and EMP and had no further comments.

4.21 In response to a query from the ExA relating to reptiles and different levels of detail between paragraph 6.5.1.19 of the Outline CoCP [REP1-142] and the Outline Ecological Management Plan (Revision 1) [REP1-147], Ms Godbehere confirmed that the measures will be consistent and the next version of the Outline CoCP will be updated accordingly.

4.22 The Applicant notes that NE confirmed that the heavy rainfall issue relating to surface runoff adversely affecting Booton Common has been resolved.

4.23 In response to a query from the ExA relating to the control of release of settlement lagoons in close proximity to SACs and SSSI, Ms Godbehere explained that the Applicant would control bentonite levels with tankers capable of responding to extreme weather events. Ms Godbehere confirmed that further detail would be added to the next version of the Outline CoCP in line with the Applicant's response to ExA Q1.4.7.[2]

4.24 In response to comments made by CPRE Norfolk relating to undesignated ecologically valued areas and the use of HVAC and HVDC transmission systems, Ms Godbehere confirmed that the Applicant had fully assessed the impacts on a worst case scenario. However, the Applicant was intending to HDD at most watercourse locations subject to restrictions.

4.25 In response to a comment from NNDC relating to the timeframe for replacement planting, Ms Godbehere confirmed that the clock starts when the hedgerow is planted and if the hedgerow is removed for Phase 2 then the clock will start again when the hedgerow is replanted. Ms Godbehere explained that the Applicant considers that a 5 year management period is sufficient to enable replacement hedges to establish and mitigate Hornsea Three's impact from an ecology and landscape perspective.

5. AGENDA ITEM 5 – NAVIGATION AND OTHER OFFSHORE OPERATIONS

5.1 **Design principles for the array, including spacing of WTGs, lines of orientation and degree of tolerance for siting WTGs:**

5.2 The ExA asked for clarification of the lines of orientation of the turbines, and their typical spacing, as although minimum spacing is specified as 1km, typical spacing could be a lot more. Meltem Duran clarified that two indicative layouts have been assessed (as set out in figures 3.9 and 3.10 of the Project Description chapter of the ES [APP-058]). Ms Duran confirmed that the maximum spacing is contained in layout B, which has a 5.6km typical spacing, but the as built figure will depend on the final number of turbines, along with the type of turbines to be used and the seabed conditions. For a 300 turbine array, the spacing between turbines would typically be 2km between centre points, with an approximate gap between blades of 700 metres, depending on the final design of the turbine.

5.3 Responding to an ExA query on design principle 3, relating to search and rescue lanes, Samantha Westwood advised that the width requirement is taken from Maritime and Coastguard Agency ("**MCA**") SAR Annex 5 guidance, which sets the minimum tip to tip distance (or centre point of the turbine, depending on whether the blades can be locked) of 500 metres. The exact minimum spacing values vary within in any wind farm array, although most current wind farms tend to be in excess of the minimum 500m required.

5.4 The ExA asked for an update on the discussions over having two or one line of orientation of the turbines. Ms Westwood advised that MCA Guidance note MGN 543 states that developers should plan for two lines of orientation, unless they can demonstrate that one is acceptable. Ms Westwood confirmed that the Applicant has made a safety case (within the NRA) that one line is acceptable, and therefore the design principles should allow for this.

5.5 In response to an ExA question, Ms Westwood confirmed that the MCA guidance on lines of orientation is based upon both surface and airborne search and rescue, with a determination on what requirements are needed to be based on where the wind farm is located (case by case) and the marine traffic is located within it. In the Applicants opinion and based on the assessment undertaken as part of the NRA Hornsea Three is a low trafficked area.

