

Norfolk Boreas Offshore Wind Farm Applicant's Comments on Deadline 5 Submissions

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Glossary of Acronyms

AEoI	Adverse Effect on Integrity
DCO	Development Consent Order
dDCO	Draft Development Consent Order
DML	Deemed Marine Licences
dDML	Draft Deemed Marine Licence
EIA	Environmental Impact Assessment
ES	Environmental Statement
ExA	Examining Authority
HHW	Haisborough, Hammond and Winterton
HRA	Habitats Regulations Assessment
IPMP	In Principle Monitoring Plan
Kj	Kilojoules
MMO	Marine Management Organisation
MoU	Memorandum of Understanding
NE	Natural England
NSAG	Necton Substation Action Group
NSIP	Nationally Significant Infrastructure Project
OASIS	Online Access to the Index of Archaeological Investigations
OMP	Operations and Maintenance Plan
OOOMP	Outline Offshore Operations and Maintenance Plan
OWF	Offshore Wind Farm
SAC	Special Area of Conservation
SIP	Site Integrity Plan
SNCB	Statutory National Conservation Bodies
SoCG	Statement of Common Ground
SoS	Secretary of State
UK	United Kingdom
UXO	Unexploded Ordnance
WSI	Written Scheme of Investigation

1 Applicant's Comments on Deadline 5 Submissions

1. This document contains the Applicant's comments on submissions by Interested Parties at Deadline 5 of the Norfolk Boreas Examination.

1.1 Necton Substation Action Group [REP5-088]

Summary of Submission	Applicant's Comments
Landscaping Mitigation	
<p>REP5-088 makes comments regarding the substation site levelling and lowering and the use of high bunds around the onshore project substation and proposes that these would help to mitigate the LVIA effects. Generally, REP5-088 does not consider the current mitigation proposed by the Applicant to be sufficient.</p>	<p>The Applicant refers to the response to the ExA's Further Written Questions Q2.9.6.4 [REP5-045] with respect to consideration of subterranean buildings and how this was considered and discounted.</p> <p>The Applicant also refers to the Comments on Responses to the ExA's Further Written Questions Q2.9.6.4 [ExA.WQ-2.D6.V1, submitted at Deadline 6] where it has responded to the suggestion regarding site levelling and use of high bunds.</p>

1.2 Necton Substation Action Group [REP5-087]

Summary of Submission	Applicant's Comments
Statement of Common Ground request	
<p>NSAG state that the Applicant should have progressed a Statement of Common Ground (SoCG) with Necton Parish Council because SoCGs were used during the Vanguard Examination process.</p>	<p>The Applicant has submitted a number of SoCGs in relation to the Project, including with Breckland Council [REP2-039], and will continue to support an effective and timely planning process, by progressing existing SoCGs. The Applicant is not progressing SoCGs with any Parish Councils.</p> <p>A SoCG was submitted as part of the Norfolk Vanguard Examination at Deadline 1. Subsequent attempts to progress the SoCG with Necton Parish Council (PC) were unsuccessful. The PC indicated that their positions were not going to change, and they did not wish to meet with the Applicant's representatives. In view of this position, the Applicant has not progressed a SoCG with the PC.</p>

Summary of Submission	Applicant's Comments
	The Applicant engaged actively with Necton Parish Council during pre-application consultation, as evidenced in the Consultation Report [APP-027].

1.3 Necton Substation Action Group [REP5-086]

Summary of Submission	Applicant's Comments
Plane crash contamination	
NSAG acknowledge that that the Applicant and the Environment Agency have an agreed SoCG, but raise concerns regarding radiation risk at the plane crash site.	<p>As agreed in the SoCG between the Applicant and the Environment Agency [REP2-044] <i>a potential risk of radioactive material was initially highlighted, however based on the site recovery reports produced by both the RAF and RDAF there is no evidence that radioactive materials are present.</i></p> <p>Although the Applicant and the Environment Agency are in agreement that there is no evidence of radioactive material, as stated in the Applicant's Responses to the ExA's Written Questions [REP3-003], <i>there is a written scheme for the management of contamination secured through dDCO Requirement 20 which both parties agree represents appropriate control measures for the discovery of potential contamination.</i></p>

1.4 Necton Parish Council [REP5-064]

Summary of Submission	Applicant's Comments
Statement of Common Ground	
<p>Necton Parish Council raise concerns around “lack of consultation and involvement with Vattenfall through the Boreas project process before and during the Planning Inspectorate examination” and lack of Statement of Common Ground. Necton Parish Council state that they are worried that there is “no obligation for Breckland Council to consult with Necton Parish Council” and therefore feel they are missing out on voicing their opinion.</p>	<p>The Applicant engaged actively with Necton Parish Council during pre-application consultation, as evidenced in the Consultation Report [APP-027]. The Applicant continues to maintain lines of communication open with Necton Parish Council, as appropriate, and matters relating to the DCO application are discussed via the examination process. No indication prior to the submission at Deadline 5 has suggested Necton PC wishes to progress a SoCG.</p>

1.5 Tony Smedley [REP5-093]

Summary of Submission	Applicant's Comments
Sub-station buildings	
<p>REP5-093 raises concerns around the height of the buildings which are presented in Works No. 8A. It is of concern that that base levels for footings, foundations and floor levels at the onshore project substation may be higher than existing ground level. <i>‘If such base levels are higher than the existing ground levels it follows that their equipment will be higher than that stated from the existing ground level and of course more visible than predicted on photomontages, etc’</i></p>	<p>The dDCO secures the maximum height of buildings and external electrical equipment above existing ground level associated with the onshore project substation through dDCO Requirement 16(5): <i>‘Buildings comprised in Work No. 8A must not exceed a height of 19 metres above existing ground level and external electrical equipment comprised in Work No. 8A must not exceed a height of 25 metres above existing ground level’</i></p> <p>The existing ground level is also defined and secured within the dDCO through dDCO Requirement 16(8): <i>(8) For the purposes of paragraph (5) of this requirement, (a) In the event of scenario 1, ‘existing ground level’ means 73 metres above ordnance datum; and</i></p>

Summary of Submission	Applicant's Comments
	<p><i>(b) In the event of scenario 2, 'existing ground level' means 72 metres above ordnance datum.</i></p> <p>These requirements work together to limit the height of the buildings and external electrical equipment with reference to existing ground level which are defined heights above ordnance datum. These existing ground levels (defined ordnance datum heights) and maximum building and outside electrical equipment heights are the basis on which photomontages and other landscape and visual assessments have been conducted.</p> <p>For clarity, as an example on how these requirements work together to limit the maximum heights, the maximum height of the onshore project substation buildings in the event of scenario 1 is 92m above ordnance datum as derived by a secured 73m existing ground level plus a secured 19m maximum building height.</p> <p>Continuing this example with reference to a raised base level, if the base level was 1m above the secured 73m existing ground level (to 74m above ordnance datum), this would result in the buildings being required to be limited to 18m in height to comply with the maximum building height of 19m from the secured 73m existing ground level.</p> <p>Therefore, the onshore project substation buildings and outside electrical equipment maximum heights as secured in Requirement 16(5) cannot be higher than stated from the existing ground levels as secured in dDCO Requirement 16(8).</p>

1.6 Norfolk County Council [REP5-066]

Summary of Submission	Applicant's Comments
Comparison of open cut trenching and trenchless crossing of highways	
Impacts to road users	
<p><u>The applicants state</u> - Open cut trenching is temporary typically lasting less than 1 week.</p> <p><u>In response</u> - The whole point of the County Councils concern is that the B1149 is not a typical crossing. We have not objected to other "B class" roads along the cable route being crossed by open cut trenching but we do have concerns with this specific crossing. This specific proposal requires the construction of a new diversion lane as shaded pink on drawing numbers TP-PB4476-DR033 and TP-PB4476-DR036 attached to the applicants trenchless crossing clarification note. The disruption to road users for this specific proposal will be significant and last for weeks (see also our detailed comments under the heading timescale below).</p>	<p>Table 2.1 in Section 2 of the Technical Note provides a general comparison of open-cut trenching to trenchless crossing and indicated that the duration of an open cut crossing would typically be less than 1 week. The Applicant acknowledges that the B1149 crossing is not a typical crossing and considers that the open cut crossing at this location would last for a period of two weeks to accommodate the specific works required at this location, including all identified necessary traffic management measures.</p>
Working hours	
<p><u>The applicants</u> - indicate night time working may be needed for trenchless crossings but imply it will not be required with open cut trenching.</p> <p><u>In response</u> - The applicants Outline Traffic Management Plan for open cut trenching states at para 113 that "...To minimise the impact of closures or diversions, night working could be employed." Accordingly it is clear that night time working could be used for either open cut trenching or trenchless crossings in equal measure, there is no difference. The Outline Traffic Management Plan is clearly at variance with the clarification note on Trenchless Crossings, they cannot both be right. We are of the view that it is the applicants trenchless crossing clarification note that gives a false impression.</p>	<p>Working outside of normal construction hours for trenchless crossings may be required for technical reasons such as maintaining fluid pressures to minimise the risk of breakout. In such a case, this would be a technical requirement, informed by ground condition investigations and the detailed design of the trenchless crossing. The ES assesses night time working at trenchless crossings throughout and DCO Requirement 26(2)(d) [REP5-003] secures the ability to work outside the construction hours for onshore transmission works requiring trenchless installation techniques to reflect this potential technical requirement.</p> <p>In comparison, construction working outside of normal construction hours for an open cut crossing at this location under temporary traffic management (not a road closure) would not be a technical requirement, but night time working could be employed if seen as beneficial to</p>

Summary of Submission	Applicant's Comments
	<p>minimise the period of time traffic management measures were in place, as noted in the OTMP [REP5-025]. Any night time construction working for an open cut crossing method would be required to be agreed with the relevant planning authority in writing in advance as stated in DCO Requirement 26(4) [REP5-003].</p>
<p><u>The applicants</u> - State that for "technical reasons", night time working may be necessary with trenchless crossing but give no such indication for open cut trenching.</p> <p><u>In response</u> - The applicants do not provide any indication as what those "technical" reasons may be. It is equally clear from the Outline Traffic Management Plan that "technical" reasons could require night time working with both methods. The proposal for the B1149 will require a deep excavation and the provision of a new diversion lane. For these reasons, open cut trenching for this specific proposal will require traffic lights to be fully operational 24 hours per day, 7 days per week. In sharp contrast to trenchless crossing, which may or may not have a night time impact - the applicants proposal for open cut trenching to the B1149 will cause disruption throughout the entire working period both day and night. Given the status of the B1149 as a "band 4" traffic sensitive street, the traffic lights will also need to be under manual control at peak times.</p>	<p>For an open cut crossing method, traffic management measures such as traffic lights would be required 24 hours a day during the period in which the crossing is being conducted. However, active construction works, including the use of machinery would not be required outside of construction hours.</p> <p>In contrast, a trenchless crossing could require active construction works 24 hours a day for technical reasons such as to maintain fluid pressures to minimise breakout which would result in the use of plant and machinery, such as generators and drilling rigs through the night time period.</p>
Works footprint	
<p><u>The applicants indicate</u> - Additional temporary land requirements for laydown areas and facilities will be required for trenchless crossings.</p> <p><u>In response</u> - The Outline Traffic Management Plan clearly indicates at para 45 that open cut trenching also requires a running track to deliver equipment to the installation site from mobilisation areas and will also require separate storage areas for topsoil and subsoil. Open cut trenching for this specific proposal to the B1149 will not only require the road to be dug up but also requires the highway verges and adjacent hedges (together with any trees) to be dug up and removed to accommodate a diversion lane (see area shaded</p>	<p>The running track (with associated topsoil and subsoil storage areas) will be available as part of the duct installation works and therefore no additional works footprint from this running track is required to be considered specific to this crossing. However, it should be noted that the period in which the running track will be required to be retained (prior to reinstatement) would be longer for a trenchless crossing as the access would be necessary for the duration of those works (up to 6 weeks) compared to an open cut crossing (2 weeks).</p>

Summary of Submission	Applicant's Comments
<p>pink on drawing numbers TP-PB4476-DR033 and TP-PB4476-DR036 attached to the applicants clarification note).</p>	<p>With respect to the works footprint specific to the open cut crossing, temporary diversion lanes are required as part of the traffic management for open cut trenching. The worst case area of additional temporary land is 153m² (south western verge) and 150m² (north western verge), a total of 303m² [REP4-017].</p> <p>The purpose of the diversion lanes is to safely accommodate Hornsea Project Three cable drum delivery Abnormal Indivisible Loads (AILs) in the worst-case event that the two week open cut trenching programme cannot be scheduled to avoid these movements. Norfolk Boreas Project in isolation would not require the diversion lanes and a relatively small 'overrun area' would be sufficient to accommodate 'standard' traffic movements. It is therefore implicit, that the Applicant's contractor will use their best endeavours to programme works to avoid the cumulative AIL scenario.</p> <p>In comparison, the addition of a trenchless crossing requires additional temporary land to accommodate additional plant and materials specifically associated with trenchless crossing such as drill rigs and drilling mud. This temporary land requirement, as secured in Requirement 16(15) of the dDCO [REP5-003], is up to 7,500m² on the drilling side and 5,000m² on the reception side (a total of 12,500m²).</p> <p>At this specific location, no temporary works compounds have been included within the current Order limits as submitted for the DCO application. Therefore, Norfolk Vanguard, in response to the letter from the SoS has developed a bespoke design whereby, in the event the Secretary of State decides that a trenchless crossing of the B1149 is necessary, a single compound could be included within the existing order limits. This compound would be set back approximately 250m from the crossing location, rather than alongside the trenchless crossing launch and exit locations. This bespoke design only accommodates the</p>

Summary of Submission	Applicant's Comments
	<p>HDD trenchless crossing method (and no other trenchless crossing method) to minimise supporting construction compound requirements, such that the compound could be wholly contained within the current Order limits. Other trenchless crossing methods such as auger boring, pipe jacking and micro tunnelling could not practicably be employed here because additional temporary land adjacent to the launch and reception pits would be needed to support the plant and materials required to sink shallow shafts at both the launch and reception pit. At all other trenchless crossing locations flexibility is retained for all trenchless crossing methods so that the most appropriate solution can be employed following ground investigation, cable design (sizing) and detailed design of the trenchless crossing. To accommodate a HDD at this specific location would be constraining the Project design prior to detailed design and investigations being conducted. In this bespoke trenchless design, a temporary works compound of 100m x 45m (4,500m²) would be required to support the works.</p> <p>At this specific location, access to the crossing would be from the running track, via MA7 to the east which would result in additional traffic flows on The Street, Oulton and B1145, Cawston of up to 72 daily HGV movements [APP-637] each to support the specific plant and materials required for a trenchless crossing. To maintain compliance with the OTMP capped peak movements, these additional HGV movements would have to be programmed to avoid currently identified times of HGV peak movements on The Street, Oulton and the B1145, Cawston, resulting in an extension to the construction programme on this cable route section.</p> <p>In summary, the temporary land requirements of a trenchless crossing at this specific location is orders of magnitude greater than a trenched crossing (303m²), irrespective of whether a bespoke trenchless crossing is constrained to within the existing order limits (4,500m²) or applying</p>

Summary of Submission	Applicant's Comments
	the standard trenchless approach as detailed within the Project Description (12,500m ²).
Timescale	
<p><u>The applicants state</u> - Open cut trenching is typically likely to be completed in days, but trenchless crossing will take up to 6 weeks as there is a requirement to "...conduct the crossing, allowing for setup of temporary areas and additional equipment, period of drilling and subsequent demobilisation and removal of equipment and materials".</p> <p><u>In response</u> - The whole point of the County Councils concern is that this is not a typical crossing. We have not objected to other "-class" B roads along the cable route being crossed by open cut trenching but we do have concerns with the specific proposal to the B1149.</p> <p>This specific proposal requires:-</p> <ul style="list-style-type: none"> • Installation of traffic lights • Creation of storage areas for the materials excavated from the verges to be kept. • Excavation and removal of the existing verges and hedges. • Construction of a new diversion lane over the former verge - including the importation of raw materials. • New road marking to be painted on the carriageway surface • Saw cut and remove one side of the existing carriageway - with removal of materials from site. • Import new granular back-fill material to infill the excavation. • Reinstate the original road. • Remove and dispose of the temporary running surface material from the diversion lane • Relocate the traffic signals and signs. 	<p>The Applicant considers that the open cut crossing timescales at this location would be over a period of two weeks to accommodate the specific works required, including all identified necessary traffic management measures.</p> <p>The Trenchless Crossing clarification note submitted at Deadline 4 [REP4-017] sets out the following traffic analysis.</p> <p>The principal guidance for temporary traffic management situations in the UK is Chapter 8 of the Traffic Signs Manual (Department for Transport, 20091) ('Chapter 1 Department for Transport, 2009. Traffic and Signs Manual, Chapter 8.</p> <p>Chapter 8 gives detailed specification for roadworks for a wide range of traffic situations.</p> <p>Open cut trenching for the Project would be carried out by closing a lane of the carriageway and providing traffic signal control to safely introduce single file traffic (known as 'one-way working'). Paragraph D5.1.6 of Chapter 8 details the maximum vehicle flows at which significant delays would be experienced by traffic subjected to one-way working as follows: <i>"On roads where flows are very high, overload of the controlled area is possible and exceptional delays may result. This can occur with two-way flows as low as 1,300 vehicles per hour"</i></p> <p>The B1149 peak hourly traffic flows (Norfolk Boreas cumulative Hornsea Project Three plus baseline traffic) are forecast in the order of 900 movements, substantially below the Chapter 8 thresholds. It is therefore evidenced, that there will not be a significant Driver Delay impact as a result of open cut trenching.</p>