5.6 **Effects on Search and Rescue capability, including the need for helicopter refuges as suggested by the Maritime and Coastguard Agency:**

5.7 The ExA asked for an update on design principle 5, and the requirement for at least one perpendicular helicopter refuge area. Ms Westwood advised that the Applicant is still in discussions with the MCA on principle 5, which is based on the MCA guidance where wind farms' lanes are over 10 nautical miles

[2] Post-hearing note: the Applicant can confirm that the measures described at the hearing are already included in the version of the Outline CoCP submitted at Deadline 1 [REP1-147] in paragraph C1.4.3

("**nm**"). She clarified that this is not based on the lines of orientation discussion but is an issue of access to and from the array.

5.8 In response to an ExA question, Ms Westwood confirmed that the Applicant's contention is that a helicopter refuge may be a requirement, rather than a must have. To clarify, the Applicant considers that there is no technical evidence to suggest the need for the helicopter refuge area in the array.

5.9 The ExA asked that a further updated version of the design principles be submitted at deadline 3.

5.10 Mark Prior on behalf of the Applicant clarified in response to an ExA question that under normal circumstances a search and rescue helicopter could enter the array from the side due to the large turbine spacings, but if there were fog, the pilot would descend and use the SAR lanes to transit the array.

5.11 Mr Prior advised the ExA that a helicopter has a maximum turn diameter of 0.5nm, although a crew would tend to bank to turn tighter than that. In bad weather, the helicopter could turn 180 degrees either within the lane that is being searched, or if using a more general search pattern, by turning from one lane to the next.

5.12 Regarding spacing between blades, Mr Prior advised that during a search and rescue mission, the turbine blades would be stopped and turned away to allow more space for operations. Additionally, the crew would take into account equipment and radar to map out turbine locations which would also be on a moving map. Use of AIS to mark significant structures within the array would be a useful mitigation to resolve the helicopter refuge area concerns, especially when combined with a minimum spacing of 1km.

5.13 Ms Westwood addressed an ExA question on the 150m tolerance for each turbine location, stating that the Applicant had a taken a proactive approach in layout design to prevent lengthy negotiations post consent. This 150m tolerance would allow maximisation of wind energy capture whilst maintaining safe navigation and access. The normal 50m micrositing allowance would be for local obstacles, for example, seabed conditions. A framework would be created to agree the layout post consent. It was noted that two other consented wind farms have DCOs allowing a 150m tolerance.

5.14 Ms Westwood advised that although the typical turbine spacing may be more than the MGN 543 recommended 1nm in width, the reason for not committing to a helicopter refuge area is that the Applicant does not consider this to be a requirement, and providing for this would restrict layout design.

5.15 **Aviation warning lighting, including whether this should be the subject of a separate requirement/condition as suggested by the Defence Infrastructure Organisation:**

5.16 Mr Phillips confirmed that a suggested condition on aviation warning lighting proposed by the Defence Infrastructure Organisation was under discussion and an agreed solution would be included in the iteration of the DCO.

5.17 **Effects on offshore oil and gas operations:**

5.17.1 **Collision risks in relation to support vessels/other shipping:**

5.17.2 Ali MacDonald addressed concerns from Spirit Energy ("**SE**") on third party vessel diversion to the east of the proposed location of Hornsea Project Three. Mr MacDonald confirmed that as part of baseline surveys commercial vessel operators had been consulted, and had confirmed that they would not go through a wind farm array. Additionally, MCA guidance note MGN 372 advises that the array should be avoided. The operators can reasonably be expected to choose the most economical and safe route possible. Mr MacDonald added that vessels travelling east could reasonably be expected to navigate north or south of the array before joining the "Traffic Separation Scheme" to the east of the Chiswick and Grove platforms. It is not likely that those vessels, having passed the array, would turn sharply north or south so as to sail close to those platforms.

5.17.3 Ms Westwood supplemented this by stating that a hazard workshop had been held, with maritime consultees including SE. The consensus from consultees was that commercial vessels would not transverse through the array. She added that although Hornsea Project

One and Hornsea Project Two were not considered as part of the baseline in the Navigational Risk Assessment [APP-112], they were considered as cumulative projects, as they had not yet been constructed at the time the NRA and ES was undertaken.