Summary of Submission	Applicant's Comments
<ul style="list-style-type: none"> Repeat the whole process all over again on the opposite side of the road. Reinstate the verges and plant new hedges. Demobilisation <p>The disruption to road users will be significant and last for weeks</p>	
Materials and Transport	
<p><u>The applicants state</u> - Negligible additional materials will be required for open cut trenching compared to trenchless crossing in agricultural land, with exception to some minor traffic management and resurfacing materials, however this is offset by no running track material requirements.</p> <p><u>In response</u> - this proposal does not simply involve negligible resurfacing of the existing road but:-</p> <ul style="list-style-type: none"> Requires the highway verges and adjacent hedges and part of the field to be dug up and removed to accommodate a diversion lane. (see area shaded pink on drawing numbers TP-PB4476-DR033 and TP-PB4476-DR036 attached to the applicants clarification note). Importing new raw materials to construct the diversion lane. Importation of granular back-fill for the deep excavation. The Outline Traffic Management Plan clearly indicates at para 45 that open cut trenching would require a running track to deliver equipment to the installation site from mobilisation areas and will require separate storage areas for topsoil and subsoil. 	<p>The running track (with associated topsoil and subsoil storage areas) will be available as part of the duct installation works and therefore no additional works footprint from this running track is required to be considered specific to this crossing.</p> <p>The worst case area for the diversion lanes for an open cut crossing is 153m² (south western verge) and 150m² (north western verge), a total of 303m² [REP4-017]. This is in comparison to the temporary works areas of up to 12,500m² required for a standard trenchless crossing or 4,500m² for a bespoke trenchless crossing at this location, constrained to the existing Order Limits. Therefore, it is evident that there would be a far greater demand for materials for a trenchless crossing than for an open cut crossing.</p>
<p><u>The applicants state</u> - state that approximately 8 HGV deliveries will be required per notional 15m highways open cut trenched crossing.</p> <p><u>In response</u> - The applicants do not give a total number of movements or the calculation of how many m2 of excavation there will be, but simply say 8 movements per 15m2 of excavation. One thing is clear, there will be a lot more than 15m2 of excavation to construct the new diversion lanes and a lot more than 8 movements.</p>	<p>The worst case area for the diversion lanes for an open cut crossing is 153m² (south western verge) and 150m² (north western verge), a total of 303m² [REP4-017]. The depth of diversion lane road will be in the order of 0.42m as informed by the NCC laboratory report.</p> <p>As a result, a scheme total in the order of 38 HGV deliveries would be required to construct and remove the diversion lanes including excavating, backfilling</p>

Summary of Submission	Applicant's Comments
	<p>and providing new pavement materials for the two 1m x 1m x 15m trenches. The 38 HGV deliveries includes a 20% contingency for miscellaneous items.</p> <p>The diversion lane construction traffic demand had not previously been calculated as the full details of the traffic management design was being finalised. The traffic deliveries have been calculated in accordance with the agreed geometric parameters and outputs from Norfolk Laboratories.</p> <p>Open cut crossing HGV deliveries would therefore be in the order of 10-20% of the trenchless crossing HGV requirements at this specific location.</p>
<p><u>The applicants state</u> - With reference to Appendix 24.20 [APP-635], worst case additional deliveries of 450 HGVs per trenchless crossing.</p> <p><u>In response</u> - This is not a typical crossing and it is very clear the applicants have not taken into account the movements associated with the construction of the new diversion lane attributable to this specific proposal and the calculations to show how the 450 movements have been derived are not substantive.</p>	<p>450 HGV deliveries for a standard trenchless crossing are derived as a result of the required additional temporary works areas (12,500m² to be 50% aggregated to a depth of 0.3m), excavated material from the drill arisings, drill rig, water supplies, geotextiles, fencing and mobilisation/demobilisation of the temporary works areas as detailed in Appendix 24.20 [APP-635]. A bespoke trenchless crossing at this location which is constrained to the existing Order Limits would require in the order of 220 HGV deliveries, reflecting the reduced compound requirements compared to the standard trenchless crossing.</p> <p>The quantity of HGV deliveries associated with a trenchless crossing at this location is therefore orders of magnitude greater than an open cut crossing.</p>
Equipment / Plant and associated noise levels	
<p>The assessment of noise falls outside our remit and accordingly it is not an issue for the Highway Authority to assess. However we would like to make the following comments:-</p> <ul style="list-style-type: none"> As with working hours mentioned above - the applicants Outline Traffic Management Plan for open cut trenching states at para 113 that "To minimise the impact of closures or diversions, night working could be employed. Accordingly it is clear that night time working could be used for either open cut trenching or trenchless crossings, there is no difference. 	<p>For an open cut crossing method, traffic management measures such as traffic lights would be required 24 hours a day during the period in which the crossing is being conducted. However, active construction works, including the use of machinery would not be required outside of construction hours.</p> <p>In contrast, a trenchless crossing could require active construction works 24 hours a day for technical reasons such as to maintain fluid pressures to minimise breakout which would result in the use of plant and machinery, such as generators and drilling rigs through the night time period.</p>

Summary of Submission	Applicant's Comments
<ul style="list-style-type: none"> • In contrast, open cut trenching at this specific location will require traffic signals 24 hours per day, 7 days per week with vehicles stopping and starting at the traffic signals together with associated noise. <p>In summary, we are having difficulty reconciling the applicants claim that their proposal for open cut trenching is based on a "...thorough investigation and assessments relating to environmental considerations" as claimed within their clarification note.</p> <p>In addition, we do not understand the applicants statement within their EIA that they will use "...trenchless crossing techniques at key sensitive environmental features, including but not limited to; waterways, protected wildlife sites, woodlands, long distance cycle route/footpaths, and major transport corridors to avoid significant environmental disturbance" and yet they are now saying that trenchless crossing (rather than open cut trenching) would actually cause significant environmental disturbance!</p>	<p>The Applicant has considered the application of trenchless crossing techniques where factual evidence has identified a significant impact (in EIA terms) to a feature. The commitment to a trenchless crossing method is made on balance of the respective impacts of open cut crossing methods, noting that trenchless methods allow mitigation of direct impacts to the features being crossed, but result in different impacts associated with the technical requirements of the method such as additional plant, materials, temporary land requirements and timescales.</p> <p>For example, the crossing of the A1067 was added as a committed trenchless method to the DCO [REP5-003] in consultation with NCC following updated traffic counts (post Norfolk Distributor Road completion) which factually evidenced that the impacts of an open cut method would be significantly adverse on road users. The assessment of the trenchless method at the A1067 illustrated that, on balance, the associated impacts of the trenchless method did not outweigh its benefits to mitigate the factually evidenced significant adverse impact to road users.</p>
<p>Considerations for the Proposed Open Cut Method at the B1149</p>	
<p>Road Network Disruption Review</p>	
<p>We agree with the applicants that "...open cut trenching for the B1149 project would need to be carried out by closing a lane of the carriageway and providing traffic signal control to safely introduce single file traffic (known as 'one-way working').</p>	<p>The Applicant agrees that traffic management measures can be appropriately employed to allow open cut trenching methods at this location.</p>
<p>Network Disruption Conclusion</p>	
<p>We disagree with the applicants claim that these works are capable of being undertaken outside of the periods of 7:30am to 9am and 4pm to 7pm with the road being open to two-way traffic thereafter. Department for Transport</p>	<p>The Applicant agrees that temporary disruption to road users would occur for a short period of time, approximately 2 weeks. However, the traffic flow data and road network disruption review provide the agreed</p>

Summary of Submission	Applicant's Comments
<p>Chapter 8 states that if it is not possible to maintain adequate sideways clearance for 2 way traffic to be facilitated, then the carriageway must be reduced to single carriageway width and traffic management deployed. Given the use of the B1149 by HGV's; PSV's etc, the width required is 6.75m to maintain 2 way traffic. The width cannot be maintained and accordingly traffic lights will be required throughout the entire working period, both day and night. Irrespective of the above, this project involves a deep excavation and the construction of a new diversion lane. The scale and nature of the works is such that it would not be feasible to open the road to two way running during construction. This proposal will require traffic lights to be fully operational 24 hours per day, 7 days per week. Even if it were possible for the applicants to open the road to two way running each day (which it isn't) it would simply extend the timescale and cause additional disruption to highway use for a longer period. The disruption will already last weeks and not days as indicated by the applicants. Given the status of the road as a "band 4" traffic sensitive street, the traffic lights will need to be under manual control at peak times.</p>	<p>factual evidence that suitable traffic management measures can be employed in accordance with Chapter 8, without significant impacts on Driver Delay, to allow the open cut trenching method.</p> <p>The requirement for manual control of signals is noted and accepted good practice. Notwithstanding, it is the Applicant's understanding that the traffic sensitive designation is related to standard axel (HGV) volume, rather than total volume of traffic. As evidenced in the Trenchless Crossing clarification note [REP-017], the total volumes of traffic can be accommodated in one-way traffic working without causing significant delays to drivers.</p>
<p>Long-Term Maintenance Liability Review</p>	
<p>The issue of long term maintenance liability remains a concern, particularly given the potential for other future large scale projects and their associated HGV load movements. Rural road structure can vary greatly and with an increasing volume of base level traffic, notwithstanding the additional loading from these HGV movements. Any weakening of the surface construction derived from breaking open the bound and subgrade layers will greatly increase the risk of carriageway failure in years to come when it has reverted to local authority responsibility.</p>	<p>The Applicant has addressed this NCC concern through instructing the NCC highways laboratory to conduct core samples of the B1149 at this specific location and detailing the necessary construction specification to mitigate this risk so far as possible. This investigation is set out in more detail in the Trenchless Crossing clarification note [REP-017] which concludes "Based on the findings of the laboratory tests and the recommended reinstatement specification, it is concluded that adverse maintenance liability can be mitigated and therefore open cut trenching remains an appropriate method."</p>
<p>Cumulative Traffic Management</p>	

Summary of Submission	Applicant's Comments
<p>The County Council agrees the proposed diversion lane is technically feasible, but the solution offered for the B1149 is not a typical open cut trench and the applicants claim under their heading of timescale that this can all be provided and completed in days is not realistic. The scale and nature of the works is such that this proposal will require traffic lights to be fully operational 24 hours per day, 7 days per week. In addition, the disruption will last weeks and not days as indicated by the applicants. Given the status of the road as a “band 4” traffic sensitive street, the traffic lights will need to be under manual control at peak times.</p>	<p>The Applicant agrees that the traffic management measures remain appropriate for open cut trenching methods when considering cumulative traffic movements.</p>
<p>Conclusions</p>	
<p>We do not agree with the applicants conclusions.</p> <p>The County Council is of the opinion that an open cut method of duct installation at this specific point on the B1149, whilst not impossible, is impractical. We still wish to see a trenchless method used similar to that at other points on this cable route.</p> <p>The road width and scale of the works is such that traffic signal control would be necessary 24 hours per day, 7 days per week. This would need manual control consideration at peak traffic times due to the roads' Traffic Sensitive designation (Band 4 0730 – 0900 and 1600 – 1900). The crossing point whilst having reasonable forward visibility would benefit from additional signage to alert approaching traffic particularly from the north approach. This traffic management would need to be in place for the full duration of the crossing works on a 24/7 basis. Trenchless methods require no carriageway incursion of works or traffic management.</p> <p>To enable an open cut method would require extensive temporary carriageway widening to give adequate sideways clearance to permit through traffic whilst the road was crossed half at a time. This widening would involve the removal of mature hedgerow, and the construction of a suitable running lane in virgin verge. The nature of the verge and traffic levels at this point requires a full depth construction to enable adequate lateral restraint. We</p>	<p>The Applicant agrees that traffic management measures would need to be in place for the duration of the crossing works on a 24/7 basis (such as temporary signage and traffic lights), however active construction works are not required on a 24/7 basis for an open cut crossing. Construction works could however be considered outside of construction working hours, in agreement with the local authority as required by dDCO Requirement 26(4), if beneficial to minimise the timescale of the traffic management during an open cut crossing method.</p> <p>The Applicant agrees that trenchless crossing methods require no carriageway incursion of works or traffic management, assuming that access for the trenchless crossing is taken from the running track via the mobilisation areas (not directly off the B1149). At this specific location, access would be from the running track, via MA7 to the east and MA6 to the west, which would result in additional traffic flows on The Street, Oulton and B1145, Cawston of up to 72 daily HGV movements [APP-637] each to support the specific plant and materials required for a trenchless crossing. Furthermore, trenchless crossing methods do require additional temporary land, additional plant, additional materials (and</p>

Summary of Submission	Applicant's Comments
<p>fully understand that Norfolk County Councils laboratory has provided a suitable construction specification. Construction would involve the importation of much aggregate and bituminous bound material to a rural environment, only for it to be removed again once the crossing was completed. This is not environmentally sound practice and goes against the applicants very reasons (environmental) for using this crossing methodology.</p> <p>The issue of long term maintenance liability is also a concern, particularly given the potential for other future large scale projects and their associated HGV load movements. Rural road structure can vary greatly, and with an increasing volume of base level traffic, notwithstanding the additional loading from these HGV movements any weakening of the surface construction derived from breaking open the bound and subgrade layers will greatly increase the risk of carriageway failure in years to come when it has reverted to local authority responsibility.</p> <p>We remain firmly of the view that trenchless crossing methods need to be employed for this crossing.</p> <p>We have not undertaken any assessment in relation to the acceptability of removing the hedgerow and/or trees as required for the construction of the proposed diversion lane as this falls outside our remit and rests with Broadland District Council.</p>	<p>associated HGV traffic to deliver those materials) and additional timescale compared to an open cut method.</p> <p>The Applicant agrees that a suitable construction specification for an open cut crossing reinstatement has been provided by NCC laboratory.</p> <p>A trenchless crossing would require the importation of significantly greater quantities of materials to establish the temporary works areas of up to 12,500m² [REP5-003] for a standard trenchless crossing or 4,500m² for a bespoke trenchless crossing constrained to the Order Limits at this specific location, in comparison to 303m² [REP4-017] for an open cut crossing (temporary road widening). These materials would need to be removed once the crossing is complete under either crossing method. The comparative quantum of materials to establish and then remove these temporary works areas illustrates that on balance, an open cut method is a considerably more efficient solution in this regard with 10-20% of the trenchless crossing HGV requirements at this specific location.</p> <p>The Applicant has addressed the NCC concern regarding long term maintenance liability through instructing the NCC highways laboratory to conduct an intrusive site investigation of the B1149 at this specific location and detailing the necessary construction specification to mitigate this risk so far as practicable.</p> <p>The Applicant has responded to all concerns raised by NCC in regard to the feasibility of an open cut trench of the B1149 at this specific location. This has included the design of the traffic management measures and a site investigation by the NCC laboratory to inform the necessary reinstatement construction method. Through these works it is agreed by both parties that an open cut trenching method is feasible, including consideration for cumulative traffic flows.</p> <p>On the basis that an open cut crossing method with appropriate traffic management is feasible, then the further consideration of a trenchless</p>

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crossing technique is only to explore if, on balance, it is beneficial with respect to mitigating overall impacts. From a comparison of impacts, the Applicant has illustrated [REP4-017] that on balance, a trenchless crossing at this location would result in additional temporary land requirements, additional plant/material requirements with associated additional HGV deliveries on The Street, Oulton and on the B1145, Cawston and additional timescale requirements which in turn result in an overall greater environmental impact than the use of an open cut crossing method at this location.