5.17.4 Responding to ExA questions on the possibility of a vessels on the eastern edge of Hornsea Project Three drifting towards SE platforms at a speed of up to 4 knots, Mr MacDonald stated that this speed would be quite extreme, given that the tidal rate is 1.1 knots. He opined that a rate of 1-2 knots would be more reasonable in this area. At this speed, it could take between 30 minutes and to two hours to travel to the nearest platform locations, with in the order of 20 minutes' warning being needed to down man the platform (based on the J6A platform emergency response procedures). Mr MacDonald was not aware of any collisions of this nature in the North Sea.

5.17.5 Regarding the likelihood of increased drifting vessel collision risk due to more vessels being in the area, Mr MacDonald advised the ExA that there have been very few incidents of collisions in arrays to date, in areas where these vessels are working with turbines and other structures in close proximity all around them. The vessels would generally only be present in reasonable weather, but mitigation in such a scenario could be for the vessel to drop its anchors. Mr MacDonald also pointed out that there are other examples of large vessels and drilling rigs servicing the oil and gas industry close to wind farms, for example SE's Rhyl field in the Irish Sea, which is 1.1nm from the nearest turbine.

5.17.6 Responding to SE comments regarding collision risk, Mr MacDonald stated that there are many examples in Southern North Sea of large offshore vessels being close to multiple offshore platforms as well as the same vessels working within wind farms. Procedures and mitigations are in place to take account of such structures, and the vessels and crews serving the offshore wind farms are normally the same as those serving the oil and gas platforms. Therefore, all are well experienced in navigating around these offshore installations. Mr MacDonald explained that the presence of a windfarm would need to be taken into account by other operators, but that it can be accommodated due to the 1.5nm distance, and that some of the vessels used by the offshore wind farm industry are the same as those working for oil and gas (e.g. in decommissioning operations).

5.17.7 **Helicopter operations:**

5.17.8 Emily Wood advised in response to an ExA question that deviation due to icing would only occur in low level icing conditions, and in any event certain helicopters are not licenced to fly in such weather. Frequency of icing conditions was anticipated to be 1% and so is not considered to be significant. Max Rowe of SE concurred with this and confirmed that this was not a major issue for SE.

5.17.9 Regarding an ExA query and SE comments on the point that instrument approaches are undertaken for 5% of the time, Dr Wood clarified that this does not mean that 95% of the time it is good weather. For 5% of the time, an airborne radar approach is needed. A standard procedure is for a pilot to fly in instrument meteorological conditions ("**IMC**"), and then descend below cloud at 500 feet to a visual meteorological conditions level. Dr Wood mentioned that the J6A platform is an accommodation hub for SE, and that the approach to this platform would not be affected. The Chiswick and Grove platforms are unmanned and must therefore be able to be controlled remotely, and so there is no need for around the clock access for safety reasons. Further, the Chiswick and Grove platforms only have certification for daytime landings only and it is possible as they are unmanned that they may have IMC restrictions. IMC restrictions as presented in the ES would only impact four days per year and it is possible that these restrictions may fall away entirely.

5.17.10 In response to an ExA question on one engine inoperative (OEI) during a missed approach, Dr Wood confirmed that this had been assessed, considering a 30 degree approach offset and 45 degree turn away. For OEI this could follow a missed approach track, albeit more slowly, whilst maintaining 1 nm separation from the turbines. SE confirmed that this approach was feasible. Richie Hinchcliffe pointed out that the simulator trials undertaken by SE for missed approach engine failure were an unlikely worst case scenario involving the pilot flying

directly towards the turbines that did not take account of factors such as the pilot's ability to undertake compound turns, or offset its approach.

5.17.11 Mr Phillips confirmed that a meeting was arranged between SE and the Applicant for 17 December to discuss technical issues, and that the ExA could request an update in the written questions due on 20 December. Mr Phillips asked SE to confirm whether its existing platforms were subject to IMC restrictions.