Finally, it is noted that NCC have recently suggested a direct access off the B1149 onto the cable corridor to potentially facilitate a Cawston Alternative Access would now be acceptable. NCC have stated [REP5-054] that these alternative access routes *“Involve a temporary access from the B1149 adjacent to the Applicant’s cable crossing, which in turn links to a haul road. These options were previously dismissed by the County Council due to traffic management concerns. Our previous concerns have now been addressed by the Applicant as part of their assessment for traffic management at this same location relating to open cut trenching (albeit unrelated issues for open cut trenching remain). The resolution of the team was that as a direct result of further detailed work undertaken by the Applicant relating to traffic management for trenchless crossings at the same location, introducing traffic management at this location for a haul road would now be acceptable on highway grounds.”*

NCC’s current position can be interpreted as contradictory; effectively advocating an access with associated traffic management and environmental impact in the same location that the lesser impacts of an open cut trench are objected to.

1.7 Patricia Lockwood [REP5-092]

Summary of Submission	Applicant's Comments
Substation at Necton	
<p>REP5-092 made a request for the minutes for the Expert Topic Group (ETG) of a meeting with representatives from local authorities about large bunds and the onshore project substation design.</p>	<p>The Applicant understands the Planning Inspectorate is directly responding to this request.</p>
<p>REP5-092 raises concern around the LVIA effects of the onshore sub-station, stating that the tree planting schemes are inadequate and that large earth bunding would be more sufficient.</p>	<p>The proposed tree planning schemes around the substation can be seen in figures 6.2.29.9 and 6.2.29.19 of the ES. Chapter 29 of the ES, Landscape and Visual Impact Assessment, provides further detail of the tree planting scheme. Furthermore, Requirement 18 of the dDCO ensures that prior to construction, a Landscape and Management scheme for each stage of the development would be produced to ensure that all proposed hard and soft landscaping works are in accordance with the relevant recommendations of appropriate British Standards or other recognised codes of good practice. The specific standards will be agreed with all relevant planning authorities in consultation with Natural England prior to commencement.</p>
<p>REP5-092 states that some sound monitoring locations have been missed when doing short-term sound monitoring of the substation.</p>	<p>The Applicant refers to comments in Table 1.8 of this document (in response to [REP5-091]) where a response is provided regarding concerns raised about the baseline noise survey.</p>
Human Health and Socio-economics	
<p>REP5-092 raises concerns regarding human health.</p>	<p>ES Chapter 27 Human Health (APP-240) provides an assessment which follows best practice guidance (Cave et al., 2017a), in considering health effects with regard to the general population and vulnerable population groups.</p>

Summary of Submission	Applicant's Comments

1.8 Colin King [REP5-091]

Summary of Submission	Applicant's Comments
Noise	
<p>REP5-091 has raised concerns with regards to the baseline noise survey.</p>	<p>To provide a conservative assessment in the Norfolk Boreas ES Chapter 25 Noise and Vibration [APP-238], all operational phase impacts considered the cumulative condition relating to Norfolk Boreas and Norfolk Vanguard being granted consent and fully operational against the prevailing baseline soundscape i.e. with Dudgeon operational during the survey.</p> <p>Paragraph 109 of the ES Chapter 25 [APP-238] states: <i>“During consultation (at ETG meetings for Norfolk Vanguard Limited in 2017) with the Environmental Health Officer at Breckland Council, it was identified that there would be a requirement for noise emissions from the onshore project substation installation to comply with the following conditions to ensure that operational noise does not exceed the permitted noise levels of the existing Dudgeon Offshore Wind Farm substation:</i></p> <ul style="list-style-type: none"> • The noise rating level (defined as set out in BS 4142) from the operation of the substation shall not exceed 35 dB LAeq, (5 minutes) at any time at a free field location immediately adjacent to any noise sensitive location; and • Noise from the operation of the substation shall not exceed a limit value of 32 dB LLeq (15 minutes) in the 100 Hz third octave band, at any time at a free field location immediately adjacent to any noise sensitive location.”

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	<p>Paragraph 110 provides additional context: <i>“These limits as agreed would apply to Norfolk Boreas and any cumulative onshore electrical infrastructure.”</i></p> <p>These conditions are applied to the existing Dudgeon scheme at Necton and have been taken forward through agreement with stakeholders as suitable to form the basis of DCO requirements for Norfolk Boreas independently, and cumulatively with Norfolk Vanguard.</p> <p>The baseline survey undertaken for Norfolk Boreas is detailed in ES Appendix 25.1 Baseline Noise Survey Environmental [APP-657], states: <i>“In order to characterise the existing noise climate within the Norfolk Boreas study area a baseline noise survey was undertaken at agreed sensitive receptor locations in the vicinity of the site and across the onshore project area (shown on Figure 25.1.1) between 27th April and 24th May 2017.”</i></p> <p>Survey locations across the study area (landfall, cable corridor and onshore substation) were agreed with local authorities as part of the Expert Topic Group (ETG) meetings and form part of the Evidence Plan Process (EPP). ES Appendix 25.1 [APP-657], Section 2.3 details the survey approach specific to the Onshore Project Substation/National Grid Substation Extension.</p> <ul style="list-style-type: none"> • Table 2.14 Baseline noise data – SSR1 (Long Term 24hrs) – 23/05/2017 to 24/05/2017, duration 24hrs; • Table 2.15 Baseline noise data – SSR2 (Long Term) – 28/04/2017 to 05/05/2017, duration up to 7 days; • Table 2.16 Baseline noise data – SSR7 (Long Term) – 03/05/2017 to 10/05/2017, duration up to 7 days;

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The measured sound levels for SSR2 (representative of Ivy Todd Farm) shows that the measurement survey started on 28/04/2017 and continued through until 05/05/2017 covering the reference daytime (07:00 to 23:00) and night time (23:00 to 07:00) periods. The survey was undertaken in accordance with BS7445:2003 and BS4142:2014.

Post survey, statistical analysis of the night time measurement data determined 97.3% of the possible measurement period samples were obtained in accordance with Clause 6.4 of BS4142:2014 (wind speeds <5m/s and no precipitation). The representative background sound level at receptor SSR2 was determined from this dataset in accordance with Clause 8 BS4142:2014. Section 8.1.4 of BS4142:2014 states: *"A representative level should account for the range of background sound levels and should not automatically be assumed to be either the minimum or modal value."*

The repeatable representative background sound level of 28.4dBA was selected as appropriate for receptor SSR2. The statistical analysis showed a good correlation between the modal value (≥ 29 to ≤ 30 dBA $L_{90,15mins}$) and the slightly lower arithmetic average of 28.4dBA.

Access to all proposed measurement locations was not granted during the consultation period, specifically receptor SSR4 and SSR10 referred to in the comments. Short term attended measurements were taken during the reference daytime and night time period. This approach was subsequently presented during the ETG meetings and agreed as being representative of each receptor, forming the basis for assessment reported in the PEIR and ES.

It is considered that the comment requesting a 12 month baseline measurement period is unrealistic and unnecessary. Section 8.1 of BS4142:2014 states:

"In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that

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	<p> <i>values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods."</i> </p> <p> Additionally, Section 8.1.4 of BS4142:2014 states: <i>"The monitoring duration should reflect the range of background sound levels for the period being assessed. In practice, there is no "single" background sound level as this is a fluctuating parameter. However, the background sound level used for the assessment should be representative of the period being assessed."</i> </p> <p> The survey dataset was presented at the subsequent ETG meetings and agreed as being representative of each receptor, forming the basis for assessment reported in the PEIR and ES. </p> <p> The assessment of Norfolk Boreas and cumulatively with Norfolk Vanguard operational noise is demonstrated in Section 25.8.6 of the ES Chapter 25 [APP-238]. Where potential impacts were identified in accordance with the assessment methodology of BS4142:2014, site specific mitigation measures were detailed in Section 25.8.6.2 of the ES Chapter 25. Following mitigation, compliance was demonstrated in the ES Chapter 25 with the Breckland Council recommended cumulative planning conditions (taken forward as Norfolk Boreas DCO requirements). </p> <p> The DCO Requirement 16 commits the Applicant to undertake an operational compliance survey as per the requirement for the existing Dudgeon Scheme at Necton. During the detailed design stage, the Applicant is required to demonstrate compliance with the DCO requirements as agreed with stakeholders. The assessment would be based on final detailed design of the onshore substation infrastructure and in accordance with BS4142:2014+A1:2019 (or any subsequent amendments), before commencement of the construction phase. </p>

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	<p>Mitigation measures would be identified and incorporated into the final design taking into account the prevailing background noise level in order to assess compliance with the DCO requirement.</p> <p>The existing Dudgeon condition (and proposed Norfolk Boreas/Norfolk Vanguard DCO requirement) is not based on a receptor by receptor basis. The predicted noise levels reported in the ES Chapter 25 at each receptor for the Norfolk Boreas scheme and cumulatively with the Norfolk Vanguard scheme (with mitigation), demonstrate compliance at each receptor with the proposed requirements and no impact at identified receptor locations in accordance with BS 4142:2014 derived impact magnitudes.</p>
Landscape and Visual Effects	
<p>REP5-091 has stated that generating photo montages have caused some uncertainty. REP5-091 states that the use of Adobe Photoshop has left “uncertainty with regard to how the infrastructure image was created to accurate scale dimensions, and how it was positioned correctly within the montage, especially with regard to height.”</p> <p>REP5-091 also requests “Could the applicant give a +/- M. of accuracy with regard to their method of producing the visualisations, with the three software packages mentioned, and after verification by their described method.”</p>	<p>All visualisations are produced to SNH guidelines as set out in ‘Visual Representation of Wind Farms Version 2.2’ (February 2017). Great care has been taken to conform to these standards to ensure the visualisations are as accurate as possible. Visualisations form an important part of the assessment and while their accuracy in respect of the standards can be verified, their limitations are formally recognised in guidance and in respect of this, their role in the assessment process is clearly set out.</p> <p>On page 22, the SNH guidelines state;</p> <p>“Visualisations, whether they are hand drawn sketches, photographs or photomontages can <u>never</u> exactly match what is experienced in reality. They should, however, provide a representation of the proposal that is accurate enough for the potential impacts to be fully understood.” And goes on to add, “...it is important to stress that visualisations represent just <u>one source of information</u> that informs a LVIA.” (Emphasis as presented in SNH’s document).</p>

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	<p>On pages 8 and 9, the SNH guidelines identify DTM Terrain 5 as an accepted format and adequate for the purposes of LVIA, highlighting its appropriateness if working with Ordnance Survey data. It highlights the 'recommended preference' for using Terrain 5 over Terrain 50 whilst also recognising the limitations of Terrain 5. Ordnance Survey has measured OS Terrain 5 against GPS point readings in a range of sample areas to provide a root mean square error (RMSE) value for the height points in each geographic area. For rural areas they have calculated this to be 2.5 +/- RMSE.</p> <p>Terrain 5 DTM is a data source purchased from Ordnance Survey, not a software package. We cannot rectify any inaccuracies inherent in this data.</p> <p>If there are any inaccuracies in the Terrain 5 DTM, these will have a singular and not a multiple effect in the process. This would occur when we use this data to construct the existing landform for the model.</p> <p>Any inaccuracies that do occur in Terrain 5 DTM will not affect the height of the substation as shown in the models or the photomontages. This is because the existing landform is not used as the base for the substation, but instead a new flat floor plain for construction is applied, which replaces the Terrain 5 DTM over that area.</p> <p>Any inaccuracies may, however, become apparent in the models or photomontages in relation to the landform context around the substation. This is because the landform model is incorporated into the photograph in Adobe Photoshop. This may have the effect of inaccuracies in the landform showing up, which may very marginally increase or decrease the extent to which the substation is visible.</p> <p>Visual Nature Studio and Adobe Photoshop are software packages, and therefore are not subject to a degree of accuracy or error. The accuracy of what is produced using these packages relies on the accuracy of the</p>

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	<p>data that is inputted. The main source of any inaccuracies, therefore, relate principally to the Terrain 5 DTM, as described above.</p> <p>In terms of production of the photomontages, verification is an ongoing part of the process. We take the 360 degree panoramic photographs on site at each viewpoint, recording the GPS reading for the camera tripod position. This GPS position is then verified back at the office using Ordnance survey maps and high resolution aerial imagery. We build our 3D model of the proposed substation and infrastructure using Visual Nature Studio software. For this we use OS Terrain 5 DTM data to model the existing landform together with the high resolution aerial imagery draped over the landform to help show some landscape context such as field boundaries and hedgerows. The viewpoint locations are entered into the 3D model so that we can replicate the same view in the 3D model as that taken by the camera in the real world. To help scale our model correctly to the existing photography, we use the landform horizon line and the topographic context shown in the aerial imagery draped on the landform, in conjunction with landscape markers for the location of existing buildings, pylons, telephone poles, trees etc. The location of these markers are extracted from Ordnance Survey Mastermap data. Using all of these inputs in combination helps us to scale the 3D model view proportionally, without distorting the scale in any way, to the photography of the existing view, in order to achieve an accurate match. While there may be some small degree of human error involved in this process, this is significantly reduced by applying the various checks described above.</p>

1.9 Natural England [REP5-078]

	Summary of Submission	Applicant's Comments
		<p>Overall comment</p> <p>The level of precaution that Natural England requires to conclude no AEoI on the HHW SAC is unreasonable given the evidence on the actual extent of Annex I <i>Sabellaria</i> reef within the site presented by the Applicant; and on the basis of the Applicant's evidence that there is a low likelihood of Annex I reef developing in future in areas of coarse sediments identified by Natural England to such an extent that micro-siting will not be possible, or that any impact will be more than de minimis or inconsequential.</p>
1	<p>That appropriate assessment must have no lacunae and must contain complete, precise and definitive findings and conclusions capable of dispelling all reasonable scientific doubt as to the effects of the proposed works on the protected area concerned (<i>Grace and Sweetman v An Bord Pleanála</i> CJEU C-164/17)</p> <p>Paragraph 1 of REP5-078</p>	<p>The Applicant does not dispute that Natural England used the best available evidence to develop their <u>generic</u> advice on HHW SAC (Natural England Designated Sites System). However, given the precaution in the evidence on which that advice is based in a number of critical areas re-iterated below, and the additional evidence, specific to the current proposal, gathered and considered by the Applicant, and the small area potentially affected; the Applicant re-asserts that the proposal-specific evidence provided and the assessments based on that evidence, dispel all <u>reasonable scientific doubt</u> as to the effects of the proposed works, including agreed mitigation, on the habitats of HHW SAC.</p>
2	<p>Uncertainty in accurately defining the extent and distribution of Annex I reef</p> <p>Natural England doesn't disagree that there is some inherent uncertainty in the current evidence base due to the size and extent of survey effort and therefore in the degree of confidence that can be placed in the evidence. NE advice in relation to the designation of the site is based on the best available evidence. The chosen model was underpinned by extensive data collection providing the greatest possible certainty.</p> <p>Paragraphs 4 and 5 of REP5-078</p>	<p>The Applicant does not disagree that Natural England's generic advice on the designation of the site is underpinned by best available evidence. The Applicant's HRA assessment is based on some of the same evidence, and hence there is some agreement in the output of the Applicant's model with that of presented by Natural England. The Applicant's model however includes the site specific survey data collected by the Applicant which has allowed a more refined mapping process than the precautionary model which has been used by Natural England. This allows the Applicant to be confident of where the actual reef is likely to be located.</p>