5.17.12 **Effects on future oil and gas operations:**

5.17.13 Mr Phillips responded to comments from SE regarding two proposed wells within 0.5nm of the edge of the array area advising that although there had been ongoing dialogue for some time between the Applicant and SE, these speculative wells had not been mentioned until SE's DL1 submission, despite that submission having asserted that plans for those wells were well developed. Whilst those wells apparently fall within an existing licence block, SE is required to obtain express consent for them from the OGA and, contrary to the assertions of SE, that is not just a formality. SE would be required to show detailed plans and demonstrate the wells are feasible, and can be implemented in a safe and environmentally sensitive manner.

5.17.14 Mr Phillips submitted that there was no information on the proposed wells or when they would come forward, and so as a matter of law, it was not necessary to include the wells in the EIA. It would also be unreasonable for known development plans for a wind farm to be subject to speculative wells, which might never be developed. Given the speculative nature of the wells, it was not necessary for the Applicant to offer mitigation. Ultimately, SE's position is protected by the "Oil and Gas Clause" in the Applicant's agreement for lease with The Crown Estate.

5.17.15 **Proposals for mitigation suggested by Spirit Energy:**

5.17.16 Mr Phillips stated that there was currently no justification for providing protective provisions for Spirit Energy. He reiterated that the Applicant has provided workable aviation and maritime solutions so as to prevent an impact on SE. Without prejudice to that, if the ExA was minded to recommend protective provisions, those suggested by SE would not be acceptable as they are tantamount to an exclusion zone in much of the array area. In summary, Mr Phillips said that both the Applicant and SE are required by policy to co-operate and facilitate coexistence, and this project raises nothing new in the context of offshore wind and oil/gas proposals to date. This issue could be revisited following the outcome of technical discussions and consideration of technical evidence.

5.18 **Extent of agreement in relation to the Fisheries Co-existence and Liaison Plan:**

5.19 Fiona Nimmo advised the ExA in response to comments by the National Federation of Fishermen's Organisations ("**NFFO**") that a proposed 1,000m advisory safe passing distance would apply to cable laying vessels in exceptional circumstances, with a 500m zone advisory safe passing distance, being advised as standard in the line with the 500 m safety zone around structures.. An example of when a 1,000m advisory safe passing distance would apply would be a cable installation vessel with extensive towed equipment. Further clarity on the advisory safe passing distance would be included in the forthcoming update to the fisheries co-existence and liaison plan.

5.20 Responding to concerns over safety hazards from exposed cables, Ms Nimmo confirmed that this will be captured in a safety sectionunder the fisheries co-existence and liaison plan, outlining communications to the fishing industry. Ms Nimmo stated that the Applicant is committed to delivering in accordance with outline document [APP-183], and that this would be secured in accordance with the DCO.

5.21 **The prospects for the resumption of fishing within the array during the operational phase of the project:**

5.22 Ms Nimmo advised the ExA that fishing could resume in the array area, taking into account safety considerations, save for the exclusion zones. The limitation on fishing would amount to 10km2, which is 1.5% of the array area, on the basis of 1km turbine spacing. Certain activities such as fly shooting could be switched to other fishing gear that has a smaller operational width which would allow more opportunity

to fish within the array. Ms Nimmo stated that the Applicant was committed to working with the fisheries industry through the co-existence and liaison plan.

5.23 In response to an ExA question, Ms Nimmo confirmed that vessels may fish in a different manner, and that there would be a reduction in fishing activity, however, she commented that this has been assumed in the Commercial Fisheries ES Chapter [APP-066]. This assessment had concluded a minor significant effect, including in relation to curtailment of fly shooting. In response to NFFO concerns on cumulative effects, Ms Nimmo confirmed the Applicant's commitment to the coexistence and liaison plan and that this would be updated.