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<p>3 Uncertainty in determining the spatial extent and degree of impact of fishing activities on reef within the site</p> <p>Towed (demersal) gear on Annex I <i>S. spinulosa</i> reef is a red risk interaction. Therefore, while we agree that it is difficult to determine the spatial extent [sic] bottom trawling is having on <i>Sabellaria spinulosa</i> reef, the evidence is demonstrating that there is an impact. This is also supported by the feature being downgraded to unfavourable condition – recovering in 2019 condition assessment.</p> <p>Paragraphs 6 and 7 of REP5-078</p>	<p>The 2014 MMO Risk matrix demonstrates there was a <u>risk</u> of impact incompatible with ongoing maintenance of a feature - it does not provide evidence that there <u>is an impact</u>.</p> <p>The red risk indicates that bottom trawling is known to occur within the HHW site, and where it occurs in the same location as Annex I <i>Sabellaria</i> reef, that it is very likely to damage the habitat. The purpose of the MMO assessment was to identify areas where fisheries protection measures should be considered based on risk of habitat damage. More detailed information then needs to be obtained to determine how best to protect the habitat from damage by bottom trawling activities.</p> <p>MMO 2014 states that “Management of fishing activity within an MPA will be only applied to the affected area of an MPA, rather than the entire site, if the evidence is available. This allows for the feature to be protected, whilst enabling fishing activity which does not have a significant impact to continue.” The same should apply to other marine activities.</p> <p>Both the MMO assessment of risk of damage and the 2019 and previous condition assessments are based on comparison of the distribution of types of fishing effort and the known and potential extent of Annex I habitats within the site – therefore the 2019 condition assessment does not provide <u>additional</u> support for a restoration objective over that already provided in the MMO assessment.</p>
<p>4 Vulnerability assessment is a valid approach</p> <p>Paragraphs 8-11 and 12 of REP5-078</p>	<p>The Applicant does not dispute that vulnerability assessment is the best available option for Natural England to provide generic advice on operations for large offshore sites. The Applicant highlighted that vulnerability assessment is a justified high level precautionary approach which was developed for use in situations where data on location and intensity of activities that might affect habitats is sparse, and where those activities do not have prior licensing and assessment procedures such as EIA, as is the case for fisheries management. The Applicant did not state that vulnerability assessment is <u>only</u> relevant to fisheries management.</p>

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	<p>For installation and maintenance of marine infrastructure, such as submarine cables, vulnerability assessment also appropriately indicates where more detailed proposal and location-specific consideration is needed through the relevant assessments (EIA, HRA). However, vulnerability assessment is a site-level assessment of <u>risk</u> of damage, it is not an assessment of actual or predicted impact resulting from a particular defined operation.</p> <p>Accordingly, more detailed information has been considered within the Applicant's HRA assessment, the conclusion of which is that there is no AEoI on the HHW SAC in relation to Annex I <i>Sabellaria</i> reef and sandbank habitats.</p> <p>In this respect, the Applicant referred to Natural England's 2018 Supplementary Advice on Conservation Objectives and 2019 condition assessment as well as the information available at the time of designation.</p> <p>In summary the Applicant agrees that Natural England's approach to vulnerability assessment is relevant at the overall SAC site level. However when assessing project specific impacts to discrete parts of the site assessment, a more refined assessment, such as that undertaken by the Applicant is required.</p>
<p>5 Habitats Regulations Assessments in the context of a Conservation Objective to achieve recovery</p> <p>"It is our view that until such time that it can be demonstrated beyond reasonable scientific doubt that management measures are improving the condition of the site and that any additional activities will not hinder the conservation objectives, unnecessary impacts are avoided and/or minimised to an acceptable level"</p> <p>Paragraph 12 of REP5-078</p>	<p>Because of how vulnerability assessment and the consequent recover objective are assigned, the objective will always be 'recover' until all fisheries management measures are in place within the HHW site, irrespective of whether any other activities are, or are not, affecting the features of the site. It is not proportionate to prevent all other marine activities taking place within the site until fisheries management measures have been implemented and demonstrated to be effective, where it can be demonstrated that the marine activity in question will not likely to significantly affect the habitat in question. The Applicant will avoid unnecessary impacts on Annex I habitats through an extensive number of mitigation measures and through careful routing which will minimise temporary impacts to an acceptable level and result in no permanent impacts.</p>
<p>6 Boundary of Annex I features within HHW SAC</p> <p>"If the [sediments between sandbanks] are sandy and dynamic they are considered important to/part of the Sandbank features and if stable and mixed sediment have the potential to support Annex I reef habitat. The only areas</p>	<p>The evidence on extent of Annex I habitats in the HHW SAC provided by Natural England and JNCC to MMO and Defra, which underpins the proposed Defra fisheries management measure (Annex A of App 2.3 of NE RR-099) already includes significant buffer and potentially suitable habitat areas in addition to</p>

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	<p>thought not to be providing this important 'functionality' role is where exposed oil and gas pipelines transect the site"</p> <p>Paragraph 13 of REP5-078</p>	<p>surveyed locations of Annex I habitat. There is no evidence to indicate that other areas of stable and mixed sediment or sandy and dynamic sediments are essential to support either the Annex I reef or sandbank habitat. The vast majority of the southern North Sea consists of such sediments. Effectively assuming the whole site consists of protected features is not supported by the evidence.</p>
7	<p>Temporary nature of disturbance to potential Sabellaria habitat/Recoverability of Sabellaria</p> <p>Paragraph 14 of REP5-078</p>	<p>The Applicant is not aware of any direct evidence of recoverability (e.g. through post-installation monitoring) where cables have been installed through existing or established Annex I <i>S. spinulosa</i> reef. There is, however, good scientific evidence of <i>Sabellaria spinulosa</i> rapidly recolonising areas in dense aggregations after one-off disturbance events (e.g. following aggregate dredging off Hastings); and good evidence for development of <i>Sabellaria</i> reef in locations where reef had not been previously recorded (e.g. off Thanet wind farm). There is good scientific evidence that the species is very common and widely distributed. Evidence on its lifecycle indicates that it is an r-strategist (able to live in unstable or disturbed habitats with rapid reproduction under favourable conditions and high dispersal of larvae/eggs).</p> <p>Bottom trawling activity tends to result in repeated damage in the same location. There is evidence that in the southern North Sea the same area may be trawled up to 7 times per year, which would prevent successful recolonization and development of reef structures. Whereas any damage which occurred due to the current proposal would consist of one or two isolated events in any particular location, thus the <i>Sabellaria</i> would be able to recolonise any damaged areas and build reef structures.</p>
8	<p>Use of the term 'Priority' areas</p> <p>Paragraph 15 of REP5-078</p>	<p>The Applicant's use of the term 'priority' originates from Natural England's Relevant Representation [RR-099] see the Applicant's comment on Natural England's response to the ExA's Further Written Question 2.8.3.4 [ExA.FWQR.D6.V1]</p> <p>The Applicant accepts that all areas of actual Annex I reef within the HHW SAC, including those located within the EIFCA and MMO established fisheries management areas, have the same status and should be conserved. Should other</p>

Summary of Submission	Applicant's Comments
	<p>areas of Annex I reef be identified in the future, these will be considered of equal value in achieving the conservation objectives for the site. The Applicant also accepts that use of the term 'Priority' areas could be misinterpreted.</p> <p>However, the Applicant would highlight that whilst those areas brought to the Applicant's attention as 'Priority' include some areas where there is evidence of Annex I reef or that it has existed in the past, these are also large areas of seabed composed of coarse sediments where it is hypothesised that <i>Sabellaria</i> reef <u>may possibly</u> develop in the future. These areas are not currently Annex I habitat, and therefore should not have the same status as areas of confirmed Annex I <i>Sabellaria</i> reef. There is evidence that <i>Sabellaria</i> as a species has a preference for such seabed types, but no scientific evidence that Annex I reef (i.e. substantial structures) will develop in the possible future absence of bottom trawling, <u>if</u> the proposed Defra offshore fisheries management measure is implemented as proposed.</p> <p>The Applicant has committed to avoiding all areas of confirmed Annex I <i>Sabellaria</i> reef, where possible, within the cable corridor by conducting seabed survey prior to installation and micro-siting to avoid damaging such areas. Given it is not possible to be absolutely certain what the extent of <i>S.spinulosa</i> may be in the future, the Applicant has included in the mitigation to avoid reef "where possible". This is considered appropriate given the Applicant's confidence in the ability to micro-site on the basis of currently known information (which is supported by evidence); the very low possibility of this changing prior to cable installation to an extent that micro-siting is no longer possible; and the significant package of mitigation measures proposed which will ensure that any residual impacts on reef will be inconsequential or <i>de minimis</i>, and will not hamper achievement of the restore objective for the HHW SAC.</p>

1.10 Natural England [REP5-079]

Summary of Submission	Applicant's Comments
Updated Onshore Ecology Advise	
Table 2 Item 1 - Natural England welcome that the screening matrices will be updated to reflect the wording in the OLEMS. Issue may be considered resolved once documents are updated.	The Applicant has submitted updated Screening Matrices with updated wording at Deadline 6.
Table 2 Item 10 - Natural England note that the number of hedgerows included is the most up to date number based on using trenchless techniques at Witton Plantation.	Noted.

1.11 Natural England [REP5-080]

- The Applicant has reviewed Natural England's updated Risk and issues log and has reflected Natural England's updated positions within the SoCG which has been submitted at Deadline 6.
- Please note that Natural England have not engaged directly on the SoCG and therefore it represents the Applicant's interpretation of Natural England's position on various matters.

1.12 Natural England [REP5-081]

Summary of Submission	Applicant's Comments
Advice on Applicant's Clarification Note on Optimising Cable Routing through the HHW SAC [REP4-022]	
Use of the term 'Priority' Areas: Please note that Annex I Reef(s) within fisheries management areas are not considered to be any more important than any other areas of Annex I reef within the SAC. The fisheries management measures are proposed to be located in areas where Annex I reef has been recorded with sufficient confidence. Should other areas of Annex I reef be identified in future these will be of equal value in achieving	The term priority areas was taken from Natural England's Relevant Representation [RR-099] <i>"This is because this area has been selected as one of two top priority sites for management of reef due to the good evidence base and likelihood for reef to recover"</i> .

Summary of Submission	Applicant's Comments
<p>the conservation objectives for the site Therefore, we disagree with the practice of referring to some areas of Reef as 'Priority Areas", because all areas of Reef within the SAC have the same status and should be conserved.</p>	<p>The Applicant will endeavour to provide further context in future documents to explain Natural England's definition of these areas. The Applicant has committed to placing no cable protection within these areas as Natural England has identified these areas as having the highest confidence for Annex I reef recovery. The Applicant has a commitment to microsite to avoid all Annex I reef where possible.</p>
<p>Please be advised that the larger reef area identified for fisheries management straddles the cable corridor even at 4.7km wide. Therefore NE's advice in relation to hindering the aims and objectives of the fisheries management measures remain unchanged [RR-099].</p>	<p>The Clarification Note focused on the section of the offshore cable corridor which would interact with the EFICA fisheries byelaw area as this area contains a number of different constraints and not just areas to be managed as <i>S.spinulosa</i> reef.</p> <p>The larger area, to which Natural England refer does span the entire cable corridor however at this location the corridor is much wider therefore, although it may not be possible to route cables to completely avoid the area to be managed as <i>S.spinulosa</i> reef there is greater space here in which to microsite around other constraints, such as those of archaeological interest.</p> <p>The Applicant dispute the assertion that <i>S.spinulosa</i> reef could have extended across the entire 4.7km for a number of reasons:</p> <ul style="list-style-type: none"> • <i>S.spinulosa</i> reef would not normally grow to this extent and a 4.7km stretch of continuous reef would be exceptional¹; • There is much uncertainty over the timeline for the implementation of the Defra proposed fisheries management closure (as discussed in the Applicant's Haisborough Hammond

¹ Examples of where the size of reef have been described in Hendrik & Foster-Smith (2006) include: the reef described by Linke (1951) which was 6-8m wide, 40-60cm high and 60m long on the island of Norderney; and also an aggregation at the mouth of the Wash described from underwater video as protruding up to 60cm above the surrounding seabed and extending more or less continuously for hundreds of metres (Foster-Smith & White, 2001). Reference is made to possible larger reefs indicated by geophysical data, however these were not ground truthed with video or grab sample data. Pearce (2017) calculated that the total extent of reefs in Thanet OWF area, which had increased following construction, was between 0.48 and 2.91 km² over the entire site. This was not continuous reef and consisted of several areas of reef.

Summary of Submission	Applicant's Comments
	<p>and Winterton Special Area of Conservation Position Paper [REP5-058]; and</p> <ul style="list-style-type: none"> The Applicant also does not believe that the closure would result in a significant reduction in fishing pressure and therefore a significant increase in the extent of <i>S.spinulosa</i> reef within this area (this is also further discussed in the Applicants HHW SAC position paper). <p>Furthermore should Annex I <i>S.spinulosa</i> reef have extended across the full width of the cable route the small scale and temporary impacts of routing cables through this area would be de minimis (further information is provided in the Applicant's HHW SAC position paper).</p>
<p>Please be advised that proposed micro-routing to avoid Annex I reef is different mitigation to that of mitigation measures proposed to avoid lasting habitat change within the SAC from cable protection.</p>	<p>The Applicant agrees with Natural England and also drew this distinction at issue specific hearing 4 and the corresponding Written Summary (REP4-014).</p> <p>The mitigation measures put in place by the Applicant for avoiding lasting habitat loss are:</p> <ul style="list-style-type: none"> Reducing the amount of cable protection (through the use of HVDC technology and reducing the amount of cable protection deployed as a result of unburied cables from 10% to 5%); Commitment to not place cable protection in the priority areas identified by Natural England; Commitment to decommissioning of all cable protection within the SAC which has been placed as a result of inability to bury.
<p>Natural England welcomes the fact that it has been demonstrated that there is more than one micro-routing option as that will enable flexibility in determining the cable installation route. However, given the Applicant's case in relation to the ephemeral nature of <i>Sabellaria spinulosa</i> reef Natural England don't believe that there is currently sufficient certainty to be able to demonstrate that the Applicant will be able to avoid any currently unknown areas of reef at the time of construction.</p>	<p>As stated above the Applicant does not believe that there will be a significant increase in the extent of Annex I <i>S.spinulosa</i> reef between now and Norfolk Boreas' construction (as discussed in the Applicant's Haisborough Hammond and Winterton Special Area of Conservation Position Paper [REP5-058]). Therefore, although it is not possible to know the future location and extent of reef the Applicant is confident that reef avoidance will be possible. Given it is not possible to be</p>

Summary of Submission	Applicant's Comments
	<p>absolutely certain what may occur in the future, the Applicant has included the mitigation to avoid reef “where possible”. This is considered appropriate given the Applicant's confidence in the ability to microsite on the basis of currently known information (which is supported by evidence); the very low possibility of this changing prior to cable installation to an extent that micro-siting is no longer possible; and the significant package of mitigation measures proposed which will ensure that any residual impacts on reef will be inconsequential or <i>de minimis</i>, and will not hamper achievement of the restore objective for the HHW SAC.</p>
<p>Bullet point 2 – Please be advised that all Annex I reef is designated feature protected within HHW SAC. If impacts to these features can't be avoided then it will be the responsibility of the MMO as the competent authority to undertake an appropriate assessment prior to construction. As set out in Natural England's written representation [REP4-041] should an Adverse Effect on Integrity (AEoI) be identified there is the potential for considerable delays to the project. Therefore we advise that this situation is addressed at the time of consent.</p>	<p>The Applicant maintains the position that impacts to Annex I reef, can and will be avoided, especially when all the additional mitigation measures are taken into account (see the Applicant's HHW SAC position paper [REP5-057] and the Applicant's Additional information to the HHW SAC position paper [ExA.AS-2.D6.V1].</p>
<p>In the unlikely situation that there are no changes in the distribution of Sabellaria reef Natural England agrees with the Applicants conclusions out to 6nm; but does not agree within the boundaries of the MMO/Defra fisheries management area. Please see previous Natural England representations on potential for interactions with reef features</p>	<p>The Applicant does not disagree that the distribution of <i>S.spinulosa</i> reef may change, it is the overall extent which the Applicant considers unlikely to change. For further evidence on this issue please see the Applicant's HHW SAC position paper [REP5-057] and the Applicant's Additional information to the HHW SAC position paper [ExA.AS-2.D6.V1].</p>
<p>As set out in Natural England's Relevant Representation [RR-099] and [REP4-041] we do not agree that a commitment to micro-route where possible is Habitat Regulations compliant as the scale of the impact cannot be assessed.</p>	<p>The Applicant has provided a detailed response to Natural England's Relevant Representation in AS-025 and REP5-050 and to Natural England REP4-041 in the Applicant's HHW SAC position paper [REP5-057].</p>

2 References

Hendrick V.J., and Foster-Smith R.L (2007) Sabellaria spinulosa reef : a scoring system for evaluating 'reefiness' in the context of the Habitats Directive. Running Head: *Sabellaria spinulosa*: scoring Reefiness Available at:
https://www.dassh.ac.uk/dataDelivery/filestore/8/9/0/3_50fd853b85cfdfd/8903_4a9196bfd29f418.pdf

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